SESSIONAL PAPERS

VOL. XLV.—PART II.

SECOND SESSION

OF THE

THIRTEENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO

SESSION 1913

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1913

Printed By
WILLIAM BRIGGS
29-37 Richmond St. W
TORONTO

LIST OF SESSIONAL PAPERS

ARRANGED ALPHABETICALLY.

TITLE.	NO.	REMARKS.
Accounts, Public	1	*Printed.*
Agricultural College, Report	29	"
Agricultural and Experimental Union, Report	31	"
Agricultural Societies, Report	42	"
Agriculture, Department of, Report	28	"
Algonquin National Park, timber in	91	*Not Printed.*
Archivist, Report	50	*Printed.*
Auditor, Statement	65	"
Bee-Keepers' Association, Report	37	*Printed.*
Births, Marriages and Deaths, Report	19	"
Bruce Mines and Algoma Railway, general character of country	99	*Not Printed.*
Children, Dependent, Report	26	*Printed.*
Colcock, N. B., Correspondence, Reorganization of London Staff	98	*Not Printed.*
Combines, Agreements seized	90	"
Combines, Correspondence seized	111	"
Communicable Diseases, Order-in-Council	96	"
Consolidated Revenue Act, Orders-in-Council	68	"
Corn Growers' Association, Report	35	*Printed.*
Counsel retained at Criminal Assizes	97	*Not Printed.*
Dairymen's Association, Report	38	*Printed.*
Damage Suits against Employers	112	*Not Printed.*
Dempsey, Police Magistrate, complaints	76	"
Division Courts, Report	5	*Printed.*
Dominion Fish Company, correspondence *re* permit for tug	53	*Not Printed.*
Dominion Fish Company, licenses to	102	"
Donnelly, John, Order-in-Council	100	"
Ducks, food supply for	72	"
Education, Report	16	*Printed.*
Education, Orders-in-Council	55	*Not Printed.*
Education, meetings of Advisory Council	67	"

TITLE.	No.	REMARKS.
Education, correspondence *in re* character of teaching in Simcoe, etc.	75	*Not Printed.*
Education, correspondence *re* teaching of French in Plantagenet	77	"
Education, correspondence re granting of certificate to Jean McGregor	87	"
Education, Orders-in-Council appointing John Donnelly and as to printing of School Readers.	100	"
Education, names of Professors of Faculty of Education in Toronto and Queen's Universities; hours of teaching by	113	"
Elections, Return from Records	49	*Printed.*
Elk Lake Branch T. N. O. telegram	58	*Not Printed.*
Entomological Society, Report	36	*Printed.*
Estimates, 1913-14	2	"
Factories, Report	45	*Printed.*
Farmers' Institutes, Report	40	"
Farr, Michael, charges against	63	*Not Printed.*
Feeble-minded, Report	23	*Printed.*
Fernon, B. F., correspondence	33	*Not Printed.*
Fish Company, Dominion, correspondence	53	"
Fish Hatcheries, establishment of	54	"
Forest Rangers and Timber Cullers, number of, etc.	62	"
Fort Frances Lumber Company, Cullers Report	69	"
Friendly Societies, Report of	10(a)	*Printed.*
Fruit Growers' Association, Report	32	"
Game and Fisheries, Report	13	*Printed.*
Grand Juries, presentments	105	*Not Printed.*
Grand River, Local Flow, Report	86	*Printed.*
Grey, County Judge, Surrogate fees	56	*Not Printed.*
Health, Report	20	*Printed.*
Highway Improvement, Report	14	"
Horticultural Societies, Report	43	"
Hospitals and Charities, Report	24	"
Houston, M., charges against	60	*Not Printed.*
Hydro-Electric Power Commission, Report	47	*Printed.*
Hydro-Electric Power Commission, expenses incurred at North Bay	84	*Not Printed.*
Idiots and Epileptics, Report	22	*Printed.*
Industries, Report	44	"
Insane Hospitals, Report	21	"
Insurance, Report	10	"

TITLE.	No.	REMARKS.
James Bay, McMillan's Report	71	*Printed.*
Jeannette, Settlers at	88	*Not Printed.*
Johnston, W. I., appointment of	81	"
Jordan Harbour, Hor. Ex. Station, Resolutions of Board Meeting	109	"
Judges, Supreme Court, increase in number of	64	"
Labour, Report	15	*Printed.*
Lands, Forests and Mines, Report	3	"
Land Titles, instruments registered	94	*Not Printed.*
Lapointe, John, correspondence	103	"
Legal Offices, Report	6	*Printed.*
Library, Report	51	*Not Printed.*
Liquor License Acts, Report	27	*Printed.*
Liquor License Laws, detective work	74	*Not Printed.*
Liquor License Duties, Orders-in-Council, increasing or decreasing, etc.	93	"
Live Stock Association, Report	39	*Printed.*
Lizard Island Preserve, correspondence	53	*Not Printed.*
Loan Corporations, statements	11	*Printed.*
Mines, Report	4	*Printed.*
Mines, Report on underground Labour in	82	"
Mining Industry in Northern Ontario	70	"
Montreal-Cobalt Power Company, correspondence	59	"
Municipal Auditor, Report	8	"
Munn Lumber Company, correspondence	61	*Not Printed.*
McGregor, Jean, correspondence	87	*Not Printed.*
McMillan's Report, James Bay	71	*Printed.*
Notch The, Montreal River, correspondence	59	*Not Printed.*
Ontario Railway and Municipal Board, Report	48	*Printed.*
Ontario Vegetable Growers' Association, Report	34	"
Ontario Veterinary College Report	30	"
Price's Report, Underground Workmen	82	*Printed.*
Prisons and Reformatories, Report	25	"
Provincial Institutions, patients admitted to	66	*Not Printed.*
Provincial Municipal Auditor, Report	8	*Printed.*
Public Accounts	1	"
Public Health, Report	20	"
Public Health, Order-in-Council *re* communicable diseases	96	*Not Printed.*
Public Works Report	12	*Printed.*
Queen Victoria Niagara Falls Park, Report	9	*Printed.*

TITLE.	No.	REMARKS.
Railway and Municipal Board, Report	48	*Printed.*
Registrar General, Report	19	"
Registry Offices, Report	7	"
Road Construction under 2 Geo. V.	80	"
Roads and Bridges in Sudbury, etc.	106	*Not Printed.*
Saw Manufacturers combine	90	*Not Printed.*
Secretary and Registrar, Report	18	*Printed.*
Saunders Report, *re* M. Farr	63	*Not Printed.*
Smoky Falls Water Power, correspondence	57	"
Stamped Ware combine	78	"
Standard Insurance Company, correspondence	104	"
Statute Distribution	108	"
Stone, information against	83	"
Sudbury, Nipissing, etc., roads, bridges and drains in	106	"
Surrogate Court, Orders-in-Council	95	"
Sutherland, Judge, Surrogate Fees	56	"
Tack Combine, information	79	*Not Printed.*
Tack Combine, finding of Grand Jury	92	"
Tavern and Shop Licenses, prohibited	101	"
Timagami Lake, correspondence	107	"
Timber, quantity cut at mileage 81.	52	"
Timber, cut on Munn Limits	61	"
Timber in Algonquin Park	91	"
Timber Cullers, number of	62	"
Timiskaming and N. O. R.. Report	46	*Printed.*
Timiskaming and N. O. R.. lands owned by Commission	73	"
Timiskaming and N. O. R., Passes issued by	89	*Not Printed.*
Timiskaming and N. O. R.. Orders-in-Council reducing Royalties payable to	110	"
Toronto University, Report	17	*Printed.*
Underground Labour, Hours of in Mines, Report	82	*Printed.*
Vegetable Growers' Association, Report	34	*Printed.*
Veterinary College, Report	30	"
Women's Institutes, Report	41	*Printed.*
Workmen's Compensation, Interim Report	85	"

LIST OF SESSIONAL PAPERS

Arranged in Numerical Order with their Titles at full length; the dates when presented to the Legislature; the name of the Member who moved the same, and whether ordered to be Printed or not.

CONTENTS OF PART I.

No. 1 Public Accounts of the Province for the year ending 31st October, 1912. Presented to the Legislature, 26th February, 1913. *Printed.*

No. 2 Estimates—Supplementary, for the service of the Province for the year ending 31st October, 1913. Presented to the Legislature, 28th February and 9th April, 1913. *Printed.* Estimates for the year ending 31st October, 1914. Presented to the Legislature, 14th April, 1913. *Printed.*

CONTENTS OF PART II.

No. 3 Report of the Department of Lands, Forests and Mines, for the year 1912. Presented to the Legislature, 21st April, 1913. *Printed.*

No. 4 Report of the Bureau of Mines for the year 1912. Presented to the Legislature, 28th March, 1913. *Printed.**

No. 5 Report of the Inspector of Division Courts for the year 1912. Presented to the Legislature, 24th February, 1913. *Printed.*

No. 6 Report of the Inspector of Legal Offices for the year 1912. Presented to the Legislature, 25th March, 1913. *Printed.*

CONTENTS OF PART III.

No. 7 Report of the Inspector of Registry Offices for the year 1912. Presented to the Legislature, 21st April, 1913. *Printed.*

No. 8 Report of the Provincial Municipal Auditor for the year 1912. Presented to the Legislature, 1st April, 1913. *Printed.*

No. 9 Report of the Commissioners for the Queen Victoria Niagara Falls Park, for the year 1912. Presented to the Legislature, 25th March, 1913. *Printed.*

No. 10 Report of the Department of Insurance for the year 1912. Presented to the Legislature, 13th March, 1913. *Printed.*

No. 10 (*a*) Report of the Registrar of Friendly Societies for the year 1912. Presented to the Legislature, 13th March, 1913. *Printed.*

*See Part V. for the Report of 1912, printing of which was delayed.

CONTENTS OF PART IV.

No. 11 Loan Corporations Statements made by Building Societies, Loaning, Land and Trust Companies for the year 1912. Presented to the Legislature, 28th February, 1913. *Printed.*

No. 12 Report of the Department of Public Works for the year 1912. Presented to the Legislature, 25th February, 1913.

No. 13 Report of the Department of Game and Fisheries for the year 1912. Presented to the Legislature, 21st February, 1913. *Printed.*

CONTENTS OF PART V.

No. 14 Report upon Highway Improvement for the year 1912. Presented to the Legislature, 21st February, 1913. *Printed.*

No. 15 Report of the Bureau of Labour for the year 1912. Presented to the Legislature, 19th March, 1913. *Printed.*

CONTENTS OF PART VI.

No. 16 Report of the Department of Education for the year 1912. Presented to the Legislature, 4th March, 1913. *Printed.*

No. 17 Report of Board of Governors of University of Toronto for the year ending 30th June, 1912. Presented to the Legislature, 13th February, 1913. *Printed.*

CONTENTS OF PART VII.

No. 18 Report of the Secretary and Registrar of the Province for the year 1912. Presented to the Legislature, 3rd April, 1913. *Printed.*

No. 19 Report of Registrar General upon Births, Marriages and Deaths, for the year 1912. Presented to the Legislature, 4th March, 1913. *Printed.*

No. 20 Report of the Board of Health for the year 1912. Presented to the Legislature, 15th April, 1913. *Printed.*

No. 21 Report upon the Hospitals for the Insane for the year 1912. Presented to the Legislature, 3rd April, 1913. *Printed.*

No. 22 Report upon the Hospitals for Idiots, Orillia, and Epileptics, Woodstock, for the year 1912. Presented to the Legislature, 3rd April, 1913. *Printed.*

CONTENTS OF PART VIII.

CONTENTS OF PART IX.

CONTENTS OF PART X.

No. 36 Report of the Entomological Society for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

No. 37 Report of the Bee-keepers' Association for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

No. 38 Report of the Dairymen's Association for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

No. 39 Report of the Live Stock Association for the year 1912. Presented to the Legislature 20th February, 1913. *Printed.*

No. 40 Report of the Farmer's Institutes for the year 1912. Presented to the Legislature, 20th February, 1913. *Printed.*

No. 41 Report of the Women's Institutes for the year 1912. Presented to the Legislature, 20th February, 1913. *Printed.*

CONTENTS OF PART XI.

No. 42 Report of the Horticultural Societies for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

No. 43 Report of the Agricultural Societies for the year 1912. Presented to the Legislature, 20th February, 1912. *Printed.*

No. 44 Report of the Bureau of Industries for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

No. 45 Report of the Inspector of Factories for the year 1912. Presented to the Legislature, 17th April, 1913. *Printed.*

CONTENTS OF PART XII.

No. 46 Report of the Temiskaming and Northern Ontario Railway Commission for the year 1912. Presented to the Legislature, 13th March, 1913. *Printed.*

No. 47 Report of the Hydro-Electric Power Commission for the year 1912. Presented to the Legislature, 6th March, 1913. *Printed.*

No. 48 Report of the Ontario Railway and Municipal Board, for the year 1912. Presented to the Legislature, 15th April, 1913. *Printed.*

CONTENTS OF PART XIII.

No. 49 Return from the Records of the Elections held on the 28th October, 5th November, 1912, and 19th March, 1913. Presented to the Legislature, 4th February and 26th March, 1913. *Printed.*

No. 50 Report of the Archivist for the year 1912. Presented to the Legislature, 21st April, 1913. *Printed.*

No. 51 Report of Librarian upon the State of the Library for the year 1912. Presented to the Legislature, 5th February, 1913. *Not printed.*

No. 52 Return to an Order of the House of the 11th April, 1912, for a Return shewing: 1. The quantity of pine timber cut at or near mileage 81 on the Timiskaming and Northern Ontario Railway during each of the seasons 1907-1908, 1908-1909, 1909-1910, 1910-1911, by the North Land Mining Company, Limited. 2. The price at which the said pine timber was sold to the said Company in each of the said seasons. 3. The names of the persons by whom the pine cut in each of the said seasons by the said Company was measured for the Government. 4. The names of the original incorporators of the said Company and the names of its shareholders and directors in each of the years 1907, 1908, 1910, 1911 and 1912. Presented to the House 13th February, 1913. *Mr. Mageau. Not printed.*

No. 53 Return to an Order of the House of the 9th April, 1912, for a Return of Copies of all correspondence, official or unofficial, reports and written memoranda of every kind passing between the Government or any Minister or officer thereof and any other person or corporation with respect to:—(*a*) The granting of a permit for a tug owned by the Dominion Fish Company to fish on what is known as "the Lizard Island Preserve," during the season 1911, and copy of such permit. (*b*) The granting of a permit or permits to any other body or person or corporation to fish upon the said Lizard Island Preserve during the season 1911, together with copies of such permits. (*c*) The granting of permits to move the tugs of the Dominion Fish Company from one fishing ground to another, in either of the years 1909, 1910, 1911, with copies of such permits. (*d*) The issue of permits permitting the removal of tugs or other fishing boats owned by persons or corporations other than the Dominion Fish Company from one fishing ground to another during the seasons 1909, 1910, 1911, with copies of such permits. (*e*) The issue of a license to a Canadian-owned tug or boat to fish in waters of the Lizard Island Preserve in either of the seasons of 1911 or 1912, with copy of such license, if any. (*f*) The issue of licenses or permits to use 5-lb. or 6-lb. nets on the said Lizard Island Preserve during the seasons of 1911 and 1912, with copies of such licenses or permits. Presented to the Legislature, 13th February, 1913. *Mr. Mageau. Not printed.*

No. 54 Return to an Address to His Honour the Lieutenant-Governor of the sixth day of March, 1911, praying that he will cause to be laid before this House, a Return of copies of all correspondence between the Province of Ontario and the Dominion of Canada, regarding the establishment of Fish Hatcheries in Ontario. Presented to the Legislature, 13th February, 1913. *Mr. Gamey. Not printed.*

No. 55 Copies of Orders in Council and Regulations to be laid before the Legislative Assembly as required by section 27 of the Department of Education Act. Presented to the Legislature, 13th February, 1913. *Not printed.*

No. 56 Copy of an Order in Council approved by His Honour the Lieutenant-Governor the thirtieth day of April, A.D. 1912, pursuant to provisions of Subsection 3 of Section 78 of the Surrogate Courts Act, Chapter 31, 10 Edward VII., that there be paid to His Honour C. F. Sutherland, of the County Court of the County of Grey, from year to year during his tenure of Office, the Surplus Surrogate Fees over and above the amount payable by Statute to the Surrogate Judge of the said County of Grey, provided, however, that the sum paid out of the said Surplus Surrogate Fees shall not in any year exceed the sum of six hundred and sixty-six dollars ($666.00). Presented to the Legislature, 14th February, 1913. *Not printed.*

No. 57 Return to an Order of the House of the 11th April, 1912, for a Return of copies of (1) All correspondence passing between the Government or any Minister or official thereof or any commission under the Government or any official thereof and any other person or corporation with respect to the development of the Smoky Falls Water Power on the Sturgeon River for the benefit of the Town of North Bay. Presented to the Legislature, 17th February, 1913. *Mr. Mageau. Not printed.*

No. 58 Return to an Order of the House of the 17th day of February, 1913, for a Return shewing whether the Prime Minister or any person on his behalf received a telegram purporting to be from one Rowlandson of Elk Lake between the 1st and 11th days of December, 1911, addressed to the Prime Minister with reference to the building of the Elk Lake Branch of the Timiskaming and Northern Ontario Railway. 2. If such telegram was received, the contents of such telegram. 3. If such telegram was received, did the Prime Minister or any person in his name or with his authority or knowledge or on his behalf send a telegram in reply to the said Rowlandson. 4. If so, the date of such telegram and the contents thereof. Presented to the Legislature, 17th February, 1913. *Mr. Elliott. Not printed.*

No. 59 Return to an Order of the House of 2nd April, 1912, for a Return of copies of all correspondence between any person or persons whatever and the Government of Ontario, or any Minister or Official thereof, with respect to the water power on the Montreal River, known as the "Notch" and all applications for a lease of the said water power and any and all leases issued, assignments of any such leases and all other papers and documents in any way relating to the said "Notch" water power or to the Montreal-Cobalt Power Company, Limited, since the 1st day of January, 1905. Presented to the Legislature, 18th February, 1913. *Mr. Mageau. Not printed.*

No. 60 Return to an Order of the House of the 28th March, 1912, for a Return of Copies of (1) All correspondence between the Department of the Attorney-General or any official thereof and any other person whatsoever with respect to certain charges against M. Houston, one time Police Magistrate for the City of Chatham. (2) All charges against the said M. Houston. (3) All Commissions issued, evidence taken and documents submitted in connection with the said charges and the dismissal of the said M. Houston from his office as Police Magistrate. Presented to the Legislature, 18th February, 1913. *Mr. Richardson. Not printed.*

No. 61 Return to an Order of the House of the 20th March, 1912, for a Return of Copies of: 1. All correspondence, reports, estimates or returns of any kind and from any source respecting the quantity of timber cut upon the Munn limits in the seasons of 1909-10, 1910-11 and 1911-12. 2. The amount received by the Government of Ontario for timber dues, stumpage, rentals, or otherwise howsoever in connection with the said limits in each of the financial years 1909-10-11 with full details. 3. The Annual Return made to the Department of the Provincial Secretary by the Munn Lumber Company, Limited, for the years 1909, 1910 and 1911. Presented to the Legislature, 21st February, 1913. *Mr. Sinclair. Not printed.*

No. 62 Return to an Order of the House of the 11th March, 1912, for a Return showing:—1. (*a*) The number of Forest Rangers and Timber Cullers employed by the Government of Ontario in the seasons of 1903-4 and 1904-5. (*b*) The number of feet of timber measured in each season. (*c*) The amount of money paid in each of the said seasons to (1) Forest Rangers, (2) Timber Cullers. 2. Also showing all the information hereinbefore asked for with respect to the seasons 1909-10 and 1910-11. Presented to the Legislature, 21st February, 1913. *Mr. Mageau, Not printed.*

No. 63 Return to an Order of the House of the 17th February, 1913, for a Return of a Copy of the Report made by Mr. E. Saunders, appointed to investigate into certain charges made by Michael Farr of an attempt made to procure money from him in consideration of a license being renewed for the Union Hotel in the Town of Goderich, together with copies of all correspondence which passed between the Government and any person in reference to the said license or the said investigation, the evidence taken by Mr. Saunders and generally all papers, letters, memoranda or papers of any kind and description relating to the said license, including all papers, and correspondence relative to the refusal of a renewal of such license. Presented to the Legislature, 21st February, 1913. *Mr. Proudfoot. Not printed.*

No. 64 Return to an Order of the House of thirteenth day of April, 1912, for a Return of:—(*a*) All memorials, resolutions, letters or other written memoranda received by the Government or any Minister or official thereof since the 1st day of January, 1910, from any individual, public officer or organization with respect to the increase of the number of Judges of the Supreme Court of Judicature for Ontario or with respect to the changes in the constitution of the Supreme Court of Judicature for Ontario provided for in sections 1 to 19 inclusive, of The Law Reform Act, 1909. (*b*) Copies of all letters or written memoranda from the Government or any Minister or official thereof to any individual, public officer, or organization with respect to the said two subject matters, or either of them, since the said date. Presented to the Legislature, 26th February, 1913. *Mr. Elliott. Not printed.*

No. 65 Statement of the Auditor made pursuant to the provisions of Section 13, subsection 2, of the Audit Act as amended by Section 6, of Chapter 10, 9 Edward VII. Presented to the Legislature, 28th February, 1913. *Printed.*

No. 66 Return to an Order of the House of the 14th March, 1912, for a Return showing:—How many male patients have been admitted to each of the Provincial Institutions for the Insane, Feeble Minded, and Epileptics during the three years beginning Jan. 1st, 1909, and ending Dec. 31st, 1911. How many female patients were admitted to these institutions during the same years. How many male patients were discharged from each of these institutions during the same three years. How many female patients were discharged from each of these institutions during these years. Of these male patients discharged: 1st. How many were discharged recovered; 2nd. How many were discharged improved; 3rd. How many were discharged unimproved. Of the female patients discharged: 1st. How many were discharged recovered; 2nd. How many were discharged improved; 3rd. How many were discharged unimproved. Of the female patients discharged how many were under 45 years of age. Of the patients admitted to each of these institutions during the years 1909, 1910 and 1911 how many were admitted for the first time. How many were admitted for the second time. How many were admitted for the third time. How many had been admitted more than three times. In how many of these cases admitted during these years is there evidence that the patients have become the father or mother of children after the first attack of insanity. In how many of these patients is there a history of insanity, epilepsy or imbecility in the father, mother, brother or sister of the patient. In how many of these patients is there a history of insanity, epilepsy or imbecility in the children of the patients. How many patients are in each of these institutions who have had a father,

mother, son or daughter in an asylum at some time. Presented to the Legislature, 28th February, 1913. *Mr. Godfrey. Not printed.*

No. 67 Return to an Order of the House of the 19th February, 1913, for a Return showing:—1. The number of meetings of the Advisory Council of Education held in each of the years 1909, 1910, 1911 and 1912. 2. The total number of meetings attended by each of the different members of this Council during each of the said years. 3. The total number of votes received by each candidate for representative of the public school teachers and for each candidate for representative of the high school teachers for each of the said years. Presented to the Legislature 28th February, 1913. *Mr. Marshall. Not printed.*

No. 68 Orders in Council issued under the provisions of Section 10 of Cap. 2, 2 George V. Presented to the Legislature, 3rd March, 1913. *Not printed.*

No. 69 Return to an Order of the House of the 3rd March, 1913, for a Return showing:—1. Copies of the Culler's report made by the Fort Frances Lumber Company for the logging seasons of 1909-10, 1910-11, 1911-12. Presented to the Legislature, 4th March, 1913. *Mr. Kohler. Not printed.*

No. 70 The Mining Industry in that part of Ontario served by the Timiskaming and Northern Ontario Railway for the year 1913. Presented to the Legislature, 11th March, 1913. *Printed.*

No. 71 Report of T. G. McMillan, covering investigations at James' Bay during 1912. Presented to the Legislature, 11th March, 1913. *Printed.*

No. 72 Report on the increase of the food supply for Ducks in Northern Ontario by G. R. Mickle, with description of edible plants by R. B. Thompson. Presented to the Legislature, 11th March, 1913. *Printed.*

No. 73 A Return to an Order of the House of the 26th February, 1913, for a Return showing: 1. All lands (other than the Railway's right of way) owned by the Timiskaming and Northern Ontario Railway Commission situate in the various municipalities of the Province, stating the municipality in which the land is situate, the area and estimated value of the land, and showing which are mineral lands, agricultural lands and town lots. 2. All lands (other than the Railway's right of way) owned by the Timiskaming and Northern Ontario Railway Commission situate in any unorganized territory within the Province, stating the unorganized territory in which the land is situate, the area and estimated value of the land, and showing which are mineral lands, agricultural lands and town lots. Presented to the Legislature, 10th March, 1913. *Mr. Atkinson. Not Printed.*

No. 74 Return to an Order of the House of the 3rd March, 1913, for a Return showing:—1. How much the Government has spent on private detective work in each of the years 1910, 1911 and 1912. 2. How much of the amount mentioned in the first paragraph hereof, has been spent by the Government in connection with the administration of the Liquor License Laws. 3. What amount was recovered in fines and penalties under the Liquor License Act, in each of the years 1910, 1911 and 1912. Presented to the Legislature, 12th March, 1913. *Mr. McQueen. Not printed.*

No. 75 Return to an Order of the House of the 11th April, 1912, for a Return of copies of all correspondence between the Government and any Minister or Official thereof with respect to the character, efficiency or teaching in the Schools in Simcoe, Stormont, Prescott, Russell and Glengarry Counties since January 1st, 1910. Of all orders, regulations, provisions or other means authorized or directed by the Government or any member or official thereof, to meet or in consequence of any of the said memorials, resolutions, affidavits, protests, charges or complaints. The schools in the said Counties from which the Provincial grant was withheld in the years 1910 and 1911 respectively. The reports or other evidence upon which grants were paid in 1911 to any schools in the said counties from which grants had been withheld in 1910. Presented to the Legislature, 14th March, 1913. *Mr. Elliott. Not printed.*

No. 76 Return to an Order of the House of the 14th March, 1913, for a Return of copies of: 1. All complaints from any other person or persons received in the years 1911 and 1912 by the Government or any Member of the Government regarding the conduct of Police Magistrate Dempsey. 2. All prosecutions instituted or carried on before Superintendent Rogers as a special magistrate within the Town of Cochrane during the years 1911 and 1912. 3. All protests filed with the Government, with the Prime Minister, the Provincial Secretary, Attorney-General or any other Member of the Government by the corporation of the Town of Cochrane, the Board of Trade or the citizens of the Town of Cochrane against the action of Superintendent Rogers in exercising or assuming to exercise jurisdiction within the Town of Cochrane as a special magistrate. Presented to the Legislature, 14th March, 1913. *Mr. Sinclair. Not printed.*

No. 77 Return to an Order of the House of the 26th February, 1913, for a Return of copies of all correspondence between the Department of Education, the Minister of Education himself, and the Board of Trustees of the Schools of the Village of Plantagenet since the 1st day of March, 1905, up to the 1st day of December, 1908, regarding the Teaching of French. Presented to the Legislature, 17th March, 1913. *Mr. Evanturel. Not printed.*

No. 78 Return to an Order of the House of the 24th February, 1913, for a Return of (1) Copies of the letters referred to on the last page of the brief furnished to the Attorney-General by the Crown Counsel in the proceedings against the Stamped Ware Association, showing offences under the different subsections of Section 520 of the Criminal Code, each incriminating letter being marked *a, b, c,* or *d,* as it discloses an offence against a subsection. The said brief forms part of Return 82, Session 1912. (2) Copies of all correspondence between the Crown Counsel and the Government with reference to prosecution of the said combine and all correspondence containing instructions, if any, from the Government not to prosecute. Presented to the Legislature, 17th March, 1913. *Mr. Elliott. Not printed.*

No. 79 Return to an Order of the House of the 14th March, 1913, for a Return of: (1) A copy of the information, depositions and proceedings before the Police Magistrate of Toronto (including the warrant of commitment) with respect to the members of the Tack Combine who were committed for trial by the Police Magistrate of the City of Toronto. (2) Copies of all correspondence passing between the Attorney-General or any one on his behalf or on behalf of the Government and Mr. Du Vernet, K.C., Crown Counsel, or anyone on his behalf with reference to the trial of the members of the Tack Combine. Presented to the Legislature, 17th March, 1913. *Mr. Rowell. Not printed.*

No. 80 Report on Road Construction under 2 George V. Cap. 2, being Consolidated Revenue Act of Ontario. Presented to the Legislature, 19th March, 1913. *Printed.*

No. 81 Return to an Order of the House of the 12th March, 1913, for a Return showing:—Copies of all correspondence between the Chairman or any other member of the T. & N. O. Railway Commission or any other person on their behalf and any official or employee of the T. & N. O. Railway at North Bay relative to the appointment of W. I. Johnston to his present position with the T. & N. O. Railway at North Bay, Ont. Presented to the Legislature, 19th March, 1913. *Mr. Munro. Not printed.*

No. 82 Report of S. Price *re* limitation of hours of Labour of underground workmen in the Mines of Ontario. Presented to the Legislature, 20th March, 1913. *Printed.*

No. 83 Return to an Order of the House of the 7th March, 1913, for a Return showing:—1. Copy of the information laid against one Stone before the Police Magistrate at Collingwood, in January, 1913, for an alleged violation of the Liquor License Act. 2. Copy of the judgment of the magistrate. Presented to the Legislature, 28th March, 1913. *Mr. Anderson (Bruce.) Not printed.*

No. 84 Return to an Order of the House of the 26th February, 1913, for a Return showing:—1. All expenses incurred by the Hydro-Electric Power Commission, or the Government, or by any person or persons on their behalf, in connection with the passing of the Hydro-Electric By-law at North Bay in January, 1913, or for the purpose of procuring the passage of such By-law, or otherwise connected with the submission of such By-law to the electors of North Bay. 2. The names of all persons employed by the Hydro-Electric Power Commission who were in or visited the Town of North Bay during the months of December or January last, and the purposes for which they were employed in the Town of North Bay, and the amounts that were paid to each of them for their services there. 3. Copies of all correspondence between the Hydro-Electric Power Commission, or the Government, or any person or persons on behalf of the Hydro-Electric Power Commission, or the Government, and the Council of the Town of North Bay, or any person on behalf of the said Council, relating to the Hydro-Electric By-law. Presented to the Legislature, 1st April, 1913. *Mr. Mageau. Not printed.*

No. 85 Further interim Report of the Commissioner on the subject of Compensation to Workmen for Injuries sustained in the course of their employment, together with draft Bill, embodying the Commissioner's conclusions. Presented to the Legislature, 2nd April, 1913. *Printed.*

No. 86 A preliminary study by H. G. Acres, of the Hydro-Electric Power Commission, dealing with the possibility of improving the general regimen and local flow characteristics of the Grand River, by means of Storage and Training Works. Presented to the Legislature, 3rd April, 1913. *Not printed.*

No. 87 Return to an Order of the House for a Return showing:—Copies of all correspondence passing between the Department of Education or the Minister or any official thereof and J. Russell McGregor of Gore Bay (President of the Manitoulin Conservative Association), the Public School Board of Gore Bay, the Public School Inspector in Manitoulin or any other person concerning the granting of a temporary teacher's certificate to one Jean McGregor. 2. A copy of the temporary certificate or temporary certificates granted to the said Jean McGregor. 3. Copy of the Departmental Regulations under which the Minister acted in granting the temporary certificate to the said Jean McGregor. 4. Copies of all advertisements (stating the dates of the same), inserted in any paper or papers prior to the granting of such temporary certificate to Jean McGregor, as required by subsection 2 of section 2 of Circular 30½, dated 7th May, 1912, issued by the Department of Education. 5. The evidence (if any) which the Minister had before him at the time such tem-

porary certificate was granted, that the school board had "taken due measures to obtain a teacher with the prescribed grade of certificate," before the Inspector made his recommendation that Jean McGregor should be granted a temporary certificate. Presented to the Legislature, 4th April, 1913. *Mr. Marshall. Not printed.*

No. 88 A return to an Order of the House of the 21st February, 1913, for a Return showing:—1. All petitions, letters and other documents passing between the British settlers at Jeannette, Kent County, Ontario, and the Premier, the Minister of Agriculture, or any other member of the Government, or any officer or official thereof. 2. All reports by any officer or official of the Government on conditions at Jeannette. 3. All correspondence with the Department of Colonization, the Minister of Agriculture, or any officer or official of the Government in reference to the conditions at Jeannette. Presented to the Legislature, 7th April, 1913. *Mr. Anderson (Bruce.) Not printed.*

No. 89 Return to an Order of the House of the 26th February, 1913, for a Return showing:—1. The number of passes issued by the Timiskaming and Northern Ontario Railway Commission over its line of railway or any part thereof during the period from July 1st, 1911, to 1st July, 1912. 2. The persons to whom the said passes were granted. 3. The purpose for which each of the said passes was granted. Presented to the Legislature, 7th April, 1913. *Mr. Mageau. Not printed.*

No. 90 Return to an Order of the House of the 10th March, 1913, for a Return showing:—1. Copies of the agreements entered into by the members of the following combines and seized by the Toronto Police: (*a*) The Saw Manufacturers' Association; (*b*) The Canadian Churn Manufacturing Association; (*c*) The Hame and Saddlery Hardware Manufacturing Association. 2. Copies of all correspondence between the Attorney-General or any other Member of the Government and any counsel with reference to the prosecution of the said combines. Presented to the Legislature, 8th April, 1913. *Mr. Elliott. Not printed.*

No. 91 Return to an Order of the House of the 2nd April, 1913, for a Return showing:—Copies of all reports received by or in the possession of the Government upon the timber in Algonquin National Park covered by the following agreements:—1. Agreement dated 18th June, 1912, between the Crown and the Bank of Montreal. 2. Agreement dated 15th June, 1912, between the Crown and J. R. Booth. 3. Agreement dated 4th June, 1912, between the Crown and H. Stikeman, General Manager of the Bank of British North America. Presented to the Legislature, 8th April, 1913. *Mr. Marshall. Not printed.*

No. 92 Return to an Order of the House of the 3rd April, 1913, for a Return showing:—The findings of the Grand Jury in the prosecution against the Tack Combine. Presented to the Legislature, 8th April, 1913. *Mr. Sinclair. Not printed.*

No. 93 Return to an Address to His Honour the Lieutenant-Governor of the third day of April, 1913, praying that he will cause to be laid before this House, a Return of copies of all Orders in Council passed during the years 1906, 1907, 1908, 1909, 1910, 1911, 1912, increasing or decreasing the duties payable for tavern or shop licenses in any Provincial or Judicial District or in any municipality or locality situated therein, under authority of 6 Edw. VII., Chap. 47, Sec. 10 (1), and showing in respect to every such Order in Council: (*a*) the date of the same, (*b*) the name of the person holding the shop or tavern license affected by the said Order in Council, (*c*) the place where such shop or tavern license was held, (*d*) the amount of license fee as fixed by such Order in Council, (*e*) the amount of the license fee previous to such increase. Presented to the Legislature, 8th April, 1913. *Mr. Anderson (Bruce.) Not printed.*

No. 94 Return to an Order of the House of the 14th March, 1913, for a Return showing:—1. The number of instruments registered in each of the years 1909, 1910, and 1911, in the Land Titles Office, at Toronto. 2. The total amount of fees received in each of the said years. 3. The total amount of disbursements for each such year. 4. The amount of the Guarantee Fund. 5. The total losses. 6. The number of Plans of sub-division. Presented to the Legislature, 9th April, 1913. *Mr. Proudfoot. Not printed.*

No. 95 Copies of Orders-in-Council in accordance with the provisions of subsection 6 of section 78 of the Surrogate Courts Act. Presented to the Legislature, 14th April, 1913. *Not printed.*

No. 96 Copy of an Order in Council approved by His Honour the Lieutenant-Governor, the 3rd day of April, A.D. 1913, approving of the accompanying regulation, being a regulation of the Provincial Board of Health, for the control of Communicable Diseases under the provisions of the Public Health Act, Chapter 58, 2 George V. Also Regulations of the Provincial Board of Health, Ontario, approved by His Honour the Lieutenant-Governor in Council on the 10th day of August, 1912. Presented to the Legislature, 14th April, 1913. *Not printed.*

No. 97 Return to an Order of the House of the 19th February, 1913, for a Return showing:—1. The names of all Counsel retained on behalf of the Crown at any criminal assize in the Province during the year ending 31st December, 1912. 2. The Assize at which each Counsel was so retained. 3. The amount paid

to every such Counsel for services rendered to the Crown at every such assize. 4. The names of all Solicitors or Counsel employed or retained by the Crown for any other purposes during the year ending 31st December, 1912, showing:—(*a*) The amount paid to every such Solicitor or Counsel. (*b*) The matter in respect of which such Counsel or Solicitor was so employed or retained. 5. The total amounts paid to Counsel for the Crown in criminal or other proceedings for the years 1910, 1911 and 1912. Presented to the Legislature, 14th April, 1913. *Mr. Richardson. Not printed.*

No. 98 Return to an Order of the House of the 9th April, 1913, for a Return showing:—1. Copies of all correspondence during the past year between the Minister of Agriculture or any other member or official of the Government and N. B. Colcock (formerly employed in the London Office of the Colonization and Emigration Branch) relating to the reorganization of the London Office, to the staff thereof, or to the resignation of the said Colcock, or to his dismissal from office, or to his retirement from the service of the Government, or to any other matters connected therewith. 2. Copies of all correspondence during the last year between the Minister of Agriculture or any other member or official of the Government and any other person or persons relating to the matters aforesaid. Presented to the Legislature, 15th April, 1913. *Mr. Anderson (Bruce.) Not printed.*

No. 99 Return to an Order of the House of the 15th April, 1913, for a Return showing:—Copies of all reports received by the Government and other information in the possession of the Government: 1. In reference to the general character of the country through which the projected line of the Bruce Mines and Algoma Railroad runs, and of the lands proposed to be granted to the said railway. 2. In reference to the extent and character of the different classes of timber on said lands. 3. In reference to the extent and character of the agricultural lands within the said areas. 4. In reference to the portion of the Mississagi Forest Reserve through which the projected line will pass and the effect that the construction of the said line will have upon the timber in the said Reserve. 5. The estimated length of the said line and the total estimated area of land to be granted to the said railway company. 6. In reference to the surveys already made, and the probable route of the said railway. 7. The names of the parties at present interested in or owning the said railway and who are responsible for its promotion with full information as to their business occupation and financial standing. 8. The character of the plants, mills or other industries upon which the railway undertakes to expend $3,500,000 and the site or sites where it is proposed to locate the same; and if the parties now interested in the railway are the parties who

are to control the industries proposed to be established. Presented to the Legislature, 17th April, 1913. *Mr. Atkinson. Not printed.*

No. 100 Copies of Orders in Council approved by His Honour the Lieutenant-Governor the 12th day of April, A.D. 1913, appointing John Donnelly, Esquire, one of the Governors of the School of Mining, Kingston, in the room and stead of H. W. Richardson, resigned, and Agreements made between the Canada Publishing Company and His Majesty the King, respecting the right to print, publish and supply the Ontario High School English Grammar, and the Ontario High School Reader: also, an Agreement between the Copp, Clark Company, Ltd., and His Majesty the King, respecting the right to print, publish and supply the Ontario High School Reader. Presented to the Legislature, 18th April, 1913. *Not printed.*

No. 101 Return to an Order of the House of the 2nd April, 1913, for a Return showing:—All tavern and shop licenses, the renewal of which has been prohibited by the Provincial Secretary under Section 23 of 6 Edward VII., Chapter 47, as amended by Section 13 of 1 George V. Chap. 64. Presented to the Legislature, 18th April, 1913. *Mr. Proudfoot. Not printed.*

No. 102 Return to an Order of the House of the 27th March, 1913, for a Return showing:—Copies of all licenses or permits granted by the Game and Fisheries Department to the Dominion Fish Company, or to any person on its behalf during the seasons 1910, 1911 and 1912. Presented to the Legislature, 18th April, 1913. *Mr. Clarke. Not printed.*

No. 103 Return to an Order of the House of the 9th April, 1913, for a Return showing:—1. All correspondence between any member or official of the Government or any other person or persons, relating to the application of one John Lapointe of Spanish, for a renewal of his fishery license for the years 1911 and 1912. 2. Any reports or recommendations relating to the matter made by any official of the Game and Fisheries Department. Presented to the Legislature, 18th April, 1913. *Mr. Clarke. Not printed.*

No. 104 Return to an Order of the House of the 10th March, 1913, for a Return showing:—(*a*) Copies of all correspondence between any official of the Government and the Standard Insurance Company during the years 1907, 1908 and 1909. (*b*) A copy of any Reports made by the Inspector who inspected the books of the Standard Insurance Company during the same years. (*c*) Copies of all correspondence between any official of the Government and the Liquidator of the Standard Insurance Company. Presented to the Legislature, 18th April, 1913. *Mr. Elliott. Not printed.*

No. 105 Return to an Order of the House of the 19th February, 1913, for a Return showing:—1. All presentments made by Grand Juries within the Province of Ontario during the year ending 31st December, 1912, stating the assize at which each presentment was made and the date. Presented to the Legislature, 18th April, 1913. *Mr. Sinclair. Not printed.*

No. 106 Return to an Order of the House of the 26th February, 1913, for a Return showing:—1. The amount of money expended directly by the Government in each of the years 1911 and 1912, in the construction or repair of (*a*) roads; (*b*) bridges, and (*c*) drains in each of the Districts of Sudbury, Nipissing, Parry Sound and Sturgeon Falls, distinguishing the amount spent in each of said Districts for each of said purposes. 2. The amount of money expended during 1911 and 1912, by the Government by way of aid to any municipalities in the said Districts in the construction or repair of roads, bridges or drains, stating in respect to each work which was undertaken with Government aid as aforesaid. (*a*) The purpose of the work, that is, whether for roads, bridges or drains, and whether for construction or repair. (*b*) The District in which such work was undertaken.. (*c*) The amount expended by the Government on such work. (*d*) The amount expended by the municipality on such work. Presented to the Legislature, 18th April, 1913. *Mr. Mageau. Not printed.*

No. 107 Return to an Order of the House of the 27th February, 1913, for a Return of:—1. Copies of all correspondence during the years 1910 and 1911 between the Minister of Lands, Forests and Mines, or any other member of the Government, and the Imperial Paper Mills Company, or the Liquidator or Interim Liquidator of the Imperial Paper Mills with reference to the diversion of water from Lake Temagimi into the Montreal River. 2. Copies of all correspondence passing during the years 1910 and 1911 between the Minister of Lands, Forests and Mines or any other member of the Government, and the Council of the Town of Sturgeon Falls, or any official or any other person on behalf of the Town of Sturgeon Falls, or the Board of Trade of the Town of Sturgeon Falls, or any person on behalf of the said Board of Trade. 3. How many cubic feet of water per second have been diverted from Lake Temagimi into the Montreal River, and what is the available head of water, and what is the horse power. Presented to the Legislature, 21st April, 1913. *Mr. Mageau. Not printed.*

No. 108 Statement of distribution of Revised and Sessional Statutes for the year 1912. *Not printed.*

No. 109 Return to an Order of the House of the 10th March, 1913, for a Return showing copies of the resolutions (if any) adopted at the Board Meeting held at the Horticultural Experiment Station at Jordan Harbour on or about December 17th last. Pre-

sented to the Legislature, 23rd April, 1913. *Mr. Anderson (Bruce.) Not printed.*

No. 110 Return to an Order of the House of the 27th March, 1913, for a Return showing:—1. Copy of an Order in Council dated the 23rd April, 1910, reducing the royalty payable to the T. & N. O. Railway by the Right of Way Mining Company. 2. Copy of an Order in Council dated 17th December, 1912, further reducing the royalty payable by the Right of Way Mining Company to the T. & N. O. Railway. 3. Copy of an Order in Council dated December 14th, 1909, reducing the royalty payable by the Cobalt Townsite Mining Company to the T. & N. O. Railway. 4. Copy of an Order in Council dated December 17th, 1912, further reducing the royalty payable by the Cobalt Townsite Mining Company to the T. & N. O. Railway. 5. Copy of an Order in Council dated December, 14th, 1909, reducing the royalty payable by the City of Cobalt Mining Company to the T. & N. O. Railway. 6. Copy of an Order in Council dated December 23rd, 1912, further reducing the royalty payable by the City of Cobalt Mining Company to the T. & N. O. Railway. 7. Copy of an Order in Council dated December 14th, 1909, reducing the royalty payable by the Nancy-Helen Mines, Limited, to the T. & N. O. Railway. 8. Copy of an Order in Council dated December 17th, 1912, further reducing the royalty payable by the Nancy-Helen Mines, Limited, to the T. & N. O. Railway. 9. Copy of an Order in Council dated December 14th, 1909, reducing the royalty payable by the Wright Silver Mining Co., to the T. & N. O. Railway. 10. Copy of an Order in Council dated December 17th, 1912, further reducing the royalty payable by the Wright Silver Mining Co., to the T. & N. O. Railway. 11. Copy of an Order in Council dated December 14th, 1909, reducing the royalty payable by the Railway Reserve Mines, Limited, Jack Pot Silver Mining Company, Ontario Development and Mining Company, and Station Grounds Mining Company, to the T. & N. O. Railway. 12. Copy of an Order in Council dated December 17th, 1912, further reducing the royalty payable by the Railway Reserve Mines, Limited, Jack Pot Silver Mining Co., Ontario Development and Mining Company and Station Grounds Mining Company, to the T. & N. O. Railway. 13. Copy of an Order in Council or agreement reducing the royalty payable by the O'Brien Mine to the Crown. 14. Copy of Order in Council or agreement, further reducing the royalty payable by the Chambers-Ferland Mining Company from 25 *per cent.* of value of ore at pit's mouth, less surface charges, to 25 *per cent.* of net profits. 15. Copy of agreement dated 8th October, 1912, exempting Chambers-Ferland Mining Company from royalty, unless on rich ore being found, when rate of 25 *per cent.* on net profits made to be imposed. Presented to the Legislature, 23rd April, 1913. *Mr. McDonald. Not printed.*

No. 111 Return to an Order of the House of the 26th February, 1913, for a Return shewing:—1. Copies of all correspondence and other papers, documents, etc., seized by the Crown in connection with the prosecution of the Canadian Washing Machine Manufacturing Association. 2. Copies of all correspondence between the Government or any member or official of the Government and any other person or persons relating to the Canadian Washing Machine Manufacturing Association, or the prosecution thereof, or the discontinuance of such prosecution. 3. Copies of all correspondence and other papers, documents, etc., seized by the Crown in connection with the prosecution of the Canadian Clothes Wringer Manufacturing Association. 4. Copies of all correspondence between the Government, or any member or official of the Government, and any other person or persons, relating to the Canadian Clothes Wringer Manufacturing Association, or the prosecution thereof, or the discontinuance of such prosecution. Presented to the Legislature, 23rd April, 1913. *Mr. Sinclair. Not printed.*

No. 112 Return to an Order of the House of the 14th March, 1913, for a Return showing:—For the year 1912. 1. The number of cases in which damage suits were entered in Court against the employer. 2. The number of instances where damages were obtained and the amounts. 3. The number of cases non-suited by the Court. 4. The number of cases where employers settled by paying compensation without damage suit and the amounts. Presented to the Legislature, 7th May, 1913. *Mr. McQueen. Not printed.*

No. 113 Return to an Order of the House of the 27th March, 1913, for a Return showing:—1. The names of the professors of the Faculty of Education (not including instructors in practice schools) at (*a*). Toronto University; (*b*), Queen's University. 2. The number of hours teaching done by each of said professors *per* week. 3. The number of students in attendance in the Faculty of Education during the Session 1912-1913, at (*a*), Toronto University; (*b*), Queen's University. 4.The average cost *per* pupil in the Faculty of Education during each of the last five years at (*a*), Toronto University; (*b*), Queen's University. 5. The number of extra-mural students under instruction by the Faculty of Education at (*a*), Toronto; (*b*), Queen's. 6. The number of hours of instruction *per* session given in each of the following subjects of the course of study in education:—(*a*) History of Education and Educational systems; (*b*) Principles of Education; (*c*) Psychology and General method; (*d*) School management and school law; (*e*) Methods in Public School subjects; (*f*) Methods in High School subjects; (*g*) Art work; (*h*) Commercial work and writing; (*i*) Constructive work; (*j*) Household science; (*k*) Nature study; (*l*) Music; (*m*) Physical training; (*n*) Physiology and Hygiene, including treatment of emergencies. Presented to the Legislature, 7th May, 1913. *Mr. Marshall. Not printed.*

REPORT

OF THE

Minister of Lands, Forests and Mines

OF THE

PROVINCE OF ONTARIO

For Year Ending 31st October

1912

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty

1913

Printed by
WILLIAM BRIGGS
29-37 Richmond Street West
TORONTO

CONTENTS.

Report of the Minister of Lands, Forests and Mines of the Province of Ontario

For the Year ending 31st October, 1912

To His Honour The Honourable Sir John Morison Gibson, K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

May It Please Your Honour:

I have the honour to submit for the information of your Honour and the Legislative Assembly a report for the fiscal year ending 31st October, 1912, of the management, etc., of the Crown Lands of the Province.

Clergy Lands.

The area sold during the year was 101 acres, the value of which was $110. The collection on account of sales of Clergy Lands was $1,565.92. (See Appendix No. 3, page 7.)

Common School Lands.

The value of these lands sold during the year was $94. The collection on account of these and former sales was $7,124.25. (See Appendix No. 3, page 7.)

Grammar School Lands.

There were no sales. The collection on account of former sales was $292.55. (See Appendix No. 3, page 7.)

University Lands.

The area of these lands sold during the year was 11.890 acres for $6,855.80. The collection on account of these and former sales was $4,263.39. (See Appendix No. 3, page 7.)

Crown Lands.

There was sold during the year for agricultural and town site areas 349,319 acres for $272,233.08. The collection on account of these and former sales was $218,710.29. There was sold for mining purposes 18,971 acres for $45,552.18. There was collected on account of these and former sales $51,634.48.

There was leased for mining purposes 16,711 acres for $17,316.65. There was collected on account of these leases and those of former years $33,098.34. There was leased of Crown Lands an area of 15,793½ acres for $2,157.50. There was collected on account of these and the leases of former years $18,931.82.

The total area of Crown Lands disposed of by sale and lease during the year was 412,790½ acres for a value of $344,319.21. The total collection on account of the sales, leases, etc., was $335,645.04. (See Appendix No. 3, page 7.)

The townships of Kendry and Haggart, situated on the Transcontinental Railway thirty miles west of Cochrane, containing about 98,000 acres, were sold at the price of $1 per acre cash to a company, subject to certain terms as to development and settlement. A copy of the agreement with this company will be found in appendix No. 34, page 83, and will speak for itself.

The Department, being of opinion that centres of industry affording markets for natural products and creating employment for labour, are important aids in the opening up and settlement of the new country, recommended to the Government that these two townships should be sold to a company composed of energetic and wealthy men, but subject to conditions which, while conserving the interests of the public, would become an industrial centre. The development already made is large and important, and fully justifies the expectations formed as to the good results which would be obtained by selling these townships. Over $60,000 has been expended in the erection of buildings, opening up of roads, etc. Hotels have been erected, and a large sawmill is in operation—the latter affording a supply of merchantable lumber purchasable by settlers at reasonable prices—the absence of which convenience was one of the greatest drawbacks to the settlement of that country; for, without lumber to erect buildings, progress is very slow, and people are not able to provide homes for their families.

Not only is there now a supply of lumber, but the company is purchasing pulp wood and other kinds of timber from the settlers which enables them to stay on their lands during the winter season instead of being obliged to seek employment away from home.

In further pursuance of the policy of encouraging industries in this immense region, a pulp concession was laid out and tenders were called for. The successful tenderers were Ogilvie and Anson, now the Abitibi Pulp and Paper Company, Limited, and they are actively engaged in developing their water power, erecting mills, clearing land, etc. When this industry is in complete running order considerably over half a million dollars will have been spent, and at least 250 hands kept employed for ten months in the year. This will cause a large expenditure for wages; will create markets for the natural products, and will enable the settlers to dispose of their spruce timber removed in clearing their land, at prices which will afford them some profit for taking out their pulpwood. The lands covered by this pulp concession are not withdrawn from sale or settlement, so that there is no monopoly or tying up of land. This development is on the Abitibi River, at Iroquois Falls, and a branch of the Temiskaming & Northern Ontario Railway is being built from Iroquois Falls to the mills. The expectation is that these two large industries will be powerful incentives to settlers to take up land in that country, and the creation of other industries further west along the Transcontinental will encourage people to come in until there is a continuous settlement all along the line.

These developments, of course, are in the great clay belt, which continues to attract more attention than any other part of the Province, warranting the belief that in the immediate future we shall see a great expansion in that region. It is expected that by next fall the Algoma Central Railway will be running as far north as Hearst on the Transcontinental. Another railway from Bruce Mines is also assured, which will strike the Transcontinental midway between Cochrane and Hearst. The Canadian Northern, lying midway between the Transcontinental and the Canadian Pacific Railway, will be running within a short period. When the

Transcontinental Railway Commission takes over their road from the contractors, and trains are run on proper schedules and reasonable fares, and the carriage of freight brought down to some permanent basis, then we may expect active interest to arise and a steady inflow of settlers to take place.

During the year the following townships in the clay belt have been opened for settlement: German, Beatty, Stock, McCart, Bond, Playfair, Calvert, Leitch, Blount, Calhoun, Calder, Pyne, Fox, Fournier, and Kennedy. During the year ended the 31st of October last 250 settlers took up land in the New Liskeard Crown Land Agency, about 175 in the Englehart Agency, 365 in the Matheson Agency, and 600 in the Cochrane Agency, while many people have gone on and selected lands, but had not, on the 31st of October, been regularly entered. So that before the end of the year probably 1,500 settlers had selected and entered upon their lands in that region.

It is intended to place a Crown Land Agency at the town of Hearst and open townships there for sale and settlement early in the coming year. It is safe to say that ultimately the region extending from the Quebec boundary on the east to the boundary of the Province of Ontario on the west, and from the C. P. R. north to the height of land, will afford homes for millions of people and support them in comfortable circumstances on their farms. In addition, large towns are certain to spring up, which will afford markets for a good proportion of what the farmers raise.

This may seem a large prophesy, but when it is remembered that the clay belt is as great in area as the present settled area of Ontario, there is no exaggeration in the statement.

Free Grants.

In other newer parts of the Province considerable settlement has taken place. While the other districts have been over-shadowed in point of interest by the clay belt yet there has been good progress made. In the Rainy River Free Grant District and in the Thunder Bay Free Grant District there are considerable areas of good land, and settlement is flowing in. In the Port Arthur Free Grant Agency 500 settlers have been located during the year. In the Rainy River Free Grant Agency 366 have been located. In the Dryden Agency 158 settlers were located. Altogether nearly 1,700 free grant locations were taken up by intending settlers. who located and purchased in addition about 262,000 acres. During the year, 1,095 locatees completed their settlement conditions and obtained their patents.

The following townships were opened under the Free Grant Act during the year ending the 31st of October, 1912:

Baldwin (part), Lumsden (part), both in the District of Sudbury.

Ware (part) in the District of Thunder Bay.

Military Grants.

The total number of military certificates issued to date, authorizing veterans to select land under the Act 1 Edw. VII., cap. 6, is 13,996.

The new locations made during the year numbered 139, making in all to the end of the year 7,871, and in 14 cases location certificates were applied for and issued.

Twenty-one certificates were surrendered to the Crown for the $50.00 commutation, making in all 3,217 surrendered.

During the year 53 certificates were surrendered to be applied in payment of lands purchased from the Crown, a total of 668.

The number of patents that were issued for lands located were 997, being a total of 5,560 patented in all.

The total number, therefore, of certificates that have now been redeemed is 11,756, leaving 2,240 still outstanding.

The locatees of all lands granted under this Act, must apply for their patents for such land before ten years have expired from date of location. If this application for patent is not made within ten years, then the land comes under the settlement regulations, and unless the settlement duties are proceeded with, the locations are liable to cancellation.

As the first locations, under this Act, were made in April, 1903, the ten years exemption, as stated above, is expiring on many of these locations.

The Mining Industry.

Gold.—For the first time in the history of Ontario there was a substantial production of gold. In 1911 the output had a value of $42,637.00; in 1912, of $2,114,086.00. The greater part came from the mines of the Porcupine district, principally from the Hollinger and Dome, which came into full production early in the year. Other mines at Porcupine, whose stamp mills are under construction or actually at work are McIntyre, Vipond, Jupiter, and McEnany. The St. Antony mine at Sturgeon Lake, near the junction of the Transcontinental railway and the Lake Superior branch, and the Cordova in the county of Peterborough, yielded considerable bullion. The outlook for 1913 is for a much larger production at Porcupine. The other camps undergoing development, such as Larder Lake, Kirkland Lake, Swastika, etc., have not yet reached the stage of steady output.

Silver.—Cobalt well maintained its rate of production, the yield of silver being 30,719,883 fine ounces, worth $17,671,918, as against 31,507,880 ounces worth $15,953,895 in 1911. The total production since the opening of the mines in 1904 has amounted to about 156 million ounces; of a value of about 82 million dollars. A notable feature of the industry at Cobalt is the tendency towards final treatment of the ore on the spot. At first the high grade ore was shipped as mined to smelters in the United States, the low grade going to the dumps. Refining works came into being at several points in Ontario, and concentration plants became common at Cobalt, resulting in great saving of freight and the recovery of silver from ores too low in grade to admit of shipment. The third stage was the establishment of plants for the refining of the silver and the production of merchantable bars. The Buffalo and Nipissing mines are now equipped for reducing their entire output, both of high grade and low grade ore, to silver bullion.

The largest producers during the year were the Nipissing, Coniagas, La Rose, Crown Reserve, McKinley-Darragh-Savage, Kerr Lake, Buffalo, Townsite Temiskaming, O'Brien. Three mines in Gowganda and one in South Lorrain were in active operation. The principal by-product of the Cobalt mines is Cobalt oxide, of which these mines are now the chief, practically the only, source of supply. This article is used to impart to chinaware and porcelain goods the beautiful color known as cobalt blue. Another by-product is white arsenic, and a third, nickel oxide, both of which are utilized in the arts.

Nickel and Copper.—The Sudbury mines yielded 22,421 tons of nickel and

11,116 tons of copper, being the largest production yet. The nickel in the matte was valued at $4,722,040, and the copper $1,581,062. The producing companies are two in number—the Canadian Copper Company and the Mond Nickel Company. The former has been enlarging and improving its plant, and the latter has erected new smelting works at Coniston, east of Sudbury, to which it purposes to remove early in 1913. A third company, the Dominion Nickel Copper Company, has sold its holdings to English interests, who are likely to enter upon a vigorous campaign of production. Extensive diamond drill borings have revealed the presence of very large reserves of ore at the Frood, Murray, and other mines.

Iron Ore and Pig Iron.—Iron ore to the extent of 117,357 tons valued at $238,884 was raised from the Helen, Moose Mountain and Bessemer mines. Concentration plants are being erected at Moose Mountain and Magpie. Of pig iron the output was 589,593 tons as compared with 526,610 tons in 1911, the number of blast furnaces in operation being eight.

Other Products.—Brick, stone, and Portland cement were produced in increased quantities, the whole production of building materials amounting in value to $8,735,575. Petroleum continues to decline in yield, and natural gas to increase, the value of the former in 1912 being $344,537, and of the latter $2,268,022. Salt, gypsum, mica, graphite, corundum, talc, feldspar, iron pyrites, quartz and the other materials on the long list of minor minerals comprised in the mining industry of the Province were produced on about the usual scale, several of them providing the basis of industries of local importance.

The aggregate value of the minerals and mineral products for 1912 was $48,341,612, as compared with $41,976,797 in 1911, an increase of 13 per cent. In the development and settlement of the northern portions of Ontario the mining industry is of great importance, as may be realized from the fact that it gives employment to about 20,000 men and pays out in wages over 12 million dollars yearly.

Collections.

The total revenue of the Department from all sources was $2,900,204.74. Of this $218,737.29 came from agricultural and town sites, and included $98,838, the purchase price of the Townships of Haggart and Kendry. $36,842.65 was derived from town sites; mining lands, $51,634.48; rent—leases, $52,030.16; miners' licenses, permits, and recording fees, $107,162.70; royalties, $250,145.65; supplementary revenue tax, $190,875.53; from woods and forests the revenue was $1,985,662.78, covering such items as bonus, $540,702.85; timber dues, $1,339,957.12; ground rent, $96,262.81; transfer fees, $8,740. (See Appendix No. 4, page 8.)

Disbursements.

The total expenditure of the Department for ordinary services was $603,782.31. Some of the principal items were: Agents' salaries and disbursements, $15,374.84; homestead inspectors, $10,524.41; Crown timber agents, $27,630.94; wood ranging and estimation of timber, $91,753.06; fire ranging, $124,483.74; Forest Reserves, fire ranging, etc., Temagami Reserve $46,394.96, Metagami Reserve, $8,723.86; Mississaga Reserve, $11,965.01; Nepigon Reserve, $8,568.17; Quetico Reserve, $4,407.95; Mines and Mining, $32,129.01; Mining Recorders, $27,296.75; Surveys, $123,016.46; Refunds, $15,625.44; Contingencies, lands, and forests, $25,815.29; Bureau of Mines, $9,188.67.

There was expended under the direction of the Department the sum of $233,-534.29. Of this the largest expenditure was in connection with the Northern Development, under 2, George V., which was $193,082.80; exploration of the District of Patricia, $10,000; parks, $24,471.39. (See Appendices Nos. 6 and 7, pages 10 to 33.)

Woods and Forests.

The total revenue accrual from woods and forests during the year ending the 31st of October, 1912, was $2,068,060.38, which amount is $83,197.78 less than the accrual for last year.

The falling off was principally in the receipts from bonus, which were $96.968 less than the receipts for bonus last year.

The revenue collected on account of the above accrual and those of former years was $1,985,662.78, or $274,225.91 in excess of the revenue collected last year.

The principal increases were in timber dues $166,673.37, and in bonus $113,-884.14.

The mileage under license last year was 996 miles less than that of the previous year. The reason for this was that certain licensees had not paid up their ground rent or were indebted for dues, which prevented the issue of their licenses. 307 miles were also surrendered as having been cut out, and were withdrawn from license.

The output of pine sawlogs, boom timber and square timber brought into feet board measure equalled 487,838,666 feet board measure, which is 96,425,439 feet below the output of 1911.

The output of timber other than pine showed an increase of 24,093,160 feet over last year. There was also an increase in the pulpwood of 49,612 cords. The most notable expansion was in railway ties. The quantity taken out last year was 4,270,832 ties. The quantity taken out this year was 5,704,459 ties, showing an increased output for the year of 1,433,627 ties.

Several berths in the Rainy River, Thunder Bay and Kenora Districts that had been damaged by fire or cut over in previous years were sold by tender.

The only other timber sale held during the year was of two berths on the Jocko River, each having an area of 25 miles, which were in a dangerous position and on which the timber had reached its maturity, and it was considered wise to sell them so as to get the value of the timber. The sale of this timber established a record for price. The pine timber on Berth No. 1 was sold for $13.26 per thousand feet board measure in addition to $2 dues: and the pine timber on Berth No. 2 was sold for $12.10 per thousand feet board measure in addition to $2 dues. In the disposal of these berths it was determined to insert a condition in the terms of sale requiring the licensees to remove all limbs, brush, and other debris arising from the lumbering operations under the direction of an officer appointed by the Department of Lands, Forests and Mines. A deposit was required of $1,000 per mile in each case, which desposit is held as security for the performance of all conditions of sale. The Forester for the Province, Professor Zavitz, was requested to visit the locality, and a special ranger was placed in charge of the cutting to see that the conditions with respect to the disposal of the debris were carried out. The timber will be culled and measured by scalers appointed by the Department.

The year 1912 was, on the whole, a fairly good year for lumbermen, both as regards demand and prices. Some years ago, when our lumbermen looked chiefly

if not altogether to the United States market for their sawn lumber, and the duty was $2 per thousand feet B.M., our inferior grades were shut out of the American market and became unsaleable, and had to be piled up at the mills. Since then we have gone a considerable distance. The expansion of our own country and the enormous building that is going on of towns, cities and railway construction, are such that our lumbermen no longer need look to the United States market, our own markets being able to use up most of the lumber taken out at a fairly good price, not only for superior grades, but for the lower grades as well.

Speaking of the state of the market during the past year an excellent authority says: "The lumber market was firm, generally speaking, throughout 1912; prices showing on the whole an increase in tendency. The demand for lumber for building purposes was probably never so large, and in the year past the United States demand was good. In Ontario the year appears to have been one of steady prices for medium qualities, but low grades also advanced, as did some of the higher grades." The advance in prices was not confined to pine, but all varieties of timber shared in the increased value. Hemlock particularly, which had been somewhat of a drug a year or so ago, became scarce and more than shared in the general increase of prices. The outlook for the coming winter is of even a smaller production of pine lumber than during the year last past.

Fireranging.

There were on duty during last summer: In forest reserves, 228 firerangers: on railways, 193: on lands of the Crown 111, which, with 10 chiefs, makes a total of 542 firerangers employed.

The timber licensees are required to place rangers on their limits and pay them. Under this arrangement there were on duty on licensed lands during the summer 350 rangers and 8 supervisors, making a total staff in the forest last summer of 900.

The Department divides the licensed territory into districts and places a supervising ranger in charge of each district, whose duty it is to see that all limits are properly protected by having firerangers on them. The supervising ranger visits all firerangers in his district and advises them. Should he find any limit unprotected he reports the fact to the Department, which takes the matter up with the licensee. If the licensee fails to put on rangers after notice the Department puts them on and charges the expense against the timber limit, and requires that the licensee pay it before he obtains a renewal of his license. The summer of 1912 was a very wet one, in consequence of which there were no fires of any moment.

Forest Reserves.

The Temagami Forest Reserve, which contains a large quantity of valuable pine timber, covers an area of about 6,000 miles. The Village of Gowganda, a mining centre, is in this Reserve, and there is considerable mining and prospecting going on in different localities. It has become a great summer resort, having innumerable lakes and being easily accessible by the Temiskaming and Northern Ontario Railway. Owing to the number of miners, prospectors, tourists, hunters and others moving about through this Reserve, a large staff of firerangers has to be kept on duty in the summer months. During the past summer one chief ranger and three assistant rangers were on duty in this reserve, with a staff of 137

firerangers. Owing to this close supervision and the season being a wet one, no forest fires took place.

The Mississaga Reserve contains an area of about 3,000 miles. It is called after the large river whose tributaries meander through it. There is a large quantity of first class pine in this Reserve, which, owing to its quality, accessibility, and short drive to Lake Huron, is extremely valuable. Some few years ago a considerable quantity of pine in this reserve was damaged by fire, and we sold it, obtaining as high as $13.37 per thousand feet board measure, including dues. There have been no serious fires in this reserve since. The fireranging staff consists of one chief and 32 firerangers under him. These men are distributed in such manner as to have complete supervision of the routes of travel through the Reserve, the lumbering operations, etc. There is no mining or settlement in or near this Reserve. The only danger, therefore, would be from tourists, explorers and lumbermen, but these are carefully looked after by the ranging staff.

The Nepigon Reserve is the largest in the Province, having an area of 7,300 miles. There is no large quantity of pine timber in this Reserve, but there is an illimitable quantity of pulpwood, consisting of spruce, jackpine, and poplar. The Nepigon River is the most celebrated trout stream on the continent, and visitors from all over the United States come to enjoy the sport afforded by its waters. Great care is exercised by rangers along the portages and camping places to see that fires are extinguished by campers and others using the stream. The large lake from which the Reserve takes its name is one of the most beautiful lakes in Canada—60 or 70 miles long by about 35 miles wide. It contains a large number of islands, and is becoming better known each season. Here is one of the oldest Hudson Bay Company posts—Nepigon House—which is continually referred to in the history of the fur trade in its very earliest stages in that immense region. Two of the three transcontinental railways run through this Reserve, viz., the Grand Trunk Pacific and the Canadian Northern, while the Canadian Pacific Railway runs along its southern boundary. Great care was exercised this past season along the construction work of the Canadian Northern and the Grand Trunk Pacific. In the Reserve proper there was a chief ranger and 20 firerangers on duty under him; and in addition there were two firerangers on every two miles of railway construction on the two railways being built through the Reserve. The Canadian Northern Railway comes into the Reserve at what is now called Orient Bay, which is at the east end of the lake. It is in contemplation to make this a divisional point and erect a summer hotel there. There have been no serious fires in this reserve of late years, notwithstanding the thousands of employees on the railway which built through it. When the two railways are finished and in running order—one touching it at the north end and one at the south—it will become one of the greatest summer resorts in Canada.

The Quetico Reserve is situated in the Rainy River District abutting on the boundary waters between Canada and the United States. It contains an area of 1,500 miles and there is a very large quantity of good pine in it. There is no settlement in or near it and few prospectors. A few timber berths were sold before the Reserve was created, and some lumbering has been carried on. There are two or three Indian Reserves in this Reserve and an Indian population of 123. The Quetico Reserve is a harbour for game, and is well protected by a permanent staff. It lies immediately north of a game reserve on the United States side of the waters. There was on duty in this Reserve last summer a chief ranger and fourteen fire-

rangers under him, who looked after the protection of the timber from trespass or fire.

The Eastern Reserve is situated in the County of Addington and has an area of 100 square miles. This Reserve was originally covered by timber licenses and the townships composing it were opened for settlement. When the Reserve was set apart a surrender of the timber licenses was taken, but where settlement existed the patentees or locatees remained in occupation; consequently there are a number of settlers scattered through the Reserve. The object of setting apart this Reserve was to see how a cutover limit adequately protected would reforest. The experiment has been interesting as well as satisfactory. Growth has been luxuriant, and has evidenced that in course of time this Reserve will produce quantities of valuable merchantable pine, hardwood, hemlock, and other timbers. The Reserve is protected by one chief and six firerangers.

The Sibley Reserve contains an area of only 70 miles. It covers the great promontory at the entrance of Thunder Bay called Thunder Cape. This territory had been partly burnt over and it was set apart as a forest reserve so that it might be protected and grow up again. The result has been very satisfactory, as the point is becoming clothed again with timber. No fires have occurred in this Reserve.

There are two parks in the Province under Government control, the Algonquin and the Rondeau.

The Algonquin National Park has an area of 2,060 miles and covers the head waters of the Muskoka, Petewawa, Madawaska, Amable du Fond, South River, and some other minor streams. One of the important objects in setting aside this park was to keep the head waters of these large rivers clothed with timber instead of allowing them to be denuded. Another was to protect the game and animal and bird life generally. Another object was to afford a large forest area where people might get in touch with Nature and enjoy the benefits resulting therefrom, such as pleasant surroundings, good fishing, delightful canoeing through what may be described as a lacustrine paradise, and renewed health and strength; the quieting of the timber titles and bringing the territory back into the hands of the Crown so that the timber might be permitted to grow and be conserved for the use of posterity. The park is admired by everyone who visits it for its beauty. It is rapidly becoming a winter resort, where skating, snow-shoeing, and other Canadian recreations can be enjoyed to the full. The protection afforded the game has caused it to increase so rapidly that thousands of dollars have been obtained by taking a certain number of beaver, otter, mink, etc., and disposing of them by public sale.

Rondeau Park.—This park has an area of 8 square miles. It is beautifully situated, lying as it does between Rondeau Harbour and Lake Erie. Here is to be found the finest piece of original forest in the Province. Magnificent specimens of trees that are almost extinct are growing here, such as black walnut, butternut, sycamore, etc. This park was set apart to protect and conserve this particular forest and to create a harbour for game. It was also intended to afford a place where people from the surrounding country might have a recreation ground during the summer months. Many summer cottages have been erected. The park is a favorite resort for picknickers from towns in the vicinity. Driveways are built through it and there is a constant stream of automobiles. Ten years ago a few deer were placed in the park and they have been carefully protected. They have multiplied until they became a menace to the crops of the surrounding people and

it became necessary to kill off nearly one hundred of them, and $800 was derived from the sale of the meat.

(For Superintendents' reports see Appendices Nos. 30 and 31, page 71 to 76.)

Railways.

An additional staff of rangers had to be put upon the railways in the Province owing to increased construction. The Transcontinental runs through the Province north of the height of land on the Hudson Bay slope from the time it enters Ontario until it passes into the Province of Manitoba. In addition to the main line there is a branch from Fort William to Sioux Lookout. Considerable progress has been made in the construction of the Transcontinental, but it is still in the hands of the contractors and we have to look after the fireranging on it very closely.

The Canadian Northern is under construction from near Ruel west to Port Arthur, and from Ruel east to Pembroke, and a large staff of firerangers were kept on it.

The Algoma Central is under construction from Hobon to Hearst. On the Transcontinental the usual staff of rangers was on duty all summer.

On these railways we have placed four supervising rangers with two men on each ten miles under them. Their instructions were to keep a close watch over the habits and acts of the labourers. The Italians and other foreigners are notoriously careless in the use of fire, using it for smudges and for cooking—not only in the camp where they live, but wherever they sit down to lunch or smoke, and they are inveterate cigarette smokers and careless how they dispose of the partly unsmoked cigarette and where they throw down matches. The rangers are instructed to impress upon the foremen the necessity for warning their men to be very careful in the use of fire, and also to be sure to extinguish it when it has served their purpose, whatever that may have been. Where the labour is English-speaking the rangers warn them and give them directions and hand them a copy of the Fire Act. They also put up poster copies in Italian and English at all points where men congregate. By doing this and traversing their five-mile beats twice a day—once out and once back—they keep in touch with what is going on and enforce obedience to the regulations. We had no fires of any consequence on the Transcontinental last summer. This no doubt was, in a measure, due to the very wet season.

On the Canadian Northern from Ruel to Nepigon we put a ranger on every seven miles. The company had an engineer with a residency every seven miles, and one ranger was put in each residency, and the engineers and contractors were asked to see that they did their duty in patrolling the railway and render them every assistance they required. We had no fires of any consequence on this railway.

On the Algoma Central a staff of rangers was also on duty under similar instructions and no fires occurred there.

The railways that are in running order or partly in running order are the Canadian Pacific, the Canadian Northern, the Algoma Central, the Algoma Eastern and the Temiskaming & Northern Ontario.

On the Canadian Pacific we had one ranger from the Severn north, whose duty it was to take care of the block of pine timber that grows in the Township of Wood through which the railway runs. We had another ranger on the C. P. R. from Port Arthur west, his duty being to have supervision of the track to see where ties were being burnt or any fires taking place along the line, and wherever he finds a fire to get off the train at the next station and find out all particulars about it, and

see that it is extinguished. Considerable danger has existed from carelessness in the burning of ties that have been used up and pulled out of the track, and therefore it was thought expedient to put a travelling ranger on to see that care was exercised where fire was used for this purpose.

On the Canadian Northern, from Port Arthur to Rainy River there were also rangers placed, and no fires occurred.

On the Temiskaming & Northern Ontario Railway we had a staff of rangers from a short distance north of North Bay through the Temagami Forest Reserve. On this line the rangers follow the trains out of their districts or divisions with speeders, and great care is exercised as the railway runs through a dense body of pine. No fires occurred on this railway during the past season.

From Latchford north a considerable distance no firerangers are required, as the railway travels through a settled region.

Further up rangers are placed again in sufficient numbers to have close supervision of the railway and to see that the regulations are observed, and if any fires occur to extinguish them immediately.

As before stated, there were on railways during the past summer 193 firerangers and 9 chiefs, making a total staff of 202.

Cullers' Examinations.

Cullers' examinations were held at Kenora and North Bay. Twenty-two candidates were successful at these examinations and were granted certificates authorizing them to act as cullers.

(For list of cullers who passed at the above examinations see Appendix 32, page 77.)

(For complete list of licensed cullers see Minister's report for 1911.)

Crown Surveys.

The following Crown surveys have been undertaken this year.

Instructions were given for subdivision of the following townships:

Township of Drayton, at Sioux Lookout, on the National Transcontinental Railway, in the district of Kenora.

Township of Mathieu, in the district of Rainy River.

Townships of McMillan, Mulloy; Gill, Studholme, Stoddart, Kendall, Way, and parts of the townships of Hanlan and Casgrain, in the district of Algoma.

Townships of Shackleton and Sargeant and parts of the townships of Nansen and Fauquier, in the district of Temiskaming.

Also for resurveys of parts of the townships of Pardee and Crooks, and the Dawson Road Lots, in the district of Thunder Bay, and Mattawan in the district of Nipissing.

Instructions were given for subdivision of the following townships:
ship outlines in the districts of Algoma, Nipissing, and Sudbury, the great majority of this work being along the lines of the Algoma Central and Hudson Bay Railway, north of the Canadian Pacific Railway, and along the line of the Canadian Northern Ontario Railway between Sudbury and Oba Junction.

Instructions were issued for survey of timber berths in the township of Mulligan, district of Temiskaming, also timber berth "G," in the district of Temiskaming.

Instructions were also issued for survey of town plot at Armstrong, in the district of Thunder Bay, and an addition to the town plot of Hearst, in the district of Algoma.

The reports of the surveyors so far as received and examined will be found in Appendices 18 to 29 inclusive, pages 49 to 70 inclusive.

Municipal Surveys.

On the petition of the Municipal Council of the Township of Williamsburgh, instructions were issued to survey the road allowance between the 7th and 8th concessions of the Township of Williamsburgh, from the east limit of lot 25, or the nearest undisputed monument, to the west limit of the township. Also on the petition of the Municipality of the Council of Marlborough, instructions were issued to survey the road allowance between the 6th and 7th concessions of the Township of Marlborough, in the county of Carleton, opposite lots 1, 2, 3 and 4, or as much farther as may be necessary to find an original monument and to define by permanent stone or other monuments the limits of the said road allowance. Also on the petition of the Municipal Council of the Township of Assiginack, instructions were issued to survey the rear boundary of lots 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, concession No. 2, in the Township of Assiginack, being the road allowance in rear of the lots fronting on the road to Michael's Bay, and have the same defined by permanent monuments, also in front of lots 20, 21 and 22 on the 6th and 7th concession road allowance. Also on the petition of the Council of the Township of Hinchinbrooke, to survey the line between concessions 7 and 8 from lots 9 to 13, in the Township of Hinchinbrooke.

The following municipal surveys have been confirmed under the provisions of the Revised Statutes of Ontario 1897, chapter 181, sections 14 and 15, such surveys being final and conclusive: Part of the concession line between concessions 3 and 4, in the township of East Oxford, in the County of Oxford, across lots 16 to 18 inclusive, and to define the road allowance between said concessions with stone or iron monuments. Also the concession line between concessions 6 and 7 in the Township of Elmsley North in the County of Lanark, from lots 22 to 30 inclusive, and to define the same by stone or iron monuments.

Particulars relating to these surveys will be found in Appendices 14 and 15, pages 44 and 45.

Mining and Other Surveys.

The Mining Act of Ontario requires that applicants to purchase or lease mining lands in unsurveyed territory shall file in the Department surveyor's plans (in triplicate) of the proposed mining claims with field notes and description by metes and bounds, before any sale or lease can be carried out, and under Orders-in-Council, dated February 26th, 1906, 2nd October, 1907, 7th November, 1907, applicants to purchase islands, or locations for pleasure and summer resorts or for agricultural purposes in unsurveyed territory, are required to file surveyor's plans (in triplicate) of their islands or locations as the case may be, with field notes and descriptions by metes and bounds, together with the necessary affidavits as to there being no adverse claim by occupation or improvement, etc.

Under the above Act, Orders-in-Council and Regulations in the Districts of Parry Sound, Nipissing, Sudbury, Algoma, Thunder Bay, Rainy River and Kenora, an area of 18,428.27 acres has been sold and patented during the year, for which the sum of $66,121.50 has been received, and an area of 15,262.99 acres has been leased for the sum of $15,878.79 as the first year's rental.

W. H Hearst,
Minister.

Department of Lands, Forests and Mines.
Toronto, October 31st, 1912.

APPENDICES

Appendix No. 1.

Return of Officers and Clerks of the Department of Lands, Forests and Mines for the year ending October 31st, 1912.

Branch.	Name.	Designation.	When appointed.	Salary per annum.	Remarks.
				$ c.	
	Hon. W. H. Hearst	Minister	1911, Oct. 12	6,000 00	
	Aubrey White	Deputy Minister	1882, Jan. 1	4,100 00	
	Geo. Kennedy	Law Clerk	1872, Feb. 1	2,700 00	
	Geo. W. Yates	Minister's Secretary	1899, Feb. 26	2,000 00	Resigned, Dec. 30, 1911.
	C. C. Hele	do do	1912, Jan. 23	1,600 00	
	E. S. Williamson	Secretary to Department	1889, May 1	1,850 00	
	Janet Garvie	Stenographer	1905, Jan. 1	750 00	
	James Farrington	Clerk and Stenographer	1910, Dec. 14	600 00	
Sales and Free Grants	J. J. Murphy	Chief Clerk	1872, May 1	2,200 00	
	Walter C. Cain	Clerk	1903, March 6	1,600 00	
	W. R. Ledger	do	1894, Feb. 5	1,250 00	
	Selby Draper	do	1903, Jan. 1	1,250 00	
	S. A. Platt	do	1907, March 13	1,050 00	
	F. Lucas	do	1909, March 24	1,000 00	
	F. Samuels	do	1909, March 24	775 00	
	W. B. Baines	do	1912, Oct. 5	800 00	
	May Bengough	Stenographer	1896, Oct. 23	700 00	
	Jean C. Oram	do	1907, Jan. 16	700 00	
	Nan McQueen	do	1909, March 24	675 00	
Military Grants.	R. H. Browne	Chief Clerk	1900, March 2	1,850 00	Died, Sept. 2, 1912.
	H. E. Johnston	Clerk	1907, March 13	1,100 00	
	E. F. O'Neil	Stenographer	1904, Nov. 9	700 00	
Surveys	G. B. Kirkpatrick	Director of Surveys	1886, Jan. 30	2,650 00	
	J. F. Whitson	Surveyor and Draughtsman	1892, Sept. 1	2,500 00	Transferred to Northern Development Branch June 1, 1912.
	L. V. Rorke	Asst. do do	1909, May 1	2,100 00	
	W. F. Lewis	Clerk	1872, May 5	1,300 00	
	D. G. Boyd	Draughtsman	1897, Sept. 27	1,500 00	
	E. M. Jarvis	Clerk	1904, Oct. 19	1,200 00	
	J. B. Proctor	do	1897, Jan. 15	1,100 00	
	H. Treeby	Draughtsman	1904, Jan. 13	1,150 00	

	John Work	Draughtsman	1911, March 3	1,050 00	
	F. E. Blanchet	do	1907, March 13	1,000 00	
	J. L. Byrne	do	1909, March 24	1,000 00	Died, Sept. 18, 1912.
	A. Leaman	do	1909, March 24	1,000 00	
	B. Rushford	do	1912, Oct. 5	950 00	
	M. H. Kirkland	Stenographer	1904, Nov. 23	700 00	
	E. G. Halliday	do	1909, March 24	650 00	
	E. C. Armer	do	1911, March 3	575 00	
	B. Benson	do	1911, March 3	575 00	
	C. O'Connor	do	1911, March 3	575 00	
Patents	C. S. Jones	Chief Clerk	1890, May 22	1,950 00	
	C. E. Burns	Clerk	1900, April 9	1,300 00	
	W. S. Sutherland	do	1902, Jan. 13	1,250 00	
	W. Carrell	do	1904, Jan. 15	1,150 00	
	A. E. Robillard	do	1894, May 8	950 00	
	A. E. Roe	do	1909, March 24	1,050 00	
Woods and Forests	J. A. G. Crozier	Chief Clerk	1867, Dec. 1	2,200 00	
	J. B. Cook	Clerk	1898, Aug. 1	1,600 00	
	H. Gillard	do	1900, April 9	1,400 00	
	F. J. Niven	do	1903, March 6	1,200 00	
	W. F. Trivett	do	1904, Jan. 13	1,150 00	
	R. H. Hodgson	do	1904, Nov. 23	1,100 00	
	J. Houser	do	1907, March 13	1,200 00	
	A. H. O'Neil	do	1909, March 24	900 00	
	G. W. Harris	do	1909, March 24	900 00	
	N. L. Rogers	do	1911, Nov. 1	850 00	
	S. D. Meeking	do	1910, June 1	800 00	
	Florence Lennon	Stenographer	1907, March 13	700 00	Resigned, June 30, 1912.
	Amy Thompson	do	1909, March 24	700 00	
	Mary E. Bliss	do	1909, Sept. 1	600 00	
Accounts	D. G. Ross	Accountant	1861, April 15	2,400 00	
	H. M. Lount	Clerk	1904, Jan. 13	1,400 00	
	H. G. Harris	do	1907, March 13	1,050 00	Resigned June 4, 1912.
	C. J. Clarke	do	1907, March 13	1,050 00	
	C. Bowland	Clerk and Stenographer	1911, March 3	625 00	
	Frank Yeigh	Registrar	1880, March 1	1,550 00	
	Chester Dies	Clerk	1907, March 13	1,100 00	
Bureau of Mines.	Thomas W. Gibson	Deputy Minister	1891, June 19	3,600 00	
	R. D. Fisher	Secretary	1907, March 13	1,200 00	

Appendix No. 1.—Concluded.

Return of Officers and Clerks of the Department of Lands, Forests and Mines for the year ending October 31st. 1912

Branch.	Name.	Designation.	When appointed.	Salary per annum.	Remarks.
				$ c.	
Bureau of Mines.	W. H. Morris	Clerk	1906, Jan. 1	1,050 00	
	R. A. Sinclair	do	1907, March 13	1,000 00	Died, Dec. 6, 1911.
	W. Lemoine	do	1908, April 8	1,050 00	
	A. Burritt	do	1908, April 8	1,050 00	
	D. H. Barr	do	1907, March 13	1,050 00	
	Anne Moffatt	do	1901, March 1	1,000 00	
	A. G. Scovell	do	1909, March 24	950 00	
	C. W. St. John	do	1910, April 14	900 00	
	Ethel Craig	Stenographer	1906, May 16	725 00	
	Flossie McDougall	do	1907, March 13	700 00	
	J. L. McNaughton	do	1909, March 24	700 0	
	H. W. Batchelor	do	1911, Dec. 19	550 00	
	H. Brophy	Messenger	1898, Oct. 1	850 00	

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Deputy Minister Lands and Forests.

Appendix No. 8.

List of Land Agents and Homestead Inspectors for the year ending October 31st, 1912.

Name.	Post office address.	District or county.	Date of appointment.	Salary per annum.	Remarks.
				$ c.	
Baker, R. H.	Minden	Part of Victoria	1907, Oct. 1	350 00	
Barr, James	Fort Frances	Homestead Inspector	1906, Nov. 23.	1,200 00	
Both, Charles	Denbigh	Part of Frontenac and Addington	1905, Oct. 20.	100 00	
Brown, J. B.	Bracebridge	Homestead Inspector and Crown Land Agent	1905, July 28.	900 00	
Byers, R. J.	Massey	Part of District of Sudbury	1905, July 3.	500 00	
Buchanan, T.	Thessalon	do do Algoma	1901, Nov. 30.	300 00	
Burrows, W. A.	Port Arthur	do do Thunder Bay	1912, Jan. 30.	500 00	
Burnes, C. W.	Sundridge	Homestead Inspector	1905, Nov. 15.	900 00	
Cameron, Wm.	Stratton Sta.	Part of District of Rainy River	1911, Apr. 27.	500 00	
Chester, T.	New Liskeard	Homestead Inspector	1906, June 8.	1,200 00	
Child, F. A.	Matheson	Part of District of Nipissing	1909, Jan. 8.	500 00	Resigned, March 12, 1912.
Dean, Thomas	Sault Ste. Marie	Homestead Inspector	1908, July 29.	600 00	
Dempsay, S. J.	Cochrane	Part of District of Nipissing	1911, Feb. 1.	500 00	
Douglas, W. J.	Greenview	do Hastings	1912, June 1.	500 00	
Ellis, H. J.	Powassan	do do Parry Sound	1909, May 20.	500 00	
Freeborn, Dr. J. S.	Magnetawan	do do do	1905, Nov. 10.	500 00	
Ginn, F. E.	Matheson	do do Nipissing	1912, Mar. 20.	500 00	
Grills, J. J.	New Liskeard	Lake Temiskaming, District of Nipissing	1905, July 3.	500 00	
Grouix, R. J.	Chelmsford	Homestead Inspector	1906, May 7.	600 00	
Hales, W.	Apsley	Part County of Peterboro	1911, July 17.	250 00	
Hollands, C. J.	Fort Frances	Part Townplot of Alberta and part of District of Rainy River	1892, Oct. 12.	300 00	
Hughes, Thomas	Murillo	Homestead Inspector	1908, July 20.	800 00	
Jenkins, Wm.	Emsdale	Part of District of Parry Sound	1908, July 29.	500 00	
Langlois, E.	Warren	do do Sudbury	1911, Apr. 4.	500 00	
Lemieux, J. A.	Blezard Valley	do do do	1908, July 1.	400 00	
MacLennan, J. K.	Sudbury	do do do	1905, July 3.	500 00	
McFadyen, Alex.	Emo	do do Rainy River	1905, Sept. 8.	500 00	
Mulvaney, N.	Espanola Sta.	do do Algoma	1912, June 1.	100 00	
Parsons, W. J.	North Bay	do do Nipissing	1908, April 8.	500 00	
Philion, J. A.	Sturgeon Falls	do do do	1907, Sept. 13.	500 00	

Appendix No. 2.—Concluded.

List of Land Agents and Homestead Inspectors for the year ending October 31st, 1911.—*Continued.*

Name.	Post office address.	District or county.	Date of appointment.	Salary per annum.	Remarks.
				$ c.	
Powell, F. R.	Parry Sound	Part of District of Parry Sound	1907, May 31.	500 00	
Prince, Adam	Wilno	do Renfrew	1905, July 12.	500 00	
Pronger, R. H.	Dryden	District of Rainy River	1906, May 7.	500 00	
Quenneville, I.	Sturgeon Falls	Homestead Inspector	1906, May 7.	600 00	
Rothwell, B. J.	Sault Ste. Marie.	Part District of Algoma	1909, March 1	300 00	
Smith, Dalton	Cochrane	Homestead Inspector	1912, April 16	800 00	
Small, Robert	Mattawa	Part District of Nipissing	1910, June 30.	500 00	
Spry, W. L.	Kenora	do do Rainy River	1909, Sept. 21.	400 00	Also Mining Recorder.
Tait, J. R.	L'Amable	do Hastings	1869, May 28.	500 00	Died, May 13, 1912.
Wilson, James	Kinmount	do Peterboro	1905, May 31.	150 00	
Warren, D. B.	Pembroke	do Renfrew	1905, July 3.	300 00	
Watson, T. P.	New Liskeard	Homestead Inspector	1905, May 10.	915 00	
Whybourne, W. E.	Marksville	Part of St. Joseph Island	1905, April 7.	250 00	
Woollings, J.	Englehart	do District of Nipissing	1908, June 30.	500 00	

D. GEO. ROSS
Accountant.

AUBREY WHITE,
Deputy Minister Lands and Forests.

Appendix No. 3.

Statement of Lands Sold and Leased. Amount of Sales and Leases and Amount of Collections for the year ending October 31st, 1912.

Service.	Acres sold and leased.	Amount of sales and leases.	Collection on sales and leases.
Lands Sold:		$ c.	$ c.
Agricultural and Townsites	349,319.28	272,233 08	218,710 29
Mining	18,971.96	45,552 18	51,634 48
Clergy	101	110 00	1,565 92
Common School	2.50	94 00	7,121 25
Grammar School	.....	.....	292 55
University	11,890.50	6,855 80	4,263 39
Lands Leased:			
Mining	16,711.85	17,316 65	33,098 34
Crown	15,793.50	2,157 50	18,931 82
	412,790.59	$344,319 21	$335,645 04

D. GEO. ROSS.
Accountant.

AUBREY WHITE.
Deputy Minister Lands and Forests.

Appendix No. 4.

Statement of Revenue of the Department of Lands, Forests and Mines for the year ending October 31st, 1912.

Service.	$ c.	$ c.	$ c.
LAND COLLECTIONS.			
Crown Lands:			
Agricultural	181,894 64		
Townsites	36,842 65		
		218,737 29	
Mining	.....	51,634 48	
		270,371 77	
Clergy Lands	1,565 92		
Common School Lands	7,121 25		
Grammar School Lands	292 55		
University Lands	4,263 39		
		13,243 11	
Rent:			
Mining Leases	33,098 34		
Crown Leases	18,931 82		
		52,030 16	
Miners' Licenses	56,147 75		
Permits	1,780 75		
Recording Fees	49,234 20		
		107,162 70	
Royalties	.....	250,145 65	
Supplementary Revenue:			
Acreage Tax	15,770 62		
Profit Tax	155,506 86		
Gas Tax	19,598 05		
		190,875 53	
WOODS AND FORESTS.			883,828 92
Bonus	.....	540,702 85	
Timber Dues	.....	1,339,957 12	
Ground Rent	.....	96,262 81	
Transfer Fees	.....	8,740 00	
			1,985,662 78
Provincial Assay Fees	654 00		
Casual Fees	655 47		
Cullers' Fees	124 00		
		1,433 47	
Algonquin Park	7,610 05		
Rondeau Park	489 65		
Forest Reserves	778 80		
		8,878 50	
			10,311 97
REFUNDS.			
Wood Ranging	.....	5,751 67	
Fire Ranging	.....	13,821 88	
Surveys	.....	74 77	
Contingencies	.....	60 00	
Diamond Drill	.....	208 25	
Agents' Salaries	.....	468 50	
Mining Recorders	.....	16 00	
			20,401 07
			$ 2,900,204 74

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 5.

Statement of Receipts of the Department of Lands, Forests and Mines for the year ending October 31st, 1912, which are considered as Special Funds.

Service.	$ c.	$ c.
Clergy Lands.		
Principal	956 59	
Interest	609 33	
		1,565 92
Common School Lands.		
Principal	2,303 28	
Interest	4,817 97	
		7,121 25
Grammar School Lands.		
Principal	110 80	
Interest	181 75	
		292 55
University Lands.		
Principal	4,144 07	
Interest	119 32	
		4,263 39
		$13,243 11

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 6.

Statement of Disbursements of the Department of Lands, Forests and Mines for the year ending October 31st, 1912.

Service.	$ c.	$ c	$ c.
AGENTS' SALARIES AND DISBURSEMENTS.			
Land, $15,374.84.			
Baker, R. H.	350 00		
Disbursements	8 30		
		358 30	
Both, C.	.....	100 00	
Brown, James B.	900 00		
Disbursements	135 96		
		1,035 96	
Buchanan, Thomas	300 00		
Disbursements	4 52		
		304 52	
Burrows, W. A.	369 50		
Disbursements	18 45		
		387 95	
Byers, R. J.	500 00		
Disbursements	5 25		
		505 25	
Child, F. A.	190 75		
Disbursements	50 45		
		241 20	
Cameron, Wm.	500 00		
Disbursements	39 75		
		539 75	
Dempsay, S. J.	500 00		
Disbursements	54 35		
		554 35	
Douglas, W. J.	.....	175 70	
Ellis, H. J.	.....	500 00	
Freeborn, J. S.	500 00		
Disbursements	14 50		
		514 50	
Ginn, F. E.	309 25		
Disbursements	64 05		
		373 30	
Grills, J. J.	500 00		
Disbursements	78 95		
		578 95	
Hollands, C. J.	.....	300 00	
Hales, W.	.....	250 00	
Jenkin, Wm.	500 00		
Disbursements	7 87		
		507 87	
Langlois, E.	500 00		
Disbursements	4 06		
		504 06	
Lemieux, J. A.	.....	400 00	
Mulvaney, N.	41 66		
Disbursements	38		
		42 04	
McFayden, A.	500 00		
Disbursements	81 91		
		581 91	
MacLennan, J. K.	500 00		
Disbursements	69 85		
		569 85	
Carried forward	.....	9,325 46	

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		9,325 46	
AGENTS' SALARIES AND DISBURSEMENTS—*Continued.*			
Land.—Concluded.			
Oliver, J. A. (Acting)	.....	130 50	
Parsons, W. J.	500 00		
Disbursements	17 00		
		517 00	
Philion, J. A.	500 00		
Disbursements	20 18		
		520 18	
Powell, F. R.	500 00		
Disbursements	16 00		
		516 00	
Prince, A.	500 00		
Disbursements	17 00		
		517 00	
Pronger, R. H.	464 80		
Disbursements	41 43		
		506 23	
Rothwell, B. J.	300 00		
Disbursements	9 00		
		309 00	
Small, R.	500 00		
Disbursements	5 56		
		505 56	
Spry, W. L.	400 00		
Disbursements	523 75		
		923 75	
Tait, J. R.	.....	324 30	
Warren, D. B.	300 00		
Disbursements	14 25		
		314 25	
Whybourne, W. E.	250 00		
Disbursements	3 41		
		253 41	
Wilson, J.	150 00		
Disbursements	16 20		
		166 20	
Woollings, Jos.	500 00		
Disbursements	46 00		
		546 00	
Homestead Inspectors, $10,524.41			
Barr, James	1,200 00		
Disbursements	639 15		
		1,839 15	
Burnes, C. W.	900 00		
Disbursements	706 20		
		1,606 20	
Chester, T.	1,200 00		
Disbursements	279 80		
		1,479 80	
Dean, T.	600 00		
Disbursements	51 05		
		651 05	
Groulx, R. J.	600 00		
Disbursements	733 80		
		1,333 80	
Carried forward	.....	22,284 84	

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		22,284 84	
AGENTS' SALARIES AND DISBURSEMENTS—*Continued.*			
Homestead Inspectors.—Concluded.			
Hughes, Thos.	650 00		
Disbursements	320 65	970 65	
Quenneville, I.	600 00		
Disbursements	49 80	649 80	
Smith, Dalton	415 35		
Disbursements	115 35	530 70	
Watson, T. P.	915 00		
Disbursements	548 26	1,463 26	
Timber, $27,630.94.			
Christie, W. P.	1,600 00		
Disbursements	383 59	1,983 59	
Hawkins, S. J.	1,400 00		
Disbursements	354 06	1,754 06	
Henderson, C.	1,800 00		
Webster, W. A.	800 00		
Disbursements	446 10	3,046 10	
Johnson, S. M.	1,600 00		
Disbursements	176 28	1,776 28	
McDonald, H.	1,400 00		
Disbursements	391 75	1,791 75	
McDougall, J. T.	1,600 00		
Disbursements	304 10	1,904 10	
MacDonald, S. C.	1,600 00		
Disbursements	179 05	1,779 05	
Margach, Wm.	1,600 00		
Legris, John	1,241 66		
Disbursements	2,129 97	4,971 63	
Maughan, Jos.	1,400 00		
Disbursements	529 68	1,929 68	
Oliver, J. A.	1,500 00		
Penfold, G. S.	733 36		
Disbursements	852 51	3,085 87	
Stevenson, A.	1,400 00		
Disbursements	437 20	1,837 20	
Watts, G.	1,500 00		
Disbursements	271 63	1,771 63	
Carried forward		53,530 19	

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		53,530 19	
AGENTS' SALARIES AND DISBURSEMENTS—*Concluded.*			
Miscellaneous, $1,455.66.			
Ames, D. H., Caretaker Islands in Dog and Loughborough Lakes		20 00	
Bilton, Geo., Caretaker Islands in North and South Crosby		25 00	
Coveney, E., Valuating Lots in Sandwich East		25 00	
Davis, S., Caretaker Islands in Leonard Lake		20 00	
Guthrie, Wm., Caretaker Islands in Devil's Lake		25 00	
Giroux, F. A., Inspecting Township of Lorrain		71 00	
McArthur, T. A., Inspector of Agencies	250 00		
Disbursements	464 40		
		714 40	
McKelvey, Wm., Inspection of Lots in Hardy and McConkey		440 26	
Scott, John, Inspecting Township of McConkey		115 00	
			54,985 85
OTTAWA AGENCY.			
Darby, E. J., Agent		1,500 00	
Larose, S. C., Clerk		1,000 00	
Rent	500 00		
Disbursements	95 41		
		595 41	
WOOD RANGING.			3,095 41
Allen, R. A.	1,080 00		
Disbursements	100 45		
		1,180 45	
Almon, J. E.		332 00	
Ainslie, D.		675 00	
Ansley, W. E.		750 00	
Ansley, J. J.		317 50	
Arnell, Wm.		695 00	
Bailey, S. I.		905 00	
Barrett, Thos.	780 00		
Disbursements	43 00		
		823 00	
Barins, P.		60 00	
Bates, R.		136 00	
Baulk, G. R.		380 00	
Bedome, W. E.		312 00	
Benham, W. E.		120 00	
Berlinquet, J.		188 00	
Binnie, T.		805 00	
Bliss, L. E.	915 00		
Disbursements	853 91		
		1,768 91	
Boussineau, Peter		141 00	
Bremner, Geo.		400 00	
Brown, J. T.		1,008 00	
Buckan, S.		324 00	
Buchan, H.		539 42	
Buie, D.		938 27	
Buisson, Wm.		765 00	
Burns, Gordon G.		228 00	
Burns, W. S.		205 50	
Carried forward		13,997 05	58,081 26

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		13,997 05	58,081 26
WOOD RANGING.—*Continued.*			
Callahan, T.		500 00	
Canose, J.		162 00	
Carnfoil, D.		175 50	
Carter, Geo.		565 00	
Castonguay, A. C.		835 00	
Charlton, W. R.		81 00	
Chenier, D. A.		655 00	
Clarke, D.		564 00	
Comer, B. F.		484 00	
Corrigan, R. T.		1,210 00	
Coyne, Phin.		885 00	
Crawford, S. N.		317 50	
Cross, R. J.		536 00	
Currie, J.		147 00	
Didier, H.		770 00	
Dougherty, R.		50 00	
Dougherty, J. M.		92 00	
Douglas, J.		9 00	
Durrell, Wm.		1,240 00	
Duval, C. A.		605 00	
Ferguson, E. A.		815 00	
Fiddes, J.		444 00	
Fisher, Geo.		765 00	
Fraser, D.		895 00	
Fraser, W. A.		360 00	
Fraser, T.		117 00	
Gamey, W. H.		620 00	
Gault, R.		24 00	
Gilligan, E.		6 00	
Gorman, J. P.		552 50	
Hagan, E. G.		550 00	
Hargis, Thos.		416 00	
Hartley, Chas.		1,175 00	
Hawkins, H. C.		575 00	
Henderson, Chas.		107 15	
Henry, Mat.		3 00	
Hey, B.		220 00	
Huckson, A. H.		1,275 00	
Hutton, John		1,270 00	
Irving, Ed.		560 00	
Johnston, T.		158 00	
Kelso, Robt.		3 00	
Kernahan, G. A.		192 00	
Kerby, D. F.		675 00	
Lee, J. B.		740 00	
LeRoy, J. H.		804 00	
Lockhart, Jas.		6 00	
Londry, W. E.		539 42	
Long, H. E.	780 00		
Disbursements	212 15		
		992 15	
Lowe, W. E.		484 00	
MacDonell, R. D.		588 00	
MacNamara, J.		795 00	
Margach, Wm., Disbursements		338 93	
Margach, J. A.	680 00		
Disbursements	19 10		
		699 10	
Carried forward		41,644 30	58,081 26

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Carried forward		41,644 30	58,081 26
WOOD RANGING.—*Continued.*			
Manice, Wm.		1,185 00	
Maughan, J., Disbursements		149 44	
Menzies, Alex.		880 00	
Milway, J. H.		995 00	
Molyneaux, G.		860 00	
Mooney, L.		310 00	
Morel, H.		395 00	
Morley, C.		560 00	
Muckle, J.		132 00	
Murray, Wm.		1,420 00	
McAuley, W. D.		611 34	
McCaw, J. G.	1,565 00		
Disbursements	62 32		
		1,627 32	
McCaw, J. E.		595 00	
McDonald, A. J.	1,252 00		
Disbursements	70 20		
		1,322 20	
McDonald, J.		306 00	
McDonald, J. D.		1,345 00	
McDonald, Thos.		541 85	
McDonald, A.		504 00	
McGillivray, D. D.		560 00	
McGregor, C. F.		505 00	
McIvor, J. A.		480 00	
McLaughlin, J.		200 25	
McLeod, W. A.		820 00	
McKenzie, R.		632 00	
McKinley, J. H.		580 00	
McNabb, Alex.		850 00	
McPherson, J. S.		1,540 00	
Nault, Jas.		56 00	
Nevison, R. H.		284 00	
Newburn, Wm.		660 00	
Niblett, J.		245 00	
O'Donald, C.		55 00	
Oliver, J. A., Disbursements		34 00	
O'Malley, D.		37 50	
Paul, C. A.		938 27	
Patterson, Malcolm		141 00	
Pigott, J.		1,060 00	
Presley, J.		50 00	
Prevost, D.		110 25	
Pronger, H.		141 00	
Purdy, John		655 00	
Revell, L. O.		1,544 00	
Ridley, R.		1,040 00	
Ritchie, J. A.		640 77	
Robertson, J. A.		460 00	
Rogers, Fred.		219 04	
Ross, S.		880 00	
Rowe, F. E.		452 00	
Rushworth, Chas.		60 00	
Rusk, O.	780 00		
Disbursements	3 50		
		783 50	
Sanderson, Geo.		345 00	
Sharp, Jos.		9 00	
Carried forward		72,451 03	58,081 26

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c
Brought forward		72,451 03	58,081 26
WOOD RANGING—*Concluded.*			
Sharpe, J. A.		1,560 00	
Shaw, Geo.		80 00	
Shaw, D.		648 00	
Shaw, Alf.		510 00	
Shields, F.		616 00	
Shilling, H.		165 00	
Short, J.		360 00	
Simmons, A. G.		608 00	
Simpson, Wm.		770 00	
Smith, J. D. C.		528 00	
Smith, V.		48 00	
Smith, D.		12 00	
Stein, P.		621 15	
Stewart, R. E.		508 00	
Stewart, J.		384 00	
Thomson, W. B.	520 00		
Disbursements	14 50		
		534 50	
Thompson, G. S.		880 00	
Thorp, Thos.		290 00	
Tucker, L. A.		460 00	
Turpin, T.		27 50	
Urquhart, A.		855 00	
Vanier, John		295 00	
Vincent, H. T.		1,125 00	
Wagner, F.		376 00	
Watts, Geo., Disbursements		12 45	
Watts, W. B.		432 00	
Watts, J. J.		132 00	
Webster, W. A.		775 00	
Whalen, P. J.		1,435 00	
White, A. P.		645 00	
Wilkins, G. N.		870 00	
Wilson, Dan		715 00	
Wood, W. D.		609 43	
Yuill, T.		825 00	
Yuill, J. A.		65 00	
Yuill, A. D.		185 00	
Young, R. J.		340 00	
			91,753 06
EXPLORATION AND ESTIMATION OF TIMBER BERTHS			
Annis, Victor		8 00	
Chenier, D. A.		84 00	
Dulmage, James		7 50	
Durrell, Wm.		75 00	
Henderson, Chas., Disbursements		517 32	
Margach, J. A.		19 00	
McDonald, J. D.		50 00	
McLaughlin, J.		20 25	
Mooney, L.		98 00	
Presley, J.		22 50	
Smith, Walter, Disbursements		98 11	
Webster, W. A Disbursements		62 50	
			1,062 18
Carried forward			150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward			150,896 50
FIRE RANGING.			
Adams, A.		382 50	
Allen, D.		385 00	
Allen, T. W.		377 50	
Anger, L.		296 00	
Annis, Jas.		160 00	
Armstrong, T. C.		317 50	
Armstrong, G. D.		360 00	
Armstrong, W. H.		382 50	
Ault, J. C.		357 50	
Austin, P.		270 00	
Aylward, J.		620 00	
Bailey, H.		207 50	
Bain, L.		382 50	
Baker, H. S.		382 50	
Baker, O.		265 00	
Baker, D. M.		380 00	
Barbeau, J.		296 00	
Bartlett, G. W., Disbursements		142 69	
Bellanger, E.		296 00	
Bennington, J. D.		294 00	
Bentham, W. G.		382 50	
Berry, Geo.		352 50	
Berry, Geo. B.		296 00	
Bertram, J.		332 50	
Bertrand, H.		385 00	
Binnie, T.		368 50	
Bisaillon, C. H.		85 00	
Bisaillon, J. H.	895 00		
Disbursements	594 89		
		1,489 89	
Bisaillon, James		307 50	
Bisio, C. H.		170 00	
Bissonette, R. J.		282 50	
Blair, Bert		318 00	
Blaise, O.		300 00	
Bliss, L. E., Disbursements		492 13	
Bliss, C. H.		322 50	
Boccard, Adolph		305 00	
Bonin, A.		382 50	
Bonter, S.		387 50	
Bookhout, H.		405 00	
Bottrell, D.		352 50	
Boulanger, P.		207 50	
Brasher, S. M.		382 50	
Brown, T. E.		365 00	
Brown, A.		282 00	
Brown, P. R.		295 00	
Brown, Thos.		232 50	
Brooks, A.		500 00	
Brozeau, A.		382 50	
Brozeau, O.		382 50	
Brunet, A.		382 50	
Bruce, Geo.		327 50	
Buchanan, R. F.		382 50	
Burnham, H. H.		332 50	
Burger, Wm.		372 50	
Burns, Robt.		252 00	
Carried forward		19,350 71	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		19,350 71	150,896 50
FIRE RANGING.—*Continued.*			
Burns, W. S.		632 00	
Burrows, C. S.		190 00	
Callahan, A. S.		260 00	
Callahan, T.		327 50	
Cameron, W. J.		370 00	
Campbell, Duncan		420 00	
Campbell, R.		282 00	
Caronchan, G.		387 50	
Capp, S.		382 50	
Cavanagh, S.		220 00	
Ceaser, H. P.		387 50	
Chambers, Thomas		380 00	
Chapman, Wm.		282 00	
Christie, W. I.	423 00		
Disbursements	105 75		
		528 75	
Christie, W. P., Disbursements		138 09	
Chittick, W. J.		407 50	
Clark, Harry		382 50	
Cobb, C. E.		288 00	
Coghlan, J. S.		312 50	
Combs, F. H.		335 00	
Contryman, J. G.		282 00	
Coombs, J.		284 00	
Cooper, A. W.		268 00	
Copley, J. D.		202 00	
Cousineau, C.		382 50	
Cousineau, A.		390 00	
Cox, J. H.		282 00	
Coyne, P.	765 00		
Disbursements	273 98		
		1,038 98	
Craigie, H.		382 50	
Cridford, W. G.		282 00	
Cullane, D.		262 00	
Darkhouse, J.		167 50	
Darlington, E.		247 50	
Davidson, L.		272 50	
Davison, Ira		387 50	
Davis, J.		100 00	
Dean, A.		407 50	
Deschamp, F.		382 50	
Dial, A. C.		299 50	
Didier, H.		387 00	
Dobbs, G. W.		296 00	
Donald, R.		167 50	
Dougherty, A. E.		387 50	
Dubbiday, John		290 00	
Duff, R. A.		430 00	
Duncan, R.		368 50	
Durfey, L. H.		335 50	
Drew C.		268 00	
Dyson, W.		390 00	
Eastwood, J.		15 00	
Eaton, Leslie		7 00	
Eilber, George		382 50	
Elliott, A.		337 50	
Carried forward		36,646 53	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		36,646 53	150,896 50
FIRE RANGING.—*Continued.*			
Elliott, G.		221 50	
Elliott, Jac.		365 00	
Ellis, E. C.		370 00	
English, M.		382 50	
English, John		280 00	
Fairbairn, N. H.		528 00	
Ferguson, George		380 00	
Ferguson, Thomas H.		370 00	
Fisher, George		524 00	
Fitzbock, John		210 00	
Fitzgerald, Robert		266 00	
Flannagan, James		298 00	
Forman, J. L.		194 00	
Forsyth, W. W.		10 00	
Francey, George		292 00	
Fraser, W. A.		387 50	
Gagne, F.	174 69		
Disbursements	895 00		
		1,069 69	
Gale, W. J.		387 50	
Galt, J.		310 75	
Gammond, George		310 00	
Gault, James		231 25	
Gauthier, Theo.		407 50	
Gemmell, John	564 00		
Disbursements	164 50		
		728 50	
Gillanders, G.		235 00	
Gladd, Albert		210 00	
Gliddon, G. C.		268 00	
Glover, Ed.		296 00	
Godin, Ed.		282 50	
Gordon, Wm.		324 50	
Gordon, T. S.		148 00	
Gorman, J. P.		484 00	
Gunn, M. G.		125 00	
Guthrie, Wm.		390 00	
Hackett, Wm.		385 00	
Hamilton, A. J.		196 00	
Hamilton, Robert		272 00	
Hammond, W.		372 50	
Hammond, Wm.		282 00	
Hand, Thomas		564 00	
Hankshaw, Wm.		140 00	
Hanks, F.		352 50	
Hanmer, George		375 00	
Harrison, W. H.		168 00	
Hatch, B.		99 00	
Hawkesbury Lumber Co.		256 00	
Hayes, J. L.		272 00	
Henderson, Charles		680 33	
Henderson, C. E.		267 00	
Henderson, G.		283 25	
Henderson, John		240 00	
Hennessy, Wm.		106 00	
Henrey, Alex.		282 50	
Higgins, Robert		308 00	
Carried forward		53,834 30	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		53,834 30	150,896 50
FIRE RANGING.—*Continued.*			
Hollis, J.		300 00	
Hornick, George		370 00	
Hough, J. A.		382 50	
Ireton, F.		60 00	
Irish, W.		235 00	
Isbister, J. A.		332 50	
James, F.		275 00	
Jamieson, K.		365 00	
Jarvis, Edgar		337 50	
Jenkin, S.	276 00		
Disbursements	92 00		
		368 00	
Johnson, G. N.		362 50	
Johnston, Wm.		168 00	
Jones, R. E.		254 00	
Keily, Charles A.		385 00	
Keily, M.		385 00	
Kerr, Alex.		306 00	
King, W. A.		8 00	
Lalond, E.		372 50	
Lalond, J. M.		62 50	
Langford, Thomas		248 00	
Langtree, John		365 00	
Laurin, J. A.		385 00	
LeBlanc, Oliva		382 50	
LeBlanc, Oliver		564 00	
Leclaire, S.		296 00	
Lee, J. B.	835 00		
Disbursements	235 60		
		1,070 60	
Lennox, T. A.		370 00	
Leo, Philip		188 00	
Leo, Charles		190 00	
Leppard, Fred.		202 00	
Levis, J. A.		370 00	
Liddle, H. W.		272 00	
Locheed, R. W.		387 50	
Lockhart, W. H.		380 00	
Long, H. E.	765 00		
Disbursements	193 63		
		958 63	
Loys, Robert		377 50	
Lutton, B. M.		332 50	
Lyons, R.		282 50	
MacDonald, Ed.		357 50	
MacDonald, S. C., Disbursements		8 90	
MacDonell, L. P.		387 50	
Macdonell, R. D.		564 00	
MacNeill, E. R.		382 50	
Margach, Wm., Disbursements		636 48	
Margach, J. A.		332 00	
Marshall, J. A.		290 00	
Marshall, James		100 00	
Marston, W.		382 50	
Martin, E. M.		300 00	
Mason, Alex.		370 00	
Carried forward		70,896 41	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c	$ c.
Brought forward		70,896 41	150,896 50
FIRE RANGING.—*Continued.*			
May, H.	860 00		
Disbursements	210 29		
		1,070 29	
May, Alex.		172 50	
Menzies, A.		448 00	
Merchant, John		388 75	
Merchant, H.		397 50	
Miller, R.		357 50	
Mills, W. F.		84 00	
Milway, J. H.		412 00	
Minher, D.		296 00	
Molyneaux, G.		423 00	
Montgomery, R.		280 00	
Montgomery, T. P.		385 00	
Monohon, P.		370 50	
Merand, L.		387 50	
Morin, John		385 00	
Morris, D.		236 00	
Moore, James		260 00	
Moore, B. F.		385 00	
Moody, H. D.		335 00	
Mowell, John		65 00	
Murphy, Pat.		185 00	
Murphy, Pete		185 00	
McArthur, J. A.		380 00	
McColl, W.		370 00	
McCullough, D. J.		395 00	
McDonald, T.		264 00	
McDougall, J. T., Disbursements		17 30	
McIntosh, James		296 00	
McIver, H.		382 50	
McKenzie, A.		363 00	
McKenzie, R.		368 50	
McKinnon, H.		382 50	
McLaren, W. A.		382 50	
McLaren, Alex.		387 50	
McLaughlin, John		367 50	
McMeekin, S.		305 00	
McPhee, D. J.		370 00	
McMullin, S. J.		382 50	
McMurry, John		380 00	
McRae, D. A.		387 50	
Nadon, D.		367 50	
Neilly, L. M.		155 00	
Neelon, G. M.		387 50	
Newburn, Wm.		564 00	
Newell, John		300 00	
Newhouse, Alex.		302 50	
Niely, W.		383 75	
Ojick, J.		290 00	
Oldfield, A.		372 50	
Oliver, J. A., Disbursements		222 31	
O'Malley, D.		198 00	
Onegut, J.		237 50	
Ouellette, F.		385 00	
Patterson, H. L.		385 00	
Pigeon, C.		356 50	
Carried forward		89,493 31	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		89,493 31	150,896 50
FIRE RANGING.—*Continued.*			
Pingle, A.		387 50	
Powell, George		375 00	
Powell, N. L.		387 50	
Prevoust, D.		216 00	
Proulx, A.		387 50	
Quick, W. G.		365 00	
Quilty, J.		200 00	
Radcliffe, R. A.		327 50	
Ranger, A.		382 50	
Redden, M. A.		387 50	
Read, C. F.		350 00	
Reeves, E. H.		370 00	
Remus, Charles		266 00	
Rennon, James		187 50	
Reynolds, M.		287 50	
Richardson, S.		352 50	
Richardson, John		382 50	
Rodden, M. J.		387 50	
Robinson, Peter		285 00	
Rochford, A.		385 00	
Rogers, R.		32 50	
Ross, W.		370 00	
Rushworth, C. E.		287 50	
Rusk, O.	632 00		
Disbursements	542 25		
		1,174 25	
Russell, A.		300 00	
Saunders, H. A.		375 00	
Sauve, J.		387 50	
Savard, A.		382 50	
Schenk, Nelson		382 50	
Schneider, C.		297 50	
Scully, James		362 50	
Scott, Robert		572 00	
Seline, A.		2 25	
Seline, F.		2 25	
Seline, J.		2 25	
Sharpe, J.		382 50	
Shields, H. R.		370 00	
Shields, F.		282 50	
Shilling, H.		155 00	
Shore, D.		377 50	
Sherlock, S.		382 50	
Simpson, A.		349 25	
Skidmore, T. B.		370 00	
Small, M. A.		360 00	
Smith, H. S.		305 00	
Smith, V.		267 00	
Smyth, J. J.		367 50	
Snatch, Joseph		132 50	
Snider, S. H.		380 00	
Spearing, Fred.		256 00	
Spearman, T.		160 00	
Spence, E. J.		5 00	
Spence, D.		352 50	
Spillett, J. J.		365 00	
Spillett, A. J.		365 00	
Carried forward		107,078 06	150,896 50

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		107,078 06	150,896 50
FIRE RANGING—*Concluded.*			
Stewart, Charles		370 00	
Stevens, Alex.		187 50	
Storey, V.		342 50	
Storey, Wm.		5 00	
Stubbington, F. J.		296 00	
Sturdy, G. R.		300 00	
Sutherland, R. A.		380 00	
Sutton, G.		300 00	
Switzer, D.		82 50	
Thomas, Philip		377 50	
Thompson, G. S.	572 00		
Disbursements	238 95		
		810 95	
Thompson, J. H.		272 50	
Tooke, S.		387 50	
Toomer, S.		390 00	
Tower, O.		576 00	
Tremblay, Emelien		385 00	
Tremblay, E.		387 50	
Trollope, Henry		276 00	
Twigg, J. F.		380 00	
Tye, R. H.		345 00	
Urlin, W. R.		375 00	
Urquhart, A.		544 00	
Urquhart, J.		60 00	
Valentine, D.		85 00	
Volois, P.		385 00	
Walker, G.		387 50	
Wallace, W. F.		244 00	
Ward, W. D.		130 00	
Washburn, B.		352 50	
Watson, R. W.		290 00	
Watts, George, Disbursements		232 48	
Waugh, J. K.		385 00	
Webster, R. D.		345 00	
West, W.		312 50	
Whaley, G.		385 00	
Whalley, H.		385 00	
Whiteoak, D.		387 50	
Whitock, H. W.		385 00	
Wier, S.		385 00	
Wier, G.		268 00	
Wilkins, D. E.		375 00	
Wilkins, G. N.		560 00	
Williams, R. E.		380 00	
Wilson, James		272 50	
Wilson, J. G.		327 50	
Wilson, H. J.		377 50	
Winn, J.		292 50	
Wood, H. C.		25 00	
Wood, W. D.		472 00	
Wooden, John		370 00	
Woodcock, G.		432 50	
Wright, J. S.		346 25	
			124,483 74
Carried forward			275,380 24

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward			275,380 24
Forest Reserves.			
Temagami Reserve—$46.394.96.			
Albright, L.	.....	367 50	
Albright, A. J.	.....	367 50	
Barr, James	.....	837 50	
Barrett, Thomas	765 00		
Disbursements	216 63		
		981 63	
Barraclough, W. W.	.....	300 00	
Benoit, E.	.....	352 50	
Bertrand, O.	.....	305 00	
Biederman, Wm.	.....	295 00	
Bibet, L. A.	.....	277 50	
Bissett, J.	.....	370 00	
Boivin, J.	.....	365 00	
Bresebois, P.	.....	357 50	
Brown, J. F.	.....	137 50	
Buisson, W.	.....	365 00	
Campbell, G. L.	.....	267 50	
Clement, F. W.	.....	360 00	
Clemow, F.	.....	352 50	
Coghill, R.	.....	367 50	
Cook, W. F.	.....	275 00	
Corbett, G. E.	.....	437 50	
Davidson, R. D.	.....	352 50	
Deacon, A.	.....	365 00	
D'Embremont, F.	.....	365 00	
Derosiers, John	.....	365 00	
Downs, George	.....	367 50	
Duff, H. D.	.....	367 50	
Duff, J. H.	.....	357 50	
Duisetti, T.	.....	135 00	
Dunston, G.	.....	270 00	
Egan, Wm.	.....	332 50	
Evans, J. J.	.....	355 00	
Faeris, R.	1,061 00		
Disbursements	8 00		
		1,069 00	
Farmer, J. F.	.....	365 00	
Flannagan, Ed.	.....	355 00	
Forsyth, G.	.....	352 50	
Fox, W. W.	.....	367 50	
Fuller, E. W.	.....	357 50	
Galligan, J. B.	.....	305 00	
Gauthier, O.	.....	352 50	
Graham, Jas. E.	.....	230 00	
Grenier, Jas.	.....	367 50	
Goodearle, W. E.	.....	320 00	
Haines, Herb.	.....	367 50	
Harrison, J. W.	.....	435 00	
Hayden, G. F.	.....	360 00	
Henderson, C., Disbursements	.....	167 56	
Herlihy, D.	.....	367 50	
Higgins, L. T.	.....	367 50	
Higley, C. E.	.....	295 00	
Hindson, C. E.	1,300 00		
Disbursements	760 62		
		2,060 62	
Carried forward	.....	20,233 81	275,380 24

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		20,233 81	275,380 24
FOREST RESERVES.—*Continued.*			
Temagami Reserve.—Continued.			
Hogan, M. A.		320 00	
Holland, B. J.		147 50	
Jocko, J.		277 50	
Johnston, Jas.		360 00	
Johnston, W. J.		292 50	
Keefer, N. S.		297 50	
Kelly, T.		320 00	
Kelso, R. F.		367 50	
Kennedy, Wm.		355 00	
Knox, J. E.		317 50	
Kruger, L. E.		62 50	
Lamarche, A.		915 00	
Landeront, J. P.		362 50	
Latoure, John		367 50	
Legree, V.		362 50	
Livingston, J. A.		317 50	
Lyon, J. W.		350 00	
Marks, V.		370 00	
Marshall, A. C.		365 00	
Mason, D. M.		367 50	
Maynard, W. B.		295 00	
Montgomery, A.		397 50	
Monville, M.		365 00	
Moore, C. A.		342 50	
Moran, O.		360 00	
Morel, H.		365 00	
McClennagan, A. R.		342 50	
McCost, H.		352 50	
McGregor, P.		102 50	
McGuire, H.		342 50	
McIntyre, D. S.		170 00	
McKay, Angus		237 50	
McLaughlin, John		12 50	
McLeod, J. D.		367 50	
McNeilly, Mat.		347 50	
McPhee, H. A.		347 50	
McPherson, J. B.		292 50	
Nadon, P.		365 00	
Neil, W.		365 00	
Nicholas, Herb.		367 50	
Nixon, John		365 00	
O'Neil, W. S.		360 00	
Papineau, Jos.		340 00	
Petrant, T.		15 00	
Petrant, Wm.		332 50	
Philpott, G. M.		367 50	
Pointer, R. R.		360 00	
Powell, John		315 00	
Prudhomme, W. A.		370 00	
Raymond, Ad.		360 00	
Rochon, Jos.		915 00	
Rochon, F.		365 00	
Rodgers, Walter		367 50	
Sage, P.		362 50	
Sage, J. F.		350 00	
Carried forward		38,811 31	275,380 24

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		38,811 31	275,380 24
FOREST RESERVES.—*Continued.*			
Temagami Reserve.—Concluded.			
Sargeant, W. B.		367 50	
Sassiville, L.		360 00	
Scott, E. H.		367 50	
Shannon, R. J.		135 00	
Shelson, H.		367 50	
Spence, Wm.		347 50	
Sutton, Fred.		367 50	
Tromblay, E.		247 50	
Turner, John		112 50	
Vivaris, D.		915 00	
Vivaris, M.		365 00	
Wagner, H. W.		362 50	
Wallace, C. H.		102 50	
Williams, Chas.		305 00	
Willoughby, J. B.		332 50	
Wilson, H. P.		362 50	
Winder, A.		365 00	
Whitney, K. H.		330 00	
Young, R. J.	814 00		
Disbursements	657 15		
		1,471 15	
Metagami Reserve—$8,723.86.			
Ainslie, D.		352 50	
Bracken, R.		365 00	
Bruster, H. S.		302 50	
Burden, John	835 00		
Disbursements	344 36		
		1,179 36	
Dundas, Geo.		257 50	
Eveline, A.		32 50	
Fraser, E. E.		392 50	
Gowinlock, R. W.		127 50	
Hatton, E. R.		285 00	
Henderson, C. E.		172 00	
Lawrence, C. F.		335 00	
Lower, A. R. M.		327 50	
Luke, A.		132 50	
Manerd, Napoleon		272 50	
Noble, C. V.		355 00	
Poisson, A.		365 00	
Reid, Jos.		392 50	
Smith, W. R.		310 00	
Sparks, W. E. L.		367 50	
Stewart, D.		307 50	
Taylor, J. S.		367 50	
Thorpe, G. H.		362 50	
Thurston, A. M.		370 00	
Wallace, J. B.		327 50	
Wallace, W. W.		342 50	
Wood, E. H.		322 50	
Mississaga Reserve—$11,965.01.			
Albright, L.		7 50	
Arnill, L.		7 50	
Belanger, Thomas		182 50	
Carried forward		55,316 32	275,380 24

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		55,316 32	275,380 24
FOREST RESERVES.—*Continued.*			
Mississaga Reserve.—Concluded.			
Bickell, R. R.		290 00	
Blaney, A.		225 00	
Bondon, F. H.		295 00	
Bothwell, G. E.		267 50	
Burden, Wm.		400 00	
Burden, J. H.		172 50	
Cameron, Geo.		352 50	
Cameron, B.		302 50	
Copp, F. C.		292 50	
Cowper, J. W.		285 00	
Dean, T. B.		202 50	
Doolittle, G. W.		250 00	
Doolittle, Robert		320 00	
Doyle, Gus		285 00	
Duval, C. A.	835 00		
Disbursements	1,691 51		
		2,526 51	
Dyson, Isaac		300 00	
Edwards, H. S.		272 50	
Eveline, J.		225 00	
Eveline, A.		230 00	
Eveline, J. H.		160 00	
Featherstonhaugh, M. H.		300 00	
Ferguson, Julien		350 00	
Ferguson, J. B.		262 50	
Foot, W. S.		265 00	
Gordon, R.		290 00	
Hall, J. E.		167 50	
Haskell, H. R.		302 50	
Henderson, C. E., Disbursements		301 00	
Hewlett, R. C.		287 50	
Jean, Aug.		190 00	
Jones, R. D.		295 00	
Kingsford, M. R.		100 00	
Knox, D.		292 50	
Locke, W. D.		282 50	
Sawyer, C. E.		167 50	
Taylor, Chas.		260 00	
Nepigon Reserve—$8,568.17.			
Absolon, W.		172 50	
Blair, Bert		5 00	
Bliss, L. E.	765 00		
Disbursements	1,360 67		
		2,125 67	
Bouchard, N.		240 00	
Davies, E. L.		320 00	
Dickson, H. A.		275 00	
Donley, J. P.		312 50	
Ferris, R. H.		332 50	
Fraser, Grant		352 50	
Greenwood, John		337 50	
Harris, R. J.		320 00	
Heffernon, J. J.		360 00	
Carried forward		72,237 00	275,380 24

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		72,237 00	275,380 24
FOREST RESERVES—*Concluded*			
NEPIGON RESERVE.—*Concluded.*			
Higgins, Robt.		2 50	
Husband, A. C.		347 50	
Judge, S. E.		332 50	
King, G. A.		360 00	
Linklater, Wm.		275 00	
McDowell, T. W.		300 00	
Michael, A.		297 50	
Rae, A.		395 00	
Scott, C. V.		325 00	
Thompson, A. R.		45 00	
Ward, James		387 50	
Young, N. M.		347 50	
Eastern Reserve—$2,737.76.			
Bishop, Hugh		375 00	
Brown, George		335 00	
Egan, Wm.		37 50	
Gilmour, John		375 00	
Shultz, James		335 00	
Tapping, Thomas	400 00		
Disbursements	135 26		
		535 26	
Watkins, Robert		375 00	
Young, William		30 00	
Young, George		340 00	
Sibley Reserve—$807.50.			
Cross, J. G.		382 50	
Cross, R. J.		325 00	
Oliver, J. A.		100 00	
Quetico Reserve.—$4,407.95.			
Armstrong R.		300 00	
Berrye, C. W.		300 00	
Brecken, F. E.		300 00	
Darby, W.		300 00	
Gadd, C. H.		300 00	
Gibson, W. F.		300 00	
Gilfoil, G.		300 00	
Hampshire, F. N.		300 00	
Johnston, R.		300 00	
McDonald, D.		300 00	
Murray, O. J.		300 00	
Oglesten, R.		300 00	
Wall, S. L.		300 00	
Wall, George		480 00	
Watts, George. Disbursements		27 95	
			83,605 21
Carried forward			358,985 45

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward			358,985 45
MINES AND MINING.			
Miller, G. W., Provincial Geologist services	4,250 00		
Disbursements	359 41		
		4,609 41	
Knight, C. W., 1st Assistant Geologist services..	2,100 00		
Disbursements	479 30		
		2,579 30	
Burrows, A. G., 2nd Assistant Geologist services	2,000 00		
Disbursements	571 55		
		2,571 55	
Hopkins, P. E., 3rd Assistant Geologist services..	1,000 00		
Disbursements	166 47		
		1,166 47	
Mickle, G. R., Mine Assessor, services	4,000 00		
Disbursements	725 00		
		4,725 00	
Price, S., Mining Commissioner, services	3,700 00		
Disbursements	1,171 56		
		4,871 56	
Dance, R. W., Mining Commissioner's Clerk, ... services	920 01		
Disbursements	458 48		
		1,378 49	
Corkill, E. T., Inspector of Mines, services	2,400 00		
Disbursements	976 30		
		3,376 30	
Sutherland, T. F., Assistant Inspector of Mines, services	2,200 00		
Disbursements	1,356 30		
		3,556 30	
Rogers, W. R., Topographer, services	1,700 00		
Disbursements	506 68		
		2,206 68	
McArthur, T. A., Inspector of Recorders' Offices, services	650 00		
Disbursements	437 95		
		1,087 95	
			32,129 01
EXPLORATIONS, INVESTIGATIONS AND INSPECTIONS.			
Coleman, Dr. A. P. Disbursements	.....	399 04	
Freeman, D.	329 23		
Disbursements	23 55		
		352 78	
Greenland, C. W.	.....	268 27	
Mahaffy, A. F.	.....	76 92	
Parsons, A. L.	471 15		
Disbursements	630 90		
		1,102 05	
Scott, John	600 00		
Disbursements	225 50		
		825 50	
Sharpe, Donald	700 00		
Disbursements	187 15		
		887 15	
Smith, G. J.	.....	294 23	
Smith, R. M.	314 42		
Disbursements	19 05		
		333 47	
Carried forward	.....	4,539 41	391,114 46

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		4,539 41	391,114 46
EXPLORATIONS, INVESTIGATIONS AND INSPECTIONS.—*Concluded.*			
Stewart, R. B.	617 30		
Disbursements	173 59		
		790 89	
Stewart, Wm.	.....	55 00	
Express	.....	3 80	
			5,389 10
MINING RECORDERS.			
Bowker, S. T., Recorder	986 16		
Disbursements	319 12		
		1,305 28	
Bruce, A. E. D., Recorder	1,061 65		
Gauthier, G. H., Recorder	416 10		
Graham, F. W., Clerk	1,200 00		
Millard, C. S., Clerk	540 77		
O'Brien, J. D., Clerk	1,026 54		
Clarke, W. K., Clerk	258 27		
Keenan, H. F., Clerk	273 46		
Glazier, M. B., Clerk	636 92		
Disbursements	813 75		
		6,227 46	
Campbell, C. A. Recorder	886 50		
Gordon, T. C., Clerk	630 00		
Washburn, H., Clerk	724 59		
Glazier, M. B., Clerk	450 00		
Young, Miss E., Stenographer	483 08		
Disbursements	352 62		
		3,526 79	
Hough, J. A., Recorder	1,200 00		
Browning, A. J., Clerk	900 00		
Disbursements	537 94		
		2,637 94	
McQuire, H. F.	500 00		
Disbursements	159 30		
		659 30	
Morgan, J. W., Recorder	986 16		
Disbursements	311 05		
		1,297 21	
Sheppard, H. E., Recorder	1,000 00		
Disbursements	178 93		
		1,178 93	
Skill, Albert, Recorder	1,200 00		
Disbursements	273 96		
		1,473 96	
Smith, G. T., Recorder	2,300 00		
Meagher, T. J., Clerk	900 00		
Sarsfield, J. M., Clerk	1,100 00		
Ferguson, L. H., Clerk	717 50		
Monroe, Miss E., Stenographer	720 00		
Smith, Miss M. H., Stenographer	480 00		
Disbursements	660 00		
		6,877 50	
Spry, W. L., Recorder	.....	635 83	
McArthur, T. A., Salary as Inspector for 3 months	.....	300 00	
Carried forward	.....	26,120 20	396,503 56

Appendix No. 6.—Continued.

Service.	$ c.	$ c.	$ c.
Brought forward		26,120 20	396,503 56
MINING RECORDERS.—*Concluded.*			
Dominion Express Company	145 74		
King's Printer	763 99		
Methodist Book Room	31 88		
Harcourt, E. H. Co.,	147 29		
Rice, Lewis & Co.	87 65		
		1,176 55	
			27,296 75
PROVINCIAL ASSAY OFFICE.			
Turner, N. L.	1,200 00		
Disbursements	41 85		
		1,241 85	
Rothwell, T. E.	1,060 26		
Disbursements	133 50		
		1,193 76	
Supplies		1,180 36	
Disbursements		154 12	
Equipment		634 27	
			4,404 36
CULLERS' ACT.			
Currie, D. H., Services		4 00	
Henderson, Charles, Disbursements		3 00	
McDougall, J. T. Disbursements		21 00	
Margach, Wm., Disbursements		2 50	
Advertising		6 80	
			37 30
SPECIAL SERVICES AND UNFORESEEN EXPENSES.			
Nicol, Wm., *re* Toronto Exhibition	300 00		
Disbursements	276 82		
		576 82	
Orser, E. H., *re* Windsor Exhibition	50 00		
Disbursements	77 14		
		127 14	
Turner, N. L., Disbursements		100 00	
Disbursements *re* Toronto Exhibition		462 02	
			1,265 98
SURVEYS			123,016 46
BOARD OF SURVEYORS			200 00
EXPERIMENTAL TREATMENT OF ORE			428 50
REFUNDS			15,625 44
CONTINGENCIES.			
Departmental			
Printing and Binding	4,740 71		
Stationery	6,415 99		
		11,156 70	
Postage	1,814 26		
Express	295 74		
		2,110 00	
Carried forward		13,266 70	568,778 35

Appendix No. 6.—Concluded.

Service.	$ c.	$ c.	$ c.
Brought forward		13,266 70	568,778 35
CONTINGENCIES.—*Concluded.*			
Departmental.—Concluded.			
Telegraphing	504 36		
Bell Telephone Company	90 30		
Car Fare	30 00		
		624 66	
Subscriptions	227 75		
Advertising	4,802 14		
		5,029 89	
Maps	.....	257 21	
Typewriters, rent and repairs	.....	556 95	
Hearst, Hon. W. H., Travelling expenses	250 00		
Kirkpatrick, G. B., Travelling expenses	15 50		
Ledger, W. R., Travelling expenses	35 65		
Rorke, L. V., Travelling expenses	100 00		
St. John, C. W. Travelling expenses	25 00		
White, Aubrey, Travelling expenses	489 50		
Whitson, J. F., Travelling expenses	73 60		
Stewart, A. M., Legal Fees	275 00		
		1,264 25	
Extra Clerks	4,484 03		
Sundries	331 60		
		4,815 63	
			25,815 29
BUREAU OF MINES.			
Printing and Binding	1,101 02		
Stationery	2,682 01		
		3,783 03	
Postage	425 46		
Telegraphing	257 95		
Express and Cartage	34 40		
Advertising	1,324 84		
Subscriptions	169 81		
Maps	2,143 10		
		4,355 56	
Gibson, T. W., Travelling expenses	7 30		
Whitson, J. F., Travelling expenses	14 45		
		21 75	
Typewriter repairs	29 80		
Bell Telephone Company	51 85		
		81 65	
Extra Clerks	.....	70 01	
Legal Fees	89 50		
Nattress, Rev. Thos., Drawings for report	200 00		
Nicholas, F. J., Preparing Index	75 00		
Sundries	512 17		
		876 67	
			9,188 67
			603,782 31

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Deputy Minister, Lands and Forests.

Appendix No. 7.

Statement of Expenses on account of various services under the direction of the Department of Lands, Forests and Mines for the year ending October 31st, 1912.

Service.	$ c.	$ c.	$ c.
Algonquin Park			20,468 10
Rondeau Park			4,003 29
Veterans' Commutation			1,050 00
Clearing Area re Townsites			2,333 30
Exploration Party in New Territory			10,000 00
Northern Development			
Whitson, J. F. Salary	1,666 66		
Bruce, A. E. D. do	525 00		
Robinson, W. J. do	633 06		
Lye, R. G. do	434 07		
Mahon, G. H. do	318 51		
Beardall, F. G. do	258 65		
Buchan, W. E. do	292 97		
Grey, F. B. do	318 51		
Ewing, S. B. do	119 11		
Smith, Miss I do	10 00		
Ryan, Miss H. do	146 66		
Bauldry, F. do	30 00		
Office Expenses	1,694 56		
		6,447 76	
Wages	108,633 66		
Contracts	28,227 82		
Camp equipment, etc.	12,800 98		
Supplies	36,542 38		
Sundries	430 20		
		186,635 04	
			193,082 80
Bounty Act VII., Edward VII., Cap. 14			
Delora Mining Reduction Company		1,432 20	
Coniagas Reduction Company		1,164 60	
			2,596 80
			233,534 29

D. GEO. ROSS,
Accountant.

AUBREY WHITE.
Deputy Minister of Lands and Forests.

Appendix No. 8.

WOODS AND FORESTS.

Statement of revenue collected during the year ending October 31st, 1912.

	$ c.
Amount of Western collections at Department	1,781,789 10
do Belleville collections	27,610 53
do Ottawa collections	176,263 15
	1,985,662 78

J. A. G. CROZIER,
Chief Clerk in Charge.

AUBREY WHITE,
Deputy Minister.

Appendix No. 9.

PATENTS BRANCH.

Statement of Patents, etc., issued by the Patents Branch from 1st November, 1911, to 31st October, 1912.

Crown Lands	902
School do	25
Mining do	596
Public do (late Clergy Reserves)	10
Free Grant Lands (A. A.)	97
do (Act of 1880)	460
Mining Leases	378
Licenses of Occupation	21
Crown Leases	11
Crown Lands (University)	21
Mining do do	1
Free Grant, (Act of 1901) Veterans	911
Rondeau Leases	4
Pine	2
Total	3,439

CHARLES S. JONES,
Chief Clerk.

AUBREY WHITE,
Deputy Minister.

Appendix

WOODS AND

Statement of Timber and Amounts accrued from Timber Dues, Ground

QUANTITY AND

Agencies.	Area covered by timber licenses.	Saw logs.			
		Pine.		Other.	
	Square miles.	Pieces.	Feet B.M.	Pieces.	Feet B.M.
Western Timber District	12,469¼	8,942,229	373,393,923	1,145,543	38,575,660
Belleville Timber District	610	336,003	9,400,281	195,898	6,340,333
Ottawa Timber District	5,331½	1,661,792	78,870,197	462,684	17,260,160
	18,410¾	10,940,024	461,664,401	1,804,125	62,176,153

General Statement

Agencies.	Cordwood.		Tan Bark.	Railway Ties.	Posts.	Poles.	Stave Bolts.	Shingle Blocks.	Pulpwood.
	Hard.	Soft.							
	Cords.	Cords.	Cords.	Pieces.	Cords.	Pieces.	Cords.	Cords.	Cords.
Western Timber District	43,822	44,376	5,920	5,703,774	481	13,617	2,093	66	130,345
Belleville Timber District	205	.....	.....	30	⅘	70	.....	.....	17
Ottawa Timber District	24	1,986	.....	655	17½	1,680	.....	.....	9,976
	44,051	46,362	5,920	5,704,459	499	15,367	2,093	66	140,338

J. A. G. CROZIER,
Chief Clerk in Charge

No. 10.

FORESTS.

Rent and Bonus during the year ending 31st October, 1912.

DESCRIPTION OF TIMBER.

Boom and Dimension.				Square Timber.				Piling.		
Pine.		Other.		Pine.		Oak and Ash.		Tamarac.	Tamarac.	
Pieces.	Feet B.M.	Pieces.	Feet B.M.	Pieces.	Cubic feet.	Pieces	Cubic feet.	Lineal fect.	Pieces	Ft.B.M.
164,258	18,339,981	49,115	4,883,489	8,720	416,097	.....	.....	112,256	1,887	250,724
1,259	197,112	3,486	685,584	.....	.....	.....	.....	.....	.....	.....
22,230	2,251,284	10,368	1,377,622	748	32,727	o 4 a 14	124 566	.....	.....	.....
187,747	20,788,377	62,969	6,946,695	9,468	448,824	18	690	112,256	1,887	250,724

of Timber.—Concluded.

Amounts accrued.

Tran s-fer bonus.	Interest.	Trespass.	Timber dues.	Bonus.	Deposits timber sales 1912.	Ground rent.	Total.
$ c	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
7,640 00	11,296 08	6,470 55	1,184,194 36	485,926 44	111,550 83	64,567 00	1,871,645 26
720 00	92 71	129 25	19,824 24	.....	.....	4,780 00	25,546 20
380 00	575 97	615 37	142,675 40	.....	.....	26,622 18	170,868 92
8,740 00	11,964 76	7,215 17	1,346,694 00	485,926 44	111,550 83	95,969 18	2,068,060 38

AUBREY WHITE,
Deputy Minister.

Appendix No. 11.

Statement of the work done in the Military Branch of the Department of Lands, Forests and Mines, during the year 1912.

Letters received	6,150
" written	5,900
Maps and reports supplied to veterans	1,850
Printed forms issued	1,200
Locations made	139
Location certificates issued	14
Certificates surrendered	21
Certificates applied in payment of lands	53
References for patents issued	997

H. E. JOHNSTON,
Chief Clerk in Charge.

AUBREY WHITE,
Deputy Minister.

Appendix No. 12.

Statement of the number of Letters received and mailed by the Department in 1909-10, 1910-11 and 1911-12.

Year,	Letters received.					Names indexed.	Orders-in-Council.	Returned letters.	Letters, circulars and reports mailed from Department.
	Sales and Free Grants.	Surveys.	Woods and Forests.	Mines.	Totals.				
1909–10.	23,700	18,290	9,752	8.498	60,240	67,210	201	81	69,400
1910–11.	24,705	14,478	9,212	8,220	56,615	63,200	180	94	67,150
1911–12.	20,050	10,150	7,700	87,507	50,407	57,000	150	76	63,125

FRANK YEIGH,
Registrar,

AUBREY WHITE,
Deputy Minister.

Appendix No. 13.

Statement showing the number of Locatees and of acres located; of purchasers and of acres sold; of lots resumed for non-performance of the settlement duties and of patents issued in Free Grant Townships during the year ending 31st October, 1912.

Township.	District or County.	Agent.	No. of persons located.	No. of acres located.	No. of purchasers.	No. of acres sold.	No. of lots resumed.	No. of patents issued.
Baxter	Muskoka	J. B. Brown, Bracebridge	14	1,723	2	45	5	11
Brunel	"	" "	1	100	...	.....	....	6
Cardwell	"	" "	2	400	1	58	3	6
Chaffey	"	" "	....	.....	1	75	....	2
Draper	"	" "	....	.....	...	.....	.....	....
Franklin	"	" "	3	253	4	73	3	3
Freeman	"	" "	2	400	...	.....	1	2
Macaulay	"	" "	4	447	...	.....	4	....
Medora	"	" "	4	696	2	11	4	8
Monck	"	" "	....	.....	2	$\frac{1}{16}$	....	2
Morrison	"	" "	3	490	9	70	2	12
Muskoka	"	" "	5	510	3	10	4	3
McLean	"	" "	2	183	1	37	3	2
Oakley	"	" "	2	203	1	26	....	1
Ridout	"	" "	2	285	...	.....	1	1
Ryde	"	" "	4	598	1	8	1	2
Sherborne	Haliburton	" "	1	76	...	.....	....	2
Sinclair	Muskoka	" "	6	815	2	45	6	4
Stephenson	"	" "	....	.....	...	.....	....	2
Stisted	"	" "	3	250	1	4	3	3
Watt	"	" "	1	50	...	.....	1	2
Wood	"	" "	6	862	3	8	10	31
Burpee	Parry Sound	F. R. Powell, Parry Sound	4	695	...	.....	....	2
Carling	"	" "	8	898	...	.....	5	18
Christie	"	" "	10	1,394	1	5	5	4
Conger	"	" "	4	586	3	12	5	16
Cowper	"	" "	....	.....	1	40	....	13
Ferguson	"	" "	4	697	...	.....	1	3
Foley	"	" "	1	100	1	25	2	4
Hagerman	"	" "	....	.....	...	.....	1	....
Harrison	"	" "	....	.....	10	111	....	46
Humphrey	"	" "	3	336	5	128	2	5
McConkey	"	" "	4	578	1	18	2	2
McDougall	"	" "	5	702	2	6	....	3
McKellar	"	" "	4	571	...	.....	4	1
McKenzie	"	" "	....	.....	1	37	....	3
Monteith	"	" "	5	653	...	.....	1	3
Shawanaga	"	" "	1	97	2	16	1	20
Wilson	"	" "	1	200	...	.....	1	1
Chapman	Parry Sound	Dr. J. S. Freeborn, Magnetawan	2	264	...	.....	2	5
Croft	"	" "	3	400	...	.....	4	3
Ferrie	"	" "	....	.....	...	.....	....	....
Gurd	"	" "	1	101	2	101	....	5
Lount	"	" "	4	578	1	29	3	8
Machar	"	" "	7	1,064	1	99	7	8
Mills	"	" "	5	800	1	85	1	3
Pringle	"	" "	....	.....	...	.....	....	....

Appendix No. 13.—Continued.

Township.	District or County.	Agent.	No. of persons located.	No. of acres located.	No. of purchasers.	No. of acres sold.	No. of lots resumed.	No. of patents issued.
Ryerson.....	Parry Sound..	Dr. J. S. Freeborn, Magnetawan.	6	660	...	.....	8	6
Spence	"	" " "	8	1,053	2	55	7	4
Strong	"	" " "	1	160	...	.....	1	1
Armour.....	Parry Sound..	W. Jenkin, Emsdale.	7	764	1	100	4	8
Bethune	"	" "	2	258	...	.....	3	4
Joly	"	" "	....	.....	2	191	....	6
McMurrich ...	"	" "	....	.....	...	.....	....	....
Perry	"	" "	....	.....	...	.....	....	....
Proudfoot....	"	" "	1	182	...	.....	....	4
Hardy	Parry Sound..	H. J. Ellis, Powassan..	....	.....	1	1	....	2
Himsworth ..	"	" "	14	1,785	5	246	9	12
Laurier.....	"	" "	3	400	...	.....	1	5
Nipissing....	"	" "	3	405	12	717	1	10
Patterson....	"	" "	2	300	1	7	....	2
Bonfield.... .	Nipissing	W. J. Parsons, North Bay...	9	939	...	.....	3	6
Boulter (pt) ..	"	" "	....	.....	...	.....	....	....
Chisholm	"	" "	3	375	4	893	4	11
Ferris	"	" "	24	2,382	2	7	14	15
Anson	Haliburton ...	R. H. Baker, Minden.....	2	200	1	1	1	....
Glamorgan ..	"	" "	7	989	...	.....	6	5
Hindon	"	" "	....	.....	...	.....	....	....
Lutterworth..	"	" "	3	295	1	26	2	1
Minden ..	"	" "	1	114	...	.....	2	3
Snowdon ...	"	" "	3	394	...	.....	3	1
Stanhope	"	" "	1	105	1	56	1	3
Anstruther ...	Peterboro'. .	William Hales, Apsley	6	500	...	.....	6	....
Burleigh, N.D.	"	" "	....	.....	...	.....	....	1
" S.D.	"	" "	....	.....	...	.....	....	....
Chandos	"	" "	2	200	...	.....	1	1
Methuen	"	" "	....	.....	...	.....	....	....
Cardiff.....	Haliburton ...	James Wilson, Kinmount...	4	460	...	.....	3	1
Cavendish....	Peterboro'....	" "	8	1,148	1	49	4	1
Galway	Peterboro'....	" "	8	845	...	.....	5	4
Monmouth ...	Haliburton ...	" "	11	1,513	...	.....	7	3
Bangor	Hastings	W. J. Douglas, Greenview.....	4	500	1	10	2	....
Carlow.....	"	" "	1	100	...	.....	....	....
Cashel	"	" "	....	.....	...	.....	....	....
Dungannon .	"	" "	4	497	1	3	1	2
Faraday	"	" "	7	857	1	52	1	5
Herschel	"	" "	8	832	...	.....	8	2
Limerick.....	"	" "	3	500	...	.....	2	1
Mayo	"	" "	....	.....	...	.....	1	4
Monteagle ...	"	" "	5	697	1	1	....	2
McClure	"	" "	1	105	2	9½	....	....
Wicklow ...	"	" "	5	825	1	10	....	....
Wollaston....	"	" "	1	111	1	17	1	2
Algona, S.....	Renfrew	Adam Prince, Wilno.....	1	100	...	.....	....	4
Brougham ...	"	" "	1	100	...	.....	....	2
Brudenell ...	"	" "	3	400	...	.....	3	....

Appendix No. 13.—Continued.

Township.	District or County.	Agent.	No. of persons located.	No. of acres located.	No. of purchasers.	No. of acres sold.	No. of lots resumed.	No. of patents issued.
Burns	Renfrew	Adam Prince, Wilno	5	686	...	.....	5	2
Grattan	"	" "	5	634	3	21	2	7
Griffith	"	" "	....	.....	...	.....	....	....
Hagarty	"	" "	5	812	...	.....	3	1
Jones	"	" "	2	337	1	32	3	2
Lyell	Nipissing	" "	5	695	2	17	4	1
Lyndoch	Renfrew	" "	4	502	...	.....	1	3
Matawatchan	"	" "	1	97	1	2	....	3
Radcliffe	"	" "	6	756	1	2	2	5
Raglan	"	" "	5	471	...	.....	3	4
Richards	"	" "	....	.....	...	.....	....	1
Sebastopol	"	" "	2	237	...	.....	1	1
Sherwood	"	" "	7	937	1	99	6	4
Algona, N.	Renfrew	D. B. Warren, Pembroke	4	311	...	.....	2	....
Alice	"	" "	2	136	...	.....	1	....
Buchanan (pt)	"	" "	2	281	1	62	3	1
Fraser	"	" "	....	.....	...	.....	....	2
Head	"	" "	....	.....	...	.....	....	1
Maria	"	" "	....	.....	...	.....	....	....
McKay (pt)	"	" "	....	.....	...	.....	1	....
Petawawa	"	" "	2	200	3	6	2	2
Rolph	"	" "	1	100	1	1½	....	1
Wilberforce	"	" "	....	.....	...	.....	....	....
Wylie (pt)	"	" "	2	241	...	.....	2	2
Calvin	Nipissing	Robert Small, Mattawa	3	283	...	.....	1	2
Cameron (pt)	"	" "	2	176	...	.....	....	....
Lauder	"	" "	....	.....	...	.....	....	....
Mattawan	"	" "	5	631	3	4	1	....
Papineau	"	" "	9	997	1	8	7	3
Korah	Algoma	Edw'd Noble, Sault Ste. Marie	1	80	...	.....	1	....
Parke	"	" "	....	.....	1	151	1	6
Prince	"	" "	5	732	1	17	6	3
Aberdeen	Algoma	Thos. Buchanan, Thessalon	2	240½	1	3	....	7
" add.	"	" "	....	.....	...	.....	....	....
Galbraith	"	" "	2	317½	1	1½	....	10
Lefroy	"	" "	....	.....	...	.....	....	1
Plummer	"	" "	....	.....	...	.....	....	....
" add.	"	" "	....	.....	...	.....	....	....
St. Joseph Is'd	Algoma	W. E. Whybourne, Marksville	12	1,282	...	.....	11	1
Baldwin (pt.)	Algoma	Neil Mulvaney, Espanola	18	2,558	...	.....	1	2
Merritt	"	" "	9	1,058	4	255	1	6
Blake	Thunder Bay.	W. A. Burrows, Port Arthur	14	2,074	...	.....	8	13
Conmee	"	" "	23	3,733	11	719	20	15
Crooks	"	" "	24	3,552	1	30	9	3
Dawson Road	"	" "	49	5,108	10	364	35	....
Dorion	"	" "	10	1,511	1	66	6	19
Gillies	"	" "	11	1,560	3	35½	8	8
Gorham	"	" "	78	11,904	19	2,321	44	12
Lybster	"	" "	8	1,085	2	198	7	5
Marks	"	" "	12	1,918	7	487	9	11

Appendix No. 13.—Continued.

Township.	District or County.	Agent.	No. of persons located.	No. of acres located.	No. of purchasers.	No. of acres sold.	No. of lots resumed.	No. of patents issued.
McGregor	Thunder Bay.	W. A. Burrows, Port Arthur	70	11,265	9	980	27	6
McIntyre	"	" "	3	349	2	160	3	8
O'Connor....	"	" "	16	2,489	7	350	14	9
Oliver.....	"	" "	16	2,572½	12	662	16	10
Paipoonge,N R	"	" "	....	.....	...	.....	....	8
" S R	"	" "	8	773	1	100	9	5
Pardee.....	"	" "	....	.....	...	.....	....	8
Pearson.....	"	" "	15	2,315½	2	14	9	7
Scoble.....	"	" "	27	3,898½	23	555	13	22
Strange.....	"	" "	24	3,716½	13	1,264	13	5
Ware	"	" "	80	12,454	17	885	28	9
Atwood	Rainy River..	William Cameron, Stratton..	1	161	...	.....	2	....
Blue	"	" "	14	1,888	10	299	12	16
Curran.... .	"	" "	4	644	2	42	5	1
Dewart	"	" "	....	.....	1	40	1	3
Dilke	"	" "	1	162	2	3	1	1
Morley.....	"	" "	15	2,189	5	167	13	3
Morson	"	" "	26	3,956	17	780	20	....
McCrosson ...	"	" "	8	1,119	10	458	10	4
Nelles.....	"	" "	16	2,432	5	128	11	10
Pattullo... ..	"	" "	16	2,259	4	204½	12	4
Pratt	"	" "	5	801	2	42	3	11
Rosebery	"	" "	....	.....	...	.....	....	....
Shenston.....	"	" "	4	646	5	92	4	6
Sifton	"	" "	16	2,554	9	470	12	12
Spohn	"	" "	6	871	7	300	9	10
Sutherland ...	"	" "	18	3,181	3	156	21	12
Tait	"	" "	12	1,671	5	221½	7	7
Tovell	"	" "	4	720	4	169	4	8
Worthington..	"	" "	3	242	1	80	2	1
Aylsworth ...	Rainy River .	Alex. McFayden, Emo	....	.....	...	.....	....	2
Barwick	"	" "	1	118	...	.....	....	....
Burriss	"	" "	7	1,134	5	202½	7	10
Carpenter	"	" "	9	1,516	5	247	8	9
Crozier.....	"	" "	7	989	9	194	8	8
Dance.....	"	" "	20	3,299	4	163	15	8
Devlin	"	" "	9	1,388	...	.....	6	6
Dobie	"	" "	12	1,816	5	281	11	6
Fleming	"	" "	1	160	...	.....	1	5
Kingsford . ..	"	" "	29	4,574	6	243	23	9
Lash.....	"	" "	4	527	5	677	2	8
Mather	"	" "	10	1,480	11	556	7	10
Miscampbell .	"	" "	13	2,113	1	40	8	11
Potts	"	" "	50	7,792	3	124	38	4
Richardson...	"	" "	24	3,969	3	279	17	10
Roddick.....	"	" "	....	.....	...	.....	....	1
Woodyatt	"	" "	2	149	...	.....	1	....
Aubrey	Kenora	R. H. Pronger, Dryden	23	3,518	6	320	10	13
Eton.....	"	" "	27	3,823	1	80	14	2
Langton	"	" "	2	320	...	.....	....	....
Melgund	"	" "	15	2,031	...	.....	9	2
Mutrie.....	"	" "	6	785½	1	56	5	4
Rugby	"	" "	1	160	...	.....	....	3
Sanford.....	"	" "	6	880	...	.....	7	2
Southworth ..	"	" "	12	1,639	...	.....	3	5
Temple	"	" "	7	1,108½	...	.....	5	....

Appendix No. 13.—Concluded.

Township.	District or County.	Agent.	No. of persons located.	No of acres located.	No. of purchasers.	No. of acres sold.	No. of lots resumed.	No. of patents issued.
Van Horne ...	Kenora	R. H. Pronger, Dryden.....	3	314	...	.....	4	2
Wabigoon	"	" "	20	2,914	5	345	10	....
Wainwright ..	"	" "	9	1,217	...	.....	11	1
Zealand	"	" "	18	2,219	6	229	6	4
Melick	Kenora	W. L. Spry, Kenora	17	2,462	2	70	10	1
Pellatt.....	"	" "	16	2,111	3	127	10	5
Blezard	Sudbury.....	J. A. Lemieux, Blezard	3	480	1	6	11	2
Capreol	"	" Valley	7	1,071	6	480	3	11
Hanmer	"	" "	7	964	1	$2\frac{3}{4}$	2	9
Lumsden.....	"	" "	9	1,282	1	$1\frac{1}{2}$	....	6
Balfour	Sudbury	J. K. MacLennan, Sudbury ..	12	1,705	1	$155\frac{1}{2}$	6	8
Broder.....	"	" "	16	2,213	2	161	6	4
Chapleau.....	Algoma	" "	....	.....	...	.....	....	....
Dill.....	Sudbury	" "	5	647	4	709	1	11
Garson.....	"	" "	5	827	1	$4\frac{1}{2}$	1	4
Morgau (pt) ..	"	" "	4	475	...	.....	....	6
Neelon.....	"	" "	9	1,195	8	1,228	....	15
Rayside.....	"	" "	2	171	1	102	....	1
Appleby.....	Sudbury	Emile Langlois, Warren.....	4	572	3	10	6	2
Casimir	"	" "	3	479	1	4	2	3
Dunnet.	"	" "	7	$929\frac{1}{2}$	1	$1\frac{1}{2}$	1	3
Hagar	"	" "	2	$317\frac{1}{2}$	2	$49\frac{1}{2}$	1	2
Jennings	"	" "	8	1,214	...	.....	2	1
Kirkpatrick ..	Nipissing ...	" "	10	1,475	2	$171\frac{1}{2}$	....	5
Ratter.....	Sudbury	" "	7	1,076	1	163	1	3
Caldwell	Nipissing	J A. Philion, Sturgeon Falls.	9	$1,194\frac{1}{2}$	1	$1\frac{1}{2}$	....	12
Cosby.....	Sudbury	" "	9	1,299	3	164	....	11
Grant..... .	Nipissing . ..	" "	7	1,061	...	.....	1	1
Macpherson ..	"	" "	6	874	...	.....	1	2
Martland	Sudbury	" "	9	$1,470\frac{1}{2}$	1	$2\frac{1}{2}$	2	8
Springer	Nipissing	" "	4	490	...	.....	2	7
Abinger.....	Lennox and Addington	Charles Both, Denbigh	2	200	...	.....	2	....
Canonto, S....	Frontenac....	" "	1	100	...	.....	....	1
" N...	"	" "	....	.....	...	.....	....	....
Clarendon.. .	"	" "	3	251	...	.....	5	....
Denbigh.. .	Lennox and Addington	" "	2	204	...	.....	2	1
Miller (pt.)...	Frontenac....	" "	1	100	...	.....	1	....
Palmerston (pt.)	"	" "	....	.....	...	.....	1	1
Airy.....	Nipissing	Unattached	2	298	...	.....	....	1
Finlayson ...	"	"	1	133	1	$4\frac{11}{16}$	....	2
Murchison ...	"	"	2	301	1	1	....	....
Sabine	"	"	8	950	...	.....	3	....
			1675	237,152	489	24,815	1030	1095

W. C. CAIN,
Clerk in Charge.

AUBREY WHITE,
Deputy Minister.

Appendix No. 14.

Statement of Municipal Surveys for which instructions issued during the 12 months, ending October 31st, 1912.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.
1	F. M. Eagleson ..	683a	Nov. 1st, 1911...	To survey the road allowance between the 7th and 8th concessions of the township of Williamsburgh, from the east limit of lot 25, or the nearest undisputed monument, to the west limit of the township, and to define the limits of said road allowance by permanent monuments on each side thereof.
2	S. B. Code	684	Feb. 2nd, 1912...	To survey the road allowance between the 6th and 7th concessions of the township of Marlborough, in the county of Carleton, opposite lots 1, 2, 3 and 4, or as much farther as may be necessary to find an original monument, and to define by permanent stone or other monuments the limits of said road allowance.
3	T. J. Patten.....	685	July 11th, 1912..	To survey the rear boundary of lots 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33, of concession No. 2, in the township of Assiginack, being the road allowance in rear of the lots fronting on the road to Michael's Bay, and have the same defined by permanent monuments on each side of said road allowance, and also the front of lots Nos. 20, 21 and 22 on the 6th and 7th concession road allowance and to have the corners of said lots defined by permanent monuments.
4	E. T. Wilkie.....	686	Sept. 27th, 1912.	To survey the line between concessions 7 and 8 from lots 9 to 13 in the township of Hinchinbrooke, or as much farther on each side as an original post can be found.

GEORGE B. KIRKPATRICK,
Director of Surveys.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 15.

Statement of Municipal Surveys confirmed during the 12 months ending October 31st, 1912.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.	Date when confirmed under R.S.O., 1897, Chap. 181, secs. 10-15 inclusive.
1.	William H. Fairchild.	666	May 2nd, 1908...	To survey the road allowance between the 3rd and 4th concessions of the township of East Oxford, in the county of Oxford, across lots Nos. 16 to 18, inclusive, or as much farther on either side as may be necessary to find an original monument, and to mark the road allowance across lots Nos. 16 to 18, inclusive, with permanent monuments on each side of said road allowance.	Dec 29, 1911.
2.	W. J. Moore	683	Aug. 24th, 1911.	To survey the original road allowance between the 6th and 7th concessions of the township of Elmsley North, in the county of Lanark, from Lot 22 to Lot 30, inclusive, or between such points in which an original or undisputed point can be found and to define said road allowance by permanent stone or iron monuments on each side thereof, in accordance with the provisions of the Revised Statutes of Ontario, 1897, Chapter 181, Section 14.	Dec. 14, 1911.

GEORGE B. KIRKPATRICK,
Director of Surveys.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 16.

Statement of Crown Surveys in progress during the twelve months ending October 31st, 1912.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount Paid.
				$ c.
1	May 4, 1911.	R. W. Demorest ..	Survey of islands in Lake of the Woods, District of Kenora	1,600 00
2	May 14, 1912.	Lang & Ross.....	Survey of township outlines, District of Algoma	5,000 00
3	May 20, 1912.	Speight & Van Nostrand.....	Survey of township outlines, District of Algoma and township of Mulloy	8,500 00
4	May 20, 1912.	H. J. Beatty	Survey of township outlines, District of Algoma	4,500 00
5	May 21, 1912.	Andrew Bell.....	Survey of township of Sargeant, District of Timiskaming	2,400 00
6	May 22, 1912.	J. Hutchcon	Survey of township of Shackleton, District of Timiskaming	4,500 00
7	May 21, 1912.	C. H. Fullerton...	Survey of township of Stoddart, District of Algoma	3,800 00
8	May 21, 1912.	J. W. Pierce.....	Survey outlines of townships, District of Algoma	4,500 00
9	May 27, 1912.	D. J. Gillon.....	Survey of township of Mathieu, District of Rainy River	2,300 00
10	July 9, 1912..	J. W. Fitzgerald..	Survey of township outlines, District of Sudbury	4,800 00
11	June 7, 1912..	G. L. Brown	Survey of township of McMillan, District of Algoma	4,500 00
12	July 10, 1912.	T. J. Patten.....	Survey of township outlines, District of Algoma	3,800 00
13	May 29, 1912.	H. O. Dempster....	Survey of part of the township of Nansen, District of Timiskaming	1,800 00
14	July 17, 1912.	McAuslan & Anderson.....	Survey of township of Way, District of Algoma	4,200 00
15	June 5, 1912.	G. P. Angus.....	Survey of part of the township of Hanlan, District of Algoma	1,800 00
16	July 13, 1912.	Cavana & Watson.	Survey of township outlines, District of Algoma	4,500 00
17	June 17, 1912.	E. D. Bolton	Survey of Dawson Road Lots, District of Thunder Bay	2,100 00
18	July 17, 1912.	A. S. Code	Survey of township outlines, District of Algoma, and township of Studholm, District of Algoma	4,500 00
19	July 12, 1912.	Patterson & Byrne.	Survey of part of township of Mattawan District of Nipissing	2,000 00
20	June 24, 1912.	Coltham & Coltham	Survey of part of township of Casgrain, District of Algoma	2,800 00
21	Oct. 10, 1912.	C. H. Fullerton	Survey of timber berths in township of Mulligan, District of Timiskaming	100 00
22	June 10, 1912.	C. E. Fitton	Inspection of Surveys, 1912	1,500 00
				75,500 00

GEORGE B. KIRKPATRICK,
Director of Surveys.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 17.

Statement of Crown Lands surveyed, completed and closed during the 12 months, ending October 31st, 1912.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.	No. of acres.
				$ c.	
1	May 29, 1911...	A. Bell.....	To survey outlines of new townships, District of Nipissing	204 02	
2	June 10, 1911..	D. Beatty.....	To survey islands in Georgian Bay, in front of Conger and Cowper..	263 72	
3	July 25, 1911 & June 20, 1911.	E. D. Bolton...	To survey tract of land near Mack Station, District of Thunder Bay, and survey of township of Lyon, additional	656 27	6,149
4	May 2, 1911 ...	H. J. Beatty...	To survey township outlines, District of Sudbury	283 30	
5	June 20, 1911...	Code & Code...	To survey township outlines, District of Sudbury	246 10	
6	May 4, 1911.....	J. S. Dobie	To survey township outlines, District of Sudbury	293 28	
7	May 17, 1911...	C. H. Fullerton	To survey township outlines, District of Nipissing	276 80	
8	June 8, 1911....	J. W. Fitzgerald.	To survey township outlines, District of Sudbury	249 77	
9	July 18, 1911...	T. D. Green....	To survey islands in Gun and Sand Lakes, Winnipeg River, District of Kenora	378 44	
10	June 17, 1911...	D. J. Gillon....	To survey islands in Rainy Lake, District of Rainy River	508 35	
11	July 31, 1911...	A. D. Griffin....	To traverse Sesekinika Lake, District of Nipissing	309 92	
12	June 12, 1911..	Jas. Hutcheon..	To survey Base and Meridian lines, District of Sudbury and Township of Machin	277 00	53,812
13	July 21, 1911...	J. E. Jackson...	To survey Base and Meridian lines, District of Nipissing	241 25	
14	June 28, 1911...	Paulin & Anderson....	To survey Zealand additional, and townsite in Wabigoon township, District of Kenora	.....	17,644
15	June 28, 1911...	Sutcliffe & Neelands....	To traverse the Mattagami River, District of Sudbury	2,509 20	
16	June 2, 1911....	J. J. Newman..	To survey township outlines, District of Nipissing	1,164 32	
17	May 20, 1911...	Speight & VanNostrand.	To survey base and meridian lines, District of Sudbury	1,517 50	
18	June 8, 1911....	Walter Smith..	To traverse lakes and rivers, lying between Bisco Station and Mattagami Lake, District of Sudbury	195 03	
19	Sept. 10, 1911..	D. J. Gillon....	Survey of timber berth W.10, Quetico Forest Reserve	518 50	
20	May 23, 1912...	E. H. Low.....	Survey of township outlines, District of Sudbury	5,153 30	
21	May 28, 1912...	Jas. S. Dobie...	Survey of the township of Kendall, District of Algoma	5,242 20	52,422
22	June 25, 1912..	W. Smith.....	Survey of township outlines, District of Sudbury	4,633 80	
23	June 18, 1912...	Code & Code...	Survey of outlines District of Sudbury	2,234 10	
24	June 21, 1912...	Code & Code...	Survey of line between Timiskaming and Nipissing	595 80	
25	June 7, 1912....	A. D. Griffin...	Survey of township of Gill District of Algoma	5,188 60	51,886

Appendix No. 17.—Continued.

Statement of Crown Lands surveyed, completed and closed during the 12 months.—Continued.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.	No. of acres.
				$ c.	
26	June 19, 1912...	David Beatty...	Survey of township of Fauquier, District of Algoma, and survey of part townships of Wallbridge and Mowat	2,561 87	34,861
27	June 26, 1912...	Sutcliffe & Neelands...	Survey of township outlines, District of Algoma	5,192 37	
28	Oct. 10, 1912....	C. H. Fullerton	Survey of timber berths in Mulligan, District of Nipissing	687 93	
29	June 21, 1912 ..	Code & Code...	Survey of township outlines, District of Temiskaming	1,684 38	
30	June 8, 1912....	W. J. Moore....	Survey of land at Armstrong Divisional point	178 95	
31	May 21, 1912...	W. Smith.....	Survey of timber berth No. 9, District of Temiskaming	649 45	
		C. Tarling & Co	Mounting maps	316 59	
		E. H. Harcourt & Co.....	Lithographing maps	2,349 25	
		Rice Lewis & Sons.....	Iron posts	190 00	
		E. R. Watts & Sons.....	For purchase of reflecting level ...	46 00	
		Maurice Derourard..	Draughtsman on R. W. DeMorest's survey party on survey of islands in Lake of the Woods	519 10	
				47,516 46	

GEORGE B. KIRKPATRICK,
Director of Surveys.

AUBREY WHITE,
Deputy Minister of Lands and Forests.

Appendix No. 18.

Survey of Line Between the Districts of Timiskaming and Nipissing, from the South Angle of the Township of Cassels East to Lake Timiskaming.

Cobalt, Ont., October 17th, 1912.

Sir,—In accordance with instructions from your Department, bearing date June 21st, 1912, I have the honour to submit the following report on the survey of a Base Line forming a portion of the boundary between the District of Nipissing and the District of Timiskaming.

The survey was commenced at an iron post, marked "Riddell," on the south-west side, and "Cassels" on the north-west side. This post was found in the meridian line, run by O.L.S. Niven in 1885, which forms the east boundary of the townships of Cassels and Riddell. From this point, the line was run due east astronomically a distance of 9 miles 74 chains and 39 links to the waters of Lake Timiskaming. On the line wooden posts were planted every half-mile, and marked on the west side with the number of miles or half-miles distant from the starting place. The mile posts were also marked "Timiskaming" on the north side, and "Nipissing" on the south side. Iron posts were planted at the end of the fourth and eighth miles, and marked similarly to the wooden posts. As there was a perpendicular drop of some 100 feet at the point where outline joined the waters of Lake Timiskaming, it was impossible to plant iron posts at the high water mark as instructed by you. However, they were planted as near the face of the cliff as possible, and were well mounted with boulders. They were marked "Timiskaming" on the north side, "Nipissing" on the south side, and "IX. M & 74 chains, 23 links" on the west side.

Timber.

At Mileage IV. M. & 48 chains, 47 links the line crossed the eastern limit of the Timagami Forest Reserve. To the west of this line is a virgin forest of white and red pine with a considerable amount of valuable spruce and jack pine. There is also balsam and birch in smaller quantities. East of the reserve line all the pine has been cut. There is left a dense growth of spruce averaging about 8 inches, as well as some cedar, birch, and jack pine. The timber around Macdonald Lake was destroyed by fire about three years ago.

Waters.

The main waters of the section are Rabbit Lake, Macdonald Lake, and the Matabitchouan River. On Rabbit Lake large storage dams have been constructed by the British Canadian Power Company. These have flooded the surrounding country, but have done very little damage, as the shores of the lake are steep and rocky. There is a convenient canoe route from Rabbit Lake to Macdonald Lake.

Physical Features.

The greater portion of the country is rocky and very rough. The surface soil is scanty. The hills surrounding Lake Timiskaming are about 400 feet in height, and drop sharply towards the lake. At the Matabitchouan River there is also a very steep hill.

Rocks and Minerals.

The rock formation is chiefly diabase and granite. Very little trace of economic mineral was found. In the vicinity of Macdonald Lake the country has been staked for mining purposes, and considerable work has been done, though at present no companies are operating.

Game and Fish.

Moose and red deer are quite plentiful in this district. The smaller animals have been trapped off to a great extent. There is, however, an abundance of fish. Rabbit Lake and the smaller lakes surrounding it are well stocked with pike, bass, and pickerel.

Observations for Azimuth were taken on Polaris throughout the work, and recorded in the field notes. The Magnetic Variation found was 9°30′ West.

Accompanying the report I beg to submit a plan on mounted paper, showing the topography of the line, and the waterways; a timber plan on tracing linen; a copy of the field notes, and index for same.

All of which are respectfully submitted.

I have the honour to be
Sir,
Your obedient servant,
(Signed) R. S. Code,
Ontario Land Surveyor.

The Honourable, the Minister of Lands, Forests and Mines,
Toronto, Ont

Appendix No. 19.

Survey of Township Outlines, Districts of Algoma and Sudbury.

Ottawa, September 7th, 1912.

Sir,—I have the honour to submit the following report on the survey of certain township outlines in the Districts of Algoma and Sudbury, lying between the Ground Hog River and the Kapuskasing River, performed under instructions dated May 21st, 1912.

In pursuance of instructions I commenced my survey at the 18th mile post of O.L.S. T. B. Speight's base line run in 1909 near the crossing of the Canadian Northern Railway (under construction) over the Ground Hog River. From this point I ran north astronomically a distance of 9 miles, planting posts at the end of each 120 chains, excepting that as the third mile came in Gervais Lake, I planted a post on either shore with the chainage marked thereon.

From the nine mile post I ran west astronomically to intersect the meridian run north from the 9th mile post of O.L.S. Speight's base line aforesaid, which meridian I produced northward to intersect O.L.S. A. Niven's base line run in 1899 from the 120 mile post of the boundary between Nipissing and Sudbury Districts near the 61st mile post.

I then produced my before-mentioned base line west astronomically to intersection with O.L.S. Speight's meridian line run in 1909 near the 57th mile post thereof; thence west astronomically 9 miles, planting posts in accordance with instructions at the end of each 1½ miles, excepting that as the end of the sixth mile came in Mishiongo Lake, I planted a cedar post on the eastern shore of the west bay; thence due north to intersect O.L.S. Niven's base line near the 79th mile post thereof.

Again, commencing at the 81st mile post of O.L.S. Niven's base line aforesaid I ran north a distance of 18 miles and 78 links to intersection with O.L.S. Speight's base line run in 1909.

Finally, I ran due east astronomically from the intersection of O.L.S. Beatty's base line run this year, with the meridian mentioned in the next preceding clause near the 9th mile thereof, to intersect O.L.S. Speight's meridian line run in 1909, due north from the 72nd mile post of O.L.S. Niven's base line run in 1899.

The above mentioned lines were well cut out and the adjacent trees blazed on three sides in the customary manner, and especially well blazed where lines intersected navigable streams or lakes. Hewn wooden posts were planted as shown in the notes, and, except where available timber was too small, were six inches square when so hewn. Care was taken to plant posts as firmly as possible. Where possible a mound of stones was erected about the base of the posts. When the end of the mile and a half came in a lake or river the post was planted at the nearest shore with the chainage in miles, chains, and links carved thereon.

Iron posts were planted alongside the wooden posts (1) at the end of the first nine miles run, (2) at the intersection with the second meridian run, and (3) at the intersection of the second meridian with O.L.S. Niven's base line near the 61st mile post, (4) at the intersection of the 1st base line run with O.L.S. Speight's meridian near the 57th mile post, (5) at the end of the 9th mile west from Speight's base line, (6) at the intersection of the third meridian line with O.L.S. Niven's base line near the 79th mile post, (7) at the intersection of O.L.S. H. J. Beatty's base line with the meridian run by me north from the 81st mile of Niven's base line, near the 9th mile post, and (8) at the intersection of O.L.S. Beatty's base line produced by me, with O.L.S. Speight's meridian north from the 72nd mile post of O.L.S. Niven's base line run in 1899.

At frequent intervals throughout the survey observations on Polaris were taken for obtaining azimuth, and the magnetic declination, which varied between 5 degrees and 7 degrees west of north, was noted and entered in the field notes.

Throughout the survey the chainbearers were impressed with the importance of noting the nature of the soil where exposed, the kind and size of the timber passed through, etc., and also of the need of great care to obtain accuracy in their operations.

Physical Features.

The district within the limits of the lines run by me is traversed diagonally by the new Sudbury-Port Arthur branch of the Canadian Northern Railway, and is for the most part rolling country, with numerous lakes, rivers, and creeks. The soil is light and gravelly in the eastern part of the district surveyed, but good agricultural clay land was met with in the western areas near the Kapuskasing River. Very little rock was met with and no evidence was seen of the presence of any economic minerals. A low hill of syenite was encountered on the first line run north from the 18 m.p. of O.L.S.. Speight's base line, and again an exposure of granular quartzite was crossed west of the Piskanogama River.

Timber.

Considerable black and white spruce was seen and noted, as shewn in the notes, the most valuable tract from a commercial viewpoint being east of the Kapuskasing River and several miles north of the Canadian Northern Railway.

The timber for the most part, however, is small and faulty. Some scattering red and white pine groves were crossed and several large tracts of poplar suitable for pulp-wood.

It was noticed that the tamarac trees are beginning to put out green shoots, and a good deal of young green tamarac was seen in the level swamp land.

Water Power.

Nearly every stream crossed is available for power development, the most promising being the falls on the Kapuskasing, below Kapuskasing Lake, and a series of long rapids on the Piskonogama, a few miles north from the crossing of the Canadian Northern Railway. There is also a splendid chute with a fall of about 30 feet on the Kapuskasing River, just north of the crossing of O.L.S. Speight's base line.

Game.

Signs of moose were plentiful everywhere, but partridge and rabbit seemed scarce.

The waters and shores of some of the lakes and rivers abound with muskrat and beaver. A good many marten and fisher were seen and two red deer. Duck, geese and loon were fairly plentiful.

Accompanying this report are field notes, index plan, timber plan, general plan mounted on cotton, chain bearers oaths, account in triplicate.

I have the honour to be
Sir,
Your obedient servant,
(Signed) J. W. Pierce.

The Honourable, the Minister of Lands, Forests and Mines,
Toronto, Ontario.

Appendix No. 20.

Survey of Township Outlines, District of Sudbury.

Sudbury, Ont., October 17th, 1912.

Sir,—I have the honour to report as follows on the survey of certain township outlines in the vicinity of Ground Hog Lake, along the line of the Canadian Northern Ontario Railway, in the District of Sudbury, performed under instructions from your Department, dated May 23rd, 1912.

On June 27th my packers left for Bisco, and the following morning proceeded up Bisco Lake and over the old canoe route to Flying Post. The remainder of the

party followed on July 3rd, overtaking the packers at Marion Lake, and all arrived at the O.L.S. Speight's Base Line, on the Ground Hog River, early on the morning of July 8th.

I started my survey at the 18th mile post on this base line, and ran my second meridian line south 18 miles to connect with O.L.S. Smith's survey, but Mr. Smith had not then reached that part of his work, so I blazed several chains ahead of the end of my line to enable him to find it without trouble.

From a post on O.L.S. Speight's base line on the west shore of Ground Hog River, marked 18 miles, 73.00 chains, my first base line was run 8 miles and 7.00 chains east and the north-east corner of township of Penhorwood established and the line continued east to the west boundary of Township of Pharand.

From the north-east corner of township of Penhorwood my third meridian line was run south 18 miles, and, as before, the blazing was continued beyond the end of the line to enable him to find it quickly.

My second base line was begun at the 9th mile on my third meridian and run east to the west boundary of Township of Crothers and west to intersection with my second meridian line at the 9th mile, and continued west 9 miles farther.

From this last point my first meridian line was run 9 miles north to intersection with O.L.S. Speight's base line near his 9th mile post.

The iron posts provided by your Department were planted at the various township corners according to instructions and marked with the names of the adjacent townships, so far as they were known to me, and with the mileage.

Wooden posts of cedar, spruce or pine, six inches square or larger, were similarly marked and firmly planted beside the iron ones and both securely rocked up.

Wooden posts similar to the above and properly marked with the mileage were planted at every mile and a half on each line, and the position of every post was established with reference to two bearing trees.

All lines were well cleared to a good width, and particular attention was paid to liberal blazing of the same.

The season was very wet and caused much discomfort, which was only partly counter-balanced by the complete absence of blackflies. Owing to the long continued spells of cloudy weather I was unable to take as many observations for azimuth as I wished. Those taken are shown in their proper places in the field notes, and the bearing of the line at each place noted.

The variation of the compass was found to be about 6°30′ west of north.

General Features.

The surface of the country included within the limits of this survey may be described as gently rolling, as only on the west line of Township of Hardiman and on the south line of Township of Keith were hills over thirty feet in height encountered, and none were precipitous, being for the most part sand ridges. Small lakes and small cedar swamps are very numerous. An area of old brulé, grown up with small poplar, spruce, and Banksian pine lies in a north and south direction across the township east of Penhorwood. The south-west corner of Township of Hardiman lies in a similar brulé, and the same was encountered on the south and west lines of Township of Keith.

Soil.

A small area of sandy loam in the north-west corner of Township of Penhorwood is suitable for farming, but for the most part the soil, as observed on the lines,

consists of very light sand, or sand and granite boulders with a very few rocky ridges. However, there are probably many small areas of good farm land in the interiors of the townships. Mr. McLeod, Hudson's Bay Factor at Flying Post, has been very successful in raising all kinds of vegetables, potatoes especially, in large quantities.

Timber.

The timber worthy of note consists of spruce, poplar, Banksian pine, birch, cedar, and balsam of splendid growth. Except for scattered specimens, the only white pine seen was in the south-west corner of Township of Penhorwood and south-east corner of Keith, east of the Ground Hog Lake. The pine here, which covers an area of about four square miles, is neither very large nor very plentiful. Some red pine, averaging about fifteen inches in diameter, was seen on the shores of the north-east arm of Matagaming Lake.

Rock.

On the west line of Township of Penhorwood greenstone schist was seen. On the south line of Township of Keith the line crossed a small ridge of porphyry, and a couple of outcroppings of quartz were noticed. The remainder of the rock seen was all granite.

Water Powers.

No water powers of commercial value are known to exist within the limits of this survey.

Game.

Mink, marten, and bears were seen, the latter being very plentiful, as are moose and beaver. No signs of red deer were seen, and partridges were scarce, owing, no doubt, to the cold wet weather during the time of hatching and later The Indians report fur-bearing animals in general to be plentiful.

Accompanying this report are the field notes, oaths of chainmen, map on scale of one mile to an inch, timber plan on linen and my account in triplicate, all of which are respectfully submitted.

I have the honour to be,
Sir,
Your obedient servant,
(Signed) E. H. Low,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 21.

SURVEY OF TOWNSHIP LINES, DISTRICT OF SUDBURY.

SUDBURY, ONT., October 31st, 1912.

SIR,—I beg to submit the following report on the survey of the township outlines, in the District of Sudbury, along the line of the Canadian Northern Railway, performed under your instructions dated June 25th, 1912.

I arrived with my party at the north-west corner of the township of Togo on July 18th, and was fortunate enough to get an observation for azimuth, using the west boundary of the township of Mattagami as reference line for same. I began my first base line the following morning and continued it west to the Macaming River, after which I returned to the posts left at 6 miles and 30 chains west of the place of beginning, and ran my first meridian north between the townships of Stetham and Carter to the intersection thereof with the south boundary of the township of Hazen. I then ran south between the townships of Jack and Noble to the north bank of Minniesinaqua Lake, and returned to the base line at Macaming River and continued west to a point distant 6 miles and 6.29 chains from my first meridian. I ran the second meridian south along the west boundary of Jack from this point 6 miles. From this second meridian I continued west along the south boundary of Whalen 6 miles, and returning to the said meridian ran it north to the intersection thereof with the south boundary of the township of Middleboro produced to a point 27 links west of its south-west angle. I then ran west along my second base line between the townships of Wigle and Whalen, 6 miles, and thence south along the west boundary of Whalen to the south-west angle thereof. Returning to the north-west angle of Whalen, I produced my third meridian north along the west boundary of Wigle to a point near the intersection with my third base line. I then located the post planted at the north-west angle of the township of Middleboro by H. J. Beatty, O.L.S., and ran my third base line west to the intersection thereof with the west boundary of Wigle, continuing it west to the south-west angle of the township of Hardiman. At the intersection with the west boundary of Regan I moved the post planted by E. H. Low, O.L.S., 1.40 chains south to my line, and at the west boundary of Hardiman I moved his post 1.47 chains south to my line, and by so doing completed the above survey.

Wooden posts were planted at half-mile intervals on the different lines, together with one of the iron posts supplied by your Department at each of the township corners, all of which have been marked and referenced by bearing trees, as shown in the accompanying field notes. Where it was possible to do so cairns of stones were built around the posts, and, with the exception of that at the south-east corner of Jack, at Minniesinaqua Lake, the different township corners have been so protected.

The country generally is composed mostly of rolling sandy loam and clay with loose boulders and stony. In different places, as shown in the field notes, high rocky hills were met with, and numerous swamps and small lakes were crossed.

The timber is mostly Jack pine, spruce, birch, balsam, and poplar with underbrush. Brulé and windfall lie along the lines in different places as shown in field notes. Some white pine was seen on the following lines, *i.e.*, between Carter and Jack, II. M. to III. M. South boundary of Whalen I. M. to IV. M. West boundary of Jack I. M. to II. M. West boundary of Whalen, O. M. to IV. M. West boundary of Wigle, II M. to IV. M.

The rock is of a granite formation, except a diorite outcrop near the south-west corner of Hardiman. No minerals were discovered or mining claims found.

Moose, partridge and beaver are plentiful, and the lakes are well stocked with pike and pickerel.

Accompanying this report is a plan of survey, timber plan, field notes, and oaths of chainmen.

I have the honour to be,
Sir,
Your obedient servant,
(Signed) WALTER SMITH,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 22.

SURVEY OF OUTLINES OF TOWNSHIPS WEST OF LAKE TIMAGAMI AND LADY EVELYN LAKE, DISTRICT OF SUDBURY.

COBALT, ONT., *October 17th,* 1912.

SIR,—I beg to report that in accordance with instructions received from your Department and dated June 18th, 1912, I have surveyed the Third and Fourth Meridian lines, and First Base line, being north of the townships of Marconi, Turner and Seagram, and south of the townships of Corley, Gamble and McGiffin, in the Timagami Forest Reserve, in the District of Sudbury.

From a post marked "VI Miles" on the east, "Selby" on the north-east, "Dundee" on the south-west, and "Parker" on the north-west, "Acadia" on the south-east, on the line between the townships of Selby and Acadia, run by J. J. Newman, O.L.S., in 1911, I ran the Third Meridian due north astronomically 5 miles, and 74.69 chains, and intersected the south boundary of the township of Gamble at a point due west astronomically 10.85 chains from an iron and spruce post defining the south-east angle of the said township of Gamble and the south-west angle of the township of McGiffin. I then returned to the said point of commencement and ran said Third Meridian due south astronomically 6 miles and 6.50 chains, and intersected the north boundary of the township of Seagram in a lake at a point due west astronomically 29.70 chains from the post planted on the east shore of said lake, and marked V.M.—4.93. From a six-inch red pine post planted on the easterly shore of Florence Lake and marked 66 plus 43 on the east side, and which said post was planted by J. J. Newman, O.L.S., in 1911, on the line between the Townships of Parker and Dundee, I ran the first Base Line due west astronomically, intersecting the east boundary of the Township of Haentschel at a point 4.33 chains south astronomically from the north-east corner of the said Township of Haentschel.

From the end of the 6th mile on the first base line, I ran the fourth meridian north astronomicaly to intersect the south boundary of the Township of Corley

and south astronomically to the north boundary of the Township of Turner. The fourth meridian intersects the south boundary of Corley at a point 7.41 chains west of the south-east angle of the said Township of Corley. The fourth meridian line intersects the north boundary of Turner Township in a lake at a point 31 chains west of the second mile post on said township boundary.

Along these base and meridian lines most durable posts were planted every mile and half-mile, and where possible, a cairn of rock was piled around them. On the base line these posts were carved in Roman numerals on the east side, while the posts on meridian lines were carved on the south side. Where these lines intersected township boundaries, iron posts were planted with the names of the adjacent townships marked thereon with a cold chisel and the wooden posts were marked similarly.

Physical Features.

The country throughout consists of high rocky successions of ridges running north and south, with a light overburden of soil, with very little agricultural land to be found. The formation of rock is principally quartzite and diabase, the quartzite being principally found around Florence Lake. A diligent search for mineral was made throughout the work, but none was found. A number of mining claims have been staked around the locality of Florence Lake, but no surveyed claims were to be found.

Timber.

The district throughout is heavily timbered, consisting chiefly of white and red pine, balsam, spruce, poplar, jackpine, and a few scattering groves of maple.

Fish and Game.

Moose, red deer and caribou are the principal species of large game, all being most plentiful. The small fur-bearing animals are the black bear, beaver, mink, marten, otter, fox and muskrat. Partridge, geese and ducks are very plentiful, and the various kinds of fish are speckled trout, pike, pickerel and bass.

Observations for azimuth were frequently taken on Polaris, and recorded in the field notes. The magnetic variations was found to be 8°30′ west.

Accompanying this report I submit a general plan on the scale of one mile to the inch, a timber plan, and field notes.

All of which is respectfully submitted.

I have the honour to be,
Sir,
Your obedient servant,
(Sgd.) R. S. Code,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 23.

Survey of the Outlines of the Township of Lowther, Templeton and Talbott, District of Algoma.

New Liskeard, Ont., October 19th, 1912.

Sir,—We have the honour to submit the following report on the survey of the outlines of the Townships of Lowther, Templeton and Talbott, in the District of Algoma, made by us under instructions from your Department dated June 26th, 1912.

Work on this survey was commenced during the last week of July. We started at the south-easterly corner of the Township of Way, which is also the south-westerly corner of the township of Kendall, both of which townships were being subdivided at the same time. From the south-easterly corner of Way we ran a meridian due south astronomically nine miles; thence west astronomically nine miles. We then brought a line south astronomically nine miles from the south-westerly corner of the Township of Way to intersect the east and west line already run by us. Those lines, with the south boundary of the Township of Way, form the boundaries of the Township of Lowther. From this intersection, which is the south-westerly angle of Lowther Township, a meridian was run south astronomically eighteen miles to intersect the base line run by O.L.S. Speight in 1910. From the same point we ran west astronomically nine miles and thence south astronomically eighteen miles to O.L.S. Speight's base line, above mentioned. From the end of the ninth mile on the most westerly meridian run by us we ran east astronomically nine miles to intersect the most easterly meridian which intersected O.L.S. Speight's base line, above mentioned. Those latter lines form the boundaries of the Townships of Templeton and Talbott, Talbott being to the south.

Good substantial squared wooden posts were planted at every mile and a half. In no place those posts came in a lake or a stream, so that no witness posts were planted. All those posts were properly marked with the mileage number from the east and south, from 1½ M to 9 M, for each township boundary. At the corners of the several townships an iron post was planted. Those iron posts, as well as the wooden posts at the same corners have marked on them the names of the Townships contiguous to the corner at which the post is planted; the names of the townships on the post facing in the direction of the respective townships.

Physical and Geological Features.

The country crossed by those lines is on the whole comparatively level, although in most cases sufficiently undulating to afford good drainage at such time when the bush is cleared and ditches dug.

The only stream of any importance passing through those townships is the Mattawishquia River. Several creeks and small streams drain into this; on the whole, affording fairly good drainage. This river from where it is crossed by the Algoma Central and Hudson Bay Railway is navigable for canoes to Hearst town and to its outlet on the Missinaibi River, although it is very rough in places. During the past summer it was used as a canoe route by the contractors on the Algoma Central and Hudson Bay Railroad from Hearst to where the river crosses the Algoma Central. Although only a distance of about fifty miles by the river, it took several days to traverse it with a loaded canoe, so that as a means of transportation

it is of very little use. We are told that there are numerous rapids and falls on this river, although none of importance were seen or measured by us. In any case there will be very little chance of any power development on this stream in those townships surveyed, as the banks of this stream are quite low, and consequently, very few facilities for damming purposes. In low water the discharge of the stream is very small.

The highest ground crossed by those outlines is on the east boundary of the Township of Lowther between Mileage One and Three, and on the west boundary of the Township of Talbott, which passes through a chain of lakes between M 3 and M 6, and in no place being very rough.

At approximately 2 miles and 50 chains on the south boundary of Lowther we found outcrops of fine grained basic igneous rock, probably a diorite and rich in horn-blende. Those outcrops continue at intervals up to 3 miles and 10 chains, and occur as north-east and south-west ridges, just rising slightly above the surrounding country, which contains boulders of the same formation.

Another small outcrop parallel to the former occurs at 5 miles and 30 chains on the south boundary of Lowther. At approximately 7 miles the line again crosses an outcrop of granite rising to the south 15 or 20 feet above the surrounding country. Between M 3 and M 4, on the west boundary of Templeton, outcrops of diorite cut by a network of acidic dykes and masses of very coarsely crystallized granite, almost pegmatitic, occur. From the character of the rock and the strike of the outcrops, which is west and south-west, it would appear to be of the same series of outcrops that was crossed by the south boundary of Lowther.

Occasional other small ridges of granite were crossed.

Lakes are not very numerous, the only lakes of importance being along the west side of the Township of Talbott.

Timber.

The timber crossed in those townships was, generally speaking, very small. Very little was seen that will be of much commercial value. There are, however, in places, small strips of spruce which will make pulpwood; but very little of the timber seen by us averages more than seven or eight inches. None of the country in this section has been burned during the construction of the Algoma Central Railway. The only brulé seen is on the west boundary of Talbott, along Wigwam Lake, and along the west boundary of Templeton from 2 M to 3 M. In each case those brulé are at least five years old. The bush is almost entirely of spruce, which in places grows very thick. There are also a few ridges of poplar which runs as high as twelve inches in diameter, as well as small balsam and tamarac.

Soil.

The soil seems to be entirely of a sandy nature. In places there is a considerable depth of vegetable matter, after which is the sand, with small stones and boulders mixed through it. This can be plainly seen along the construction of the Algoma Central Railway. The soil in those townships is not a good clay like that seen along the Transcontinental Railway. Along the Algoma Central Railway the soil seems to change from a clay to a sand about nine miles south of the town of Hearst. This soil, however, in time will be turned into agricultural land, although it will not be so easily worked as the clay to the north owing to the great number of stones in it.

GAME.

Of the larger animals, the moose seems to be the only one to be seen, but the moose are very plentiful. In a few places we saw fresh beaver work, although they do not appear to be very numerous. No bears were seen although signs of small numbers of them are evident. Partridge are quite plentiful. There are also a few ducks on some of the lakes. Outside of the moose, it is not a very good game country.

Accompanying this report are also field notes and plans of survey.

We have the honour to be,
Sir,
Your obedient servants,
(Sgd.) SUTCLIFFE & NEELANDS,
Ontario Land Surveyors.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 24.

SURVEY OF TOWNSHIP OUTLINES, DISTRICT OF TIMISKAMING.

COBALT, ONT., October 3rd, 1912.

SIR,—In obedience to instructions received from your Department, dated June 21st, 1912, I have the honour to submit the following report:—

The survey was commenced at the III mile and 41 chain post on O.L.S. Fitzgerald's Base Line, run in 1908. The line was produced east astronomically from this point to intersect the east boundary of the Township of Timmins at Mileage VI. and 64 chains, 81 links, which point is 4 chains 82 links north astronomically from the south-west angle of McEvay Township.

From the VI. mile post at the end of the base line run by O.L.S. Bell, in 1911, which defines the south boundary of the Township of McEvay, the meridian was run north astronomically to intersect the south boundary of the Township of Egan, this beilng O.L.S. Galbraith's base line. The intersection came at a point 14 chains 63 links west of the post between lots 10 and 11, and at chainage V miles, 77 chains 6 links. An iron and a spruce post were planted here, and marked "Timmins" on the south-west, "McEvay" on the south-east.

From the VI mile post at the end of the base line run by O.L.S. Bell, in 1911, which defines the south boundary of the Township of McEvay, the meridian was run south astronomically, passing 39 links west of iron and wooden posts planted by O.L.S. Bell, and marked "Nordica" on the north-east, and "Sheba" on the south-east. O.L.S. Bell's base line was produced to intersect my line. From this intersection the meridian was produced south astronomically to intersect O.L.S. Fullerton's base line at a point 16 chains 48 links west of the north-east corner of the Township of Baden. At the intersection point an iron and a six-inch Jack pine

post were planted, being marked "Sheba" on the north-east and "Robertson" on the north-west. From this point the line was chained north to the south-east corner of the Township of Timmins.

From the south-east angle of the Township of Fasken, the south boundary of the Township of Michie was run east astronomically 6 miles, 64 chains, 84 links, intersecting the west boundary of the Township of Nordica at a point 3 chains, 6 links north of the south-west angle thereof. At this point a 10 inch Jack pine post was planted, marked on the west, VI M and 64 chains, 84 links; on the south-west, "Robertson," and on the north-west "Michie." This completed the survey.

The details of the survey will be found in the field notes. The lines were well opened out, and well blazed. All posts were well planted and marked with the various names of the townships, bearing trees being taken very carefully in every instance. The instrument work was very carefully performed, and observations for azimuth were taken frequently on Polaris, the magnetic variation of the needle being from 8°15′ to 8°45′ west of north.

Physical Features.

The country, although not too good for agricultural purposes, is not very rocky, except for a portion extending about a mile east and west of Trout Lake. With the exception of the north five miles of the east boundary of the Township of Timmins, the country is fairly hilly, the hills rising from one hundred and fifty to two hundred feet above the lake levels, but with long, easy slopes. The soil is very sandy, and in the Townships of Timmins and Michie, to the west and north of Trout Lake, where the fire has run through, the soil appears to be entirely sand.

Waters.

The principal waters in this district are Trout Lake and Trout Creek. Trout Lake is very clear, and in places is more than one hundred feet in depth. Trout Creek is barely navigable by canoe, and there seems to be but very little difference in elevation betwen the levels of Trout and Night Hawk Lakes.

Small lakes are very numerous. No waterfalls were evident and no rapids, with the exception of a very small one on Trout Creek, just north of O.L.S. Fitzgerald's base line.

Rocks and Minerals.

The rock formation is mostly granite, with the exception of a few small patches of Keewatin and Diabase.

Timber.

With the exception of a portion to the west and north of Trout Lake, which is very old brulé, and is overgrown with small pine of two or three inches on the stump, the timber is Jack pine, cedar, birch, balsam, spruce and poplar, of from eight to ten inches through.

Fish and Game.

With the exception of Trout Lake, where we were successful in catching two small lake trout, the lakes are full of pike.

The country abounds with moose, but as it has been well trapped over by the Indians, there are few evidences of beaver, mink or muskrat.

Partridges were very plentiful.

Accompanying this report I beg to submit a plan on mounted paper, of the district in general, a timber plan on tracing linen, and also a copy of field notes, including astronomical observations and magnetic variations.

I have the honor to be,
Sir,
Your obedient servant,
(Sgd.) T. G. Code,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 25.

Survey of the Township of Gill, District of Algoma.

Elk Lake, Ont., October 12th, 1912.

Sir,—Acting under instructions from your Department dated June 7th, 1912, I have completed the survey of the Township of Gill, in the District of Algoma. Herewith I am sending you copies of my field notes, together with a plan of the township on a scale of forty chains to the inch, traverse plans of the lakes and the White River and a timber map of the township.

With the exception of a comparatively small area of muskeg, on which there is only scattered small spruce and tamarac, and five or six thousand acres of burnt country in the north-west part, the township is well timbered with spruce, poplar, cedar, and white birch, and in the southeasterly part by Banksian pine. There is very little milling timber, but a large amount of valuable pulp wood.

About half the area of this township is more or less swampy. While this swampy land does not afford much encouragement for early settlement, most of it will, I believe, eventually make good farming land, as it will be comparatively easily drained, the creeks and rivers all having considerable fall and strong currents, thus affording good outlets for the water.

The land most available for present settlement is that included in the burnt country previously mentioned. This land is practically all dry and of good quality and easily cleared. Most of the timber formerly standing on it is now lying on the ground, the trees in falling having taken the roots with them. There is only a scattered second growth of hazel and other shrubs, with some spruce, poplar, birch and Banksian pine not exceeding two inches in diameter.

Generally speaking, lots one to twelve in all of the concessions south of the National Transcontinental Railway are not desirable farming land. In concessions one to three these lots are largely sand and gravel hills with granite boulders, while some are swampy and a few muskeg. From the third concession to the railway they form the most swampy part of the township. West of the side line between lots twelve and thirteen, though, there is some muskeg and not a little swamp; there is a large quantity of very desirable farming land.

The White (or Nagagamissee) River, which enters the township in lot sixteen in the first concession is, from the northerly limit of the second concession to where it leaves the township in the west boundary of concession nine, largely a succession of rapids and waterfalls, the total fall in that distance being about 120 feet. As the volume of water estimated at ordinary low water is about 48,000 cubic feet per minute there is in this river a large amount of water power. No great amount of this power could be developed as a single unit as the slope of the land generally follows that of the river, and only towards the north are there any high banks. The highest fall is fourteen feet, and probably the highest that could be obtained from a single dam about twenty-five feet. I have, as shown in red on the plan and in my field notes, reserved from the lots a liberal allowance of land for the development of larger units. In order to give access to these and to permit the development of the smaller units I have reserved, as also shown in red, one chain in width along each bank of the river from the southerly limit of concession three to the railway. At the intersection of these reservations with the concession lines I have planted posts, marking them in the same manner as posts planted for road allowances about lakes except that on the side facing the water instead of the letter "R" I have put "W."

The following iron posts were planted:

At the S. W. corner lot 12, Con. 1, a post 1¼ inches in diam. marked Con. 1 on N. side, Lot XII on E. side, R. on W. side and R. on S. side.

At the S. W. corner of lot 12, Con. VII an iron post 1¼ inches in diam. marked Con. VII on north side, Lot XII on east side, R. on south side and R. on west side.

At the N. W. corner of Lot 12, Con. XII an iron post 1¼ inches in diam. marked Con. XII on south side, Lot XII on east side, R on north side and R on west side.

Trusting that this will meet with your approval,

I have the honor to be,
Sir,
Your obedient servant,
(Sgd.) A. D. GRIFFIN,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 26.

SURVEY OF THE TOWNSHIP OF KENDALL, DISTRICT OF ALGOMA.

THESSALON, ONT., August 24th, 1912.

SIR,—In accordance with your instructions dated May 28th, 1912, I have surveyed the Township of Kendall, in the District of Algoma, and beg to submit the following report:—

The survey was commenced on the 10th of June and continued without interruption until completed on the 14th of August.

This township is very easily reached, as the National Transcontinental Railway crosses it from east to west, and the townsite of Hearst is in the north-west corner of the township. The north-east corner of the township was surveyed first and the line between Lots 6 and 7 across Concessions 1 to 8 was run from north to south. The field notes, however, were reversed so as to read from south to north.

Iron posts were planted at the intersections of the centres of the road allowances at the following places: At Lots 12 and 13, Concessions 1, 6, 7 and 12, at the east side of Lot 1, Concessions 6 and 7, at the west side of Lot 29, Concessions 6 and 7, at the north-west and south-west corners of the township; and at Lots 6 and 7, Concession 12 (north boundary). Iron posts had already been planted at the north-east and south-east corners of the township.

The town site of Hearst lies in the north-west corner of the township, and all the land between the Transcontinental Railway and the Mattawishquia River as far west as the west boundary of the township is included in the town site.

The line between Concessions 10 and 11 intersects the town site near the north-east corner of Town Lot No. 1 and a tie to the corner of this lot is shown in the field notes.

The posts for the corners of Lots 25 to 29, Concession 11, were planted by measuring along the Transcontinental Railway track. They were then projected to their proper position, as shown in the field notes. These positions were calculated from the information obtained from the plan of the right of way and railway yards supplied me by your Department.

The lines throughout the survey were all well cut and blazed and the posts were carefully made and firmly planted in the ground. All posts and bearing trees are marked with a scribing iron. Bearing trees were noted at all lot corners wherever a suitable tree could be found and the bearings and distances of these trees from the respective corners are all entered in the field notes.

The traverse of the Mattawishquia River was carefully made with transit and stadia. The posts for Lots 23 to 29, Concession 10, were all projected as the traverse was being made, the bearings and distances being reduced at the time so as to give the lots their correct frontage on the river. In some cases where a small corner of a lot would have been cut off by the railway or the river, it was considered advisable to leave such corners with the lot adjoining on the same side of the railway or river, as the case may be. Those parts of Lots 22, 23, and 24, Concession 10, which lie north of the railway were posted as two lots and numbered 22 A and 23 A in order to avoid confusion. All thees lots are shown on the plan which accompanies this report.

In running the north boundary it was discovered by an observation that the bearing across Lots 1 to 6 was south 89° 39′ west. This line is straight, and the error was made in starting. I decided not to re-run the line, but deflected the boundary north at Lots 6 and 7 and ran across Lots 7 to 12 on a course north 89° 39′ west. Across Lots 13 to 29 the course of the north boundary is west astronomically. An iron post was planted where the line was deflected at the intersection of the line between Lots 6 and 7 with the north boundary.

Observations were taken where possible, a siderial watch and proper azimuth tables being used for this purpose.

Across Lots 12 to 18, Concessions 9 and 10, the railway is used as the blind concession line. These lots are posted as double fronts, the road allowance on each side of the right of way of the railway being posted as well as the concession lines at the fronts of these lots. These lots are shown on the accompanying plan.

This township as a whole is gently rolling, there being very few elevations that could be called hills and very few rock exposures. The soil is a loose clay and clay loam. At least fifty per cent. of the township is clay land, high enough to require little or no drainage. There are some muskegs of considerable size, but these can all be drained when circumstances warrant doing so. The drainage facilities are good, as the township is well watered with a number of small creeks, some of which are fairly large. None of the muskegs appear to be very deep.

The prevailing timber is spruce, with poplar on the high ground. The spruce is of a size best suited for pulpwood and runs from 6 to 14 inches in diameter. There are very few spruce trees over 15 inches in diameter, but the quantity of spruce of the sizes mentioned is very large, and if pulp mills are ever established in the locality this timber will be of very great value. Part of the township was swept by fire a number of years ago, and is now growing up with a dense growth of small spruce and poplar. Where this fire ran the land should be easily cleared, and in most cases is high and dry. I am of the opinion that when this township is opened up it will prove to be a valuable one for agricultural purposes.

The Mattawishquia River is quite wide in places, but the volume of water flowing in the summer months is not large. There are some shallow rapids within the township, making canoe navigation rather tedious. None of these rapids would afford a water power of any value.

The magnetic variation is fairly constant at an average variation of 6° 15′ west.

Rock exposures are very few. The prevailing formation is granite.

There is only one lake of any size in the township, and this was properly traversed and the notes of the traverse are included.

Game of all kinds appear to be scarce, although rabbits are very plentiful in the small second growth. Traces of fresh beaver work were seen.

Herewith are plan, timber plan, field notes and accounts in triplicate all duly attested.

I have the honor to be,
Sir,
Your obedient servant,
(Sgd.) JAMES S. DOBIE,
Ontario Land Surveyor.

The Honourable the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 27.

SURVEY OF THE TOWNSHIP OF WAY, DISTRICT OF ALGOMA.

NORTH BAY, ONT., October 25th, 1912.

SIR,—We have the honour to submit the following report upon the survey of the Township of Way, in the District of Algoma, performed under instructions from your Department, bearing the date of June 17th. The work was started on the 16th of July, and completed on the 12th day of September.

The survey was commenced at an iron post planted by O.L.S. Speight to mark the corner between the Townships of Hanlan, Way, Kendall and Casgrain. This was the north east angle of Way, and from this point the east boundary

of the township was run south astronomically a distance of nearly 9 miles, being run to the intersection with the south boundary of the Township of Kendall as laid down by O.L.S. Dobie. From this intersection the south boundary was run west 9 miles, and then the west boundary was run north astronomically as far as the south boundary of the 11th concession. From this point the line was swung a few minutes in azimuth to close in on the previously established south west angle of the Township of Kendall.

The Mattawishquia River was traversed as was also a portion of the Cuckoo Creek and two small lakes occurring within the township.

Posts were planted according to instructions on the various intersections of the lot lines with the road allowances along the Algoma Central Railway and National Transcontinental Railway right of way. All lots along the several Concession lines were also posted at their front angles. On all such posts were carved the word "Con." and the Concession number on the north or south face as the case might demand and the numbers of the adjacent lots on the east and west faces. Posts were planted on the actual transit lines to mark these offsetted posts. These guide posts were carved "R" on the north and south faces, and the numbers of the adjacent lots on the east and west faces. Bearing trees were carved and noted in relation to all posts planted save the last mentioned guide posts.

Iron posts were planted in the following positions:—

1. In the east boundary of the township in the centre of the road allowance between concessions 6 and 7 marked "R" on all sides.

2. At the south east angle of the township in the centre of the road allowance and marked "Kendall" on the north east face, "Way" on the north west face, "Lowther' on the south west face and "R" on each face.

3. In the south boundary of the township in the centre of the road allowance between lots 12 and 13 and marked "R" on each face.

4. At the south west angle of the township in the centre of the road allowance marked "R" on each face, "Way" on the north east face and "Lowther" on the south east face.

5. In the west boundary of the township in the centre of the road allowance between concessions 10 and 11, marked "R" on each face.

6. In the centre of the road allowance between lots 12 and 13 and concessions 6 and 7, marked "R" on each face.

7. The iron posts planted by O.L.S. Speight at the north east and north west angles of the township are in the centres of the road allowances about the township and were carved "Way" and "R" in the former case on the south west face and in the latter on the south east face.

Our party suffered considerably in the matter of accidents. A number of our very best men being laid up through severe cuts. Rain also materially retarded our progress and our records show somewhat over 40 actual days of rain while on the survey. Because of this, astronomical observations were of necessity rather limited in number, but such were taken at every possible opportunity.

General Features.

The country embraced by this survey is traversed in an easterly and westerly direction by the Mattawishquia River and in a north easterly direction by the Algoma Central Railway which forms a junction with the Transcontinental Railway in the northerly part of the township. The T. C. R. runs in a north westerly

direction through a portion of this township at the north east corner. From these remarks it may be deduced that the township is easy of access for settlers. Such is quite the case and construction of the Algoma Central Railway is well under way; and steel will be laid in all probability during the coming winter. The Mattawishquia River, while in the main having a good width and a fair depth, nevertheless is broken by numerous swift, rocky rapids, hence cannot be utilized for other means of transportation than canoeing. This river permits of no water powers within the limits of the township.

The country has been entirely burned over a period of 50 or 70 years ago. Evidences of this fire were found every day thoughout the entire survey. The country is very level and but few water courses were found within the limits of the township. Cuckoo Creek was surveyed for only a portion of its length and this at its junction with the Main River, in order that the road allowance might be accurately plotted as far as the first concession line, south of the junction. The remaining portion of this creek, although at times it attains a fair width could scarcely be called navigable, and hence was not traversed. On account of the country being level very much of the land is low and swampy.

Soil.

The soil chiefly encountered is a very rich clay loam, and various evidences were noted along the railway lines of the abundant growth of hay, oats, potatoes, etc., of which it was capable. On the higher knolls the soil is somewhat lighter, while on the lower swampy portions the soil is covered with a deposit of black muck, but this will make equally as good land for agricultural purposes when the country is cleared and drained. Very little of the actual worthless muskeg was encountered but in the field notes there are noted a number of these areas.

Timber.

The almost sole timber of the township is spruce, and this in size runs in general from 4 in. to 8 in. Along the Mattawishquia River and Cuckoo Creek are splendid groves of spruce of a larger size, running from 10 to 18 in. in diameter. Inland from these streams no large spruce were found. Poplar of a size from 8 in to 15 in. in diameter were found on the banks of these streams and scattered throughout the township on the higher knolls. Considerable areas were covered with thickets of small spruce and balsams from 1 in to 3 in. in diameter.

Minerals.

No outcroppings of rock were found during the survey but we submit to you two samples taken from a rock cut in the bottom of a clay cut on the line of the T. C. R. at Mileage 236 about.

Game.

Moose are very plentiful although no red deer or caribou were seen. Bears are also very plentiful and our stores suffered more or less from their depredations. Partridge, mink and beaver are also quite plentiful.

General Remarks.

The proximity of this township of Hearst, the divisional point of the T.C.R. and the fact that this railway together with the A. C. R. both traverse the township makes it probable that this township will be thoroughly colonized when thrown open. The settlers in the southern portion of the township will by means of the concession roads have easy access to the A. C. R. line, while those in the northern portion of the township, by means of the side roads will have easy access to the T. C. R.

Accompanying this report are the usual returns, consisting of plans, tracing, field notes, triplicate accounts, etc., all of which are respectfully submitted.

We have the honour to be,
Sir,
Your obedient servants,
(Sgd.) McAuslan and Anderson.

per H. M. Anderson.

The Honourable, the Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 28.

Re-Survey of Part of the Township of Mattawan, District of Nipissing.

Ottawa, Ont., September 16th, 1912.

Sir,—I beg to submit the following report on the survey of part of the township of Mattawan, in the District of Nipissing, under instructions dated July 12th, 1912.

The party was outfitted at Ottawa and on the first day of August, 1912, left for Mattawa.

After questioning all the settlers in the district to be surveyed, it was found that the nearest post to the work that was known to any of them was that between Lots 33 and 34, on the north side of the road allowance between Concessions 7 and 8.

There the survey was commenced and by running a line on the approximate bearing, always looking for evidence of the true line and when such evidence was found these points were joined up by straight lines. In this manner the following intersections were obtained, viz.:

Lots 10 and 11, Concessions 7 and 8,
Lots 15 and 16, Concessions 7 and 8.
Lots 20 and 21, Concessions 7 and 8,
Lots 10 and 11, Concessions 9 and 10.
Lots 15 and 16, Concessions 9 and 10 and
Lots 20 and 21, Concessions 9 and 10.

Posts were planted at these intersections, the chainage between them carefully ascertained, and other posts were planted to mark the lot corners by proportioning the chainage according to that given in the original field notes.

Owing to the fact that lumbermen have been operating in this country for a great many years and also owing to the fires which have overrun this territory, evidence of the original lines has, in places, been completely obliterated.

A traverse was made along the concession lines across lots 11 to 20, and also on the road allowances between lots 15 and 16 and between lots 20 and 21. No traverse was made of the road allowance between 10 and 11, as the true line was not cut out all the way.

I enclose plans in duplicate, field notes and also accounts in triplicate.

I have the honour to be,
Sir,
Your obedient servant,
(Sgd.) FRANK E. PATTERSON,
Ontario Land Surveyor.

The Honourable, the Minister of Lands, Forests and Mines.
Toronto, Ont.

Appendix No. 29.

SURVEY OF THE TOWNSHIP OF NANSEN, DISTRICT OF TIMISKAMING.

GANANOQUE, ONT., October 1st, 1912.

SIR,—I wish to report that following instructions from you bearing date May 29th, 1912, that I have completed the survey of the north eight concessions of the said township in all 34,907/7 acres, and am submitting for your approval and inspection the field notes and plans of the same, and that during the course of my survey I have inspected closely the soil and have come to the following conclusions:

RE SOIL.

The greater portion of the tract is a muskeg moss, and vegetation matter partially decayed over a clay subsoil.

There is, however, a strip of country along the spur of the Transcontinental Railway constructed by Messrs. Fauquier that is a gravelly and sandy loam.

Messrs. Fauquier have taken gravel from pits 4, 5 and 6 respectively L. 0. 465 L. 0. 489 and H.S. 2,000 the gravel from pit 4 L.O. 465 that was in sight in the cut is of such quality that I do not believe that the persons in charge will use any more from this pit.

Pit 5 L.O. 489 is exhausted.

Pit 6 H. Sight 2,000 carries, I understand, the best gravel to be had in this section of the country, and is supplying Fauquier's construction needs at several points at present.

Further, that I have inspected the timber growth and have the following summary:

Timber.

There is a portion of this tract approximately 9,000 acres of brulé or burned over tract. On this are dry trees and windfalls to 8 inches in bottom. This timber I consider of no value, but over the greater portion of this brulé it would be very light clearing for settlers and the fire has left the soil in good condition.

The balance of area covered by me of approximately 25,000 acres is a spruce growth varying to an 8 and 10-inch bottom, the average about 6 inches, there are a few patches of cottonwoods, birch and balsam, but nothing to speak of.

I do not consider the timber on this tract in any way valuable as a lumbering proposition, but I think the same should have considerable value for pulp purposes.

Rock.

There are only a few ridges of rock all of which I have shown on the plans, this is a granite formation.

I spent time on the croppings and failed to find any leads of valuable mineral.

Gravel is mentioned under soil.

Drainage.

The various creeks flowing to the lakes and Ground Hog River, will on improvement give good outlet and can be improved at comparative small cost with proper outlay of improvement work.

I consider this tract a good extent of country and might suggest a consideration for this district in line with the improvement work that is being now carried out in North Ontario, the spur of the Transcontinental Railway gives access, the burned over tract should find favor with settlers as their holdings could be much more easily improved.

Iron bars were planted at intersections of lines actually run at fronts of Concessions 5, 7 and 12 between lots 12 and 13 the same being marked by cold chisel on east and west with lot numbers and on north and south with "Con." and number of the concession found.

I have the honour to be.
Sir,
Your obedient servant.
(Sgd.) H. O. Dempster,

Ontario Land Surveyor.

The Honourable, the Minister of Lands, Forests and Mines.
Toronto, Ont.

Appendix No. 30.

ALGONQUIN NATIONAL PARK OF ONTARIO.

ALGONQUIN PARK, 31st December, 1912.

HONOURABLE SIR,—I beg to hand you my fifteenth annual report on Algonquin Park, of which I have the honour of being Superintendent, and trust it will meet with your approval.

Our staff for the past year has consisted of twenty-six men, a housekeeper and superintendent. During the trapping season—from the first of September to the first of June—the time of the staff is taken up patrolling the sections over which they have charge, to prevent illegal trapping and other breaches of the Park laws. Our men travel in pairs. The area of each section is governed by the water stretches and the ease with which it can be covered; some men cover more ground than others, owing to the fact that a great part of it is accessible by water. I feel that the staff have done good work. Illegal trapping is certainly on the decrease. We had only two cases during the past year; in each the offender was fined $50.00 and costs, the fine being paid in both cases.

Our men also took out a quantity of fur during the trapping season, it having become so abundant that a large quantity can now be taken annually.

During the remainder of the year the time of the men is taken up in building new shelter houses, cutting portages, cleaning out streams, making improvements at headquarters, etc. We have built three new shelter houses during the past year, one on South River, one on Long Lake, and one on Tim's Lake. These are all substantial buildings. Some of the old shelters have been repaired, and at headquarters the boat house has been rebuilt. An acetylene gas plant has also been installed with a capacity of 50 lights. The slash along the Madawaska River has been cleaned up, adding very much to the appearance of the river, and also to the safety from fire.

Our men at all times act as fire rangers, and their duties as such take precedence over everything else. By acting in conjunction with the regular fire rangers a good work has been done, and I am glad to inform you the year has passed without any serious damage being done by fire in the Park. We have hundreds of canoeists on our lakes and rivers during the summer and fall, but very few fires are traceable to them. We find most of our fires originate either from the railway or lightning, generally the former.

The Canadian Northern Railway Company has been at work on construction ever since last January through the townships of Deacon, Boyd, and Pentland. Some hundreds of men are employed, and the work has been pushed ahead rapidly. I am glad to report very little trouble with fires, and less with their men breaking the law. Four special men were put on to act as fire rangers; these with the help of our regular men have kept a close supervision over the work, and I feel I have done well. This railway, skirting as it does all our best lakes and rivers, will become a very popular tourist route, and will necessitate more men on that section. Game of all kinds has very much increased in the Park and the surrounding sections. Last spring 480 beaver, 12 otter, 11 marten, 5 fisher, 71 musk rats, 8 ermine and 89 mink skins were sold, also several beaver and otter for mounting specimens. In addition 21 live beaver were sold at $50.00 a pair f.o.b here. Of these two went to Kentucky, two to Philadelphia, nine to New York, two to

Unionville, Ont., two to England and four to Prince Edward Island. We also sold four young foxes. The amount realized by the Department at Toronto from sale of furs and live animals was $5,959.05. I have on hand at present 14 beaver, 130 mink, 19 marten, 7 fisher, 5 raccoon, 32 musk rat, 6 otter and 14 ermine skins, and I hope to have the best showing of furs at the coming spring sale yet offered.

Wolves, I regret to say, are still very numerous and have already begun their winter's work of destruction. I estimate we killed over one hundred of these brutes during the past year, and nine have been brought in this winter already. Our men are doing their utmost to rid the Park of these pests. There is no doubt a great many come in from Quebec during the winter, as there is such an abundance of food to be found in the Park.

Fishing during the past year has been good. Some fine specimens of the true salmon introduced here three years ago have been taken. One sent to Professor Prince of the Fisheries Department, Ottawa, measured 18 inches, and was pronounced by him to be the best specimen they had received from any point where these gamest of fish have been introduced. The Government last summer put a quantity of salmon trout fry and small-mouthed bass into the lakes near headquarters. We have here a splendid location for a good hatchery, and I should like very much to see one established. We could not only keep our own stream stocked, but could supply the rest of the Province as well. The first grand prize for salmon trout in the two thousand dollar contest organized by Field and Stream was awarded a Mr. G. W. Collier of Bordentown, N. J., for a salmon trout caught in Lake of Two Rivers, Algonquin Park. It measured 30½ inches.

As a health resort and pleasure ground, the Park is now very popular; so much so that the Grand Trunk people have doubled the capacity of the Highland Inn and are building a series of camps at Smoke Lake and other points in the Park, consisting of six cottages, a guide's house and eating house, with other necessary buildings, with a view of making round trips from the hotel here without taking tents, etc.; this at an approximate cost of $70,000.00.

Not only is the Park popular as a summer resort, but is fast becoming a winter resort also. People who visit it once in winter wish to come back; there are at the Inn now over sixty guests and this will keep up all winter. The hotel at Joe Lake is also well patronized during the summer months, but closed in winter. We have three large camps of schools, Miss Case on Cache Lake with her school of fifty girls; the Bordentown Military School at Lake of Two Rivers, and the Long Trail Camp for boys on Joe Lake. The Y.M.C.A. also of Buffalo send in a camp of young men each year.

The amount collected here during the past year for licenses was $1,146, for rents, $285.00, fines, $100.00; this does not include moneys paid direct to the Department.

Capercalzie.

These birds introduced from Norway some years ago are not making the showing I had hoped. Several were seen during the past year, but from reliable information I believe many went north of the Canadian Pacific Railway. In time they may become numerous. They evidently seek the dense pine woods.

Lumbering is still going on to a considerable extent in the Park, but the firms of Brennen & Sons, A. Barnet & Co., J. D. Shier, Mickle, Dyment & Co.,

and the Huntsville Lumber Co., have cut out their limits, and I would strongly recommend all this territory being taken over by the Government. It would include the townships of McCraney, Hunter, McLaughlin, Finlayson and Peck. The firm of Brennen & Sons have moved their mill from Rainy Lake in the Park to the village of Kearney, which leaves only the mill of A. Barnet & Co., in the Park. It did not run last year, all the timber that would come to it of all kinds being cut.

Re Leases.

Several were granted during the past year on Cache and Canoe Lakes, and there are several other applications, I would respectfully recommend that no leases be granted for some time to come except upon the lakes near headquarters. It is certain that with the Canadian Northern going through the north end of the Park there will be applications coming in from parties wishing to locate in that section. I think it should, however, be kept as near in a state of nature as possible, and be left as one spot in the province where all men can enjoy the same privileges. This northern section is a paradise for the canoeist and angler that cannot be equalled in America.

Government Limits in the Park.

We have now good shelter houses all through the newly acquired territory, and the game has already perceptibly increased. Four fire rangers were put on this year, two being located at Great Opeongo Lake and two at Lake of Two Rivers, these with the co-operation of the regular staff were able to control all fires started, excepting one at Rock Lake, where a few men had to be hired. I am pleased to say no damage was done this year to the standing timber.

I have the honour to be,
Your obedient servant,
G. W. Bartlett,
Park Superintendent.

The Honourable, W. H. Hearst,
Minister of Lands, Forests and Mines.
Toronto, Ont.

Appendix No. 31.

RONDEAU PROVINCIAL PARK.

MORPETH, 4th January, 1913.

SIR,—I have the honour to submit this my report as caretaker and ranger of the Rondeau Provincial Park for the year 1912.

This has been a wet, cold and backward season, consequently the picnic season was shorter than usual. In the spring when the ice in the Eau broke up, a high wind was blowing which caused the ice to damage the Park dock, knocking it considerably out of shape. I had it levelled up again, and put it into good condition at a cost of $21.00, and to prevent a repetition of this trouble next spring I am now having the corners of the outer-end crib bound with thin boiler plate steel 4 ft. x 4 ft. x ⅛ in. thick.

The floor and posts in the old open pavilion were showing considerable decay in places, and according to instructions from the Department the building has been partially overhauled, painted, and put into fair condition again, at a cost of $186.00—painting $140.00, repairing $46.00 This pavilion was built sixteen years ago and has been painted and repaired from time to time; but as the unpainted floor, posts, etc., have been exposed to the rains and change of weather all this time, they, as well as the under supports of the building, are not in a condition that would warrant a large expenditure in repairs. It should be replaced by a new pavilion in a few years.

The new drive road through the Park forest is nearing completion, but is costing more than we at first anticipated. Taking the stumps out of the ground and getting them off the roadway was a slow, laborious task under the system of grubbing around them and hauling out and off with rope and tackle. But when we adopted the use of stumping powder and engaged the services of an expert blaster, this part of the work went on more rapidly and satisfactorily. The blasting not only jarred the stumps and caused the soil to leave the roots, but shattered them into pieces so a team could handle them quite easily, and they could be piled in heaps to be burned later. Many of the smaller stumps landed several rods away in the bush, and did not require handling again. The soil being a light sand made it necessary to use more than double the quantity of stumping powder than would be needed in clay or gravel. However, we have the stumps all out, the holes filled in, and most of the hollows or low places in the road bed filled in. This was a tedious part of the work on account of having to get the soil for filling from among the roots or wherever it could be got at. The road is now completed for a distance of about one mile from the picnic ground, that is the driveway is levelled and graded to a width of 16 feet. When the frost goes out of the ground enough to resume levelling, the work will be continued until completed. I might say that the mosquitoes and flies became so troublesome we were compelled to stop work on the road on June 25th, and did not begin again till October 15th. These pests were worse than usual this year. Had it not been for this delay the new road would have been completed early in the fall of this year. However, we will have it in good shape for the season of 1913. The total cost to date is about $2,641.00. The present high price of labor makes this job cost fully one-third more than it would have ten or twelve years ago. The above prices does not include the gravelling of that portion of the road leading through the picnic grounds.

The old road leading into the Park had not been gravelled for three years, and as it needed it badly in places I had it gravelled from the townline up to the pavilion, then continued with a much heavier coat up through the picnic ground on the new road. The total cost of gravelling was $635.20.

The sawlogs that were cut out of the trees that stood on the new roadway and sold have not been taken away from the Park yet. The firewood we cut out of the tops of these trees will furnish the Park Ranger with fuel for two years, besides supplying the cottagers who camp on the Park with fuel at $2.25 per cord. I have sold over $70.00 worth to them this season, and forwarded the amount to the Department.

The red deer on this Park have been breeding for about ten years and increased until they numbered up into the hundreds. They became so numerous that they have browsed and destroyed a large number of the young pine, cedar and seedlings of other kinds of trees on the Park, and also on properties adjoining. They have been seen pasturing on farms nearby, 15 to 25 in a herd. Complaints from the farmers and destruction of the young growth here caused the Department to arrange to reduce the number. Consequently two expert deer hunters were sent, and during the deer season succeeded in killing about 90. Besides selling about $800 worth of venison, the Department gave a carcass to each person who had sustained loss. As there are still quite a number of deer left, it will probably be necessary to repeat this action in another year or two.

Muskrats have been giving trouble along the sand approach to the dock, by cutting holes through behind the sheet piling into the sand, allowing the water to wash out large holes. We dug a trench along the low dock, put in plank and filled behind with marsh grass to keep the sand from washing out, but that only lasts a short time. We put in the grass twice this season and there are several fresh washouts already. To make a permanent job, a trench should be dug when the water is low in the spring, between the sand and the dock, as deep as the water will allow, and put in a cement wall. A wall 6 inches thick along the low dock would be sufficient. At the end of the high dock it should be 10 inches thick. This, I think, would prevent the rats doing further damage to the dock.

A few weeks ago some person fired the marsh grass at the farther end of the Park. During the night, while we were alseep, a high wind drove the fire to this end, and it narrowly missed burning the whole row of summer cottages. We were awakened by the light of the burning leaves, grass and old buildings across the picnic grounds, about six o'clock in the morning. We just got there in time to put out the fire in one building and save two others. When the fire was well under control we found that it had burned three unsightly old boat houses, an old shack formerly used as a summer cottage, and a small stable. None of these structures were of much value, but there were several boats and a large number of decoy ducks burned in them.

If the coming season is favorable for picnics and summer resorters, it is the general impression among the people here that, with the completion of the new road and a few other improvements that will be made in the spring, the season of 1913 will be the best in the history of the Park; so many are anticipating the pleasure of driving through the natural forest on the new road. There have been as many as 75 automobiles here in a day this season, and often from 30 to 40.

The wild geese in the enclosure have done well this season, but the wild turkeys have not given satisfactory results at all. After the two hens had been setting about a week something disturbed them and they left the nest. In a few

days they made new nests, laid again and set. They hatched 13 chicks. At the present time the gobbler, two hens and one young hen remain. We gave them their liberty from the beginning of the season, and some days they would go over two miles up into the forest. So far as we know they have had a first-class chance to do well, but it seems their enemies have been too many for them. The four that are left seem strong and hardy birds, and I think perhaps we should give them another trial next season.

Mr. F. D. Weir, the lessee of the refectory and also the boat livery, has had a poor season, the cold, backward weather being much against his business. Bathing was not so popular on account of so much cool weather. We look for a better and brighter season in 1913.

I have the honour to be, Sir,

Your obedient servant,

ISAAC GARDINER,

Ranger.

The Honorable W. H. Hearst,
Minister of Lands, Forests and Mines,
Toronto, Ont.

Appendix No. 32.

SUPPLEMENTARY LIST OF LICENSED CULLERS 1912.

(For complete list see Minister's Report, 1911.)

Brown, R. A.	Cartier
Brouse, Silas	Webbwood
Byrne, James	Kenora
Clearihue, Geo. A	784 St. Hubert St., Montreal, Que.
Cuddihey, J. T	Pembroke
Fraser, Darlington	Pembroke
Faulkner, Wm	Dryden
Hartt, I. B	Orillia
Harkins, J. J	Keewatin
Jones, Wellard	Ignace
Kennedy, Frederick J	Buckingham, Que.
Macdermid, Harry	Sellwood Junction
Morel, H. (Jr.)	Mattawa
Molyneaux, Harold	Parry Sound
Marchildon, J. P	Sturgeon Falls
Main, G. C	Fort Frances
McIntosh, Herbert	Biscotasing
Norgate, Chas	Dryden

Schultz, Albert .....Pembroke
Spavin, John.....Wes.meath
Spence, Dalton.....Parry Sound

Whalen, Joseph.....Pembroke

Appendix No. 33.

THE ABITIBI PULP LIMIT AGREEMENT.

THIS AGREEMENT made in duplicate this twentieth day of August, one thousand nine hundred and twelve;

BETWEEN:

HIS MAJESTY, represented by The Honourable The Minister of Lands, Forests and Mines for the Province of Ontario, Hereinafter called "The Government"

of the First Part,

and

SHIRLEY OGILVIE and FRANK HARRIS ANSON, both of the City of Montreal in the Province of Quebec, Capitalists, Hereinafter called the "Grantees"

of the Second Part.

WHEREAS by advertisement duly published The Honourable The Minister of Lands, Forests and Mines for Ontario called for tenders to be received by him up to and including the 15th day of August, 1912, for the right to cut pulpwood on a certain area, situated on the Abitibi Lakes and River tributary to the Grand Trunk Pacific Railway and The Temiskaming and Northern Ontario Railway, hereinafter more particularly described;

AND WHEREAS on the said 15th day of August, 1912, the said The Honourable The Minister of Lands, Forests and Mines received from the Grantees a tender for the right to cut pulpwood on the said area which said tender was on the day of the date hereof approved and accepted by His Honour the Lieutenant-Governor-in-Council;

AND WHEREAS the Grant of the right to cut pulpwood upon said area was by said advertisement for tenders and by the tender of said Grantees to be upon certain terms and subject to certain conditions and stipulations;

AND WHEREAS this agreement is entered into for the purpose of ensuring the performance by the Grantees of their obligations as hereinafter defined, and of securing to the Grantees a continuous supply of wood, adequate water power privileges and lands, for the purpose of the business to be established, maintained, conducted and carried on at Iroquois and Couchiching Falls in the said area upon the terms and subject to the conditions and stipulations hereinafter contained;

Now Therefore This Indenture Witnesseth and it is agreed by and between the Grantees and the Government as follows, that is to say:

1. The Grantees shall with all convenient despatch proceed to the construction of a pulp mill or pulp mills at or near Iroquois Falls within the limits of the territory hereinafter described and will thoroughly equip the same so that the expenditure in the construction and equipment of the said pulp mill and of such other buildings and constructions as are necessary to the undertaking will be at least five hundred thousand dollars ($500,000.00) and will operate the same so that the daily output of the said mill or mills shall not be less than one hundred tons of pulp, and so that at least two hundred and fifty hands on an average shall be kept employed in connection therewith for at least ten months of each and every year;

2. Of the said sum of five hundred thousand dollars not less than one hundred thousand dollars ($100,000.00) shall be expended within one year from the date hereof and not less than two hundred thousand dollars ($200,000.00) within two years from the date hereof, and the balance within three years from the date hereof;

3. The Grantees shall within such time and at such place within said territory as the Lieutenant-Governor-in-Council shall direct, erect a paper mill of the capacity of at least one hundred tons of paper per day, and shall after the erection thereof operate the same continuously so that the daily output shall not be less than seventy-five tons of paper per day;

4. The Grantees shall pay to His Majesty, His heirs and successors in advance at the Treasury Department, Toronto, yearly and every year during the period hereinafter mentioned for the cutting and removal of wood the sum of five thousand dollars ($5,000.00) of which payments of five thousand dollars each, the first five, amounting to the sum of twenty-five thousand dollars, have been paid in advance by the Grantees, and the receipt of which is hereby acknowledged;

5. The Grantees shall during and after the year 1913 advance for the purpose of being expended or shall expend as and when The Honourable The Minister of Lands, Forests and Mines may determine, sums of money up to a total of fifty thousand dollars in clearing, erecting buildings and preparing for settlement lands selected by the Minister in the neighborhood of Iroquois Falls, such lands to remain the property of His Majesty and to be disposed of at such prices and upon such terms as the said Minister may determine, subject to a lien, as against purchasers of said lands, in favour of the Grantees for the amounts advanced or expended by the Grantees and interest thereon, the same to be repaid to the Grantees at such times and in such manner as the said Minister may determine;

6. The Grantees shall assist and co-operate with the Government in promoting settlement upon the lands of His Majesty in the said District by buying the wood and agricultural products of and giving preference in the matter of employment to bona fide settlers upon said lands;

7. The Grantees shall forthwith proceed to incorporate and organize a Joint Stock Company under the provisions of the Ontario Companies Act, with a subscribed capital of at least One million five hundred thousand dollars ($1,500,000.00) for the purpose of developing water powers, erecting mills and carrying on the business of manufacturing pulp and paper in said territory;

8. In consideration of the said expenditure and of the contracts and engagements entered into on the part of the Grantees, the Government will and doth for the rates and prices hereinafter set forth and provided, and subject to such

reasonable terms, conditions and regulations as to the locality and the manner of cutting, measuring, removing, and driving the same as may from time to time be imposed by the Lieutenant-Governor-in-Council and subject also as is hereinafter set forth and contained; grant to the Grantees the right to cut and remove, spruce, balsam, banksian or jack pine, poplar and whitewood trees, seven inches and upwards in diameter, two feet from the ground, sufficient to supply the mill or mills to be erected for a period of twenty-one years from unoccupied, unsold and unlocated lands of the Crown as follows: being composed of land situate near the upper and lower Abitibi Lakes and along the Abitibi River, and its tributaries in the District of Temiskaming, containing by admeasurement fifteen hundred and sixty square miles, more or less, the outlines of which are more particularly described as follows, that is to say: Commencing at the north-west angle of the Township of Stimson, sixteen miles east of the Town of Cochrane at the junction of the Temiskaming and Northern Ontario Railway with the Grand Trunk Pacific Railway; thence east astronomically fifty-four miles, more or less, to the interprovincial boundary line between Ontario and Quebec; thence south astronomically along said boundary line forty-two miles; thence west astronomically twenty-three and one-half miles, more or less to the south-east angle of the Township of Michaud; thence continuing west astronomically along the south boundary of said Township six miles to the south-west angle; thence north astronomically along the west boundary of the said last-mentioned Township six miles, to the south-east angle of the Township of Munro; thence west astronomically along the south boundary of said Township of Munro six miles to the south-west angle thereof; thence north astronomically along the west boundary thereof six miles to the south-east angle of the Township of Coulson; thence west astronomically along the south boundary of the said Township of Coulson, and along the south boundary of the Township of Wilkie, twelve and a half miles more or less to the south-west angle of the latter; thence north astronomically along the west boundary of the said Township of Wilkie six miles, to the south-east angle of the Township of Teefy; thence west astronomically along the south boundary of said Township six miles to the south-west angle thereof; thence north astronomically along the west boundary of the Townships of Teefy, Edwards, Mortimer and Stimson, twenty-four miles, to the place of beginning;

Excepting and Reserving nevertheless from the above described area the Townships of Warden and Milligan, the Abitibi Indian Reserve, the land covered by the waters of Upper and Lower Abitibi Lakes, and all islands therein, the right of way of the Grand Trunk Pacific Railway, including station grounds, all townsites, all lands heretofore patented, leased, located or applied for, in respect of which such proceedings have been taken, or shall hereafter be taken, as in the opinion of the Minister of Lands, Forests and Mines entitles the applicant or applicants to a lease or Patent for such lands;

9. The Grantees shall pay forty cents per cord for spruce, and twenty cents per cord for the other woods above mentioned, or such other prices as may from time to time be fixed by the Lieutenant-Governor-in-Council for such wood, but in no case shall the price so to be fixed be at higher figures than the price at which the general public shall be permitted to cut on other portions of the Crown domain or than others similarly situated, shall be permitted to cut;

10. The Grantees further covenant, promise and agree with the Government that they will from year to year put on such a force of firerangers as the Government shall consider necessary to protect the lands aforesaid from fire, and will

pay one-half the cost and expense of such fire ranging, the other half of such cost and expense to be borne by the Government;

11. No wood shall be cut under this agreement until after the sum of one hundred thousand dollars shall have been expended on the erection of said pulp mill and equipment thereof;

12. The Crown may revoke the right, license or permit to cut, and forfeit any bonus paid whenever the Grantees shall fail to comply with the terms of this agreement;

13. It is distinctly understood and agreed that only the right to cut wood as aforesaid is sold to the Grantees and not the soil or any part thereof, nor is any interest in the soil so sold, except in so far as may be necessary, to cut and remove the woods as aforesaid, and the wood when so cut shall (subject to the payment of the price thereof) become the absolute property of the Grantees;

14. The Government shall retain the right to sell, lease, locate or otherwise dispose of any lands included in the territory on the same terms and conditions for settlement, mining or other purposes as ordinary Crown Lands situated elsewhere, and this agreement is not to impede or retard settlement or mining operations, and nothing herein contained shall limit or affect the right of the Department of Lands, Forests and Mines to sell, locate, lease or otherwise dispose of lands in the aforesaid territory for settlement, mining or other purposes, but the same shall be as free for such disposal as if this agreement had not been made; and where any lands are so sold, located, leased or otherwise disposed of the rights of purchasers, locatees, lessees or other parties entitled to the said lands in and to the timber thereon shall be the same as if this agreement had not been made;

15. Nothing herein contained or to be done hereunder or by virtue hereof shall entitle the Grantees to a monopoly in the use of any river, streams or lakes, or tributaries thereof in the said territory, but the same shall be and continue open for the use of the public in accordance with the law in that behalf. But in view of the character of the industry to be established, the investment of so large an amount of capital and the probable enlargement of the industry in the near future, it is understood that the Government will not grant, sell or confer upon any other person or persons, corporation or corporations the right to cut pulpwood within the territory hereinbefore referred to for the purpose of export before being manufactured into pulp, or the right to cut pulpwood within or upon the said territory, the granting of which rights would, in the opinion of the Minister of Lands, Forests and Mines for the time being, have the effect of so far lessening or diminishing the supply of pulpwood in the said territory during the period covered by this agreement, and which under this agreement will be available for the making of pulp by the Grantees, as to prejudicially interfere with the Grantees during that period in obtaining all the pulpwood necessary for supplying the said mills and any extensions thereof that may be made in the meantime of extensions which may be under construction and bona fide in process of completion.

16. It is distinctly understood and agreed that nothing herein contained shall, without the consent in writing of the Minister of Lands, Forests and Mines for Ontario, be deemed to confer any right to cut or remove timber from any territory or areas already under license from the Crown, or which may hereafter be placed under license for the cutting of white and red pine timber, nor shall any cutting take place under this agreement in or in the immediate proximity of territory covered by green merchantable white or red pine available for lumbering purposes or which may be considered by the Government to be pine bearing

lands. If, however, the wood in the other part of the available territory has been exhausted or is insufficient for the requirements of the Grantees' Mills, the Grantees may cut in the vicinity of such pine bearing lands upon such terms and conditions as may from time to time be agreed upon between the Government and the Grantees, or, if they cannot come to an agreement, upon such terms, conditions and regulations as may from time to time be imposed by the Lieutenant-Governor-in-Council or by the Minister of Lands, Forests and Mines, for the purpose of affording ample protection to the standing pine, PROVIDED, HOWEVER, and it is understood and agreed, that the Grantees shall not be entitled to cut wood of any kind on said territory or on any part thereof for the purposes of export in the wood nor for sale to other persons for export in the wood;

17. It is Hereby Agreed that nothing in this agreement contained shall prevent the Government from selling the right to any person or persons to cut white and red pine trees on any part of the territory hereinbefore mentioned, which has not already been placed under license, and to grant timber license in respect thereof under the Statutes and regulations in that behalf, and in no case shall the Grantees be entitled to cut the pine trees other than banksian pine unless under special permit or license from the Government or the Minister of Lands, Forests and Mines. But in the case of the sale of the right to cut white and red pine trees as in this clause hereinbefore mentioned, the sale of the right to cut shall be confined to the white and red pine trees only, and to such other timber as may be necessary to cut and remove the same;

18. Nothing Herein Contained shall require the Government to provide any particular quantity of wood, as the Government in no case guarantees quantities or does anything more than grant the right to cut such wood as aforesaid within the aforesaid limits, and nothing herein contained shall require the Grantees to purchase any particular quantity of wood, or to pay for any wood not actually cut upon the said territory, but it is clearly understood and agreed that so long as the supply of wood upon the said territory is sufficient to supply the mills of the Grantees herein referred to, the Grantees will take their supply of wood therefrom; except such as may be purchased by the Grantees from bona fide settlers in the District;

(*a*) It is also Hereby Declared that the intention of these presents is that the Grantees shall at all times during the term of twenty-one years from the date of commencement of cutting obtain a sufficient supply for their pulp and paper mills, so far as the same can be found available within the limits hereinbefore described, and so far as the same can be obtained consistently with the terms of this agreement;

19. If the Grantees shall not within three years from the date hereof expend at least the sum of five hundred thousand dollars ($500,000.00) in erecting the said pulp mill and other necessary buildings and constructions as aforesaid, and in the constructions and equipment thereof, and in preparing for the operation of the same, and for getting out the wood for the supply of the said mill, this agreement shall become null and void; and of no effect in so far as the whole territory is concerned;

20. Settlement shall be made with the Govenment at the close of each season of navigation for the price of the wood cut up to that time, and a correct account of all wood cut by the Grantees shall be kept in the Books of the Grantees in such manner as the regulations made, or to be made, shall provide, and to which the officers of the Crown shall at all times be entitled to access, and returns shall from

time to time be made under oath by the Grantees to the Crown of the quantities cut as the Crown or as regulations as aforesaid may require;

21. In the Event of the Failure on the part of the Grantees to erect the said pulp and paper mills and expend the moneys thereon hereinbefore stated, or in default of the said Grantees keeping the said pulp and paper mills running after the erection thereof, and keeping the required number of men employed as aforesaid, the Government may refuse to permit the continuance of the cutting of the said wood;

22. The Grantees Covenant with His Majesty that they shall and will not at any time or in any place deposit, empty, run or turn into or permit to be placed, deposited, emptied, run or turned into any river, stream or other waters whatsoever, refuse, sawdust, chemicals or matter of any other kind which will have the effect of destroying, harming, or driving away the fish in such river, stream or water:

23. The Lessees Shall be Entitled to a lease upon the usual terms of the water powers of Iroquois and Couchiching Falls, with the right to hold and control the waters of the Abitibi Lakes for power purposes to such an extent and in such manner and subject to such conditions and stipulations as the Minister of Lands, Forests and Mines may deem expedient. All plans and specifications of works for the storage and regulation of said waters must be approved of by the said Minister, and the Crown reserves the right to erect dams and maintain works for the storage of water for power purposes upon said lands, and to regulate and control same and to charge the lessees or owners of the powers benefited thereby a fair and equitable sum for the benefits conferred by such dams and works. Said lease shall contain a provision for the development of said powers to the full extent thereby required according to plans and specifications approved of by the Hydro-Electric Power Commission, and said lease shall contain a further provision that the Temiskaming and Northern Ontario Railway Commission shall be entitled, should they so desire, to delivery of all the power that can be developed over and above the amount required for the operation of said mills to the extent of ten thousand horse power at such prices and upon such terms and conditions as the said Hydro-Electric Power Commission shall fix. Save as Aforesaid, all water powers and privileges on said territory, and the right of the Crown to raise, hold, lower and maintain the waters in the Abitibi Lakes at such height and in such condition, as may be found necessary or expedient for the development of the same, are reserved to the Crown:

24. The Lessees shall also be entitled to a grant upon such terms and conditions as may be imposed or determined by the Minister of Lands, Forests and Mines, of such Crown lands in the neighborhood or vicinity of Iroquois and Couchiching Falls as may be necessary or expedient for the purpose of or connected with the business to be established, maintained, conducted and carried on at Iroquois and Couchiching Falls in the said area:

25. This agreement shall be binding upon and enure to the benefit of the Grantees, their heirs, executors, administrators and assigns:

In Witness Whereof the said Minister of Lands, Forests and Mines for the Province of Ontario, and the parties of the second part have hereunto set their hands and seals:

Signed, sealed and delivered in the presence of (As to execution by the Minister of Lands, Forests and Mines). (Signed) THOS. W. GIBSON.	(Signed) W. H. HEARST, Minister of Lands, Forests and Mines. (Seal)
(As to execution by Shirley Ogilvie and Frank Harris Anson). (Signed) S. A. MCARTHUR. (Signed) G. ALFRED MORRIS. (Signed) J. A. MCANDREW.	(Signed) SHIRLEY OGILVIE (Seal) (Signed) FRANK HARRIS ANSON, (Seal)

Appendix No. 34.

AGREEMENT FOR SALE OF TOWNSHIPS OF KENDREY AND HAGGART.

THIS AGREEMENT made in duplicate this fourteenth day of June, 1912.

BETWEEN:

HIS MAJESTY, represented by the Honourable the Minister of Lands, Forests and Mines for the Province of Ontario, hereinafter called "the Government."

Of the First Part,

and

WILLIS K. JACKSON, of the City of Buffalo, in the State of New York, one of the United States of America, WILLIAM A. RUSHWORTH, of the City of Toronto, in the County of York, in the Province of Ontario, and ERNEST S. WIGLE, of the City of Windsor, in the County of Essex, in the Province of Ontario, hereinafter called "the Purchasers,"

Of the Second Part.

WITNESSETH that in consideration of the mutual covenants, promises and agreements hereinafter set forth the parties hereto have agreed with each other as follows:

1. Concurrently with the execution of this agreement the Purchasers will pay to the Government the sum of $98,364.00, the receipt whereof is hereby by the Government acknowledged, which said sum of $98,364.00 is the price or consideration paid by the Purchasers to the Government for this agreement, and is and shall be deemed to be fully earned by the Government by the execution of this agreement, and the Purchasers shall not be entitled on the termination of this agreement by forfeiture or otherwise to any repayment, drawback or relief whatsoever in respect of the said sum of $98,364.00 or any part thereof, but have received and shall be deemed to have received full value therefor in the original execution of this agreement by the Government.

2. Subject always to each and all of the terms of this agreement the Government, under and by virtue of all rights or powers it thereunto enabling, doth grant, concede and confer unto and upon the purchasers the exclusive power, right, license and authority, for the purposes of and during the continuance of

this agreement, to enter into and upon those certain parcels or tracts of lands and premises hereinafter set forth and to take possession and control of the same and to clear, cultivate, occupy, use and enjoy the same. The said lands are as follows:

First: The Township of Kendrey, in the district of Sudbury, now in the new district of Temiskaming as created by 2nd George 5th, chapter 21, containing a lot area of 50,002 acres, more or less, as shown on plan of survey by Ontario Land Surveyor, J. W. Fitzgerald, dated 5th December, 1907, of record in the Department of Lands, Forests and Mines, save and excepting therefrom the following reservations:

(*a*) The beds of the Mattagami and Muskego Rivers and all lakes within the Township, and all islands, islets and reefs in said lakes or rivers, together with a road allowance one chain in perpendicular width laid out along each bank of said rivers and around the shores of said lakes.

(*b*) The right of way, station grounds and extra land of the National Transcontinental Railway across said Township as shown on plan of survey of said right of way dated 27th March, 1909, signed by S. N. Parent, Chairman; Hugh D. Lumsden, Chief Engineer, and A. S. Cotton, Ontario Land Surveyor, of the record in the Department of Lands, Forests and Mines.

(*c*) All regular road allowances as shown on plan aforesaid by J. W. Fitzgerald, Ontario Land Surveyor.

(*d*) Broken lots 24 and 26, concession 9, broken lots 24, 25 and lot 26 in concession 10, containing by admeasurement 776 acres more or less, for the purposes of development of the water power at Smooth Rock Falls on the Mattagami River.

(*e*) Those portions of broken lots 25 and 26, concessions 5 and 6, subdivided into lots and streets for townsite purposes as shown on plan of survey by H. M. Anderson, Ontario Land Surveyor, dated October 7th, 1911, of record in the Department of Lands, Forests and Mines, together with all that portion of lot 25, concession 5, and broken lot 26, concession 5, east of the Mattagami River not included within such subdivision, also that part of broken lot 25, concession 6, and that portion of broken lot 26, concession 6, lying east of the Mattagami River and not included in such subdivision, containing by admeasurement an area of 404 acres more or less.

(*f*) Reserving also the right over a strip of land 100 feet wide in any and all parts of the Township for the purpose of constructing a pole or pipe line to transmit electricity or power.

Second: The Township of Haggart, in the district of Sudbury, now in the new district of Temiskaming as created by 2nd George 5th, chapter 21, containing a lot area of 49,860 acres, more or less, as shown on plan of survey by Ontario Land Surveyor, J. W. Fitzgerald, dated 25th November, 1908, of record in the Department of Lands, Forests and Mines, save and excepting therefrom the following reservations:

(*a*) The right of way, station grounds and extra land of the National Transcontinental Railway across said Township as shown on plan of survey of said right of way dated 27th March, 1909, signed S. N. Parent, Chairman; Hugh D. Lumsden, Chief Engineer, and A. S. Cotton, Ontario Land Surveyor, of record in the Department of Lands, Forests and Mines.

(*b*) The bed of the Muskego and Poplar Rapids Rivers, also the bed of Departure Lake and all other lakes within the township, and all islands, islets

and reefs in said lakes or rivers, together with a road allowance one chain in perpendicular width laid out on each bank of the said rivers and around the shores of the said lakes.

(*c*) All regular road allowances as shown on the plan aforesaid by J. W. Fitzgerald, Ontario Land Surveyor.

(*d*) Reserving also the right over a strip of land 100 feet wide in any and all parts of the township for the purpose of constructing a pole or pipe line to transmit electricity or power.

3. The purchasers will forthwith proceed to settle and colonize the said lands with bona fide occupant farmers and settlers, such settlement and colonization to be effected with all reasonable despatch. And, without limiting the generality of the above obligation, the purchasers guarantee that within two years from the date hereof they will cause at least two thousand four hundred acres of the said lands to be occupied and settled by at least sixteen bona fide farmers or settlers, and that during each succeeding period of one year thereafter, for a period of nineteen years, they will cause at least two thousand four hundred additional acres of the said lands to be occupied and settled by at least sixteen additional bona fide farmers and settlers. Such farmers and settlers to be such and the occupation and settlement work by them to be such as to satisfy requirements similar to the present requirements in like case of the Free Grant and Homestead Act and the regulations thereunder. In computing the number of farmers and settlers occupying and settling and the acreage occupied and settled by them from year to year as aforesaid any excess or deficiency of numbers or acreage in any year shall be carried forward to the credit or debit, as the case may be of the year following, and so from year to year, and where in the case of any farmer or settler previously credited his occupation and settlement subsequently fails to be such as to satisfy the provisions of this clause the deficiency so arising in numbers and acreage shall be forthwith chargeable against the year then current and succeeding years. Provided always that the purchasers shall not be deemed to be in default under the terms of this clause, so far as relating to specific numbers and acreage guaranteed from year to year, unless and until the deficiency in question has failed to be rectified in subsequent balances within at least two years, but this proviso shall not apply to any failure to meet the obligations of this clause as regards at least five settlers and a proportionate acreage in the first period of two years or as regards at least five settlers and a proportionate acreage in the second period of one year.

4. If and as requested by the Minister of Lands, Forests and Mines for the Province of Ontario, hereafter in this agreement referred to as the Minister, the purchasers will improve portions of the said lands as farms, in each case by clearing and preparing for cultivation such area thereof as the Minister may designate, not exceeding twenty-five acres, and by building a house and barn thereon of such size and character as the Minister may prescribe, not exceeding in cost one thousand dollars, and by digging a well or otherwise as the Minister may prescribe, and shall offer such farms for sale at prices and upon terms to be approved of by the Minister.

5. The purchasers will at their own expense, as directed by, in a manner approved of by and to the satisfaction of the Minister, construct, build and for a reasonable period maintain all roads, bridges or other road improvements in the said Townships of Kendrey and Haggart, as such construction, building and maintenance may from time to time be required in the interest of said settlers.

6. The purchasers will undertake that proper and adequate provision is made, to the satisfaction of the Minister, for the institution of public schools in the said Townships and for the erection of suitable school buildings. Provided always that such schools shall be entitled to the usual Government and Municipal aid and support.

7. In order to facilitate the colonization and settlement of the said lands, the purchasers will erect thereon a hotel, store building, housing for accommodation and other buildings or works necessary to meet requirements in advance of town or village settlements and will also erect, construct and equip thereon a permanent saw-mill, planing-mill and lath-mill, the buildings and works in this clause mentioned to be undertaken and commenced within ninety days from the date of this agreement, and to be completed within twelve months from the date of this agreement, and at least $70,000 to be expended on such buildings and works.

8. The purchasers shall cut the timber from the said lands in blocks or areas of not less than eighteen hundred acres at one time, the location of such blocks or areas to be first approved by the Minister. The lands so cut over shall be properly cleared in a good and workmanlike manner and to the satisfaction of the Minister, and the timber is not to be specially selected but the cutting is to be done out of a face. Provided always that not less than twenty acres of timber must be left for each farm as a wood lot. No land shall be cut over in advance of settlement except to an extent limited until the expiry of five years from the date hereof to fifteen thousand acres, such limit to be increased each year thereafter by two thousand acres until a limit of forty-five thousand acres has been reached. All timber cut from the said lands, other than timber which in the opinion of the Minister is useful for pulp only, shall be manufactured in the mills of the purchasers and disposed of within the said townships or locally to the satisfaction of the Minister or otherwise to the satisfaction of the Minister. No pulp wood cut from the said lands shall be exported from Canada, without the permission of the Minister.

9. The purchasers will purchase from said settlers, on reasonable terms, any timber on the lands settled by them and will also give said settlers the preference for their teams and labour in cutting and removing timber from their lands and also in cutting and removing timber from the other lands of the purchasers.

10. All sales of land by the purchasers to settlers, all agreements between the purchasers and any settler or settlers and all regulations by the purchasers affecting any settler or settlers shall before becoming effective be submitted to and receive the approval of the Minister. Provided always that the Minister, in considering, pursuant to this clause or to clause 4 of this agreement, the prices sought by the purchasers to be placed upon the said lands from time to time, shall have regard to the fair market value of the said lands in view of the enhancement of such value brought about by reason of the colonization and improvement of the locality through the efforts of the purchasers.

11. The purchasers shall not issue or publish any prospectus, advertisement or other publication respecting the said lands or the settlement of the same, until such prospectus, advertisement or publication has been submitted to and approved by the Minister.

12. The purchasers shall not lay out any townsite or sites on the said lands except with the approval of and in a manner and upon terms and conditions satisfactory to the Minister.

13. As and when the purchasers shall from time to time cause parcels of

the said lands, not exceeding in each case one hundred and fifty acres, more or less, to be occupied and settled in such manner, as regards qualifications of occupant and character, continuity and duration of occupancy and settlement work, as to satisfy requirements similar to the present requirements in like case of the Free Grant and Homesteads Act and the regulations thereunder, the Government shall, on the application of the purchasers, issue a Patent for the parcel in question to the settler in question, or, where there remains unperformed or only partly performed some obligation by such settler to the purchasers, to the purchasers in trust to convey the same to such settler on the performance of such obligation, or otherwise upon such terms for the due securing of the rights both of the purchasers and of such settlers as the Minister shall determine. Provided always that the Minister may in any case, in which in his opinion such a course is desirable, issue the Patent to the settler in question upon his own application and with or without the imposition of terms in favour of the purchasers.

14. The Government will also grant to the purchasers Patents for such portions of the said lands as shall in the opinion of the Minister be reasonably necessary for or in connection with hotel site, store sites, mill sites or other building sites required for the purposes of the undertaking, such Patents to issue in each case on the completion of the building in question.

15. Notwithstanding anything in this agreement contained all mines, minerals and mining rights in, on or under the said lands, and, subject to the exceptions similar to those allowed by the terms of the Free Grant and Homesteads Act and the regulations thereunder, all white pine now standing or being on the said lands are and shall be excepted and reserved to the Crown, and all Patents to be issued hereunder shall be issued subject to such exception and reservation and to all other usual exceptions, reservations and conditions.

16. Upon breach or default by the purchasers in carrying out any of the terms of this agreement, this agreement and all rights, benefits and advantages of the purchasers thereunder shall, at the option of the Government, to be notified to the purchasers in writing, forthwith cease and determine, and all interest of the purchasers thereunder or in or to the said lands shall forthwith revert to and re-vest in the Government, and in such case the purchasers shall not be entitled to the return of the price paid as hereinbefore set forth as consideration for this agreement or any portion thereof, nor to reimbursement for any sums expended by the purchasers under the terms of this agreement or for improvements on the said lands or otherwise, nor to any compensation or damages whatsoever. Provided always that the interests of bona fide settlers in occupation of any portion of the said lands prior to the date of such termination shall be protected by the Government in such manner as the Minister shall reasonably determine. Provided further that the title of lands for which Patents have issued shall not be affected by such termination. Provided further that before the Government shall have the right to determine this agreement as aforesaid the Government shall give to the purchasers at least six months' notice in writing stating the nature of the default in question and the purchasers shall have failed within such six months to remedy said default.

17. Time shall be of the essence of this agreement.

18. All notices to be given to the purchasers under the terms of this agreement shall be deemed to be sufficiently given if mailed postage prepaid and registered and addressed to Jackson and Tindle, Buffalo, New York State.

19. No waiver by the Government of any default by the purchasers under

the terms of this agreement shall be deemed to operate as a waiver of any other default thereunder or of any other matter or thing therein contained.

20. All questions arising between the Government and the purchasers under the terms of this agreement or as to the true construction thereof or as to true extent of the obligations of the Purchasers or of the Government to each other thereunder or otherwise shall be subject to the award, order and determination of the Minister, whose decision shall be final and conclusive as between the parties hereto.

21. No assignment of this agreement by the purchasers shall be valid unless and until the same is approved and counter-signed by the Minister.

22. This agreement shall respectively enure to the benefit of and be binding upon the respective heirs, executors, administrators and successors of the parties hereto.

In Witness Whereof the parties hereto have hereunto set their respective hands and seals the day and year first above written.

Signed, sealed and delivered in the presence of As to the signatures of Willis R Jackson and Wm. A. Rushworth. (Signed) Aubrey White, (Signed) Carroll C. Hele, as to signature of W. H. Hearst. as to signature of E. S. Wigle. (Signed) W. T. Piggott.	(Signed) W. H. Hearst. (Signed) Willis K. Jackson. (Signed) Wm. A. Rushworth. (Signed) Ernest S. Wigle.

Appendix No. 35.

Instructions to J. F. Whitson.

(Under 2, Geo. V., Chap 2.)

Toronto, 23rd May, 1912.

Mr. J. F. Whitson, O.L.S.,
Surveys Branch, Toronto.

Sir,—Under directions of the Hon. the Minister of Lands, Forests and Mines, I have to instruct you to proceed with as little delay as possible, to carry out the following instructions:—

Under 2 Geo. V., Chap. 2, the Lieut.-Governor in Council is authorized to raise, by way of loan, the sum of money not exceeding $5,000,000: part of which is to be expended in Northern Ontario in the making of roads.

As you are familiar with that part of Northern Ontario, in which it is desirable that roads be constructed this year, more particularly in the clay belt along the line of the Transcontinental Railway, and in the agricultural section north of

Lake Temiskaming, in the vicinity of the Temiskaming and Northern Ontario Railway; the Minister has seen fit to place you in charge of the work until further advised.

Having discussed very fully with the Minister the roads it is considered advisable to construct this season—which roads have been outlined and shown in red on a plan hereto attached—you will, as far as it is practicable, construct these roads, extending along the T. C. Ry. from the Quebec boundary, west to the town of Hearst, and as far south along the line of the T. & N. O. Railway as Englehart or thereabouts.

You are expected to conduct and carry on the work along lines effectively used in well organized business enterprises, so as to secure the best and most economical results.

Petitions are being received from different localities all over the district, to hasten the work in this or that direction. You will, however, strictly adhere to the plan as far as it is practicable and economical, and to the policy as laid down by the Minister, when discussing these questions a few days ago.

The first roads to be constructed are where settlers are most in need of them, and where the greatest good will be done to the greatest number, conforming as closely as practicable to a definite systematic plan, after considering carefully what will be required in the early extension of the settlements, or the growth of the pulp and lumbering interests.

The plan, as outlined by the Minister, contemplates, first, the construction of main high-ways or trunk roads, leading into the larger centres, railway stations, villages or towns, from the best agricultural areas, where roads have not yet been constructed: with a view to opening up for settlement new territory.

Secondly, the connecting up of all the main highways or partly constructed roads in the sections sparsely settled. The main trunk roads should, as far as practicable in the 9 mile townships along the T. C. Ry., be constructed along the right of way, so that later on they will serve to connect up the different side roads or concession roads that have been or may hereafter be constructed, either by the Government or by the municipalities.

Main highways will be required to be constructed along the outer boundaries of the different townships through which the railway passes, or in the immediate vicinity thereof, extending back therefrom from 8 to 12 miles. North and south roads should be constructed through the centre of the townships and east and west roads across the township along the centre concession line.

Where you find, after carefully examining these projected roads that—owing to the character of the country from an agricultural standpoint, or the physical features, (such as hills, valleys or swamps), or to the difficulty in procuring suitable crossings on the railway—it would be more practicable, and more in the interests of the public to construct these roads on the next side-road or concession road, you are at liberty to do so: remembering, however, that in the event of any material change from the projected plan of the Minister's system of roads to be constructed, is found necessary or expedient, you will advise the Department before proceeding with the work: so that your proposed changes may be considered, and if found satisfactory, they may be approved of.

In the 6 mile townships along the line of the T. & N. O. Railway, you will first construct roads along the outer boundaries of the townships, and only in cases where it is found more necessary, and in the public interest, will you construct interior roads.

It is considered advisable to construct a main trunk road connecting the most important stations on the T. & N. O. Railway, so as to link up the different side-roads and concession roads constructed or which may hereafter be constructed in the interior of the townships; thereby giving to the settlers access to the railway stations.

As settlement will first take place around the railroad centres and where land is best suited for agricultural purposes, you will commence your operations in or around these centres. As you are aware, there are certain sections of the clay belt better adapted for agricultural purposes than others. Before commencing operations in any particular section, you will consult well the field notes and reports of the different surveys which have been made, and will make a personal examination of the ground, so as to be able to verify those reports.

The agricultural lands along the T. C. Ry. extend over a very large area. Only the best sections will at first be opened up for settlement: and in those sections it is desirable that roads should first be constructed: so that there will be no unnecessary expenditure of public funds in the construction of roads through sections which may not be desirable for settlement in the near future.

To assist you in examining these localities, it will be necessary to employ capable men, in whom you have every confidence.

It is considered advisable to cut out the roads where practicable the full width of 66 feet, more particularly in those portions of the country where the land is comparatively level, and covered with a thick growth of timber: so that the roads can be properly drained.

The timber cut on the road allowance must not be fallen off the right of way, but should be carefully piled so as to reduce to a minimum the danger of fire spreading. Every man in your employment should be advised as to the necessity for care in the use of fire, and every precaution must be taken when burning off the debris, so that no damage is done to the forests adjacent to the roads, or to settlers' improvements.

The roads should be well drained and graded in a proper workmanlike manner. The character of the roads will depend in a measure upon the amount of traffic that will be likely to pass over them in the near future. The foundations of the roads, however, should be so constructed that permanent roads may, when required, be constructed thereon.

You will keep a strict account of all moneys paid out in connection with the work, taking the necessary receipts or vouchers therefor. Your accounts should be so kept that at any time when called upon, you can give the cost of each road. The receipts or vouchers you will forward to this Department periodically: and will from time to time forward a statement of the total amount expended to date so that the Department will be enabled to keep an exact check on your expenditures.

Whenever you require advances to carry on the work, you will forward to this Department the necessary requisition.

You will require a thoroughly competent and reliable bookkeeper, to keep the accounts in proper shape; and such a man will be selected as soon as you have commenced operations.

When in the progress of your work you find any localities where settlers have gone in, and have no communication by roads outside the localities mapped out, you will notify this Department as to the number of the settlers, the necessity for roads, etc., so that the matter may be considered.

You will engage the necessary laborers, teams, engineers and clerical staff, paying them at the current rate of wages paid in the locality of the work. Where settlers can be secured in the vicinity of the work, and are capable and willing to perform the kind of work required, you will in every instance engage them.

In the employment of men, you will make no distinction, as the Department will require of every man employed a day's work for a day's pay; merit being the sole consideration in the payment of wages. Before hiring your inspectors, foremen or timekeepers, you will make diligent enquiry, and ascertain that they are capable and trustworthy. The duty of selecting your men devolves upon yourself, and you will be held responsible for the results of their labour.

You will purchase the necessary supplies, camp equipage, tools and road machinery, where you can secure the best value for the amount expended. You will keep yourself posted on the market prices of supplies, etc., required on your work. You will see that your camp equipage, tools, machinery, etc., is properly looked after; and that there be no waste of provisions around your different camps.

Where you have found by experience that a certain class of work can be performed cheaper by contract than by day labour, you will be at liberty to let small contracts, after making careful examination and estimates.

You will report from time to time on the progress of your work; and if you are at any time in doubt as to the advisability of constructing certain roads, you will apply to this Department for instructions.

You will, where necessary, engage proper office accommodation, and will construct such buildings as are necessary for the protection and storing of your camp outfits, provisions, tools and machinery.

Yours truly,

(Sgd.) Aubrey White,

Deputy Minister of Lands and Forests.

Appendix No. 36.

Report on the Construction of Roads in Northern Ontario, under the Provisions of 2 Geo. V., Chap. 2.

To the Hon. W. H. Hearst,
Minister of Lands, Forests and Mines, Ontario.

Sir,—I have the honour to submit my report of the work done under the Northern Development Branch of the Department of Lands, Forests and Mines, on the Construction of Roads in Northern Ontario, under the provisions of 2 Geo. V., Chap. 2.

Under instructions, dated the 23rd of May, 1912, I proceeded to the town of Cochrane at the junction of the National Transcontinental Railway and the Temiskaming and Northern Ontario Railway.

After making a personal examination of the townships in the vicinity of Cochrane, I travelled over the different side-lines and concession lines along which it was proposed, in my instructions, roads should be built, if no engineering difficulties were met with and the land was found suitable for settlement. I com-

menced the construction of my first road on the boundary between the Townships of Glackmeyer and Lamarche, east and west from the town of Cochrane; which road will form the main highway running east to the Abitibi River and the Quebec boundary, and west to the Frederickhouse River, or to the town of Hearst, the first divisional point on the National Transcontinental Railway west of Cochrane, and distant therefrom 130 miles.

I had some difficulty at first in procuring the required number of labourers, as nearly all the available men in that part of the country were otherwise engaged on railroad construction work, and the settlers were occupied in clearing their lands. About the 20th of June I succeeded in securing 50 men, and began operations; and from that time on I had no great difficulty in securing the number of men I required. By the end of September I had 650 men on the work.

The operations of the season of 1912 extended east in townships already surveyed along the National Transcontinental Railway from the town of Cochrane to the Inter-Provincial boundary, a distance of 72 miles; and west in places along the railway as far as the town plot of Hearst, at the junction of the National Transcontinental Railway and the Algoma Central Railway; and southerly in the Townships along the Temiskaming and Northern Ontario Railway from the town of Cochrane to the town of Englehart, a distance of 115 miles.

The roads constructed in the large or nine-mile townships along the National Transcontinental Railway were along the outer boundaries of the townships, and north and south through the centre; and east and west across the centre, where it was at all practicable to follow those lines. In the smaller, or six-mile townships along the Temiskaming and Northern Ontario Railway, the work was confined in most instances to the outer boundaries of the townships only, except where the physical features of the country made it impracticable to follow these boundaries. In such cases, the most suitable lines were selected in the interior of the township.

In order to give settlers along the Temiskaming and Northern Ontario Railway access to the different stations thereon, it was found necessary to construct a trunk road along the right of way, to connect up the different sideroads and concession roads which had already been constructed by the Department of Public Works during the last few years, in the townships adjacent to the railway. This trunk road was begun near the town of Matheson and extended north and south for a distance of 25 miles. Besides this trunk road, roads were constructed along the boundaries of several of the townships; and in some instances, where it was found impracticable to use the boundaries, interior roads were constructed in lieu thereof.

In the vicinity of Cochrane roads were constructed along the outer boundaries of the different townships along the National Transcontinental Railway for a distance of over 20 miles west of Cochrane, and 12 miles east, and extending 12 miles north of the railway and over 6 miles south. These townships were divided by roads running north and south through the centre, and east and west across the centre.

A trunk road was also commenced on the National Transcontinental Railway, near the Quebec boundary, through a large area of first class agricultural land, contiguous to a settlement already begun in the Province of Quebec.

At the town of Hearst, a trunk road was begun, running west from the town to the Algoma Central Ontario Railway, which will form part of the main trunk

road, and east along the right of way of the National Transcontinental Railway, to open up a fine agricultural section contiguous to the town of Hearst.

The continuous rainy weather of last season, beginning about the middle of July, made it difficult to complete the grading of many roads and it was almost impossible to burn off the timber and debris. The roads, however, were all well cut out the full width and the central portion grubbed 26 feet in width ready for grading. The timber and brush was well piled so that no difficulty will be met with next season in burning it off as soon as the weather is at all favorable.

Herein is a description of the different roads cut out and graded: the amounts expended thereon, and also a general description of the character of the country through which these roads were laid out.

The total number of miles cut out or improved during the season of 1912 is 233; of which 210 is entirely new road; and the balance 23 miles, roads which have previously been cut out or partly cut out, and were improved by grading, widening, ditching, or by the construction of crosslay thereon. 39 miles of the new road, and 11 miles of the old road has been graded, or 50 miles in all.

The work was carried on strictly in accordance with the instructions and performed as economically and expeditiously as possible, both in the employment of men and in the purchase of supplies, road machinery, etc. In the progress of the work I was assisted in every way possible by the officials of the Temiskaming and Northern Ontario Railway Commission; and along the line of the National Transcontinental Railway by the contractors, in the forwarding of supplies and men from point to point.

With reference to the country through which these roads have been constructed, I am glad to be able to report that at least 75 per cent. was found to be of a first class character, suitable for agricultural purposes: the soil chiefly clay and in some instances clay loam. Only a few rock exposures were met with and those of comparatively small area: and in only a few instances was sand or gravel met with, the largest area being crossed by the road running west from Iroquois Falls, which is an extension of the sand plain in the vicinity of Nellie Lake on the Temiskaming and Northern Ontario Railway. One of the greatest difficulties met with in the construction of these roads, more particularly along the National Transcontinental Railway, was the lack of gravel, sand, or stone for road material.

In some of the townships in which work was carried on there is very little waste land; occasionally a muskeg is met with but a great deal of land which appears at first sight to be muskeg is, after being burned over, capable of cultivation; and will, in my opinion, make first class meadow land. The land has nearly all good drainage in a northerly direction towards the small tributaries flowing north to the larger rivers, and with a reasonable amount of expenditure in drainage the proportion of cultivatable land herein mentioned can be very much increased.

On the higher land the timber is of fair size, reaching a diameter of from 12 to 20 inches. On the level land and muskegs the average diameter is from 4 to 9 inches, but is of very dense growth. The timber is chiefly spruce, balsam, Balm-of-Gilead and white birch; spruce predominating.

When travelling over the different roads I took particular notice of the quantity of timber cut, and while the timber large enough for lumber is not nearly

so great as in the country to the south of the Height of Land, the quantity suitable for pulpwood is much greater.

Attached to this report is a statement of the expenditures in connection with the above work.

I have the honour to be,

Sir,

Your obedient servant,

J. F. Whitson,
Road Commissioner.

STATEMENT OF EXPENDITURE BY THE NORTHERN DEVELOPMENT BRANCH ON ROAD CONSTRUCTION UP TO 31st JANUARY, 1913.

Wages of workmen		$112,155 76
Amount paid on Road Construction under contract		32,633 64
Salaries of office staff, including assistant engineers and inspectors		7,726 48
Camp equipment—tools, implements, road machinery, tents, blankets, utensils, etc.		13,035 90
Supplies, provisions, freight and express charges, etc.		39,594 35
Insurance on warehouse and contents, Cochrane		380 00
Office Expenses—		
Stationery and printing	$269 35	
Travelling, railway and hotel expenses	986 64	
Postage and telegrams	97 48	
Furniture, rent of offices, equipment and incidental expenses	897 31	
		2,250 78
Medical and surgical expenses for workmen		248 05
Other expenses, made up of small accounts, livery, etc.		421 35
		$208,446 31

Arthur E. D. Bruce,
Secretary and Accountant.

DESCRIPTION OF ROADS CONSTRUCTED.

Road No. 1.

Commencing at the south west angle of the Township of Glackmeyer, one mile west of the town of Cochrane and three-quarters of a mile south of the National Transcontinental Railway, in the District of Temiskaming, thence east along the boundary between said township and the Townships of Lamarche and Brower, and between the Townships of Kennedy and Fox, a distance of 12 miles to the side-road between lots 18 and 19 in the Township of Kennedy.

This road cut out through a thickly timbered country the full width of 66 feet, the centre 26 feet, 13 feet on each side of the centre was well grubbed; the timber cut on the road allowance for the first 9½ miles up to the west bank of the Abitibi River has nearly all been burnt off, and 6 miles of the road well drained and graded: 3½ miles of it corduroyed with timber 16 feet in length; the balance of the road is now ready for grading, with the exception of the burning off of the timber, which, owing to the rainy season, it was impracticable to do.

This road passes through a good agricultural country, except in the immediate vicinity of the town of Cochrane where there is an area of low-lying ground. Every lot along this road in the Townships of Glackmeyer, Lamarche, Brower and Kennedy has been located upon and in most instances small clearings have been started.

Two wooden bridges were constructed on this road across Brower Creek on Lot 11, and one across a small stream on Lot 26, Concession 1, Glackmeyer. The Abitibi River, which crosses the road on Lot 27, Concession 1, Kennedy, has a width of 400 feet and over 14 feet deep with clay banks over 50 feet high on the east side. It will be an expensive matter to construct an iron bridge at this point, but a ferry will answer the purpose for some time to come until the country is more thickly settled.

There is no waste land along this road; no rock, sand, or gravel to be found, the soil is rich clay loam. This road will serve as a main trunk road into Cochrane for the eastern townships along the railway. $14,700 was expended on this road.

Road No. 2.

Commencing at the south west angle of the Township of Glackmeyer, thence west along the boundary between the Townships of Clute and Fournier, as far as the north west angle of the latter, a distance of 6 miles, crossing the Frederickhouse River on Lot 10, Concession 1, Clute (where it has a width of 175 feet with clay banks 45 feet high and a swift current).

The road has been cut out the full width of 66 feet and grubbed 13 feet on each side of the centre line, and is now ready for grading, although part of the timber could not be burned off owing to the wet season.

The road passes through a good agricultural country. The land has all been located on either side, and in most instances, small clearings have been started. This road is a continuation of Trunk Road No. 1, and connects the Abitibi and Frederickhouse Rivers, the distance between them being 12½ miles. No difficulty will be found in draining the land between these two rivers; the country has a good fall, either to the Frederickhouse or to the Abitibi Rivers.

On this road $3,800 was expended.

Road No. 3.

Situate on the boundary between what was formerly the Districts of Nipissing and Algoma, on the line first run across the clay belt by the late O. L. S. Alexander Niven, in 1896, which line crosses the Canadian Pacific Railway three miles west of Sudbury. The distance between the Canadian Pacific Railway and the National Transcontinental Railway at this point being 17¼ miles north of Sudbury in latitude 49 degrees 5 minutes north.

This road was constructed in two sections; one section extending south from the National Transcontinental Railway between the Townships of Glackmeyer and Clute, and between the Townships of Lamarche and Fournier to the north west bank of the Frederickhouse River, a distance of 5¾ miles. The road was cut out the full width of 66 feet and grubbed the usual width of 26 feet; the timber burned off, the first 1¼ miles was graded, well ditched and crosslayed. The balance is now ready for grading.

There is no broken land along this road although in places, owing to lack of drainage, it was difficulty to construct the road without first crosslaying. The crosslay is of the usual width of 16 feet. The land along this road was located by settlers last season and fair progress has been made in making small clearings.

North of the right-of-way of the National Transcontinental Railway, on the continuation of the same road, three contracts were let. The first for the cutting and grading of 3¾ miles at $1,500 per mile; the second for 4½ miles at $1,500 per mile for cutting and burning off the timber the full width of 66 feet and grubbing out 26 feet in the centre, and properly draining and grading the road; and the third for the cutting and burning off 66 feet and grubbing the centre 26 feet of all roots ready for grading for $650 per mile, the last covering 3 miles. The first two contracts for the cutting and grading have been nearly completed with the exception of the burning of some timber, the building of a few culverts, and the deepening of the drains in some instances. The third contract has been completed with the exception of the burning of the timber in places.

The total length of this road is 17 miles and is now suitable for traffic in the winter season, 9 miles of it being almost a completed road. The sum of $21,253.00 was expended thereon. The contractors are expected to finish this work as soon as the weather conditions are suitable. On these contracts and on the portion south of the right-of-way which was performed by day labour, first class corduroy was laid wherever the conditions of the ground required it. The road has been well drained from the south west angle of the township of Glackmeyer, north between the said township and the township of Clute, a distance of 9 miles. The last three miles of the road, which is not yet graded, is on the boundary between the townships of Blount and Leitch.

The road, through its entire distance, 17 miles, passes through a good agricultural country. Small areas of low land were met with, and a few semi-muskegs but not a single rock or gravel bed were encountered: and from the highest point on the road, which is undulating, it is possible to view, looking either way, the road as constructed from end to end. Fair progress has been made by the settlers who located along this road in the Townships of Glackmeyer, Blount, Clute, Fournier and Lamarche.

The road, when completed north a further distance of 6 miles to the north boundary of Blount and Leitch, will form the main trunk road north and south leading to the town of Cochrane for the territory lying between the Frederickhouse and Abitibi Rivers.

Transcontinental office building at Hearst.

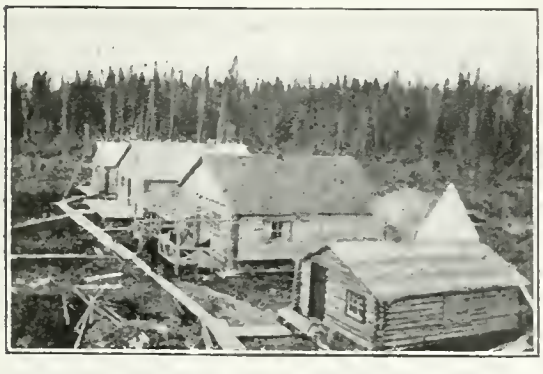
An unfinished corduroy road through semi-muskeg land.

Looking east on the Transcontinental Railway, towards the Abitibi River, sixteen-mile tangent.

A settler's home, township of Glackmeyer, three miles north of Cochrane.

A road cut-out, south boundary of Glackmeyer.

A settler's clearing in the township of Glackmeyer.



Township of Sargent, near the Quebec boundary, showing railroad construction camps.

A new road on the old District boundary between Algoma and Nipissing, two miles west of the town of Cochrane.

Road No. 4.

This road extends east through the centre of the Township of Glackmeyer between Concessions 6 and 7, commencing on the old boundary between the Districts of Nipissing and Algoma, as described under Road No. 3, a distance of 8 miles, to the west bank of the Abitibi River on Lot 3, Glackmeyer.

Previous to my commencing work on this road, two miles had been partially cut out and about ½ mile corduroyed; which corduroy, however, during the fire of 1911 was partially destroyed. The road has been widened and graded and the crosslay that was burnt renewed, and over a mile of additional crosslay laid. The road was cut out the full width of 66 feet and grubbed the usual width of 26 feet in the centre for a distance of 5½ miles, and the balance, 2½ miles, has been cut out and grubbed. Two bridges have been constructed, one at the head of Lillabelle Lake on Lot 24, and one across Brule Creek on Lot 12 The ungraded portion is in good condition for winter travel. The portion graded has been well drained.

The land along this road is first class, well timbered: the soil, a clay or clay loam; every lot has been settled upon and in several instances from 10 to 30 acres cleared. Very little waste land was met with.

$8,800 was expended on this road.

Road No. 5.

Constructed west across the centre of the Townships of Clute and Calder, between Concessions 6 and 7, a distance of 18 miles. The first 2¾ miles west to the east bank of the Frederickhouse River has been well graded and ditched, although in some places the timber still requires to be burned off. This portion was performed under contract by E. Pauze at $1,500 per mile. The work has not yet been taken off the contractor's hands, as in some places it was found on examination that the drainage is not complete. This will be completed by the contractor as soon as the weather conditions are favorable.

$3,800 has been advanced on this contract.

Crossing to the west bank of the Frederickhouse River the road was continued west along the centre line of the townships to the road allowance between Lots 12 and 13 in the Township of Calder, a distance of 10¼ miles. It was cut out the full width of 66 feet, the centre part 26 feet well grubbed, and with the exception of the burning of the timber, is now ready for grading. Part of it has been crosslayed and several culverts constructed. This work was performed by day labor at a cost of $600 per mile or $6,150.

Still continuing west on this road from the side-road between Lots 12 and 13, a contract was let for the cutting out of the road the full width of 66 feet and the grubbing of the centre portion 26 feet to the west boundary of the township, a further distance of 5 miles, at $650 per mile. The cutting and grubbing, and part of the burning off has been done, and $2,750 paid on account of the contract, leaving a balance of $500 still to be paid as soon as the timber is burned off. The total amount expended on the three sections of road No. 5 being $12,700.

This road across both the townships of Clute and Calder passes through a good agricultural country: no rock exposures, sand or gravel were encountered. A few semi-muskegs were met with and no land not capable of being thoroughly drained at a reasonable cost. The chief timber found is spruce up to 16 inches,

Winter view of roads cut out through semi-muskeg, Township of Glackmeyer.

Burning off the right of way on the trunk road west of Cochrane.

A road camp, Township of Glackmeyer.

The first theatre in Hearst.

Township of Lamarche.

Balm-of-Gilead and poplar up to 18 inches in diameter, and some small white birch. Through the Township of Calder several small settlers' clearings were met with. The Township of Clute is well drained by the Frederickhouse River and its tributaries, the Buskegow and Deception Creeks; a small saw-mill is located on the Buskegow Creek on the line between Lots 12 and 13. The western part of Calder Township is well drained by the Driftwood River and numerous small streams flowing into it.

This trunk road as now cut out and partly graded across the centre of the Townships of Glackmeyer, Clute and Calder has a total length of 26¾ miles, of which 18 miles are through the Townships of Clute and Calder. The National Transcontinental Railway crosses these townships from east to west.

Road No. 6.

A north and south road through the centre of the Township of Calder was constructed, 9 miles in length, between Lots 12 and 13. A contract was let for the cutting and burning off the timber on the road 66 feet wide, and grubbing the centre 26 feet, to A. Allard at $650 per mile. The road has been cut out the full width of 66 feet and well grubbed 26 feet in the centre, and part of the timber burned off. With the exception of the burning of the balance of the timber the road is now ready for grading. $4,950 has been paid on account of this contract. The burning of the remaining timber will be done as soon as the weather is favorable.

The road passes through a good section of agricultural land gently undulating, with here and there a few small areas of semi-muskeg land.

Road No. 7.

A road on the boundary between the Townships of Clute and Calder was cut out across the 1st to the 10th Concessions inclusive, a distance of 7½ miles and a bridge built across Deception Creek on Concession 5, and considerable corduroy laid. This road was cut out the full width of 66 feet and grubbed the usual width of 26 feet, although very little burning of the timber has yet been done.

The road passes through a very fine farming country: very little broken land; no stone, sand or gravel was met with, and the land thickly timbered with spruce, balsam, Balm-of-Gilead, white birch and poplar. Settlers who located along this road early last spring have made fair progress in the performance of their settlement duties. Every lot has been located, some of the settlers having packed in their household effects along the blazed trial before the road was cut out. The same remarks will apply to several settlers along the centre line east and west through Clute.

This work was performed by day labor at an average cost of $525 per mile, including the construction of a bridge across Deception Creek and the laying of considerable corduroy in places.

$3,950 has been expended on this road.

Road No. 8.

A road was constructed between Lots 18 and 19 across Concessions 1 to 12 inclusive, through the Township of Clute a distance of 9 miles. The road was cut out the full width—66 feet—grubbed the usual width—26 feet—in the centre and

A road camp in settler's clearing near the Abitibi River, Township of Brower, showing poplar, white birch and spruce timber.

A field of oats on the Experimental Farm on the T. & N. O. Ry., Township of Clergue.

the timber partly burned off, south of the railway. This work was performed by day labor at an approximate cost of $630 per mile. The road crosses the Buskegow Creek in the 5th Concession where the river has a width of about 75 feet with high clay banks.

There is very little waste land along this road, although, in a few places, semi-muskegs are met with. The general character of the country, however, is rolling; the soil is a rich clay loam: the timber of the usual character, spruce predominating with poplar, Balm-of-Gilead and white birch on the high land. The lots along this road are all located and in many instances fair progress has been made by the settlers in making small clearings.

$5,650 was expended on this road.

Road No. 9.

Returning again to the Township of Glackmeyer, a road between Lots 18 and 19 across Concession 1, was cut out the full width and well graded. The balance of this road across Concessions 2 to 12 inclusive was cut out 3 years ago by the Department of Public Works, and partly graded as far as the line between Concessions 6 and 7. Across part of Concessions 9 and 10 the road was graded last season by the Department of Public Works. On the 2nd, 3rd and 4th Concessions there are two large semi-muskegs, one of them about ½ a mile in length which had not been corduroyed, but ditched; the other one, about ¾ a mile in length had been well corduroyed but not ditched. I corduroyed the first mentioned one and deepened the ditches, and ditched the other on both sides, and re-graded and ditched parts of the balance of the road up to the 12th Concession inclusive, but owing to the wet season could not complete the work across the 12th Concession. I also cut down several steep hills on this road expending $1,400 thereon up to the north boundary of Glackmeyer.

The land along this road was the first located upon in the vicinity of Cochrane, and, with the exception of the semi-muskegs above mentioned, the land is fairly good: the soil a clay or clay loam with the exception of one sand hill. Almost every lot is settled upon; in a few instances from 20 to 40 acres have been cleared on individual lots with fairly good buildings. There are two sawmills on this road, one in the 2nd Concession and one in the 10th.

This road has also been continued north as far as the Abitibi River across Concessions 1 and 2, Township of Blount, a distance of 1¼ miles. The work was performed under contract for the cutting out, grubbing and burning at $650 per mile. $337.50 has already been advanced: the work has not yet been completed; it has been cut out and grubbed in the usual way but not burned off.

This road passes through a very fine country. Several years ago fire swept over a section of country along the Abitibi River in Blount and Leitch Townships and the burning off of the moss, which retains the moisture and retards drainage, has materially improved the country from an agricultural stand point. The road intersects the Abitibi River near the centre of the Long Soo Rapids, where the river is about 40 rods in width and very rapid, and it will be practically impossible, except at a very great expense, to construct a bridge at this point. An easier crossing can be made about ½ a mile down the stream where the river narrows down to about half its average width.

Cutting out a trunk road east from the town of Cochrane to the Abitibi River.

Road No. 10.

The boundary between the Townships of Glackmeyer and Blount, across part of Lot 15 and across Lots 16 to 28 inclusive, a distance of 4½ miles, has been cut out the usual width of 66 feet and the centre 26 feet grubbed; the timber has not, however, been burned off. The eastern mile was let by contract to E. Pauze at $650 per mile for the cutting, grubbing and burning. $300 has been advanced on his contract. A contract for the balance of the road across Lots 19 to 28 was let to F. Nault for cutting, grubbing and burning at $650 per mile. Mr. Nault has completed his contract with the exception of burning off the timber and has been paid $1,787.50 on account.

The land along this road is very fine, well drained by the Abitibi River and small tributary streams. There are several settlers located along this road who have started small clearings.

Road No. 11.

The road between Lots 12 and 13 across the 1st to the 6th Concession in the Township of Glackmeyer, a distance of 4½ miles, has been cut out the full width—66 feet—grubbed the usual width but not yet burned off. Two bridges across the Brule or Brower Creek on Concession 2 have been constructed and considerable corduroy laid.

The amount expended on this road is $3,664.34.

There is no broken or waste land along this road although part of it is flat and will require considerable ditching.

Road No. 12.

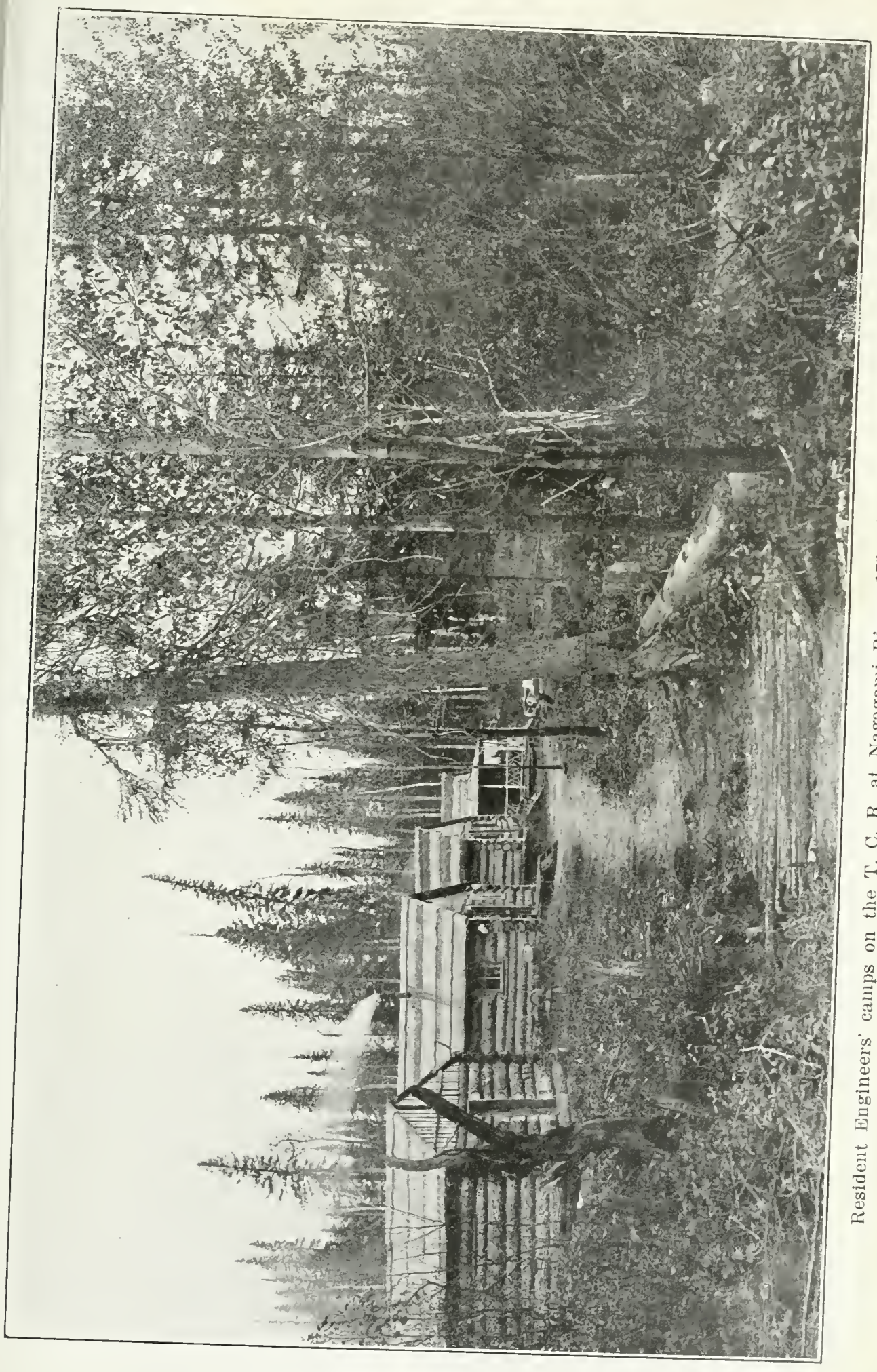
The road between Lots 24 and 25 across Concessions 1, 2 and 3 in the Township of Kennedy has been cut out the full width, grubbed and ready for grading, with the exception of the burning of the timber. It was found impracticable to construct the road along the boundary line between the Townships of Kennedy and Glackmeyer across these three Concessions, inasmuch as an expensive bridge would be required across the Abitibi River on Concession 3. It is proposed to extend this road ¾ of a mile further north and then jog west on the line between Concessions 4 and 5 to the boundary, thence north along the boundary. This road, which has a length of 2¼ miles, was cut out and grubbed at a cost of $1,525.00.

The road passes through a good agricultural country.

Road No. 13.

The road between Lots 8 and 9 in the Township of Lamarche, across Concessions 2 to 6 inclusive, a distance of 5 miles, has been cut out the usual width and grubbed. Across Concession 6 for one mile the road has been well graded and well ditched, and a bridge constructed across Lamarche Creek on Concession 4. A large drain was constructed on each side of the road across the 6th Concession through a large spruce and tamarac swamp. These ditches will serve to drain the town of Cochrane and a large area surrounding it. The land in part of the 6th Concession is very swampy, with, however, sufficient fall for good drainage. The balance of the road is through fairly good agricultural land until the 1st Concession is met where the land is again swampy. Every lot on this road has been located on and fair progress is being made by the locaters.

On this road there was expended $4,450.



Resident Engineers' camps on the T. C. R. at Nagagami River, 172 miles west of the town of Cochrane.

Road No. 14.

A road along the boundary between the Townships of Brower and Lamarche across Concessions 2 to 6 inclusive, a distance of 5 miles, was cut out and grubbed in the usual way and the northern mile burned off. A bridge was constructed across Brule Creek in the 6th Concession.

This road passes through a good agricultural section; the soil a clay or clay loam; well timbered with spruce, Balm-of-Gilead, white birch and poplar. Several settlers have already commenced clearing land along this road and a small saw mill is in operation on the 4th Concession. It crosses both the National Transcontinental Railway and the Temiskaming and Northern Ontario Railway.

On this road $3,850 was expended.

Road No. 15.

Townships of Fox and Brower.

A road along the boundary between the Townships of Fox and Brower was cut out the full width and well grubbed across the 1st, 2nd and part of the 3rd Concessions to the National Transcontinental Railway, a distance of about 2¼ miles. It was found very difficult to construct a crossing over the National Transcontinental Railway owing to the high embankment, and it was considered advisable to construct the road between the 2nd and 3rd Concessions in the Township of Brower, a distance of 1 mile, across Lots 1 and 2, and construct the road between Lots 2 and 3 across the 3rd, 4th, 5th and 6th Concessions in the Township of Brower in lieu thereof, to the north boundary, a distance of four miles. This road will be more in the public interest and will serve a greater number of settlers and cross the railway at Brower Siding, a very suitable place for a station and a very easy crossing. These 7¼ miles of road were cut out the full width and grubbed, and 2½ miles graded and ditched.

On this road $5,200 has been expended.

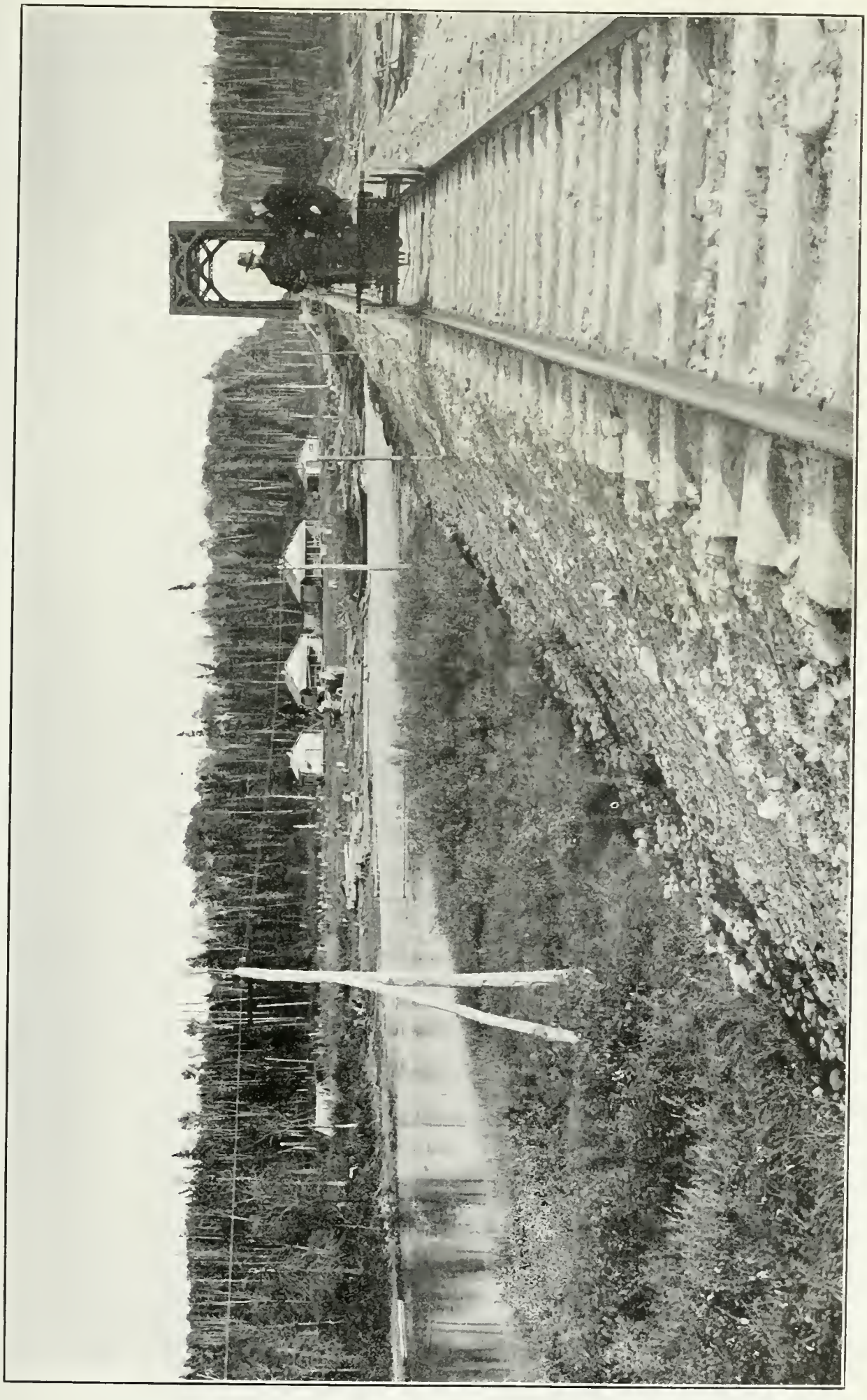
The land along this road is first class: the soil clay or clay loam and well timbered. The country along the banks of the Abitibi River is high above the bed of the stream: the clay banks of which rise to an elevation of from 20 to 75 feet.

The river has an average width of from 400 to 500 feet; the water is deep and the current swift. It is one of the largest of the many tributary streams of the Moose River and the land along the banks or in the valley is all well adapted for agricultural purposes. The timber is of the usual character common to Northern Ontario, spruce predominating, reaching from 4 inches up to 18 inches on the high land: the poplar, Balm-of-Gilead and white birch along the banks is from 6 inches to 20 inches or over in diameter. There is a small sawmill situate on the 5th Concession. The land is all located and good progress has been made: the road passes through one of the best settlements east of Cochrane.

Road No. 16.

A road was cut out along the south boundary of the Township of Fox across Lots 11 and 12, and along the south boundary of the Township of Brower and along the south boundary of the Township of Lamarche across Lots 1, 2 and 3, a distance of 8½ miles. The road was cut out the full width of 66 feet and the centre 26 feet grubbed, and is now ready for grading with the exception of the burning of the timber.

of t On this road $5,200 was expended by day labour.



Travelling by motor car on the Transcontinental Railway.

The easterly 4½ miles of this road passes through a good agricultural country, the land is high, the soil a good clay loam, the timber of the usual character–spruce, balsam, Balm-of-Gilead, poplar, and some white birch. The balance of the road passes through low swampy land with small spruce timber. There are no settlers along this road. The road, as cut out, will give access to settlers who may hereafter locate on the higher land on the easterly 4½ miles of the road to the Temiskaming and Northern Ontario Railway. Part of the low land, when properly drained, will make fairly good meadow land.

Road No. 17.

A trunk road was cut out along the north side of the right of way of the National Transcontinental Railway, passing through this township for a distance of 6½ miles, from Lot 14 to Lot 34 inclusive. The road was cut out the full width, and well grubbed, and is ready for grading.

On this road was expended $4,949.43.

It is proposed to extend this road easterly to the Quebec boundary, a further distance of 4½ miles.

This road passes through a very fine section of land; the soil is all a rich clay loam. In this township, which was surveyed last season, there is over 75 per cent. of the land suitable for agricultural purposes; and, in order to promote settlement in this township, it will be necessary to complete the road to the Quebec boundary, and to construct two roads crossing the railway at right angles, so as to give access to the lots in the rear of the township. A few hundred yards east of the Quebec boundary, in the Province of Quebec, the railway crosses the Okikodosik River, which has a width of over 150 feet, and is navigable south into the Abitibi Lakes. At this point there is a station bearing the same name as the river, and a small settlement has been started by the Quebec Government, and roads are being cut out in advance of settlement by the Government of the Province of Quebec.

To the east of the township of Sargent, in Quebec, there is a large area of fine land similar to that in the Township of Sargent, and there is every reason to believe that on completion of the roads, settlement will take place on both sides of the Inter-Provincial boundary. Already several settlers have located in Sargent. The Quebec boundary is distant 72 miles east of the town of Cochrane.

Road No. 18.

In the neighbourhood of the town of Hearst, a divisional point of the National Transcontinental Railway, 130 miles west of Cochrane.

A main trunk road was begun near the town of Hearst and constructed west with a view to connecting the said town with the Algoma Central Ontario Railway running north from Sault Ste. Marie and Michipicoten Harbour and 160 miles north therefrom for a distance of 1¼ miles. A contract was let to P. Turgeon to cut the timber on the road, burn it, and grub the centre portion 26 feet in width, at $650 per mile. The road is now cut out and grubbed, but part of the timber has not yet been burned off. $625 has been paid on account of this contract. The road will be ready for grading as soon as the timber is burned off.

This trunk road was extended easterly through the town plot of Hearst along the main street which is contiguous to the southerly limit of the right of way of the National Transcontinental Railway station grounds. This road was stumped,

A settler's clearing near the town of Cochrane.

corduroyed in places, and graded for a distance of one mile, and will serve as part of the main trunk road along the line of railway between Hearst and Cochrane, which towns are 130 miles apart.

The 9th street in the town of Hearst, which intersects the railway a short distance from the station, was stumped and partly graded for a distance of a quarter of a mile, to the bank of the Mattawishquia River, or Southern boundary of the town plot. This road, when produced southerly through the township of Kendall (surveyed last season), will form part of the main trunk road projected south through the centre of the township.

On the roads in and adjacent to Hearst, in addition to the $625 already mentioned, a sum of $3,866.71 has been expended, or a total of $4,491.71.

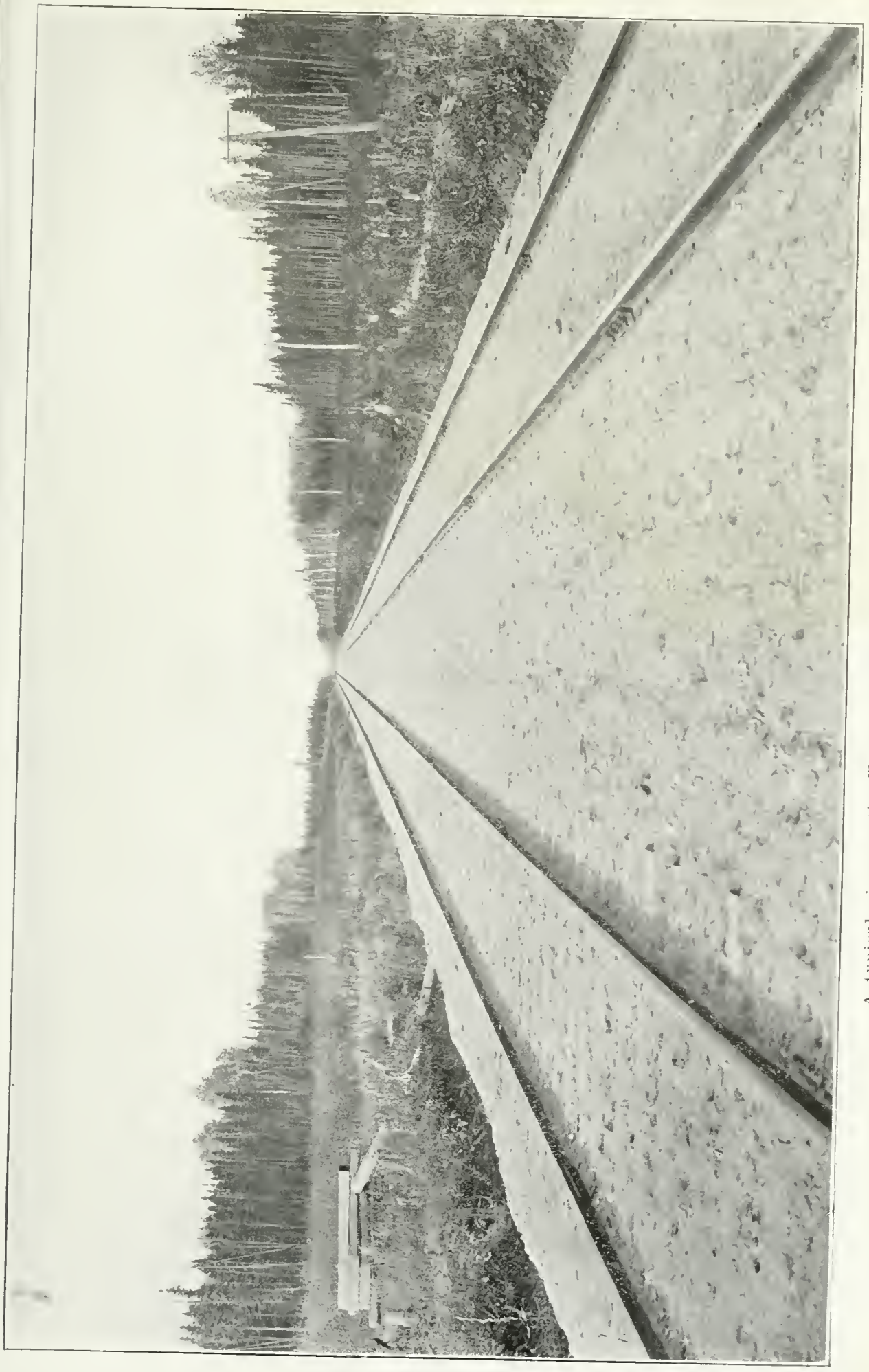
Road No. 19.

On the line of the Temiskaming and Northern Ontario Railway, 25 miles south of Cochrane, a trunk road was constructed east and west from Iroquois Falls Station, at the junction of the Porcupine Branch of the said railway, and at the junction of a branch line of the said railway now being constructed to the Pulp and Paper Mills under construction at Iroquois Falls on the Abitibi River, situate about 7¼ miles in a north-easterly direction from the station bearing the same name. The road was cut out and grubbed west of the railway along the boundary between the townships of Calvert and Clergue, and between the townships of McCart and Dundonald for a distance of about 7 miles to the Frederickhouse River; and east of the Temiskaming and Northern Ontario Railway to the Abitibi River, about 6 miles, or in all, a distance of 13 miles. This road was also connected, by a road ¼ of a mile in length, with Iroquois Falls Station on the Temiskaming and Northern Ontario Railway. The road passes through a country heavily timbered with large spruce, Balm-of-Gilead, poplar, white birch, and balsam. The land is rolling, and in several instances east of the railway, ravines, or gullies were met with. To the west of the railway, the road passes through a sandy plain about 1¼ miles in width, which is locally known as the Nellie Lake Jack Pine District. On this road is also met a high rocky exposure about ¼ mile in width, rising to an elevation of over 75 feet. A detour was made around the foot of this mountain to the south side. On this road, a bridge 130 feet in length was built, crossing a ravine at the end of a small lake on Lot 3. Also a bridge across a small stream on Lot 9. With the exception of the sandy plain above referred to, and the rock exposure, the land both east and west of the railway is fairly good agricultural land. A few semi-muskegs were met with, and in some instances the land is low. The road will require cross-laying in places, but it can all be drained at a moderate expense. Settlers have located on almost every lot in the township of Clergue, and on the 1st Concession in the Township of Calvert; also on lots in the 6th Concession of the Township of Dundonald, as far west as Lot 5.

This trunk road was constructed with a view to giving access to settlers who might hereafter locate in the townships of Little, Evelyn, and the townships to the west thereof, west of the Frederickhouse River; and also to give to settlers located in the townships of Teefy and Walker, east of the Abitibi River, access to the railway. It will be necessary to construct on the Frederickhouse River a bridge at the foot of Frederickhouse Lake. At this point, no great difficulty will be encountered in constructing a bridge; on the Abitibi River it may be practicable to construct a ferry, as the river is wide at this point.

This road was cut out the full width; the timber well piled, and the centre portion, 26 feet in width, well grubbed.

$10,625.71 was expended on this road.



A typical view on the T. C. R. west of the town of Cochrane.

Road No. 20.

Township of Clergue.

In the Township of Clergue, on the Temiskaming and Northern Ontario Railway, south of Kelso Station a road cut out about three years ago as a winter road for mining purposes was widened from 30 feet to 66 feet, and grubbed ready for grading. This road commences at the centre of the township and runs east between Concessions 3 and 4 from Lots 7 to 12. The same road was cut out the full width east from the centre of the township across Lots 6 to 1 inclusive, and from the same point it was cut out the full width across the 3rd and 2nd Concessions, and north across part of the 4th, 5th, and part of the 6th Concessions.

A road was also cut out the usual width, and grubbed, along the boundary between the townships of Clergue and Walker, across the 4th and part of the 5th Concessions. Half a mile of the road between Lots 6 and 7, Concession 4, was well graded and ditched. A bridge was constructed on the 5th Concession and some corduroy laid. The road between the townships of Walker and Clergue, as cut out, connects with a road cut out this season by the Department of Public Works, commencing at the Experimental Farm near Monteith. In this section, 10½ miles of new road were cut out, and ¾ of a mile graded, at a cost of $9,277.44.

These roads connect Kelso Station with the Experimental Farm at Monteith, and will also serve to connect the village of Kelso with the Porcupine branch of the Temiskaming and Northern Ontario Railway. The country served by these roads is very fair agricultural land. Along the Driftwood Creek it is somewhat broken and a few rocky outcrops were met with. In some places the land is low, but there is fair drainage. There is a dense growth of timber on the ground of large size: Balm-of-Gilead, poplar, white birch and spruce, the Balm-of-Gilead reaching a diameter of 24 inches. The country is rolling, with high clay banks along the creeks: the soil is a rich clay loam.

Road No. 21.

A trunk road was constructed along the Temiskaming and Northern Ontario Railway from a point north of Homer Siding, in the Township of Taylor, to a point south-east of the east boundary of the township of Playfair in the Township of Cook, which road passes through the townships of Taylor, Carr, the town of Matheson, the townships of Bowman, Hislop, and Playfair, a distance of 25 miles. This road was cut out and grubbed the usual width, and about 3 miles of it ditched and graded; 25 culverts have been constructed. The ungraded portion of the road, as soon as the dry weather sets in and the timber burned off, will be ready for grading. The road will connect all the different side-roads and Concession lines on which roads have been constructed by the Department of Public Works and others in the above-named townships, and give to the settlers access to the different stations, more particularly to the town of Matheson. The road passes through a fairly good agricultural country; in some instances it is broken by ravines and a few rock outcrops, and also a few semi-muskegs. The soil, however, is chiefly clay or clay loam, with an occasional sand and gravel ridge. Fair progress has been made by the settlers who have located on the lots in the above-mentioned townships. There are some large clearings and there is every appearance that, in the not distant future, Matheson will be the centre of a prosperous farming community.

$12,599.90 has been expended on this road.

The valley of the Abitibi River, township of Brower, near the T. C. R.

Road No. 22.

A road along the town line between the townships of Walker and Taylor was constructed from the railway east to the township of Carr, a distance of 3 miles. The road was well cut out and grubbed, but not burnt, at a cost of $1,900. The road passes through a fairly good country, on which a fair beginning has been made by settlers.

Road No. 23.

On the town line between the townships of Taylor and Carr, a road was cut out and grubbed ready for grading, with the exception of the burning. The road is situate across the 3rd and 4th Concessions, a distance of 2 miles in length.

$1,200 was expended on this road.

The land adjacent to this road is very fine; the soil a rich clay loam. On Lot 1, Taylor, and Lot 12, Carr, Concession 3, there are large clearings. Forty bushels of fall wheat per acre were grown on Lot 1, and, notwithstanding the backward season, ripened. Timothy, clover, and vegetables of all kinds matured, equal to any produced in Old Ontario under more favorable conditions.

Road No. 24.

The road between the townships of Bowman and Currie, across the 6th, 5th, and 4th Concessions, was cut out and grubbed in the usual way, and is now ready for grading, except the burning. The total distance is 4 miles, performed at a cost of $2,868.16.

This road passes through a fairly good agricultural country. The road crosses the Way-tay-beg River, over which a bridge with a span of 70 feet has been constructed.

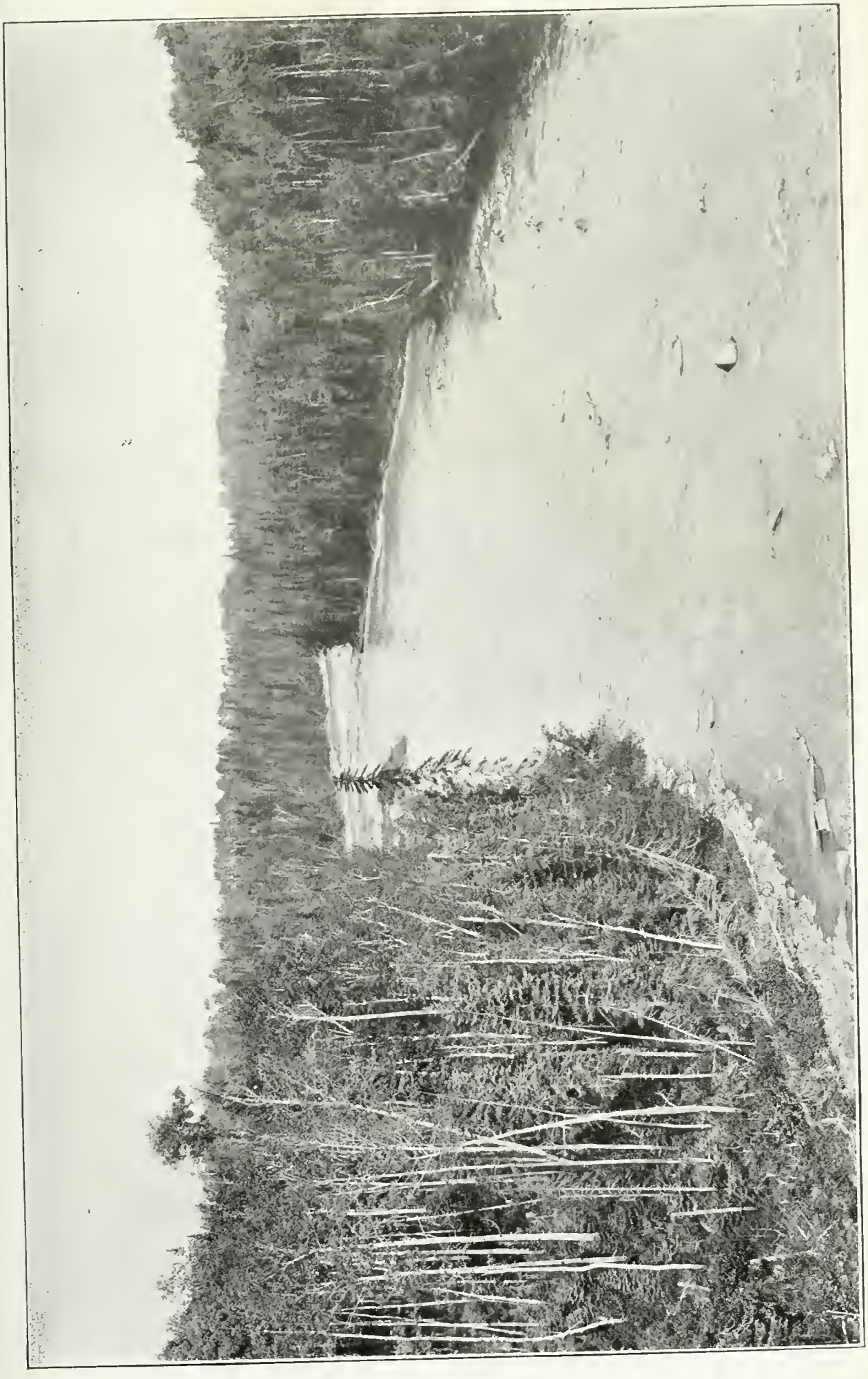
Road No. 25.

A road was constructed through the townships of Hislop and Bowman from the Temiskaming and Northern Ontario Railway south across part of the 5th, the 4th, 3rd, 2nd, and 1st Concessions, and between the townships of Hislop and Playfair across Lots 1 to 13 inclusive, a distance of 6½ miles, or in all a total distance of 11 miles; and a substantial wooden bridge with a span of 43 feet constructed across the Black River on Lot 4, south boundary of Hislop, and the approaches to the bridge cut down; 20 culverts built on the town line between Hislop and Bowman, and the road cross-laid in places. This work was done at a cost of $9,311.23.

The road passes through a good agricultural country, part of which has, within the last seven years, been burned over and easily cleared. The country is rolling, and near the Black River and tributary streams it is broken by clay ridges and a few rock outcrops. The bridge is one of two across the Black River, the other being at Matheson, and will give access to a large section of agricultural land, east of the river, not yet settled on.

Road No. 26.

A road was built on the town line between the townships of Carr and Beatty across the 1st to 6th Concession inclusive, a distance of 6 miles. This road was well cut out and grubbed the full width, and is now ready for grading, with the



The valley of the Fredericklouse River, nine miles west of the town of Cochrane.

exception of the burning of the timber. It passes through a fine agricultural country, with the exception of the 6th Concession and part of the 5th, where there is a narrow ridge of sand. Most of the country has been burned over, and is easily cleared. The lots are all located on, and fair progress is being made by the settlers.

The cost of this road was $3,345.86.

Road No. 27.

The road between the townships of Beatty and Hislop, known as the Munro Road, was improved and partly graded, and 6 clay hills cut down in front of Lots 7, 8, and 9, a distance of 1½ miles, at a cost of $1,855.18.

This road passes through a rolling clay country broken by clay ridges; the soil is A1. The country was all swept by fire 7 years ago and easily cleared.

Road No. 28.

The Night Hawk Lake Road, on the line between the townships of Carr and Bowman was repaired and regraded from the west boundary of the town of Matheson across Lots 6 to 10 inclusive, a distance of 2½ miles; and the corduroy around Jean Lake which had been partly burned two years ago was replaced, and several small culverts repaired.

This work was done at a cost of $400.

This road was originally constructed by the Department of Public Works to connect Matheson, on the T. & N. O. Railway, with the mining district around Porcupine. It passes through a good section of agricultural land.

Road No. 29.

A road between the townships of Ingram and Evanturel across part of the 2nd and 1st Concessions, and the town line between the townships of Hilliard and Armstrong across the 6th and part of the 5th Concessions, a distance of two miles, was ditched and part of it corduroyed, at a cost of $1,154.77. This road was cut out and the greater portion of it corduroyed by the Department of Public Works early last spring. The road passes through a flat country with fairly good farming land. The road was cut out to give settlers in the vicinity of Tomstown an outlet south to Thornloe and Earlton. The ditches now constructed will assist in draining the low lying lands adjacent; there is abundance of fall.

Road No. 30.

Townships of Marter and Catherine.

A road was cut out the full width and grubbed, commencing on the line between Concessions 2 and 3 at the south-west angle of Lot 10, Marter; thence east one mile, thence north one mile, thence east one mile, to the south-east angle of Lot 7 in the 4th Concession; hence east between the 3rd and 4th Concessions across Lots 5, 4, and part of Lot 3, a distance of 1¼ miles; thence north one mile through the centre of Lot 3, Concession 4, to the line between Concessions 4 and 5; thence east 1¼ miles to the Windigo Road leading to Tomstown. These roads were all cut out the full width and well grubbed, and 2¼ miles well graded, that is the road across Lots 5, 4, and part of 3, and north along the centre line of Lot 3, Concession 4, a distance of 2¼ miles.

The road was also widened and graded between Lots 4 and 5 across part of Concession 2, Concessions 3 and 4, and part of Concession 5, a distance of 3 miles; and cut out and grubbed across part of Concession 5, Concession 6, township of Marter; and between Lots 4 and 5 across the south half of Concession 1, Township of Catherine; also cut out and grubbed along the town line between the townships of Catherine and Marter across Lots 5 and 6. This road was partly ditched on Concession 6, Marter, and two bridges or large culverts and several small ones constructed; also a bridge on Concession 5, Marter. The total length of roads cut out in the townships of Marter and Catherine is 11½ miles.

These roads were constructed at a total cost of $10,900.

The country through which these roads are constructed is fairly good in places, and in places is very sandy, broken by ridges, and has very little timber of value. The lots are nearly all located on and some of them well improved.

Road No. 31.

Four clay hills were cut down on either side of the Blanche River, at the approaches to the bridges crossing the said river on Lot 10, Concession 5, Evanturel, and on Lot 1, Concession 3, Township of Dack; both on main travelled roads leading into Englehart. These hills in wet weather were impassable for heavy traffic.

The cutting down of the hills on Lot 10 cost $1,000, and those on Lot 1 cost $992.10.

The road between the townships of Evanturel and Dack, across Concessions 3 and 4, was improved by cleaning out the ditches and repairing the culverts.

The total cost of these two works amounted to $1,992.10.

The work was badly needed, and has since given general satisfaction.

Besides the above roads, a fireproof warehouse 24 feet by 50 feet was constructed at Cochrane at a cost of $794.89.

To the Honourable the Minister of Lands, Forests and Mines, Ontario.

SIR,—After closing down most of the operations on the construction of roads for the season of 1912 on the 15th of November, I immediately proceeded, as directed by you, to examine the different sections of Northern Ontario where there was immediate likelihood of opening up new settlements by the construction of roads under the provisions of 2 Geo. V., Chap. 2, during the season of 1913.

District of Rainy River.

I proceeded first to the Rainy River Valley in the District of Rainy River, and drove over parts of the different roads which had already been constructed, and examined, as far as possible, the unsettled parts of the country in the valley suitable for agricultural purposes, and from my observation have made an estimate of the amount that would be required this coming season in opening up new roads and improving one main thoronghfare or trunk road from the town of Fort Frances West through the valley to the mouth of the Rainy River; and also in constructing trunk roads north and south at regular intervals, chiefly along township boundaries so as to connect up the various short roads now constructed; and also to open

up twelve new townships in which there is a large percentage of good agricultural land in which there are as yet few settlers and few existing roads.

I estimate that $100,000 would be required in opening up 100 miles of new road, and repairing and grading 50 miles of old road.

These roads, when constructed, will allow the settlers to reach the different stations along the Canadian Northern Railway passing through the Valley.

District of Kenora.

Leaving the Rainy River Valley, I proceeded to the District of Kenora, and drove through the townships north-east, north and west of the town of Kenora and Keewatin. In these townships I found a fair percentage of agricultural land; although, speaking generally, the country is not well adapted for that purpose. Where the land is free from stone the soil is fairly good, and farming is at present being carried on in places with apparently some success. The difficulty at present, however, is that the farmers cannot get to Kenora and Keewatin with their produce, except during the winter season or during the dry seasons.

After examining the different roads which have already been opened up, I engaged a small exploration party, with a view to determining what agricultural land might be opened up by the continuation of the present colonization road west through the township of Pellatt and west towards the Manitoba Boundary; and, if possible, locate a branch road northerly to the Grand Trunk Pacific Railway; as it has been found almost impracticable, owing to the rough character of the country north or north-east of Kenora, to tap the Transcontinental Railway in that direction. I am glad to report that fair success has been met with, and my explorer reports having been able to locate a good line of road, passing through, in places, sections of good agricultural land, which will be tributary to Keewatin or Kenora. The length of the road from Kenora to the boundary is 34 miles. Of this distance, 12 miles were partly constructed last season by the Department of Public Works, and now requires to be graded. The 22 miles of proposed new road, besides opening up agricultural land, will pass through a section of country on which there are considerable quantities of tie and other timber, which at present cannot be reached.

I also found good agricultural land along the Canadian Pacific Railway, east of Dryden, which has been partly settled upon. The construction of a good trunk road along the right of way for 10 miles would greatly assist in promoting settlement in these sections, and enable the settlers to get their produce to a market.

$75,000 would be required to cover the cost of these roads.

District of Thunder Bay.

In the District of Thunder Bay, in the sections tributary to Fort William and Port Arthur, roads have been constructed in different directions leading into the agricultural sections. After these roads reach a few miles beyond the limits of the cities it is difficult to travel over them during several months in the summer season. Many of them have never been graded or ditched, and settlers in the outlying districts find it difficult to get their produce to a market. There is a considerable area of good agricultural land in small sections between Fort William and Pigeon River, but as yet few settlers have located on the land, owing to the fact that it is difficult or almost impossible to reach this land for want of roads. A road has been partly constructed through the Slate River Valley and extending

southerly to the International boundary. It is impossible in the summer season however, to drive over a good portion of this road.

I beg to recommend the reconstruction of this road. I would also recommend that the road from Fort William into the Whitefish Valley be improved and graded. There is a large area of first class land in this valley and in the neighborhood thereof, which would be settled upon if there was one good road to a market. I would also recommend that two other trunk roads, tapping this main road, be constructed through the valley. Also that the old Dawson Road, which was constructed in the early seventies, be improved as far as the Kaministiquia River; also that a trunk road be constructed running north from the said Dawson Road through the township of Gorham: also that the extension of John Street through the township of Oliver and part of the township of McIntyre, be improved; and that the Oliver Road through the township of Oliver and part of the township of McIntyre be improved; that the main road west of Fort William into Slate River Valley be improved; and that a trunk road be constructed through the centre of the townships of Scoble, Gillies, and Lybster.

It will cost $150,000 to carry out this work.

District of Sudbury.

I then proceeded to the Sudbury District and examined the different roads constructed tributary to the town of Sudbury and the mining sections. I found that while there is a good section of agricultural land to the west and north of Sudbury, through which roads have already been constructed, it is difficult, owing to the lack of good main roads, for the settlers to get their produce to the most important market in the district.

I beg to recommend that a main road leading West from Sudbury, passing the Murray Mine, and through the agricultural sections in the vicinity of Chelmsford and Larchwood, be improved; and a trunk road opened up north from Azilda, through the townships of Blezzard and Hanmer; also that the Stobi Mine road be extended north; and that the main road from Sudbury north-easterly, known as the Wahnapitae Lake Road, passing the Garson Mine, be properly graded. This road passes through a good mining section, as well as a section in which there is considerable land, suitable for agricultural purposes, not yet settled on. I also beg to recommend that the road between Sudbury and Connisan be extended from Connisan easterly along the line of the Canadian Pacific Railway, through Wahnapitae Station, and continuing easterly towards Markstay. The construction of this road would give to the settlers between Sturgeon Falls and Sudbury access to the town of Sudbury with their produce. Situated as they are at present, it is impossible for them to reach a market.

I would recommend that $75,000 be expended on these roads.

Shining Tree Roads.

I also beg to recommend the construction of a wagon road from the Canadian Northern Ontario Railway, commencing about 80 miles north of Sudbury and running in a north-easterly direction to the West Shining Tree gold mining properties, now being developed in the vicinity of West Shining Tree Lake; and to further continue the said road in an easterly direction to the silver mining district on the East Shining Tree Lake, where considerable successful development work has been done. The length of this road would be approximately thirty miles,

through a country where no engineering difficulties will be met with in road construction.

This will not be an expensive road to construct, and I would recommend the expenditure thereon of $25,000.

This road, besides opening up two very promising mining camps, would later on be of great service in connection with the development of the timber resources in that locality.

District of Algoma.

On the Sudbury and Sault Ste. Marie road, I would recommend the expenditure of $50,000 on the Western section of this road.

District of Temiskaming.

I beg to recommend the construction of trunk and other roads along the main line of the Temiskaming and Northern Ontario Railway, and along the Earlton and Elk Lake and the Charlton branches thereof, extending west as far as the Montreal River, and east for a distance of about 20 miles, through the agricultural lands. Also short roads into the more important mining sections around Gowganda and Swastika.

I estimate that $75,000 will be required to carry out this work.

I would also recommend the construction of new trunk and other roads along the Temiskaming and Northern Ontario Railway, and the Porcupine branch thereof, and in the townships east and west of the said railway between Matheson and Cochrane, including the cost of grading and improving roads cut out last season.

$125,000 will be required for these roads.

Northern Part of the Districts of Temiskaming and Algoma.

From the information gained last season in constructing roads along the Transcontinental Railway, I am convinced that for the next few years, at all events, settlement along this line of railway and throughout the Clay Belt should, as far as possible, be permitted only in the best sections, where the land is most suitable for agricultural purposes; in localities well drained by the larger or main streams tributary to the Moose River; where the land is higher and less subject to summer frosts and requires less drainage; or in sections which have been burnt or partially burnt over, thus reducing the cost of clearing; and where the drainage has been improved by the burning off of the moss.

I, therefore, beg to recommend that first the roads which were cut out and not graded last year (owing to the inclemency of the season) should be graded this season and extended where settlement is most likely to take place. The work of last season in this locality extended east and west from Cochrane, and in a small section adjacent to the Quebec boundary.

In the vicinity of the Groundhog River, one of the eight largest tributaries of the Moose River, it is suggested that a new section be opened up for settlement. There is a very large area of fine agricultural land tributary to this stream, which is about 50 miles west of Cochrane. This area extends south of the Transcontinental Railway for nearly 50 miles, and for about 30 miles North. Twenty or more years ago, fire swept over a very large area along this river, and it is now grown up with a small second growth, and would be much more easily cleared and brought under

cultivation than the land covered with virgin forest. The soil is the usual clay or clay loam, with occasional sections of sandy loam. At the railway crossing there is a considerable clearing where vegetables and hay crops have been grown successfully since railway construction first began.

I beg to recommend the opening up of roads in two townships at this point, and the construction of a trunk road along the right of way for a distance of about 25 miles east and west from the river. The cost of this work, together with the work in the vicinity of Cochrane, and near the Quebec boundary, would amount to about $150,000.

District of Nipissing.

At present there is a road between the towns of North Bay and Mattawa, which is passable for winter traffic and for light vehicles during the dry season. It follows in a general course the line of the Canadian Pacific Railway. The road is in bad condition in places, and in other sections the location of the road would require to be changed, in order to avoid bad hills. The distance between North Bay and Mattawa is 46 miles. This road will give to the settlers of the township of Chisholm access to a good market at North Bay or Callander for their farm produce.

I would recommend the expenditure of $75,000 on this work.

District of Algoma.

I beg to recommend the expenditure of $75,000 in the construction of a trunk road along the Transcontinental Railway east and west from the town of Hearst at the junction of the Algoma Central Ontario and the Transcontinental Railways, for a distance of about 25 miles; also the opening up of trunk roads in advance of settlement on the boundaries and centre lines of two townships at this point.

On completion of the Algoma Central Ontario Railway, within probably a year or 18 months, there should be no better point in the Clay Belt to commence a settlement than in the vicinity of this junction and divisional point of the railway. The land is well adapted for agricultural purposes, and owing to its splendid location and easy distance (160 miles) from navigation on Lake Superior, settlers should find an easy market for all the pulp timber on their land. A town of some importance will soon spring up at Hearst, and there seems no reason why the land should not be rapidly settled on if colonization roads are opened in advance of settlement.

Salaries.

A further sum of approximately $25,000 will be required to pay the wages of inspectors, engineers, and office staff required to carry out the above works.

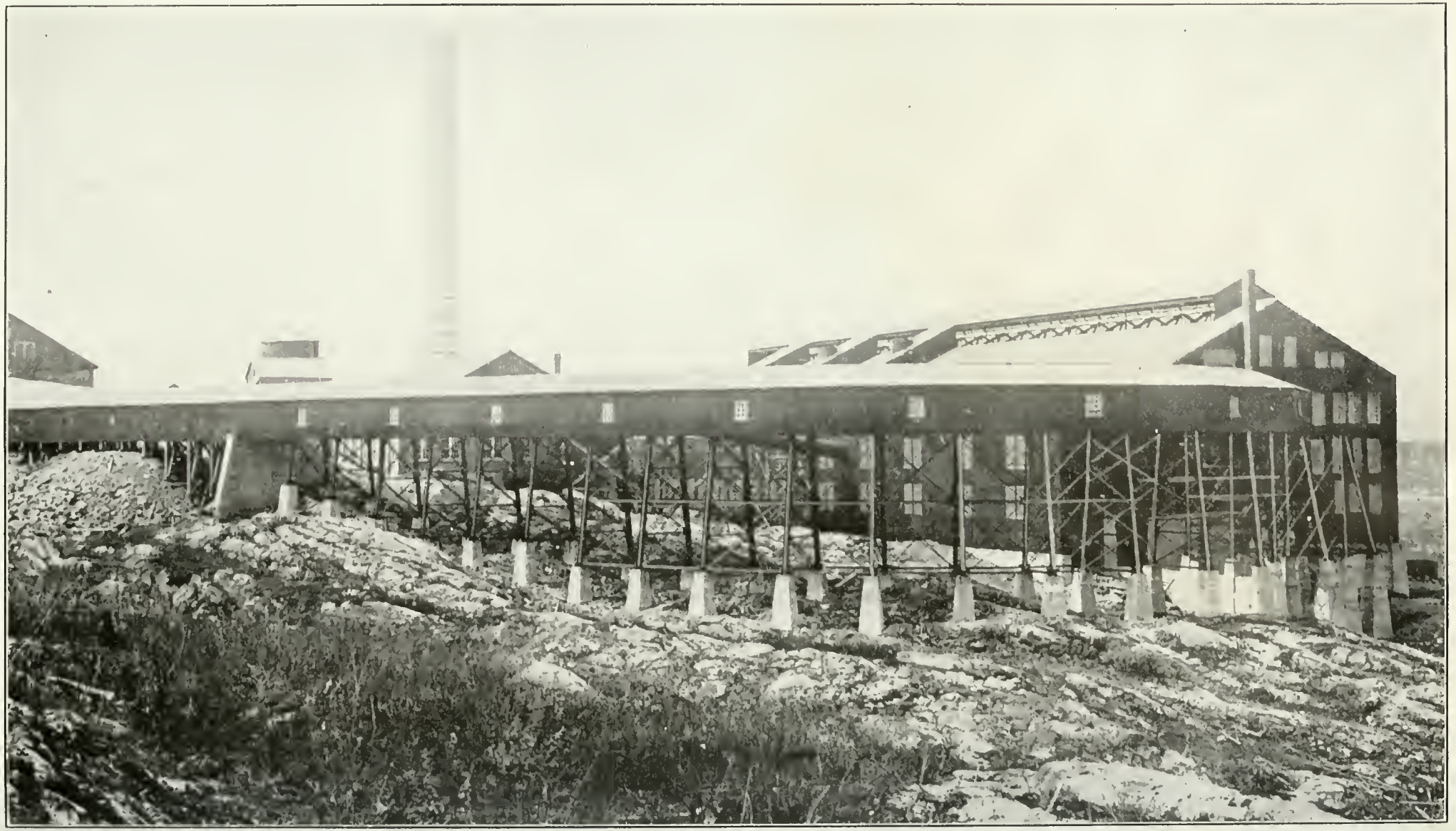
I have the honour to be, Sir,

Your obedient servant,

J. F. Whitson,
Road Commissioner.

Memorandum giving the amount recommended to be expended in the construction of Main or Trunk Roads; and the improving by grading or otherwise, of main roads, or roads partially constructed; and also in the construction of a few short roads into sections sparsely settled, where few, if any, roads have as yet been constructed.

1. District of Rainy River.	
Rainy River Valley, trunk and other roads	$100,000 00
2. District of Kenora.	
Trunk roads	75,000 00
3. District of Thunder Bay.	
Trunk roads through the agricultural sections tributary to Port Arthur and Fort William, extending northwest along the Grand Trunk Railway and Canadian Pacific Railway for a distance of 30 miles; and west and southwest for about the same distance; and northeast of Port Arthur for a distance of 15 miles	150,000 00
4. District of Sudbury.	
(*a*) Trunk roads to the agricultural and mining sections west and north of Sudbury for a distance of 25 miles; and northeast to Wahnapitae Lake through the mining and agricultural sections and east along the Canadian Pacific Railway, a distance of 25 miles	75,000 00
(*b*) A mining road from a point on the Canadian Northern Railway about 80 miles north of Sudbury, east to the mining districts around East and West Shining Tree Lakes	25,000 00
5. District of Algoma, and Sault Ste. Marie.	
Sections of the Sudbury and Sault Ste. Marie trunk road	50,000 00
6. District of Temiskaming.	
(*a*) Trunk and other roads along the main line of the Temiskaming and Northern Ontario Railway, and along the Earlton and Elk Lake, and the Charlton branches thereof; extending west as far as the Montreal River, and east for a distance of about 20 miles, through the agricultural lands; also short roads into the more important mining sections around Gowganda and Swastika	75,000 00
(*b*) New trunk and other roads along the Temiskaming and Northern Ontario Railway, and the Porcupine branch thereof and in the townships east and west of the said railway between Matheson and Cochrane; including the cost of grading and improving roads cut out last season	125,000 00
(*c*) New trunk roads along the Transcontinental Railway, and the grading of roads not completed last season, between the Quebec boundary and a point 60 miles west of Cochrane; in all, a distance of about 130 miles, along the line of the railway, and extending back from the railway from 6 to 12 miles	150,000 00
7. District of Nipissing.	
Trunk road from North Bay to Mattawa, via Callander, and through the township of Chisholm	75,000 00
8. District of Algoma.	
New trunk roads along the Transcontinental Railway east and west of the town plot of Hearst, at the junction of the Transcontinental and Algoma Central Ontario Railways	75,000 00
9. Salaries.	
For inspectors, engineers, and office staff	25,000 00
	$1,000,000 00



General view of Charge Trestle, Smelter Building and Stack, Mond Nickel Company, Coniston, Ontario

TWENTY-SECOND ANNUAL REPORT

OF THE

BUREAU OF MINES, 1913,

BEING

VOL. XXII., PART I.

CONTENTS:

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO

Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty

1913.

Printed by
WILLIAM BRIGGS
29-37 Richmond Street West
TORONTO

CONTENTS

LIST OF ILLUSTRATIONS

List of Illustrations (*continued*).

SKETCH MAPS

SHEET MAPS ACCOMPANYING REPORT

No. 22g. Map of Toronto and Vicinity, contoured; showing Pleistocene geology. Scale, 1 mile to the inch.

No. 22h. Map of the Sudbury-Cobalt-Porcupine Region, geologically coloured. Scale, 8 miles to the inch.

No. 22i. Map of parts of the Nelson and Hayes rivers. Scale, 2 miles to the inch.

No. 22j. Map showing route of the Nelson river Exploring Expedition, Geologically coloured (in part). Scale, 10 miles to the inch.

LETTER OF TRANSMISSION

To His Honour Sir John Morison Gibson, Etc., Etc., Etc.,
Lieutenant-Governor of the Province of Ontario.

Sir,— I have the honour to transmit herewith, for presentation to the Legislative Assembly of the Province of Ontario, the Twenty-second Annual Report of the Bureau of Mines.

I have the honour to be, Sir,

Your obedient servant,

W. H. Hearst,
Minister of Lands, Forests and Mines.

Department of Lands, Forests and Mines.
Toronto, 16th April, 1913.

INTRODUCTORY LETTER

To The Honourable William Howard Hearst,
Minister of Lands, Forests and Mines.

Sir,—I beg to submit to you, for transmission to His Honour the Lieutenant-Governor in Council, the Twenty-second Annual Report of the Bureau of Mines, the same consisting of two Parts.

Part 1 contains the customary review of the mining industry of the Province, dealing with the progress and developments of the year 1912, and presenting as far as possible the salient facts in a series of tables.

It is gratifying to be able again to report that the past year was the most productive the industry has yet experienced. The output of the mines and mineral works for the year had a spot value of $48,341,612, which was $6,364,815, or fifteen per cent. more than that of 1911, previously the largest on record.

All the metallic products showed an advance in value, some of them very considerable advances, the sole exception being iron ore, shipments of which were smaller than for some years past. The silver mines of Cobalt continue to yield their riches, the small decline in production being more than offset by the higher value; the nickel-copper mines of Sudbury were worked on a more extensive scale than ever; and the gold fields of Porcupine gave a substantial earnest of their future by turning out one and three quarter million dollars' worth of bullion.

In the non-metallic list there was also an increase in value, but of smaller proportions, being about five per cent. The items on this list from year to year show more or less fluctuation. Brick and stone, among the construction materials, were last year produced in larger quantities, while Portland cement and lime were less in value; petroleum once more showed a smaller production, and natural gas a larger. Feldspar and iron pyrites were below the level of 1911; corundum, graphite, gypsum and quartz were above.

On the whole, it may be confidently stated that 1912 was the best year yet in the Ontario mining industry.

The statistical review also gives the revenue derived by the Government from sale and lease of mining lands, and from profit, acreage and gas taxes, royalties, etc., and deals with the work of the Mining Recorders, Provincial Assay Office, etc.

The mines of Ontario are described by Mr. E. T. Corkill, Chief Inspector of Mines, who gives details of the plants and workings. Mr. Corkill also makes report on the accidents which occurred during the year in the mines, quarries and metallurgical works. The statistics concerning such accidents reveal little or no improvement over previous years. The casualties which kill or maim so many of the men engaged in mining in Ontario are too numerous, and this feature is far from making a showing upon which the industry can be congratulated.

The geology of the Whiskey Lake and Massey Copper Mine areas is briefly described by Dr. A. P. Coleman. In the former a number of copper sulphide outcroppings have been discovered, but none have ever yet been worked to such an extent as to show their size or continuity, or to prove the value of the district as a whole. In the latter area two mines at least were worked with considerable perseverance, but both are now, and have been for some time, closed down.

When the District of Patricia was handed over to Ontario by the Government of Canada, this Province was given terminal facilities for a railway at the mouth of the Nelson river, within the territory allotted to the Province of Manitoba, and in May, 1912, Mr. J. B. Tyrrell, under your directions, proceeded to Fort Nelson for the purpose of locating and surveying the lands required. On his return journey Mr. Tyrrell and party came through the District of Patricia by the Severn River Route, and under the title "Hudson Bay Exploration Expedition, 1912" he gives an account of his work and of the geological, agricultural and other features in part of the newly acquired territory, which will be read with considerable interest.

Mr. A. L. Parsons deals with the Lake of the Woods and other Mineral Areas in the northwestern part of Ontario, his work being a continuation of that done by him in previous seasons for the Bureau.

A brief article by Mr. R. B. Stewart on the West Shining Tree Gold Area, gives particulars of interest concerning the geology and gold discoveries in that district.

The concluding articles of Part 1, entitled "Glacial Phenomena of Toronto and Vicinity" and "Moraines North of Toronto" by Dr. A. P. Coleman and Mr. Frank B. Taylor respectively, deal with the interesting glacial developments at and near the City of Toronto. These papers were prepared originally in connection with the meeting of the International Geological Congress in Toronto, August, 1913.

Part II deals with the Pre-Cambrian geology of Southeastern Ontario, the authors being Professor Willet G. Miller, Provincial Geologist, and Mr. Cyril W. Knight, Assistant Provincial Geologist. The age and structural relations of the rocks are described, and an account is given of the mineral industries of the region. For many years the geology of this part of the Province has attracted the attention of field men, but many difficulties have been met with, and the relations of the rocks have not been clearly understood. From time to time, as opportunity offered during the last few years, Messrs. Miller and Knight have made a detailed study of areas at several points along a strip of country sixty-five miles in length from Peterborough in the west, to Frontenac county on the east. It is believed that this work will be not only of scientific interest, but will have an important economic bearing. It has already resulted in the opening of a large quarry near Havelock which furnishes trap rock, the best material for road-making purposes, and it is expected that other quarries will soon be opened. The district is an important one, from the very considerable variety of economic minerals which it contains.

I have the honour to be, Sir,

Your obedient servant,

THOS. W. GIBSON,
Deputy Minister of Mines.

BUREAU OF MINES,
DEPARTMENT OF LANDS, FORESTS AND MINES.
Toronto, 16th April, 1913.

REPORT OF THE BUREAU OF MINES 1913

VOL. XXII. PART I.

STATISTICAL REVIEW

By Thos. W. Gibson, Deputy Minister of Mines

The mining industry of Ontario continues to expand, not only in the quantity and value of the annual production, but also in the area embraced within its operations.

The beginnings of the industry were on the shore of lake Erie, where a hundred years ago the settlers smelted the bog iron ores of the locality into stoves and potash kettles. In the eastern part of the Province the rocky areas proved to contain iron, gold, mica, and many other useful metallic and non-metallic minerals on which have been established industries of local, and in some cases more than local, importance. The shores of the great lakes, being accessible by water, lay open to the early prospectors, who were rewarded by the finding of copper at Bruce Mines, and silver at Silver Islet and on the mainland of lake Superior.

The period of railway building set in, and wherever a pathway was opened in the forest, it became a base, sometimes indeed the actual site, of fresh discoveries. In a cut of the Canadian Pacific railway, near Sudbury, in the year 1883, the first copper ores of that region were found, which soon proved to contain nickel, and so led to the opening up of the world's chief source of supply of that metal. The building of the C. P. R. enabled prospectors to ply their calling on Lake of the Woods and to penetrate to the valley of the Seine river, where they found gold indeed, but failed to open up a permanent gold field. The rumours of placer gold drew a crowd of prospectors into the wilds of Michipicoten in 1897. They found no golden sands, but in 1898 there was discovered the Helen mine, which brought about the building of the Algoma Central railway. A stretch of fertile land at the head of lake Temiskaming had called for years for connection with older Ontario, but not even the standing promise of a substantial bonus by the Government induced private capital to undertake the construction of a railway. The Government itself set about the task, and Cobalt was discovered, one of the richest silver camps ever made known. Gowganda, South Lorrain and Casey followed, and in 1909 Porcupine, now getting into its stride as a producer of gold.

The only key to the future is found in the past, and in the vast area of pre-Cambrian rocks yet unprospected in northern Ontario—to which was added last year the principality of Patricia—it can hardly be doubted that many more deposits of mineral wealth will be found, some of them perhaps as rich as any that have yet been brought to light.

For the year 1912 the returns made by mining companies and mine owners show the aggregate production of minerals and mineral products to have had a value at the point and in the form produced of $48,341,612. In 1911 the value was $41,976,797, so that the increase for the year was $6,364,815 or 14.9 per cent.

The following Table (No. I) gives particulars of production, as well as the number of employees and wages paid for labour.

Table I.—Mineral Production of Ontario, 1912

Product.	Quantity.	Value.	Employees.	Wages.
Metallic:		$		$
Gold ..... ounces	(a) 102,278	2,114,086	1,183	1,254,361
Silver ..... "	(b) 30,719,883	17,671,918	3,746	3,543,419
Cobalt ..... tons	936	315,781		
Copper ..... "	11,126	1,584,310		
Nickel ..... "	22,850	4,736,460	2,881	2,404,889
Platinum ..... ounces	(e) 2,366	80,736		
Palladium ..... "	(d) 4,316	147,235		
Iron ore ..... tons	117,357	238,884	687	550,744
Pig iron ..... "	589,593	8,054,369	846	636,420
Lead (concentrates) ..... "	26	1,290	19	3,074
	.....	34,945,069	9,362	8,392,907
Less Ontario iron ore smelted into pig iron (71,589 tons)	.....	145,326	.....	.....
Net metallic production	.....	34,799,743	.....	.....
Non-metallic:				
Arsenic ..... tons	4,166	79,297	(e)	(e)
Brick, common ..... No.	385,000,000	3,178,250	2,582	1,012,469
Tile, drain ..... "	16,463,000	279,579		
Brick, paving, etc. ..... "	8,082,000	221,986	732	386,627
Brick, pressed ..... "	65,598,000	634,169		
Building and crushed stone	.....	953,839	829	371 041
Calcium carbide ..... tons	1,998	120,000	44	27,697
Cement, Portland ..... bbl.	2,993,367	3,365,659	1,551	876,722
Corundum ..... tons	1,960	233,212	197	123,465
Feldspar ..... "	13,633	28,916	60	21,257
Graphite ..... "	1,246	65,076	84	24,201
Gypsum ..... "	31,331	50,246	140	59,823
Iron pyrites ..... "	20,744	71,043	170	115,342
Lime ..... bush.	2,297,525	281,672	379	113,344
Mica ..... tons	570	57,384	79	35,116
Natural gas ..... million cub. ft.	12,414	2,268,022	277	184,351
Peat ..... tons	175	725	15	520
Petroleum ..... Imp. gal.	8,432,730	344,537	(f) 699	(f) 436,852
Pottery	.....	52,445	34	17,630
Quartz ..... tons	94,758	179,576	112	68,506
Salt ..... "	90,986	450,251	219	151,218
Sewer pipe	.....	464,627	230	140,398
Talc ..... tons	6,726	61,358	79	32,396
Non-metallic production	.....	13,541,869	8,512	4,198,975
Add metallic production	.....	34,799,743	9,362	8,392,907
Total production	.....	48,341,612	17,874	12,591,882

(a) See under "Gold," p. 10. (b) See under "Silver," p. 12. (c) See under "Platinum," p. 26. (d) See under "Palladium," p. 26. (e) Included under "Silver" and "Cobalt." (f) In refining works only.

The increase in production as compared with 1911 was largely in the metals, the value of which was greater by $5,696,876, or 19.5 per cent. Non-metallic substances advanced in value by $667,939, or 5.1 per cent. Of the entire output, the metalliferous list provided 72 per cent., and the non-metalliferous 28 per cent., as against 70 per cent. and 30 per cent. respectively in 1911.

From Table II, given below, it will be seen that among the metals decided gains were made in gold ($2,071,449), silver ($1,718,023, or 10 per cent.), nickel ($1,071,986, or 29.2 per cent.), copper ($303,192, or 23.6 per cent.), and cobalt ($144,891, or 84.7 per cent.). The gold production given for 1912 includes, as is more fully explained

under the heading of "Gold," a considerable output really belonging to the six years beginning with 1907, of which no report has been made until now. The item for cobalt also obtains some advantage from the fact that much of the mixed oxides of cobalt and nickel which are produced in the process of refining the ores from Cobalt are shipped without being separated from each other. Cobalt predominating, both in quantity and value, the whole is credited to cobalt alone. There was a moderate advance in pig iron ($338,055, or 4.3 per cent.). The single decrease was in iron ore ($207,046, or 46.1 per cent.).

In the non-metallic substances, the chief increases were in common brick ($376,279, or 13.5 per cent), paving and fancy brick ($135,301, or 156 per cent.), pressed brick ($69,539, or 12.1 per cent.), stone ($61,212, or 6.8 per cent.), corundum ($86,054, or 5.8 per cent.), quartz $115,171, or 17.8 per cent.) and sewer pipe ($54,563, or 13.3 per cent.). The largest decreases were in Portland cement ($274,983, or 7.5 per cent.), feldspar ($22,694, or 43.9 per cent.), iron pyrites ($47,414, or 40 per cent.), and drain tile ($69,966, or 20 per cent.).

Table II.——Comparative Value Mineral Production, 1911 and 1912

Product.	1911	1912	(I) Increase. (D) Decrease.	
Metallic:	$	$		$
Gold	42,637	2,114,086	I	2,071,449
Silver	15,953,895	17,671,918	I	1,718,023
Copper	1,281,118	1,584,310	I	303,192
Nickel	3,664,474	4,736,460	I	1,171,986
Iron ore	445,930	238,884	D	207,046
Pig iron	7,716,314	8,054,369	I	1,338,055
Cobalt	170,890	315,781	I	144,891
Non-metallic:				
Arsenic	74,609	79,297	I	4,688
Brick, common	2,801,971	3,178,250	I	376,279
" paving, fancy, etc	86,685	221,986	I	135,301
" pressed	564,630	634,169	I	69,539
Building and crushed stone	892,627	953,839	I	61,212
Calcium carbide	84,437	120,000	I	35,563
Cement, Portland	3,640,642	3,365,659	D	274,983
Corundum	147,158	233,212	I	86,054
Feldspar	51,610	28,916	D	22,694
Fluorspar	200	.....	D	200
Graphite	36,492	65,076	I	28,584
Gypsum	32,535	50,246	I	17,711
Iron pyrites	118,457	71,043	D	47,414
Lime	402,340	381,672	D	20,668
Mica	43,058	57,384	I	14,326
Natural gas	2,186,762	2,268,022	I	81,260
Peat	2,830	725	D	2,105
Petroleum	353,573	344,537	D	9,036
Phosphate of lime	240	.....	D	240
Pottery	50,500	52,445	I	1,945
Quartz	64,405	179,576	I	115,171
Salt	430,835	450,251	I	19,416
Sewer pipe	410,064	464,627	I	54,563
Talc	47,725	61,358	I	13,633
Tile, drain	349,545	279,579	D	69,966

An Accelerating Production

During the five years covered by Table III, beginning with 1908, the products of the mines, quarries and mineral works of the Province have increased in value by 88 per cent. It is in the metalliferous materials that the more notable increase have taken place. The entire list of products of this kind participates in the increase save one—iron ore, the output of which has of late shown a tendency to diminish. Gold remained stationary at a small production until 1912, when the effect of the opening up of the Porcupine deposits began to be seen. Silver, notwithstanding a reduction in the quantity produced, brought a greater return in 1912 than in any previous year, because of the higher prices which prevailed. Nickel expands steadily, and carries along with it its by-product, copper. Cobalt is also a by-product, the figures for which are assuming more importance as the business of refining and especially of marketting it is being mastered. Among the rarer metals platinum and palladium reappear in 1912, after an absence of some years. The statistics given are not, strictly speaking, for that year only, but represent an unreported output for the six years beginning with 1907.

The changes in the production of the non-metallic materials have not been so marked. There has been a steady growth in the output and value of brick of all varieties, also of stone both for building purposes and crushed for road material and use as a flux. Portland cement shows a rapid growth until 1912, when for the first time since the manufacture began in 1891, there was a check in the output, the figures falling below those for 1911. Lime alone among the materials of construction seems to be losing ground, possibly because of partial displacement by cement. The decline in the yield of petroleum, remarked on in this Report annually for a number of years, shows no symptom of abatement. Natural gas continues to advance, but the increase in 1912 over 1911 is comparatively small. Salt maintains an annual production of less than half a million dollars in value, and shows little fluctuation from one year to another. Sewer pipe made in Ontario appears to be coming into better demand, for the production has been for some years rising in value; but another clay product, drain tile, shows an unusual falling off in 1912. Pottery, too, remains stationary. Notwithstanding private and governmental effort, the manufacture of peat fuel makes little headway, measured at any rate by quantity of actual output. The milling of talc is becoming more important yearly; mica barely holds its own against competition from India; the feldspar quarries on the Kingston and Pembroke railway were active during the latter part of the five-year period, but less so in 1912, and iron pyrites also failed to maintain in that year the advances successively made for several years before. Graphite and gypsum have both increased, the latter markedly so; this is true also of corundum, though the destruction by fire of the only operating plant for treating this mineral may cause a temporary stoppage of production. Quartz for flux and converter linings is being raised in larger quantities; white arsenic, made from the ores of Cobalt, has of late found a good market; carbide of calcium, though higher in 1912 than in 1911, did not attain to the level of the earlier part of the five-year term. The production of apatite, or phosphate of lime, has practically ceased, and fluorspar, though appearing in the Tables for 1910 and 1911, has not yet been produced in quantity. Further comment on the progress of the various departments of mining will be found under the heading of the several products.

Table III.—Mineral Production, 1908 to 1912

Product.	1908	1909	1910	1911	1912
Metallic:	$	$	$	$	$
Gold	60,337	32,445	68,498	42,637	2,114,086
Silver	9,136,830	12,464,722	15,481,322	15,953,895	17,671,918
Cobalt	111,118	94,965	54,699	170,890	315,781
Copper	1,071,140	1,127,015	1,374,103	1,281,118	1,584,310
Nickel	1,866,059	2,790,798	4,005,961	3,664,474	4,736,460
Iron ore	574,839	645,622	513,721	445,930	238,884
Pig iron	4,390,839	6,301,528	6,975,418	7,716,314	8,054,369
Zinc ore	.....	8,950	5,760	.....	.....
Lead	.....	.....	.....	.....	1,290
Platinum	.....	.....	.....	.....	80,736
Palladium	.....	.....	.....	.....	147,235
	17,211,162	23,466,045	28,479,482	29,275,258	34,945,069
Less value Ontario iron ore smelted into pig iron	456,176	537,549	317,804	172,391	145,326
Net metallic production	16,754,986	22,928,496	28,161,678	29,102,867	34,799,743
Non-metallic:					
Actinolite	.....	.....	320	.....	.....
Arsenic	40,373	61,039	70,709	74,609	79,297
Brick, common	1,575,875	1,916,147	2,374,287	2,801,971	3,178,250
" paving	61,554	73,700	70,648	86,685	221,986
" pressed	485,819	490,571	458,596	564,630	634,169
Building and crushed stone	530,041	660,000	761,126	892,627	953,839
Carbide of calcium	147,150	151,676	184,323	84,437	120,000
Cement, Portland	2,417,769	2,897,348	3,144,343	3,640,642	3,365,659
Corundum	11,437	140,817	171,994	147,158	233,212
Feldspar	20,300	36,264	47,518	51,610	28,916
Fluorspar	.....	.....	15	200	.....
Graphite	1,600	37,624	55,637	36,492	65,076
Gypsum	20,778	23,604	17,825	32,535	50,246
Iron pyrites	69,980	78,170	98,353	118,457	71,043
Lime	448,596	470,858	474,531	402,340	381,672
Mica	73,586	73,124	85,294	43,058	57,384
Natural gas	988,616	1,188,179	1,491,239	2,186,762	2,268,022
Peat fuel	900	240	1,284	2,830	725
Petroleum (crude)	703,773	559,478	368,153	353,573	344,537
Phosphate of lime	7,048	1,904	.....	240	.....
Pottery	50,310	43,214	51,485	50,500	52,445
Quartz	52,830	75,329	87,424	64,405	179,576
Salt	488,330	389,573	414,978	430,835	450,251
Sewer pipe	344,260	311,830	357,087	410,064	464,627
Tale	3,048	8,700	46,592	47,725	61,358
Tile, drain	338,658	363,550	318,456	349,545	279,579
Total non-metallic production	8,882,631	10,052,879	11,152,217	12,873,930	13,541,869
Add metallic production	16,754,986	22,928,496	28,161,678	29,102,867	34,799,743
Total production	25,637,617	32,981,375	39,313,895	41,976,797	48,341,612

In the Nineteenth Report of the Bureau, page 9, the total production of metals in Ontario was given from the beginning of production to the end of 1909. This table was continued in the Twentieth and Twenty-first Reports, and is here reproduced, so far as values are concerned, with the addition of the figures for 1912. The basis of computing values followed is the one adopted throughout by the Bureau, namely, the selling price in the form and at the point produced.

Table IV.—Total Production of Metals in Ontario

Product.	Value.
	$
Gold	4,734,713
Silver	97,176,289
Platinum and Palladium	290,755
Cobalt	1,072,141
Nickel	41,012,763
Copper	17,239,531
Iron ore	6,724,385
Pig iron	57,246,101
Lead	117,290
Zinc ore	92,410

The footing of the valuation column in the above table is $225,706,378. The only item in which there is any duplication or overlapping is iron ore, a considerable proportion of which was smelted into pig iron, and so included in the latter. Making ample deduction for this, it would appear that up to the end of 1912, the selling value at the mine or works of the metals and metalliferous substances produced in this Province was $220,000,000 at least. If the nickel and copper were valued at the prices of the refined metals in New York, according to the method employed by the Mines Department at Ottawa, the total would be about $290,000,000.

Gold

For the first time in the history of Ontario, there was in 1912 a substantial production of gold. The largest previous yield was in 1899, when a number of stamp mills were operating in the Lake of the Woods and Seine river districts. The output that year amounted to $423,978, but the performance of these fields not proving equal to their promise, the production fell off in 1900 to $297,861. Last year the actual yield of gold within the limits of the Province was 86,603 ounces, worth $1,790,087, or over four times as much as in 1899. To this is added 15,675 ounces, valued at $323,999, recovered at the Orford works of the International Nickel Company, New Jersey, in refining the nickel-copper mattes from the Canadian Copper Company's mines in the Sudbury district. This extraction extended over the six years from 1907 to 1912, but no part of it has hitherto been included in the Bureau's statistics, since no returns of it were made. Though the effect is to swell the figures for the twelve months beyond their strict limits, it seems proper to incorporate this production in the official record at the first opportunity. The total number of ounces stands therefore at 102,278, with a value of $2,114,086.

The feature of the year was the coming into production of the Porcupine camp. The Dome and Hollinger mines both suffered the destruction of their milling plants, then well on their way to completion, by the unprecedented fires of 1911, which were also accompanied by so lamentable a loss of human life. It was not until April and June, respectively, 1912, that the new mills at the Dome and Hollinger were ready to begin work, so that the output for last year by no means represents a full twelve months' operations.

The Hollinger Mine

At the Hollinger mine, the plant went into commission July 1st, with the full complement of thirty stamps, and during the remainder of the year it treated 45,195 tons of ore and rock, from which a recovery was made of $933,682, or an average of $20.33 per ton. Of this, $927,135 was in gold, and $6,547 in silver. The mill and process have proven satisfactory, but after a short time experience led to the abandonment of amalga-

mation in favor of cyanidation of the concentrates. This necessitated no change in the apparatus, the substitution of cyanide of potassium for mercury in the grinding pans being all that was required. At the end of the year, the underground workings amounted to 8,918 feet, distributed as follows:—5,039 feet of drifts, 2,764 feet of crosscuts, 451 of winzes, 232 of raises, and 432 of shafts. There are levels at 100, 200 and 300 feet. The reserves of ore are placed at $10,230,000, of which $7,560,000 is credited to No. 1 vein, and $1,200,000 to No. 2. In computing the reserves, no allowance is made for ore which may exist beyond a depth of 50 feet below the deepest working of any vein. The total operating profits up to 31 December, 1912, were $600,664, and a monthly distribution of dividends at the rate of 3 per cent. per month was begun in November. Three such dividends of $90,000 each were declared before the close of the year.

Operations here and at the Dome and other mines of the Porcupine camp were much interfered with by a strike of the miners, which began early in November, the men refusing to accept a reduction of wages. The strike was unsuccessful, for the companies were able to procure labour enough to operate the mines and mills, though for a time only partially so, and not a little of the help obtained was of an indifferent character.

The Dome mine also operates thirty stamps, and crushed a large tonnage of ore from the date at which work began. The workings of the Dome Company are open cut, and both the quartz and the schist in which it occurs are put through the mill The other mines which turned out bullion at Porcupine in 1912 were the Vipond and McIntyre. In eastern Ontario, the Cordova; in Lake of the Woods, the Olympia; and in Sturgeon lake, the Northern Gold Reef, Limited (St. Anthony) contributed to the output. Of the total production of $2,014,126, Porcupine supplied $1,730,628, and the remainder of the Province, $452,656, including the gold obtained in refining the Canadian Copper Company's mattes during the last six years, as above set forth.

Other mines at Porcupine, such as Jupiter, McEnaney, Pearl Lake, etc., may be expected to become producers ere long, and it is now evident that this camp is destined to make a substantial contribution to the gold output of Canada, and to break the long record of disappointment which so far has been the chief result of gold discoveries in Ontario.

There are other districts where development has been going on with more or less activity for some time, including Larder lake, Swastika, Munro township, Long lake, etc., but none of them have yet reached the stage of permanent production.

A find of more than ordinary interest has been made at Kirkland lake in the township of Teck. On the Tough-Oakes claims, some very rich ore occurs in small stringers. Since the beginning of 1913, several carloads of ore have been taken out by open-cut methods and shipped in bags, the ore realizing $448 per ton. The property is being opened up by Mr. C. A. Foster, of Haileybury, discoverer and first owner of the Foster silver mine at Cobalt.

A New Find in Michipicoten

Towards the close of last season, a discovery of gold was made in township 34, Range 24, Michipicoten. During the fall and winter a number of mining claims were staked out, but no work has yet been done to test their value. The locality of the discovery is about 55 miles southward of White River station on the Canadian Pacific railway, and about 10 miles north of lake Superior. A good canoe route, with only two difficult portages, leads up White river, across Pokay lake, down the Dog river, and over a number of small lakes into lake Michi Biju. The more promising of the two main outcrops is a 3-foot silicified zone cutting a well-mineralized green schist, and ramified by numerous small stringers of quartz. At the discovery post the hanging wall of the zone is exposed to a height of 12 feet above the adjoining small valley. On the wall, the gold occurs in small blebs and scales and again is heavily intermixed with arsenical pyrites, which occurs in patches. A sample of the pyrites was assayed by the Provincial Assayer and showed a high gold content. This sample was taken from the wall only, and covered

but 15 feet of the best material then showing, consequently the result cannot be considered as that of a fair average sample. It is as yet uncertain whether or not the gold-bearing arsenical pyrites is confined to the hanging wall or, what seems more likely, whether it is associated with the numerous small enclosed quartz stringers that follow the trend of the zone.

The other gold-bearing formation occurs a mile farther north. Here, on the edge of a small lake, a quartz vein having a width of at least 20 feet at the discovery post, outcrops prominently for a distance of 200 feet. The only sample taken, from the hanging wall, showed a gold content of $1.20. The quartz looks promising, and it is possible that systematic sampling may prove the vein to be worthy of exploitation.

Owing to the closeness of the freeze-up, nothing in the way of sampling or actual testing of either of the two main outcrops could be undertaken. It is intended to prospect the formations during the coming season. The geological conditions are in general favorable, and resemble those obtaining in other Ontario goldfields. The thick forest growth and the heavy over-burden, however, combine to make prospecting in this but little explored part of the Province difficult, tedious and expensive.

Gold Mining Companies

Following is a list of the gold mining companies in operation during 1912, distinguishing between those which produced bullion and those which did not:—

Name of Company.	Name of Mine	Locality.	P. O. Address of Manager, etc.
Producing Companies:—			
The Dome Mines Company, Limited	Dome	Porcupine	South Porcupine.
Hollinger Gold Mines, Limited	Hollinger	Porcupine	Timmins.
Vipond Porcupine Mines Company, Limited	Vipond	Porcupine	Schumacher.
McIntyre Porcupine Mines, Limited	McIntyre	Porcupine	Schumacher.
Northern Gold Reef, Limited	St. Anthony	Sturgeon Lake	Toronto.
Cordova Mines, Limited	Cordova	Peterboro' county	Cordova Mines.
Olympia Gold Mining Company, Limited	Olympia	Shoal Lake	92 Reaney Street, St. Paul, Minn.
Non-producing Companies:—			
Ore Chimney Mining Company, Limited	Ore Chimney	Frontenac county.	335 Brisbane Bldg., Buffalo, N.Y.
Crown Reserve Mining Company, Limited.	McEnaney	Porcupine	Cobalt.
Canadian Exploration Company, Limited	Long Lake	Long Lake	Naughton.
Lucky Cross Mines of Swastika, Limited.	Lucky Cross	Swastika	Swastika.
The Swastika Mining Company, Limited	Swastika	Swastika	18 Toronto Street, Toronto.
The Gilmour Mining Company, Limited	Gilmour	Hastings county.	Gilmour.
Jupiter Mines, Limited	Jupiter	Porcupine	Schumacher.
Dome Lake Mining and Milling Company, Limited	Dome Lake	Porcupine	Schumacher.
Pearl Lake Gold Mines, Limited	Pearl Lake	Porcupine	Schumacher.
Plenaurum Mines, Limited	Plenaurum	Porcupine	Schumacher.
Goldfields, Limited	Goldfields	Larder Lake	Larder Lake.

Among the non-producing companies, stamp mills were in course of erection about the beginning of 1913 by Crown Reserve, Lucky Cross Swastika, Dome Lake. Canadian Exploration Company and Goldfields, Limited, are already equipped, having made extensive alterations during the year, including the installation of hydraulically generated electric power. The former derives current from the Wahnapitae river, and the latter from the falls at Raven lake.

Silver

The production of silver last year amounted to 30,719,883 ounces, which was 787,997 ounces less than in 1911. Owing to the higher price of silver, however, the value was greater by $1,718,023, or $17,671,918 in all. Cobalt, of course, was the preponderant source of supply, others being the gold obtained from Porcupine and elsewhere, and the nickel-copper mattes of Sudbury. These sources contributed respectively as follows:

	Ounces.	
Cobalt proper	28,859,764	
Gowganda	549,976	
South Lorrain	834,119	
		30,243,859
Gold ores		16,776
Canadian Copper Company's mattes		459,248
Total		30,719,883

The explanation of the last item is similar to that already given regarding the gold obtained from the same material; the quantity mentioned was recovered at the Orford works of the International Nickel Company in New Jersey during the last six years. It has not been included in any of the statistics previously published by the Bureau of Mines for the reason that it was omitted in the returns for the years in question.

From the year 1904 when the first silver was obtained from the mines of Cobalt, the production of the camp has amounted in all to 155,815,839 ounces, the sum received by the mining companies for which was $81,731,115.

The producing mines numbered 30 as against 34 in 1911, those whose output was a million ounces or more being

	Ounces Shipped.
Nipissing	4,719,578
Coniagas	3,703,942
La Rose	2,920,344
Crown Reserve	2,714,766
McKinley-Darragh-Savage	2,704,868
Kerr Lake	1,895,309
Buffalo	1,890,150
Cobalt Townsite	1,505,396
Temiskaming	1,242,243
Cobalt Lake	1,123,146
O'Brien	1,091,631

The other producing mines were Penn-Canadian, Hargrave, Bailey Cobalt, Hudson Bay, Casey-Cobalt, Colonial, General, City of Cobalt, Trethewey, Right of Way, Chambers-Ferland, Beaver, Cobalt Provincial, Drummond, Seneca-Superior, Miller Lake-O'Brien, Mann, Wettlaufer-Lorrain. New-comers on the producing list are Bailey, Seneca-Superior and Mann. The following yielded more or less silver in 1911, but none in 1912: Silver Cliff, Standard Cobalt, Green-Meehan, Belellen, Nancy-Helen, Wyandoh, King Edward. The name of the Cobalt Central mine is now Penn-Canadian, and Seneca-Superior partially takes the place of Peterson Lake, being situated on part of the bed of that lake, or rather of Cart lake which at the time of making the grant was thought to be an extension of the former, instead of a separate body of water.

The producing mines in Gowganda were Miller Lake-O'Brien, Millerett and Mann, and in South Lorrain, Wettlaufer-Lorrain.

Shipments

Shipments of ore and concentrates from Cobalt can no longer be taken as indicating the tonnage raised from the mines, since the tendency towards absolute refinement of the silver on the spot is becoming more marked year by year. For instance, two of the leading mines, Nipissing and Buffalo, are now equipped for reducing their entire output, both of high grade and low grade ore, to merchantable bars, which leave the camp in an express car. In consequence, the quantity of bullion produced at Cobalt is steadily increasing, being 5,080,127 ounces last year as compared with 3,122,976 ounces in 1911. The shipments by freight were smaller than in the previous year, the ore shipped out amounting to 10,719 tons as against 17,278 tons in 1911, and concentrates to 11.214 tons, as against 9,393. The several classes of material sent out of the camp and their silver contents, respectively, were as follows:—

Product.	Quantity. (tons)	Silver. (ounces)
Ore	10,719	15,395,504
Concentrates	11,214	9,768,228
Bullion	....	5,080,127
Total	21,933	30,243,859

The above figures refer, of course, to the output of the mines of Cobalt and subsidiary fields only, and the difference between the total silver contents of the shipments and the production of the Province given in Table I is due to the inclusion in the latter of the silver extracted from gold ores and nickel-copper mattes.

Ore Concentration

In all, 456,167 tons of ore were put through the concentrating plants, of which 101,338 tons were treated at the several custom concentrators now working in the camp, namely, those of the Nipissing Reduction Company, the Dominion Reduction Company, and the Northern Concentrators, Limited. The remainder, 354,829 tons, were manipulated by the mining companies in their own plants. The average ratio of cocentration works out therefore at 39 tons of ore to one ton of concentrates. The silver contents of the concentrates were 9,768,228 ounces, an average of 871 ounces per ton. The quantity of ore or rock subjected to concentration being 456,167 tons, the recovery was at the rate of 21.4 ounces per ton. Assuming that 85 per cent. of the original silver was contained in the concentrates, the silver contents of the concentrating material as it went into the mill would be 25.1 ounces per ton. These results correspond closely with those obtained in 1911, when the concentrates carried 858 ounces per ton, the silver recovered averaging 21.6 ounces per ton, and the concentrating ore 25.4 ounces per ton.

Four refineries were in operation in Ontario on ore and concentrates from Cobalt last year, namely, those of the Canadian Copper Company, at Copper Cliff, the Coniagas Reduction Company, at Thorold, the Deloro Mining and Reduction Company, at Deloro, and the Canadian Refining and Smelting Company at Orillia. Of these, the one at Copper Cliff worked for part of the year only, and is still idle, while the Orillia works have since been burned down. The total quantity of ore and concentrates treated at these establishments was 8,111 tons, which yielded 15,675,218 ounces of silver. Bullion produced at Cobalt itself amounted to 5,080,127 ounces, so that not less than 67.5 per cent. of the total silver yield of the mines was refined in the Province, as compared with 66 per cent. in 1911.

The Dominion Refineries, Limited, have established a plant at North Bay, for the treatment of Cobalt ores low in silver. A new refinery is being built at Kingston, by the Buffalo and Ontario Smelting and Refining Company, Limited. The Metals Chemical Company, Limited, have also erected a plant for the production of cobalt and nickel oxides at Welland.

A summary of the operations of the silver refineries of Ontario for 1911 and 1912, so far as silver is concerned, is as follows, the by-products being dealt with under their respective headings:—

	1911.	1912.
Silver refineries in operation	4	4
Silver-cobalt ore received, tons	9,142	8,274
Silver-cobalt ore treated, tons	9,330	8,096
Silver recovered, fine ounces	17,756,651	15,675,218
Value of ditto	$9,248,829	$9,094,156

Markets and Prices

There was a good demand for the silver-cobalt ores during the year. The refining companies in Ontario have, through their efforts to keep their plants supplied, no doubt assisted in maintaining the prices of ore, but in view of the diminution in their number, and the fact that one of them, the Coniagas Reduction Company, is now sufficiently occupied with ore from the Coniagas mine, their influence in this direction is likely for the time being to be less than in the past. New Jersey, Pennsylvania and Colorado smelting works took most of the ore that went to the United States, much of it low grade, but being silicious, it is found highly useful for mixing with basic material.

Prices of silver are fixed by influences which find their stage largely in the Orient. The requirements for coinage and the arts in the commercial and manufacturing nations of America and Europe absorb considerable quantities, but production continues at a rate which would inevitably depress the price of silver to lower levels were it not for

the capacity which India and China have, almost from time immemorial, shown to buy a large share of the world's output. Thus in 1912 the production of silver is estimated to have been 229,569,903 fine ounces,* worth at the average price for the year in New York, say, $139,658,850. The imports of India during the year amounted in value to $59,975,802, and of China, to $20,971,423, or together to $80,947,225, a good deal more than one-half the entire output for the year. The explanation of the movement of silver to these countries is two-fold—the medium of exchange is silver, and in India the habit of generations has been, and still is, to use silver in the form of bars, personal ornaments, objects of art, etc., as a means of hoarding the savings of the people. The preliminary market is London, whose control of trade with the East remains unshaken, and to which all the silver mines of the world send their bars of silver, whose size, dimensions and weight are determined by the preferences of the silversmiths of the Indian bazaars. The intercourse between the Pacific coast of the United States and China has led, of late years, to the export of a certain amount of silver to that country from San Francisco. This export last year was in value $11,503,620, as against $9,234,000 in 1911.

The actual price throughout the year was much higher than in 1911, the average for fine silver in New York being 60.835 cents per ounce, as against 53.304 cents in 1911. The market steadily advanced from the beginning of the year, and recessions were few and slight. The year closed with silver at 63.365 cents as the average for December. The settlement of the new Republican Government in control of China, and the anticipated reforms in the currency system of that country with their accompaniment of large loans and heavy purchases of silver, the requirements of the Indian Government for coinage purposes which were met by the purchase of £6,000,000 worth of silver in London, and favorable monsoon rains in India, all tended to raise prices, which even the outbreak of the Balkan war in October did not materially check.

The increase in the price of silver over 1911, say 7.531 cents per ounce, applied to the production for the year, meant $2,313,514 additional return to the mining companies of Cobalt.

It may be remarked in connection with the causes which affect the prices of silver that the preference for silver for hoarding purposes which has for so long a time characterized the people of India, seems now to be yielding to a liking for gold. Gold bars, to the value of $39,482,640, were imported into India during 1912, as against $37,699,020 in 1911. How much of this went into the banks for coinage reserve purposes, and how much into the pockets of the people, there are no certain means of determining, but it seems probable that a larger proportion of the savings of the peasants of India are now being invested in gold than formerly, and that the incidence of this tendency will have some effect upon silver prices in the future.

Table No. V. which follows shows the total output of silver from the mines of Cobalt since they were opened in 1904:—

Table V.—Silver Production, Cobalt Mines, 1904 to 1912

Year.	Producing Mines.	Shipments.			Silver Contents.			Av'ge Silver Contents per Ton.		Value of Silver Shipments.			Total Value.
		Ore.	Concentrates	Bullion.	Ore.	Concentrates.	Bullion.	Ore.	Concentrates.	Ore.	Concentrates.	Bullion.	
	No.	Tons.	Tons.	oz.	oz.	oz.	oz.	oz.	oz.	$	$	$	$
1904	4	158	.....	.....	206,875	.....	.....	1,309	.....	111,887	.....	.....	111,887
1905	16	2,144	.....	.....	2,451,356	.....	.....	1,143	.....	1,360,503	.....	.....	1,360,503
1906	17	5,335	.....	.....	5,401,766	.....	.....	1,013	.....	3,667,551	.....	.....	3,667,551
1907	28	14,788	.....	.....	10,023,311	.....	.....	677	.....	6,155,391	.....	.....	6,155,391
1908	30	24,487	1,137	.....	18,022,480	1,415,395	.....	736	1,244	8,468,293	665,085	.....	9,133,378
1909	31	27,729	2,948	.....	22,436,355	3,461,470	.....	809	1,174	10,809,872	1,651,701	.....	12,461,576
1910	41	27,437	6,845	980,633	22,581,714	7,082,834	980,633	821	1,030	11,360,489	3,590,098	527,460	15,478,047
1911	34	17,278	9,375	3,132,976	20,318,626	8,056,189	3,132,976	1,176	858	10,250,991	4,017,241	1,685,615	15,953,847
1912	30	10,719	11,214	5,080,127	15,395,504	9,768,228	5,080,127	1,436	871	8,766,871	5,556,919	3,085,145	17,408,935
Tl..	..	130,075	31,519	9,193,736	116,837,987	29,784,116	9,193,736	898	945	69,951,848	15,481,047	5,298,220	81,731,115

* Eng. and Mg. Jour., New York, 11th January, 1913.

The Subsidiary Constituents

The other constituents of the Cobalt silver ores made use of industrially are cobalt, nickel and arsenic. For some time past these elements have not been of interest to the mine owners, since they add nothing to the value of their ore, and for this reason it is impossible to procure exact figures showing the quantities produced. The ores are not assayed for nickel or cobalt or arsenic, and it is undoubtedly the case that only a percentage of these substances ever reaches the market in the finished form or in a condition to be made use of industrially. All three constituents are recovered by the Canadian refiners, who treat the ores from Cobalt without admixture of other kinds of ore, and who produce white arsenic, cobalt oxide, nickel oxide, and also a mixture of the oxides of cobalt and nickel which they ship without final separation principally to English and European manufacturers of cobalt oxide. In the case of refineries situated in the United States, the ores from Cobalt are mixed in the smelting charge with ores of lead and copper, etc.; and little or no attempt is made to save the arsenic, nickel or cobalt. Table VI, which is subjoined, gives the total production of silver, nickel, cobalt, and arsenic from the mines of Cobalt from the beginning. The assumption is made that the ores and concentrates as shipped contain 1.47 per cent. nickel, 3.20 per cent. cobalt and 14.28 per cent. arsenic, but the values attached to the several substances are those which have been obtained by the refiners on the sale of the products as marketed.

Table VI.—Total Production, Cobalt Mines, 1904 to 1912

Year.	Nickel.		Cobalt.		Arsenic.		Silver.		Total Value.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Ounces.	Value.	
		$		$		$		$	$
1904....	14	3,467	16	19,960	72	903	206,875	111,887	136,217
1905....	75	10,000	118	100,000	549	2,693	2,451,356	1,360,503	1,473,196
1906....	160	.....	321	80,704	1,440	15,858	5,401,766	3,667,551	3,764,113
1907....	370	1,174	739	104,426	2,958	40,104	10,023,311	6,155,391	6,301,095
1908....	612	.....	1,224	111,118	3,672	40,373	19,437,875	9,133,378	9,284,869
1909....	766	.....	1,533	94,965	4,294	61,039	25,897,825	12,461,576	12,617,580
1910....	504	.....	1,098	54,699	4,897	70,709	30,645,181	15,478,047	15,603,455
1911....	392	.....	852	170,890	3,806	74,609	31,507,791	15,953,847	16,199,346
1912....	429	14,220	934	314,381	4,166	80,546	30,243,859	17,408,935	17,818,082
Total.	3,322	28,861	6,835	1,051,143	25,854	386,834	155,815,839	81,731,115	83,197,953

Health and Labour

So far as epidemic diseases are concerned, health conditions were satisfactory during the year at Cobalt. There was an almost complete absence of typhoid, which indeed has not been prevalent in the district since 1909.

As regards labour, the relations between employers and employed have on the whole been tolerably good. The Cobalt miners took no action when their fellow-workmen at Porcupine went out in November, but the question of an eight-hour working day has been the subject of considerable discussion. In several of the leading mines nine hours from bank to bank had for some time constituted a day's labour, and in February, 1913, the mining companies voluntarily made this general.

It will be remembered that a measure to restrict the working hours to eight in every twenty-four for underground employees was introduced into the Legislature by the Government in the session of 1912, but was subsequently withdrawn in order to admit of a fuller investigation of all the conditions not only at Cobalt, but in the other mining districts of the Province. Mr. S. Price, late Mining Commissioner, was appointed to make the investigation, and he reported in favor of an eight-hour day from face to

face. An Act was passed in the session of 1913 limiting the hours of underground labour accordingly, and fixing the first day of January, 1914, as the time for the change to take effect.

The wage scale at one of the leading mines at Cobalt is as follows per day of nine hours:—

Surface.—Surface boss $3.75, carpenters $3.25, do. helpers $2.25, mechanics $3.25, pipe-fitters $3.00, head blacksmith $3.75, blacksmiths $3.25, do. helpers $2.75, engineers $3.60, firemen $3.00, head ore-sorter $2.75, ore-sorters or cobbers $2.50, hand-miners $2.75, teamsters $2.50, hoistmen $2.75, cage or bucket-tenders $2.50, other surface labour $2.25.

Underground.—Timbermen $3.25, machinemen $3.25, ditto helpers $2.75, cage or bucket-tenders $2.50, other underground labour $2.50.

The foregoing scale is about 25 cents per day less than the rates paid at Porcupine at the present time. Much of the labour is non-English-speaking and inexperienced. Skilled miners are in good demand.

Profits and Dividends

The high price of silver made the year 1912 a good one for shareholders in the producing companies, and the sum distributed in dividends was large, being $9,324,049.24, or $590,091.08 more than in 1911. The total amount paid out as dividends and bonuses since the inception of the camp up to the end of 1912 was $39,834,740.54, not including the profits made by private owners, which would increase it by nearly five million dollars more.

Table VII, printed on page 18, gives a statement of the dividends paid by the silver-mining companies of Cobalt, and also other particulars, such as the date of incorporation, amount of capital, etc.

Table VII—Dividends and Bonuses Paid and Declared by Silver-Cobalt Mining Companies to December 31st, 1912.

Name of Company.	Date of Incorporation.	Authorized Capital.	Capital Stock issued.	Par value per share.	Amount of Dividends and Bonuses declared to end of 1911.	Amount of Dividends and Bonuses declared during 1912.	Total of Dividends and Bonuses declared to Dec. 31, 1912.	Last Dividend or Bonus.	
								Date declared.	Rate per cent.
		$	$	$	$ c.	$ c.	$ c.		
Beaver Consolidated Mines, Limited	Mar. 5, 1907	2,000,000	2,000,000	1.00	170,000 00	180,000 00	350,000 00	Dec. 21, 1912	3
Buffalo Mines, Limited	April 27, 1906	1,000,000	1,000,000	1.00	1,377,000 00	500,000 00	1,877,000 00	Dec. 4, 1912	26
City of Cobalt Mining Company, Limited	Oct. 5, 1906 Jan. 7, 1909	500,000 1,500,000	1,500,000	1.00	139,312 42		139,312 42	April 15, 1909	3
Cobalt Central Mines Company	Dec. 13, 1906	5,000,000	5,000,000	1.00	192,815 00		192,815 00	Aug. 25, 1909	1
Cobalt Lake Mining Company, Limited	Dec. 22, 1906	(a)1,070,834	3,929,166	1.00		75,000 00	75,000 00	Nov. 26, 1912	2½
Cobalt Silver Queen, Limited	April 1, 1906	1,500,000	1,500,000	1.00	315,000 00		315,000 00	Dec. 31, 1908	3
Cobalt Townsite Mining Co., Limited	May 6, 1906	100,000	15,011	1.00	125,000 00	316,000 00	471,000 00	Nov. 1912	324
Coniagas Mines, Limited	Nov. 24, 1906	4,000,000	4,000,000	5.00	2,840,000 00	1,140,000 00	4,280,000 00	Oct. 14, 1912	9
Crown Reserve Mining Company, Limited	Jan. 16, 1907	2,000,000	1,999,957	1.00	3,711,509 40	1,061,288 40	4,775,797 80	Dec. 15, 1912	5
Foster Cobalt Mining Company, Limited	Feb. 14, 1906	1,000,000	915,588	1.00	45,000 00		45,000 00	Jan. 1, 1907	5
Kerr Lake Mining Company, Limited	Aug. 9, 1905	(b) 40,000	10,000	100.00	3,940,000 00	670,000 00	4,610,000 00	Oct. 8, 1912	350
La Rose Mines, Limited	Feb. 21, 1907	(c)6,000,000	6,000,000	5.00	2,672,000 00	1,000,546 84	3,672,546 84	Dec. 16, 1912	6¼
McKinley-Darragh-Savage Mines of Cobalt, Limited	April 9, 1906	2,500,000	2,247,692	1.00	2,156,791 38	1,123,846 00	3,280,637 38	Nov. 4, 1912	20
Nipissing Mining Company, Limited	Dec. 16, 1904	(d) 250,000	250,000	100.00	8,325,797 25	1,842,500 00	10,168,297 25	Dec. 9, 1912	181
Right of Way Mining Company, Limited	July 13, 1906	500,000	500,000	1.00	321,643 93		321,643 93		
The Right of Way Mines, Limited	Sept. 11, 1909	2,000,000	1,685,500	1.00	202,260 00		202,260 00	Dec. 2, 1911	2
Temiskaming and Hudson Bay Mining Company, Limited	July 29, 1903	25,000	7,761	1.00	1,521,156 00	209,547 00	1,730,703 00		300
The Hudson Bay Mines, Limited	July 16, 1909	3,500,000	3,200,050	5.00	394,903 42	192,003 00	586,906 42	Sept. 20, 1912	3
Temiskaming Mining Company, Limited	Nov. 16, 1906 Jan. 1, 1908.	2,500,000	2,500,000	1.00	1,009,156 00	300,000 00	1,309,156 00	Dec. 31, 1912	3
Trethewey Silver Cobalt Mine, Limited	May 30, 1906 June 1, 1911	1,000,000 2,000,000	1,000,000	1.00	761,998 50	100,000 00	861,998 50	June 1, 1912	10
Wettlaufer-Lorrain Silver Mines, Limited	Nov. 30, 1908	1,500,000	1,116,590	1.00	283,318 00	283,318 00	566,636 00	Nov. 25, 1912	5
Total					30,510,691 30	9,324,049 24	39,834,740 54		

(a) Reduced by shares purchased for cancellation from $5,000,000.
(b) Kerr Lake Mining Company, incorporated under the laws of the State of New York, capital $3,000,000.
(c) La Rose Consolidated Mines Company, incorporated under the laws of the State of Maine, capital $7,500,000.
(d) Nipissing Mines Company, incorporated under the laws of the State of Maine, capital $6,000,000.

For the information of the general public, a summary is given of the printed reports of several of the principal mining companies of Cobalt for the calendar year 1912, or the latest company year, as the case may be. The reports summarized are those of the Nipissing, Coniagas, La Rose, Crown Reserve, McKinley-Darragh-Savage, and Kerr Lake companies.

Nipissing

For the year 1912 there was produced and shipped from the Nipissing mine 4,719,578 ounces of silver, as follows:—

	Dry Tons.	Gross ounces Silver.
High grade ore	121.5635	325,246.92
Low grade ore	1,414.4910	330,990.97
Concentrates	180.6080	153,373.21
Silver Bullion	134.2005	3,909,967.11
Total	1,850.8630	4,719,578.21

The gross value of the silver shipped was $2,892,581.42, and the net value $2,827,-299.58. General operation of the mine cost $566,532.82, of which the leading items were: Development and exploration $268,906.08, stoping $83,548.52, insurance and taxes $75,438.39, general and legal expenses $28,110.01, administration and office $24,145.80, boarding-house and camp maintenance $22,974.56. The cost of operating the high grade mill was $99,271.79 and of the low grade mill $30,917.42. Depreciation is estimated at $52,418.14, custom milling cost $41,068.71, marketing product $61,577.03, and corporation, New York office and travelling expenses $13,869.03. Deducing rents and interest $50,374.99, the total expense accounted for $815,279.95, leaving the profits for the year $2,081,710.15. Dividends amounted to $1,842,366.76. The aggregate production of silver from the Nipissing veins to 31st December, 1912, was 27,741,248.32 ounces, and the total sum paid in dividends $10,168,297.25.

The mill for the treatment of the high grade ore ran successfully throughout the year, and treated 1,752 tons of Nipissing ore, averaging 2,212 ounces per ton, also 90 tons of custom ore. The total bullion shipped, including that produced from ore bought, was 4,258,641 ounces. A cyanide plant for treating low grade ore was completed in 1912, and came into full operation after 1st January, 1913; cost $254,839.52. This mill has a capacity of 200 tons per day, and there are 185,000 tons of mill rock, assaying between 20 and 30 ounces per ton, on the dumps and blocked out underground, which alone will keep it going for two and a half years. The management expects the mill to earn enough out of the low grade rock to pay for itself in six months.

Surface prospecting was carried on by the hydraulic plant installed in 1911. During the year 33.2 acres of ground were cleared of soil, the average depth of which was 4.75 feet. The area cleared had been carefully trenched in previous years, but a great many additional small veins and stringers were exposed by the hydraulic operation. The price received for silver averaged 61.457 cents per ounce; the cost of production was 17.39 cents; net profit 44.067 cents. Ore reserves are figured at 9,643,338 ounces. By means of its treatment plants for high grade and low grade ore, the Nipissing Company has been put in a position henceforward to ship practically all its silver as fine bullion.

Coniagas

The Coniagas report is for the year ending 31st October, 1912. It shows that 650 tons of mine ore containing 1,944,213 ounces of silver and 1,287.5 tons of concentrates containing 1,564,164 ounces, or a total shipment of 1,937.5 tons with contents amounting to 3,508,377 ounces silver were forwarded to the Coniagas Reduction works at Thorold. The total quantity of silver paid for or credited to the mining company was 3,309,724

ounces. The total receipts were $2,172,966.54, of which $2,135,621.89 was revenue from ore, $16,679.61 camp revenue, $17,666.38 interest, and $2,954.75 rent. The principal items of working expenses were: Mining $147,682.25, Sale of Ore $155,971.73, Milling $48,300.68, Taxes and Royalties $44,601.49, Camp Expense $17,872.85, Mines Office and Supervision $17,967.64, Head Office and Administration $16,626.32, Employees' Bonus $4,359.61, etc.—a total of $471,412.84—leaving a credit at Loss and Gain of $1,701,553.70. Out of this $1,440,000 was paid in dividends and bonuses, and the balance carried forward to the next year was $1,124,867.11. The total tonnage of ore milled was 53,627, an average of 2.86 tons per stamp for 24 hours. Of the concentrates shipped 803.3 tons were high grade and 484.2 tons low grade slimes. Development of new ore bodies during the year exceeded the shipments by 1,400,000 ounces. Reserves of ore at 31st October, 1912, were estimated at 17,441,800 ounces, of which 13,440,000 ounces were in high grade ore carrying 3,000 ounces per ton. Allowing 20 per cent. for possible over-estimation, the net reserves were placed at 13,953,000 ounces. The total shipments from the opening of the mine were 9,298.1 tons containing 14,090,505 ounces of silver. The Coniagas Mines Limited is capitalized at $4,000,000, and up to the end of 1912 had paid out in dividends a total of $4,280,000. The cost of producing silver, including all charges from mining to marketing, amount to 12.96 cents per ounce.

La Rose

La Rose Consolidated Mines Company is capitalized at $7,500,000. It owns the La Rose, Lawson, Princess and University mines, also La Rose Extension, Violet and Fisher-Eplett prospects. The production is from the three first-named. Ore and concentrates obtained in 1912 carried a total of 2,816,597 ounces of which 2,290,344 ounces were marketed, having a value of $1,644,836. Shipments comprised:

	Tons.	Ounces Silver.
Silver-cobalt-nickel ore	1,653.435	2,161,481.84
Low grade silicious ore	611.054	122,227.62
Nuggets	5.327	125,351.80
Concentrates	1,207.898	511,282.69
Total	3,477.714	2,290,343.95

Net receipts from ore sales were $1,603,969.50, and total cost of production was $730,-351.17. Mine operation cost $495,373.71, concentration $102,072.49, marketing ore $165,424.45, depreciation $13,134.04, corporation and travelling expenses $3,830.75. Rents, interest and discounts brought in $49,484.27. Dividends paid during the year amounted to $936,641.86. There was a combined surplus of the holding and operating companies at the end of the year amounting to $1,578,592.11, which, the directors state, is being held for the acquisition of other mining enterprises when proper occasion presents itself. La Rose mine produced more silver than either the Lawson or the Princess, but the difference was smaller than in former years. The ore taken from La Rose came mostly from No. 1 vein, which has been worked out below the first level, the estimated quantity of silver remaining above that level being placed at 435,068 ounces. The great fault which traverses La Rose and the adjoining properties to the south was explored at depth. A strong vein of calcite, in places three feet wide, lies along the fault and was cut at the 380-foot level; it carries some silver throughout, but has as yet developed no high grade ore. The Lawson yielded 732,000 ounces during the year, and the Princess 744,000. Reserves of ore are estimated as follows: La Rose, 1,766,860 ounces, Lawson 148,800, Princess 880,990, total 2,796,650 ounces. The aggregate of dividends paid, including profits to owners previous to 31 May, 1908, is placed at $4,877,409.56 which includes the dividend paid 20 January, 1913.

Crown Reserve

The Crown Reserve Mining Company, Limited, is capitalized at $2,000,000. Its mine is situated on the bed of Kerr lake, where its holdings comprise 23 acres. Silver produced and shipped in 1912 amounted to 2,714,766 ounces, the gross value of which was $1,692,060.76. The mining cost was $311,836.90, consisting of Development $103,482.34, Freight, Treatment and Smelter Deductions $53,869.18, Ore Handling $32,468.43, Power and Light $25,428.10, Depreciation building plant and equipment $23,860.65, Maintenance of building plant and equipment, $19,421.21, General Expenses $20,227.50, Head Office Expenses $19,729.02, Superintendence and Travelling $13,350.47. Milling charges were $68,976.06, making the total cost of ore $380,812.96. The average price received for silver was 62.38 cents per ounce; total cost of silver 14.027 cents per ounce. The profit for the year was $1,311,247.80, out of which was paid in dividends $1,061,288.40, and in royalties to the Government of the Province $147,910.03. Under the terms of purchase from the Crown, the latter is entitled to 10 per cent. of the value of the ore at the pit's mouth. Total shipments from the mine to the end of 1912 were 8,057.4 tons of ore and concentrates, containing 15,227,143 gross ounces of silver, the value of which was $8,273,908.53, and net value $7,773,482.26. The aggregate cost to the same date was $1,687,836.43, the average price per ounce received for silver 54.336 cents, the average cost per ounce 11.084 cents, and the average profit per ounce 43.252 cents. Total dividends paid were $4,775,797.80, and total royalties $727,050.58. No estimate of ore reserves is given, but the intention of the management is stated to be to drain off the waters of Kerr lake, which would make all the ore above the 100-foot level available and open up the remainder of the property for exploration. This company is developing the McEnaney gold mine at Porcupine.

McKinley-Darragh Savage

The recovery of silver for the year was 2,717,383 ounces—2,089,593 from the McKinley mine and 627,790 from the Savage—and the shipments 2,704,868 ounces. The average price received per ounce was 61.66 cents, and the total cost 18.59 cents, leaving a profit of 43.07 cents per ounce. Reserves of ore are estimated to contain 5,368,500 ounces, of which 4,133,500 ounces are ascribed to the McKinley, and 1,235,000 ounces to the Savage. The gross tonnage of ore and rock removed from the McKinley mine was 66,332 tons, and from the Savage 32,794 tons, a total of 99,126 tons. There was milled from the McKinley 52,482 tons and from the Savage 17,888 tons, a total of 70,370 tons. Cost of production, including depreciation, amounted to $358,721.13. Sales of silver, less cost of marketing, yielded $1,466,173.52, and there was ore on hand worth $86,596.29; the total value of ore produced therefore was $1,552,769.81. Adding interest $12,095.36, and deducting administration, taxes, insurance and stock and divdend expenses, in all $52,-295.14, a net profit was left for the year of $1,153,848.90. Out of this three dividends were paid amounting to $674,307.60, and a further distribution was ordered for 1st January, 1913, of $449,538.40, making a total payment to shareholders on the business of the year of $1,123,846. There have been taken from the property up to 31 December, 1912, an aggregate of 10,770,176 ounces of silver.

Kerr Lake

During the twelve months ending 31 August, 1912, Kerr Lake mine yielded 1,855,495 ounces of silver. Of this 1,741,804 ounces were from shipping ore, and 113,691 ounces from low grade ores milled at the Nova Scotia and Dominion reduction works. Cost of production and development was $224,466.99, shipment, treatment and other charges $38,685.34, administration and general expenses $12,089.34, total $275,241.67. Proceeds of ore sales were $1,034,881.35, and interest $9,536.17, total receipts $1,044,417.52, the balance $769,175.85 being the profit for the year. Dividends amounting to $690,000 were paid, making the total distribution to shareholders $4,020,000. The cost of producing silver was 18.30 cents per ounce. During the previous year it was 14.69 cents, the increase being attributed principally to the greater amount of development work per

ton of ore mined, and the larger proportion of lower grade product shipped. The ore reserves are estimated to contain 6,660,091 ounces of silver. About 2,781,400 ounces of these reserves are under the waters of Kerr lake, and will no doubt be made accessible should the lake be drained, as is proposed. The output from the mine for the year ending 31 August, 1911, was 2,269,680 ounces, and President J. A. Lewisohn speaks of the future of the property as follows: "While it was thought wise, in order to conserve the resources of the company, to reduce production, yet we believe, from data on hand, that the ore reserves are sufficient to last for one or two years at the present rate of production."

Below is given a list of the mines producing silver in 1912, with the post office address of the manager or other officer in charge of the property. The order of arrangement is alphabetical:

Silver Producing Companies

Name of Company or Owner.	Name of Mine	Locality.	P. O. Address of Manager, etc.
Bailey Cobalt Mines, Limited	Bailey	Cobalt	Giroux Lake.
Beaver Consolidated Mines, Limited	Beaver	Cobalt	Cobalt.
Buffalo Mines, Limited, The	Buffalo	Cobalt	Cobalt.
Casey Cobalt Silver Mining Company, Limited	Casey-Cobalt	Casey Township	New Liskeard.
Chambers-Ferland Mining Company, Limited	Chambers-Ferland	Cobalt	Cobalt.
City of Cobalt Mining Company Limited	City of Cobalt	Cobalt	Cobalt.
Cobalt Lake Mining Company, Limited	Cobalt Lake	Cobalt	Cobalt.
Cobalt Provincial Mining Company, Limited	Provincial	Cobalt	Cobalt.
Cobalt Townsite Mining Company, Limited	Townsite	Cobalt	Cobalt.
Colonial Mining Company, Limited	Colonial	Cobalt	Cobalt.
Coniagas Mines, Limited, The	Coniagas	Cobalt	Cobalt.
Crown Reserve Mining Company, Limited.	Crown Reserve	Cobalt	Cobalt.
Drummond Mines, Limited	Drummond	Cobalt	Cobalt.
Hargrave Silver Mines, Limited	Hargrave	Cobalt	Cobalt.
Hudson Bay Mines, Limited	Hudson Bay	Cobalt	Cobalt.
Kerr Lake Mining Co., Limited	Kerr Lake	Cobalt	Cobalt.
La Rose Mines, Limited	La Rose, Lawson, Princess, etc.	Cobalt	Cobalt.
McKinley Darragh-Savage Mines of Cobalt, Limited	McKinley-Darragh, and Savage	Cobalt	Cobalt.
Millerett Silver Mining Company, Limited.	Millerett	Gowganda	Gowganda.
Nipissing Mining Company, Limited	Nipissing	Cobalt	Cobalt.
O'Brien, M. J.	O'Brien	Cobalt	Cobalt.
O'Brien, M. J.	Miller Lake-O'Brien	Gowganda	Gowganda.
Penn-Canadian Mines, Limited	Penn-Canadian	Cobalt	Cobalt.
Right-of-Way Mines, Limited	Right-of-Way	Cobalt	Cobalt.
Ryckman, E. B.	Mann	Gowganda	Gowganda.
Seneca-Superior Silver Mines, Limited	Seneca-Superior	Cobalt	Cobalt.
Temiskaming Mining Company, Limited.	Temiskaming	Cobalt	Cobalt.
Trethewey Silver Cobalt Mines, Limited.	Trethewey	Cobalt	Cobalt.
Wettlaufer Lorrain Silver Mines, Limited.	Wettlaufer	South Lorrain	Silver Centre.

Cobalt

The opening of the silver mines of the Cobalt district has changed the course of the world's trade in cobalt. The chief use of cobalt is as a coloring material in the manufacture of fine chinaware, and the largest users are the great porcelain makers of Germany, France, and England. For this purpose it is employed in the form of cobalt oxide, CoO, the theoretical composition of which is 78.66 per cent. by weight of cobalt, and 21.34 per cent. of oxygen. Commercially, however, the proportion of cobalt is considerably lower. The commoner form is black oxide, which contains from 68 to 71 per cent. of cobalt; some manufacturers prefer the gray oxide, which may contain 73, 74, or even 75 per cent. of cobalt. A small percentage of nickel, or of the other constituents of the original ore, is not considered deleterious.

The Market for Cobalt

Formerly, about 250 tons of cobalt oxide was sufficient to meet the annual requirements of the trade, and until the discoveries at Cobalt, the chief source of supply was New Caledonia, an island possession of France, in the South Pacific Ocean. It has sold

as high as $4.00 per pound, but at the time of the opening of the Cobalt mines, the price was about $2.50 per pound. Primarily, of course, the Ontario mines are worked for silver, but the ore contains much cobalt, and in the process of recovering the silver, the cobalt must be dealt with. Refiners of the ores from the Cobalt mines had perforce therefore to grapple with the problem of obtaining a commercial product, and this in the face of a rapid and severe fall in the value of cobalt oxide, brought about by the over-supply of ore from the Cobalt mines. The usual difficulties were encountered accompanying the effort to wrest a well-established trade from its customary channels, which were not lessened by the complex and refractory nature of the raw material. These difficulties, however, have been surmounted, and at the present time, cobalt oxide from the mines of Cobalt is supplying the larger part of the world's need of this article, New Caledonia having temporarily, at any rate, ceased production.

As a natural result of the lowering of the price, which is now about three shillings a pound, the consumption of cobalt oxide has materially increased. It is being used more largely than before in the ceramic trade, and in the manufacture of the commoner and cheaper varieties of ware, not only for actual coloring purposes, but to correct the yellowish tone of the goods and to impart to the white a clearer hue. It seems likely, too, that in the manufacture of certain alloys, metallic cobalt will yet find a large outlet. Particulars were given in a previous Report of the experiments by Mr. Elwood Haynes, of Kokomo, Indiana, in perfecting an alloy of cobalt and chromium named by him, "stellite," which exhibited qualities promising much usefulness in the manufacture of cutlery, cutting tools for lathes, etc. Certain German steelmakers have also placed orders for considerable quantities of oxide, presumably for use in articles of their own manufacture. In so far, however, as the employment of cobalt is founded upon qualities which it possesses in common with its sister metal, nickel, it would seem that its use must be restricted by its higher price.

There is but a small market for cobalt oxide on the continent of America, possibly not more than fifty tons annually, and the export by the Ontario refiners is to England, France and Germany. A considerable quantity of the oxide is exported in the form of the finished article ready for use, and much more as cobalt oxide mixed with nickel oxide, which the English and European manufacturers refine, separating the cobalt from the nickel. The former oxide is then sold by the manufacturers under their own brands.

Bounties on Cobalt Oxide

Under the terms of the Metal Refining Bounty Act, 7 Edward VII., chapter 14, a bounty of six cents per pound is paid on the metallic cobalt contents of cobalt oxide made in the Province. The term for this bounty provided in the original Act was five years, from 10th April, 1907, but in the session of 1912, the Legislature extended the term for another period of five years, which will expire on 10th April, 1917. The following sums were earned by refineries in the Province under the terms of this Act in 1912:—

Name of Company.	Location.	Cobalt Oxide produced	Metallic Cobalt contents	Bounty
		lb.	lb.	$
Deloro Mining and Reduction Co., Limited.	Deloro.....	24,224	16,634.62	998.07
Coniagas Reduction Co., Limited	Thorold	202,325	143,306.79	8,958.40
Dominion Refineries, Limited	North Bay..	1,550	1,043.31	62.59
Total.....		228,099	160,984.72	10,019.06

Provision is also made in the Metal Refining Bounty Act for bounties on refined nickel, nickel oxide, copper, and arsenic made from mispickel ores not carrying cobalt. With the exception of nickel oxide, no claims have yet been presented for bounty on any of the other products mentioned in the Act.

A considerable quantity of cobalt in the form of "crude cobalt material," otherwise residues, was exported by the Canadian Copper Company and the Canadian Refining and Smelting Company, at whose plants the process was not carried to the point of producing the oxide.

It is doubtful whether the demand for cobalt oxide, even with such additional outlets as have yet been provided, will prove sufficient to absorb the entire cobalt product of the mines saved in treating the ore. In various quarters there are on hand accumulations of cobalt-containing material, and these will necessarily be added to by the operation of those plants in the cobalt field itself where nothing save bar silver is now being turned out. There are silver-free veins of cobalt ore now unworked, and from these and in the course of mining operations generally, much larger supplies of cobalt ore could be obtained were it required, and were a stimulus applied in the way of a price per pound for the cobalt contents. As it is at present, the mine-owner receives nothing for the cobalt his ores may contain.

Nickel

There are now three sources of nickel supply in Ontario:—(1) The mines of the Sudbury district, (2) the Alexo mine in Dundonald township, (3) the ores of the Cobalt silver camp. The last-named is of little commercial moment; the second is significant as indicating the possibility of nickel in quantity being found outside of the recognized area; while the first is the chief source, and one rapidly growing in output and importance.

There were raised from the mines of Sudbury in 1912, 735,656 tons of ore and from the Alexo mine (treated at the Mond Company's works) 1,792 tons, or 737,656 tons in all. The ore was taken from the following deposits:—

	Tons.	Tons.
Canadian Copper Company:		
Creighton mine	518,417	
Crean Hill mine	33,507	
No. 2 mine	66,372	
		618,296
Mond Nickel Company:		
Victoria No. 1 mine	34,287	
Garson mine	83,281	
Alexo mine	1,792	
		119,360
Total		737,656

There was charged into the smelting furnaces 725,065 tons, the product of which was 41,925 tons of Bessemer matte, containing 22,421 tons of nickel. The value of the nickel contents was returned as $4,722,040, or about 10.5 cents per pound. As compared with 1911, the production of matte was greater by 9,318 tons and of nickel by 5,372 tons, being in fact the largest output of any year since the industry was established. The nickel contents of the ore, computed on the basis of the quantity of matte produced, were 61.8 pounds per ton of 2,000 lb., or 3.09 per cent., exclusive of the losses in roasting and smelting.

Progress of Nickel Mining

The demand for nickel was active throughout the year, and the two producing companies—the Canadian Copper Company and the Mond Nickel Company—were fully

employed. Both indeed have had to increase their facilities for production. The Copper Company has enlarged and improved its plant at Copper Cliff, and the Mond Company has for some time had under construction a new smelter at Coniston, near the point where the Canadian Northern railway crosses the line of the Canadian Pacific, east of Sudbury. When these works are completed, which will probably be in the spring of 1913, the company will abandon their present site at Victoria mines, and move their entire plant to Coniston, which has the advantage of greater proximity to their Garson mines, now the main source of the company's ore supply.

The indications are that a third company will soon be producing nickel. The holdings of the Dominion Nickel Copper Company, of which company Mr. J. R. Booth, of Ottawa, and Mr. M. J. O'Brien, of Renfrew, were leading members, have been bought by interests represented by Messrs. Holmes and Wilson. These holdings included the Whistle and other properties on the northern nickel range and the Murray mine, the first deposit discovered in the Sudbury district, formerly owned and worked by the Vivians, of Swansea, but idle for many years; also the Gertrude and Elsie mines, formerly held by the Lake Superior Corporation. The new concern is erecting a smelter at the Murray mine capable of treating 1,500 tons of ore per day, so constructed as to admit of ready enlargement to 5,000 tons capacity. Bessemer matte of the type produced by the companies now operating will be turned out, and there is a possibility that the nickel may be refined in Ontario by the Hybinette process, the rights of which for the American continent are owned by the newcomers.

Results of much significance have been obtained from extensive exploration of the Sudbury nickel fields by diamond drill borings. These have been carried on by all three companies. At the Murray mine, same distance from the old workings, a large body of ore has been found, the existence of which was unknown to the original owners. Owing to this discovery, the site of the proposed works has been changed from Blue lake, near the Whistle mine, to the Murray. At what is known as the No. 3 or Frood mine, the Canadian Copper Company have had a number of drills at work for over two years, and the borings have revealed an extensive ore deposit, stated to be larger than even the Creighton. The company have constructed a railway from Copper Cliff to the Frood mine, and are putting down a four-compartment incline shaft and a three-compartment vertical shaft in order to develop the deposit. They are planning to extract some 10,000 tons per day from this mine. Frood extension, immediately north of the Frood proper, is owned by the Mond Nickel Company. The ore body crosses into the Mond ground, and the latter are sinking a shaft to intercept it at a depth of 800 feet. It is hardly too much to say that these developments have placed the Sudbury nickel field in a position of complete dominancy with regard to the production of this metal.

The quantity of nickel recovered from the ores of the Cobalt silver mines can only be estimated, but in any event it is not large. At the proportion of nickel assumed in this Report, namely, 1.47 per cent., nickel contents of the 1912 production would be about 429 tons. Part of this is wasted in the smelting of the ores by the United States refining plants, part of it is separated as nickel oxide in Ontario, and part is exported mixed with cobalt oxide for final treatment by the cobalt oxide makers of Europe, and no doubt is recovered in their works. The quantity of nickel oxide produced and marketed as such last year by the home refiners was 117,160 lb., containing 78,392.20 lb. metallic nickel, the bounty paid on which at the rate of 6 cents per pound of metallic nickel was $4,703.53. The nickel contents of the Cobalt ores would appear to have yielded to mine-owners and Ontario refiners in 1912 some $14,220, and this amount is reckoned in these statistics as the money equivalent of the 429 tons mentioned above.

New uses for nickel are being found from time to time. The Sydney (Australia) correspondent of the *Mining Journal* (London, Eng.), of 10th May, 1913, states that specimens of a new alloy called "Ormiston metal" have recently been shown in that city. The composition is 90 per cent. aluminium and 10 per cent. nickel. "Ormiston metal" is described as approaching aluminium in lightness. It can, it is said, be turned out as soft as copper or as hard as steel; can be soldered or brazed on another metal; in

tensile strength it is equal to mild steel; it does not tarnish; and a piece kept in sea-water for many weeks showed no sign of corrosion.

The course of the nickel industry during the five years beginning with 1908 is shown by the following table:—

Table No. VIII.—Nickel-Copper Mining, 1908 to 1912.

Schedule.	1908	1909	1910	1911	1912
Ore raised.....tons	409,551	451,892	652,392	612,511	737,656
Ore smelted ..... "	360,180	462,336	628,947	610,788	725,065
Bessemer matte produced ..... "	21,197	25,845	35,033	32,607	41,925
Nickel contents..... "	9,563	13,141	18,636	17,049	22,421
Copper contents..... "	7,501	7,873	9,630	8,966	11,116
Value of Nickel..... $	1,866,059	2,790,798	4,005,961	3,664,474	4,722,040
Value of Copper..... $	1,062,680	1,122,219	1,574,103	1,281,118	1,581,062
Wages paid..... $	1,286,265	1,234,904	1,698,184	1,830,526	2,357,889
Men employed ..... No.	1,680	1,796	2,156	2,439	2,850

The nickel mining concerns carrying on active work are:—

Name of Company.	Name of Mine.	Location.	P.O. Address of Manager, etc.
Canadian Copper Company.....	Creighton, Crean Hill, No. 2, etc.	Sudbury.....	Copper Cliff
Mond Nickel Company, Limited	Victoria, Garson	"	Coniston
Holmes and Wilson.....	Murray, Whistle, etc	"	Toronto
E. F. Pullen.....	Alexo	Dundonald Tp...	Cochrane

Copper

The copper product of Ontario for 1912 was 11,126 tons, all of which save 10 tons was from the nickel-copper mines of Sudbury. A quantity of copper ore containing about 7 tons of metal was encountered in the workings of the Temiskaming silver mine at Cobalt, and the remaining 3 tons of non-Sudbury origin was obtained by the Dane Mining Company from a prospect near the station of that name on the T. and N. O. railway.

According to the figures supplied the Bureau by the nickel companies, the 41,925 tons of Bessemer matte turned out by the blast furnaces and converters of Sudbury contained 33,537 tons, or 80 per cent. of nickel and copper. Of this 1,069 lb. per ton or 53.45 per cent. was nickel, and 530 lb. or 26.5 per cent. copper. Calculated on the quantity of ore smelted, 725,065 tons, the resulting matte showed the ore to contain 3.09 per cent. nickel and 1.53 per cent. copper. These figures, of course, take no account of losses of metal at any stage of the process of treatment. There is probably an appreciable loss of copper during heap-roasting of the ore in the open air, due to the leaching action of rain or snow falling upon the heaps; also a loss in the smelting itself.

Platinum and Palladium

It is known that the Sudbury ores carry not only nickel and copper, but also a proportion of the precious and rarer metals, including gold, silver, platinum and palladium. Cobalt is likewise a constituent, but since the opening up of so prolific a source of supply of this metal in the silver mines of Cobalt, there is no inducement to recover the small proportion of cobalt contained in the Sudbury pyrrhotites. The rare metal rhodium, which is almost invariably contained in crude platinum to the extent of about

2 per cent., and which is at present worth $5 per gram, or $155 per ounce, is also present in these ores, and a little is said to be produced in the United States, partly from platinum sand, and partly from Canadian and other copper bullion.* Another rare metal, ruthenium, an accompaniment of the mineral iridosmine, is also said to occur in the copper ores of Sudbury.†

The platinum is present in the unaltered ores of Sudbury as sperrylite, or arsenide of platinum, and it has been definitely ascertained by T. L. Walker and Charles W. Dickson, to be associated with the chalcopyrite. The increasing demand for platinum, due to its extensive use for laboratory utensils, and also to its employment of late in the manufacture of jewellery, has caused a very decided rise in price, which went up from $21.27 per ounce in 1908, to $43.62, in 1911, remaining at about the same figure in 1912. There has been little or no increase in the supply, the bulk of which, about 300,000 ounces annually, comes from the Ural mountains in Russia. Colombia, with 11,750 ounces in 1912, ranks second as a producer, and smaller quantities are recovered in the placers of northern California, western Oregon, and British Columbia. Under these circumstances any source of supply is important.

Through the courtesy of the International Nickel Company, it is learned that during the six years, 1907 to 1912, inclusive, 2,366.47 ounces of platinum, and 4,216.482 ounces of palladium were recovered at the Orford refining works of that company in New Jersey, while refining the mattes produced by the Canadian Copper Company from the nickel-copper ores of the Sudbury district. No part of this production was previously reported to the Bureau, and hence it has not been covered by statistics previously issued. Under these circumstances, and although not strictly correct, the figures for the six years have been included in those for the year 1912, as the only practicable method of incorporating them in the official record of production. The platinum has been valued at the average price for the several years, and the palladium has been accorded the same figure. The former amounts to $80,736, and the latter to $147,235.

Palladium is a white metal, intermediate in color between platinum and silver. In hardness it is about equal to platinum. It is malleable, ductile, sectile, and dissolves in nitric acid. Palladium finds a use in parts of astronomical instruments, in watchmaking, dental work, and in soldering platinum metals. Not being altered or discoloured by exposure to air or hydrogen sulphide, it is often used for plating metal ware. The demand is greater than the supply.

It should be added with regard to this production of platinum and palladium, and also gold and silver from the same source, that owing to certain residues from ores from other districts and of different character, which form part of the smelting charge at the Orford works, along with the nickel-copper mattes, it cannot be stated with absolute definiteness that the elements in question are wholly derived from the Sudbury ores; it is, however, believed that they are largely traceable to the latter.

Iron Ore

Iron ore was shipped from three mines during the year 1912—Moose Mountain, Bessemer, and Helen—amounting to 117,357 tons. The Moose Mountain and Bessemer ore is magnetite, while the Helen ore is hematite. The production was considerably smaller than in 1911, when it was 175,631 tons. The Algoma Steel Corporation was actively engaged in developing the Magpie mine, and in installing the roasting plant for the treatment of the sideritic ore of which the deposit is composed. Complete success has not yet been achieved by the process, and the works are not at present in full commercial operation. The Atikokan Iron Company operated the Atikokan mine (magnetite) for a time, but shipped no ore, and the old Belmont or Ledyard mine, in the township of Belmont, Peterborough county, has been taken over by the Buffalo Union Furnace Company, who are carrying out a systematic development of the property. At the Moose Mountain a Gröndal plant for magnetic concentration of the leaner por-

*The Production of Platinum and Allied Metals in 1911, by Waldemar Lindgren, U. S. Geol. Survey, p. 19.
†Ibid, p. 19.

tions of the ore body and the production of briquettes has been installed, and it is expected that both ore and briquettes will be placed on the market during the present year. Of the shipments from the Moose Mountain about 35,000 tons were taken from the stock pile, the remainder being mined during the last four months of the year. Some 45,000 tons were sent to the Columbus Iron and Steel Company, Cleveland, Ohio; 5,000 to the Standard Iron and Steel Company, Deseronto, Ont., and 1,263 tons of briquettes were forwarded to Key Harbour, and held there, as against sales for 1913. Mr. J. W. Evans, of the Tivani Electric Steel Company, Limited, did considerable development work at the Orton mine in Hastings county, the ore of which carries 1 to 3 per cent. of titanium. It is Mr. Evans' intention to utilize this ore in the manufacture of steel by means of an electric furnace, which he has himself devised.

The following is a list of the iron mining companies at work last year:—

Name of Company.	Name of Mine.	Locality.	P. O. Address of Manager, etc.
Moose Mountain, Limited	Moose Mountain	Hutton township.	Sellwood.
The Canada Iron Mines, Limited	Bessemer	Hastings county.	Trenton.
The Algoma Steel Corporation, Limited	Helen	Michipicoten	Helen Mine.
The Algoma Steel Corporation, Limited	Magpie	Michipicoten	Magpie Mine.
Buffalo Union Furnace Company	Belmont	Peterboro' county	Cordova Mines.
Atikokan Iron Company Limited	Atikokan	Thunder Bay	Port Arthur.
Tivani Electric Steel Company, Limited	Orton	Hastings county.	Belleville.

Pig Iron and Steel

From the blast furnaces of Ontario last year there was turned out 589,593 tons of pig iron, having a value of $8,054,369, the pig being worth at the furnace on an average $13.66 per ton. Of the product, 567,892 tons were coke iron, and 21,701 tons charcoal iron, the latter being made at the Standard Iron Company's furnace at Deseronto. Of the nine furnaces in the Province, eight were in blast as follows:—Algoma Steel Corporation, Limited, Sault Ste. Marie, 3; Canada Iron Corporation, Limited, Midland, 2; Steel Company of Canada, Limited, Hamilton, 2; Standard Iron Company, Limited, Deseronto, 1. The Atikokan Iron Company's furnace at Port Arthur, was idle throughout the year. Steel to the amount of 457,817 tons, valued at $8,071,339, was made by the Algoma Steel Corporation and Steel Company of Canada, in the manufacture of which pig iron, produced by these companies, to the extent of 312,709 tons, was utilized, besides 17,372 tons of pig iron purchased from other makers. The number of workmen employed in the making of pig iron only was 846, to whom wages were paid aggregating $636,420. This does not include employees in the steel-working departments, who numbered 2,179. Bessemer and basic steel are made at Sault Ste. Marie; at Hamilton, basic open hearth. Electro Metals, Limited, Welland, carry on the manufacture of ferrosilicon in electric furnaces, of which they had five in operation during the year. They employed one hundred men and paid out in wages the sum of $70,000.

To produce the above quantity of pig iron, 1,133,660 tons of iron ore were charged into the furnaces, along with 22,252 tons of scale and mill cinder. Of this quantity of ore only 71,589 tons were the product of Ontario mines, all the rest being ore imported from the United States. The proportion of Ontario ore used in making pig iron in this Province is not increasing. On the contrary, it is decreasing steadily. In 1901 it amounted to 56 per cent.; in 1903 it fell to 22.5 per cent.; in 1905 to 19.3 per cent.; rose in 1907 to 23.6 per cent.; in 1909 to 28.7 per cent., and fell again in 1910 to 17.4 per cent.; in 1911 to 7.3 per cent., and in 1912 to 6.3 per cent.

The development of the iron mines of the Province is not keeping pace with the expansion of the iron smelting industry For this there are several reasons. One is the ease with which supplies of iron ore of known quality and required composition can be procured from the Lake Superior region south of the line, and another is the comparatively small number of mines which have yet been opened in this Province. There are many iron ranges in Ontario, and if the conditions in Michigan and Minne-

sota afford any analogy there must be numerous bodies of workable ore contained in these iron-bearing rocks. The fact remains, however, that only a few have yet been located, and it seems as if much energy, skill and money must be expended in the search for ore bodies before the iron ore resources of the Province will be placed in a position to respond to the requirements of the smelting trade.

Particulars of the pig iron and steel manufacture for 1912 are given in the following figures, and for the sake of comparison, for the year 1911 as well:—

	1911.	1912.
Ontario ore smelted, tons	67,631	71,589
Foreign ore smelted, tons	848,814	1,062,071
Scale and mill cinder, tons	18,476	22,252
Limestone for flux, tons	275,628	305,509
Coke for fuel, tons	577,388	660,248
Value of ditto	$2,367,704	$2,584,766
Charcoal for fuel, tons	1,666,897	1,886,748
Value of ditto	$158,354	$157,597
Pig iron product, tons	526,610	589,593
Value of ditto	$7,716,314	$8,054,369
Steel product, tons	361,581	457,817
Value of ditto	$9,505,013	$8,071,339
Workmen employed, number	3,633	2,925
Wages paid	$2,927,573	$2,383,029

The steady growth of the pig iron and steel making industry during the past five years is sufficiently shown by the following table:—

Table IX.—Production Iron and Steel, 1908 to 1912

Schedule.	1908	1909	1910	1911	1912
Ontario ore smelted....tons	170,215	220,307	143,284	67,631	71,589
Foreign ore smelted.... "	342,747	543,544	678,890	848,814	1,062,071
Limestone for flux.... "	179,741	226,991	248,750	275,628	305,509
Coke.... "	322,817	436,707	471,493	577,388	660,248
Charcoal....bush	.....	973,413	1,133,419	1,666,897	1,886,748
Pig iron....tons	271,656	407,013	447,351	526,610	589,593
Value of pig iron.... $	4,390,839	6,301,528	6,975,418	7,716,314	8,054,369
Steel....tons	172,108	296,031	331,321	361,581	457,817
Value of steel.... $	4,397,082	6,759,960	7,855,407	9,505,013	8,071,339

From the figures given for the operations of 1912 it would seem that, disregarding scale and mill cinder, 1.92 tons of ore were required to produce one ton of coke pig iron, also .53 ton of limestone, and 1.16 tons coke. For a ton of charcoal pig, the materials were, 1.90 tons ore, .114 ton limestone, and 8.35 bushels charcoal.

Following are the blast furnace companies producing pig iron in Ontario:—

Name of Company.	No. of Furnaces.	Fuel used.	Location.
Algoma Steel Corporation, Limited	3	Coke	Sault Ste. Marie.
Steel Company of Canada, Limited	2	"	Hamilton
Canada Iron Corporation, Limited	2	"	Midland.
Atikokan Iron Company, Limited	1	"	Port Arthur.
Standard Iron Company, Limited	1	Charcoal	Deseronto.

Materials of Construction

Building operations in the towns and cities of Ontario were again active, and there was an increased production of brick and stone. At the same time, however, the output of Portland cement fell off slightly, and there was a decrease in the quantity of lime produced.

Brick

Returns to the Bureau show that the brick kilns of the Province turned out 385,000 M common brick in 1912, valued at $3,178,250, as against 354,546 M in 1911 worth $2,801,971—an increase in number of 30,454 M or 8.58 per cent., and in value of $376,279, or 13.42 per cent. It will be seen that the increase in cost was considerably greater than the increase in number, and this is further brought out by a comparison of the price per M which in 1911 was $7.90 and in 1912 $8.20. It is a truism now to state that the cost of living has gone up of late years; but common building brick, which in this country and climate may fairly rank as a necessary of life, well illustrates the tendency to higher levels of cost. In 1901 ordinary brick were worth $5.73 per M.; in 1905 the price had risen to $7.75; in 1909 it was $7.78; in 1911, $7.90, and in 1912, $8.20.

The manufacture of paving brick does not seem to be increasing in Ontario. Objection is taken to them because of their noisiness, and if they are not well made of suitable material, they fail to provide a durable pavement. The value of their production last year was $78,195, as against $86,685 in 1911. Terra cotta, worth $137,239 and fancy brick valued at $6,552, made up a total of $221,986.

Pressed, or re-pressed, brick is highly esteemed for its colour and finished appearance, and the number made rose to 65,598 M in 1912 valued at $634,169, as compared with 52,764 M in 1911 valued at $564,630.

The brick statistics of 1912 may be summarized as follows:—

	M.	Value.
Common brick	385,000	$3,178,250
Paving brick or blocks	4,229	78,195
Terra cotta building blocks	3,637	137,239
Fancy brick	216	6,552
Pressed brick	65,598	634,169
Total	458,680	$4,034,405

The number of men employed in the making of bricks and drain tile was 3,314, who received wages amounting to $1,399,096.

The value of the drain tile made in 1912 was less than in 1911, being $279,579 as compared with $349,545.

Other manufactures of clay were sewer pipe and pottery, the value of the former in 1912 being $464,627, an increase over 1911 of $54,563, and of the latter $52,445, an increase of $1,945.

About six million sand-lime brick were returned for 1912, valued at $50,277, or $8.50 per thousand.

Extracts from the remarks made on their returns by brick and tile manufacturers are interesting. In some places on the north shore of Lake Erie, natural gas is used to fire the kilns. The season of 1912 was wet; rain hampered operations, and was productive of delay and loss. Statements such as the following show how the scarcity of labour in the rural districts is interfering with local industries: "Works were idle part of the time for repairs and lack of help." "Could not get men; think I will have to quit the business on account of labour." "Only worked three months in the year. We had a gang of Italians, and they all left us at once, and we could not get another gang, times are so good for the men." This from a small manufacturer is surely a unique case:—"Labour all performed by my daughter and myself."

About 40 per cent. of all the brick made in the Province is manufactured in the yards on the outskirts of Toronto, which is a city of brick, and in which many millions of dollars have been spent during the last few years in building operations. In capacity these plants range upwards from two million brick per annum. Some turned out five million in 1912, some eight million, one fifteen million, and one—the Don Valley Brick Works—upwards of forty-three million. The average output of 23 yards was 6,900,000 brick. The local supply was insufficient last year to meet the demand, and quantities were shipped in from outside points.

Sewer Pipe

Three sewer pipe manufacturing companies turned out a total of $464,627 worth of pipe last year. This was an increase of $54,563 over the production of 1911. The rapid growth of the towns and cities of Ontario provides a good market for the output.

Pottery

The manufacture of pottery from Ontario clays is not keeping pace with the expansion experienced by other branches of the clay-working industry. Only the coarser and commoner articles, such as flower-pots, hanging baskets, jardinieres, etc., are made from the native clay, any finer varieties of ware requiring the use of imported material. It is not to be wondered at that in a region such as Ontario where there are no coal beds with their seams of fire-clay, and where glaciation has been so active a force in the formation of the present surface, there should be a scarcity of clays sufficiently free from fluxing agents to be suitable for fine porcelain and chinaware. Kaolinic clays have been reported from the valleys of several of the rivers running down the James Bay slope, but in the absence of transportation facilities no attempt has yet been made to test their adaptability for pottery purposes. The value of the pottery turned out by the half dozen potteries reporting their production in 1912 was $52,445, as compared with $50,500 in 1911.

List of Clay-Working Plants

Below is a list of the clay-working plants with particulars as to kinds of goods manufactured:—

Name.	Address.	Manufacture.
Arnold, Willard	Virginia	Brick.
Adamson, William	Valkerton	Brick.
Armstrong, G. H.	Wheeler	Tile.
Allen, Solomon	Brantford	Brick.
Ashbridge Brick Company	Toronto	Brick.
Alsip Brick & Tile Co.	Fort William	Brick and tile.
Boone, George H.	Thornbury	Brick.
Baker Bros.	Casselman	Brick.
Brownscombe & Sons, H.	Cargill	Brick and tile.
Baker, George E.	Arnprior	Brick and tile.
Beckett, E. C.	Orwell	Brick and tile.
Bechtels, Limited	Waterloo	Brick.
Bell Bros.	Paisley	Brick and tile.
Bell Bros.	Drew	Tile.
Baird & Son, H. C.	Parkhill	Brick and tile.
Burgess, Charles F.	Carleton Place	Brick.
Blake, W. C.	Nairn	Brick and tile.
Blake, Elias D.	Elginfield	Tile.
Beamsville Brick & Terra Cotta Co.	Beamsville	Pressed and fancy brick.
Barnhardt, W. H.	Monkton	Brick.
Beaverton Brick and Tile Co., Limited.	Beaverton	Brick and tile.
Bechtel, W. B.	Waterloo	Brick and tile.
Bell, John H.	Fulton's Mills	Brick.
Bell Bros. & Co.	Toronto	Brick and tile.
Bemrose, Thos.	Beeton	Brick and tile.
Berlin Brick Co.	Berlin	Brick.
Bowler, Wes.	Markdale	Brick.

List of Clay-Working Plants—Continued

Name.	Address.	Manufacture.
Bracebridge Brick Co.	Bracebridge	Brick.
Brampton Pressed Brick Co., Limited.	Brampton	Pressed brick.
Brandon Pressed Brick & Tile Co.	Milton	Brick and tile.
Brick Mnfg. & Supply Co., Limited	London	Brick.
Brown, John W.	Vienna	Brick.
Belleville Pottery Company	Belleville	Pottery.
Broadwell, B.	Kingsville	Brick and tile.
Bond & Bird	Woodstock	Brick.
Baeckler, William	Chesley	Brick.
Buck, J. L.	Port Rowan	Brick and tile.
Brantford Brick Company	Brantford	Brick.
Brown, Edwin	Bronte	Brick and tile.
Bushell, William	Toronto	Brick.
Brown, J. A.	Mount Dennis	Brick.
Butwell Brick Co., Limited	Toronto	Brick.
Brown Bros. Brick Co.	Mount Dennis	Brick.
Big Four Brick Co., Limited	Toronto	Brick.
Cabana, Jr., Oliver	St. Joseph	Brick and tile.
Canada Sand Lime Pressed Brick Co.	West Toronto	Sand lime pressed brick.
Card, N. B.	Harrisburg	Brick and tile.
Caswell, Edgar	Cobden	Brick.
Campbell, Neil F.	West Lorne	Brick.
Cherrett, E.	Woodstock	Brick.
Clemen, Moses	Croton	Brick and tile.
Conway, Frank P.	Stratford	Brick and tile.
Cornhill, James, & Son	Chatham	Brick and tile.
Crain, Geo.	Beamsville	Pressed brick.
Cranston, and Sons, J.	Hamilton	Pottery.
Crawford Bros.	Hamilton	Brick.
Crone, R., & Son	Collingwood	Brick.
Crowhurst, Walter J.	Port Hope	Brick.
Cumberland, John M.	Listowel	Brick.
Curtin, Francis	Lindsay	Brick.
Curtis Bros.	Peterborough	Brick.
Davenport, B. F.	Orwell	Brick and tile.
Davis and Son, John	Davisville	Pottery.
Deller and Sons	Norwich	Brick and tile.
Dodge, Geo.	Kerwood	Tile.
Dominion Sewer Pipe Co., Ltd., The	Aldershot	Brick and sewer pipe.
Deller Bros.	London, R. D. 3	Brick and tile.
Don Valley Brick Works	Toronto	Common, plain and fancy brick, terra cotta.
Dominion Sewer Pipe Co., Limited	Swansea	Sewer pipe.
Dahmer, H. D.	Conestogo and Elmira.	Brick.
Davisville & Carlton Brick Mnfg. Co.	Davisville	Brick.
Deller, Albert	Ingersoll	Brick.
Deterling, Mrs. E.	Humberstone	Brick.
Draper Bros.	Huntsville	Brick.
Dryden Timber & Power Co., Limited.	Dryden	Brick.
Dumas, Geo. W.	Fletcher	Brick.
Dublin Brick and Tile Works	Dublin	Brick and tile.
Dungey Bros.	Wartburg	Brick.
Dunlop & Schmidt	Pembroke	Brick.
Eddie, Joseph	Bracebridge	Brick.
Elliott, Wm.	Glenannan	Brick.
Elliott, Eli	Wingham	Brick.
Elliott & Sons, James	Steelton	Brick.
Emard, T.	Embrun	Brick.
Entricken, F. W.	Tavistock	Brick.
Esterbrook, W. H.	Freeman	Brick.
Farah, K.	New Liskeard	Brick.
Forman, J. H.	St. Mary's	Brick.
Fort William Brick and Tile Co.	Fort William	Brick and tile.
Fox, S. J., Estate of	Lindsay	Brick and tile.
Fox, G. J.	Dresden	Brick and tile.
Frank, C. G.	Strathroy	Brick.

List of Clay-Workin Plants—Continued

Name.	Address.	Manufacture.
Fraser & Logan	Blyth	Brick and tile.
Fuller, Geo.	Dracon	Tile.
Frid Bros.	Hamilton	Brick.
Frid Brick Company, Geo.	Hamilton	Brick.
Freek, Wm.	Barrie	Brick.
Frost, Geo. H.	Toronto	Brick.
Foster Pottery Company	Hamilton	Pottery.
Gardiner, Wm.	Blenheim	Brick.
Gowanlock, J.	West Fort William	Brick.
Govanlock, J. M.	Winthrop	Brick and tile.
Haack, E. C.	Drayton	Tile.
Hales, C.	Northwood	Tile.
Hall, Mrs. H.	Cobourg	Brick.
Hallett, H.	Comber	Brick and tile.
Hallman, J. B.	Hanover	Brick.
Hamilton Pressed Brick Co., Limited.	Hamilton	Pressed brick.
Hamilton & Toronto Sewer Pipe Co., Limited	Hamilton	Sewer pipe.
Hamley, R. H.	Bowmanville	Brick.
Hancock, Wm.	Hamilton	Brick.
Harbour Brick Co., Limited	Toronto	Brick.
Haw, J. R.	Proton Sta. R. R. No. 1	Brick.
Hicks, D.	Shelburne	Brick and tile.
Hill Bros.	Essex	Brick and tile.
Hill & Co., Jas. S.	Madoc	Brick and tile.
Hinde Bros.	Toronto	Brick.
Hiscock and Sons	Cobourg	Brick.
Hitch, John	Ridgetown	Brick and tile.
Hohl, Geo.	Lisbon	Brick and tile.
Holton Bros.	Drew	Brick.
Howlett, Fred.	Petrolea	Brick.
Humberston, Thos. A.	Newton Brook	Pottery.
Haileybury Brick & Tile Co., Limited.	Haileybury	Brick and tile.
Haist, Fred	Crediton East	Brick.
Haist, Jos.	Crediton East	Brick.
Hooker, D. D.	Welland	Brick.
Irwin, James	Norwich	Brick.
James and Sons, Thos.	Blackwell	Brick and tile.
Jamieson, J. A.	Renfrew	Brick and tile.
Janes, Henry	Delaware	Brick and tile.
Janes, W. B.	Mitchell	Brick and tile.
Jasperson, B.	Kingsville	Tile.
Jemison, J. and A.	Corunna	Brick.
Jervis and Son, John	Dorchester Sta.	Brick and tile.
Johnson, James	Pembroke	Brick.
Johnston, R. and George J.	Putnam	Brick.
Jordan, Daniel	Chatham	Brick and tile.
Kruse Bros.	Egmondville	Brick and tile.
Koebel, Joseph Z.	St. Clements	Brick and tile.
Kuhn, Henry J.	Crediton East	Brick and tile.
Kaar, John	Brownsville	Brick and tile.
Kingston Brick and Tile Co., Limited.	Kingston	Brick and tile.
Kerr, Fred	Crediton East	Brick and tile.
Keyser, O. G.	Keyser	Tile.
Lines, J. C.	Earlscourt	Brick.
Lang and Sons, M. K.	Merrickville	Brick.
Lethbridge, W. H.	Steelton	Brick.
Leatherdale, R. W.	Dresden	Brick and tile.
Lowes, Gordon	Chatham	Brick and tile.
Light, Wm.	Aylmer West	Brick and tile.
Lewis, C. J.	Milton	Pressed brick.
Ladouceur, Joseph	Embrun	Brick.
Lindsay, Stephen	Tupperville	Tile.
Leamington Brick & Tile Co., Limited.	Leamington	Brick and tile.
Lochrie, Jas.	Toronto	Brick.
Launders, Thos.	Fruitland	Brick and tile.

List of Clay-Working Plants—Continued

Name.	Address.	Manufacture.
Lowe, Joseph	Meaford	Brick and tile.
Logan, J.	Toronto	Brick.
Lainson & Sons, J. W.	West Toronto	Brick.
London Pottery Mnfg. Co.	London	Pottery.
MacKay Bros.	Dutton	Brick and tile.
Mills, George E.	Hamilton	Brick.
Munro Brick Co.	Pembroke	Brick.
Munro, D. W.	Carp	Brick and tile.
Moody, G. W.	Highgate	Brick and tile.
Marshall, W. W.	Woodstock	Brick.
Miner, J. T.	Kingsville	Brick and tile.
Martin, David	Thamesville	Brick and tile.
Morley and Ashbridge	Toronto	Brick.
Mason, Chas.	Toronto	Brick.
Maloney, John	Toronto	Brick.
Milton Pressed Brick Co., Limited	Milton	Pressed and fancy brick.
Meaford Brick Company	Meaford	Brick.
Merkley Bros.	Casselman	Brick.
Miller, Wm.	St. Joseph	Brick and tile.
Morley, Walker	Toronto	Brick.
Mouldey, Jno.	Kingston	Brick and tile.
McLean, Frank	Brigden	Tile.
McMahon, J. B.	Kerwood	Brick and tile.
McLaughlin, John	London	Brick.
McCredie, W.	Lyons	Brick and tile.
McCormick Bros.	Kingscourt	Brick and tile.
Norton, Alsey	Bolton	Brick and tile.
Norton, Thos. W.	Toronto	Brick.
Nayler and Sons, J. W.	Marmora	Brick.
National Fire Proofing Co. of Canada, Limited	Hamilton	Pressed brick.
Newman, Wm.	East Toronto	Brick.
New, Edward	Hamilton	Brick and tile.
Neal, A., and Son	Seeley's Bay	Brick.
Owen Sound Brick Co., Limited	Owen Sound	Brick.
Ott Brick and Tile Manufacturing Co., Limited	Berlin	Brick and tile.
O'Reilly, T. E.	Ottawa	Brick.
Ontario Sewer Pipe Co., Limited	Mimico	Sewer pipe.
Ottawa Brick Manufacturing Co., Ltd.	Ottawa	Brick.
Ollman Bros.	Hamilton	Brick.
Ontario Paving Brick Co., Limited	Toronto	Paving blocks.
Oakville Pressed Brick Co.	Oakville	Pressed brick.
Ouellette, C. P.	Forest	Brick and tile.
Pitblado and Sons, John	Benmiller	Brick and tile.
Petty C. K.	Cherrywood	Brick and tile.
Parks H. W.	Dresden	Tile.
Pilon, Alex.	Casselman	Brick.
Port Arthur Sand-Lime Brick Co, Ltd.	Port Arthur	Sand-lime brick.
Port Dover Brick and Tile Co., Ltd.	Port Dover	Brick and tile.
Peterborough Sandstone Brick Co., Ltd.	Peterborough	Brick.
Paxton and Bray	St. Catharines	Brick.
Ponsford, A. E.	St. Thomas	Brick and tile.
Phillips, Thomas	St. Helen's	Tile.
Phinn, Geo. E.	Elginfield	Brick and tile.
Prices Limited	Toronto	Brick.
Pears, Wm.	Toronto	Brick.
Price, John	Toronto	Brick.
Port Credit Brick Co., Limited	Port Credit	Pressed Brick.
Paisley and Chisholm	Kingston	Brick and tile.
Peerless Brick and Tile Co.	Ottawa	Brick and tile.
Russell, Joseph	Toronto	Brick.
Rice Bros.	Dresden	Brick.
Russell Brick and Tile Co., Limited	Russell	Brick and tile.
Richardson and Sons, James	Kerwood	Brick and tile.
Richardson and Sons, James	Wyoming	Brick and tile

List of Clay-Producing Plants—Continued

Name.	Address.	Manufacture.
Ries, John	Carlsruhe	Brick and tile.
Rilett and Holmes	Alvinston	Brick and tile.
Reed, Almon	Foxboro	Tile.
Robinet Brick Co.	Sandwich	Brick.
Reid Bros.	Hepworth	Brick and tile.
Ryan & Co., T. M.	Niagara Falls	Brick and tile.
Rilett, David	Oil Springs	Brick and tile.
Red Star Brick and Tile Co.	Stratford	Brick and tile.
Sadler, Frederick Louis	Dublin	Brick and tile.
Schultz Bros. Co., Limited	Brantford	Brick.
Scott, Jas. M.	Meaford	Brick and tile.
Smith and Son, Alex.	Dutton	Brick and tile.
Smith, W. W.	Shallow Lake	Brick and tile
Silicate Brick Co. of Ottawa, Limited	Ottawa E.	Brick.
Smith, Allan, G. C.	Acton	Brick.
Sipprell, J. H.	Wilkesport	Brick and tile.
Superior Brick Co., Limit d	Fort William	Brick.
Smith Bros.	Port Elgin	Brick.
Sudbury Brick Co. Limited, The	Sudbury	Brick.
Snelgrove and Co.	Beaverton	Brick and tile.
Souter, G. S.	North Bay	Brick.
Surridge, Fred	Toronto	Brick.
Standard Brick Co., Limited, The	Toronto	Brick.
Sawden Bros.	Toronto	Brick.
Stratford Brick, Tile & Lumber Co, Limited	Stratford	Brick and tile.
Stonehouse, Wm.	West Toronto	Brick.
Steele, Edwin	Vankleek Hill	Brick and tile.
Star Brick Co.	North Bay	Brick.
Sproat, Wm. M.	Egmondville	Brick and Tile.
Smith, W. L.	Drew	Brick and Tile.
Sinden, L. H.	Tillsonburg	Brick and Tile.
Shuttleworth and Co.	London	Brick.
Schaefer, F.	Breslau	Brick and tile.
Schaefer, F.	New Hamburg	Brick and tile.
Stickwood, Chas.	Newmarket	Brick and tile.
Taylor, James	Port Hope	Pottery.
Thornton, John	Perth	Brick.
Taylor Bros.	North Rideau	Brick.
Taylor and Hall	Peterborough	Brick and tile.
Toronto Pressed Brick and Terra Cotta Co., Limited	Milton	Pressed and fancy brick.
Terra Cotta Pressed Brick Co., Ltd	Terra Cotta	Pressed brick and terra cotta.
Townsley, G. H., & Co.	West Toronto	Brick.
Toronto Fire Brick Co.	Mimico	Brick.
Toronto Brick Co., Limited	Toronto	Brick.
Voakes, E. R.	Wheatley	Brick and tile.
Watson Brick Co.	Bracebridge	Brick.
Weppler, Henry	Hanover	Brick and tile.
Workman, James	Brantford	Brick.
Wood, W. H.	Brockville	Brick.
Wehlann and Son	Aldboro	Brick and tile.
Wehlann, Alfred	Cairo	Brick and tile.
Wagstaff, A. H.	Toronto	Brick.
Willcox Lake Brick Co., Limited	Toronto	Brick.
Wallace and Son, R. W.	North Bay	Brick.
Waite, John E.	Forrester's Falls	Brick and tile.
Wright, Samuel	Chesley	Brick and tile.
Wright, J. C.	Toronto	Brick.
Wilson, R. J.	Gananoque	Brick and tile.
Whittington, Geo.	Napanee	Brick and tile.
West Bros.	Campbellford	Brick and tile.
Webb Co., John E.	Toronto	Brick.
Waide Bros.	London	Brick and tile.
Yack, Louis	Walkerton	Brick.
York Sandstone Brick Co., Limited	West Toronto	Brick.

Lime

The output of lime in 1912 was apparently less than in 1911, being 2,297,525 bushels, worth $381,672, as against 2,469,773 bushels, valued at $402,340. Little difficulty is experienced in obtaining lime for any purpose in the older parts of the Province, where limestone occurs abundantly and in strata of various ages and differing composition. Nearly pure carbonate of lime can be procured in some parts; elsewhere the rock contains magnesia from small quantities up to proportions sufficient to constitute a dolomite. All varieties are used for burning into lime, the idea once prevalent that magnesia injured the quality of the product being now no longer generally held. Formerly, much of the production was from small kilns operated by farmers and their sons during their spare time, or when other work was not pressing; now the number of kilns is smaller, but the individual output has increased. In short, the modern tendency towards concentration of industrial effort has made itself felt in lime-making, as well as in nearly all other kinds of manufacture.

The lime manufacturers reporting to the Bureau were as follows, those whose works were not in operation being marked with an asterisk:—

Name.	Location.
*Appleyard, Albert	Georgetown.
*Alexander, A. S. and W.	Alton.
Annis, George	Orillia.
Bergin, Patrick	Napanee.
Brown, George	Cataraqui.
Callan & Bros., John	Innerkip.
Chestnut, W. D.	Duntroon.
Chalmers, David	Owen Sound.
Cameron, W. M.	Carleton Place.
Canada Lime Company, Limited	Coboconk and Sand Point.
*Christie, Henderson & Company, Limited	Toronto.
Ducket, J. H.	Eugenia.
Delta Lime Company, Limited	Delta.
*Foster, William	Cheltenham.
Foote, Will	Varna.
*Flieler, Ed. J.	Fernleigh.
Harvey, E., Limited	Rockwood.
*Harton, S. L.	Sand Bay.
*Hebert, J.	Casselman.
Higginson & Stevens	Stepney.
*Jelly, H. M.	Bowling Green.
*Jamieson Lime Co.	Renfrew.
Lumsden, G. D.	Holstein.
Leslie, Alfred	Puslinch.
*Marren, John	St. Andrews, West.
*Moore, James	Foxmead.
*Muldoon, J.	Toronto.
Marshall, James	Hamilton.
Milton, Peter	Burnbrae.
McMillan, Fred.	Havelock.
McKenzie Bros.	Lucknow.
MacTernon, Jno.	Dirleton, Torbolton.
McGilvray, James	Durham.
*Ontario Limestone & Clay Co., Ltd.	Belleville.
Poirier, Emerie	Apple Hill.
Parks, C. W.	Troy.
Robillard & Son, H.	Ottawa.
Reeb, John A.	Port Colborne.
Robertson & Co., Limited	Milton.
Smith, John S.	Inverhuron.
Standard Chemical, Iron & Lumber Co. of Canada, Ltd.	Eganville.
Standard White Lime Co., Ltd.	St. Mary's, Guelph and Beachville.
Toronto Lime Company, Limited	Dolly Varden, Limehouse.
Wellman, Albert	Belleview.
*Walker, Jay	Uhthoff.

It will be noticed that, out of 46 firms reporting, 16 were idle during the year, and a number of others burned very little lime. The wet season was in part responsible for the curtailment of production. Thirteen plants produced together more than 75 per cent. of the whole output.

Stone

The stone quarried in Ontario is varied in character, and is used for widely different purposes. For construction material, limestone, sandstone and marble are employed; for use as a flux, limestone is required; for roadmaking, limestone and so-called "trap." Granite and gneiss are also used both in blocks and crushed for building and other work. Limestone, however, largely preponderates. An industry is being developed on the basis of the marbles found in the neighbourhood of Bancroft in the county of Hastings. The serpentines of Darling township, of varying shades of green, are also capable of producing very handsome effects. In value, the stone raised last year amounted to $953,839, an increase of $61,212 over 1911. For an account of the limestone deposits of Ontario, arranged by counties, reference should be had to Part II. of the Thirteenth Report of the Bureau of Mines, 1904, by Prof. W. G. Miller, Provincial geologist.

In the following list is given the name and location of the various stone quarrying concerns reporting to the Bureau for the year 1912, also the kind of stone produced. An asterisk indicates those which were idle during the year:—

Name.	Location.	Kind of Stone.
Aylesworth, J. B.	Newburgh	Limestone.
Bedborough, James	Picton	do.
Bergin, Patrick	Napanee	do.
Britnell & Co.	Burnt River	do.
Bannerman & Horne	Ignace	Granite.
Coughlin, Daniel	Smith's Falls	Limestone.
Cook, J. S.	Wiarton	do.
Canada Iron Corporation, Ltd., The	Midland	do.
Coldwater Stone Quarry & Power Co., Ltd.	Coldwater	do.
Cartmell, Wm.	Thorold	do.
*Central Ontario Granite & Marble Co., Ltd.	Trenton	Marble.
*Canadian Marble Co., Ltd.	Bancroft	do.
Doolittle & Wilcox, Ltd.	Dundas	Limestone.
Empire Limestone Co.	Shisler Point	do.
Farr, C. C.	Haileybury	do.
Fleming, J. H.	Glenwilliams	Sandstone.
Fretz, Jacob	Vineland	Limestone.
Foster, Wm.	Cheltenham	Sandstone.
Gordon & Bruce	Lyndhurst	Granite.
Granite, Crushed & Dimension, Ltd.	Washago	do. (crushed).
Harvey, Geo.	Nanticoke	Limestone.
Hagersville Contracting Co., Ltd.	Hagersville	do.
Hastings Quarry Co., Ltd.	Actinolite	Granite.
Intercities Quarries Co., Ltd.	Port Arthur	Trap.
Kennedy, R. C.	Guelph	Limestone.
Kiraly, Jas.	Crookston	do.
Kingston Penitentiary	Portsmouth	do.
Lytle, Thomas	Alfred Centre	do.
Longford Quarry Co., Ltd.	Longford Mills	do.
Laplante, R.	Embrun	do.
Lally, Estate of M.	Smithville	do.
Murphy, J. S.	Tweed	do.
Marshall, James	Hamilton	do.
Markus & Co.	Pembroke	do.
Maloney, John	Schaw	do.

Name.	Location.	Kind of Stone.
MacDonald	Point Anne	Limestone.
MacRow, Henry	Kingston	do.
McWilliams, R. H.	St. Mary's	do.
*North Lanark Marble & Granite Quarries, Ltd.	Darling Tp.	Marble.
Power City Stone Co., Ltd.	St. David's	Limestone.
Perkin, George A.	Owen Sound	do.
Ontario Rock Co., Ltd.	Havelock	Trap.
Queenston Quarry Co., Ltd.	St. David's	Limestone.
Roddy, John M.	Kingston	do.
Reid, Fenton	Fellows	do.
Robillard, H., & Son	Ottawa	do.
Rubel Bros.	Jordan	do.
Rogers, F., & Co.	Terra Cotta	Sandstone.
Robertson & Co., Ltd.	Milton	Limestone.
Soo Trap Rock Co., Ltd.	Poole Island	Trap.
Sidney Kirby Co., T., Ltd.	Gloucester & Nepean Tps.	Limestone and Sandstone.
St. Mary's Horse Shoe Quarry	St. Mary's	Limestone.
Thames Quarry Co.	St. Mary's	do.
Thibault, E.	Hog's Back	do.
Thunder Bay Contracting Co., Ltd.	Blake Tp.	Diabase.
Tillson, T. W.	Ottawa	Sandstone.
Tietz, William A.	Naber	Limestone.
*Wilson, Geo. S.	Scotch Line	Sandstone.
Wentworth Quarry Co., Ltd.	Vinemount	Limestone.
Webster, James	Galt	do.
Wilk, Herman	Eganville	do.
Webber, John	Byng Inlet	do.
Webb, George F.	Hamilton	do.
Walker Bros.	Thorold	do.
Welland County Lime Works, Ltd.	Port Colborne	do.

The foregoing list does not take in firms or companies quarrying feldspar, quartz, or other materials whose production is given separately and is not included under that of building and crushed stone.

Portland Cement

The Portland cement plants of Ontario last year produced 2,993,367 barrels of cement, worth, at the factory, $3,365,659, being a decrease in production as compared with 1911 of 17,482 barrels, and in value of $74,893. This check is the first which the industry has experienced since it was established in 1891, every year hitherto having shown a decided advance over the preceding one. The average price per barrel also fell from $1.209 to $1.124. A feature of the year was the action of the Dominion Government in reducing the duty by one-half on cement imported from June 1 to October 31 inclusive. The reason assigned for this step was the inability of the plants in Ontario and Quebec to supply the urgent demand for cement from Saskatchewan, Alberta and the west generally, arising not so much from shortness of supply as from the congestion of freight traffic on the railways.

When the manufacture of Portland cement began in this Province, shell marl was invariably the material employed as raw material, along with the clay. A change in the process has taken place, and at present a large proportion of the cement is made from limestone of suitable composition, quarried for the purpose. The substitution of rock for marl is advantageous economically, and the cement does not seem to suffer in quality. It costs less to handle the rock, and there is not so much moisture to eliminate.

The plants in operation last year were fourteen in number, five of which belong to the Canada Cement Company, Limited. These manufactured much the larger proportion of the output.

Herewith is a list of the Portland cement companies and plants of Ontario:—

Name of Company.	Location of Plant.
Canada Cement Company, Limited, Plant No. 4.	Belleville.
" " " " " No. 5..	Belleville.
" " " " " No. 6..	Marlbank.
" " " " " No. 7..	Lakefield.
" " " " " No. 8..	Port Colborne.
Hanover Portland Cement Co., Limited	Hanover.
Imperial Cement Company, Limited, The	Owen Sound.
Kirkfield Portland Cement Co., Ltd.	Raven Lake.
Maple Leaf Portland Cement Co., Ltd.	Atwood.
National Portland Cement Co., Ltd.	Durham.
Ontario Portland Cement Co., Ltd.	Blue Lake.
St. Mary's Portland Cement Co., Ltd.	St. Mary's.
Superior Portland Cement Co., Ltd., The	Orangeville.

The plant of the Sun Portland Cement Company, Owen Sound, has been closed. It did not operate last year.

Arsenic

From the silver-cobalt ores treated in Ontario refineries there was produced and shipped 3,927,347 pounds of white arsenic, which realized $79,297, or a little over two cents per pound. The theoretical percentage of arsenic in these ores is assumed to be 14.28, which, on the quantity of ore raised from Cobalt in 1912, would give 8,332,000 pounds of white arsenic. The difference between this quantity and the product actually marketed, must be set down for the greater part as waste. Little or no attempt to save the arsenic is made in the smelters of the United States to which much of the lower grade ore is shipped for treatment. The production of 1911 was 4,234,000 pounds, worth $74,609, the average value per pound being 1.76 cents per pound. Since the close of 1912 there has been a marked advance in the price of arsenic, which is chiefly a by-product of the ores of other metals. There are large deposits of arsenical ore in Hastings county, which at one time were worked for their gold contents, but which have remained untouched since experience showed the values to have fallen below the profit line.

Arsenic is a most useful substance in the arts, being employed as a preservative of skins, as a pigment, in the manufacture of glass for the purpose of imparting brilliancy, but chiefly as the active agent in insecticides. As a constituent of Paris green and arsenate of lead, it plays an important part in controlling the insect pests which annually work havoc amounting to tens of thousands of dollars among the potato fields and apple orchards of Ontario.

Iron Pyrites

No deposits of native sulphur, such as are found in Sicily and Louisiana, occur in this Province, yet there are very large supplies of sulphur locked up in the pyrrhotites of Sudbury and the iron pyrites of many other parts of Ontario's mineral regions. No attempt is being made, or in the present state of the metallurgical arts perhaps can be made, to recover the immense quantities of sulphur annually scattered to the winds in the fumes which ascend from the roast heaps of the nickel-copper companies of Sudbury. This sulphur is worse than wasted, because these acrid fumes blast and wither every green thing within their range, and when carried by contrary winds to centres of population are certainly objectionable. So long, however, as it costs more to entrap the surphur and convert it into sulphuric acid or some other article of commerce than the price it would bring when sold, this waste is inevitable.

Five deposits of pyrite were worked last year, but from three only were shipments made. These were the mines of the Canadian Sulphur Ore Company of Queensboro, in Hastings county; Nichols Chemical Company at Sulphide, and the Buffalo-Brockville Mining Company at Brockville. The output from the last-named was small, and work ceased about the middle of July. No shipments were made by the Northern Pyrites Company, from their mine on Big Vermilion lake, near Graham, nor from the Helen mine by the Algoma Steel Corporation. The quantity shipped was 20,744 tons, valued at $71,043. This was considerably less than the output for 1911, which was 43,629 tons, worth $118,457.

The Nichols Chemical Company operate an acid-making plant at Sulphide, at which is used not only the ore from the company's own mine at the same place, but also ore purchased from other deposits worked in the neighborhood. The ore from the Northern Pyrites and Helen mines when shipped goes to the United States for the manufacture of sulphuric acid, or for use in pulp and paper mills.

Following is a list of the iron pyrites mining companies in Ontario, working last year:—

Name of Company.	Location of Mine.
Algoma Steel Corporation, Limited	Helen Mine.
Buffalo-Brockville Mining Company	Brockville.
Canadian Sulphur Ore Company, Limited	Queensboro.
Nichols Chemical Company, Limited, The	Sulphide.
Northern Pyrites Company	Graham.

Mica

The amber mica of Ontario and Quebec has long been highly esteemed by manufacturers, especially those of electrical apparatus, for its flexibility and high insulating efficiency. Nevertheless, mica mining in Ontario shows comparatively little progress from year to year. Its product is meeting with strong competition in the markets of the United States from the white mica of India, where wages are low, and whose mica finds much favor from the form in which it is placed on the market, namely, in small circular boxes or cartons of mica films. These are used in building up the micanite or board mica in sheets of any desired size, which has practically taken the place of the large natural sheets formerly regarded as indispensable, and for which a high price was demanded. The irregular and pocketty nature of the mica deposits here, too, has a tendency to deter systematic exploitation or the expenditure of large sums in development.

Notwithstanding these drawbacks, the output of the mica mines of this Province for 1912 was considerably greater than for 1911, being 570 tons of rough-cobbed material, worth $57,384, as compared with 322 tons in 1911, valued at $43,058.

Following are the producers of mica, an asterisk signifying that no shipments were made in 1912:—

Company or Firm.	P. O. Address.	Location of Mine.
Allard, G. E.	Sydenham	Loughborough Tp.
Birch Lake Mining Syndicate	Ottawa	Loughborough Tp.
Brockville Mining Company	Brockville	South Crosby Tp.
*Connell, F. M.	Toronto	Lanark County.
Kent Bros. & J. M. Stoness	Kingston	Bedford Tp.
*Kingston Feldspar & Mining Company	Kingston	Loughborough Tp.
Loughborough Mining Co., Limited, The	Sydenham	Sydenham.
*McConnell, Rinaldo	Ottawa	North Burgess Tp.
McLaren, W. L.	Perth	North Burgess Tp.
*New York & Ontario Mining Co.	Perth Road	Loughborough Tp.
*Scriven & Whyte	Sydenham	do
*Tett & Brother, J. P.	Bedford Mills	do
*Trousdale, J. W.	Sydenham	Gould Lake.
*Watts, E., & Noble, John J.	Toronto	North Burgess Tp.

Salt

The production of salt from the wells situated on the eastern shore of Lake Huron and St. Clair and Rivers St. Clair and Detroit, remains at pretty much the same figure from year to year. In 1912 it amounted to 90,986 tons, valued at $450,251. The year previous the output was 88,689 tons, worth $430,835. Besides the ordinary uses of salt in the preservation of food products, a beginning has been made in its utilization as the raw material for a large and varied list of chemical manufactures. The Canadian Salt Company have begun the operation of a plant on the Detroit river, near the eastern boundary of the town of Windsor, having good railway connections and a shipping dock on the Detroit river channel bank. The products at present made are bleaching powder and caustic soda. The former is used for bleaching paper and fabrics and also for sterilization of water and sewage; the latter mainly in the manufacture of soap, also in the refining of certain grades of oil and glue, and in the manufacture of lye. It is proposed to add other products to the list. The market for the company's goods is found in Canada, the rate of duty preventing export to the United States. There is no protection on these articles in Canada. The number of hands employed last year was thirty-eight, and the wage bill amounted to $23,859.

Employees in the salt industry in 1912 numbered 219, who were paid in wages $151,218.

The Canadian Salt Company makes two-thirds of the entire output of salt in this Province, but there are a number of smaller independent plants also in operation. The process of manufacture is essentially the same in all; brine is pumped from the wells and evaporated. No rock salt is mined.

Following is a list of the salt-making companies; an asterisk denotes idleness for 1912:—

Name.	P. O. Address.	Location of Wells.
Canadian Salt Co., Limited	Windsor	Sandwich.
Canadian Salt Co., Limited	Windsor	Windsor.
Carter & Kittermaster	Mooretown	Mooretown.
Dominion Salt Co., Limited, The	Sarnia	Sarnia.
Elarton Salt Works Co., Limited, The	Hyde Park Corners.	Warwick Tp.
Exeter Salt Works Co., Limited	Exeter.	Exeter.
Gray, Young & Sparling Co., Limited, The	Wingham	Wingham.
Ontario People's Salt & Soda Co., Limited	Kincardine	Kincardine.
*Parkhill Salt Co.	Parkhill	Parkhill.
Ransford, John	Clinton	Stapleton.
Western Salt Co., Limited, The	Mooretown	Mooretown.
Western Canada Flour Mills Co., Limited	Goderich	Goderich.

Petroleum

A steady drying up of the sources which feed the petroleum wells of the Province has been in progress for a number of years. That the influences which cause this diminution are still in operation is manifest from the fact that the output of crude petroleum last year fell to 8,432,730 imperial gallons, or 240,935 barrels, as compared with 10,102,081 gallons, or 288,634 barrels in 1911, a reduction of 16.5 per cent. The production of 1912 was only 24 per cent. of that for 1904 when the yield was 34,912,360 gallons, or 997,496 barrels. A comparison of the production by districts in 1911 and 1912 is as follows:—

	1911.	1912.
	bbl.	bbl.
Lambton	184,450	150,272
Tilbury	48,707	44,727
Bothwell	35,244	34,486
Dutton	6,732	4,335
Onondaga	13,501	7,115
Total	288,634	240,935

These figures show that there has been a falling-off in all the fields, but at varying rates. Bothwell holds its own very well; the decline in Tilbury is not so rapid as a year or two ago; Dutton suffered a heavy loss and Onondaga—the youngest pool of all—went down to nearly one-half. Lambton (which includes Petrolea and Oil Springs), and Bothwell are evidently by no means on the verge of exhaustion, yet even in them there is a substantial decline. Drilling still goes on in quarters that may have possibilities of oil production, but no strikes of any consequence were made last year. The exact number of wells in operation is not known; the only way to ascertain it would be to enumerate them in the field. The average production probably does not exceed two barrels per month. Pumped as they are in groups of 20 to 60 on a single rig, the expense of operation is very small.

Mr. John Scott, Inspector of gas and oil wells, reports that 201 oil wells were abandoned during 1912. Of these 89 were in the township of Enniskillen, 36 in Tilbury, 25 in Sarnia, 19 in Moore, 18 in Raleigh, 6 in Caradoc, 5 in Mersea, and 3 in Plympton. Many others would also have been abandoned had it not been for the advance in the price of crude oil. Pumps have been removed from 625 wells not abandoned, and there are now about 600 wells being baled.

At the beginning of 1912 the price of petroleum averaged $1.24 per barrel, and at the close $1.62. The increases during the year were not at uniform intervals, but for statistical purposes, the value has been reckoned at the rate of $1.43 per barrel, or $344,537 for the whole. This does not include the Dominion Government bounty of 1½ cents per gallon, or 52½ cents per barrel.

The following table gives the production of crude petroleum by districts for the last five years:—

Table X.—Petroleum Production by Districts, 1908 to 1912

Field.	1908	1909	1910	1911	1912
	bbl.	bbl.	bbl.	bbl.	bbl.
Lambton	265,368	243,123	205,456	184,450	150,272
Tilbury and Romney	201,283	124,003	63,058	48,707	44,727
Bothwell	39,228	38,092	36,999	35,244	34,486
Leamington	9,334	5,929	141	.....	.....
Dutton	13,743	9,513	7,752	6,732	4,335
Onondaga (Brant Co.)	.....	.....	1,005	13,501	7,115
Total	528,959	420,660	314,410	288,634	240,935

The shortage in domestic crude and the increasing demands of the home market have naturally led to a large importation of petroleum by the refining companies, and the proportion of Ontario crude now distilled at their plants is a comparatively small proportion of the whole. In addition to imports of crude for refining purposes, large quantities of refined illuminating and lubricating oils, gasoline and other petroleum products have been brought in. Indeed, the situation now is such that if the production of crude petroleum in Ontario were to cease, the gap would be readily filled by increased imports from the United States, either of crude or the refined products themselves.

Following are the statistics of the refining industry for the five years 1908 to 1912 inclusive:—

Table XI.—Petroleum and Petroleum Products, 1908 to 1912

Schedule.		1908	1909	1910	1911	1912
Crude produced	Imp. gal.	18,479,547	14,723,105	11,004,357	10,102,081	8,432,730
Crude distilled	"	34,675,120	35,530,918	36,171,032	38,632,504	46,270,701
Value crude produced	$	703,773	559,478	368,153	353,573	344,537
Value distilled products	"	2,347,680	2,501,384	2,511,368	2,294,396	3,592,230
Illuminating oil	Imp. gal.	17,604,920	17,902,254	18,983,357	20,240,523	23,090,280
Lubricating oil	"	3,384,940	3,856,778	4,469,038	4,729,257	5,932,166
Benzine and naphtha	"	3,667,997	3,930,691	4,297,615	4,179,575	4,955,022
Gas and fuel oils and tar	"	4,461,186	4,687,588	5,876,498	4,847,124	6,028,983
Paraffin wax and candles	lb.	5,400,003	7,092,278	5,179,391	5,267,485	8,086,841
Workmen employed	No.	430	436	428	511	699
Wages paid	$	247,829	261,014	280,485	314,851	436,852

Natural Gas

The natural gas fields of the Province last year yielded 12,414 million cubic feet of gas, which is valued in the returns made to the Bureau at an aggregate of $2,268,022, being at the rate of more than 18 cents per thousand cubic feet. In 1911 the output was valued at $2,186,762. The retail price of gas is on an average nearly double this figure, but the valuation is not based on the cost to the ultimate consumer, but on the price obtained by the producer, for the most part at the mouth of the well. Naturally, the users of gas in the towns and cities of southwestern Ontario must pay for the cost of piping and distribution, hence the price varies according to distance from the point of production, and other circumstances. As has been remarked before in these Reports, gas is a most desirable fuel, and it would be highly in the general interest if it could be confined to domestic purposes, and not expended on such operations as the burning of lime and brick, or for the generation of steam.

Gas in Lake Erie

No new fields or marked extensions of old ones were brought in during the year, but the productive area now occupies a large part of the northern and eastern shores of lake Erie. The eastern field, including the counties of Welland, Haldimand, Norfolk and Brant, is of greater extent, but Kent county yields nearly two-thirds of the entire production.

A somewhat novel departure is the boring for gas in the land under the waters of lake Erie adjoining the productive fields on the shore. This has been successfully done off the township of Rainham in the county of Norfolk, and wells are now being sunk in front of the townships of Tilbury East and Romney. The gas field in Essex county has ceased to yield, having been destroyed, as is generally believed, by the influx of salt water; but there are those who believe that gas is yet to be found in the extension of

the old field under the lake in front of the townships of Gosfield South and Mersea, and who are desirous of being permitted to put down wells at some distance from the shore in order to test the correctness of this theory. It would appear from the situation of the old field on the land and from the fact that it broadens out as it approaches the lake, that the reservoir may extend under lake Erie, but no one can say in advance how far, if it exists at all, it has been affected by the conditions which injured the field on shore.

The Tax on Natural Gas

The Department maintains in the gas and oil fields of the Province, two Inspectors for the purpose of enforcing the provisions of the Act to prevent the waste of natural gas and to provide for the plugging of all abandoned wells. The Inspectors are Mr. John Scott, Petrolea, and Mr. Donald Sharpe, Welland. The former's duties are exercised in the counties of Lambton, Essex, Kent and Elgin, and the latter's in the Welland-Haldimand-Norfolk-Brant field. There are also certain provisions in the Supplementary Revenue Act, 1907,—which imposes a tax on natural gas—designed to make illegal the wilful and deliberate waste of natural gas which is so common in gas districts. Under the latter Act a tax of two cents per thousand cubic feet is leviable on all natural gas produced in the Province, but a rebate of 90 per cent. is allowed on all gas used in Ontario. The enforcement of these laws has had two results: (1) No gas is now piped out of the Province for consumption in the border cities of the United States, and (2) the waste of gas has been reduced to a minimum. The fact that in any given field the gas comes from a reservoir common to all the wells, gives each producer an incentive to see that no one wastes any part of the product, for what is permitted to escape without performing some useful office diminishes by just so much the stock of all. The efforts of Mr. G. R. Mickle, Mine Assessor, and of Inspectors Scott and Sharpe, to enforce the regulations against waste of gas have met with general support from gas producers, and have brought the controllable waste of gas to a minimum. The chief, if not the only, point of difficulty is where oil and gas are found in the same well. In such a case the law authorizes the owner to allow the gas to escape; but, fortunately, those portions of the gas territory where oil is also found in commercial quantity do not constitute a large part of the whole.

Mr. Mickle furnishes the following notes regarding the natural gas industry:—

Natural Gas Industry in 1912

Natural gas was obtained from three different fields or areas during the year, viz.: the oldest or the Welland-Haldimand-Norfolk-Brant field, which commences near the Niagara river and stretches westward along lake Erie for about seventy miles with some barren places. The next historically is the Kent field, which was fully described in Vol. XIX, p. 149-153, Report of the Bureau of Mines, and which appeared as a producer first in 1907. The third is the Elgin field, in the township of Bayham, described in Vol. XX, p. 49 of the Bureau's Reports, and producing first in 1911.

The total production from these three fields was approximately 12,454.9 million cubic feet, distributed as follows:—

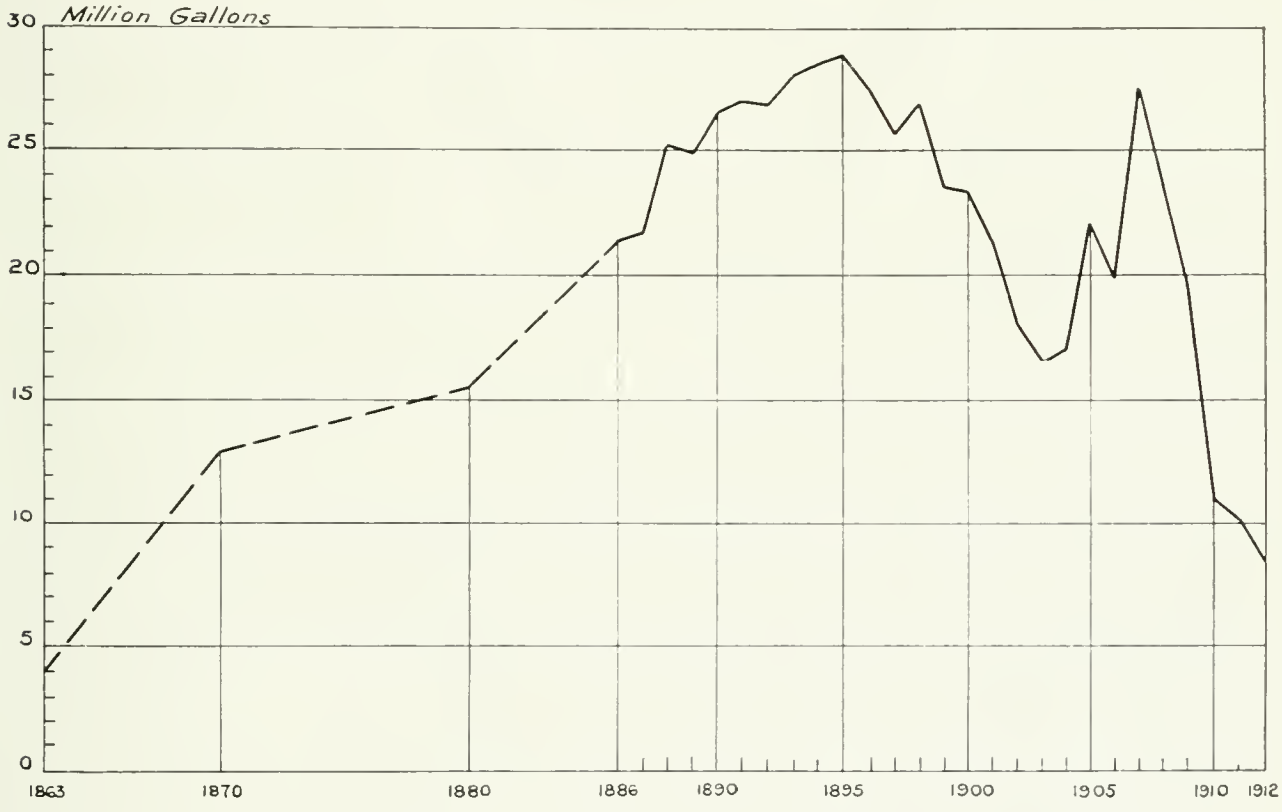
	Million Cu. Ft.		
Welland-Haldimand-Norfolk, etc.	4,246.0	or	34.0%
Kent	7,752.5	"	62.2%
Elgin	456.4	"	3.8%
Total	12,454.9	"	100.

The gas-bearing rock in the Welland-Haldimand, etc., area does not usually extend more than a very few miles back from lake Erie; probably the total area on the land covered by this gas rock is about 200 square miles. This field has been producing gas for over twenty years. It is impossible to give statistics of the total production from the field up to the present, as during the earlier years no complete record was kept of the output. It seems probable, however, that an approximate estimate can be made The writer proposes to attempt this at some future ime. During the seven years covered by the Supplementary Revenue Act, the total yield from this field has been approximately

25,891 million cubic feet. The drain has been very heavy, and in the older parts the productive period is drawing to an end. No oil has been found associated with the gas in this field.

Separated from this first-mentioned area by a barren or untested stretch of about twelve miles, is the small Elgin field mentioned above, in which the sand-bearing rock so far known at present, is found within an area of less than ten square miles, reckoning the dry land only. Undoubtedly, however, in all three fields the gas-bearing rock extends some distance under lake Erie. Up to the end of 1912 the production from this part has been 582 million feet. The prospects that this will develop into a very important field seem small. The area is not great and the gas-bearing strata are thin.

The Kent field, as is seen above, was much the heaviest producer, and appears as if it would ultimately yield more gas than the first-mentioned one. It is separated from the Elgin field by an interval of about sixty miles which is barren or untested. As the gas is found in different rock and differs in composition from that obtained in Elgin, it is undoubtedly not connected with the latter in any way. The total yield of gas up to the end of 1912 from this field, including waste in the first years after discovery as explained on p. 39, Vol. XXI, Report of the Bureau of Mines, is 23,132 million cubic feet. The land area is about twenty-six square miles.



Production of crude oil in Ontario up to the end of 1912 (from 1863 to 1886 estimate only).

Equivalent of Gas in Oil

It is customary in dealing with the natural gas industry to value it according to the price at which the gas is sold; as it permeates certain strata of rock, and the amount drawn off is not confined to the holdings of any lessee, but comes in part from the adjoining lands, intense competition arises among gas operators, and a desire to draw off as much gas as possible before their rivals. Hence a great part of the gas is sold for extremely low prices—10 to 15 cents per thousand to the consumer—and a proper idea is not obtained of its value. Practically all gas and oil are converted into heat when used. If they are employed as illuminants, some substance is heated and radiates the light. In the case of oil giving light from the flame direct, the particles of carbon are heated and act as radiators of light. In order, therefore, to compare oil and gas, both must be reduced to their equivalent heat units. As shown on p. 152 of the 19th Report, a barrel of oil (35 gal.) is equivalent to about 5,400 cubic feet of natural gas of the kind found in Kent; hence the amount given above is equivalent to about 4,283,600 barrels of oil. If this is compared with the total production of oil in the Province up to the end of 1912, a better idea can be had of the value of the Kent gas field.

Complete returns of the oil production do not exist, as far as the writer can ascertain, but Vol. V of the Bureau's Reports gives the production from 1886 up to 1891 (p. 21), and from that onwards the annual reports give the statistics. The total amounts

to 591,600,000 gals. approximately. For the period preceding this, beginning with 1862, when the production started, only an estimate can be made. The Geological Survey Report, 1863 (p. 786), gives the production for seven months in that year, and the calculated amount for the year in the same proportion is approximately 3,860,000 gals. The Report of the Royal Commission on the Mineral Resources of Ontario, 1890 (p. 209), states that the production in 1870 was 12,900,000 gals., and for 1880, 15,500,000 gals. These returns were made in connection with the decennial census. By plotting these known points to scale as shown on accompanying chart and joining the points mentioned, the probable production for each year can be ascertained. If this is done it will be seen that it amounts to 302,500,000 gals. for 1863 to 1886, or a total probable production up to the present of oil from the whole Province of 894,100,000 gals. or about 25,540,000 barrels.

As is seen, the Kent gas field has produced already the equivalent of one-sixth of this, and certainly will produce more than six times the amount yielded up to the present, and therefore, in actual value to the consumer will exceed the value of the yield of oil from the whole Province. When it is considered that this very valuable asset was very nearly sacrificed in the elusive search for oil, which in the end was insignificant in amount—less than 10,000 barrels from the gas field proper—the need for stringent legislation to prevent any possibility of the recurrence of a similar state of affairs is apparent.

Inspector Sharpe reports that during the year two new gas fields were found in the county of Haldimand, one being in the township of Sherbrooke and the other in the township of Dunn, on the east and west sides respectively of the mouth of the Grand river. These fields are within five miles of the first wells drilled in the county of Haldimand. The wells are the most productive of any in the county, six of them yielding over a million cubic feet each per day. Two other fields have been developed, one in Canboro', Haldimand county, and the other in Binbrook, county of Welland. Drilling is in progress near Woodstock, and if successful, the gas will be piped to that city. Three deep wells, 2,800 feet each, were drilled in Haldimand, at Jarvis, Nelles' Corners and York respectively, but all three were practically dry. Considerable drilling is in prospect for 1913. The largest single producer is the Dominion Natural Gas Company, which drilled 63 wells during the year and have a total of 343 producing wells. A large syndicate under the name of H. L. Doherty & Co., of Broadway, New York, have obtained a charter from the Dominion Government for a company capitalized at $12,000,000 with the object of taking over all natural and artificial gas companies recently acquired by the syndicate.

There were in all the fields at the close of 1912 1,247 producing wells, of which 178 had been put down during the year. The number of non-producing wells bored in the year was 41. There were 1,448 miles of pipe, the number of employees engaged in the business was 277, and the wages paid them amounted to $184,351.

The following list gives the names and addresses of owners or operators of gas wells having any considerable production last year:—

Name.	P. O. Address.
Aikens, Smith and Lalor	Dunnville.
Aldrich Gas and Oil Company	Selkirk.
Aikens and Kohler	Dunnville.
Bertie Natural Gas Company, Limited	Ridgeway.
Beck, Aikens and Lalor	South Cayuga.
Beaver Oil and Gas Company, Limited	Brantford.
Bertie Natural Gas Company, Limited	Ridgeway.
Chippewa Oil and Gas Company, Limited	Tavistock.
Cheapside Natural Gas and Oil Company	Cheapside.
Canboro' Natural Gas Company, Limited	Canboro'.
Canadian Gas Company, Limited	Detroit, Mich.
Canadian Steel Foundries	Port Robinson.
Canfield Natural Gas Company, Limited	Canfield.
Coleman, J. A.	Wellandport.
Crystal City Oil and Gas Company, Limited	Brantford.

Name.	P. O. Address.
Commonwealth Gas Company, Limited	Hamilton.
Dominion Natural Gas Company, Limited	Pittsburg, Pa.
Dunn Natural Gas Company	Dunnville.
Deagle, John	Tuscarora.
Danskin, David	Cainsville.
Empire Limestone Company	Buffalo, N.Y.
Enterprise Gas Company, Limited, The	Delhi.
Fisherville Gas Company	Fisherville.
Holmes Gas Company	Selkirk.
Humberstone Mutual Natural Gas and Fuel Company, Limited	Humberstone.
Hagersville Light and Fuel Company, Limited	Hagersville.
Hamilton, Alex.	Onondaga.
Howell, H.	Onondaga.
Hager, Ham.	Tuscarora.
Home Natural Gas Company, Limited	Hamilton.
Hoover, Jas. E.	Selkirk.
Hoover, D. E., A. E., and Menno	Rainham Centre.
Hoover, D. E.	Rainham Centre.
Industrial Natural Gas Company, Limited	Port Robinson.
Kohler Gas Company	Kohler.
Kindy and Sons, D.	Selkirk.
Lamb, Walter B.	Nanticoke.
Lalor, F. R.	Dunnville.
Lawson, J. J.	Stromness.
Lint and Emerson	Attercliffe.
Lamb, Alfred	Selkirk.
Maple City Oil and Gas Company, Limited	Chatham.
Medina Natural Gas Company, Limited	Chatham.
Miller, R. F.	Rainham Centre.
Midfield Natural Gas Company, Limited, The	Hamilton.
Marshall, James	Hamilton.
Manufacturers' Natural Gas Company	Hamilton.
Melick and Moote	Dunnville.
Norfolk Gas Company, Limited	Port Dover.
North Shore Gas Company, Limited	Hamilton.
Northwestern Gas Company, Limited	Erie, Pa.
Oxford Oil and Gas Company	Brantford.
Onondaga Oil and Gas Company, Limited	Brantford.
Ontario Iron and Steel Company, Limited	Welland.
Port Rowan Natural Gas Company, Limited	Pittsburg, Pa.
Port Maitland Gas Company	Port Maitland.
Provincial Natural Gas and Fuel Company, Limited	Niagara Falls, Ont.
Producers Natural Gas Company, Limited	Hamilton.
Port Colborne-Welland Natural Gas and Oil Company, Limited	Port Colborne.
Rolston and Bennett	Dunnville.
Regah Gas Company	Hagersville.
South Cayuga Natural Gas Company	South Cayuga.
Snively, F. L.	Dunnville.
Sterling Gas Company	Port Colborne.
Selkirk Gas and Oil Company, Limited	Selkirk.
Steele, J. A., Estate of	Humberstone.
Springvale Natural Gas Company	Springvale.
Standard Natural Gas Company, Limited	Dunnville.
Telephone City Oil and Gas Company, Limited	Brantford.
Union Natural Gas Company, Limited	Niagara Falls.
United Gas Companies, Limited	St. Catharines.
Utor Gas Company, Limited	Rainham Centre.
Van Sickle, A. W.	Onondaga.
Waines and Root Gas Company, Limited, The	Dunnville.
Welland County Lime Works, Limited	Port Colborne.
Widrick, M.	Nanticoke.

Miscellaneous

There was about the usual production of mineral substances, most of them non-metallic, not referred to above. They include calcium carbide, corundum, feldspar, graphite, gypsum, quartz and talc. All of these except calcium carbide and gypsum are obtained from Eastern Ontario, and almost all occur in quantities which would permit a much larger output, if the demand existed.

Gypsum

The gypsum deposits of the Province now being worked are in the valley of the Grand river, principally in the neighbourhood of Caledonia. Some of them have been operated for many years, and the workings are now quite extensive. Occurring as horizontal beds, with a thick over-burden, the gypsum bodies are mined like coal. The development of the Portland cement industry has furnished a new outlet for gypsum, a small proportion of which is added for the purpose of regulating the setting of the cement. Large deposits of gypsum are known to occur in the valleys of several rivers running down the northern slope into James Bay, but as yet they are too remote from transportation facilities to be available. The production of crude material in 1912 amounted to 31,331 tons, valued at $50,246. Besides its use as a "retarder" in cement, gypsum is manufactured into alabastine and other forms of wall dressing, wall plaster, etc.; it is also employed in the ground form as a carrier of poison for potato bugs, and as a fertilizer.

Calcium Carbide

The manufacture of calcium carbide in Ontario is now confined to the Canada Carbide Company, whose works are situated at Merritton. Calcium carbide is formed by fusing lime and carbon in the electric furnace, and when subjected to the action of water, gives off acetylene gas, a powerful illuminant, now largely used where ordinary gas or electric light is not available, as in small or isolated places. Some 1,998 tons were made in 1912, valued at $120,000, or $60 per ton.

Corundum

Corundum is obtained from the deposits in Renfrew and Hastings counties, the rock in which they occur being mainly nepheline syenite. The working of these deposits has shown that as a rule the crystals of corundum which are found on the surface do not continue to great depth, hence they are worked by open cut or quarry methods. Operations began in 1899, and for a time were carried on by two concerns, known at first as the Canada Corundum and Ashland Emery and Corundum Companies. The interests of both were subsequently acquired by the Manufacturers' Corundum Company, which continued to mine and treat the corundum by crushing and grading it until last year. Recently, however, the mill was burned down. In 1912 the output of grain corundum was 1,960 tons, of a value of $233,212, or $119 per ton. The chief use of corundum is as an abrasive or polishing material for metals. For certain classes of work it is preferred to anything else, but various artificial compounds are now being produced which compete with corundum in certain lines of manufacture. Among these is carborundum, the silicide of carbon, made by fusing silica and carbon in the electric arc. Corundum is pure alumina, but so far has defied experimenters who have endeavoured to dissociate the oxygen from the aluminium, and obtain the latter in metallic form.

Feldspar

Feldspar is a common rock constituent, and makes up a large part of the granite and gneisses of eastern and northern Ontario. Occasionally it is found in masses sufficiently pure to admit of its being quarried and used in the manufacture of pottery, enamelled ware and kindred articles. The principal feldspar quarries are on the line

of the Kingston and Pembroke railway, near Verona, but the mineral also occurs in the neighbourhood of Parry Sound and elsewhere. It is mostly exported to East Liverpool, Ohio, and Newark, New Jersey, for the use of the pottery trade there. The Verona deposits are of the microcline variety, and contain 13 or 14 per cent. of potash. The demand for the latter substance to maintain or replenish the fertility of the farms of the United States and Canada has given rise to many attempts to obtain the potash ingredient of feldspar in a form which could be laid hold of by vegetation, but so far no successful method seems to have been perfected. In 1912 the output of feldspar was less than usual, being 13,633 tons, valued at $28,916, as compared with 17,697 tons in 1911, worth $51,610. Dominion Feldspar, Limited, formerly the Suroff Feldspar Mining and Milling Company has built and equipped a mill for grinding feldspar at Parham. It was nearly ready for operation at the end of 1912. The bulk of the production was by the Kingston Feldspar and Mining Company, which operated its quarries at Desert lake, Bedford township, and Reynolds' mine, Portland township. The McDonald Feldspar Company, Charles Jenkins, and Ojaipee Silica and Feldspar Company, did not operate during the year.

Graphite

Refined graphite to the amount of 1,246 tons was produced last year, valued at $65,076. Two plants were in operation, namely, those of the Black Donald Graphite Company, at Whitefish lake, in the county of Renfrew, and the Virginia Graphite Company at Wilberforce. The New York Graphite Company began the construction of a mill for treating graphite at Harcourt last year. The Globe Refining Company's plant at Port Elmsley was idle during the whole of 1912. The chief use of graphite is in the manufacture of crucibles, lead pencils, foundry facings, stove polish, etc. It is also employed as a lubricant for gear and sprocket wheels. Artificial graphite made in electric furnaces from carbon has come extensively into use during the last few years.

Quartz

Most of the quartz taken out last year was raised by the Canadian Copper Company at their quarries in the township of Dill, being required for lining the furnaces used in converting low grade matte into Bessemer matte. The Kingston Feldspar and Mining Company annually obtain a quantity of quartz while working their feldspar deposits, the quartz occurring as veins or dikes cutting the spar. Messrs. Willmott and Company operated a quartz quarry near Killarney, and the McPhail and Wright Construction Company another on the line of the Algoma Central and Hudson Bay railway. Part of the quartz output is used in the manufacture of ferro-silicon by Electro Metals Limited, at Welland.

Talc

Talc is mined at Madoc and Eldorado in Hastings county, and is ground at the former place by Messrs. Geo. H. Gillespie and Company, and at the latter by the Canadian Talc and Silica Company, Limited. In all 13,446 tons of crude talc were raised during 1912, and of the ground product 6,726 tons were shipped, valued at $61,358. At the mines and mills, 79 hands were employed, earning wages amounting to $32,396. The chief use to which ground talc is put is in the manufacture of paper; it is also utilized as a cosmetic and in soap-making.

Peat Fuel

The manufacture of peat fuel has not developed as rapidly as was at one time hoped. There is no lack of the raw material, and there is a practically unlimited market, but there are difficulties in the way of steady and economical production which do not appear to have been satisfactorily overcome by any of the processes hitherto put forward. The chief difficulty lies in getting rid of the moisture. It seems

that the application of any form of artificial heat adds too much to the cost, while if the sun and wind are depended upon to eliminate the water, a wet summer, such as that of 1912, practically renders the manufacture impossible. At two points in Ontario peat fuel was made last year, namely, at Alfred by Mr. J. M. Shuttleworth, and at North Dorchester by Dr. J. McWilliam. The combined shipments amounted to 175 tons, valued at $725.

Mining Revenue

From the several sources of mining revenue the Government received during the fiscal year ending 31st October, 1912, the sum of $633,778.95, being a falling-off as compared with the previous twelve months, of $165,141.06. Itemized statements for the two years are as follows:—

Service.	12 months ending 31st Oct., 1911	12 months ending 31st Oct., 1912
Sales of mining land	$64,268.43	$51,634.48
Rental leases do.	25,797.14	33,098.34
Miners' licenses, permits and fees	211,768.57	107,162.70
Mining royalties	285,913.26	250,145.65
Supplementary Revenue Act, 1907	209,461.51	190,875.53
Provincial Assay Office	1,362.37	654.00
Diamond drills	.....	208.25
Provincial mine	348.73	.....
Total	$798,920.01	$633,778.95

It will be observed that receipts from sales of mining land have decreased while revenue from rentals is greater. This is in part due to the fact that much of the activity in taking up lands for mining purposes was displayed within the limits of the Temagami Forest Reserve, where the law does not permit such land to be sold outright, but authorizes leases only. In the following table is given particulars of the land disposed of by the Crown under the provisions of the Mining Act. As will be seen, the total receipts as shown by this table do not agree with those given above. The discrepancy is due to the fact that the sums appearing in the first table are those actually received within the fiscal year, while in the second are given only those pertaining to the transactions consummated—patents issued, leases made, etc.—during the year.

Table XII.—Mining Lands Sold and Leased for year ending October 31st, 1912

District.	Sales.			Leases.			Total.		
	No.	Acres.	Amount.	No.	Acres.	Amount.	No.	Acres.	Amount.
			$			$			$
Nipissing	265	10,726.95	24,697.83	434	16,032.55	16,637.35	699	26,759.50	41,335 18
Sudbury	101	4,002.29	10,923.98	8	280.70	280.70	109	4,282.99	11,204.68
Algoma	21	1,282.18	3,244.78	.....	.....	.....	21	1,282.18	3,244.78
Thunder Bay	54	2,455.10	5,694.75	.....	.....	.....	54	2,455.10	5,694.75
Kenora	13	495.70	1,155.25	.....	.....	.....	13	495.70	1,155.25
Elsewhere	8	370.71	919.01	11	398.60	398.60	19	769.34	1,317.61
Total	462	19,332.96	46,635.60	453	16,711.85	17,316.65	915	36,044.81	63,952.25

License and Recording Fees

The amount received for miner's licenses, permits to search for minerals in forest reserves, and recording fees, was considerably less than in the previous fiscal year, the decrease being $104,605.87. The items are as follows:—

Miner's Licenses	$56,147.75
Forest Reserve Permits	1,780.75
Recording Fees	49,234.20
Total	$107,162.70

Receipts under the foregoing headings are essentially dependent upon the amount of prospecting and staking out of mining claims during the year. When rich discoveries are made and new mineral belts of promise opened up, there is a rush to take up claims. No one can stake or record a claim who is not the holder of a miner's license, the charge for which is five dollars, nor can an unpatented claim be transferred to any one not a licensee. For recording a claim the fee is ten dollars, for registering a transfer two dollars, etc. The falling off in the fees paid in through the Mining Recorders' offices suggests that there were fewer prospectors in the woods and fewer claims recorded or transferred last year than in the previous one; and such was the case. Cobalt, South Lorrain, Gowganda and Porcupine have all been pretty thoroughly gone over, at any rate according to the estimate of the majority of prospectors; and there is at present a period of comparative quiescence. Past experience, however, leads to the opinion that this phase is temporary. New discoveries are bound to be made, and they will lead to fresh outbursts of prospecting and recording. The staking in Teck and Lebel, which followed on the finding of the rich, if small, gold-bearing veins at Kirkland lake, is evidence, if any is needed, that a watchful eye is maintained by the prospecting fraternity upon promising developments in northern Ontario.

Royalties

The mining royalties collected during the year amounted to $250,145.65, as follows:—

O'Brien mine	$72,070.81
Crown Reserve Mining Company	136,179.90
Hudson Bay Mines	36,758.88
Wyandoh Mining Company	123.58
Cobalt Provincial Mines	5,012.48
Total	$250,145.65

The aggregate royalties by the various mines subject to the same, up to 31st October, 1912, are as follows:—

O'Brien mine	$668,376.51
Crown Reserve Mining Company	611,990.91
Hudson Bay Mines	245,270.32
Chambers-Ferland Mining Company	26,259.64
Hargrave Silver Mines	1,200.00
Waldman Silver Cobalt Mining Company	777.48
Wyandoh Mining Company	1,421.72
Cobalt Provincial Mines	6,735.14
Total	$1,562,031.72

Certain changes were made during the year in the rate of royalty paid by some of the companies. These were as follows:—

(1) The rate payable by the O'Brien mine was reduced from 25 per cent. on the gross value of the ore at the pit's mouth (less surface costs) to 15 per cent. of the net profits as ascertained on the basis of the Supplementary Revenue Act, 1907. Should other bonanzas be struck in future workings the Government retains the power to restore the former rate.

(2) In the case of the Chambers-Ferland and Hargrave companies the royalty, which was originally the same as was levied on the O'Brien mine, has been abolished entirely; but the right is reserved should rich ore be encountered in quantity, to impose a rate not exceeding 15 per cent. of the net profits on the Supplementary Revenue Act basis, after allowing for a dividend to the shareholders up to 10 per cent. per annum.

In general it may be said that the reason for making these concessions was the allegation, which investigation proved to be correct, that the condition of the properties was now such as would not warrant a heavier burden, and that if the former royalties were to remain in force, the period was at hand when the mines would have to cease working altogether.

Supplementary Revenue Act, 1907

The operation of the Supplementary Revenue Act, 1907, yielded for the calendar year a total of $190,875.53, made up as follows:—

Profit Tax	$155,506.86
Acreage Tax	15,770.62
Gas Tax	19,598.05
Total	$190,875.53

The Act provides for the appointment of an officer called the Mine Assessor, to collect the revenue arising under it, and Mr. G. R. Mickle, M.E., formerly professor of mining engineering at the School of Practical Science, Toronto, has occupied the position from the time the act came into force six years ago. Under Mr. Mickle's supervision the Act has worked smoothly, and there has been a generous measure of co-operation on the part of the mining companies in putting its provisions into effect. Mr. Mickle furnishes the following information regarding the working of the Act during the year 1912. It should be pointed out that his figures of revenue are for the calendar year, while those given above are for the twelve months ending 31st October, the date at which the fiscal year for the Province closes.

There are three different kinds of tax levied under this Act, viz.: (1) Profit tax, which is at the rate of three per cent. on profits of mines in excess of $10,000, with certain deductions for taxes paid municipalities. (2) Natural gas tax, at the rate of two-tenths of a cent per thousand cubic feet. (3) Acreage tax, of two cents per acre on all mining lands in territory with no municipal organization.

The amount collected under this Act belonging to the calendar year 1912 was $210,407.32, and was distributed as follows:—

Profit Tax	$176,527.24
Natural Gas Tax	19,440.36
Acreage Tax (15th Ap., 1912, to 15th Ap., 1913)	14,439.72
Total	$210,407.32

This is about 28 per cent. more than the amount collected in 1911. The chief increase was in the profit tax, due mainly to the heavy production in 1911 in the Cobalt district, the tax being based on the results of the preceding year. As the fiscal year for the Province ends on the 31st of October and the tax is not due till October, a certain amount is always paid in the next fiscal year and this statement will not agree with the public accounts.

The profit tax was paid by fourteen different companies, the greater part coming from the silver mines of Cobalt. No revenue was obtained from gold mines in 1912. A substantial amount will probably be derived from the operations of gold mines in the coming years. As certain companies in the Cobalt district paying a royalty to the Crown may under their agreements deduct any tax paid from the royalty, the tax is not collected from these. If it had been, the tax would be about $42,000 more and the royalties, of course, less by the same amount. For several years the aggregate amount paid as profit tax by all the mines of the Province should not be very materially altered.

The natural gas tax was obtained from forty-eight different companies or individuals, some of the amounts being quite small. Twenty-seven of those contributing paid less than $100 each. This tax is about 10 per cent. more than last year, with an apparent increase in sight for the next few years, and then a decline, unless new fields are found.

In the case of the acreage tax no attempt is made to keep the tax for the different years separate. No bills are sent for this tax, and payments are made throughout the entire year. In many cases the owners pay several years' taxes at one time. The amount given above includes penalties and costs of advertising.

The operation of the acreage tax is a matter of some interest in 1912, as the second list of ands two years in arrears of taxes was advertised in accordance with the Act, and the provisions may now be considered to be in normal working order. One great difficulty has been met in carrying out these provisions of the Act, due to the non-enforcement of the Algoma Land Tax Act, which was passed in 1868, and which covered fully five-sevenths of the lands liable under the Supplementary Revenue Act. By two amendments to the former Act owners of lands were directly encouraged not to pay the tax, viz.: in 1886 (49 Vic. Chap. V., Sec. 5), whereby the tax which was originally 2 cents per acre, was changed to one cent, and a discount of 50 per cent. allowed on all arrears; also in 1903 (3 Edw. VII., Chap. 2, Sec. 2), whereby lands which had been brought into any municipality were relieved of all arrears of Provincial taxes.

The total number of parcels of land on the tax roll was 7,109 at the end of 1912. Of these, 285, or about 4 per cent. were advertised as two years in arrears, and before the time for making payment had elapsed—six months being required by the statute—over half the number were placed in good standing again, leaving 128 parcels, or about 1.8 per cent. of the total to be forfeited. This insignificant proportion of the whole, which the owners have decided to abandon, is an index of the interest felt in the mineral lands of the Province. There was no substantial difference in the percentage forfeitable in the several districts outside of Parry Sound, which contains only 2 per cent. of the total number of parcels and showed 6 per cent. forfeitable. The proportions in the other districts varied between 3 and 0.6 per cent.

Mining Companies

The business of forming joint stock companies for the exploitation of mining prospects and the working of mines, fell off very considerably last year, the ratio between the number of such incorporations and the intensity of the speculative fever being very definite. Speculation in mines and mining stocks for the time being gave way to speculation in real estate, and there being a poor market for mushroom shares, a much smaller number was offered. The number of mining companies incorporated under the laws of Ontario was one hundred and thirty, with an aggregate authorized capital of $73,237,000, as against two hundred and thirteen in 1911, with a capitalization of $215,640,000. Thus, while in number the incorporations were fewer by over one-third, the gross amount of nominal capital stock was smaller by nearly two-thirds, compared with the record for the previous year. Moreover, gold and silver mining companies no longer predominate. More companies were incorporated in 1912 for making brick than for mining gold, and almost as many for obtaining natural gas and oil as for winning silver. Stone, marble, and trap rock for roadmaking purposes called more than a dozen into existence, and industrial operations concerned with other metals and minerals were responsible for the remainder.

In addition to the companies of domestic origin, six foreign corporations were licensed to do business in Ontario, having an aggregate capital of $570,000.

Following is the list:—

Mining Companies Incorporated in 1912

Name of Company.	Head Office.	Date of Incorporation.	Capital.
A. B. P. Mining Company, Limited	Toronto	April 12	$40,000
Aladdin Cobalt Company, Limited	Toronto	August 23	500,000
American Eagle Mining Company, Limited	S. ½ Lot 10 in 1 Tp. of Munro.	March 2	40,000
Anchorite Mining Company, Limited	Toronto	July 22	250,000
Augarita Mines, Limited	Toronto	January 11	2,000,000
Beachville White Lime Company, Limited	Beachville	July 18	40,000
Beaver Auxiliary Mines, Limited	Toronto	September 10.	500,000
Bishopric Wall-Board Company, Limited	Ottawa	August 23	150,000
Brandon's Oil and Gas Company, Limited	Milton	April 16	100,000
Buffalo and Dunnville Oil and Gas Company, Limited	Dunnville	September 20.	100,000
Buffalo Corundum Company, Limited	Fort Erie	January 26	40,000
Buffalo-Ontario Lead Company, Limited	Kingston	May 20	100,000
Buffalo-Ontario Smelting and Refining Company, Limited	Toronto	February 16	40,000
Canada Amalgamated Nickel and Copper Company, Limited.	Toronto	March 15	2,000,000
Canada Crushed Stone Corporation, Limited	Hamilton	December 11	1,500,000
Canada Veteran Gold Mines, Limited	Toronto	March 25	1,000,000
Canadian Finance and Securities, Limited	Toronto	March 1	50,000
Canadian Furnace Company, Limited	Port Colborne	March 18	500,000

Mining Companies Incorporated in 1912—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital.
Canadian Gas Company, Limited	Windsor	January 18	1,000,000
Canadian Marble Company, Limited	Toronto	May 20	100,000
Canadian Mining and Exploration Company, Limited	Toronto	May 18	5,000,000
Canadian Quarries, Limited	Hamilton	December 5	100,000
Cartwright Gold Fields, Limited	Toronto	January 8	1,000,000
Casey Kismet Mining Company, Limited	Toronto	March 28	40,000
Consolidated Ophir Mines, Limited	Toronto	January 2	5,000,000
Dane Mining Company, Limited	Haileybury	February 14	500,000
Deer Lake Gold and Silver Mines, Limited	North Bay	June 18	500,000
Dome Lake Company, Limited	Toronto	September 17.	500,000
Dominion Reduction Company, Limited	Toronto	June 27	100,000
Elizabeth Gold Mines, Limited	Toronto	January 11	500,000
Elk Fire Brick Company of Canada, Limited	Hamilton	December 18.	40,000
Elk Lake Holding Company, Limited	Toronto	October 2	40,000
Fleur-de-Lis Silver Mining Company, Limited	North Bay	September 19.	1,500,000
Fraser-Bay Iron Company, Limited	Sault Ste. Marie.	October 9	1,000,000
Gem Flint Iron Company, Limited	Sarnia	February 15	100,000
General Mines, Limited	Toronto	September 10.	1,000,000
General Natural Gas and Oil Company, Limited	Windsor	March 22	100,000
Glenwood Natural Gas Company, Limited	Toronto	December 31	750,000
Gold Eagle Mines, Limited	Haileybury	January 22	1,000,000
Gordon Porcupine Mines, Limited	Toronto	March 13	40,000
Hart Porcupine Mines, Limited	Toronto	March 13	40,000
Hayden Gold Mines, Limited	Toronto	September 7	2,000,000
Huron Trap Rock Company, Limited	Sault Ste. Marie.	December 20.	100,000
Huronian Exploration Company, Limited	New Liskeard	January 27	50,000
Kenroy Gold Mines, Limited	Toronto	February 21	1,000,000
Lorraine-Trout Lake Mines, Limited	Toronto	October 16	1,800,000
Martin International Trap Rock Company, Limited	Bruce Mines	December 7	600,000
Meaford Brick Company, Limited	Toronto	May 7	500,000
Medina Shale Brick Company, Limited	Toronto	November 18.	180,000
Melbourne, Limited	Toronto	May 13	100,000
National Sand and Material Company, Limited	Welland	April 20	40,000
New York Graphite Company, Limited	Toronto	August 23	1,000,000
Niagara Natural Gas and Fuel Company, Limited	Sherkstone	May 9	40,000
Northern Canada Prospecting Company, Limited	Toronto	April 22	40,000
Northern Quarries, Limited	Toronto	November 19.	50,000
Ontario Calvert Porcupine Mining and Reduction Co, Ltd.	Toronto	March 4	40,000
Ontario Solid Silver Mines Limited	Toronto	October 2	100,000
Penn-Canadian Mines, Limited	Toronto	April 24	1,500,000
Peoples' Proprietary Mines Company, Limited	Toronto	April 25	250,000
Peterboro' Oil and Gas Company, Limited	Peterborough	August 10	40,000
Porcupine Fortuna Gold Mines, Limited	Toronto	January 4	2,000,000
Porcupine Gold Leaf Mining Company, Limited	Toronto	March 25	1,000,000
Porcupine Golden Quill Mining Company, Limited	Toronto	February 26	1,500,000
Porcupine Krist Mines, Limited	Toronto	March 12	1,500,000
Porcupine Twin Mining Company, Limited	Toronto	February 12	1,950,000
Prices, Limited	Toronto	March 1	100,000
Quaker City-Porcupine Mines, Limited	Toronto	April 2	2,000,000
Rochester Mines, Limited	Toronto	September 27.	1,000,000
Saratoga-Syracuse Mining Company, Limited	Toronto	March 5	1,000,000
Shale Products, Limited	Inglewood	May 1	150,000
Silver Islet Mining Company, Limited	Fort William	July 20	500,000
Six Nations Mining Company, Limited	Toronto	July 30	1,000,000
Soo Trap Rock Company, Limited	Sault Ste. Marie.	March 11	50,000
South Bay Mines of Gowganda, Limited	Toronto	February 22	40,000
Standard Development Company, Limited	Bowmanville	July 5	100,000
Superior Brick Company, Limited	Fort William	October 3	500,000
The Algunican Development Company, Limited	Haileybury	June 13	1,500,000
The Bartonville Pressed Brick Company, Limited	Hamilton	July 13	40,000
The Bear Track Mining Company of Porcupine, Ontario, Ltd.	Haileybury	April 29	2,000,000
The Big Four Brick Company, Limited	Toronto	May 14	150,000
The Bouzan Mines, Limited	Haileybury	September 23.	2,000,000
The Canada Brick and Fireproofing Company, Limited	Toronto	May 22	500,000
The Canadian Messabe Iron Company, Limited	Fort Frances	November 21.	250,000
The Cedar Valley Brick Company, Limited	Toronto	November 13.	150,000
The Chippewa Oil and Gas Company, Limited	Berlin	November 1	50,000
The Cleveland Gold Mining Company, Limited	Dryden	November 7	100,000
The Dixie Brick Company, Limited	Toronto	May 21	90,000
The Doric Portland Cement Company, Limited	Owen Sound	April 9	500,000
The Dunn Natural Gas Company, Limited	Dunnville	April 22	40,000
The Emo Iron Mine and Development Company, Limited	Emo	July 23	200,000
The Excelsior Brick Company, Limited	Toronto	November 11.	250,000
The Gallagher Lime and Stone Company, Limited	Hamilton	March 21	50,000
The Guelph Brick and Tile Company, Limited	Guelph	September 11.	50,000
The Haldimand Gypsum Company, Limited	Caledonia	November 19.	150,000
The Humber Cement Brick Company, Limited	Toronto	November 2	40,000
The Ideal Brick and Tile Company, Limited	Brantford	October 22	60,000
The Intercities Quarries Company, Limited	Port Arthur	May 6	500,000
The Ionic Cement and Stone Company, Limited	Owen Sound	August 9	40,000
The Kenora Golden Triumph Mines, Limited	Toronto	April 30	102,000
The Killarney Gold Mining Company, Limited	South Porcupine.	April 24	2,000,000
The Kingston Brick and Tile Company, Limited	Kingston	April 4	100,000
The Lake Superior Basin Mining Company, Limited	Fort Erie	February 29	1,000,000

Mining Companies Incorporated in 1912—Continued

Name of Company.	Head Office.	Date of Incorporation.	Capital.
The Mines Leasing and Development Company, Limited	Toronto	December 10.	200,000
The Moira River Mining Company, Limited	Tweed	June 29	1,000,000
The Mount Dennis Brick Company, Limited	Toronto	September 21.	200,000
The New Ontario Oil and Gas Company, Limited	Sheguiandah	June 21	45,000
The Oil Springs Oil and Gas Company, Limited	Oil Springs	April 17	40,000
The Ontario Rock Company, Limited	Toronto	January 20	40,000
The Ontario Stone Company, Limited	Toronto	November 25.	125,000
The Paragon Silver Mining Company, Limited	Collingwood	March 7	500,000
The Paris Brick and Clay Company Limited	Brantford	September 6	100,000
The Porcupine Commander Gold Mines, Limited	Toronto	January 9	1,000,000
The Port Dover Brick and Tile Company, Limited	Port Dover	February 20	60,000
The Pratt Mining Company of Ontario, Limited	Sault Ste. Marie.	September 16.	50,000
The Price-Cumming Brick Company, Limited	Toronto	October 1	100,000
The Ritchie Cut Stone Company, Limited	Hamilton	May 22	40,000
The Star Mica Mining Company, Limited	Kingston	April 19	400,000
The Sterling Silver Mines, Limited	Toronto	September 7.	1,250,000
The Streetsville Brick Company, Limited	Toronto	December 19.	100,000
The Sun Brick Company, Limited	Toronto	March 27	350,000
The Union Brick Company, Limited	Toronto	July 11	350,000
The Waines and Root Gas Company, Limited	Dunnville	May 14	400,000
The Worthington-Rowe Lumber and Development Co, Ltd.	Toronto	July 17	100,000
The York Quarry Company, Limited	Toronto	May 3	75,000
Townsite Extension Mines, Limited	Toronto	March 29	100,000
Walsh Mines, Limited	Haileybury	November 4.	100,000
Weston Brick Company, Limited	Toronto	April 16	300,000
W. S. M. K. Mining Company, Limited	Toronto	February 16.	200,000
York Ontario Silver Mines, Limited	Cobalt	September 27.	1,000,000
York Sandstone Brick Company, Limited	Toronto	May 15	80,000
		Total	$73,237,000

Mining Companies Licensed in 1912

Name of Company.	Head Office for Ontario	Date of License.	Capital for use in Ontario.
Black Lake Asbestos and Chrome Company, Limited	Toronto	December 23.	$100,000
Dominion Marble Company, Limited	Toronto	November 14.	40,000
German Kali Works	Toronto	November 14.	40,000
The Ashover Fluor Spar Mines, Limited	Toronto	January 23	40,000
The Patricia Mining Syndicate, Limited	Toronto	July 10	£10,000
The Price River Oil Fields, Limited	Windsor	September 18.	$300,000
			$570,000

Mining Divisions

The number and boundaries of the mining divisions remain the same as in 1911. The Recorders, too, are the same, except that at Porcupine, Mr. Gordon H. Gauthier has taken the place of Mr. A. E. D. Bruce, who was appointed as chief clerk to Mr. J. F. Whitson, Commissioner in charge of Northern Ontario improvements.

The list of Divisions and Recorders, together with the receipts on account of mining revenue at the several offices, is as follows:—

Mining Division.	Name and P.O. Address of Recorder.	Receipts.				Total receipts.
		Purchase money.	Miner's licenses	Forest reserve permits.	Recording fees, etc.	
		$	$	$	$	$
Kenora	W. L. Spry, Kenora	2,554 00	1,029 00	.....	947 50	4,530 50
Port Arthur	J. W. Morgan, Port Arthur	6,969 00	2,638 00	.....	2,195 75	11,802 75
Sault Ste. Marie	S. T. Bowker, Sault Ste. Marie	3,643 53	1,935 00	.....	1,040 00	6,618 53
Sudbury	C. A. Campbell, Sudbury	1,583 50	5,314 00	230 00	11,082 70	18,210 20
Gowganda	H. E. Sheppard, Gowganda	12,702 81	1,765 00	340 00	3,467 00	18,274 81
Montreal River	A. Skill, Elk Lake	4,210 91	1,195 00	190 00	1,180 25	6,776 16
Temiskaming Coleman	G. T. Smith, Haileybury " "	13,303 54	10,605 05	160 00	6,945 10	31,013 69
Larder Lake	J. A. Hough, Matheson	8,588 76	1,457 00	.....	8,038 00	18,083 76
Parry Sound	H. F. McQuire, Parry Sound	.....	192 00	.....	194 00	386 00
Porcupine	G. H. Gauthier, Porcupine	11,110 88	7,365 75	420 00	12,185 40	31,082 03
	Total	64,666 93	33,495 80	1,340 00	47,275 70	116,778 43

The remainder of the mining revenue was received by the Department direct from the parties concerned.

The several Recorders briefly report upon the work of their offices for the year as follows:—

Kenora

Recorder, W. L. Spry.—The office issued during the year 79 miner's licenses and 88 renewal licenses; 91 claims were recorded; 21 transfers recorded; 24 certificates of performance of working conditions issued, and 4 certificates of record.

The greatest activity in prospecting and recording has been in the country south of Dryden.

About four miles southeast of Kenora, the Canadian Homestake Mining Company are busy installing machinery and will push development work as soon as their electrical appliances are complete. A power line has been put up from the Kenora Power Company's plant to the mine.

No prospecting to speak of has been done during the year in the Manitou District, the Eagle Lake District, or the Lake of the Woods.

Port Arthur

Recorder, J. W. Morgan.—Miner's licenses issued, 273; renewals of licenses, 269; mining claims recorded, 180; transfers recorded, 51; certificates of record issued, 96; certificates of work, 59.

There has been a decided revival of interest in the iron properties, not only along the Kaministiquia river, but also in the Nipigon Forest Reserve. The silver district west of White Fish lake is also attracting many mining men, and I expect to see this part of Port Arthur Mining Division thoroughly prospected in the near future. Large areas of Thunder Bay District have never yet been prospected.

Sault Ste. Marie

S. T. Bowker, Recorder.—Miner's licenses issued, 216; renewals, 197; claims recorded, 137.

Sudbury

C. A. Campbell, Recorder.—Licenses issued, 469; renewals, 689; forest reserve permits, 20; claims recorded, 776.

There was considerable falling off in the business in comparison with last year. Silver has dropped out of sight. Little or nothing was done in iron. Some staking took place in the nickel field, but this has been so thoroughly prospected, it would appear there is not much likelihood of finding new prospects. The interest centered in gold, principally at West Shining Tree.

About the latter part of May there was some excitement in the neighbourhood of Whiskey lake. Many licenses were taken out, but little recording was done, as those who went in seemed disappointed with the country. In Berths 11, 82 and 90, there has been considerable staking for gold.

Elk Lake

Albert Skill, Recorder.—Certificates of work issued, 50; certificates of record issued, 40; licenses, 55; renewals, 208; mining claims recorded, 126.

During the months of August, September, and October, there was considerable activity in the townships of Cane and Auld, where several native silver discoveries were made. The principal of these are the Hitchcock, Bradley and Charron claims. Development work has been proceeded with on a number of promising properties in the Division, viz.: The Sterling Silver Mines, in the township of Farr; the Donaldson (now the Beaver); the Moose Horn and Beacon Consolidated, in the township of James; and the Paragon, in the township of Willet, which has several promising veins.

Since the advent of the railroad, attention has been turned to the district, and 1913 promises to be an active year.

Gowganda

H. E. Sheppard, Recorder.—Miner's licenses issued, 43; renewed, 305; forest reserve permits issued, 42; claims recorded, 194; certificates of record issued, 118; certificates of work, 395.

Temiskaming and Coleman

George T. Smith, Recorder.—The business transacted in the Temiskaming and Coleman Mining Divisions for the year ending 31st October, 1912, was on the whole fairly satisfactory, and as regards the Coleman area, especially so. Silver mining operations were very active. Large additions were made to several of the plants. New properties were added to the list of shippers, and some which had been closed down have resumed operations.

The opening of a portion of the Gillies limit created widespread interest, and considerable development work has been performed on a number of the claims recorded. The supposed value of the hitherto "forbidden territory" created a rush, owing to hasty and, in many cases, very defective staking and blazing of lines, considerable litigation ensued. In all, about 300 claims were recorded.

In the Temiskaming area, matters were not so favourable. Owing to the fact that a large number of our local prospectors and mining men hold interests in the Porcupine Division, and that very promising gold discoveries have been made in the Larder Lake District (a considerable part of which was until recently included in this Division), South Lorrain and other sections, which looked promising, and with some further research might have made good, have been neglected, and practically nothing beyond the mere development work necessary to protect the claims recorded has been done. Licenses issued, 506; renewals, 1,448; applications, Temiskaming 221, Coleman 295, total 516.

Larder Lake

J. A. Hough, Recorder.—541 applications for claims were recorded, 94 miner's licenses issued, 194 renewals, and 329 transfers registered.

The chief events of interest in this Division for the year were the discovery of high-grade gold ore at Kirkland lake, in the township of Teck, the discovery of gold telluride ore in the township of Beatty, and the development of electric power at Raven lake at the outlet of Larder lake.

Parry Sound

H. F. McQuire, Recorder.—Forty-three miner's licenses were issued, and five new claims staked. The assessment work on the iron claims staked in the township of Lount has been regularly filed, and results are encouraging. The copper and feldspar claims are not showing any activity, and, with the exception of isolated cases, nothing has been done during 1912.

Porcupine

Gordon H. Gauthier, Recorder.—Transfers recorded, 965; certificates of work issued, 111; certificates of record issued, 74; licenses issued, 252; renewals issued, 1,417; claims recorded, 538.

Fort Frances and Eastern Ontario

There are two Mining Divisions in which the amount of business transacted has not so far warranted the expense of appointing a Recorder and maintaining a local office. These are Fort Frances and Eastern Ontario. Under such circumstances the Mining Act provides that the duties of Recorder shall be performed by the Deputy Minister of Mines, and claims which are staked out on Crown lands for mining purposes are recorded at the Department, Toronto.

During 1912 57 claims were recorded in the Fort Frances Division. These were mainly on discoveries of iron ore, and were situated in the townships of Burriss, Crozier, Dance, Dobie, Kingsford, Mather and Miscampbell. Seven claims were cancelled.

In the Eastern Ontario Division 58 claims were recorded on discoveries of iron ore, mica, marble, molybdenite, graphite, talc, gold and silver. The claims were in Frontenac, Renfrew, Hastings, Simcoe, and Peterborough counties, and in the districts of Haliburton and Nipissing. Of claims cancelled there were 15, abandoned 1, transferred 4.

Provincial Assay Office

Mr. W. K. McNeill, Provincial Assayer, reports as follows for the year 1912:—

The Provincial Assay Office which is situated at No. 5 Queen's Park, Toronto, was established in 1898 as an aid to the mineral development of Ontario, and was located at Belleville, until November, 1911, when the change was made to its present location, which is more central and convenient for the work of the Bureau of Mines as well as the public.

The chemical laboratories and assay plant are among the best equipped in the Province and are especially constructed and equipped to give accurate work. The fire-room has a gas muffle furnace with all necessary appliances for careful and accurate assaying of gold and silver ores, while the grinding room is furnished with motor-driven grinders. Special attention is given to the sampling of all ores submitted.

The wet laboratory is supplied with the necessary equipment, and is probably one of the most up-to-date in the Province. Connected with this is the balance room, and an especially equipped room for electro-chemical analysis.

Besides these, there are private offices, library, and store rooms.

Although no new fields were opened up by prospectors during the past year, yet a greater number of silver assays passed through the office than last year, and a renewed activity was noticed in the Elk lake and Gowganda regions, due to the increased price of silver and the prospect of adequate railroad facilities.

A large number of gold samples continue to come in from the Rainy River District and Eastern Ontario, as well as from Porcupine and adjacent districts.

From other parts of the Province were received, gold, zinc, lead, copper, and other ores, besides clays, limestones, feldspars, etc. An active interest was shown in the clay deposits of Ontario, and a large number of samples were analysed and information given respecting their suitability for different purposes. During the year a number of samples of iron pyrites were examined for their sulphur contents and suitability for the manufacture of sulphuric acid, also much work was done in the way of testing samples from limestone deposits for their purity and fluxing qualities. This shows that the interest is not confined to the more precious metals, but that work is being carried on steadily in all branches of the industry.

The work of the office consists of:—

(*a*) Examination and assaying of samples received from mining engineers, geologists, prospectors and the public generally.

(*b*) Analysis of samples of rocks, etc., for the geologists of the Bureau of Mines.

(*c*) The sampling of carload lots of Cobalt silver ore shipped from the mines on which Government collects a royalty. This work is done at the various smelters and is in charge mostly of Mr. T. E. Rothwell.

(*d*) The assaying and valuation of last-mentioned consignments.

The following list of determinations will show the work of the office for the past year:—

	Assays for Bureau.	Assays for Public.	Total.
Gold	70	217	287
Silver	137	124	261
Copper	2	42	44
Cobalt	30	0	30
Nickel	9	25	34
Manganese	0	0	0
Molybdenum	0	1	1
Zinc	0	2	2
Platinum	3	3	6
Lead	0	3	3
Arsenic	4	0	4
Antimony	0	0	0
Tin	1	2	3
	256	419	675

	Analyses for Bureau.	Analyses for Public.	Total.
Metallic Iron	0	6	6
Alumina	80	5	85
Silica	88	4	92
Lime	79	5	84
Magnesia	79	5	84
Ferric Oxide	80	40	120
Ferrous Oxide	13	0	13
Sulphur	0	6	6
Phosphorus	0	4	4
Alkalies	16	1	17
Miscellaneous	80	9	89
	515	85	600

The following is a list of fees for the more common assays and determinations; others will be furnished on application:—

1. Assays:—

Gold	$1.00
Silver	1.00
Gold and silver in one sample	1.50
Platinum	4.00
Gold and Platinum in one sample	5.00
Gold by amalgamation	2.00

2. Iron Ores:—

Iron (metallic)	$1.00
Silica	1.50
Iron and insoluble residue	1.50
Ferrous Oxide	2.00
Ferric Oxide	2.00
Phosphorus	2.00
Sulphur	2.00
Iron, Sulphur, Phosphorus and Insoluble	5.00
Manganese	2.00
Titanium	2.00

3. Limestone, Dolomites, Clays, Shales, etc.:—

Insoluble	$1.00
Silica	1.50
Ferric Oxide	2.00
Ferrous Oxide	2.00
Alumina	2.00
Lime	1.50
Magnesia	1.50
Alkalies (combined)	5.00
Potash	4.00
Water (combined)	1.00
Moisture	.50
Sulphur	2.00
Phosphorus	2.00

4. Ores and Minerals, Determination of:—

Alumina	$2.00
Antimony	3.00
Arsenic	3.00
Bismuth	3.00
Cadmium	3.00
Chromium	3.00
Cobalt	3.00
Copper	1.50
Gold	1.00
Ferrous Oxide	2.00
Ferric Oxide	2.00
Lead	2.00
Lime	1.50
Magnesia	1.50
Manganese	2.00
Molybdenum	3.00
Nickel	3.00
Silica	1.50
Tin	2.00
Water	1.00
Zinc	2.00

Identification of minerals not requiring chemical analysis—Free. Samples will be dealt with in the order of their arrival.

Locality

In every instance, specimens and samples should be accompanied by statement specifying precise locality from which they are taken.

Directions

Crushed sample representing large quantities, or samples less than five pounds weight, may be sent by mail as third-class matter. Send instructions with money in payment in a separate letter. Samples may be sent by express, charges prepaid.

Sample bags addressed to this laboratory for the sending of pulp by mail may be obtained on application. Also canvas bags for shipping.

Terms

Money in payment of fees sent in by registered letter, post office order, postal note or express order and made payable to the Provincial Assayer must invariably accompany samples to insure the prompt return of certificate, as no examination is commenced until the regulation fee is paid.

Samples should be addressed as follows:—

Provincial Assay Office,

No. 5 Queen's Park,

Toronto, Ont.

MINING ACCIDENTS IN ONTARIO

IN 1912

By E. T. CORKILL, Chief Inspector of Mines

During the year 1912 in and about the mines regulated by the Mining Act of Ontario there were 30 fatal accidents, which caused the death of 32 men. The fatalities below ground numbered 26, and above ground 6. Altogether at the mines, metallurgical works and quarries regulated by the Mining Act, there were 40 fatal accidents, causing the death of 43 men, a decrease of 6 from the number killed in 1911. The tables of accidents at the metallurgical works and quarries are separated in this Report from the accidents at the mines.

The total number of serious accidents in the mines of Ontario reported to the Bureau of Mines in 1912 was 238, resulting in 32 killed and 216 injured; of these casualties, 186 occurred below ground and 62 above. The fatal accidents took place in mines operated by 19 different companies. At metallurgical works there were 128 accidents, which caused the death of 10 and serious injuries to 122 men. The total number of accidents during the year 1912 at the various mines and works regulated by the Mining Act of Ontario is therefore 370, causing the death of 43 and injuries to 341 men.

An investigation and report were made in 29 out of the 30 fatal accidents in the mines, in all the fatal accidents at the metallurgical works, but not in the single quarry accident. In accordance with the requirements of the Mining Act, inquests were held in the majority of cases and were attended either by the Assistant Inspector of Mines or the writer.

Analysis of Fatalities at Mines

By months the 32 fatalities occurred as follows:—January, 3; February, 3; March, 2; April, 2; May, 3; June, 1; July, 2; August, 2; September, 3; October, 3; November, 4; December, 4; total—32.

A comparison of the causes of the fatalities at the mines for 1911 and 1912 is as follows:—

Cause.	191 . Per cent.	1912. Per cent.
Falls of ground	5.5	9.4
Shaft Accidents	22.2	25.0
Explosives	44.5	21.9
Miscellaneous (underground)	19.5	25.0
Surface	8.	18.7

The following classification distributes the responsibility for the cause of the fatalities at the mines:—

1. Fatalities due to danger inherent to the work itself	10 or 23.3	per cent.
2. Fatalities arising out of defects in the mine workings	8 or 18.6	"
3. Fatalities due to fault of fellow workmen	1 or 2.3	"
4. Fatalities due to fault of injured person	23 or 53.5	"
5. Fatalities unclassifiable	1 or 2.3	"

There were employed at the producing and non-producing mines in 1912 approximately, 9,500 men. At these mines 32 men were killed, which is equivalent to 3.36 per 1,000 men employed.

Table of Fatal Accidents in Mines, Metallurgical Works and Quarries, 1901 to 1912.

	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	Total.
Persons killed in producing and non-producing mines.....	13	10	7	7	9	11	22	47	49	48	49	43	315
Persons employed in producing mines.....	4,135	4,426	3,499	3,475	4,415	5,017	6,305	7,435	8,505	10,862	12,543	13,108	83,625
Persons employed in non-producing mines (estimated)..	550	450	400	400	500	750	1,140	1,750	2,000	2,000	2,000	2,000	13,940
Total persons employed.....	4,685	4,876	3,899	3,875	4,915	5,767	7,345	9,185	10,505	12,862	14,543	15,108	97,565
Fatal accidents per 1,000 employed.....	2.77	2.05	1.79	1.80	1.83	1.90	2.99	5.11	4.66	3.73	3.37	2.84	3.22

Cause and Place of Fatalities in Mines

The following schedule shows the cause and place of the fatalities in 1912 compared with 1911:—

	1912		1911	
Below ground:—				
Falls of ground		3		2
Shaft accidents:—				
Falling down shaft	4		3	
Objects falling down shaft	2		1	
Falling from bucket	1		3	
Run over by skip	1		0	
Falling down shaft due to staging giving way	0		1	
	—	8	—	8
Explosive accidents:—				
Premature explosion while loading or lighting holes	0		5	
Drilling into bottom of old or missed holes	1		3	
Explosion of box of dynamite while preparing charges	0		3	
Asphyxiation from gases from explosives	5		3	
Picking or putting bar into old hole containing explosive	1		2	
	—	7	—	16
Miscellaneous accidents:—				
Falling down winze	3		0	
Falling down stope	2		1	
Struck or buried by ore	2		0	
Struck by bar while barring ore from chute	1		0	
Falling down chute	0		3	
Struck by steel, etc., falling down stope or from staging	0		3	
	—	8	—	7
Above ground:—				
Blowing up of thawing house	1		2	
Struck by falling objects	2		1	
Electrocuted	1		0	
Falling from ladder	1		0	
Burned	1		0	
	—	6	—	3
		—		—
Total		32		36

The specific occupation in the mine of the men killed and their nationality are shown in the following table:—

Occupation	English Speaking	Finlander	Italian	Polander	Swede	Austrian	Syrian	German	Total
Drill runner	4	4	1	1	.....	.....	.....	.....	10
Trammer	.....	.....	1	1	.....	.....	1	1	4
Mine captain	2	.....	.....	.....	.....	.....	.....	.....	2
Drill helper	.....	2	.....	.....	.....	.....	.....	.....	2
Scaler	.....	2	.....	.....	.....	.....	.....	.....	2
Pumpman	1	.....	.....	.....	1	.....	.....	.....	2
Laborer	1	.....	1	.....	.....	.....	.....	.....	2
Skip tender	.....	.....	1	.....	.....	.....	.....	.....	1
Engineer	1	.....	.....	.....	.....	.....	.....	.....	1
Track layer	.....	.....	.....	.....	1	.....	.....	.....	1
Timberman	.....	.....	.....	.....	.....	1	.....	.....	1
Nipper	.....	.....	.....	.....	.....	1	.....	.....	1
Carpenter	1	.....	.....	.....	.....	.....	.....	.....	1
Watchman	.....	.....	1	.....	.....	.....	.....	.....	1
Chute tender	.....	.....	1	.....	.....	.....	.....	.....	1
Total	10	8	6	2	2	2	1	1	32

The ages of the men killed at the mines were as follows:—

17–20	21–25	26–30	31–35	36–40	41–45	46–50	Unknown	Total
1	8	6	7	3	4	1	2	32

Cause and Place of Non-Fatal Accidents at Mines

The following schedule shows the cause and place of the non-fatal accidents in 1912 at the mines and the number injured:—

Underground:—

Falls of ground		13
Shaft accidents:—		
Cage accidents	4	
Falling part way down shaft	4	
Objects falling down shaft	4	
Miscellaneous	2	
		14
Explosives:—		
Drilling into old or missed holes	11	
Picking into explosives	3	
Premature explosion	3	
		17
Miscellaneous accidents:—		
Falling down stopes, raises, winzes, chutes or man-ways	11	
Jammed by cars, skips, buckets or pieces of rock or ore	39	
Scaling	2	
Falling from staging	6	
Foreign material in eyes	6	
Fall of rock or ore down chute	15	
Burned	2	
Flying rock	3	

Rock rolling down pile	7	
Caught by drill	3	
Falling objects	4	
Miscellaneous	19	
		117

Surface:—

Falling from elevated places	14	
Caught by machinery	10	
Flying rock	1	
Burned by electric wire	1	
Falling objects	4	
Explosion of boiler tube	1	
Burned	1	
Miscellaneous	23	
		55
Total		216

The specific occupation at the mine of the men who were injured and their nationality is shown in the following table:—

Occupation.	English Speaking.	Italian.	Polander.	Finlander.	Russian.	Austrian.	Roumanian.	Spanish.	German.	Bulgarian.	Swede.	Hungarian.	Bohemian.	Nationality Unknown.	Total.
Trammer	5	27	23	10	4	2	....	3	....	1	....	....	....	1	76
Drill runner	21	5	6	7	2	1	1	....	....	....	....	1	....	....	44
Drill helper	6	....	4	9	....	....	1	....	1	....	....	....	....	....	21
Laborer	7	2	1	....	....	1	1	....	....	....	1	....	....	....	13
Carpenter	10	....	....	....	....	....	....	....	....	....	....	....	....	....	10
Hammerman	1	....	....	4	....	....	....	....	....	....	....	....	....	2	7
Mill-man	6	....	....	....	....	....	....	....	....	....	....	....	....	....	6
Timberman	3	....	1	1	....	....	....	....	....	....	....	....	....	....	5
Trammer boss	3	....	....	....	....	....	....	....	....	....	....	....	....	....	3
Iron worker	1	2	....	....	....	....	....	....	....	....	....	....	....	....	3
Skiptender	1	1	....	1	....	....	....	....	....	....	....	....	....	....	3
Painter	2	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Scaler	....	....	....	2	....	....	....	....	....	....	....	....	....	....	2
Fireman	1	....	....	....	....	....	....	....	....	....	....	....	1	....	2
Deckman	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2
Mason	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Boilermaker	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Foreman	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1
Shift boss	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Trackman	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Fitter	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Master mechanic	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Teamster	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Tile layer	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Sledger	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Electrician	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Pumpman	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Straw boss	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Hoistman	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Superintendent	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Sampler	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Oiler	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Total	78	41	37	35	6	4	3	3	2	1	1	1	1	3	216

The ages of the men injured at the mines were as follows:—

17–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	Unknown	Total
5	53	43	32	16	8	6	1	1	1	50	216

The following table shows the time during which the injured persons were incapacitated for work:—

Class of Work	1 to 2 Weeks.	2 to 3 Weeks	3 to 4 Weeks	4 to 5 Weeks	5 to 6 Weeks	6 to 7 Weeks	7 to 8 Weeks	8 to 9 Weeks	9 to 10 Weeks	10 to 12 Weeks	Over 12 Weeks	Permanent	Not Reported Cured	Total
Mines—														
Above ground	21	11	2	6	3	2	1	1	1	2	4	1	1	56
Below ground	56	31	21	11	11	4	4	5	1	3	8	1	4	160
Metallurgical Works	53	16	15	6	4	2	1	1	....	....	5	1	18	122
Quarries	....	1	....	....	1	....	....	....	....	....	....	....	1	3
Total	130	59	38	23	19	8	6	7	2	5	17	3	24	341

Mining Regulations and How Observed

There was an improvement during the year in the observance of the regulations by the mining companies. This is shown by the fatalities arising out of defects in the mining works falling to 18.6 per cent., compared with 27.8 per cent. during the preceding year. The fatalities due to carelessness, neglect and foolhardiness on the part of the workmen themselves increased largely, there being 23 fatalities, or 53.5 per cent. due to the fault of the injured person, and 2.3 per cent. due to the fault of a fellow workman, compared with 38.9 per cent. during the preceding year. The record shows that 74.4 per cent. of the fatalities were due to the fault or neglect of the workmen or the managers of the work, and were preventable accidents. The other 11 fatalities, or 25.6 per cent., were due to danger inherent in the work itself.

Negligence by mine managers in carrying out the regulations and in permitting dangerous mining practices has caused serious and in some cases fatal accidents. Such negligence has been manifested with regard to the following:—

1. The proper and efficient scaling of the roofs and walls of working stopes, shafts, drifts and cross-cuts.
2. The proper ventilation of underground workings.
3. The proper installation of high voltage wires.
4. The erection and maintenance of approved thawing houses.
5. The enforcement of rules regarding the careful handling of explosives.

The provisions that are most frequently broken by the workmen have reference to:

1. Proper care in the handling of explosives.
2. Drilling into missed or cut-off holes.
3. Drilling into the bottom of old holes that have been blasted.
4. The tamping of holes after charging.
5. Riding in buckets or skips.
6. Keeping in position guard-rails around shaft openings.
7. Proper scaling of walls and roofs of working places.
8. Getting on or off cages in motion.

Mr. T. F. Sutherland, Assistant Inspector of Mines, resident at Cobalt, makes the following comments on the accident rate in the mines along the line of the Temiskaming and Northern Ontario railway:—

There were 16 fatalities in this district during 1912, and of these 7 can be classified as due to carelessness. There were 3 fatalities from asphyxiation by gas from explosives, and these were partly due to carelessness and partly to the lack of knowledge of the dangerous properties of the gases resulting from the explosion. One fatality in Porcupine was the result of electric shock. In this case the mining company was in fault in sending a workman inexperienced in electrical work into an unsafe transformer-house. Of the remaining 5 fatalities, one was probably due to an epileptic fit, one partly the fault of the company, and the remaining 3 may be classified as unavoidable.

The majority of non-fatal accidents were due to carelessness and incompetence of the injured persons.

Several accidents resulted from improper scaling. Blasting accidents have been very few during the year. In mines where each drill runner does his own blasting, as in Ontario, the prevention of blasting accidents depends largely on the care taken by the men themselves and the supervision of the shift bosses.

The mine captains and shift bosses of the mines of this district are as a rule careful regarding the safety of the men employed, and there is a direct relationship between the attitude of the men in charge of underground operations regarding accidents and the number of accidents in any mine.

The following notes briefly describe the fatal accidents at the mines from the various causes, and the methods that should be adopted for their prevention.

Falls of Ground

There were three men killed from falling rock, an increase of one over the preceding year. One man was killed while walking under a large piece of rock that he was trying to take down; the rock fell, striking and injuring him so severely that he died shortly afterwards. Another man was killed while taking down rock. The piece he was working at fell, bringing with it a larger block, which fell upon him. The third man was killed by being struck by a small piece of rock falling from the hanging wall. This accident was due to careless scaling.

Shaft Accidents

There were eight fatalities in shafts in 1912, being the same number as in 1911 and also in 1910.

Four men lost their lives through falling down a shaft. One of these men was getting off the cage at the surface when it was a few feet above the landing and fell back into the shaft. Another in some manner unknown was caught by the timber and fell into the shaft while riding up on the cage. Another man lost his life while engaged in timbering in the shaft, through the slipping of one of the ropes which held the staging. A mine captain was killed apparently by being overcome by gas from the explosives and falling down a shaft that was being raised to surface.

Two men were killed by being struck by a piece of rock or ore falling down shaft. One of these men was unwatering an old shaft, and through negligence in scaling or cleaning off the timbers, a piece of rock had been left which fell and struck him while he was standing on the pump preparing to lower it.

One man was killed through falling from a bucket, and another by being run over by a skip on which he had been riding. Both were violating the provisions of the Mining Act.

All of the above shaft accidents were preventable, and could have been avoided if reasonable care had been taken. Most of these accidents were due to the carelessness or foolhardiness of the workmen.

It is necessary to again point out that the type of cage commonly used in the mines of Ontario is not satisfactory. It is advisable to have closed-in cages with some kind of sliding door at least four feet in height, so that no one can get off or on when

the cage is in motion, or caught by the timbers through standing too close to the edge of the cage.

Accidents from Explosives

There was a marked decrease in the number of accidents from explosives in 1912, compared with 1911 and preceding years, there being but 7 fatalities as against 16 in 1911 and 10 in 1910. This shows that greater care is being taken in the handling of explosives, and also stricter supervision by the men in charge of the mines. It is also possible that the introduction of low-freezing explosives may have been a factor in the lower accident rate.

One man was killed by drilling into a missed or cut-off hole, and another from picking into the explosive. The first of these was due entirely to the recklessness of the workman.

In the non-fatal accidents, there were 17 workmen injured during the year, of whom 11 received their injuries through drilling into old or missed holes. This shows that this dangerous practice is still more or less prevalent.

Information was laid against three workmen for violation of the rule which forbids drilling into the bottoms of old holes that have been blasted.

Three casualties were due to picking into explosives, and three to premature explosions. The latter all occurred while the workmen were sand-blasting and were due to the fuse spitting into insufficiently covered explosives. Such accidents are preventable, and are due to carelessness in preparing for the blast.

Five men were asphyxiated by gases from explosives in 1912, the number in 1911 being three. In addition, many were rendered temporarily unconscious. These cases are nearly always due to improper ventilation of the underground workings. Occasionally, the men are affected through returning to work too soon after blasting. In one accident the mine captain and pumpman lost their lives in a winze about fifteen hours after the blasting took place. The question of ventilation of mines is taken up later in this Report.

Miscellaneous Accidents

There were 8 men killed in miscellaneous accidents underground, compared with 7 in 1911. Of these, 4 were killed in stopes, 3 by falling down winzes, and 1 in a drift. Of the 4 killed in stopes, 2 of the fatalities were the result of falls, and 2 through being struck or buried by ore. The method of mining was responsible for the fall of the men in the stopes. The ore is so mined that before it is all removed it is often necessary for the men to work in such a position that a misstep will cause their fall down the stope.

Of the three men killed by falling down winzes, one was due to the guard-rail not being in position; the man pushed the bucket into the winze and fell with it. Another man returned to the winze too soon after blasting out timbers near the collar and fell into it; this accident was possibly due to the caving of loose material. Another man was running a machine near the mouth of the winze and fell backward into it. This accident was also the consequence of improper mining methods.

There were in all 117 non-fatal miscellaneous accidents. Of these the greater number were not serious, incapacitating the men for work from one to two weeks, and consisting chiefly of cuts or bruises due to having hands or feet jammed by cars, skips, buckets, or pieces of rock or ore. Eleven men were injured by falling down stopes, raises, winzes, chutes, or manways. Some of these accidents might easily have resulted seriously, and the prevalence of such casualties shows the necessity for guarding all working places and openings as thoroughly as the conditions will admit.

Particulars of these non-fatal accidents are given on subsequent pages.

Surface Accidents

Six men were killed on the surface about the mines in 1912, double the number of the preceding year. Of these, one was killed by the blowing up of a thaw-house. In this case it was impossible to ascertain the cause of the explosion. Two men were

killed through being struck by falling objects. In one case, a gang of workmen were hoisting a gin pole by means of a winch, the axle of which broke and allowed the gin pole to fall back on a pike pole, breaking the latter and killing the man. Another man fell with a trestle from which he was endeavoring to loosen a guy line. He untied the wrong rope, causing the fall of the trestle, which injured him so severely that he died a few days later. Another man met his death by coming in contact with high-voltage wires in a transformer room. This accident was due to the improper construction of the transformer house. Information was laid against the company for a violation of Rule 64 of Section 164 of the Mining Act, and a fine of $100.00 and costs was imposed. Another man fell from a ladder in a hoist house, due to the breaking of a steam valve, and received injuries which caused his death. A watchman employed at one of the mines, who was subsequently ascertained to have been subject to epileptic fits, was found dead in the crusher building, his clothes having been set on fire by his lantern.

There were 54 men who received injuries while working on the surface around the mines. Most of these injuries were not serious, and incapacitated the workmen for one to two weeks only. The more serious were caused either by falling from elevated places or being caught in machinery. There were six men who received fractures through falling from elevated places. These men were incapacitated from one to three months. Five men received fractures and lacerations through being caught in machinery, and two others each had an arm so badly lacerated and broken from being caught in a conveyor belt that amputation was necessary. One man lost his eyesight through being burned by caustic soda. Two others suffered fractures of the leg, one by being run over by the skip and the other through the breaking of a chain.

Prosecutions

Prosecutions for infringement of the Mining Act were undertaken by the Inspector of Mines, with results as follows:—

1. A company was fined $100 and costs for a violation of section 164, rule 64, of the Mining Act, in not having an electrical apparatus efficiently covered and safeguarded.

2. A workman was fined $10 and costs for a violation of section 164, rule 31, in riding on a skip.

3. A workman was fined $15 and costs for a violation of section 164, rule 13, in drilling into the bottom of a hole that had been blasted.

4. Two workmen were each fined $10 and costs for a violation of the last-mentioned rule.

Health of Miners

The health of the workmen employed at the mines during the year was good. There was but little typhoid at any of the camps, and the older camps were remarkably free from it. As far as can be ascertained, there are not as yet many cases of miner's phthisis, which is so prevalent in many mining countries. It is, however, difficult to ascertain to what extent this disease has begun to make inroads. When men become sick at the mines or feel unable to work, they leave at once for their old homes and are lost track of. There is no doubt, however, that with the increased use of hammer drills, which cause much dust in drilling operations, there is grave danger of miner's phthisis spreading and becoming a serious menace to the health of all underground employees. This is more particularly true in mines where the gangue is chiefly quartz. Steps have been taken to keep down the dust from drilling operations by ordering all the mining companies to have their drills equipped with a water spray.

Miner's Phthisis in the Transvaal

The following quotations from the Report of the Mining Regulation Commission of the Transvaal show the prevalence of miner's phthisis in that colony and the means recommended to mitigate the evil:—

It is well known that persons such as cutlers, potters, quarrymen, filemakers, felt hat finishers, lead and tin miners, who are more or less continuously inhaling hard, sharp, irritating dust, show an undue mortality from respiratory disease after the age

of about 35. Naturally this is less marked in the case of open-air workers such as quarrymen than in men who work underground or in cover. On the other hand, in the case of rock-drillers, this mortality begins much earlier and is much heavier. From the reports of the Transvaal Government Mining Engineer for 1901 and 1902 (quoted by Dr. Haldane) it appears that between October, 1899, and January, 1902, the war being in progress and mining operations practically suspended, the annual death rate among the men who had been employed in the Transvaal as rock-drillers before the war was no less than 73 per 1,000, and this during a period when the great majority were not actually engaged in rock-drill work. The corresponding figure for Cornish rock-drillers is estimated by Dr. Haldane at about 60 per 1,000; while the Victorian statistics, published by Dr. Summons, indicate that in the Bendigo mines the mortality is higher even than in the Transvaal. The disease has consequently been the subject of careful official inquiry in all these localities, viz., in the Transvaal by the Miners' Commission of 1902-03; in Cornwall by Dr. Haldane, with Messrs. Martin and Thomas, who reported in 1905 "On the Health of Cornish Miners"; in Australia by the Commission of 1905 "On the Ventilation and Sanitation of Mines in Western Australia," as well as by Dr. Walter Summons who in 1907 published an excellent and illuminating report on miner's phthisis at Bendigo, Victoria. In each of these localities miner's phthisis has very greatly increased since the general introduction of rock-drills into practice, and those who have investigated the matter are generally agreed as to the nature of the disease, which is thus summarized by Drs. Irvine and Macaulay:—

"It is primarily a chronic disease of the lungs, characterized by slow but progressive fibroid changes in the lung tissue and the pleuræ, accompanied by chronic catarrhal processes in the air-cells and respiratory passages. All are agreed that immensely the most important factor in producing this condition is the more or less continuous inhalation over long periods of fine rock-dust. All true cases of miner's phthisis are thus primarily cases of silicosis; silicosis is the feature common to them all. Finally, it is agreed that, in the later stages, tuberculous infection commonly, or invariably, becomes super-imposed upon this condition, and the symptoms and course of the disease alter accordingly."

Duration of the Disease.—From the evidence before us it appears that, in the past, the average age at death of rock-drillers dying from silicosis in the Transvaal was thirty-five years, and the average period of rock-drill employment was seven to nine years. Dr. Haldane gives the following figures for rock-drillers dying in Cornwall:—

Where work has been done.	Average Age at Death in 142 cases	Average Period of Rock-drill Employment when ascertainable.
Cornwall only	37.5	8.4
Cornwall and Transvaal	36.4	4.7
Transvaal only	36.3	11.6

During 1905-07 the average age of mine employees dying of phthisis on the Rand was 39 years. At Bendigo, the incidence of the disease is, as already pointed out, considerably heavier than on the Rand, but the average age at death is much higher than here, viz., year by year just under or above fifty years, the presumption being that the development of silicosis is much more gradual and the Bendigo miner's term of active usefulness correspondingly longer.

Preventive Measures.—From the foregoing considerations it is clear that our efforts must be directed to

1. The prevention of dust inhalation;
2. The prevention or removal of noxious fumes resulting from explosives;
3. The prevention of tuberculosis.

(1) The Prevention of Dust Inhalation.—The rock-driller is far more exposed to dust than any other miner. This dust is produced (*a*) by drilling dry holes and (*b*) by blasting. In dry working places it is raised again after its subsidence (*a*) by the air escaping from the rock-drills and (*b*) by the lashing or shovelling of broken rock which is not wet. Holes drilled from above downwards are usually kept filled with water, and, as work progresses, exude only mud; "backholes," or holes drilled from below upwards, will obviously not retain water, and unless a jet or spray be played upon them, give off a continuous stream of fine dust. The chief occasions of dust inhalation are therefore (*a*) when the escaping air from the rock-drills raises the dust from the floor and sides of dry working places; (*b*) in drilling backholes; (*c*) on returning to the working face after blasting before the dust has had time to subside; and (*d*) in lashing without keeping the rock thoroughly wet.

Mine Hospitals

The mine hospital at Cobalt continues to do most efficient work for both the sick and the injured employees of the mines in the Cobalt camp. The directors have purchased a Roentgen ray machine, and have it set up in the hospital.

The last annual report of the Hospital Board for the year ending February 28th, 1912, gives the following particulars:—

Patients in hospital March 1st, 1911	15
Patients admitted during year	350
	365
Patients discharged during year—Deaths	12
Recovered	344
	356
Patients in hospital March 1st, 1912	9
Average patients per day in hospital	17
Average days per patient in hospital	17

	Deaths.	P.C. Deaths.	P.C. Recovery.
Pneumonia	3	17.6	82.4
Typhoid	2	8.5	91.5
Diphtheria	1	7.7	92.3
Heart failure	1	....	....
Accident	5	4.5	95.5
Medical cases	7	3.8	96.2
Surgical cases	5	2.8	97.2
Total cases	12	3.3	96.7

Three deaths included under "Accident" were of private patients, and not from mines. Death resulted in two cases during the operation, and the other in five hours after operation.

Three hospitals have been built and equipped for the use of the mines in Porcupine. One is at the Dome mine, and has been built and equipped for the employees of this mine. Another hospital has been equipped at Pearl lake, and is under the supervision of Dr. Moore. The mines in the vicinity of Pearl lake are subscribers to this hospital, and their employees are treated there. A third hospital has been erected in the town of Timmins, and is being looked after by the Sisters of the Roman Catholic Church. The employees of the Hollinger mine are cared for here.

Owing to the hospital of the Canadian Copper Company at Copper Cliff being destroyed by fire in January, 1912, a temporary hospital was fitted up, and the injured and sick employees of the company looked after there. A new hospital is now in course of construction.

Labor

The supply of skilled labor through all the mining camps during the year was barely sufficient. There was, however, no labor trouble until the latter part of the year, when the employees of the mines in Porcupine went out on strike, demanding an 8-hour day for underground labor and protesting against a reduction in wages. The strike is still unsettled.

Ventilation of Mines

The most serious form of accident in the mines during the year was from gases emanating from the discharge of explosives. Five men lost their lives from this cause compared with three in the preceding year. The lack of good ventilation in the mines

is certainly responsible for the majority of these accidents. In addition to the fatalities there is also to be considered the effect of the gases on the health of the men working therein; and the evils due to fine dust in the mine air.

The poisonous gases produced by the discharge of explosives are mainly carbon dioxide, carbon monoxide and nitrous fumes. Of these the most dangerous is carbon monoxide. The Mining Regulations Commission of the Transvaal state as follows regarding mine ventilation:—

Poisoning by carbon monoxide most frequently follows the ignition and subsequent explosion of large quantities of explosives. The usual history is that exposure to stagnated fumes has taken place two or more hours after the explosion in places where the local ventilation is defective and the air stagnates after blasting, *e.g.*, in the dead-ends of drives, in raises, and very notably in winzes, which are often entered (usually by colored laborers) before the fumes are blown out. Symptoms of poisoning supervene rapidly, though not so quickly as in gassing by nitrous fumes, and special danger lies in the fact that those affected are, without being aware of it, stupefied and rendered unconscious, and therefore incapable of effecting an escape. Cherry-red discoloration of the blood and tissues is, of course, a marked post-mortem characteristic.

Nitrous Fumes.—The action of nitrous fumes on the human system and the dangerous effects of its presence in the air have been dealt with by Drs. Irvine and Macaulay, who found that 47 out of 172 deaths from gassing were due to this gas. Owing to its solubility in water it is rarely present in mine air more than one hour after the detonation or burning of explosives. We are of opinion that no determinable amount of this gas should be allowed in mine air.

Treatment of Gassing

1. Every case of gassing should be at once reported to the shift boss and by him to the mine manager either directly or through the mine captain.

2. All cases of gassing should be brought to the fresh air as quickly as practicable, and kept warm by the application of warm clothing and other external means. The common practice of sousing such cases externally with cold water and of administering whisky or brandy internally should on no account be employed, because of the physiological shock produced.

3. If the sufferer can swallow, an emetic (one ounce of sulphate of zinc solution, strength 30 grains to ounce) should be at once given, and repeated every ten minutes till vomiting results.

4. When vomiting has occurred, a dose of two teaspoonfuls in water of aromatic spirits of ammonia (sal volatile) should be administered.

5. Artificial respiration should be started and continued as long as there is any indication of life, the patient thereby being made to inhale oxygen through a mask. Oxygen in such cases is invaluable; carbon monoxide is eliminated five times as rapidly in an atmosphere of oxygen as in air, and in nitrous fumes poisoning the beneficial effect of oxygen on the terrible distress of pulmonary œdema is most marked.

In the latter treatment of nitrous fumes gassing, the medical attendant may have to resort to saline transfusion and liberal blood-letting.

6. All cases of gassing, however slight, should be kept under medical observation for at least twelve hours.

We therefore submit the following recommendations:—

(*a*) That the legal maximum for noxious CO_2 permissible in mines in the Transvaal be fixed at 8 parts by volume in 10,000 of air.

(*b*) That an amount of 4 parts of CO_2 by volume in 10,000 of air shall be allowed in addition to the aforesaid maximum as representing innocuous CO_2 normally present in the atmosphere.

(*c*) That where candles or similar illuminants are in use, a further addition of 3 parts of CO_2 by volume in 10,000 of air shall be allowed as representing innocuous CO_2 resulting from the combustion of such illuminants.

(*d*) That in order to meet, from the point of view of practical administration, difficulties in regard to possible innocuous CO_2 from country rock and other uncertain sources in the mines of the Rand, a further allowance of 5 parts per 10,000 be made, making a total limit of 20 parts per 10,000 of air. That in view of the extremely poisonous effects of carbon monoxide and nitrous fumes on the human system, and the frequency of gassing fatalities on the Rand, we also recommend that the maximum permissible amount of carbon monoxide in any part of a mine shall not exceed .01 per cent., and no practically determinable amount of nitrous fumes shall be permitted in any part of a mine.

Tables of fatal and non-fatal accidents follow:—

Table of Fatal Accidents in or

Number.	Date.	Name of Mine.	Name of Owner.	Name of Injured.	Occupation of Injured.
	1912				
1	April 1..	Bessemer....	Canada Iron Mines.	Whit Hogle	Engineer .....
2	Feb. 13..	Crean Hill...	Canadian Copper Co	John Timperpakka....	Scaler.....
3	Mar. 7..	Creighton....	" "	Robt. Malinen.....	Drill runner .....
4	April 20..	No. 2.....	" "	Wm. Karkanen	" .....
5	Sept. 9..	Creighton....	" "	Leo Porco	Skip tender.....
6	Sept. 14..	No. 2.....	" "	Precio Dymter.....	Trammer.....
7	Oct. 3..	Creighton....	" "	Pietro Mascaro.....	" .....
8	Nov. 23..	Frood	" "	D. Tikkanen	Drill helper.....
9	Nov. 28..	Creighton....	" "	Henry Salo.....	Drill runner.....
10	Dec. 9..	"	" "	Henry Heino.....	Scaler.....
11	Nov. 10..	Casey	Casey Cobalt Mg. Co.	David Roberts	Mine captain.....
				Chas. Lindberg	Pumpman .....
12	Jan. 10..	Cordova	Cordova Mines, Ltd.	Bert Easton.....	Pumpman .....
13	May 31..	"	"	John Pressie.....	Drill runner.....
14	Jan. 26..	Dome.....	Dome Mines, Ltd ...	Albert Ohlander.....	Track layer.....
15	Mar. 30..	"	" ...	Nello Rea.....	Watchman.....
16	Dec. 20..	"	" ...	Luigi Mezzeroba.....	Trammer.....
17	Jan. 9..	Hollinger	Hollinger Gold Mines, Limited.	A. Lahte	Drill runner.....
18	June 12..	Kerr Lake...	Kerr Lake Silver Mines.	W. Green	Drill runner.....
19	Dec. 2..	Helen	Lake Superior Power Co.	H. M. Ephraim.....	Mine captain.....
20	July 5..	McIntyre	McIntyre Porcupine Gold Mines, Ltd.	Gilbert Martin.....	Laborer .....
21	Aug. 20..	McKinley-Darragh..	McKinley-Darragh-Savage Mines, Ltd	Joseph Rochfort.....	Carpenter.....
22	July 19..	Moose M'n...	Moose Mountain, Ltd	Monusa Luigi	Laborer .....
23	May 3..	Nipissing....	Nipissing Mining Co.	Quintino Gizzi.....	Drill runner.....
24	Aug. 9..	O'Brien	M. J. O'Brien	Z. Raezkiewicz	Trammer.....
25	Feb. 13..	Peterson Lake	Peterson Lake Mg.Co	John Deep	Trammer.....
26	Oct. 7..	St. Anthony..	Sturgeon Lake Development Co.	S. Jones.....	Drill runner.....
				J. Mikaranto	Drill helper.....
27	Sept. 4..	Temiskaming	Temiskaming Mg. Co	Frank Juretich	Timberman.....
28	Dec. 5..	Trethewey ..	Trethewey Mg. Co..	Yan Uhryn	Nipper .....
29	May 27..	Vipond	Vipond Porcupine Mines Co., Ltd.	M. Buchanan.....	Drill runner.....
30	Feb. 24..	West Dome..	West Dome Mines, Ltd.	James Riley	Drill runner.....
					Total.....

about the Mines, 1912.

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Cause of Accident.
English speaking..	42	M	....	1	Steam valve over hoist broke, causing fall and fracture of right leg. Died May 10.
Finlander	34	M	1	....	Struck by falling rock, causing fracture of leg and other injuries.
Finlander	29	M	1	....	Fell from bench on open stope.
Finlander	34	M	1	....	Struck by piece of ore falling from pile.
Italian	35	M	1	....	Struck by piece of ore falling down shaft, causing fracture of skull.
Polander	20	S	1	....	Jumped off skip while in motion, was run over and had neck broken.
Italian	24	M	1	....	Suffocated by pile of broken ore.
Finlander	23	S	1	....	Fell down shaft and injured internally.
"	27	S	1	....	Struck by falling rock; leg and ribs fractured.
"	22	S	1	....	Fell down stope and fractured skull.
English speaking..	48	S	1	..	Asphyxiated by gas in winze.
Swede	33	M	1	..	
English speaking..	27	M	1	....	Skull fractured by rock falling in shaft.
" ..	33	M	1	....	Fell down winze.
Swede	32	M	1	....	Fell from bucket.
Italian	45	M	....	1	Evidently fell in epileptic fit and clothes were set on fire by broken lantern.
"	45	M	1	....	Struck by bar while prying ore in chute and fractured skull.
Finlander	35	S	....	1	Blown to pieces in thaw-house explosion.
English speaking..	28	M	1	....	Fell down shaft.
" ..	28	M	1	....	Overcome by gas and fell down raise.
" ..	45	M	....	1	Electrocuted. Came in contact with wire carrying 12-000 volts.
" ..	36	M	....	1	While erecting gin pole winch broke causing pike pole to break, striking him and fracturing skull.
Italian	26	S	....	1	Fell with trestle and fractured leg.
"	24	S	1	....	Overcome by gas.
German	23	S	1	....	Skull fractured by falling rock.
Syrian	24	S	1	....	Fell down winze.
Polander	....	S	1	..	Asphyxiated by gas.
Finlander.....	....	M	1	..	
Austrian.....	37	S	1	....	Fell down winze and fractured skull.
Austrian	21	S	1	....	Fell from cage down shaft and fractured skull.
English speaking..	40	S	1	....	Picked into piece of explosive in muck pile, explosion followed, causing fracture of skull. Died in Buffalo, N.Y., June 24.
English speaking..	25	S	1	....	Drilled into missed hole.
.....	....	....	26	6	

Table of Non-Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Mine.	Name of Owner.	Name of Injured.	Occupation of Injured.
1	May 29	Aug. 12	Armstrong-McGibbon	Armstrong-McGibbon Syndicate	Wm. Bradley ...	Hammerman .
2	Feb. 6	Perm'ly disabled	T. R. S., 1398 and 1399 ...	Bartram, Wadsworth and Sherry Syndicate	John Novack ...	Foreman ....
3	Jan. 13	Mar. 12	Beaver	Beaver Consolidated Silver Mines, Ltd.	R. Purdy	Painter .....
4	April 25	May 2	Beaver	Beaver Consolidated Silver Mines, Ltd.	M. Colton	Drill runner .
5	Oct. 25	Nov. 25	Beacon	Beacon Consolidated Mines	L. Annitt	Hammerman .
6	Nov. 20	Jan. 21	do	do do	O. Saari	do ..
7	Jan. 31	Feb. 16	Buffalo	Buffalo Mines, Ltd..	Wm. Toeppner ..	Shift boss ...
8	Feb. 7	" 28	do	do do ..	R. Stewart	Drill helper ..
9	" 29	Mar. 7	do	do do ..	A. Jones	Painter .....
10	Mar. 29	April 15	do	do do ..	A. Giovanella ...	Trammer ....
11	April 6	Aug. 26	do	do do ..	Jas. Nowork	Drill runner .
12	Aug. 1	Sept. 1	do	do do ..	Thos. McIntyre..	Carpenter ....
13	Sept. 14	.....	do	do do ..	Thos. Patterson .	Drill helper .
14	" 20	Oct. 1	do	do do ..	Geo. Kozalauki .	Trammer ....
15	Nov. 2	Nov. 18	do	do do ..	B. Williams	Laborer .....
16	Mar. 28	July 31	Creighton ...	Canadian Copper Co.	Wasyl Byczok ..	Trammer ....
17	July 20	" 29	do ...	do do	Luigi Massi	Trackman ...
18	" 23	Aug. 5	do ...	do do	P. Giovanni	Mason .....
19	" 22	" 27	do ...	do do	Geo. Ciecunescul.	Trammer ....
20	" 26	Nov. 18	do ...	do do	Luigi Mascara ..	do ....
21	Aug. 2	" 22	No. 2	do do	Jack Maki	Trammer ....
22	" 4	Aug. 26	Creighton ...	do do	Nickolai Murtain	Drill runner .
23	" 9	" 20	do ...	do do	Paul L. Simpson.	Trammer boss
24	" 17	" 26	do ...	do do	Daniel Wink	Fitter .....
25	" 17	Sept. 17	do ...	do do	Steve Collaska ..	Drill helper .
26	" 19	" 6	No. 3	do do	Yalmer Yansen .	do ..
27	" 23	" 6	Creighton ...	do do	Eno Erickson ...	Scaler .....
28	" 26	" 4	do ...	do do	P. Virginio	Trammer ....
29	" 26	" 17	do ...	do do	Alex. Gidech	do ....
30	" 26	Oct. 7	do ...	do do	Ivan Michiloff ..	do ....
31	" 30	" 4	do ...	do do	Radi Nachoff ...	do ....
32	Aug. 31	Sept. 23	do ...	do do	S. Rihikienan ..	Drill helper..
33	Sept. 4	" 12	No. 2	do do	August Wirtanen	do ..
34	" 4	" 12	do	do do	Nestor Haninen .	Trammer ....
35	" 6	" 19	do	do do	Matti Syjala	do ....
36	" 7	" 17	Creighton ...	do do	John Harjie	Sledger .....
37	" 8	Oct. 20	No. 3	do do	F. Marashdanen.	Deckman ....
38	" 10	Dec. 3	Creighton ...	do do	James Tuomi ...	Drill helper ..
39	" 13	Oct. 7	do ...	do do	Wm. Thompson .	Timberman ..
40	" 15	" 28	No. 3	do do	Henry Kary	Drill helper .
41	" 20	" 8	Creighton ...	do do	Domitro Mazur .	Trammer ....
42	" 28	" 29	do ...	do do	Wm. Niemi	Scaler .....
43	Oct. 2	" 16	Crean Hill .	do do	Myke Kivonick ..	Drill helper ..
44	" 4	Jan. 2	No. 2	do do	M. Lorenso	Trammer ...
45	" 5	Mar. 17	Crean Hill .	do do	Aleck Alksa	Drill runner .
46	" 7	Oct. 17	Creighton ...	do do	T. Zalboy	Trammer ....
47	" 9	Nov. 7	do ...	do do	J. Beganick	Timberman ..

in or About the Mines, 1912

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Nature and Cause of Accident.
English speaking	40	M	1	....	Hands burned and face lacerated, through an explosion, caused by drilling into missed hole.
German	45	M	1	....	Lost sight of both eyes, through explosion, caused by picking into dynamite in loose rock.
English speaking	....	....	....	1	Fractured left leg by falling from truss to ground, a distance of 18 feet.
do do	....	....	1	....	Nose broken by drill breaking.
do do	....	....	1	....	Arm broken, through being hit by falling ground.
do do	....	....	1	....	Leg broken, through slipping on rock.
do do	....	....	....	1	Caught and lacerated hand in revolving screen.
do do	....	....	1	....	Scalp wound and bruises, caused by falling rock.
do do	....	....	....	1	Fell off ladder and injured scalp and tongue.
Italian	....	....	1	....	Head cut and bruised, caused by rock falling from chute.
Polander	....	....	1	....	Fracture of leg, caused by loose rock rolling down stope.
English speaking	....	....	....	1	Fell from frame work of building, and fractured left shoulder.
do do	40	M	1	....	Fell down ladder-way from stope and broke both ankles.
Polander	45	M	....	1	Broke rib by falling on piece of rock.
English speaking	32	S	....	1	Fell from staging and bruised hip.
Russian	....	....	1	....	Fractured leg, through being struck by piece of ore rolling down ore pile.
Italian	24	M	....	1	Leg bruised by piece of blasted rock.
do	25	S	....	1	Drilled into conduit carrying 550-volt power line, and burned foot, leg and face.
Polander	35	S	1	....	While dumping ore into chute, car fell back on knee and displaced knee cap.
Italian	35	S	....	1	Fractured leg by being caught between skip and bar.
Finlander	28	S	1	....	Piece of ore fell from chute and fractured leg.
Roumanian	....	M	1	....	Pinched fingers between tripod and piece of ore.
English speaking	23	S	1	....	Small piece of ore fell from chute and cut face.
do do	61	M	....	1	Fell from top of air receiver and hurt back.
Polander	26	S	1	....	Foot bruised from falling rock.
Finlander	32	S	1	....	Pinched fingers between cable and pulley.
do	25	S	1	....	Leg cut by scaling bar.
Italian	23	S	1	....	Piece of ore fell from car, and bruised knee.
Polander	26	S	1	....	Loose piece of rock rolled on foot.
do	23	S	1	....	While dumping car, it fell back and injured ankle.
Bulgarian	30	M	1	....	Hips bruised, through being jammed between car and side of drift.
Finlander	30	S	1	....	Eye cut by piece of steel from drill.
do	24	S	1	....	Head cut by falling rock.
do	23	S	1	....	Piece of rock struck eye while sledging.
do	32	S	1	....	While dumping bucket, piece of rock crushed thumb.
do	50	M	1	....	Fell while running from sand blast, and bruised knee.
Polander	23	S	....	1	Fell while dumping bucket, and sprained foot.
Finlander	36	S	1	....	Fell over piece of timber, and fractured leg.
English speaking	40	S	1	....	Eye injured by piece of rock from hammer drill.
Finlander	35	S	1	....	Leg cut by falling rock while scaling.
Polander	24	S	1	....	Hand crushed between two cars.
Finlander	35	S	1	....	Detonating cap exploded in hand, and blew off three fingers.
Polander	30	S	1	....	Foot bruised by loose rock rolling on it.
Italian	22	S	1	....	Fell about ten feet in ladder-way and broke wrist.
Finlander	27	S	1	....	Eye cut by piece of steel flying from hammer.
Polander	21	S	1	....	Foot sprained by car wheel running over it.
do	25	S	1	....	Fell about twenty feet in shaft, scratched leg and blood poison set in.

Table of Non-Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Mine.	Name of Owner.	Name of Injured.	Occupation of Injured.
48	Oct. 11	Oct. 28	Creighton ..	Canadian Copper Co.	F. Babatto	Trammer ....
49	" 14	Nov. 1	do ...	do do	V. Pietro	Pumpman ....
50	" 23	" 5	No. 2	do do	V. Walanin	Trammer ....
51	" 24	" 8	No. 3	do do	K. Kowista	Drill helper ..
52	" 26	" 26	Creighton ...	do do	Geo. Typa	do ..
53	" 26	" 6	do ...	do do	Ivan Station	Trammer ....
54	" 26	" 5	No. 2	do do	E. Basa	do ....
55	" 27	" 7	No. 3	do do	A. Daniels	Iron worker .
56	" 28	" 7	Creighton ...	do do	Ilia Barson	Trammer ....
	" 28	" 19	do ...	do do	A. Stepanink ...	do ....
57	Nov. 1	Mar. 19	do ...	do do	S. Sydanman ...	Drill runner .
58	" 2	Nov. 12	do ...	do do	W. Gorvilink	Trammer ....
59	" 4	" 18	Crean Hill ...	do do	P. Cessario	do ....
60	" 4	" 27	Creighton ...	do do	D. Constantino .	do ....
61	" 4	" 25	No. 2	do do	A. Kaktaken	do ....
62	" 11	Dec. 9	Creighton ...	do do	Arthur Kane ...	Trammer boss
63	" 11	Nov. 25	No. 2	do do	A. Kantulin	Trammer ....
64	" 12	Dec. 9	No. 3	do do	Herman Rico ...	Drill helper .
65	" 14	" 11	do	do do	Chas. Duncan ..	Laborer .....
	" 14	Jan. 2	do	do do	Dan. Kelly	Tile-layer.....
	" 14	" 1	do	do do	A. Tukowsky ...	Laborer .....
66	" 19	Dec. 3	Creighton	do do	Wm. Thompson..	Timberman ..
67	" 20	Jan. 2	do	do do	Karl Bassil	Drill runner..
68	" 22	Dec. 11	do	do do	Matt. Niemi	Trammer ....
69	" 26	" 5	do	do do	John Drochim ..	do ....
70	" 28	Jan. 2	do	do do	Joe Carbon	Straw boss ..
71	" 26	Dec. 20	do	do do	Josie Genistan ..	Trammer ....
72	" 30	Jan. 5	Crean Hill ...	do do	A. Ojanperä	Drill runner..
73	Dec. 6	" 2	Creighton	do do	Oscar Ranta	do ..
74	" 6	Dec. 23	do	do do	Geo. Mahoney ...	Carpenter ....
75	" 7	Jan. 1	do	do do	Sam. Hantanen..	Drill helper ..
76	" 13	" 3	do	do do	Jose Oliver	Trammer ....
77	" 13	" 3	do	do do	Geo. Malincing ..	do ....
78	" 16	" 4	do	do do	Autti Haiska ..	Drill runner ..
79	" 28	" 27	do	do do	Ivan Station	Trammer ....
80	" 30	" 21	do	do do	Louis Perito	do ....
81	June 13	July 24	Cobalt Lake ..	Cobalt Lake Mining Co.	S. Fryarczuk ...	do ....
82	Dec. 26	Jan. 15	do ..	do do	Walter Paul	Timberman ..
83	Mar. 22	Apr. 20	Colonial	Colonial Mining Co.	Chas. Moon	Drill runner ..
84	May 14	May 23	do	do do	N. Richards	Hoistman ....
85	Sept. 28	Oct 9	do	do do	P. Subach	Drill helper ..
86	Nov. 22	Nov. 30	do	do do	M. Bennets	Drill runner ..
87	Apr. 1	Apr. 15	Coniagas	Coniagas Mines, Ltd.	R. Kanerva	Trammer ....
88	" 27	May 6	do	do do	W. Barker	do ....
89	May 21	June 3	do	do do	John Garland ...	Skip tender ..
90	" 22	" 17	do	do do	Sam. Thomas ...	Drill runner ..
91	Dec. 11	Jan. 23	Crown Gypsum	Crown Gypsum Co..	Geo. Mortimer ..	Trammer ....
92	July 23	Aug. 10	Crown Reserve	Crown Reserve Mining Co.	Tom Dinnenon ..	Timberman ..
93	Dec. 28	Feb. 3	Henderson ...	Cross and Wellington	Thos. Birkett ...	Drill runner .
94	May 10	July 19	Dome	Dome Mines, Ltd...	Donald Kehoe ..	Millman .....
95	June 27	" 12	do	do do ..	John Cleversley..	do .....
96	July 3	" 22	do	do do ..	John Stevenson..	do .....

in or about the Mines, 1912—Continued.

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Nature and Cause of Accident.
Italian	33	M	1	....	Jammed arm between piece of ore and car.
do	35	M	1	....	Hand caught by car while dumping.
Finlander	21	S	1	....	Hand jammed between ore and car.
do	33	S	....	1	Stepped on nail, and injured foot.
Roumanian	21	S	1	....	Fell down stope, and sprained ankle.
Polander	23	S	1	....	Fell into car, and piece of ore from chute struck him in back.
Italian	21	S	1	....	Piece of ore fell on hand, and crushed fingers.
English speaking	27	S	....	1	Stepped on compressor foundation, and sprained ankle.
Polander	31	S	1	....	Head cut by explosion in ore pile.
do	25	S	1	....	Face cut and eye injured by explosion in ore pile.
Finlander	25	S	1	....	Struck on elbow by rock thrown by blast.
Polander	32	S	1	....	When dumping car, it fell back, and bruised finger.
Italian	19	S	1	....	Struck in eye by piece of rock while sledging.
do	47	S	1	....	Jammed thumb between two timbers.
Finlander	23	S	1	....	Fell about ten feet from ladders, injuring side and ankle.
English speaking	30	S	1	....	Jammed finger between car and air line.
Finlander	22	S	1	....	Crushed finger between car and piece of ore.
do	35	M	1	....	Jammed finger while taking timber out of shaft.
English speaking	21	S	....	1	Pole supporting scaffold broke, allowing men to fall to floor.
do do	32	S	....	1	
Polander	21	S	....	1	
English speaking	39	M	1	....	Cut kneecap with axe.
Polander	36	S	1	....	Arm bruised through premature explosion while sand-blasting.
Finlander	46	S	1	....	Tramcar ran over foot.
Polander	21	S	1	....	Face and eye burned by removing bell from carbide lamp and igniting gas.
Italian	45	M	....	1	Caught by trommel and broke two ribs.
Spaniard	23	S	1	....	Jammed hand between two pieces of ore.
Finlander	28	M	1	....	Finger caught between steel and rock.
do	30	S	1	....	Drilled into explosive in old hole and sight of one eye destroyed.
English speaking	32	M	....	1	Fell on spike and cut hand.
Finlander	22	S	1	....	Wheel of skip ran over foot.
Spaniard	38	M	1	....	Nose broken by falling rock.
Polander	23	M	1	....	While pulling timber out of chute it fell on leg.
Finlander	27	S	1	....	Finger caught between arm and collar of bar.
Polander	23	S	1	....	Finger struck by rock falling from chute.
Spaniard	27	S	1	....	Leg jammed between two pieces of rock.
Polander	25	S	1	....	Bucket upset off truck and fractured leg.
English speaking	46	M	1	....	Struck by falling ground and bruised back and shoulder.
do do	....	....	1	....	Fell down winze and sprained back.
do do	24	S	....	1	Valve blew off and injured eyes.
German	50	M	1	....	Rib broken by hammer falling down shaft.
English speaking	....	....	1	....	Staging broke and bruised back.
Finlander	30	....	1	....	Caught hand between car and chute and jammed fingers.
English speaking	....	....	1	....	Bruised by falling into chute.
do do	....	....	1	....	Elbow dislocated by rock falling down shaft.
do do	....	....	1	....	Crushed thumb in drill.
do do	30	....	1	....	Caught ankle between car and rock.
do do	....	....	1	....	Falling rock dislocated shoulder.
do do	55	M	1	....	Left leg broken through being jammed between timber and falling ore.
do do	26	M	....	1	Arm and shoulder caught by conveyor belt.
do do	21	S	....	1	Arm caught by conveyor belt.
do do	37	M	....	1	Broke arm in mill machinery.

Table of Non=Fatal Accidents

Number	Date of Accident.	Date of Recovery.	Name of Mine.	Name of Owner.	Name of Injured.	Occupation of Injured.
97	Oct. 15	Dec. 28	Dome	Dome Mines, Ltd.	Frank Trunk ...	Fireman .....
98	" 17	Nov. 13	do	do do ..	John Sarri	Drill runner .
99	Nov. 8	Dec. 8	do	do do ..	Geo. Makowe ...	Laborer .....
100	" 27	Jan. 6	do	do do ..	Thos. Lockstone.	Trammer boss
101	" 28	Dec. 11	do	do do ..	Fred. Trudell ...	Laborer .....
102	Dec. 13	" 26	do	do do ..	D. Jolicoeur.....	Carpenter ....
103	" 7	" 24	Dome Lake ..	Dome Lake Mines, Ltd.	Frank Dunne ...	do ....
104	Jan. 30	Mar. 16	Kerr Lake ...	Kerr Lake Mining Co.	Wm. Johns	Sampler .....
105	Mar. 8	" 15	do ...	do do	F. Rondska	Trammer ....
106	Sept. 14	Oct. 10	do ...	do do	N. Blakey	Drill runner .
107	Oct. 4	" 15	do ...	do do	R. Clattenburg ..	Drill helper ..
108	Nov. 29	Feb. 1	do ...	do do	John Dubowsky .	Trammer ....
109	Feb. 24	Mar. 19	Lawson	La Rose Mines, Ltd.	P. Beranda	do ....
110	Mar. 9	" 19	La Rose	do do	M. Kolyjczuk ...	Drill helper ..
111	April 5	April 14	do	do do	H. Moskalyh ...	do ..
112	July 10	Sept. 1	do	do do	L. Gignac	Trammer ....
113	Nov. 30	Jan. 20	do	do do	J. McIsaac	Drill runner .
114	Jan. 5	" 18	Helen	Lake Superior Power Co.	Alex. Steel	Electrician ...
115	" 18	" 29	do	do do	M. Paiogeion ...	Trammer ....
116	" 28	Feb. 5	Magpie	do do	Kusti Kangas ...	do ....
117	Feb. 6	" 23	Helen	do do	C. Zucato	do ....
118	" 8	" 24	do	do do	L. Boldovin	do ....
119	" 27	Mar. 11	do	do do	T. Kaularic	do ....
120	" 28	" 19	do	do do	G. Grollo	do ....
121	Mar. 1	" 11	do	do do	G. Falinski	do ....
122	April 11	April 22	do	do do	A. Borese	do ....
123	" 18	" 28	do	do do	J. Petyk	do ...
124	" 24	July 15	do	do do	Thos. Richardson	Laborer .....
125	May 7	May 21	do	do do	J. Macios	Trammer ....
126	" 7	" 20	do	do do	G. Zanitti	do ....
127	" 10	" 20	do	do do	J. Pecile	do ....
128	" 19	" 27	do	do do	A. Pegoraro	do ....
129	" 20	" 29	do	do do	G. Pecile	do ....
130	" 21	June 17	do	do do	A. Ferrari	do ....
131	" 21	" 5	do	do do	C. Duclos	do ....
132	" 28	" 17	do	do do	M. Dupont	Drill runner .
133	" 29	July 20	do	do do	V. Morriatt	Trammer ....
134	" 31	" 3	do	do do	G. Basso	Drill runner .
135	June 3	June 26	do	do do	E. Waara	do ....
136	" 12	" 26	do	do do	A. Fabbro	Trammer ....
137	" 18	" 26	do	do do	V. Zeraldo	do ....
138	" 24	July 8	do	do do	P. Buchan	Carpenter ....
139	July 16	" 31	do	do do	M. Pavolitch ...	Trammer ....
140	" 18	Aug. 6	do	do do	L. Presello	do ....
141	" 20	" 1	do	do do	A. Pegararo	do ....
142	Aug. 1	Sept. 5	do	do do	V. Anic	do ....
143	" 29	" 23	do	do do	G. Boika	do ....
144	Sept. 6	" 16	do	do do	J. De Meio	Drill runner .
145	Oct. 1	Oct. 14	do	do do	J. De Diana	Skip tender .
146	" 5	" 15	do	do do	A. Laguna	Drill runner .
147	" 5	" 14	do	do do	T. Meller	Trammer ....
148	" 25	Nov. 4	do	do do	A. Koski	do ....
149	" 30	" 11	do	do do	O. Peterson	Laborer .....
150	" 25	" 10	do	do do	J. Kriztof	Trammer ....
151	" 31	" 12	do	do do	P. Milaknoja	do ...
152	Feb. 26	Mar. 11	do	do do	U. Skibo	do ...
153	Mar. 20	April 1	Magpie	Lake Superior Iron and Steel Co	A. Foucault.....	Carpenter ...
154	May 2	May 31	do	do do	J. Calligoro	Laborer .....
155	" 10	" 20	do	do do	D. Vezmar	Drill runner .

in or about the Mines, 1912.—Continued.

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Nature and Cause of Accident.
Bohemian	28	S	....	1	Boiler tube exploded and burned body.
Finlander	27	S	1	....	Leg struck by falling board.
Austrian	23	S	1	....	Tramcar ran over leg.
English speaking	26	S	1	....	Car ran over foot.
do do	33	....	1	....	Car ran over foot.
do do	22	M	....	1	Slipped on ice and dislocated shoulder.
do do	38	M	....	1	Fell off scaffold and injured hip.
do do	20	S	1	....	Right foot broken by falling rock.
Polander	....	....	1	....	Hammer drill fell from staging and bruised back.
English speaking	....	....	1	....	Fell fifteen feet with staging and bruised head and shoulder.
do do	22	S	1	....	Dirt blown into eyes by blowpipe.
Russian	23	M	1	....	Jammed thumb between two pieces of rock.
Austrian	22	S	1	....	Slipped on turn sheet and displaced kneecap.
Polander	26	M	1	....	Fell about ten feet and bruised body.
do	....	....	1	....	Scalp wound from falling rock.
Austrian	50	M	1	....	Rock fell from chute and bruised foot.
English speaking	....	....	1	....	Struck foot with hammer.
do do	47	M	....	1	Caught by trommel and injured thigh.
Italian	21	S	1	....	Fell down ladder ten feet and bruised knee.
Finlander	21	S	....	1	Tramcar ran over foot.
Italian	24	S	1	....	Caught little finger between car and door.
do	27	M	1	....	Toe crushed by falling ore.
do	36	M	1	....	Leg bruised by ore falling from shovel.
do	40	M	1	....	Caught finger between car and timber.
Polander	27	....	1	....	Piece of ore rolled on foot.
Italian	30	M	1	....	Wrist jammed between car and timber.
Polander	25	S	....	1	Caught little finger between car and truck.
English speaking	35	M	....	1	Hand cut with axe.
Italian	25	S	1	....	Fingers crushed between car and piece of ore.
do	37	M	1	....	Finger caught between car and truck.
do	26	S	1	....	Finger caught between car and timber of drift.
do	31	M	1	....	Crushed shoulder between car and timber of drift.
do	28	....	1	....	Finger caught between car and timber of drift.
do	28	....	1	....	Fingers crushed between car and piece of ore.
do	28	....	1	....	Fell 55 feet down raise, and injured right arm.
English speaking	31	M	1	....	Crushed thumb in drill.
do do	35	M	1	....	Finger struck by ore falling from car.
Italian	30	....	1	....	Cut under eye by ore falling down raise.
Polander	26	....	1	....	Scalp cut through premature blast.
Italian	23	S	1	....	Caught finger between car and piece of rock.
do	42	M	1	....	Struck in eye by piece of ore.
English speaking	41	M	....	1	Slipped on plank, and injured ankle.
Polander	25	S	1	....	Caught finger between car and chute.
Italian	19	S	1	....	Finger cut by ore falling down chute.
do	32	M	1	....	Finger pinched between pipe and car.
do	23	S	1	....	Caught finger between car and chute.
Finlander	33	M	1	....	Legs bruised by ore falling from chute.
Italian	21	S	1	....	Fell down raise, and injured scalp and legs.
do	32	M	1	....	Strained back lifting on car.
do	27	....	1	....	Hand cut by piece of rock.
do	31	....	1	....	Struck on hip by ore falling from chute.
Polander	33	....	1	....	Caught wrist between car and timber.
Swede	48	M	....	1	Ankle injured while working on skip.
Polander	33	....	1	....	Caught wrist between car and timber.
Russian	23	....	1	....	Car ran over foot, and injured ankle.
Italian	21	....	....	1	Slipped on step, and injured back.
English speaking	19	S	....	1	Axe slipped, and cut leg.
Italian	28	....	....	1	Fell 14 feet from trestle, and fractured collar bone.
Russian	22	....	1	....	Struck on hand by sledge.

Table of Non-Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Mine.	Name of Owner.	Name of Injured.	Occupation of Injured.
156	May 31	June 11	Magpie	Lake Superior Iron & Steel Co	Z. Savage	Carpenter ...
157	July 23	Aug. 8	do	do do	M. Prokopectz ...	Deckman ....
158	" 27	Sept. 9	do	do do	A. De Bon	Drill runner .
159	Aug. 9	Aug. 20	do	do do	O. Lahtimer	Trammer ....
160	Sept. 2	Oct. 7	do	do do	V. Boni	Iron worker .
161	" 10	" 22	do	do do	A. De Mario	do do ..
162	" 19	Sept. 27	do	do do	J. Waitoskey ...	Drill runner .
163	Nov. 11	Nov. 25	do	do do	J. Vukovick	Trammer ....
164	" 28	Dec. 16	do	do do	A. Boni	Drill runner .
165	July 24	Aug. 21	Mann	Mann Mines, Ltd. ..	Tom Wilson	Fireman .....
166	Nov. 4	Feb. 6	McEnaney....	Crown Reserve Mg.. Co.	Dan McMillan ..	Drill runner .
167	July 19	Oct. 19	McIntyre	McIntyre Porcupine Gold Mines, Ltd...	J. G. Harris	Superintend't .
168	Aug. 17	Nov. 4	McKinley-Darragh	McKinley - Darragh-Savage Mines, Ltd.	Joe Covosh	Drill runner .
169	Nov. 2	.....	do do	do do	G. Demianink ..	Laborer .....
170	May 29	June 12	Garson	Mond Nickel Co. ...	Geo. Mortimer ..	Drill runner .
171	June 11	July 30	Frood Extension	do do	Steve Lateski ...	do ....
172	July 2	Aug. 9	do do	do do	A. Ryhanen	Timberman ..
173	Oct. 22	Feb. 8	Victoria Mine.	do do	John Crawchuck.	Skip tender ..
174	Dec. 27	Jan. 20	Sulphide	Nicholls Chemical Co.	Eli Derushie ...	Drill runner .
175	May 23	June 18	Nipissing	Nipissing Mining Co.	J. Dubois	do .. ..
	" 23	July 2	do	do do	Z. Vachour	Drill helper ..
176	July 8	Oct. 26	do	do do	G. Fournier	Carpenter ....
177	" 29	Aug. 5	do	do do	H. Buglehole ...	Boilermaker ..
178	Sept. 5	Sept. 23	do	do do	G. Angelo	Laborer .....
179	Nov. 5	Nov. 23	do	do do	Peter Dagenais..	Drill runner ..
180	Dec. 7	.....	do	do do	John Linski	Drill helper ..
181	June 21	June 30	Concentrator .	Northern Customs Concentrator, Ltd.	J. Peder	Laborer .....
182	Aug. 4	Sept. 4	do ..	do do	J. N. Monsion ..	Oiler .....
183	" 15	Aug. 24	do ..	do do	D. Walmsley ...	Carpenter ....
184	Dec. 3	Dec. 20	do ..	do do	R. Kitto	Laborer .....
185	Jan. 5	Perm'ly Disabled	O'Brien Mill	M. J. O'Brien	Chas. Westbrook.	Millman .....
186	Feb. 6	Feb. 14	O'Brien	do do	Geo. Morey	Drill helper ..
187	Mar. 21	Apr. 7	do	do do	Luke Arney	Drill runner ..
188	Nov. 30	Feb. 4	do	do do	John Shaw	do ..
189	July 6	July 20	Ophir	Ophir Mining Co. ..	M. Beniski	Trammer .....
190	Nov. 11	Dec. 3	Penn Canadian	Penn Can. Mines ..	N. Bodak	Drill runner ..
191	Dec. 4	.....	do do	do do ..	Fred Cox	do ..
192	" 23	Jan. 6	do do	do do ..	Ed. Billings	Millman .....
193	Apr. 21	May 2	Right of Way.	Right of Way Mining Co.	A. Hill	Hammerman .
	" 21	June 17	do do .	do do	M. Hendrickson .	do ..
	" 21	" 17	do do .	do do	J. Hill	do ..
	" 21	Apr. 28	do do .	do do	G. Resta	do ..
194	Jan. 5	Jan. 12	Temiskaming .	Temiskaming Mining Co.	C. Davidson	Trammer ....
195	May 21	July 15	do ..	do do	C. Flynn	Drill runner .
196	June 28	" 9	do ..	do do	H. Williamson ..	do ..

in or about the Mines, 1912—Continued

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Nature and Cause of Accident.
English speaking	45	....	....	1	Toe crushed by timber rolling on it.
Polander	....	....	....	1	Fingers caught and crushed while dumping bucket.
Italian	24	....	....	1	Tripod fell on leg.
Finlander	24	S	....	1	Fell down dump with car, and injured scalp.
Italian	29	M	....	1	Caught toe between sheave wheel and cable.
do	23	....	....	1	Struck on leg by broken end of chain.
Russian	24	....	1	....	Struck on shoulder by steel falling from sling.
do	24	....	1	....	Cut finger with sharp edge of shovel.
Italian	24	....	1	....	Caught finger between drill chuck and rock.
English speaking	45	M	....	1	Broken rib and scalp wound, through being struck by bar while starting compressor.
do do	....	....	1	....	Leg broken by falling rock.
do do	34	M	1	....	Knee cap and ankle broken, through chairs on cage catching in timber.
Hungarian	34	M	1	....	Struck on ankle by ground rolling down stope.
Roumanian	35	....	....	1	Coil of cable rolled on foot.
English speaking	....	....	1	....	Fell about 8 feet from ladder, and broke two ribs.
Polander	....	....	1	....	Struck on head by rock falling from timber in shaft.
Finlander	28	....	1	....	Slipped off timbers while timbering shaft, and injured head.
do	....	....	1	....	Riding with steel in cage, when steel caught and broke leg, causing subsequent amputation.
English speaking	39	M	1	....	Piece of timber fell on toe.
do do	23	....	1	..	Drilled into old hole, causing an explosion and injured legs.
do do	29	....	1	..	
do do	....	....	....	1	Stepped on pinch bar and fractured ankle.
do do	35	M	....	1	Ladder fell against head.
Italian	22	S	....	1	Thumb cut by crosscut saw.
English speaking	....	....	1	....	Badly bruised through falling in stope.
Finlander	32	M	1	....	Struck on hip and spine by flying rock from blast.
English speaking	....	....	....	1	Roller under heavy machinery passed over toe.
do do	35	M	....	1	Lost sight of one eye through being struck by steel.
do do	....	....	....	1	Cut right foot with axe.
do do	37	M	....	1	Fell off runway to ground and fractured skull.
do do	28	S	....	1	Burned by caustic soda and lost sight of both eyes.
do do	28	S	1	....	Struck by piece of rock on cheek.
do do	....	....	1	....	Fell from timber to rock pile and injured side.
do do	....	....	1	....	Piece of steel from drill struck eye.
Polander	....	....	1	....	Skid fell and injured left shoulder.
do	27	....	1	....	Caught between cage and timber and broke three ribs.
English speaking	....	....	1	....	Struck by falling rock and arm broken.
do	....	....	....	1	Thrown while shifting belt and injured head.
Finlander	....	....	1	..	Drilled into missed hole containing explosives.
do	....	....	1	..	
do	....	....	1	..	
do	....	....	1	..	
English speaking	....	....	1	....	Nose broken by handle of windlass.
do	....	....	1	....	Fell from temporary platform, and broke ankle.
do	....	....	1	....	Cage dropped short distance, and sprained knee.

Table of Non=Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Mine.	Name of Owner	Name of Injured.	Occupation of Injured.
197	April 22	May 10	Trethewey ...	Trethewey Mg. Co...	J. Wells	Trammer ....
198	" 27	" 13	do ...	do do	M. Slywczuk	Drill runner .
199	June 11	July 3	do ...	do do	M. Donovan	do ..
200	" 14	Dec. 14	do ...	do do	D. McA. Newlands	Laborer .....
201	Aug. 21	Oct. 14	do ...	do do	I. G. Dean.....	Master mechanic
202	Sept. 23	Jan. 15	do ...	do do	M. Ywanozuk....	Trammer ....
203	Nov. 4	Nov. 10	do ...	do do	A. McAskill	Drill runner .
	" 4	Dec. 13	do ...	do do	F. Dwyer	Drill helper ..
204	" 11	Nov. 27	do ...	do do	S. Dublik	Drill runner .
205	Dec. 7	Jan. 9	do ...	do do	J. Chamberlain .	Carpenter ....
206	Mar. 14	No ret'rn	Vipond	Vipond Porcupine Mines, Ltd.	J. Campbell	Drill runner .
207	June 10	Sept. 10	Wettlaufer ...	Wettlauffer Lorrain Silver Mines, Ltd..	Hugh R. Mill ...	Millman .....
208	" 29	July 12	do ...	do do	Alex Cayo	Teamster ....
					Total.....	.....

in or about the Mines, 1912—Concluded

Nationality of Injured.	Age.	Married or single	Below ground.	Above ground.	Nature and Cause of Accident.
English speaking	26	S	1	....	Fell down stope into chute, and broke two ribs.
Austrian	23	S	1	....	Fell from staging, and cut head.
English speaking	26	S	1	....	Caught hand between timber and bucket.
do	43	M	....	1	Fell twelve feet, and fractured spine.
do	32	M	....	1	Caught knee in elevator gears.
Polander	26	S	1	....	Fell off ladder in shaft, and broke leg.
English speaking	30	S	1	..	Drilled into old hole that had been blasted.
do	24	S	1	..	
Polander	....	....	1	....	Light ignited gas from carbide can, and burned eyes.
English speaking	25	M	....	1	Left thumb cut off by saw.
do	45	M	1	....	Drilled into missed hole; explosion followed, and caused loss of sight of one eye.
do	26	S	....	1	Caught hand in elevator gear.
do	50	M	....	1	Kicked on head by horse.
.....	....	....	160	56	

Accidents at Metallurgical Works

The metallurgical works which come under the provisions of the Mining Act of Ontario include blast furnaces, copper-nickel smelters and converter plants, and silver smelters. At such works during 1912 there were 10 workmen killed, compared with 9 in 1911, and 122 injured.

Blast Furnaces

At blast furnaces 7 men lost their lives, compared with 2 in 1911. Four of these men were asphyxiated by blast furnace gas. This gas contains from 20 to 25 per cent. carbon monoxide, a very deadly poison, and it is consequently necessary that exceptional care should be taken that the leakage of the gas around the furnace should be reduced to a minimum. One of the men lost his life in the boiler-room through an excessive leakage of gas from the gas main. Two were asphyxiated while emptying a gas leg of flue dust. These men were working practically in the open, and it is difficult to ascertain how they were overcome. The other man lost his life in a gas-washing house. In this building there is always a certain amount of gas, which is brought over in the water used in washing the gas, and it was a rule that one man should never go into this building alone. Owing to the violation of this rule, the workman was overcome by the gas and was not found until it was too late to resuscitate him. It is advisable to have around the blast furnace an oxygen reviving apparatus for treating workmen overcome by gas.

One man was killed through the breaking of a 70-lb. steel rail which supported a scaffold, causing his fall to the ground, where he was struck by a piece of material falling with the scaffold. Another man was electrocuted while engaged in washing out a boiler. He had an extension cord from the 110-volt lighting circuit, and, while adjusting the wire guard for the lamp, received a shock which caused his death. Accidents of this nature from so low a voltage are rare, but their occurrence shows that care must be taken to have low-voltage wires properly insulated. The remaining blast furnace accident occurred while the workmen were taking out the old lining of the furnace preparatory to relining it. Part of the old lining caved, causing one of the workmen to fall into the furnace, where he received burns and other injuries which caused his death. Sufficient care was not taken in this case to have the workmen properly protected, so that in case of an accident of this nature, it would be impossible to fall into the furnace.

In addition to the fatalities in the blast furnaces there were 51 workmen injured. Twenty-four of these injuries were burns received while working around the furnace, due generally speaking to the hot slag or iron. The Act requires suitable shields or appliances to protect the workmen. Sufficient attention is not paid by the management to this provision. Men are allowed to work around the furnace improperly clothed for work of this nature.

Copper-Nickel Smelters and Converter Plants

Three men lost their lives while employed at copper-nickel smelters and converter plants in 1912, compared with 6 in the preceding year. One of these men was struck by a train while walking along the track on his way home from work. Another man was crushed by the rabbles in the drying plant for fines of the reverberatory furnace. The workman must have got up on top of the dryer while the machinery was in motion and was caught by the return rabble. The other workman was struck by a piece of falling board while engaged on repair work in the smelter building. A scaffold had been erected, and, owing to one end of the supporting timber not being tied, the plank fell.

In addition to the 3 fatalities there were 65 workmen who received injuries which incapacitated them for over 7 days. Of these injuries 11 were fractures, and there were three cases of permanent disability, of differing degrees of severity.

Silver Smelters

There were no fatal accidents at silver smelters during 1912. Six non-fatal accidents were reported during the year. Of these, one was serious and involved the fracture of three ribs, due to being struck by train.

The specific occupation in the works of the men who were killed, and their nationality, are shown in the following table:

Occupation.	English speaking.	French.	Swede.	Polander.	Italian.	Total.
Water tender	2	1				3
Straw boss				2		2
Laborer	2					2
Rigger			1			1
Electrician	1					1
Cinderman					1	1
Total	5	1	1	2	1	10

The ages of the men killed at the metallurgical works were as follows:—

17–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	Total.
0	2	3	2	1	0	1	1	10

Cause and Place of Fatalities at Metallurgical Works

	1912	1911
Blast Furnaces:—		
Asphyxiation from furnace gas	4	0
Breaking of scaffold	1	0
Electrocution	1	0
Lining of furnace falling	1	0
Run over by yard engine	0	1
Struck by falling brick while relining furnace	0	1
	7	2
Copper-Nickel Smelters and Converter Plants:—		
Struck by train	1	0
Crushed by rabbles	1	0
Struck by falling plank	1	0
Explosion in settler	0	1
Crushed between cars	0	1
Struck by piece of slag falling from hood	0	1
Falling through roof of building	0	1
Falling of converter hood	0	1
Electrocuted in power house	0	1
	3	6
Silver Smelters:—		
Falling from scaffold	0	1
Total	10	9

Cause and Place of Non-Fatal Accidents at Metallurgical Works

The following schedule shows the cause and place of the non-fatal accidents in 1912 at the metallurgical works, and the number injured:—

Blast Furnaces:—		
Burned	24	
Falling objects	6	
Caught in machinery	4	
Falling from elevated places	3	
Burned by electric wires	3	
Run down by cars	2	
Gassed	1	
Miscellaneous	8	
		51
Copper-Nickel Smelters and Converter Plants:—		
Falling from elevated places	13	
Burned	12	
Crushed between two objects	11	
Run into by cars	9	
Struck by falling objects	6	
Caught in machinery	4	
Burned by electric wires	1	
Miscellaneous	9	
		65
Silver Smelters:—		
Struck by falling objects	3	
Burned	1	
Run into by cars	1	
Caught by machinery	1	
		6
Total		122

The specific occupation of the men in the metallurgical works who were injured, and their nationality, are shown in the following table:—

Occupation.	English speaking.	Italian.	Polander.	Finlander.	Bulgarian.	Austrian.	Russian.	French.	Not known.	Total.
Laborer	3	18	11	1	3	2	2	1	5	46
Furnace helper	.....	4	1	.....	.....	1	.....	.....	5	11
Brakeman	2	1	2	.....	.....	.....	.....	.....	1	6
Keeper	.....	2	1	.....	.....	.....	.....	.....	3	6
Fitter	5	2	.....	.....	.....	.....	.....	.....	.....	7
Tapper	.....	3	2	.....	.....	.....	.....	.....	.....	5
Baleman	.....	1	4	.....	.....	.....	.....	.....	.....	5
Oiler	1	2	.....	1	.....	.....	.....	.....	.....	4
Electrician	3	.....	.....	.....	.....	.....	.....	.....	.....	3
Conductor	2	.....	.....	.....	.....	.....	.....	.....	1	3
Tapper's helper	2	.....	1	.....	.....	.....	.....	.....	.....	3
Carpenter	1	2	.....	.....	.....	.....	.....	.....	.....	3
Foreman	2	.....	.....	.....	.....	.....	.....	.....	.....	2
Boilermaker's helper	1	1	.....	.....	.....	.....	.....	.....	.....	2
Engineer	2	.....	.....	.....	.....	.....	.....	.....	.....	2
Blower	2	.....	.....	.....	.....	.....	.....	.....	.....	2
Matte loader	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Water boy	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Cage tender	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Lineman	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Pattern maker	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Rigger	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Repair man	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Millwright	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Stove tender	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Machinist	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Water tender	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Master mechanic	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Total	33	39	22	4	3	3	2	1	15	122

The ages of the men injured at the metallurgical works were as follows:—

17 to 20	21 to 25	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50	60–65	Unknown.	Total.
17	30	25	25	7	4	2	1	11	122

Table of Fatal Accidents at

Number.	Date.	Name of Works.	Name of Owner.	Name of Injured.	Occupation of injured.
	1912				
1	April 27..	Blast Furnace..	Algoma Steel Company..	John Sharpe	Water tender
2	July 3..	" ..	" " ..	Albert Auger	"
3	Oct. 22..	" ..	" " ..	Oscar Kleberg.....	Rigger .....
4	Nov. 14..	" ..	" "	Geo. Zink	Laborer .....
				Geo. Smith.....	" ....
5	Dec. 11..	" ..	" " ..	Geo. Simpson	Water tender.
6	May 13..	Reverberatory Furnace.	Canadian Copper Co.....	Philip Lamichuck ..	Straw boss ..
7	Sept. 20..	Smelter yard ..	" " ..	Mat Dswonkowski..	" ..
8	Nov. 9..	Smelter	" " ..	E. J. Harper	Electrician ..
9	Oct. 3..	Blast Furnace..	Steel Company of Canada	Giovanni Contt.....	Cinderman ..

Metallurgical Works, 1912.

Nationality of injured.	Age.	Married or single.	Above ground.	Nature and cause of accident.
English speaking..	49	M	1	Overcome by gas in boiler house.
" ..	25	S	1	While washing out boiler received shock from 110-volt light wire.
Swede.....	29	S	1	Fell from scaffold and struck on head with heavy casting.
English speaking..	55	M	1	} Overcome by blast furnace gas.
" ..	35	M	1	
" ..	40	M	1	Overcome by gas while dumping seals in gas washing house.
Polander	28	M	1	Crushed by rabbles.
Polander	53	M	1	Struck by train.
English speaking..	28	S	1	Skull fractured by falling plank.
Italian	32	M	1	Brick lining of furnace fell, carrying him with it. Died Oct. 9th
Total.....	....	....	10	

Table of Non-Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Works.	Name of Owner.	Name of Injured.	Occupation of Injured.
1	Jan. 17	Jan. 30	Blast furnace.	Algoma Steel Corporation	O. H. Hugill	Repairman
2	" 16	.....	do	do	L. Maccaracca	Helper
3	" 31	.....	do	do	Jon Cwiakala	Keeper
4	Feb. 15	.....	do	do	G. Pricci	Laborer
5	" 15	.....	do	do	Robt. Hill	Millwright
6	" 4	Feb. 28	do	do	Geo. Szuba	Helper
7	" 15	" 28	do	do	Frank Daly	Laborer
8	Jan. 15	" 6	do	do	Albert Snienek	do
9	Mar. 16	.....	do	do	G. Dulesandro	do
10	Jan. 11	Jan. 26	do	do	S. W. Murphy	Blower
11	Mar. 19	Mar. 27	do	do	Geo. Paulick	Keeper
12	April 4	April 17	do	do	Jas. Dwyer	Electrician
13	" 26	.....	do	do	Isaac Waddle	Carpenter
14	" 26	.....	do	do	T. St. George	Pipe fitter
15	May 1	.....	do	do	P. Kovinich	Helper
16	" 2	.....	do	do	Toni Tersigno	Laborer
17	" 18	.....	do	do	M. Gutcher	Conductor
18	" 24	.....	do	do	F. Knorck	Helper
19	June 16	.....	do	do	P. Wilusz	Keeper
	" 16	.....	do	do	J. Kobratka	Helper
20	" 27	July 8	do	do	Jos. Refcha	Laborer
21	July 6	" 15	do	do	J. L. Radcliffe	Stove tender
22	" 23	Sept. 23	do	do	Sam Pepovitch	Laborer
23	" 26	Aug. 18	do	do	Geo. Uremovic	Helper
24	Aug. 14	" 27	do	do	Thos. Edgar	Machinist
25	" 15	Sept. 16	do	do	J. Mendetta	Laborer
26	" 15	Aug. 27	do	do	Joe Jasensky	Keeper
27	" 17	" 30	do	do	A. Marcellari	Laborer
28	" 19	" 27	do	do	J. Zurowinski	do
29	" 20	Sept. 17	do	do	S. W. Murphy	Blower
30	Sept. 3	" 15	do	do	S. Walicky	Laborer
31	" 12	Oct. 1	do	do	J. Wenovil	Helper
32	" 12	Sept. 27	do	do	Geo. Szuba	do
33	" 16	" 30	do	do	T. Saverio	Oiler
34	" 22	Oct. 14	do	do	J. Wright	do
35	" 23	" 7	do	do	Toni Pergomet	Laborer
36	Oct. 5	" 14	do	do	Harry Knox	Water tender.
37	" 19	Oct. 28	do	do	G. Aleghi	Oiler
38	" 29	Nov. 9	do	do	E. Barberesi	Helper
39	Nov. 27	Dec. 9	do	do	C. Desrochers	Laborer
40	" 28	" 6	do	do	M. Sandoni	do
41	Dec. 3	" 15	do	do	Peter Korale	Helper
42	" 17	" 30	do	do	S. Gawant	do
43	" 2	.....	do	do	G. Volpe	Keeper
44	" 24	.....	do	do	G. Calabianchi	do
45	" 29	.....	do	do	Chas. Waters	Laborer
46	Mar. 14	May 30	Smelter	Canadian Copper Co.	Peronti Pielo	Brakeman
47	May 13	July 2	do	do	Allan Bruce	do
48	July 8	" 17	Roast yard	do	F. Krutisck	Laborer
49	" 19	Nov. 19	Smelter	do	Gabriel Younie	do
50	" 19	" 19	do	do	Ubaniti Veriato	Matte loader
51	" 25	Aug. 2	do	do	John Katynka	Brakeman
52	" 26	" 22	do	do	Jan Rogozynsky	Baleman
53	" 29	" 12	Roast yard	do	John Switch	Foreman
54	" 30	" 12	Smelter	do	Robt. Bell	Electrician
55	" 30	" 8	do	do	P. Gardullo	Laborer
56	" 31	" 14	do	do	M. Petroski	do
57	Aug. 4	Dec 19	do	do	F. Pietro	do
58	July 23	Aug. 12	Roast yard	do	A. Silvester	Water boy
59	" 23	" 20	Smelter	do	W. Firborg	Laborer
60	" 28	Nov. 13	do	do	W. Balmforth	Boilermaker's helper

at Metallurgical Works, 1912

Number Injured.	Nature of Injury.	Cause of Accident.
1	Fingers bruised	Fingers caught between cable and sheave.
1	Burns on back and neck.	While stopping iron notch, burned by iron.
1	Burn on ankle	Drilling cinder notch.
1	Face bruised	Struck by hammer.
1	Nose broken	Struck by falling bolt.
1	Head burnt	Burned while casting iron.
1	Gassed.....	Overcome by blast-furnace gas.
1	Left leg burned	Leg burned by hot iron.
1	Little finger broken	Caught between hoist box and pipe.
1	Leg and back burned ...	Burned by hot cinder.
1	Arms burned	While flushing furnace, cinder splashed.
1	Hand burned	Burned by fuse blowing.
1	Finger crushed	Piece of ore fell on finger.
1	Hand burned	Took hold of live wire.
1	Hand and arm burned ..	Iron splashed on him.
1	Foot scalded	Stepped in trough of boiling water.
1	Foot crushed and toe amputated	Slipped while making coupling.
1	Foot burned	Pulling bar from cinder notch and hot cinder splashed in his boot.
1	do do	While driving bar into iron hole, iron blew out.
1	do do	
1	Shoulders burned	Burned by hot coke from iron notch.
1	Foot cut	Cut foot on bar.
1	Leg broken	Fell off platform.
1	Burns on arms and chest.	Struck by hot iron while tapping.
1	Arm bruised	Caught by armature being lowered.
1	Cut and bruised	Caught between coke car and chute.
1	Leg bruised	Struck by hammer.
1	Eyes burned	Iron exploded while shovelling on coke braize.
1	Cut on head	Struck by falling bar.
1	Two fingers crushed	Fingers caught between sheave and cable.
1	Foot burned	Iron splashed while pulling bar from iron notch.
1	Finger cut	Ball of tuyere-puller caught finger.
1	Left foot burned	Hot cinder came out through gun.
1	Fingers crushed	Oiling sheave when cable came off.
1	Right arm cut	Fell down steps into basement.
1	Face burned	Gas blew out of stove.
1	Thumb cut	Cut by axe while chopping wood.
1	Left leg bruised	Fell into pit under engine.
1	Burn on right leg	Pot of cinder exploded.
1	Burns on hands	Burned while connecting two live wires.
1	Head cut	Struck by ore falling from bridge.
1	Foot burned	Drawing bar at cinder notch.
1	Arm burned	Hot cinder splashed while casting.
1	Eye injured	Gas blew cinder into eye.
1	Burn on foot	Iron splashed while drilling tapping hole.
1	Arm scalded	Steam escaped from steam pipe.
1	Right leg fractured	Fell between charging cars.
1	Injured internally	Squeezed between post and locomotive.
1	Thumb bruised	Thumb caught between two rails.
1	Arm and side injured ...	Fell into coke bin.
1	Arm broken ..'.....	Arm crushed under sheet of matte.
1	Face burned	Oil on shovel caught fire.
1	Neck burned	Matte splashed, burning him on neck.
1	Rib broken	Foot slipped while mounting to cab of engine.
1	Finger cut	Finger cut by foot shears.
1	Arm and shoulder injured	While raising pole, it slipped and fell on him.
1	Finger bruised	Jammed between two pieces of scrap.
1	Arm mangled, making amputation necessary	Caught between moving and stationary platform.
1	Sprained ankle	Jumped off roast pile.
1	End of thumb taken off.	Thumb caught between timber and bar.
1	Wrist injured	Fell from round house.

Table of Non-Fatal Accidents

Number.	Date of Accident.	Date of Recovery.	Name of Works.	Name of Owner.	Name of Injured.	Occupation of Injured.
61	Aug. 3	Aug. 14	Smelter	Canadian Copper Co..	Wm. Hickey ...	Conductor ...
62	" 5	" 19	do	do do	Richard Death ..	Fitter .....
63	" 7	Sept. 2	do	do do	S. Luigi	Laborer .....
64	" 10	" 3	do	do do	J. Cadovius	Electrician ...
65	" 24	" 2	do	do do	D. Gregolinsky .	Baleman .....
66	Sept. 1	" 11	do	do do	Fratini Antonio	Tapper .....
67	" 7	" 19	do	do do	John Ropkuski...	Lineman ....
68	" 9	" 18	do	do do	Andri Katrinike	Baleman .....
69	" 15	" 27	do	do do	Twan Halusyzk..	Laborer .....
70	" 18	Oct. 15	do	do do	John Korneski .	do .....
71	" 22	" 2	do	do do	W. Brezwzlez....	Tapper's helper
72	" 8	Sept. 21	do	do do	G. Federico	Laborer .....
73	" 24	Oct. 14	do	do do	Wm. Uttley	Fitter .....
74	" 25	" 3	do	do do	H. Knowles	Tapper's helper
75	" 23	" 3	do ...	do do	E. Biggs	Pattern-maker
76	Oct. 6	Nov. 1	do	do do	Victor Niemi ...	Rigger .....
77	" 4	Oct. 15	do	do do	O. Gentile	Fitter .....
78	" 5	" 15	do	do do	G. Attillio	Laborer .....
79	" 12	Dec. 10	do	do do	Ernest Bray ...	Fitter .....
80	" 14	Oct. 30	do	do do	G. Luigi	Laborer .....
81	Nov. 4	Dec. 16	do	do do	Toni Denioff	do .....
	" 4	" 16	do	do do	John Dutchoff ..	do .....
82	" 6	" 19	do	do do	J. Zandri	Carpenter ...
83	Oct. 24	Nov. 15	do	do do	Yacko Syrajko .	Laborer .....
84	Nov. 20	Dec. 11	do	do do	Fred Ferrar ...	Carpenter ...
85	Oct. 25	Nov. 11	do	do do	Varzi Jasgon ..	Baleman ....
86	Nov. 1	" 26	do	do do	P. Boridez	Tapper .....
87	" 19	" 28	do	do do	Yan Baby	Laborer .....
88	" 21	Dec. 27	do	do do	B. Foleo	do .....
89	" 18	" 9	do	do do	P. Crevaglin	Fitter .....
90	" 25	" 16	do	do do	Jas. Bruce	Brakeman ...
91	" 28	" 11	do	do do	G. Barduzzi	Baleman ....
92	Dec. 4	" 12	do	do do	L. Clemante	Tapper .....
93	Nov. 26	" 12	do	do do	Geo. Treverthen	Fitter .....
94	" 9	Nov. 25	do	do do	B. J. Vaillancourt.	Conductor ...
95	Oct. 26	" 14	do	do do	A. Walmsley ...	Engineer ....
96	Dec. 10	Dec. 23	Roast yard ..	do do	Jak Huxta	Laborer .....
97	" 12	" 27	Smelter	do do	Pit Balon	do .....
98	" 12	Jan. 7	do	do do	B. Yasyan	do .....
99	" 18	Dec. 30	do	do do	W. Hanlon	Straw boss ..
100	" 20	Jan. 3	do	do do	S. Auguste	Laborer .....
101	" 24	" 5	do	do do	Wm. Knoellinger	Tapper's helper
	" 24	Dec. 31	do	do do	Geo. Vestoin ...	Tapper .....
102	" 24	" 31	do	do do	Joe Guiseppe ..	Laborer .....
103	" 25	Jan. 1	do	do do	D. Baseowski ..	Brakeman ...
104	" 29	" 15	do	do do	M. Larini	Oiler .....
105	Nov. 18	Dec. 10	Roast yard ..	do do	Andrew Bryson	Engineer ....
106	July 19	Oct. 19	do	do do	Pleon Kysko ...	Laborer .....
107	April 2	May 1	Silver refinery	Coniagas Reduction Co.	G. Poratto	Tapper .....
108	July 11	Aug. 30	do do	do do	D. Lazan	Laborer .....
109	" 30	" 29	do do	do do	E. Maynard ...	do .....
110	Nov. 5	.....	do do	do do	D. Marcanato....	do .....
111	" 9	Nov. 25	do do	do do	E. Matterollo ..	do .....
112	Dec. 14	Jan. 9	do do	do do	H. Bradley.....	Master mechanic
113	Sept. 16	Perm'nt	Roast yard .	Mond Nickel Co. ..	L. Pizzolotto ...	Laborer .....
114	Dec. 26	.....	Smelter	do do	S. Hutchiel	Brakeman ...
115	May 27	July 3	Blast furnace.	Steel Company of Canada	F. Defenso	Boilerman ...
116	June 18	Aug. 7	do do .	do do	S. Randisen ...	Laborer .....
117	July 1	July 14	do do .	do do	S. Di Matteo.....	Helper .....
118	" 9	Aug. 9	do do .	do do	J. Parrini	Laborer .....
119	Aug. 25	Sept. 4	do do .	do do	F. Diechio	Cage tender .
						Total.....

at Metallurgical Works, 1912.—Continued

Number Injured.	Nature of Injury.	Cause of Accident.
1	Head cut	Fell into ore bin.
1	Ankle hurt	Struck on ankle by steel plate.
1	Finger crushed	Finger crushed by piece of slag.
1	Ankle sprained	Fell from ladder.
1	Knee jammed	Jammed while coupling cars.
1	Foot burned	Matte splashed on foot.
1	Face and arms burned	Short circuit on 2,200-volt wires.
1	Thumb jammed	Caught between ladle and bale.
1	Head and back injured	Tile fell from roof on him.
1	Body and arm scalded	Scalded by exhaust from hoist.
1	Arm and side burned	Burned by matte flowing from tap-hole.
1	Foot injured	Wheelbarrow upset.
1	Ankle injured	Slipped off platform.
1	Leg injured	Wheelbarrow fell on him.
1	Thumb cut	Cut by chisel.
1	Face burned	Lighting fire with coal oil.
1	Hand cut	Hand cut while working on drilling machine.
1	Fingers jammed	Hand caught in gear wheels of planer.
1	Foot injured	Section of slag-pot fell on foot.
1	Fingers jammed	Fingers jammed between lever and car.
1	Left leg fractured	Elevator for hoisting brick fell with men on it.
1	Left arm fractured	do do do do
1	Fingers cut	Cut by saw.
1	Foot burned	Hot slag splashed on him.
1	Hand cut	While sharpening knife, hand slipped.
1	Fingers crushed	Caught between bale and post.
1	Foot burned	Sample can exploded.
1	Shoulder and leg bruised.	Squeezed between engine and column.
1	Finger injured	While emptying slag-pot, caught between cogs.
1	Eye injured	Struck by spark from emery wheel.
1	Foot bruised	Fell from footboard of locomotive.
1	Foot burned	Matte splashed while casting.
1	Head and face bruised	Fell into pit in reverberatory building.
1	Finger crushed	Crushed under piece of iron.
1	Rib fractured	While coupling, was thrown against tender.
1	Ribs fractured	Fell from engine.
1	Foot bruised	Piece of rail fell on foot.
1	do	Wheel of truck passed over foot.
1	Left side bruised	Struck by shell of slag-pot.
1	Arm broken	Car jumped track, crushing arm against post.
1	Leg bruised	Struck by shell of slag-pot.
1	Face and head burned	Explosion of matte.
1	do do	do do
1	Toes bruised	Dropped piece of matte on toe.
1	Leg bruised	Caught by car while coupling.
1	Hand and face burned	Gas blew out of crucible furnace.
1	Finger crushed	Hand caught between cross-head and guide bar.
1	Leg bruised	Stick of wood rolled on leg.
1	Left foot burned	While tapping furnace, speiss splashed on foot.
1	Foot burned and bruised.	Cap of tuyere fell on foot.
1	Three ribs broken	Struck by train.
1	Shock	Bag of soda ash rolled on him.
1	Back bruised	Caught by revolving shaft.
1	Foot crushed	While unloading generator, it fell on him.
1	Back broken	Caught in moving line of aerial tram, and thrown to ground, a distance of 15 feet.
1	Arm amputated	Fell between locomotive and car.
1	Right foot burned	Stepped into hot flue dust.
1	Left leg crushed	Pile of pig iron fell on him.
1	Hand burned	Pig iron cut through cinder gate.
1	Toes crushed	Pig iron he was carrying fell on his foot.
1	Toes injured	Buggy came down on toes.
122		

Accidents at Quarries

Under this heading are classified the accidents that occur in all kinds of stone quarries, gravel pits, and excavations at brick yards and cement works.

One fatality occurred during the year. This was at an excavation for marl, used for making cement. The man killed was the foreman, who was struck by the bucket

Table of Fatal Accidents

Number	Date	Name of Works	Name of Owner	Name of Injured	Occupation of Injured
1	July 18	Cement Plant	Superior Portland Cement Co.....	Wm. Carson	Foreman .....
					Total .....

Table of Non-Fatal Accidents

Number	Date of Accident	Date of Recovery	Name of Works	Name of Owner	Name of Injured	Occupation of Injured
1	Oct. 8	Oct. 22	Dill	Canadian Copper Co.	V. Emelio.....	Chore boy .....
2	Dec. 11	.....	"	" "	G. Galliano.....	Trammer .....
3	Aug. 19	Sept. 30	Doolittle & Wilcox..	Doolittle & Wilcox Ltd.	Leonard Wickens...	Engineer .....
						Total.....

swinging from the boom of the dredge. He was personally giving the orders to the operator of the dredge when struck.

Three men are reported as having been injured at quarries during the year. Two of these men received fractures of the leg, one through being struck by a rock rolling down the stope, and the other through slipping on the wet soil.

at Quarries, 1912

Nationality of Injured	Age	Married or Single	Below Ground	Above Ground	Nature and Cause of Accident.
English speaking..	57	M	.....	1	Struck by bucket of dredge that was being lowered and instantly killed.
.....		.....		1	

at Quarries, 1912

Nationality of Injured	Age	Married or Single	Below Ground	Above Ground	Nature and Cause of Accident.
Italian	20	S	.....	1	While unloading radiator off train, it fell on foot and bruised toes.
Italian	26	S	1	.....	Rock rolled down stope and struck him on leg.
English speaking..	30	M	.....	1	Slipped on wet rail and injured leg.
			1	2	

MINES OF ONTARIO

By E. T. Corkill, Chief Inspector of Mines

I.—NORTHWESTERN ONTARIO

About the same number of properties were being worked in northwestern Ontario in 1912, as in the preceding year, but the production was a little larger. The expected revival of gold mining in the Lake of the Woods area and at Sturgeon lake did not take place, although considerable gold was produced at the St. Anthony mine in the latter area.

The mining of iron pyrites at the Northern Pyrites mine on Big Vermilion lake, is one of the important industries in this part of the Province. Little ore has as yet been shipped, but the mine is being systematically developed and the ore body blocked out.

The blast furnace of the Atikokan Iron Company was not operated during the year, but development work at the mine owned by this company was carried on.

The quarry industry is becoming important in this part of Ontario. Trap rock found within the limits of Port Arthur has proved a boon both to that city and to Fort William, in providing a readily accessible supply of practically the best kind of rock for building roads. This has been used in the construction of some splendid roads, and also for concrete work. Rock for the latter purpose was also obtained along the lake shore from the talus slopes of the hill. The Canadian Pacific railway have, it is understood, let a contract for the supplying of two million yards of crushed stone to be used in ballasting the railway between Fort William and Winnipeg. If the railways adopt this system of ballasting their tracks, which must tend to permanency, a further stimulus will be given to the quarry industry, not only in this part but throughout the whole Province.

Lake of the Woods Area

But little actual mining was carried on in this area during 1912. A small quantity of ore was taken out at the Cameron Island gold mine, and a mill run made for the purpose of testing the ore. A couple of men were also working on the Olympia, and some ore put through the mill. During the first part of the year, a little work was done underground on the Ophir.

At the Scramble mine, situated on lots 13 and 14 of the sixth concession of Jaffray, a few miles north of Kenora, the Canadian Homestake Company, under the management of Charles Brent, have been installing machinery and making preparations for active development of the property. A transmission line has been built from Kenora to the mine, and the mine machinery is to be driven by electricity. The town of Kenora sell electric power at the low rate of ten dollars per horse-power per year.

Upper Manitou Lake Area

A few men were employed underground at the Laurentian mine by the Great Golconda Mines, Limited, for part of the year, and the ore taken out was run through the mill. Practically no new underground work was done, as the men were engaged chiefly in clearing up the old workings and taking out ore that had been left broken. Mr. Dryden Smith was in charge of operations. The Big Master mine was pumped out and an examination made, but no mining work was done.

Sturgeon Lake Area

Assessment work was done on a number of claims in this area, but little actual mining was attempted at any of the properties except the St. Anthony.

St. Anthony Gold Mine

Work was carried on continuously at the St. Anthony mine, by the Sturgeon Lake Development Company, throughout the year, employing a force of 120 men.

The main shaft is 175 feet in depth, the first level being at 100 feet. On the first level a drift has been run north 100 feet and a stope opened up for 160 feet along the vein and ore stoped out for a height of 60 feet. A cross-cut has been driven from the shaft east a distance of 275 feet, and a drift run on the main vein south 540 feet. From this point a cross-cut has been driven southeast 340 feet and a vein cut at a point 200 feet from the main vein, on which 100 feet of drifting has been done. A raise has been put up on this vein 40 feet. On the second level drifts have been run north from the shaft 120 feet and south 540 feet. At a point 210 feet south of the main shaft a winze has been sunk 100 feet, and 100 feet of drifting done north and south of the winze. Auxiliary exits have been provided from the first level to the surface north and south of the shaft, and from the second level to the first at a point 400 feet south of the shaft. Stoping has been done on the first level for 350 feet along the vein south of the shaft, and for 160 feet on the second level.

The mill has been remodelled, and a cyanide plant was being put in the latter part of the year. The ore is hoisted from the mine in cars on a cage and trammed to the mill, a distance of 250 feet, where it is dumped into a jaw crusher. The crushed product is elevated to storage bins, from which it is fed to two five-stamp batteries. The product from the stamps passes directly to a ball mill which crushes to about 100-mesh. The pulp from the ball mill then passes over amalgamating plates and then over slime tables. The product from these tables is then cyanided, using a Hardinge pebble mill as an agitator.

The power plant consists of three 125 horse-power Mumford boilers, two 125 horse-power return tubular boilers, an eight-drill Alley and McLennan (Glasgow) compressor and hoist.

The officers of the company at the time of inspection were Mr. George Glendinning, president, and Mr. G. F. McNaughton, mine manager.

Other Areas

Elizabeth Gold Mine

The Elizabeth gold mine, situated at the north end of Rice lake, two miles north of a point on the Canadian Northern railway, five miles west of Atikokan, is owned and operated by the Elizabeth Gold Mines, Limited, of which Mr. R. R. Gamey is president.

The main shaft is 240 feet deep, and there are levels at 65, 128 and 220 feet. On the first level the north drift is in 75 feet. The former operators carried a stope above this drift to a height of 35 feet. The present owners are underhand-stoping from the floor of the level to a raise from the second level. On the second level a drift has been run north 175 feet, and some cross-cutting done. No work was being done on the third level.

The power plant consists of one 40 and one 60 horse-power return tubular boiler, one 40 horse-power locomotive type of boiler, and the high pressure half of a 4- and a 6-drill compressor. The mill is located about 300 feet from the shaft on the hillside. In the mill is a gyratory crusher, a 10-stamp battery, an engine for driving the above, and amalgamating plates. The mill was in operation for part of the year.

Northern Pyrites Mine

This mine was operated during the year by the Northern Pyrites Company of 25 Broad Street, New York. Mr. Robert K. Painter is consulting engineer, and Mr. H. V. Smythe, superintendent, employing a force of eighty-five men.

No ore was shipped during the year, the old aerial tram being out of commission. A new Leischan aerial tram, two miles in length, was constructed during the latter part of the year from the mine to the Grand Trunk Pacific railway at a point about nine miles west of Graham.

The Nos. 1 and 2 shafts have not been sunk any deeper than described in the last Report of the Bureau of Mines. The main work done during the year was to block out ore on the second and third levels, and to stope, leaving the broken ore in the stopes. A raise was put through to the surface from the second level from a point about 300 feet east of No. 2 shaft.

The power plant at No. 1 shaft consists of three 100 horse-power return tubular boilers, a 12-drill Rand cross compound compressor and an electric light plant. The ore is crushed at No. 2 rock house, by a No. 3 and a No. 5 Austin gyrator crusher, and then elevated to bins over the aerial tram terminal. Hoisting from No. 2 shaft is done by a 30 horse-power Flory double-drum hoist in two skips of one-ton capacity dumping directly into the crusher.

Spar Island, British North American Mining Company.

Spar Island Silver Mine

The only mine being worked for silver in this area is situated at Spar Island, 20 miles southwest of Port Arthur. This is owned and operated by the British North American Mining Company, Canada Life Building, Montreal; President, Mr. W. Goff Penny, and Superintendent, Mr. R. A. Lockerby.

The shaft is sunk on a vein of calcite, which cuts across the west end of the island and can be seen extending under the water of the lake. The shaft is 150 feet deep with 75 feet of drifting on the 75-foot level.

The power plant consists of one 60- and one 40-h.p. marine type of boiler, and a 3-drill straight line compressor.

Atikokan Iron Mine

The principal work done during the year at this mine was to drive four new working tunnels through the hill in which the ore body occurs at intervals of about 500 feet. These tunnels average 300 feet in length. Two shafts have been sunk 150 feet deep, and 150 feet of cross-cuts driven. A third shaft is being sunk 700 feet west of the old tunnels.

Mr. J. Dix Fraser is manager for the operators, the Atikokan Iron Company, and Mr. F. Rodda, superintendent.

The blast furnace of the company at Port Arthur was not in operation during the year.

Quarries

In the northwest part of the city of Port Arthur the Intercities Quarries Company, Limited (formerly known as Messrs. Stewart and Hewitson), are operating a trap rock quarry. The trap has a thickness of about 20 feet resting on the Animikie slates, and only the trap is excavated. The floor of slate has a dip to the south of about 20 degrees. The main excavation is about 300 feet by 175 feet, with walls 20 feet in height. Other excavations have been opened up along the ridge, but the main production comes from the above, where the crushing plant is located. The rock is hoisted in cars of a capacity of about two cubic yards, and dumped into a large gyratory crusher which reduces it to about a 4-inch product. This is elevated by a belt conveyer to bins, from which it passes into two gyratory crushers, crushing it to a 2-inch product, which is elevated to storage bins over a standard gauge railway, connecting with the Fort William and Port Arthur Electric Railway lines.

The crushed rock is used mainly for road building, for which purpose it is unexcelled, and for concrete work. Practically all the macadamized roads around Port Arthur and Fort William are made of this rock, and their excellence and good wearing properties show clearly its superiority as a road metal.

Messrs. Bannerman and Horne opened up a quarry of granite during the year near Ignace.

The Great Lakes Dredging Company had a clam-shell at work along the shore west of Fort William, taking out rock from the talus slopes of the hills along the shore for use in the concrete work of the breakwater at Port Arthur and other works.

II.—SUDBURY and the NORTH SHORE

The year 1912 was one of the most prosperous in the history of nickel mining in the Sudbury area. A great amount of diamond drilling was done, which located some very large ore bodies. On an average, from 18 to 20 diamond drills were in operation during the year, prospecting for nickel in the Sudbury area, and about 80,000 feet of drilling was done.

Both the Canadian Copper Company and the Mond Nickel Company are widening their field of operations by developing new properties and enlarging their smelting plants. The latter company's new smelting plant at Coniston was nearly completed. The Dominion Nickel Copper Company sold out their entire holdings the first part of 1913. The new owners have commenced active mining work on the old Murray property, and purpose building a smelter near that mine.

The Moose Mountain iron mine was idle part of the year, but the new concentrator was practically completed and the old concentrating plant renovated. The company expect to operate the mine continuously throughout the year.

Owing to lack of power the Canadian Exploration Company at Long Lake did not operate extensively during the year. With the completion of the second power plant of the Wahnapitae Power Company, power was obtained in the latter part of 1912 and the mill put in operation. The company expect to operate their mill to capacity during 1913.

In the West Shining Tree area there was very little actual mining done during the year. Some of the owners of claims sank on their veins to a depth of 25 to 50 feet, but most of the work done was assessment work, mainly stripping.

In the Michipicoten area there was little done outside of iron mining by the Algoma Steel Corporation at the Helen and Magpie mines. Here work was carried on throughout the year with about the same force of men as in 1911. Development work was carried ahead at the Magpie mine, and the first unit of the roasting plant completed and put in operation in December. The Grace gold mine was unwatered, and it was the intention of the management to sink the shaft 100 feet.

Accidents

During 1912 there were 11 men killed in and around the mines in this area, 5 men at the blast furnace at Sault Ste. Marie, and 3 men at the smelters, or a total of 19 men. This shows a decrease of 2 compared with the previous year, although there was a considerable increase in the number of men employed.

Canadian Copper Company

As in 1911, all the production of the Canadian Copper Company for 1912 came from the Creighton, Crean Hill, and No. 2 mines, the greater part coming from the Creighton. Development work was carried on at No. 3 mine, where diamond-drilling has shown up an ore body, according to company reports, of over twenty-five million tons of ore. The company have built a railway from Copper Cliff to No. 3 mine, and are installing a large power plant. The new reverberatory furnaces at the smelting plant, Copper Cliff, were completed and operated during the year.

Mr. A. P. Turner has resigned from the Presidency of the company and has been succeeded by Mr. John Lawson, who for a number of years has held the position of general superintendent. Mr. D. H. Browne is metallurgist, and Mr. W. W. Mein was during the year appointed consulting mining engineer.

Creighton

The larger part of the production of the Canadian Copper Company during 1912 came from the Creighton mine.

The main No. 2 shaft remains the same depth, though No. 1 shaft was continued to the fifth level, a depth of 350 feet, and connected by drift with the No. 2 shaft. The principal development work of the year was done on this level where the ore body between Nos. 1 and 2 shafts was blocked out for a length of 300 feet by a width of 200 feet. The method of mining the ore in this level is the same as formerly described for the fourth level. A drift has been run from the No. 2 shaft southwest 300 feet to the west ore body, which has been blocked out for a length of 150 feet by a width of 100 feet. An ore pocket has been cut out at the station of this level. A winze has been sunk a depth of 100 feet at a point 150 feet from the shaft, and the work of sinking the shaft to the sixth level commenced the latter part of the year. The broken ore in the stopes of the fourth level has been drawn out during the year, and part of the floor between the third and fourth levels broken down. Stoping was also carried on during the year in the north end of the open cuts from the surface to the third level.

The surface plant has been enlarged by the installation of a 20-drill compressor. The old dry was renovated by taking out the old lockers and introducing a system of hooks suspended from the ceiling by ropes running through pulleys.

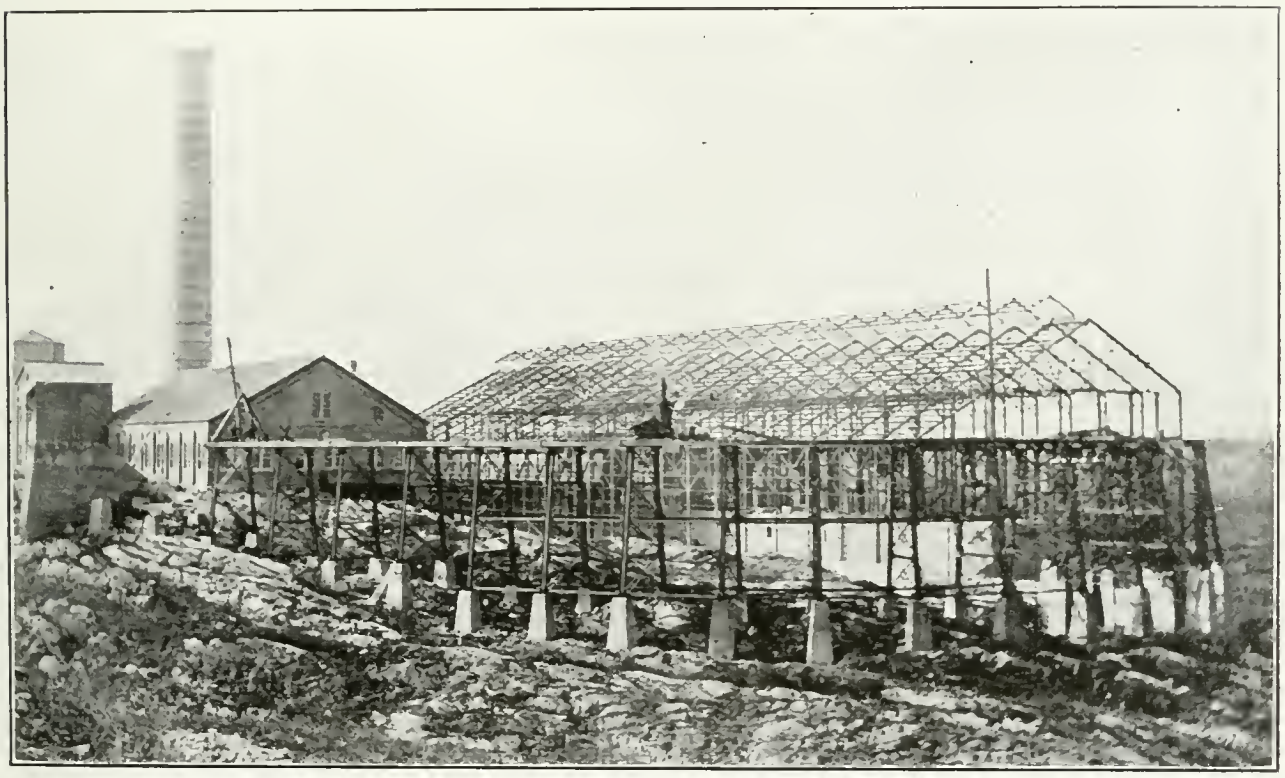
Crean Hill

Work was carried on at this mine during the year on the fifth, sixth and seventh levels. The ore is mined by the filling system, the stopes being filled with rock sorted

from the ore. Sorting is carried on both in the stopes and in the rock-house. The ore body on the seventh level has been opened up for a length of 120 feet by about the same width. A sub-level has been opened up between the sixth and seventh levels, and the ore broken is trammed through a chute from the seventh level.

No. 2 Mine

The main shaft at this mine was sunk from the eighth to the ninth level during the year, a vertical depth of 700 feet, being the deepest workings now operated by the company. The ore body on the ninth level is reached by a drift 240 feet in length. Work was carried on during the year on the seventh, eighth and ninth levels, and the same system of ore extraction followed, as outlined in former reports.



Power house, skeleton steel of charge trestle and smelter building, Mond Nickel Co., Coniston.

No 3 Mine

Active development work on the No. 3, or Frood mine, was carried on throughout the year. The No. 1, 4-compartment shaft, sunk on an incline of 77 degrees, was carried to the fourth level, a depth of 400 feet. The stations were cut on the second, third and fourth levels, and drifting begun. The No. 2 vertical 3-compartment shaft, located 625 feet northeast of No. 1 shaft, has been sunk a depth of 200 feet.

In addition to mining, a large amount of construction work was done, consisting of building a steel head-frame at No. 1 shaft, a brick power house and a large number of houses for the employees. The power line from Copper Cliff to the mine was completed, as was also the railway. A 3-drum electric hoist and a 20-drill compressor were installed.

Dill Quartz Quarry

About 300 tons of quartz per day were mined and shipped from the quarry in Dill township. The quartz is mined by open cut work, which is now about 350 feet long, 100 feet wide and 50 feet deep. The quartz is loaded into railway cars by derricks, and hauled to Copper Cliff, where it is crushed for use at the furnaces and converters.

Smelting Works

A complete description of the additions to the smelting plant was given in the last Report of the Bureau of Mines. Further improvements were carried on during the year in the reverberatory plant, and a new furnace was erected which increases the smelting capacity about twenty per cent. The company have now under consideration plans for doubling the capacity of the plant.

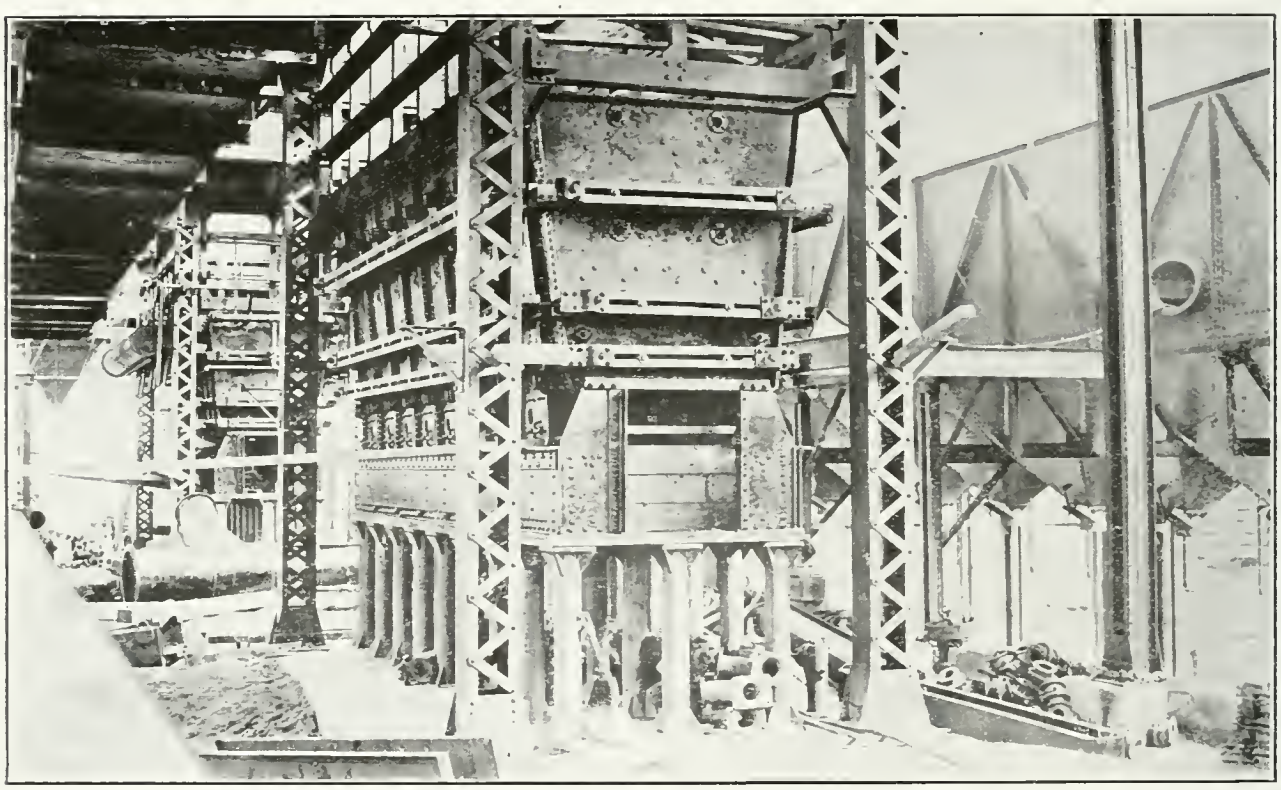
Cobalt Silver Refining Plant

The company decided during the year to discontinue the operation of this plant, and consequently the whole plant was only in operation part of the year.

Mond Nickel Company

All the production of the Mond Nickel Company during the year came from the Victoria and Garson mines.

Development work was carried on at the Frood Extension mine, and the North Star mine, about three miles from the Creighton, was reopened. The company's new smelter at Coniston was completed in June, 1913.



Furnaces during erection. Mond Nickel Company, Coniston.

The officers of the company are: Mr. C. V. Corless, manager; Mr. O. Hall, mines superintendent, and Mr. J. E. Robertson, smelter superintendent.

Victoria Mine

The main shaft at this mine is now at a depth of 1,850 feet vertically; by far the deepest shaft in the Province. The main operations during the year were confined to stoping on the eighth, ninth, tenth, eleventh and twelfth levels, carrying on exploratory work on the fifth, and locating and blocking out the ore body on the thirteenth level. The shaft is now being sunk to the 2,000-foot level.

Garson Mine

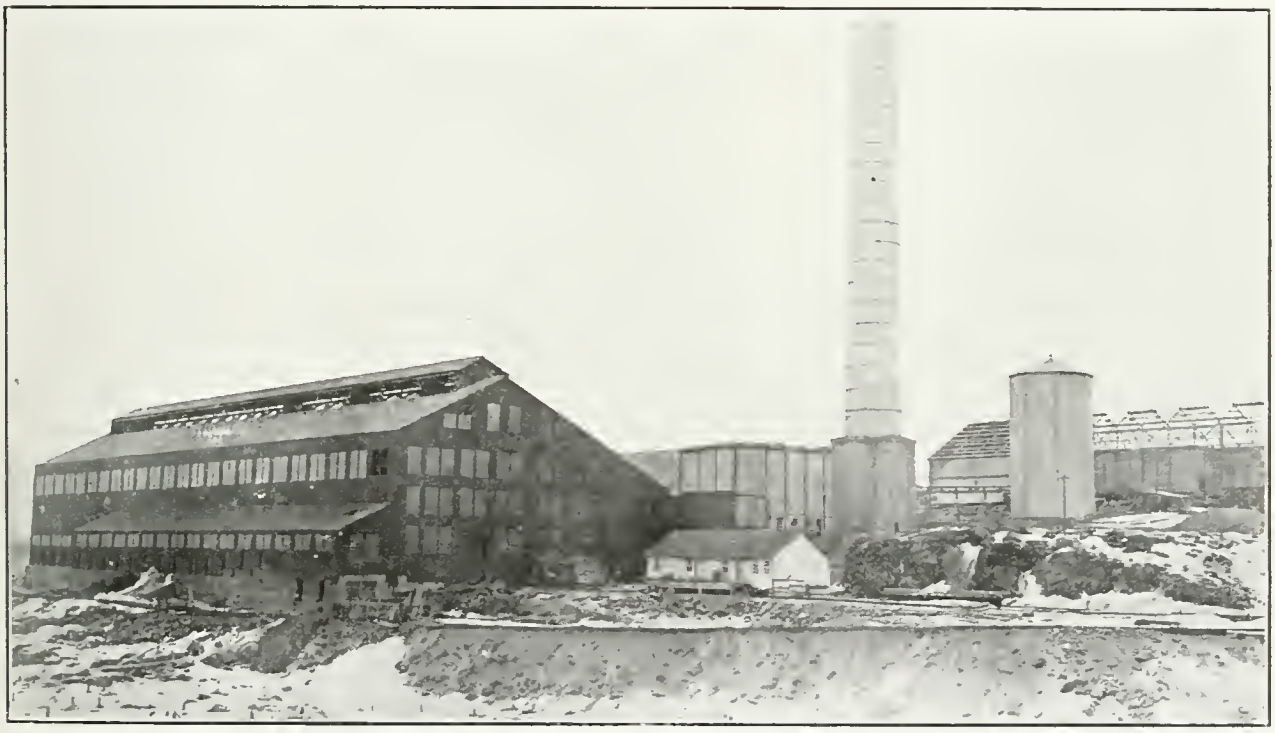
The ore produced from this mine during the year came from the first, second, third, fourth and sixth levels. The shaft was sunk 100 feet during the year, making it 700 feet in depth. On account of the ore bodies dipping to the east and being ir-

regular in outline, the plans of the workings of the several levels projected to the surface cover a large area and are difficult to describe. Some of the stopes are mined by filling, and others are worked by underhand stoping. The head frame has been raised to permit the use of automatic dumping skips having a capacity of four to five tons. A new double drum electric hoist was installed during the year. This hoist is equipped with an automatic device to prevent overwinding, and also with a device to govern the speed of hoisting or lowering.

Mr. A. Sharp is mine superintendent, employing 400 men.

Frood Extension Mine

The shaft at the Frood Extension was sunk during the year to a depth of 600 feet. A station was cut at a depth of 400 feet, and a cage put in the central hoisting compartment to hoist and lower the men to this level. The work of sinking the shaft is being continued, it being the intention of the management to sink to a depth of 1,000 feet.



General view of smelter building, Mond Nickel Company, Coniston.

A transmission line from Victoria mines was erected, a power house built, and preparations made for the installation of a large compressor and hoist.

Mr. J. H. Stovall is superintendent.

Dominion Nickel Copper Company

This company operated during the year on the Whistle property on the north nickel range. All the work was done on the adit level or above it. This main adit is 440 feet in length, and drifting and cross-cutting have been done from it to explore the ore bodies. Three raises were put through to the surface.

The company had several diamond drills at work on the Murray mine property the last half of the year, and were successful in blocking out a large tonnage of ore.

The Dominion Nickel Copper Company disposed of their holdings early in 1913, and the new owners are operating tentatively under the name of Holmes and Wilson. It is proposed to open up the Murray mine and a new shaft has been started. The company also purposes building a smelter near the Murray mine.

Gold

Long Lake

The Canadian Exploration Company did not operate their mill on their Long Lake gold property during the year, owing to lack of power. They enlarged it, however, by the addition of 10 stamps, and made some changes in the cyanide department. The company secured power from the Wahnapitae Power Company early in 1913, and commenced work. During 1912 further development work was carried on underground.

Iron

Moose Mountain

There was but little mining work done at the Moose Mountain mine until the latter part of 1912. Most of the ore is taken from the No. 1 deposit by open-cut work. The open cut is about 200 feet long by 150 feet wide. A 3-compartment shaft has been sunk to a depth of 100 feet, a large station cut, and 200 feet of drifting done. Some work was also done at the No. 2 deposit about half a mile north of No. 1.

The new mill is located near No. 2 deposit, and was nearly completed during the year. The old mill near No. 1 deposit is still used for the concentration of the ore from this deposit.

Mr. F. A. Jordan is manager, employing a force of 150 men.

Algoma Steel Corporation

The Algoma Steel Corporation operated the Helen and Magpie mines in the Michipicoten area and the blast furnace at the Sault during the year. Mr. T. J. Drummond is president of the company; Mr. J. Frater Taylor, vice-president, and Mr. R. W. Seelye, manager of the mines department.

Helen Iron Mine

The production of hematite from the Helen mine in 1912 was not as great as in 1911. This was due mainly to the nature of the ore encountered on the lower levels of the mine which necessitates a different system of mining; also to the fact that the area of marketable ore on the levels is getting smaller. The main No. 2 shaft is down to the ninth level, a vertical depth of 650 feet from the surface. Owing to the upper part of this shaft being in loose material, it was decided to put up an incline as a continuation of the No. 2 shaft from the fourth level in the solid rock. This incline shaft from the surface to the fourth level is about 475 feet in depth.

The company secured their shipping ore during the summer from the sixth, seventh and eighth levels, where it is mined by the caving method, driving sub-levels every 20 feet and slicing. The ore body on the levels has been opened up similarly to the upper levels described in former reports. All the ore shipped is washed to lessen the sulphur content.

Mr. R. W. Seelye is manager, and Mr. A. A. Mackay, mine superintendent, employing 250 men.

Magpie Mine

The main shaft has been sunk to a depth of 225 feet, with levels at 125 and 205 feet. On the first level drifts have been run east 650 feet and west 1,050 feet on the south side of the vein. Cross-cuts have been run at intervals of about 30 feet across the ore body. Three sub-levels have been driven east and west of the shaft above the first level along the middle of the vein at intervals of about 25 feet, and raises put up for drawing off the broken ore. On the second level drifts have been run east 550 feet

Magpie mine, showing shaft house and roasting plant in course of construction.

Magpie mine—Ore bridge.

and west 700 feet. A number of cross-cuts have been run across the ore body, and a raise put through to the first level. A new steel head frame 75 feet in height was erected, and a crushing plant put in consisting of one No. 8 and two No. 5 Austin gyratory crushers. A belt conveyor carries the broken ore from the ore bins to the calciners.

The roasting plant consists of one calcining tube 120 feet long and eight feet in diameter, two roasting tubes each 60 feet long, two 10-foot Chapman rotary gas producers, a coal-crushing plant and belt conveyors. A concrete stack for the calcining plant 105 feet high has been built. An ore bridge of 148 feet span with concrete walls for track has been erected for loading the ore from the roasting plant into cars, and for handling the coal for the roasting plant.

The power plant consists of five 100-h.p. Waterous boilers, a 16-drill compressor belt-driven by a 280-h.p. motor. a double drum hoist for handling the 2-ton Kimberley skips, and a single drum hoist for the cage. Electric power is to be obtained from Steep Hill falls on the Magpie river. Mr. J. Bartlett is superintendent.

Blast Furnace, Sault Ste. Marie

The Algoma Steel Corporation had three furnaces in blast during 1912, producing about 800 tons of pig iron per day. The total production of ore from the Helen mine was used at the furnaces along with American ore.

III.—TEMISKAMING

Cobalt and Vicinity

The production of silver from the mines of Cobalt and vicinity in 1912 was not quite so great as in the preceding year, the total yield being 30,243,859 ounces, compared with 31,507,791 ounces in 1911. The value, however, was greater, owing to increased prices for silver. The production came largely from the same mines as in 1911, though some of the properties increased their output. Owing to the higher price of silver, work was resumed on a number of properties that had formerly been worked; as a result, more men were employed in the camp. A number of the Cobalt mines have been working a 10-hour day, and others a 9-hour day, paying approximately the same wages. In February, 1913, all the mines in the camp adopted a 9-hour day from surface to surface for the underground men. The wages have been left the same for the 9-hour day as they were formerly.

Power

The power situation for the year was quite satisfactory in the Cobalt camp. Electric and air power was furnished to all the mines by the Northern Canada Power Company.

Concentration

The following table gives a list of the concentrating mills and the normal capacity of same in the Cobalt camp. Practically all these mills were operated to their full capacity during the year:—

Mill	Capacity per day	No. of Stamps	Remarks
	tons		
1 Beaver	90	Crushing by rolls	Increasing capacity in 1913
2 Buffalo	145	" "	
3 Cobalt Central	75	" "	
4 Cobalt Lake	75	20	Doubling capacity in 1913
5 Colonial	25	10	
6 Coniagas	180	60	
7 Dominion Reduction	120	40	Customs mill
8 Hudson Bay	60	20	
9 King Edward	30	10	
10 McKinley-Darragh-Savage	165	30	Adding 20 stamps
11 Nipissing	200	40	
12 Nipissing Reduction	50	Crushing by rolls	Customs mill.
13 Northern Customs	350	120	" "
14 O'Brien	100	30	
15 Silver Cliff	75	Crushing by rolls	
16 Temiskaming	125	40	
17 Trethewey	100	30	
Outlying Camps			
18 Casey-Cobalt	30	10	Doubling capacity in 1913
19 Wettlaufer	30	Crushing by rolls	
20 Miller Lake-O'Brien (Millerett)	30	10	Recently purchased from Millerett Mine
Total	2,055	470	

The Buffalo, Dominion Reduction, Nipissing and O'Brien use cyanidation in conjunction with concentration. The Nipissing high-grade mill was in operation during 1912, treating practically all the high-grade ore from that mine. The Buffalo mines were engaged during the latter part of the year in building a mill for treating their high-grade ore. The mill was completed and put in operation early in 1913.

Smelting

The Ontario smelters handled about 60 per cent. of the total number of ounces shipped during 1912. These smelters were as follows:—

1. Canada Refining and Smelting Company, Orillia.
2. Canadian Copper Company, Copper Cliff.
3. Coniagas Reduction Company, Thorold.
4. Deloro Mining and Reduction Company, Deloro.

The works of the Canada Refining and Smelting Company were destroyed by fire late in the year, and have not yet been rebuilt.

The Canadian Copper Company closed down their silver smelter during the latter part of the year and it is not intended to resume operations.

The foreign companies buying silver-cobalt ores were:—

1. American Smelting and Refining Company, New York.
2. Balbach Smelting and Refining Company, Newark, N. J.
3. Pennsylvania Smelting Company, Pittsburg, Pa.
4. United States Metals Refining Company, New York.
5. Beer, Sondheimer & Company, Frankfort-on-Main, Germany.
6. Government of Saxony, Saxony, Germany.

Accidents

During 1912 in the Cobalt camp proper, there were seven fatal accidents, causing the death of seven men, a decrease of two compared with the preceding year. As there were approximately 3,500 men employed in the Cobalt camp during the year, this would give an accident rate of two men killed per 1,000 men employed.

Two men were killed in one accident in the outlying silver areas during the year, compared with three in the preceding year.

Mr. T. F. Sutherland is the resident Inspector at Cobalt. He also inspects the mines in the outlying silver districts and in the Porcupine camp. It is the aim of the inspection department to inspect the mines at least once every three months. This was not found possible during 1912, but the majority of the mines were visited two or three times, and those requiring it more frequently.

Outlying Silver Camps

The Casey Cobalt mine in Casey township, about nine miles east of New Liskeard, was one of the most important shippers among the outlying silver mines during the year. The property has been worked for a number of years, but only during the last year has it ranked as an important producer.

In South Lorrain, the principal shipper continues to be the Wettlaufer, though considerable work is being done on some of the surrounding properties. The Keeley mine was not worked during the year, but it was taken over by another company early in 1913 and is again being operated.

The completion of the branch of the Temiskaming and Northern Ontario railway from Earlton to Elk Lake in the latter part of 1912, caused a revival of mining activity in the Montreal River area. It also improved the shipping facilities for the Gowganda mines.

In the Gowganda area the principal shippers were the Miller Lake-O'Brien and Mann. The Millerett was formerly the main shipper, but this property was closed down during the year and was afterwards purchased by Mr. M. J. O'Brien, the owner of the Miller Lake-O'Brien mine.

Following is a brief description of the mines and more important prospects of Cobalt and the outlying silver districts that were in operation during 1912:—

Cobalt Silver Mines

Alexandra

The Canadian Gold and Silver Mining Company, E. W. Beidler, superintendent, reopened the Alexandra mine early in 1913 and have been carrying on exploratory work. The main shaft was formerly sunk to a depth of 310 feet. At the 65-foot level 75 feet of drifting has been done, and on the 300-foot level cross-cuts have been driven southeast and southwest 235 feet respectively.

Bailey

The Bailey Cobalt Mines, Limited, under Superintendent Floyd Weed, carried on work during the year on the southwest quarter of the north half of lot 4, in the fourth concession of Coleman, adjoining the Penn-Canadian mine.

The main shaft is now 232 feet in depth, and at this level 1,000 feet of drifting and cross-cutting have been done. Most of this work is on the north side of the claim. Considerable work has also been done on the first, second and third levels, as also on intermediate levels between the second, third and fourth levels.

Beaver

The Beaver mine, situated on the north half of the northwest quarter of the north half of lot 1, in the third concession of Coleman, is owned and operated by Beaver Consolidated Mines, Limited, which have an authorized capital of 2,000,000 shares of a par value of $1.00. The officers and directors are as follows:—

Frank L. Culver, president and general manager; C. C. James, vice-president; H. E. Tremain, secretary-treasurer; Wm. Muir, Thos. Mason, Geo. Glendinning, and F. C. Finkenstaedt, directors.

During the year the company purchased the Erie-Cobalt property, consisting of 40 acres, lying east of the Beaver, and also 75 per cent. of the stock of the Beaver Auxiliary Mines (Donaldson claims) at Elk Lake. At the latter property active development work is being carried on, and it is proposed to sink the shaft at the Erie an additional 100 feet.

The main shaft at the Beaver is now 730 feet in depth, with levels as follows: First at 75 feet; second at 200 feet; third at 250 feet; fourth at 300 feet; fifth at 350 feet; sixth at 400 feet; seventh at 460 feet; eight at 530 feet; ninth at 600 feet; tenth at 700 feet.

The manager reports the following development work and stoping for the year: Drifting, 3,414.5 feet; cross-cutting, 744.5 feet; sinking, 185.5 feet; raising, 157 feet, and 4,316 yards of stoping.

During the year the company shipped 689,921 ounces of silver. The capacity of the concentrating mill has been increased so that it has now a capacity of about 90 tons per day. During the year 17,842 tons of low-grade ore were milled, producing 278,511 ounces of silver.

Buffalo

This mine, situated on the townsite of Cobalt, is owned and operated by Buffalo Mines, Limited, which have an authorized capital of $1,000,000, the shares having a par value of $1.00. Mr. Chas. L. Denison, of New York, is president; Mr. Geo. C. Miller, secretary-treasurer, and Mr. Tom R. Jones, general superintendent.

Work was carried on underground according to the same plan of operations as outlined in former Reports. No. 6 shaft, sunk on the northerly vein series, near the mill, is the main hoisting shaft and is connected with cross-cuts on the first and third levels to the southerly vein system. The management report the following work done:—Shaft work, 86 ft.; drifting, 1,514 ft.; stoping, 56,931 cu. ft.

The Buffalo low-grade mill was operated continuously throughout the year and treated about 50,000 tons of ore. A plant for the treatment of high-grade ore and concentrates was erected during the year and the treatment of ore begun in November. The method is similar to that worked out by the Nipissing Mining Company for the treatment of their high grade ore.

Casey Cobalt

This property, situated on the southeast quarter of the south half of lot 5 in the first concession of Casey township, about 10 miles northeast of the town of New Liskeard, is controlled by the Casey Cobalt Mining Company, Limited, with an authorized capital of $100,000. During 1912 the company became an important producer, owing to the discovery of high-grade silver ore. The plant was enlarged by increasing the boiler capacity to 280 horse power and building a mill capable of handling 25 tons per day.

The main work has been done on the No. 6 vein, which was found about 125 feet northwest of the old workings and parallel to them. This vein has been drifted on for a distance of 250 feet on the 210-foot level and 150 feet on the 100-foot level. A new shaft has been sunk a depth of 260 feet on the southwesterly end of the vein.

Mr. W. R. P. Parker is president, and Mr. John Shaw, manager.

Chambers-Ferland

Mining work was continued by the Chambers-Ferland Mining Company, Limited, at their No. 1 shaft. This shaft is 200 feet deep. The work during the year was confined largely to the 150- and 200-foot levels. On the 200-foot level about 1,000 feet of drifting and cross-cutting were done, and 250 feet on the 150-foot level. Several raises were put up connecting the levels.

City of Cobalt

The City of Cobalt Mining Company Limited have a 99-year lease from the T. and N. O. Railway Commission of 40 acres of the townsite of Cobalt. The main shaft is 340 feet in depth. A winze was sunk during the year from a point on the 330-foot level, 360 feet east of the shaft, a depth of 70 feet, and several hundred feet of drifting and cross-cutting were done at the 400-foot level. The greater part of the workings are on the south part of the lot adjoining the Cobalt Townsite property on the north.

The company operated the King Edward mill during the year on their low-grade ore.

Cobalt Provincial

The Cobalt Provincial Mining Company carried on underground work during the year from No. 2 shaft. This shaft has been sunk to a depth of 360 feet, an increase of 60 feet. On this lower level 120 feet of drifting were done. On the 175-foot level a cross-cut has been driven northwest a distance of 600 feet. Some work was also done during the year on the other levels.

Cobalt Townsite

The Cobalt Townsite Mining Company Limited, with an authorized capital of $100,000, hold a 99-year lease from the T. and N. O. Railway Commission of the south 38 acres of the townsite of Cobalt. Mr. W. R. P. Parker, of Toronto, is president, and Mr. A. C. Bailey, superintendent.

The work during the year was confined principally to the northeast corner of the property, although some work was done on the southern part of the lot from No. 4 shaft. No. 1 shaft is 200 feet in depth, but a winze has been sunk at a point 240 feet south of the shaft a depth of 100 feet, and about 1,000 feet of drifting and cross-cutting done at the 300-foot level. A drift has been run north to the shaft preparatory to connecting the latter with the 300-foot level. Work has been continued on the 100 and 200-foot levels and stopes opened up on the different levels. The company have a contract with the Northern Customs Concentrators, Limited, for concentrating their low-grade ore, and about 100 tons per day were treated during the year.

Cobalt Lake

The property consisting of the bed of Cobalt lake and 33 feet of the road allowance on the east shore of the lake is owned and operated by the Cobalt Lake Mining Company, which have an issued capital of 3,000,000 shares of a par value of $1.00 each. The officers and directors of the company are as follows:—

Colonel Sir Henry Pellatt, president; Major J. A. Murray, vice-president; W. R. P. Parker, Hugh Blain, and Thos. Birkett, directors; G. F. Morrison, secretary-treasurer; M. B. R. Gordon, manager.

The manager reports the following underground work during the year: Drifting, 1,319 feet; cross-cutting, 1,885 feet; raising, 90 feet; winzes, 104 feet; shaft-sinking, 68 feet; stoping, 7,449 cubic yards. A connection was made during the year between the workings of No. 4 and No. 6 shafts which improves the ventilation and provides an auxiliary exit from the workings of both shafts. The vertical depth at which this connection was made was 236 feet. A drift has been driven along the fault on the lower level to a point underneath No. 6 shaft, and a vertical shaft is being raised. A winze is also being sunk to locate the fault vein 50 feet below the present lowest level.

The 20-stamp mill was operated throughout the year and 23,410 tons of ore treated, producing 541,570 ounces of silver, the total output of the mine being 1,123,146 ounces. The capacity of the mill is to be doubled by the installation of twenty additional stamps, a tube mill and the requisite number of concentrating tables.

Coniagas

The Coniagas Mines, Limited, having an authorized capital of 800,000 shares of a par value of $5.00, own and operate the Coniagas mine, consisting of 40 acres on the townsite of Cobalt, and the issued capital stock of the Coniagas Reduction Company, Limited. The Board of Directors are as follows:—R. W. Leonard, St. Catharines (president and general manager); Alex. Longwell, Toronto (vice-president); R. P. Rogers, Cobalt; F. J. Bishop, Brantford; Welland D. Woodruff, St. Catharines.

The company have paid to stockholders since incorporation $4,280,000, or $280,000 more than the total capital.

The assistant to the president reports that during the year the following underground work was done:—

Drifting	2,773 feet.
Cross-cutting	1,401 "
Winzes	112 "
Raises	298 "
Stoping	51,350 tons.

The total tonnage of ore milled was 53,627, or an average of 2.86 tons per stamp per 24 hours. The mill heads averaged 34.12 ounces per ton, the sand tailings 4.12 ounces per ton, and the slime tailings 7.29 ounces per ton.

The development work during the year was done on the 150-ft. and 225-ft. levels. A cross-cut was driven on the 225-ft. level to the southern boundary of the property, a distance of about 850 feet.

Colonial

The Colonial mine is operated by the Colonial Mining Company. The shares of the company are owned by the Colonial Silver Mines, Limited, which have an authorized capital of 1,200,000 shares of a par value of $5.00 each.

Development work was carried on underground during the year, and sufficient stoping done to supply the 10-stamp mill.

Crown Reserve

The Crown Reserve Mining Company, Limited, having an authorized capital of 2,000,000 shares of a par value of $1.00 each, own and operated the Crown Reserve mine, Cobalt, and the McEnaney gold mine, Porcupine. The company also operated the Silver Leaf mine, Cobalt, under lease. The officers of the company are as follows: Lieut.-Col. John Carson, president; W. J. Gear, 1st vice-president; C. E. Potter, 2nd vice-president; Jas. Cooper, secretary-treasurer; S. W. Cohen, general manager.

The manager reports the following mine developments:—

	Up to 1912.	1912.	Total.
Sinking and raising	1,790 feet.	432 feet.	2,222 feet.
Drifting	5,247 "	1,973 "	7,220 "
Cross-cutting	5,172 "	2,184 "	7,356 "
Total	12,209 "	4,589 "	16,798 "

Stoping for 1912, 297,066 cubic feet.

The north shaft on the Silver Leaf property was sunk to a depth of 500 feet, and from this point a cross-cut was driven south 800 feet to connect with the Crown Reserve shaft at a depth of 450 feet. The ore production during the year came from the following veins: Carson, Nos. 14, 17, 24, 29, north and miscellaneous.

The company entered into a contract with the Dominion Reduction Company for treating their low-grade ore. The ore is taken by aerial tram from the mine to the works of the Dominion Reduction Company. The results of the concentration for the year show 15,704 tons milled, yielding 336,238 ounces of silver.

The Crown Reserve Mining Company and the Kerr Lake Mining Company have obtained the right to pump out Kerr lake, which will make available the ore above the 100-foot level, and allow development work to be carried on over the rest of the property.

Drummond

This mine comprises the northwest quarter of the north half of lot 2 in the fourth concession of Coleman, and adjoining parts of the bed of Kerr lake. The mine was owned and operated by the Drummond Mines, Limited, during 1912, but was sold early in 1913. The principal work done during the year was from No. 5 shaft, near the south boundary of the south lot. This shaft is 150 feet deep, with levels at 75 and 150 feet. A connection has been made on the first level from No. 5 shaft to No. 1 shaft, about 500 feet distant. On the second level, 750 feet of drifting and cross-cutting have been done.

The low-grade ore was treated by the Northern Customs Concentrator under contract.

Gould

The Gould Consolidated Mines, Limited, operated under lease from the Peterson Lake Silver Cobalt Mining Company on Cart lake. The shaft is 200 feet deep, and 200 feet of drifting and cross-cutting have been done at this level.

General Mines

The General Mines Limited were engaged in operating the Agaunico, Red Rock and Cobalt Contact properties during part of the year.

The Agaunico shaft is 275 feet deep. On the 200-foot level, drifts have been run southwest 265 feet and a cross-cut driven east 300 feet.

At the Red Rock, on the 50-foot level, a drift has been run northwest 80 feet.

At the Cobalt Contact, the main shaft is down 95 feet and is being sunk deeper. All work is now confined to the Cobalt Contact property.

Hargrave

Work was continued during the year by the Hargrave Silver Mines Limited on the two 40-acre claims described as the southwest quarter of the north half of lot 2 in the fourth concession and the northwest quarter of the south half of lot 3 in the fourth concession of Coleman. These claims adjoin the Drummond and Kerr Lake mines.

The company have an authorized capital of $2,500,000. Mr. W. N. Ferguson, of Toronto, is president, Mr. R. D. Moorhead, Toronto, secretary-treasurer, and Mr. E. V. Neelands, Cobalt, manager.

No. 1 and No. 3 shafts on this property remain the same depth, namely, 125 feet and 375 feet respectively. Exploratory work was carried on mainly on the lower level, where a cross-cut has been driven west along the north boundary of the south claim, a distance of 450 feet. Other exploratory work was done on the upper levels and also some stoping.

Hudson Bay

This property consists of 340 acres situated in the township of Coleman, and is operated by The Hudson Bay Mines, Limited, which have a capitalization of 3,500,000 shares of a par value of $1.00. Of this amount, 2,900,000 shares are owned by the Temiskaming and Hudson Bay Mining Company, Limited, which have an authorized capital of $25,000, of which 7,761 shares have been issued. The latter company paid $209,547 in dividends during their fiscal year, 1911-12. The officers and directors of this company are as follows:—

Geo. Taylor, president; A. A. McKelvie, vice-president; S. S. Ritchie, Jr., T. McCamus, T. Crawford, John Dunkin, and D. M. Ferguson, directors; F. L. Hutchinson, secretary-treasurer; A. H. Brown, general manager.

The company's total production for their fiscal year, 1911-12, amounted to 957,055 ounces, produced at a cost of 14.9 cents per ounce.

The manager's report shows that 1,195.8 feet of drifting and 1,653.9 feet of cross-cutting was done during the year at their main property, north of the Trethewey mine. A shaft was sunk to a depth of 100 feet and some 400 feet of drifting done on the lot southwest of the McKinley-Darragh and east of the railway track.

The 20-stamp mill of the company was operated throughout the year treating 21,439 tons of ore. The ratio of concentration was 30 to 1.

Kerr Lake

This mine is situated on the northwest part of lot 4, in the fourth concession of Coleman, and it is operated by the Kerr Lake Mining Company, Limited, which have an authorized capital of $40,000. The capital stock of the company is held by the Kerr Lake Mining Company, of New York, with an authorized capital of 600,000 shares of a par value of $5.00 each. Mr. J. A. Lewisohn is president, Mr. Willard P. Ward, vice-president; Mr. J. N. Susmann, secretary-treasurer; and Mr. Robert Livermore, mine manager. The company have paid in dividends to August 31st, 1912, $4,020,000.

The manager reports that, during their fiscal year, the following development work was done: Drifting, 4,674 feet; cross-cutting, 2,252 feet; raising, 609 feet; sinking, 197 feet; stoping, 31,782 cubic feet; total development work to date, 29,679 feet. Most of the work was done on the known veins in following and blocking out ore bodies, and on the north side of the property. Production from the veins tributary to No. 7 shaft was 1,479,894 ounces, and from No. 3 shaft, 261,910 ounces. In addition to this, there was a considerable production from mill ores. The company have an ore-sorting plant at No. 7 shaft consisting of trommels, jigs, and one Wilfley table. A contract was also entered into with the Dominion Reduction Company for treating low-grade ore, the ore being taken by an aerial tramway from the mine to the concentration mill, about one mile distant.

La Rose Consolidated

La Rose Consolidated Mines Company, Limited, own all the stock of the La Rose Limited, the Lawson Mines Limited, the Violet Mining Company, and 7,262 shares of the University Mines, Limited. The properties are as follows:—

La Rose Mines, Limited:	
La Rose (J. S. 14)	37 acres.
La Rose Extension	36 "
Princess	17 "
Fisher	20 "
Eplett	20 "
Silver Hill	93.5 "
University Mines, Limited:	
University	56 "
Violet Mining Company:	
Violet	40 "
Lawson Mining Company:	
Lawson	40 "
	359.5 "

The company have an authorized capital of 1,500,000 shares of a par value of $5.00 each. The officers and directors are as follows:—

D. Lorne McGibbon, Montreal, president; Shirley Ogilvie, Montreal, Edwin Hanson, Montreal, vice-presidents; E. W. Nesbitt, Woodstock, Victor E. Mitchell, Montreal, Duncan Coulson, Toronto, and W. M. Dobell, Quebec, directors; R. B. Watson, Cobalt, director and general manager; Stephen J. LeHuray, secretary-treasurer.

The total number of ounces of silver produced to December 31st, 1912, was 17,813,265.92, for which the company received $8,971,873.51.

The general manager gives the following summary of work done during 1912:—

Property	Shafts	Drifts	Cross-Cuts	Raises	Total	Stopes
	feet	feet	feet	feet	feet	cu. yds.
La Rose	167.5	2,059	1,454.5	72	3,753	8,413
Lawson	66	2,614.5	1,744	729.5	5,154	1,356
Princess	30	679.5	2,038.5	178	2,926	6,861
Fisher—Eplett	172.5	666	269	66	1,173.5	.....
Violet	.....	16	691	.....	707	.....
Total	436	6,035	6,197	1,045.5	13,713.5	16,630

The company have a contract with the Northern Customs Concentrator for milling their low-grade ore. This ore comes mainly from the La Rose and Princess, though a few carloads were also sent from the Lawson. The result of concentrating this ore was as follows:—

Ore treated .....33,984.16 dry tons.
Silver contents of heads .....556,612.79 ounces.
Average assay of heads .....16.38 ounces.
Concentrates produced .....1,173.5 dry tons.
Silver contents concentrates .....487,423.7 ounces.
Average assay concentrates .....415 ounces.
Net value concentrates .....$259,018.62.
Cost of concentration .....$102,072.49.
Cost per ton of ore .....$3.00.
Profit to La Rose Mines, Limited $156,946.13
Average tonnage for 313 days .....168 tons.
Ratio of concentration .....29 to 1.

According to the manager the most important exploratory work done during the year was the investigation of the La Rose fault. A winze was sunk 283 feet below the lowest levels of the mine, making the total depth from the surface 521 feet. Cross-cuts east and west were driven at the 380-foot level, and the east cross-cut encountered the fault in 115 feet, and drifts have been run along the fault a total distance of over 500 feet. The fault has also been reached at the lower level 230 feet from the shaft and about 200 feet of drifting done on it. It is the intention to sink a winze on the fault from the lower level.

The production from La Rose during the year was 852,525.98 ounces, in addition to concentrates.

The only work done on the Violet was to drive a cross-cut 700 feet in length north from the shaft.

The production from the Lawson during the year was 732,281.41 ounces. Exploratory work was carried on on the 188-, 238- and 300-foot levels.

The Fisher-Eplett claims are situated in the southern part of Coleman township north of and adjoining the Beaver. A shaft has been sunk to a depth of 200 feet and 1,173 feet of development work done. The shaft is now being sunk to the 300-foot level.

The production from the Princess during the year was 744,000 ounces. The main shaft was sunk to the third level and a winze has been started from this level on the No. 7 vein.

No work was done on the University during the year.

Lumsden

The Lumsden Mining Company were operating the property situated on the west half of the northeast quarter of the north half of lot 2 in the third concession of Coleman. The main shaft is 400 feet deep, and the work was carried on mainly on the 225- and 250-foot levels. A cross-cut has been driven east 150 feet on the 250-foot level, and the 225-foot level connected to the 300-foot by raises south of the shaft. About 350 feet of drifting and cross-cutting have been done on the 300-foot level.

Mr. John Lumsden, of Ottawa, is president of the company, and Mr. F. I. Daniels, manager.

McKinley-Darragh-Savage

The McKinley-Darragh-Savage Mines of Cobalt Limited, own and operate the McKinley-Darragh mine at the southern end of Cobalt lake and the Savage mine on lot 3 in the third concession of Coleman east of Cart lake. The officers and directors are as follows:—

C. A. Masten, Toronto, president; Thos. W. Finucane, Rochester, vice-president; J. R. L. Starr, Toronto, secretary; W. L. Thompson, Rochester, treasurer; Joseph D. Thompson, Rochester, assistant treasurer; Hiram W. Sibley, Rochester, and Harper Sibley, Rochester, directors; T. R. Finucane, Cobalt, manager.

McKinley-Darragh:—The following table from the directors' report shows the footage advance on the different levels throughout the year and the tonnage taken from the stopes:—

Levels	Drifts	Cross-cuts	Raises	Winzes	Stopes
feet	feet	feet	feet	feet	tons
110	467.5	215.5	19.5	.....	9,007
125	43.5	.....	.....	.....	252.5
150	1,527.5	826.5	150.5	100	13,434
200	594.5	282	128	.....	8,092.5
230	2.5	.....	.....	.....	.....
250	449.5	495	39	.....	1,010
Total.....	3,085	1,819	332	100	31,801

As will be seen from the above, the greater part of the development work was done on the 150-foot level or below it.

Savage:—The following table shows the underground work done at the Savage mine:—

Levels	Drifts	Cross-cuts	Raises	Winzes	Shafts	Stopes
feet	feet	feet	feet	feet	feet	tons
90	.....	191	91.5	.....	.....	359.5
140	671.5	623.5	.....	34.5	39.5	6,925.5
174	.....	3.5	.....	.....	.....	.....
190	594	412	121.5	33	45.5	3,506.5
220	134	41.5	27	.....	.....	.....
240	222	74	60.5	.....	.....	.....
Total.....	1,621.5	1,345.5	300.5	67.5	85	10,791.5

The aerial tramway connecting the Savage with the McKinley-Darragh has been completed, and all the ore will in future be treated at the McKinley-Darragh.

During the year 51,897 tons of ore were treated at the mill, from which 1,489,514 ounces of silver were recovered. An additional 20-stamps and a tube mill are being added to handle the low-grade ore from the Savage mine.

Nipissing

The Nipissing Mining Company Limited, with an authorized capital of $250,000, own and operate 846 acres in the township of Coleman, principally situated in the producing area. Mr. David Fasken, of Toronto, is president; Mr. R. B. Watson, general manager, and Mr. Hugh Park, manager. The Nipissing Mines Company is a holding company, owning all the stock of the Nipissing Mining Company, and have an authorized capital of 1,200,000 shares of a par value of $5.00. The officers and directors of the company are as follows:—

E. P. Earle, New York, president; R. T. Greene, New York, secretary; W. H. Brouse, Toronto, Duncan Coulson, Toronto, David Fasken, Toronto, John L. Feeny, New York, August Heckscher, New York, Denis Murphy, Ottawa, and R. B. Watson, Cobalt, directors.

The general manager's report for 1912 shows the work done to be distributed as follows:—

Shaft No.	Drifting	Cross-cutting	Raising	Sinking	Total	Stoping
	feet	feet	feet	feet	feet	cu. yds.
8	.....	.....	.....	99	99	.....
63	463.5	955.5	72	.....	1,491	3,109
64	139	121	117.5	230.5	608	994
73	3,133	1,168.5	500	93	4,894.5	5,656
80	1,082.5	1,554	491	77	3,204.5	3,726
86	.....	.....	.....	20	20	.....
122	1,250.5	416.5	303	32	2,002	2,015
128	.....	.....	.....	.....	.....	264
150	37	457.5	.....	206.5	701	.....
Total.....	6,115.5	4,673	1,483.5	758	13,029	15,764

The general manager gives the following table of production of individual veins for 1912:—

Shaft 63 (veins 63, 108, 148, and Little Silver)	743,657	ounces.
Vein 64	268,627	"
Vein 73 (veins 73, 80, and 100)	3 264,126	
Vein 122	364,401	"
Vein 128	26,622	"
Vein 133	20,828	"
Total	4,688,261	ounces.

The hydraulic plant for surface prospecting was operated from May 8th to November 29th for 16 hours per day, and 33.2 acres of ground were cleared, the average depth of soil removed being 4.75 feet. The pressure is obtained from a turbine pump directly connected to a 650-horse power high-speed motor throwing 4,800 gals. per minute under a head of 415 feet. The average nozzle pressure obtained was 121 pounds.

As is shown by the above table, 13,020 feet of development work was done during the year as compared with 8,781 feet the previous one.

The shaft on vein 64 north of the town was sunk to a depth of 585 feet. A great amount of drifting and cross-cutting was done on vein 73, particularly on the third level. Shaft 86 on the west shore of Cart lake was reopened. Shaft 150, on the east shore of Cart lake, was sunk to the 300-foot level.

The Nipissing Reduction Company treated 13,893.9 tons of low-grade ore from the Kendall dump, recovering 123,037.24 ounces of silver at a cost of $38,176.51. The ratio of concentration was 95.9 to 1.

The general manager reports as follows regarding the low-grade mill:—

The cyanide plant erected for the treatment of the low-grade ore was completed in 1912, and is now in full operation. Part of the stamps were dropped in November, just a year after excavation began, but the whole mill did not go into full operation until after the first of the year. During February, 1913, the plant treated an average of over 200 tons per day and made a good recovery at less than the estimated cost per ton.

All the ore so far milled has come from the town side, being transported across the lake and to the top of the picking plant by an aerial tramway.

This central picking plant replaces the several similar plants at the individual shafts; the high grade ore is sorted from a travelling belt and the undersize of a 1½-inch screen is concentrated by jigs and two tables.

The first class ore and the concentrate produced by the picking plant are sent to the high-grade mill for treatment.

The discard and tailing from the picking plant are transferred to the crushing department of the main mill. There are 40 stamps of 1,500 lbs. each and four tube mills 6 feet in diameter by 20 feet long. Six Dorr classifiers are in a closed circuit with the tube mills and all the ore is slimed before it is transferred to the cyanide plant. The silver is precipitated out of the cyanide solution by aluminum dust. The precipitate as it comes from the press and after drying carries 93 per cent. silver. This is transferred to the refinery and melted down to bullion 999 fine in one operation.

The cost of the mill was $254,839.52; the crushing and picking plants, two tramways, roads and shops cost an additional $69,811.25, making the total expenditure $324,650.77.

The plant for the treatment of high-grade ore was in operation throughout the year, treating 1,753 tons of ore and producing bullion to the amount of 4,258,641 ounces. A complete description of this plant is given by Mr. R. B. Watson, entitled:— "Nipissing High Grade Mill," in the Engineering and Mining Journal (New York), Dec. 7th, 1912.

O'Brien

This mine is owned and operated by Mr. M. J. O'Brien. The several shafts on the property have now been connected underground with the central 3-compartment shaft

near the mill and the mill ore hoisted through this shaft. No material change has been made during the year in the depths of the several workings, but about 4,000 feet of drifting and cross-cutting were done and 15,000 yards of stoping. The mill was was operated continuously throughout the year.

Penn Canadian

The Penn Canadian Mines, Limited, have taken over the property originally worked by the Cobalt Central Mining Company, and operated both mine and mill for part of the year. Considerable new work was done on the fourth and fifth levels of the mine and stoping carried on, on the upper levels.

Mr. B. W. Neilly is superintendent in charge.

Peterson Lake

The property of the Peterson Lake Silver Cobalt Mining Company, Limited, consists of about 200 acres, made up of the bed of Peterson lake and 33 feet of the road allowance around the lake. Sir Henry Pellatt is president, and Mr. G. F. Morrison, secretary-treasurer.

The Seneca Superior Mining Company and the Gould Consolidated Mining Company have leases on part of the area. Very little mining work was done by the company during the year. A new shaft was started just north of the narrows between Cart and Peterson lakes. This shaft is now down 80 feet.

Ophir

A little development work was done by the Ophir Cobalt Mines Limited, on the east half of the northeast quarter of the north half of lot 2, in the second concession of Coleman. The shaft is 300 feet deep, but most of the work was done on the 180-foot level.

Right of Way

The Right of Way Mining Company confined their operations during the year chiefly to the workings from No. 4 shaft west of the McKinley-Darragh mine. The shaft remains the same depth, but some drifting and cross-cutting was done and stoping carried on, on veins previously opened up.

The president of the company is Mr. Geo. Goodwin, and the superintendent Mr. R. F. Taylor.

Seneca-Superior

The Seneca-Superior Silver Mines Limited, have taken over the leases on Peterson and Cart lakes, formerly held by the Kerry Mining Company. Operations have been confined to the Cart lake lease, where a good vein was encountered in the latter part of 1912. No. 1 shaft is 200 feet deep with the main cross-cut north, 800 feet in length to the north shore of the lake, where a raise is being put through to the surface. On the vein encountered 450 feet from the shaft 400 feet of drifting has been done and some stoping. A shaft and ore-sorting house have been erected.

Silver Bar

Work was resumed on the Silver Bar mine, Coleman township, by the Preston-East Dome Mining Company. No. 1 shaft is 80 feet deep with a drift 200 feet west to connect with old workings on the 50-foot level. No. 2 shaft is 100 feet deep with 300 feet of drifting on the 50-foot level, and a 50-foot cross-cut on the 100-foot level. Mr. Stuart M. Thorne is in charge of operations.

Silver Cliff

This property has been taken over by the Orion Realty and Investments Limited. No work was done on it during 1912.

Temiskaming

This property, consisting of the south half of the northeast quarter and the west half of the southwest quarter of the north half of lot 1, in the third concession of Coleman, is owned by the Temiskaming Mining Company, which have an authorized capital of 2,500,000 shares of a par value of $1.00. The officers and directors of the company are as follows:—

Burr E. Cartwright, Buffalo, president; J. L. Wheeler, Marion, S.C., vice-president; Alex. Fasken, Toronto, secretary-treasurer; R. A. Cartwright, Ridgeway, Pa., Ernest C. Whitbeck, Rochester, N. Y., and Wallace Thayer, Buffalo, N.Y., directors; Norman R. Fisher, Cobalt, general manager.

The main 3-compartment shaft is 650 feet in depth. The mining work during the year was made up as follows: shaft-sinking, 36.5 feet; winzes, 87.5 feet; raises, 527.4 feet; drifting, 2,687.9 feet; cross-cutting, 936 feet; and 11,644 cubic yards of stoping. The total lineal footage of work done underground since the commencement of operations amounts to 17,455 feet, and the stoping to 33,868 cubic yards.

Seneca-Superior silver mine and plant.

Work was carried on during the year on all the levels of the mine.

The manager reports the occurrence of a good vein of silver on the 650-foot level in the diabase sill which underlies the Keewatin.

The mill treated 40,056 tons of 22.6-ounce ore and recovered 744,370 ounces of silver. The ratio of concentration was 45 to 1.

The concentrates shipped by the company were found to contain 16,037 pounds of copper for which $1,133 was received from the smelter.

Trethewey

This property is owned and operated by the Trethewey Silver Cobalt Mine, Limited, which have an authorized capital of 2,000,000 shares of a par value of $1.00, of which 1,000,000 shares have been issued.

The officers of the company are as follows:—

Alex. M. Hay, Haileybury, president; Sidney Small, Toronto, vice-president; David Fasken, Toronto, W. J. Sheppard, Waubaushene, Jas. B. Tudhope, Orillia, and S. R. Wickett, Toronto, directors; D. L. H. Forbes, Toronto, consulting engineer; H. G. Young, Cobalt, manager.

The development work during the year is as follows:

Drifting	2,072.5	feet.
Cross-cutting	877.5	"
Raises	788.5	"
Winzes	68.0	"
Shaft-sinking	79.0	"
Total	3,885.5	feet.

The total development work done to the 31st December, 1912, amounts to 18,234.5 feet. All of the shafts remain the same depth as given in the last Report, with the exception of No. 6 which was sunk an additional 79 feet to the second level, where 350 feet of drifting was done. The rest of the development work was done from the old levels, and consisted of following known veins and cross-cutting to prospect for veins in new ground.

The mill has run continuously throughout the year, treating approximately 2,450 tons per month. A number of changes have been made in the mill with the view of obtaining a better recovery of silver from the milled product.

United States

On the north half of lot 2, in the fifth concession of Coleman the United States Cobalt Mining Company, under Superintendent A. A. Amos, have driven in an adit 140 feet.

Aladdin (Silver Queen)

The old Silver Queen mine has been taken over by the Aladdin Cobalt Mining Company and has been unwatered, and 700 feet of drifting done on the 200-foot level east and west of the shaft. Some drifting has also been done on the 75-foot level.

York Ontario (King Edward)

This mine is now being worked by the York Ontario Silver Mines, Limited. It was taken over by the new company the last of the year, and some work done on the 70- and 140-foot levels. A diamond drill hole was also put down from the bottom of the 450-foot shaft to test the depth of the diabase formation.

Cobalt Custom Mills

Dominion Reduction Company

This company have taken over the old Nova Scotia mill, and are treating low-grade ore from the Crown Reserve and Kerr Lake. Some changes have been made in the methods of treatment. The concentrates are now reground in a tube mill and subjected to separate cyanidation.

Nipissing Reduction Company

This company were engaged during the year in treating ore for the Nipissing Mining Company. A little ore was also treated for the Cobalt Lake, Green-Meehan and Silver Queen mines. The same system of water concentration as formerly described is followed.

Northern Customs Mill

The Northern Customs Concentrator, Limited, is an independent company operating the largest customs concentrating mill in Canada, and has also the greatest capacity of any mill in the Cobalt camp. Mr. A. J. Young is president, Mr. F. J. Bourne, consulting engineer, and Mr. M. F. Fairlie, superintendent. The mill is situated in Cobalt, south of the railway station.

The company have a contract from La Rose Mines, Limited, Cobalt Townsite Mining Company, Limited, and Drummond Mines, Limited, for treating their low-grade ores. During the year they handled about 65,000 tons of low-grade ore averaging from 15 to 20 ounces of silver to the ton.

The company now have 120 1,250-pound stamps for crushing the ore, 30 Wilfley tables, 24 vanners and 3 slime tables.

South Lorrain

Bellellen

On R. L. 470 the Bellellen Silver Mines Limited have been engaged part of the year in carrying on development work. All work is confined to No. 2 shaft, which is 100 feet deep with drifts west 56 feet and south 120 feet. A winze 35 feet deep has been sunk from the south drift and a drift started north from the bottom of this winze.

Curry

On H. R. 104, adjoining the Wettlaufer on the southwest, the Pittsburg Lorrain Syndicate have been engaged in development work under consulting engineer J. A. Rice. An incline shaft has been sunk 271 feet, and a cross-cut driven 45 feet to connect with the Wettlaufer workings.

A plant consisting of a 4-drill compressor driven by a 75-h.p. motor and hoist has been installed.

Keeley

No work was done on Keeley mine during 1912. Early in 1913 the Huronian Belt Syndicate took an option on the mine and began to unwater it.

Wettlaufer Lorrain

The Wettlaufer was the only shipper in South Lorrain during 1912. It is owned and operated by the Wettlaufer Lorrain Silver Mines, Limited, which has an authorized capital of 1,500,000 shares of a par value of $1.00.

The main shaft has been sunk to the fourth level, a depth of 250 feet. At a point 210 feet southwest of the shaft a winze has been sunk to the second level a total depth from the surface of about 500 feet. On the fifth level drifts have been run northeast and southwest of the winze distances of 70 and 180 feet and on the seventh level 120 and 130 feet respectively.

The mill has a capacity of about 30 tons per day. A Huntingdon mill is used for grinding the jig tailings.

Elk Lake Area

Beacon

On the northwest quarter of the north half of lot 4, in the first concession of James, the Beacon Consolidated Mines, Limited, were engaged during the year in development work. A shaft was sunk a depth of 200 feet, and 500 feet of drifting and cross-cutting done. A plant consisting of two boilers of 50- and 60-h.p. capacity, a 3-drill compressor and hoist were installed.

Beaver Auxiliary

This property is situated on part of lot 10 in the sixth concession of James, about two miles north of the town of Elk Lake, and was formerly known as the Donaldson. It is owned and operated by the Beaver Auxiliary Mines Limited, of which the Beaver Consolidated Mines Limited own 75 per cent. of the stock.

Two shafts have been sunk to depths of 107 and 142 feet respectively, and sinking is being continued in the first mentioned shaft. A plant consisting of two 90-h.p. boilers, an 8-drill compressor and hoist has been installed.

Fleur De Lis

On the northwest quarter of the north half of lot 7 in the first concession of Smythe the Fleur de Lis Silver Mining Company have been engaged in development work. A shaft has been sunk a depth of 120 feet.

Moose Horn

Very little work was done by the Moose Horn Mines, Limited, during 1912, but active operations were resumed early in 1913. A cross-cut is being driven from the 125-foot level west to cut the vein showing on the surface.

Patricia

On part of lot 2 in the second concession of James the Patricia Mines, Limited, have sunk a shaft a depth of 44 feet. The plant used consists of a 20-h.p. boiler and hoist.

Prudential

On parts of lots 4 and 5 in the sixth concession of James the Prudential Mining Company have sunk a shaft 125 feet deep.

Regal

On the southeast quarter of the south half of lot 9 in the sixth concession of James the Regal Mines, Limited, have been engaged in sinking a shaft. This shaft is now 250 feet in depth with 75 feet of cross-cutting at the 200-foot level. The plant consists of a 50-h.p. boiler and hoist.

Gowganda Area

Hudson Bay

The Hudson Bay Mining Company have been developing a property near Hanging Stone lake, south of Gowganda. Two shafts have been sunk, one to a depth of 110 feet and the other 200 feet. On the 80-foot level of the first shaft 160 feet of drifting has been done. On the first level of the deeper shaft drifts have been run east and west 120 feet and 150 feet respectively, and on the second level cross-cuts have been driven north 70 feet and south 110 feet.

La Brick

On the west shore of Gowganda lake, just east of the Mann mines, the La Brick Mining Syndicate have been carrying on development work under Superintendent G. R. Rogers. The main shaft is 200 feet in depth. On the 100-foot level a drift has been run northeast 100 feet, and on the 200-foot level drifts run northeast 200 feet and southeast 104 feet.

The plant consists of two 50-h.p. boilers, a hoist and compressor developing 500 cubic feet of air per minute.

Mann

The development work at the Mann Mines during 1912 opened up an ore body, and a shipment of ore was made. No. 3 shaft is 90 feet deep; on the 80-foot level drifts have been run east and west 200 feet respectively. At 90 feet west of the shaft a winze has been sunk 46 feet and drifts are being run from it east and west on the vein. Some stoping has been done below the 80-foot level. The Mann Mines, Limited, have taken over the Boyd-Gordon mine lying to the west of the Mann, and the power plant at this mine is used to supply power for operating the Mann mines.

Mr. Geo. R. Rogers is superintendent, employing a force of 45 men.

Miller Lake-O'Brien

This mine is now the largest shipper in the Gowganda area. The Millerett mine adjoining the Miller Lake-O'Brien, was purchased by the owners of the latter during 1912. The mill on it will be utilized for treating the low-grade ore.

The main shaft is 250 feet in depth. From a point 135 feet south of the main shaft on the 250-foot level a winze has been sunk 50 feet, and 160 feet of drifting and some cross-cutting done. Stoping is now being carried on, on both the 250- and 300-foot levels.

Oliver

About two miles south of Neilson's roadhouse in the township of Lawson a shaft has been sunk a depth of 90 feet by the Oliver Silver Mining Company. The shaft is being sunk by contract.

Powerful

On mining claim H. R. 397, in the township of Lawson, the Powerful Mining Company have continued development work. An adit has been driven 700 feet, a winze sunk 50 feet and a raise to the surface started.

Mr. J. E. Wilson is superintendent, employing 16 men.

Scottish Nigeria (Bartlett)

Work was resumed on what was formerly known as the Bartlett by the Scottish Nigeria, Limited. Only a few men are employed underground in development work.

South Bay

On claims H.F. 225 and H.S. 125 and 124, in the township of Milner, south of Gowganda lake, the South Bay Mining Company have erected a 16-h.p. boiler and hoist and sunk a shaft a depth of 80 feet.

Willing

Near Gowganda, in the township of Charters, the Willing Mining Company have sunk a shaft a depth of 88 feet.

Dane and Larder Lake Area

Dane Copper Mine

The Dane Mining Company were operating part of the year on claims near the southwest corner of Lebel township, three miles north of Dane station. A force of 22 men was employed under Superintendent Alex. D. McPhee. Two shafts have been sunk to a depth of 100 and 113 feet respectively, with some cross-cutting at the 50- and 100-foot levels to the deeper shaft.

The plant consists of two 100-h.p. boilers, one 75-h.p. boiler, a 6-drill compressor and two hoists.

Goldfields

The only property on which active work was carried on during the year at Larder Lake was the Goldfields Limited. Here the 30-stamp mill was completed and in operation part of the year. Electrical power is obtained from the company's own hydro-electric plant at Raven Falls.

The mine is being opened up by an incline shaft to the 65-foot level where drifts and cross-cuts are run and raises put through to the surface. It is the intention of the company to open-cut the ore body. A force of 28 men is employed under Manager E. T. Brooks.

Cartwright

On the north half of lot 8 in the fifth concession of the township of Beatty the Cartwright Goldfields are carrying on development work on a gold property. A shaft has been sunk a depth of 35 feet.

The plant consists of a 50-h.p. boiler, a 3-drill compressor and hoist.

Swastika and Kirkland Lake Gold Area

The greatest activity during the winter was in the Kirkland lake district, which lies about six miles to the northeast of Swastika. Some very rich gold ore has been shipped from the Foster property, and considerable prospecting work is being done throughout the area. At Swastika stamp mills have been erected at the Lucky Cross and Swastika mines.

Foster

Mr. C. A. Foster, of Haileybury, has purchased five claims in the townships of Teck and Lebel, near Kirkland lake, and has been carrying on development work. A shaft has been put down on the vein to a depth of 115 feet, and some ore taken out of an open cut along the vein. From the open cut and shaft 73.85 tons of ore have been shipped, yielding 1,636.87 ounces of gold and 2,300 ounces of silver. A 5-stamp mill has been erected on the property about 320 feet from the shaft.

The power plant consists of two 40-h.p. boilers, and a hoist, and a 4-drill compressor.

Mr. C. A. O'Connell is manager, employing a force of 40 men.

Lucky Cross

The Lucky Cross Mines, Limited, own three claims in the township of Teck situated south of and adjoining the Swastika townsite. The main shaft has been sunk to a depth of 200 feet. On the 100-foot level, drifting and cross-cutting has been done in addition to that outlined in the last Report, and a raise put up a distance of 40 feet near the shaft. A 5-stamp mill has been erected, and it was expected that it would be put in operation early in 1913.

Swastika

The property of the Swastika Mining Company, Limited, is situated about one-third of a mile west of the townsite of Swastika. The company have an authorized capital of 2,000,000 shares of a par value of $1.00. Dr. M. Steele is president, Mr. Jas. Clark, secretary-treasurer, and Mr. John Redington, manager.

A three-compartment shaft has been sunk to a depth of 400 feet, where a station has been cut and a cross-cut driven west 60 feet. On the 300-foot level, 420 feet of drifting and cross-cutting have been done, and on the 200-foot level, 360 feet of drifting and 220 feet of cross-cutting. In addition to this, considerable work was done on the 35-foot and 100-foot levels.

A 10-stamp mill was being erected the latter part of the year, and it was expected that it would be in operation early in 1913.

Teck

On the southwest side of Kirkland lake, on claims L. 1238, 1239, and 1240, in the township of Teck, the Teck Hughes Gold Mines Limited have commenced development work. Most of the work done consists of surface trenching and prospecting, but a shaft has been sunk 35 feet. A small plant is being erected.

Porcupine Gold Area

Satisfactory development work has been carried on during the year by a large number of companies in the Porcupine area during 1912. Four mills were in operation part of the year, and one of the companies went on a dividend basis the latter part of

the year. Operations were seriously interfered with by a strike of the Porcupine branch of the Western Federation of Miners, which was declared in November, and has now been in progress six months. The miners asked for an 8-hour day and a higher scale of wages. A number of the smaller companies were forced to suspend operations, and, as a result, development work has been considerably retarded.

Dome mill, showing power house and mill.

Dome stamp mill.

Apex

The Apex Porcupine Mines Limited carried on development work on parts of lots 6 and 7, in the first concession of Tisdale, under Superintendent E. S. Sawyer. Two shafts have been sunk to a depth of 65 and 100 feet respectively.

Dome

The properties of the Dome Mines, Limited, are situated on the north half of lot 4, in the first concession of Tisdale. The company have an authorized capital of 350,000 shares of a par value of $10.00. The stockholders at their annual meeting in May, 1913, authorized an increase of the capital to 500,000 shares, and the issuing of sufficient stock to provide for the installation of sixty additional stamps in the mill, and the necessary auxiliary plant. The officers of the company are: Mr. Ambrose Monell, president; Mr. W. W. Mein, consulting engineer; Mr. R. M. Meek, general superintendent. The Merrill Metallurgical Company are consulting metallurgists.

For the year ending March 31st, 1913, the company mined and milled 101,812 tons of ore, of a total value of $1,043,994.93. The results were as follows:—

Tons milled	101,812
Yield by amalgamation	$560,481.62
Yield by cyanidation	$483,513.31

Dome Extension mine.

Total value	$1,043,994.93
Percentage of gold recovery	95.63
Mining costs	$157,666.27
Milling costs	$214,788.15
General expenses	$131,096.72
Marketing and miscellaneous	$30,487.83
Total cost	$534,038.83
Net earnings	$509,956.10

The production for the year has come largely from the open pit above the 45-foot level. The incline shaft from the mill has been extended to the 100-foot level. This level is being blocked out similarly to the 45-foot level, and will be mined by open-cut work. The No. 2 shaft is 257 feet deep with a cross-cut driven south 200 feet.

The company used steam power during the year, but are now operating by hydro-electric power supplied by the Northern Canada Power Company from their plant at Wawaitan Falls.

The method of extraction of gold in the mill is essentially the same as described in the last Report of the Bureau of Mines.

Dome Extension

Development work was carried on at the Dome Extension Mines during the year. No. 1 shaft is 222 feet deep, and on the 200-foot level a cross-cut was driven northwest 650 feet. From this cross-cut, 500 feet from the shaft, drifts have been run southwest 360 feet and northeast 300 feet. Drifts have also been run east from the shaft 540 feet and west 130 feet. No. 4 shaft is 100 feet deep. On this level, 500 feet of drifting and cross-cutting have been done.

Dome Lake

The Dome Lake Mining and Milling Company have sunk four shafts to a depth respectively of 60, 200, 110 and 130 feet. The three deepest shafts are on the same vein and are about 300 feet apart. The central shaft has three compartments and is connected with the west shaft on the 60-foot level, and with the east shaft on the 110-foot level. About 2,000 feet of drifting and cross-cutting have been done.

A 10-stamp mill has been erected and is equipped with one tube mill and four concentrating tables.

Hollinger mine, showing shaft house and mill.

Hollinger

The holdings of the Hollinger Mines, Limited, consist of four 40-acre claims, comprising the east half of the north half and the northeast quarter of the south half of lot 11, and the northwest quarter of the south half of lot 10, in the second concession of Tisdale.

The company have an authorized capital of $3,000,000, divided into 600,000 shares of a par value of $5.00. Mr. Noah Timmins is president, Mr. D. A. Dunlap, secretary-treasurer, and Mr. P. A. Robbins, general manager.

The Hollinger Mines, Limited, was the first of the Porcupine companies to go on a dividend basis. On November 3rd, 1912, a three per cent. dividend was declared, and since that date regular dividends of three per cent. have been declared every four weeks. This is equivalent to 39 per cent. per annum, and will mean a distribution of $1,170,000 per year to shareholders.

A 4-compartment shaft has been sunk to the 200-foot level, and two winzes sunk from the 200-foot to the 300-foot level.

The manager reports the total underground work done during the year ending December 31st, 1912, to be as follows:—

Level.	Drifts.	Cross-cuts.	Winzes.	Raises.	Shafts.	Stopes.
feet.	feet.	feet.	feet.	feet.	feet.	tons.
100	1,802	401	121	60	.....	23,973
200	1,299	820	263	90	66	6,767
300	179	160	.....	.....	.....	.....
Total....	3,280	1,381	324	150	66	30,740

For the year 1912, the company mined and milled 45,195 tons of ore of a total value of $933,682, or an average value of $21.44 per ton.

Hollinger Reserve

On claims Nos. 44, 45 and 46, in the township of Ogden, the Hollinger Reserve Mining Company were engaged during the year in development work. The main shaft was sunk to the 200-foot level, and 200 feet of drifting and cross-cutting done on the 100-foot level and 250 feet on the 200-foot level.

The plant consists of two 60-h.p. boilers, a 6-drill compressor and hoist. Mr. W. Evans is superintendent, employing 25 men.

Hughes

On parts of lot 10, in the fourth concession of Whitney, the Hughes Porcupine Mines, Limited, were carrying on development work, and have erected a 2-stamp mill. The main shaft is down 200 feet, with 75 feet of drifting and cross-cutting on the 100-foot level, 165 feet on the 150-foot level, and 95 feet on the 200-foot level. Mr. E. H. York is superintendent, employing 26 men.

Jupiter

The Jupiter Mines, Limited, were engaged during the year in developing their property on the north shore of Pearl lake. No. 1 shaft is 100 feet in depth. On the 200-foot level, 400 feet of drifting has been done and 250 feet of cross-cutting, and on the 100-foot level, 300 feet of drifting and cross-cutting. Some drifting was also done on the 50-foot level. No. 2 shaft, 460 feet east, near the east boundary of the property, is 300 feet deep. On the 200-foot level, 450 feet of drifting and cross-cutting have been done. On the 300-foot level, a drift has been run west 200 feet and a cross-cut north 250 feet. At a point 160 feet north of the shaft, a drift has been run west towards No. 1 shaft, a distance of 400 feet.

The company purpose erecting a 10-stamp mill during the summer of 1913.

McEnaney

The McEnaney mine is owned and operated by the Crown Reserve Mining Company. A summary of mine development for the year is as follows:—

Sinking and raising	415 feet.
Drifting	1,222 "
Cross-cutting	738 "
Total	2,375 "

The shaft has been sunk to a depth of 417 feet, with levels every 100 feet. The vein has been drifted on on each of the three upper levels for a distance of approximately 400 feet and a cross-cut driven to the vein on the fourth level.

A 5-stamp mill has been erected to treat 40 to 50 tons of ore per day. The method of treatment is as follows:—

The ore goes directly into a gyratory rock breaker for the preliminary crushing, then into the stamps, where it is crushed to 1-6th of an inch, and prepared for the fine crushing in the tube mill which follows. Between the stamp and the tube mill, a shaking screen has been put in, with the idea of getting out the fine material capable of being amalgamated at that point. The product from the tube mill goes to a Dorr classifier, the over-size of which is returned to the tube mill; the fine product finally going over a series of amalgamating plates.

McEnaney gold mine.

McIntyre

The McIntyre Porcupine Mines, Limited, have done extensive development work on their holdings at the west end of Pearl lake. The company also own part of the beds of Pearl and Gillies lakes. Most of the mining work during the year was done from Nos. 1 and 4 shafts on the south side of the lake. No. 1 shaft is 300 feet deep, and No. 4 shaft 200 feet. The new development work was done largely on the 300-foot level, and consisted of 300 feet of drifting and 200 feet of cross-cutting. Stoping has been carried on during the year on No. 1 vein chiefly above the first level. The company's 10-stamp mill was in operation the greater part of the year. The latter part of the year the company started work on a 300-ton mill, and the first unit was completed and put in operation in April, 1913. In this mill it is proposed to do the crushing by rolls and Chilian mills and cyanide the whole product.

North Dome

On parts of lots 3 and 4, in the first concession of Tisdale, the North Dome Mining Company carried on development work throughout the year. Shaft B is sunk to a depth of 50 feet. The main shaft, 325 feet northeast, is 250 feet deep and is connected with shaft B on the 50-foot level. On the 250-foot level, 150 feet of drifting has been done. The Temiskaming Mining Company own a controlling interest in this company.

Pearl Lake

The Pearl Lake Gold Mines, Limited, confined their operations during the year to the sinking of their main 3-compartment shaft. This shaft is now 700 feet in depth. On the 400-foot level a cross-cut was driven south 270 feet, and 130 feet of drifting done

McIntyre gold mine.

North Dome mine.

on the vein encountered 230 feet from the shaft. A cross-cut is also being driven on the 600-foot level. A new plant was put in operation consisting of a 12-drill electrically driven compressor and a double-drum hoist.

Plenaurum

At the easterly end of Pearl lake the Plenaurum Mines, Limited, have sunk two shafts, No. 1 to the north of the lake, and No. 2 to the east. These shafts are about 1,000 feet apart, and have been sunk to a depth of 200 feet and connected at this level. Some drifting has been done on veins encountered, and a winze sunk a depth of 60 feet on a vein near No. 2 shaft. Another cross-cut was run north from No. 1 shaft a distance of 400 feet.

Schumacher

South of Pearl lake a shaft has been sunk on the Schumacher property a depth of 110 feet, and a drift driven north 240 feet and south 270 feet. The north drift ran into loose ground and a cave-in occurred. A concrete bulkhead was put in just north of the shaft to recover the workings. Mr. J. C. Houston is the manager of the mine.

Vipond mill and shaft house.

Three Nations

On lot 5 in the fifth concession of Whitney the Porcupine Three Nations Gold Mining Company, Limited, have continued exploratory work, and have sunk their shaft to a depth of 100 feet with 100 feet of drifting and cross-cutting at this level.

Vipond

The main shaft of the Vipond Porcupine Mines Company, Limited, has been sunk to a depth of 325 feet. The following work has been done underground: On the 100-foot level, 670 feet of drifting and 540 feet of cross-cutting; on the 200-foot level, 1,000 feet of drifting and 550 feet of cross-cutting; on the 300-foot level, 350 feet of drifting and 450 feet of cross-cutting.

The new mill was put in operation early in July, 1912, and was closed down in October. It has a capacity of about 100 tons per day, and is equipped with jaw crusher, rolls, Hardinge ball and pebble mills and classifiers. The ore is crushed to about 200-mesh and amalgamated on plates.

IV—EASTERN ONTARIO

Eastern Ontario attracted more attention from mining men during 1912 than for some years. The agitation for good roads has caused attention to be drawn to this area for a supply of suitable rock for road-building. Trap rock, or diabase, is acknowledged to be the most durable for macadamized roads, and the occurrence of this rock near Havelock, within easy haul of the more thickly populated section of the Province, has caused the opening of a quarry at this place. A number of limestone quarries have also been opened up, producing both building and crushed stone.

Iron

Belmont

The Buffalo Union Furnace Company have been operating the Belmont mine, formerly known as the Ledyard mine, situated on the west half of lot 19 in the first concession of Belmont township in the county of Peterborough. A 3-compartment vertical shaft has been sunk a depth of 230 feet. On the first level at 100 feet in depth drifts have been run northeast 100 feet and southwest 100 feet. On the second level at 170 feet, 50 feet of drifting has been done north and south of the shaft, and on the third level at 230 feet, about 25 feet of drifting.

Air for running the drills and hoist is obtained from the Cordova Mines, Limited. Mr. Frank Platto is superintendent, employing 42 men.

Canada Iron Mines, Limited

The Canada Iron Mines, Limited, have opened up the Bessemer, or Mayo mine, situated on lot 4 in the sixth concession of the township of Mayo, and the Childs mine, three miles northeast of Bessemer on lot 11, in the ninth concession of the same township. The Rankin-Coe property, on lot 10 in the ninth concession of Mayo township was worked under lease until January 1st, 1913. Ore from the Bessemer and Childs properties is shipped to the company's concentrator at Trenton.

Mr. W. D. P. Motter, of Trenton, is manager of both the mill and the mines.

Bessemer Mine

Work is confined at this mine to the No. 4 shaft, where development work only is being done except on the second level where stoping is being carried on. The shaft is 250 feet deep with levels at 60 feet, 115 feet, 175 feet and 250 feet. At the lowest level the station is being cut. On the third level drifts have been run northeast 155 feet and southwest 215 feet. Two raises are being driven from this level and are up 40 feet. On the second level the main drifts northeast and southwest of the shaft are run 125 feet and 375 feet, respectively. Considerable stoping has been carried on southwest of the shaft on this level; also to the northwest, where raises have been put through to the bottom of the old open pit.

Mr. W. J. McLaughlin is manager, employing 90 men.

Child's

This property was first opened up some years ago by the original holders, the Mineral Range Mining Company. The present owners have diamond-drilled it, and are taking out ore from two open cuts 300 feet apart. The ore is hauled in three-ton cars by "dinky" engines to the incline, where it is hoisted and dumped into a gyratory crusher. The product of this crusher goes to bins from which it is loaded directly into railway cars.

The plant consists of one 80-h.p. locomotive type boiler, one 80-h.p. return tubular boiler and hoist. The standard railway track has been extended from Bessemer to this property.

Coe and Rankin

This prospect was worked under lease with option to purchase by the Canada Iron Mines, Limited, until January 1st, 1913. The ore body was stripped for a distance of 300 feet long by 75 feet wide.

Concentrating Plant

The Canada Iron Mines, Limited, have erected at Trenton a magnetic concentrator for treating the ores from their Bessemer and Childs mines.

The ore is received from the mine, crushed to $2\frac{1}{2}$-inch in standard hopper-bottom cars, and dumped into bins. It is fed out of the bins on a conveyor to a shaking screen at the top of the mill, this screen having $\frac{3}{4}$-inch openings. The oversize from the screen goes to the mill bins. The product from the bins is elevated and discharged into a trommel making 4 sizes and oversize. The fine product goes direct to the magnetic separator. The three coarse sizes go to three Ball-Norton drum separators. The middlings from these are re-crushed on a second set of 14 by 42-inch rolls and sent back to the separator. The capacity of the ore unit is 20 tons per hour.

The machinery in the mill is driven by electricity purchased from the Trenton Electric Company, and consists of an 85-h.p. motor running the mill, a $7\frac{1}{2}$-k.w. motor-generator-set supplying 110-volt d.c. current for the magnetic separator and four $7\frac{1}{2}$-h.p. motors running the conveyor and shop machines.

Orton

Work has been continued at the Orton mine by Mr. J. W. Evans and associates. The ore body is being stripped, and some ore has been shipped for experimental purposes.

Gold

Cordova Gold Mine

Work was carried on during the year by the Cordova Mines, Limited, at No. 3 shaft of this mine, and also at No. 1 shaft, which was timbered to the first level. The fifth level at 485 feet in depth was opened up at No. 3 shaft, and stopes opened up, both east and west of the shaft. Stoping was also being carried on on the 385-foot level, where the stopes have been carried up about 60 feet. The 30-stamp mill was in operation part of the year.

Mr. P. Kirkegaard is manager, employing about 60 men.

Golden Fleece

This mine, situated on the west half of lot 24 and on lot 25 of the sixth concession of the township of Kaladar, is owned by the Adelaide Mining Company of Baltimore, and is operated under lease, with option to purchase, by the A. B. P. Mining Company. The officers of this company are Mr. A. B. Potter, president and manager, Flinton; Mr. J. L. Potter, treasurer, and Mr. E. V. MacMillan, secretary, Toronto.

The underground development done at the property consists of a shaft 85 feet deep with a level at 65 feet On this level a drift has been run north 75 feet and a cross-cut 45 feet. The present operators have abandoned the shaft for the present, and are confining the work to the open cut, 75 feet south of the mill, which is about 45 feet deep, 25 feet wide and 30 feet long.

The plant consists of two boilers, one 50- and the other 60-horse power, a straight line compressor developing 300 cubic feet of air per minute, and two hoists.

A 10-stamp mill is in operation, driven by a 25-h.p. engine. The ore is crushed to about 30-mesh, amalgamated, and concentrated on two Wilfley tables.

Ore Chimney

The Ore Chimney Mining Company, capitalized for $600,000, own lots 34 to 36 in the first concession of the township of Barrie, Frontenac county. The officers of the

company are as follows:—A. E. Fletcher, president, 220 Potomac Ave., Buffalo; Frank Misener, vice-president, Welland, Ont.; Chas. Narroway, secretary-treasurer, 335 Brisbane Building, Buffalo; Jas. Sullivan, mine manager, Northbrook, Ont.

There are three abandoned shallow test pits on various parts of the property, but work is at present carried on in what is known as shaft No. 4, which is sunk to a depth of 150 feet. At a depth of 125 feet a cross-cut has been run east 25 feet, and a drift run from this southwest 20 feet.

The plant consists of the following:—

1 100-h.p. Erie return tubular boiler;

1 Laidlaw-Dunn-Gordon compressor developing 600 cubic feet of air per minute;

4 machine drills;

1 No. 6 Cameron pump.

The company, at the date of inspection in April, 1913, were employing 12 men.

Iron Pyrites

Sulphide

Practically no new work was done during 1912 by the Nichols Chemical Company, the owners of the iron pyrites mine at Sulphide. The work has been confined chiefly to the north vein on the first and second levels, where stoping is being carried on. No. 2 shaft has been sunk to a depth of 575 feet. On this lower level 100 feet of drifting has been done on the south vein, and 200 feet on the north vein. The surface plant remains the same.

No change has been made in the acid plant, except the replacing of worn parts. The ore-crushing plant has been changed by the addition of a set of 16 by 36-inch rolls and a new dryer 40 feet in length by 5 feet in diameter. A No. 5 American blower fan, with a capacity of 2,040 cubic feet of air per minute, is being installed to take care of the dust formed at the crushing plant.

Mr. W. H. DuBlois is superintendent, employing 125 men.

Queensboro

The Canadian Sulphur Ore Company have been operating their iron pyrites mine continuously during the year. A branch line two and one-half miles in length from the Bay of Quinte Railway near Queensboro to the mine is under construction. A power line has been built from Madoc to the mine, and the plant is now run by electrical power purchased from the Seymour Power and Electric Company. The plant consists of a compressor with a capacity of 720 cubic feet of free air per minute driven by a 150-h.p. motor and single-drum hoists at Nos. 3 and 4 pits.

Work has been confined during the year to Nos. 3 and 4 workings. No. 3 shaft is 120 feet in depth, and at this level drifts have been run east 50 feet and west 50 feet. No. 3 open pit alongside of No. 3 shaft is 75 feet deep, 58 feet long and 25 feet wide. No. 4 open pit is west of No. 3, and is 60 feet deep, 25 feet long and 25 feet wide.

The mine is under the management of Mr. A. B. Willmott, who employs 44 men.

Talc

Henderson Mine

This mine, situated near the village of Madoc, is being operated under lease by Messrs. Cross and Wellington, who employ 22 workmen. Practically the whole output is sold as it comes from the mine to Geo. H. Gillespie and Company. All the machinery at the mine is operated by electric power purchased from the Seymour Power and Electric Company.

No. 1 shaft is 225 feet deep, with the first level at 120 feet. No work is being done on the first level. Drifts are being run on the ore on the second level. No. 2

shaft is 100 feet deep and at a depth of 100 feet a drift has been driven southwest on the ore to connect with No. 1 shaft. Some stoping was done along this drift but, owing to a fall of ground, has been discontinued.

Gillespie Mill

A mill for the grinding of talc in the town of Madoc alongside the Belleville-to-Madoc branch of the Grand Trunk Railway, is owned and operated by George H. Gillespie and Company. The crude talc is purchased from Messrs. Cross and Wellington, lessees of the Henderson talc mine.

The mill machinery is driven by electric power purchased from the Seymour Power and Electric Company.

Canadian Talc and Silica Company

This company operated their mine and mill for the production of talc throughout the year. The officers of the company are as follows: President, H. B. Hungerford, Chicago; vice-president and secretary, David Plant, Chicago; treasurer, M. H. Orde, Chicago; mine superintendent, Robt. M. Philips, Eldorado.

Two shafts have been sunk on the incline, No. 1 being 90 feet and No. 2 130 feet deep. On the 90-foot level of No. 1 shaft a drift has been run northeast 200 feet to connect with No. 2 shaft. The other work at this shaft consists of a stope 20 feet wide and 25 feet in height.

The mill is equipped with pulverizers for grinding the talc and bolting machines for grading it.

Connolly Mine

This mine adjoins the Henderson mine to the east, and is owned and operated by the Hungerford syndicate.

A shaft has been sunk a depth of 70 feet and drifts driven west 45 feet and northeast 25 feet. The plant consists of a 40-h.p. boiler and hoist.

Lead

Frontenac Mine

Work was carried on during the year by the North American Smelting Company at the old Frontenac lead mine in the township of Loughboro near Perth Road. No. 3 shaft has been sunk a depth of 150 feet, and a cross-cut 15 feet driven to the vein on this level. Drifts have been run on the vein northeast and southwest 200 feet respectively, and raises started at 20-foot intervals along the vein. The southwest drift is being run to connect with No. 2 shaft about 700 feet distant.

The plant at No. 3 shaft consists of one 90- and one 100-h.p. boiler, a Laidlaw-Dunn-Gordon compressor developing 625 cubic feet of air per minute, and a 10 by 8-inch jaw crusher and hoist. The company are also installing a double-drum electric hoist at this shaft.

The mill is located near No. 1 shaft, and the ore is hauled to the mill from No. 3 shaft by a Leschen aerial tram 4,000 feet in length. The ore is dumped into mill bins, then fed to 36-inch rolls and elevated to shaking screens, the coarse and medium product going to four Richards jigs, and the fines to a Richards classifier. The oversize from the screens goes to 24-inch rolls and back to the screens. The middlings from the jigs go to a Huntington mill and then to classifiers. The classified product is further treated on five Wilfey tables and three Frue vanners.

The power plant at the No. 1 shaft consists of a 100- and a 150-h.p. boiler, a 200-k.w. generator, a Bury compressor developing 800 cubic feet of air per minute and a 9 by 13-inch hoist. The machinery in the mill is all motor-driven.

Mr. W. M. Weigle, of Kingston, is manager both of the mine and the smelter at Kingston.

North American Smelter

The North American Smelting Company have built a lead smelter in Kingston for treating the ore from their mine, and also custom ore. A water-jacketed blast furnace has been erected with a capacity of 30 tons of charge per 24 hours, two open-hearth furnaces with a capacity of 10 tons each per 24 hours, one positive pressure blower with a capacity of 2,250 cubic feet of air per minute and one for regulating the draft. The blower fan and elevator are motor-driven, electric power being obtained from the city.

Buffalo and Ontario Smelter

The Buffalo and Ontario Smelting and Refining Company is a subsidiary company of the General Mines Company, the president being Geo. O. Wagner, Kingston, and the manager Geo. H. Fullerton of the same place. The smelting company was formed to treat the ores of the General Mines Company, also custom ores. The General Mines Company have acquired the Red Rock and Cobalt Contact mines at Cobalt.

The smelter is being equipped with the following:—

One positive pressure Connellsville blower, three 60-inch Buffalo exhausters, two reverberatory furnaces, one rotary furnace, two arsenic refining furnaces, one cupel furnace, two bag houses and dust chambers.

Power is supplied by a 75- and a 100-h.p. boiler.

Feldspar

Richardson Mine

The Kingston Feldspar and Mining Company continued operations and shipped steadily during the year 1912. Until the opening of navigation during the last week of April, both feldspar and quartz were teamed to Godfrey and shipped by rail in box cars. In the summer months the feldspar is loaded on flat cars at Glendower siding and transhipped to boats at Kingston.

The method of operating remains the same as described in former reports. A six-foot stope was taken up in the northwesterly end of the pit, otherwise the open cut was not extended.

Mr. H. W. Richardson, Kingston, is president and general manager of the Company. It is proposed to build an incline skip track and erect a concentrating plant. This will do away with hand sorting in the pit, and the output should be considerably increased.

The engine room and boiler house were destroyed by fire on August 21st, 1912, and shipping was suspended until repairs were made to the hoists.

Fifty men are employed under Foreman S. Hunter.

Reynolds Mine

This mine, owned and operated by the Kingston Feldspar and Mining Company on lot 1 in the thirteenth concession of Portland township, was worked till April 15th, 1912, and closed till September 1st. The pit was considerably extended at both the north and south ends, and several thousand tons of high grade feldspar produced. On account of there being no summer road to this pit, it is worked only in the winter months, the product being teamed to Verona on sleighs.

Card Mine

This mine, about two miles west of Verona Station, K. & P. Ry., is also owned by the Kingston Feldspar & Mining Company. During 1912 no work was done at the pit.

In April, 1912, about one thousand tons of quartz was loaded at Verona siding from the Card stock pile. The quartz capping at this mine has a very high silica content.

Mica

There was very little activity in the mining of mica during 1912; in fact the production of amber mica in Ontario is confined to a few of the properties that have been worked for years. No new properties of merit have been developed during recent years, although the price of mica has been steadily increasing.

Bob's Lake

Messrs. Stoness and Kent continued work at their mica property on the west side of Bob's lake during the year. As with mica-mining in general in the Province, no extensive underground work has been done, the mica being mined chiefly from surface pits. It is rough-cobbed at the mine and shipped to Kent Bros.' trimming works at Kingston.

Lacey

This mine, owned by the Loughboro Mining Company, still continues to be the main producer of mica in the Province.

As in 1911, all work during the summer months was confined to the open cut near the main shaft. During the winter, work was carried on from the main shaft at a depth of about 140 feet.

Mr. Geo. W. McNaughton is manager, employing 26 men.

Graphite

Black Donald

The Black Donald Graphite Company, whose mine and mill are situated about 12 miles from Calabogie in the county of Renfrew, were the main producers of graphite in the Province during the year. The mine is operated for about three months during the summer, and sufficient crude material is taken out to keep the mill supplied for the year. The pit is about 85 feet deep, and the graphite was stoped from the east end of the pit.

Mr. R. F. Bunting is manager and Mr. Geo. W. Stewart superintendent.

Virginia

The Virginia Graphite Company have built a concentrating plant and opened up a pit for the mining of graphite on lots 34 and 35 in the sixth concession of the township of Monmouth, near Wilberforce, on the Irondale and Bancroft railway.

The officers of the company are as follows:— President, J. J Tonkin, 86th Ave. and Broadway, New York; manager and secretary, H. G. Tonkin, Wilberforce; vice-president and treasurer, M. Du Pont, Atlantic City.

The open pit, formerly worked on the hill west of the mill, was abandoned at date of inspection, and two core drills were working to determine the ore body. This open pit was 75 feet in length, 40 feet wide and 37 feet deep. The company's property near Maynooth on the Central Ontario railway is being opened up, and the compressors formerly used at Wilberforce have been shipped here.

The ore is first dried and then crushed in two Taylor jaw crushers and two sets of rolls. It is taken from rolls on a conveyor belt to the dry concentrators.

New York Graphite Company

This company are developing a graphite property on lots 9, 10 and 11 in the twenty-second concession of Cardiff township, county of Haliburton.

The officers of the company are as follows:—

President, W. B. Spader, Cobourg, Ont.; secretary, J. G. Marshall, 135 William street, New York; manager, J. W. Brewer, Harcourt, Ont.

The mine and mill are situated just south of the Irondale and Bancroft railway, three-quarters of a mile west of Mumford station. The graphite has been found out-

cropping along the face of the hill and has been prospected by small open cuts. At the time of inspection, all work was confined to No. 3 open pit. This pit is equipped with a 40-h.p. boiler and hoist. Ore is hauled to the mill in three-ton cars.

A large mill has been constructed, but was not in operation in April, 1913. The scheme of concentration is to dry the ore and crush it first in a No. 4 Austin gyratory and then in rolls, and afterwards concentrate and grade it on Dallas dry tables and bolting machines.

The power plant consists of three 150-h.p. return tubular boilers, a 250-h.p. engine for driving mill machinery and an electric light plant.

Corundum

Manufacturers' Mine

The Manufacturers' Corundum Company operated under lease during 1912 the mines and mills both of the Canada Corundum Company and the Ashland Emery and Corundum Company. The large mill of the Canada Corundum Company at Craigmont was totally destroyed by fire early in 1913, which will probably affect the production of corundum in Ontario.

Mr. D. A. Brebner is managing director.

Silver Refinery

Deloro Mining and Reduction Company

The Deloro Mining and Reductions Company at Deloro continued the smelting of cobalt-silver ores throughout the year under the management of Mr. S. B. Wright.

The schedule of freight rates from Cobalt to Marmora station and the payment for the ores is given in the last report of the Bureau of Mines.

Blast Furnace

Standard Iron Company

Part of the plant of the Standard Iron Company at Deseronto was destroyed by fire during the year. It has been rebuilt and is again in operation under the management of Mr. R. H. Watson. The company are building another furnace at Parry Sound and expect to have it in operation in June, 1913.

Marble Quarries

Ontario

The Ontario Marble Quarries, Limited, are operating quarries for the production of marble on lots 28 to 30 in the tenth concession of Dungannon township about two miles south of Bancroft. About 32 men are employed under Superintendent Thos. Morrison. A siding is being constructed from the Central Ontario railway to the No. 1 and No. 2 quarries.

The plant at No. 1 quarry and sawing plant consists of the following:—

One 90-h.p. return tubular boiler, one 75-h.p. engine, one Fairbanks-Morse dynamo, one 20-ton steel derrick with hoist, one 10-ton hand derrick with winch, one Sullivan channeller, two drills, four gang saws for sawing the marble.

The plant at No. 2 quarry consists of:—

One 30-ton derrick with double-drum hoist, two 30-h.p. upright boilers, one Sullivan channeller, two steam drills.

At No. 3 quarry there is one 10-ton derrick.

Fluorspar

About two miles southwest of Madoc in the township of Huntingdon, Mr. C. Bowman has begun work on a deposit of fluorspar formerly worked by Messrs. Gillespie and Wellington. Camp buildings have been built and the old workings unwatered.

Limestone Quarries

Lehigh

The Canada Cement Company quarry limestone at Point Anne for use at their Lehigh and Belleville plants, and employ about 30 men in the quarry. A pit about 30 feet deep has been excavated over an area of six acres. A steam shovel is used for loading the broken rock into cars, which are trammed to the plant and the rock automatically dumped into crushers.

Point Anne

A limestone quarry was operated during the year at Point Anne, near the Lehigh plant of the Canada Cement Company, by the Point Anne Quarries, Limited, of which Mr. M. J. Haney is president, Mr. J. F. M. Stewart, manager, and Mr. A. G. Bennett, superintendent at Point Anne. The company ship crushed stone, rubble, crib-filling, etc., mainly by boat, their storage bins being on the lake shore.

Electric power is purchased from the Seymour Power and Electric Company. The crusher plant consists of a 175-h.p., 600-volt a.c. motor running three Gates' crushers, Nos. 4, 6 and 8. The crushed material from the crusher is screened and taken on a 36-inch conveyor belt 407 feet long to the bins on the lake shore. The rock is loaded at the quarry by a steam shovel into cars holding six cubic yards, and hauled by trolley to the crushing plant. The power plant consists of a compressor developing 700 cubic feet of air per minute, rope-driven by a 100-h.p. motor and a 225-h.p. motor-generator-set for furnishing power for the trolley line.

Britnell and Company

On parts of lots A and B in the sixth concession of the township of Somerville, near Burnt River, Britnell and Company, Limited, Toronto, are operating a limestone quarry, producing crushed and building stone. Mr. Wm. Britnell is manager, employing 35 men.

The plant consists of two 20-h.p. boilers and a 40-h.p. boiler, two hoists and three steam drills. The rock is crushed in a No. 3 Gates crusher, driven by a 35-h.p. engine.

Ontario Rock Company

At Preneveau, five miles east of Havelock, the Ontario Rock Company are operating a quarry for diabase. Nearly all their product is crushed and shipped to Toronto or the county of York for use in building roads, for which purpose it is well suited by reason of its toughness and great wearing qualities. A crushing plant and bins have been erected, and the crushed material loaded into cars on a spur built to the quarry from the main line of the Canadian Pacific railway.

Mr. A. Longwell, Toronto, is president and Mr. Geo. Rayner, superintendent.

Canada Lime Company

At Coboconk village in the county of Haliburton the Canada Lime Company are quarrying limestone for the manufacture of lime. Mr. C. R. Christie, 34 Yonge Street, Toronto, is president, and Jas. Ballantyne, Coboconk, superintendent. The company have three lime kilns, having a capacity of 26 tons per 24 hours. A derrick and hoist is used for dumping material into the kilns.

Toronto Brick Company

At Coboconk village the Toronto Brick Company are excavating limestone for use in the manufacture of lime. Mr. F. B. Allen, 64 Wellington Street, Toronto, is secretary, and Mr. C. M. Callam is superintendent, employing 11 men.

The broken rock is handled by means of a hoist and derrick and dumped into the kiln.

York Sand and Gravel Company

Near the Grand Trunk railway in East Toronto the York Sand and Gravel Company are excavating sand and gravel for use in the building industry. The sand pit is 25 feet deep, and standard gauge tracks are laid into the pit and the cars handled by a locomotive crane. The sand is excavated by a travelling derrick of 10-tons capacity.

Mr. C. S. Richards is superintendent, employing 20 workmen.

Excavations for Clay

Don Valley

At the Don Valley Brick Works, situated in the Don Valley, Toronto, and owned by Mr. Robt. Davies, both clay and shale are quarried for use in the manufacture of brick. The shale pit is circular, about 50 feet in depth and 200 feet in diameter. Two steam shovels, of 25 and 70 tons capacity respectively, are used in excavating the clay. The loaded cars are lowered by a gravity tram to the brick works.

Other Brick Works

The excavations of the following companies engaged in the manufacture of brick at Toronto have been inspected:—

A. H. Wagstaff and Company, 362 Greenwood Avenue.
Bell Bros. Brick Company, 368 Greenwood Avenue.
Sun Brick Company, Don Valley.
John Price, Greenwood Avenue.
Prices, Limited, 500 Greenwood Avenue.
Standard Brick Company, 532 Greenwood Avenue.
J. Logan, Greenwood Avenue.

V.—SOUTHWESTERN ONTARIO

The industries in this area which come under the provisions of the Mining Act as regards inspection include silver smelting works, blast furnaces, gypsum mines, quarries, excavations in brickyards, sand and gravel pits, and lime kilns. A large number of these are worked in a very small way and at irregular intervals. The quarries are mainly of limestone for use in the manufacture of cement, as a flux for blast furnaces, in the making of lime, for building stone, and, when crushed, for road material and for use in concrete work.

Silver Refineries

Canada Refining and Smelting Company

The works of this company at Orillia were destroyed by fire the latter part of the year, and have not been rebuilt. They were engaged up to the time of the fire in treating silver ores from the Cobalt camp.

Coniagas Reduction Company

The Coniagas Reduction Company at Thorold treat all the ore from the Coniagas mine at Cobalt, and also custom ores from the Cobalt camp. Electric power is obtained from the Ontario Distributing Company. The machinery used in the plant is all motor-driven.

Ores are purchased on the following basis:—

Percentage of silver to be paid for on commercial assay of silver content per ton of 2,000 lbs. is as follows:

55	per cent. for	50	ounces	and proportionate	increase	in percentage up to
75	" "	200	"	"	"	"
78	" "	300	"	"	"	"
84	" "	500	"	"	"	"
91.5	" "	1,000	"	"	"	"
92.5	" "	1,500	"	"	"	"
93.5	" "	2,000	"	"	"	"
95	" "	3,000	"	and over.		

If sampled at purchaser's works at Thorold, sampling will be charged for at rate of $2.00 per ton of 2,000 lbs.

All ore purchased will be subject to a refining charge of 3/4 c. per ounce of silver contents.

Gypsum

Two companies are engaged in the mining of gypsum in the valley of the Grand river near Caledonia. Both companies have mills for grinding and calcining the product.

Alabastine Company

The company's mine is situated about three-eighths of a mile north of the town of Caledonia, on lot 10 in the first range west of the Hamilton and Port Dover road in the township of Seneca. The body of gypsum being mined occurs in a flat-lying bed about 80 feet below the surface. The gypsum is mined by the room and pillar system, the material being hoisted through an incline shaft. An area of about eight acres has been mined. The drilling is done by an electric rotary drill.

The gypsum is crushed and calcined in the mill situated about 75 feet from the mouth of the incline shaft.

Carson

The Alabastine Company also operate this property situated about three miles south of Caledonia. A good quality of white gypsum is mined here. A new air shaft has been put up 775 feet from the mouth of the incline shaft. The workings extend 200 feet beyond the air shaft. In this mine the worked-out places are filled by waste.

Crown Gypsum Company

The mine operated by this company is situated one-half mile from York on the south side of the Grand river in Oneida township, and the mill at Lythmore on the Michigan Central railway about three miles from the mine. The gypsum is hauled to the mill by a narrow-gauge railway operated by the company. The mine is worked from an incline shaft 720 feet in length. From the foot of this shaft, workings have been extended north and south 280 and 160 feet respectively. Mr. H. J. Brown is manager, employing 26 men in the mine and 11 in the mill.

Quarries

More carelessness is shown in the operation of their works by quarry owners than by mine operators. Some of the owners seem to think that, because they are working only a small crew, it is not necessary to look after the work as closely as if they were working a large gang. There is also less willingness on the part of owners of quarries to live up to the requirements of the Mining Act. Quarrying is not as dangerous a business as mining, and accidents should not be more numerous than in ordinary industrial enterprises where machinery is employed. The greatest degree of carelessness is shown in the handling and storage of explosives. The premature explosion of a few sticks of dynamite will kill a man as quickly as the explosion of a few tons. It is, therefore, necessary to use as great care in the storage, thawing and handling of explosives where only a few cases are used during the year as there is where a number of tons are used. The practice of thawing in the sun in the spring and autumn is largely in vogue in the smaller quarries. This is most dangerous. Another source of accident is the working of steep clay banks at brickyards. The practice of blasting at the bottom of clay banks to cave the whole bank above has proved to be dangerous, as the bank then remains nearly perpendicular and liable to cave at any time.

Canadian Quarries

At Stoney Creek, in the township of Saltfleet, the Canadian Quarries, Limited, are opening up a quarry for the production of crushed limestone. Mr. O. E. Quigley, of 26 Fairleigh Avenue, South Hamilton, is manager, employing 18 workmen.

A spur from the T. H. and B. railway, 3,566 feet in length, has been built to the quarry.

The plant consists of a No. 6 Austin gyratory crusher, screens, and a double-drum hoist for hauling cars of crushed rock from screens to loading platform. Two boilers of 25- and 40-h.p. capacity furnish steam for running machinery.

Clifton Sand, Gravel and Construction Company

This company are engaged in excavating sand and gravel in the township of Stamford.

The plant consists of three clam shells operated from A. frames by double-drum hoists, motor-driven. Electric power is purchased from the Ontario Power Company. About 10 acres are worked out to a depth of 60 feet.

Mr. J. J. Mackan, St. Catharines, is manager, and Mr. A. G. Bridge, superintendent, employing 18 men.

Doolittle and Wilcox

On lots 12 to 15 in the first concession of West Flamboro township near Dundas, Doolittle and Wilcox, Limited, are quarrying limestone, crushing it and selling it for use as a flux and for road material. Drilling in the quarry is all done by cyclone drills, motor-driven, which put down 4-inch holes to a depth of about 20 feet. The stone is loaded on cars in the quarry by a steam shovel. The loaded cars are hauled to the crushing plant by locomotives.

Electric power is purchased from the Cataract Power Company. The company have in use seventeen motors for driving the machinery in the crushing plant, drills, hoists, etc., using about 700 h.p. The crushing plant is equipped with a mammoth McCulla crusher having a rated capacity of 700 tons per hour, Nos. 6, 7½ and 8 Austin gyratory crushers and one set of 54-inch rolls. The plant is further equipped with trommels and conveyor belts for screening and distributing the crushed product.

Mr. J. D. Small is manager, employing 30 men in the quarry and 30 men at the crushing plant.

Empire Limestone Company

At Shisler's Point, on lots 4, 5 and 6 in the first concession of Humberstone, the Empire Limestone Company are quarrying limestone and excavating sand. Most of the material is shipped to Buffalo. An area of 16 acres has been worked over.

The plant consists of thirteen boilers having a total capacity of 775 horse power, a compressor developing 1,000 cubic feet of free air per minute, five "dinky" locomotives, a Vulcan and a Marion steam shovel, a sand clam and hoist for operating cars. In the crusher plant are two No. 7½ and one No. 9½ McCulla gyratory crushers.

Mr. T. R. Thomas is manager, employing 93 men.

Hagersville

On lot 14 in the thirteenth concession of Walpole township, Haldimand county, the Hagersville Contracting Company were engaged in operating a limestone quarry.

The plant consists of two 60-h.p. boilers, a 60- and a 150-h.p. gas engine and three crushers. Mr. D. C. Ingles is manager, employing 45 men.

Michigan Central

The Michigan Central railway operates a quarry of limestone at Hagersville. All material produced is used by the railway company for ballast and concrete work. An area of about eight acres has been worked out to a depth of 20 feet. The plant consists of two 75-h.p. and one 60-h.p. boilers, a compressor and drills.

Mr. D. C. Cronin is manager, employing 75 men.

Milton Pressed Brick Company

On lot 1 in the first concession of Esquesing near Milton, this company are excavating clay for use in making brick. About five acres have been worked out to a depth of 40 feet. The clay is loaded in cars and trammed out of the pit with horses.

Mr. J. S. McCannell is manager, employing 40 men in the clay pit.

Toronto Pressed Brick Company

Near Milton, in the township of Esquesing, this company are excavating clay for use in making brick. About 18 men are employed under Superintendent C. B. Lewis.

Queenston

On lots 47 and 48 in the third and fourth concessions of Niagara township, county of Lincoln, the Queenston Quarry Company are excavating limestone for use as building material and also crushed for road material and concrete work. The equipment consists of four Beatty double-drum hoists with derricks, a Belleville hoist and an A. frame sand clam-shell derrick with Beatty hoist. These hoists are all steam-operated with six small upright boilers. A 350-cubic foot compressor, motor-driven, supplies air from the drill. The crushing plant is equipped with a No. 5 Austin crusher and a Simons disc crusher, both motor-driven with 40-h.p. motors.

About 60 men are employed under Manager Chas. Lowrey.

Wentworth

On lot 4 in the fifth concession of the township of Saltfleet, the Wentworth Quarry Company are quarrying limestone and crushing it. Mr. F. W. Schwendiman, Vinemount, is manager, employing 25 men.

Power for the crushing plant is supplied by a 120-h.p. Dudbridge gas engine which runs the crushers and screens. The rock is hauled up an incline standard gauge track and dumped direct into a No. 7½ McCulla crusher, rated at 75 to 100 tons per hour. From this crusher the product passes over a trommel, and the oversize to a No. 5 McCulla and then to rolls. Five products are produced: rock sand, ¼-inch, ½-inch, 1-inch and 2-inch rock.

Drilling is done with a cyclone drill, making a 4½-inch hole, and working a 15-foot face. A steam shovel is used for loading the broken rock into cars in the pit.

THE WHISKEY LAKE AREA

By A. P. Coleman

Introduction

Though the Whiskey lake area has been known for some years to contain more or less copper ore,[1] etc., little attention has recently been paid to it by prospectors or geologists until the discovery of gold on the east shore of Whiskey lake early in 1912. Following the instructions of Mr. T. W. Gibson, Deputy Minister of Mines for Ontario, the present writer visited the region during the summer of 1912 examining the mining locations and mapping the geology as far as could be done in the vicinity of the lakes. No map covering the geology of the area has yet been published, though topographic

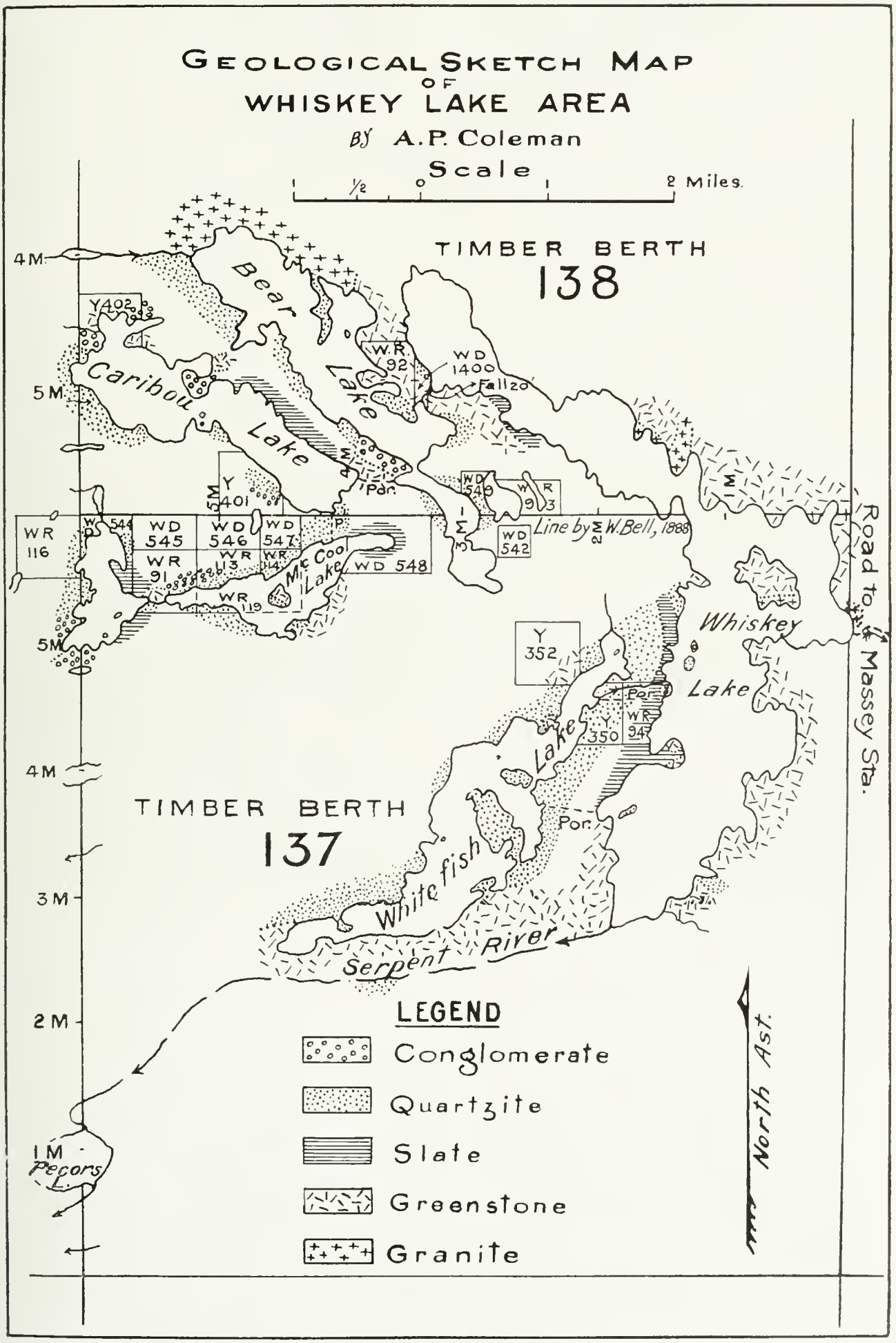
Sable river, Massey.

map sheet No. 129, prepared by the Geological Survey of Canada some years ago, includes this district. The sheet was never issued, and I am under great obligations to the Director of the Survey for permission to use a copy in my field work. It proved of much service, though its small scale (4 miles to the inch) and the fact that some of the lakes on which work has been done are not shown on it have made it necessary to re-map most of the topography.

During my work in the area, Mr. Charles Baycroft proved a very efficient assistant. Messrs. George and John Wallace, firerangers on the lakes, were very helpful and hospitable, and their intimate knowledge of the region was of much value.

Whiskey lake and the neighboring bodies of water are in the third and fourth tiers of townships of Algoma north of lake Huron. As they have not yet been subdivided for settlement they are unnamed, but may be referred to as Nos. 137 and 138. These townships have merely been blocked out and there are few lines available for fixing points in the topography, but a number of mining locations surveyed in the region have been of service in this respect.

[1]Bur. Mines, 1906, Vol. XIV., pp. 62-67; and Vol. XV., pp. 69-70.


GEOLOGICAL SKETCH MAP
OF
WHISKEY LAKE AREA
BY A.P. Coleman
Scale
½ 0 1 2 Miles.
TIMBER BERTH
138
TIMBER BERTH
137
Bear Lake
Caribou Lake
Mc Coo Lake
Whiskey Lake
White fish Lake
Serpent River
Pecors L.
Line by W. Bell, 1888
Road to Massey Sta.
North Ast.
4M
5M
3M
2M
1M
Y 402
Y 401
Y 352
Y 350
WR 116
WD 545
WD 546
WD 547
WD 548
WD 542
WD 1400
WR 92
WR 91
WR 94
Por.
Fall 20'
LEGEND
Conglomerate
Quartzite
Slate
Greenstone
Granite

Whiskey lake is best reached by a lumber road running about 30 miles northwest of Massey on the Sault branch of the Canadian Pacific railway; but it may also be reached by canoe from Serpent, 25 miles farther west, since Serpent river is the outlet of Whiskey lake. During the earlier part of the summer this route is apt to be blocked with log drives.

Though the road from Massey follows roughly the valley of Sable river, it crosses the divide westwards near Whiskey lake, and the drainage of the whole system of lakes is southwest by Serpent river. The numerous falls and rapids between lakes or on the course of the river are overcome for lumbering purposes by dams and slides. Whiskey lake, the largest of the group of lakes, is about seven miles long and one mile wide. The lakes named Whitefish, Bear and Caribou are not more than half this size. It is a pity that these names should be repeated so often.

The general topography of the area is that characteristic of the Archæan, consisting of rocky hills rising above lakes of irregular shape, with occasional flats of swamp land or old lake deposits. The mean of two aneroid readings (taken in changeable weather) puts Whiskey lake 364 feet above Massey, or 1,000 feet above the sea; and the other lakes range from 21 to 130 feet higher. On the southwest shore of Caribou lake a hill rises about 700 feet above the water, or about 1,800 feet above the sea, forming the culminating point of the region; and a number of other hills rise 300 or 400 feet above the general level, giving an unusually high relief to the country.

There is comparatively little good soil in the area, except along Serpent river southwest of Whiskey lake, where some hundreds of acres of excellent sandy loam are covered with hardwood forest. The district has largely escaped burning, and on sandy tracts and on morainic and rocky hills there is often a good stand of red or white pine. This has been more carefully preserved than the pine in most of northern Ontario, and represents a considerable reserve of good timber. Lumbering is active in the district to the north on the head waters of Serpent river; and several "alligators" as well as large gangs of men were engaged in taking down drives of logs in the early summer of 1912.

General Geology

The solid rocks observed in the area include granite and syenite, greenstone and green schist, quartzite often associated with conglomerate or tillite, limestone and slate. Of these rocks the greenstones and green schists cover most space, especially toward the east and southeast; quartzite comes next, followed by slate, conglomerate and limestone, the last rock occurring only in outcrops too small to be mapped on the scale employed. The map has been prepared almost entirely from work done by canoe, so that little of the inland portions has been touched beyond the outcrops on portages and in the vicinity of mine workings.

As to classification, it is probable that part at least of the greenstone and green schist is Keewatin, that the granite and syenite are Laurentian, and that the other rocks belong mainly to the Huronian; though there is reason to think that some of the sedimentary rocks are earlier than the Huronian, probably of the age of the Sudbury series, which comes between the Huronian and Keewatin. The quartzite often passes into coarse conglomerate with the character of tillite, and there must be two ages of quartzite, since pebbles of quartzite are found in the conglomerate. It is probable that there are conglomerates of two ages also, a boulder of conglomerate occurring in the tillite at one place. The slate appears to be the lowest and oldest sedimentary rock of the region, and is sometimes cut by greenstone.

From the relations mentioned above one may conclude that the two conglomerates are at the base of the middle and lower Huronian respectively, and that much of the quartzite will go with them into the Huronian. It is probable, too, that the limestone and at least one bed of slate must be considered Huronian; while the rest of the slate and part of the quartzite are pre-Huronian and probably of the age of the Sudbury series.

The rocks of the region probably include therefore:

Middle Huronian—conglomerate and quartzite.

Unconformity.

Lower Huronian—conglomerate, quartzite, slate and limestone.

Great unconformity.

Sudbury series—slate and probably quartzite, part of the greenstone.

Unconformity.

Keewatin—most of the greenstone and green schist.

Eruptive contact.

Laurentian—granite and syenite.

While probably all of these subdivisions are present, some of them are very difficult to separate without more field work than could be devoted to the area; and on the map a lithological classification is adopted, all quartzites being represented by the same symbol, and conglomerates likewise.

Greenstone, trunk road west of Massey.

Detailed Geology

Road to Whiskey Lake

The road from Massey, which begins on a sand terrace at 639 feet, ascends two other sand terraces at 710 and 870 feet within the first ten miles, evidently water levels of ancient lake Algonquin. The sand plains are largely delta deposits formed by the Sable (Sand) river when it entered lake Algonquin at the above levels. The Sable is now cutting down its channel to bed rock through these stratified sand deposits. As long as the road follows the drift-filled valley of the Sable outcrops of bed rock are rare, and consist mainly of knobs of granite.

Approaching Twelve-mile creek, greenstone occurs frequently with the granite, and between this and Cameron creek boulder clay covers much of the surface, though greenstone penetrated by granite is frequently seen. About two miles south of Twenty-mile creek (really 18 miles from Massey) the road ascends a high and wide ridge of greenstone running northeast and southwest. This has a width, as crossed by the road, of nearly half a mile. Farther to the north there is a mixture of the two rocks once more, but this ends a little beyond Twenty-mile. The ten miles completing the distance to

Whiskey lake show mainly green schist with a northwesterly strike. A few dikes of red granite cut the schist in places. During the last half mile sand and drift deposits hide the bed rock until an eastern bay of Whiskey lake is reached.

Whiskey Lake

The main body of Whiskey lake runs three miles a little west of south from the bay at which the lumber road ends, and a large hilly island hides an arm which extends 4½ miles northwest. The eastern shore and southern end, where not formed of drift, consist mainly of different phases of greenstone, including hornblende, porphyrite, green schist, and in some places agglomerate. Rarely a trace of pillow structure may be seen. The whole were no doubt the basic lavas so commonly found in the Keewatin.

Through the greenstones a band of red granite rises north of the end of the road and crosses the southern end of the large island. The north shore of the western arm, where not drift-covered, includes both greenstone and red granite, as may be seen from a lumber road which runs along that side of the lake and continues westward along Bear lake, the next in order.

Whiskey lake, showing pine trees.

The most interesting rocks on the lake lie along the west coast of its southern part or on islands, and include the best-known gold deposits. The promontory separating the two parts of the lake is of morainic materials, below which a little greenstone may be seen on the shore. Going southwards one encounters quartzite with a north and south strike and a dip of 25° to the west. The rock is cross-bedded and contains pyrite. Parts of it include angular or rounded pebbles of quartz, felsite and greenstone; and opposite an island the rock may be described as a conglomerate of pebbles and boulders of granite, felsite, greenstone and schist, with a coarse matrix of arkose. The strike here is 160° and the dip hard to determine. The shore is largely drift-covered, making the relations uncertain, but the conglomerate is apparently lower Huronian, and a small point of rock between it and the quartzite consists of gray-green schist penetrated by pegmatite, suggesting a basal complex. To the south of the conglomerate slate appears with a nearly north and south strike and a dip of 10° or 15° to the west, the cleavage crossing the stratification at a small angle.

A small island near by consists of conglomerate once more, with angular or subangular pebbles and boulders, like those referred to before, but including many of slate,

enclosed in coarse arkose. The conglomerate is in one place parted by a slaty layer. The largest boulder seen is of granite and measures 3 x 2½ feet. Inland a hill of slate rises 200 feet, while to the west another hill reaching 240 feet is capped with conglomerate. Quartzite with a gentle dip to the northwest shows on the shore to the south. The rocks just described are on WR 94, the claim including the gold deposits.

On a small point projecting at the south of the location patches of greenstone cut slate like that referred to above, and the shore for half a mile to the south consists mainly of slate with a cliff of the same rock inland. The last half mile of shore, reaching to the outlet of Serpent river, shows only greenstone.

There is evidently a complicated series of rocks, including at least three ages, the slate and probably most of the quartzite being oldest, since greenstone comes up through them, and the conglomerate latest. The slate and most of the quartzite appear to be earlier than lower Huronian, and therefore may belong to the Sudbury series; and the greenstones seem to be later than the Keewatin.

The quartzites and slates have been greatly shattered and faulted in places, and the fissures are filled with quartz charged with sulphides and some free gold.

Looking north from the falls at outlet of Bear lake.

Whitefish Lake

From near the north end of WR 94 a portage leads westwards for half a mile to Whitefish lake, with a rise of 77 feet, crossing drift and quartzite boulders most of the way, though quartzite rises in place at one point to the north of the stream as a cliff overlying a few feet of slate. Except along the southern side of the lake, where greenstone forms the shore, quartzite is commonly found, sometimes with pebbles or boulders of granite or slate enclosed, showing that these rocks existed before the quartzite. Near the southwest end of the lake a cliff consists of slate, rising 50 feet, with a strike of 60° and a northwesterly dip, followed by quartzite to the top, which is at about 100 feet above the lake.

A portage 240 paces long leads southward from Whitefish lake to Serpent river, crossing greenstone at first and then a ridge of moraine. The river is 85 feet lower by aneroid.

Toward the north end of the lake, on location Y 352, a steep hill of greenstone

rises through the quartzite, and probably some ore has been found in connection with it, though we saw no workings.

The age of the quartzite which forms so much of the coast is probably Huronian, since in places it becomes conglomeratic and encloses rounded fragments of slate, probably from the Sudbury series, but possibly lower Huronian.

Bear Lake

The northwest arm of Whiskey lake is mainly enclosed in shores of drift, but its southwestern bay leading towards the outlet of Bear lake is of rock, chiefly greenstone rising as hills, but including patches of quartzite and slate. The most interesting outcrop is at the Reynolds mine, between Whiskey and Bear lakes, where copper ores occur at the contact between greenstone and the sedimentary rocks. On a hillside northeast of the mine, sloping toward Whiskey lake, one finds a section of 100 feet, consisting of 45 feet of impure limestone on top, followed by 20 feet of slate and probably 50 feet of conglomerate at the foot of the cliff. A little farther toward the shore quartzite appears to dip under the conglomerate. The series dips 15° to 20° to the southwest, and the outcrop is surrounded by greenstone and green schist except on the side toward Whiskey lake.

The portage follows Serpent river, draining Bear lake, with a rise of 21 feet toward the upper lake, and passes over greenstone, which rises as cliffs on each side. This belt of greenstone extends for an unknown distance southeastward and as a ridge for half a mile westward to a bay of Bear lake. A point just west of the upper end of the portage consists of thickly-bedded quartzite with a dip of 45° southwestward. Coasting northwestwards one encounters the rugged ridge of greenstone just mentioned followed by a bay on whose north shore greenstone and granite are found.

A long narrow peninsula stretching south from the western side of the bay is of quartzite. The shore beyond this toward the west is of red granite, which continues as striking cliffs for at least a quarter of a mile along the north bank of Serpent river, which enters at the head of the lake. On the south side there are cliffs of quartzite, which extends southeast to the bay leading toward Caribou lake, with a dip of 20° to the south or southwest. This is followed by conglomerate with boulders of granite, slate and other rocks, probably resting on the quartzite. A hill west of the portage shows 200 or 300 feet of slaty rock, with some greenstone on top. On the portage there are large boulders of fine-grained white limestone or marble, much purer than that mentioned near the mine. The shores of the lake toward the southeast, where not drift-covered, consist of quartzite or slate apparently penetrated in one or two places by greenstone.

Caribou Lake

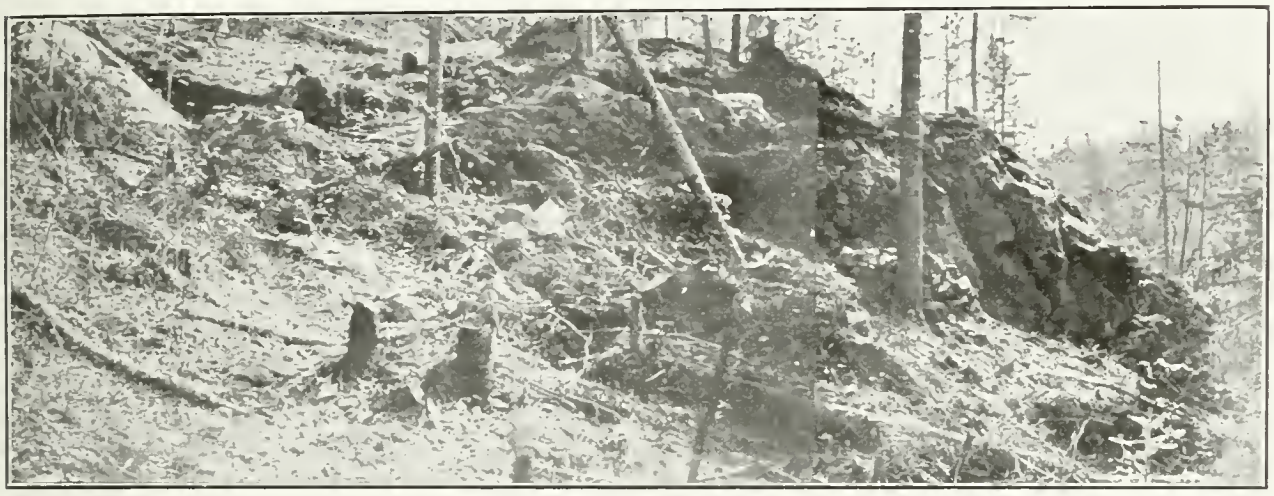
Two portages lead from Bear to Caribou lake, which is less than two miles long, but has very varied shores, rising to hills 700 feet high and presenting cliffs of at least 100 feet. The rocks represented include quartzite, slate, conglomerate, limestone and greenstone. The top of the highest hill, south of the southeast end of the lake, consists of conglomerate; and a cliff to the north on the opposite shore shows limestone with some slate forming a gentle anticline. Limestone collected on an island is compact, bluish-gray and shows conchoidal fracture. As it weathers rusty it must contain an appreciable amount of siderite. The greenstone contains copper ore in a few places, giving the occasion for the locations which were taken up on the lake.

McCool and Corner Lakes

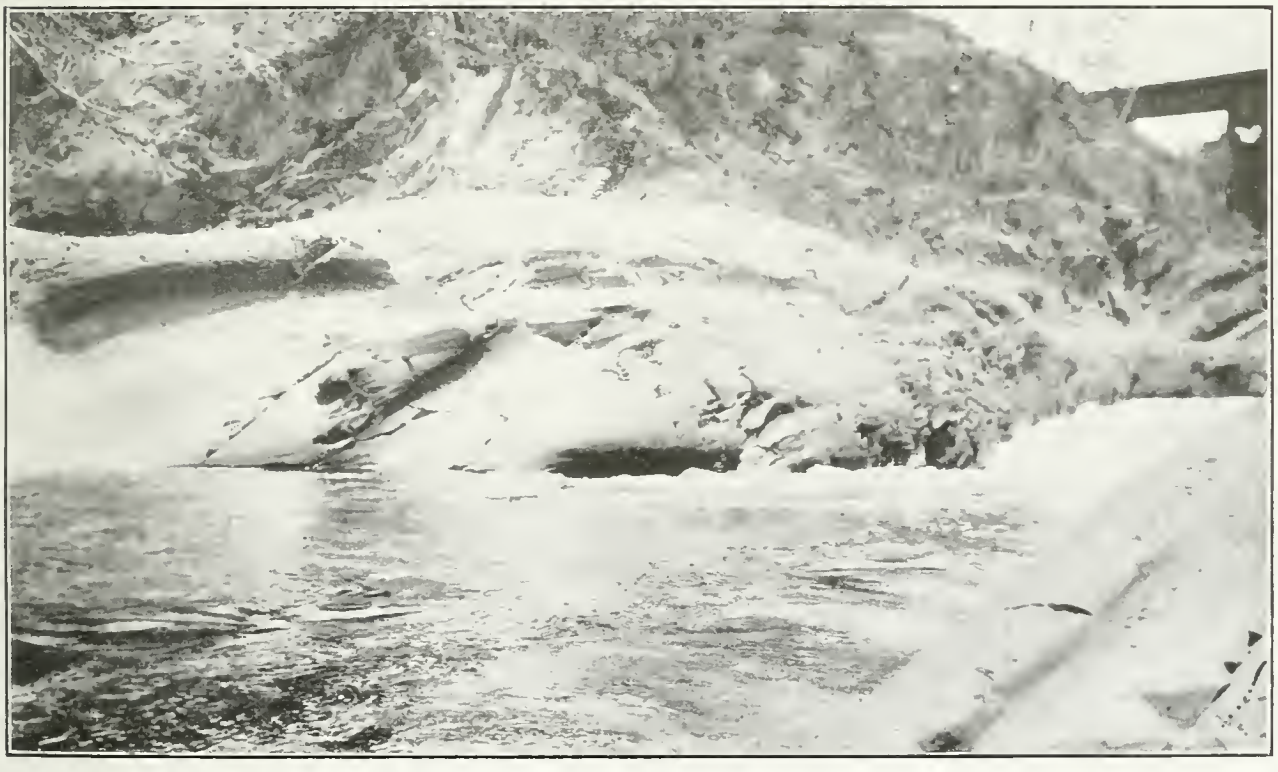
From the southeast end of Caribou lake a short portage leads south into McCool lake, which has a length of two miles from east to west and gives access from its west end to Corner lake, the last of the chain. The rocks which have been referred to on the other lakes are repeated here with the exception of limestone and with the addition of fine grained reddish-gray arkose. Quartzite with the usual gentle southwesterly dip

forms most of the northern side of McCool lake, with a mixture of slate, conglomerate and greenstone in other parts. The large island in the centre consists mainly of rugged greenstone.

The shores of Corner lake consist of the same rocks less regularly distributed. The locations on both lakes seem to have been taken up on quartz veins.



Ore outcropping on Reynolds property, as seen from blacksmith shop. Shaft is situated around the point on right.



Ice carving, Sable river.

Ore Deposits of the Region

More than a score of claims have been located on the group of lakes just described, and some of the lines were evidently freshly cut in the early summer of 1912. The earlier locations were taken up for copper[2] and the later ones for gold. Both metals occur and small amounts of cobalt ore have been found also. The property which has recently attracted most attention is the Payton, or as it is often called, Wilson's mine. This property on the west shore of southern Whiskey lake has been located for a number of years, and appears to have been taken up first for copper. About fifteen years

[2]Bur. Mines, XIV., Part I., pp. 64-67, and XV., pp. 69-70. Reports by W. E. H. Carter, then Mines Inspector.

ago a small shaft was sunk close to the shore by Mr. Teasdale, on a little deposit of copper pyrites in quartzite. The rock is distinctly bedded, with finer and coarser parts and some greenish-slaty seams, and has been more or less shattered and faulted. Five years ago a pit was sunk 20 paces inland, on a fault plane or shearzone, where a little smaltite and cobalt bloom may still be found on the dump.

The recent work carried on under the management of Mr. Art. Teasdale has been much more extensive, including a large amount of stripping and trenching, with a few quite large test pits. The ore as disclosd is rusty quartz containing, where not too much weathered, pyrite, pyrrhotite and a little copper pyrites and galena. Free gold could be seen at a number of places, and in general the ore looked promising in June, 1912; but the final test of its value was still to be made.

The workings included several hundred feet of stripping and disclosed quartz veins 2½ feet wide and less regular bodies of quartz of much larger size. Most of the ore occurred in slate, but some in quartzite.

The only other ore deposit on Whiskey lake that seemed to have importance is what is called Reynolds' mine, at the northwest end of the lake, on a hilly ridge between it and Bear lake. This is a deposit of green schist with copper pyrites near the contact of greenstone, with sedimentary rocks, including impure limestone. The ore contains much quartz and is widely diffused but with indefinite boundaries. The zone, including some infiltrated ore can be traced, it is said, for 1,000 feet with a southwesterly strike, but comparatively little of the ore seemed high enough in grade to work. It is stated that at one point a width of 30 feet of ore assayed five per cent. of copper. A shaft 50 feet deep ends in schist, the ore body, which is very irregular, dipping away from it.

Work was done on this property by Mr. Charles Baycroft for Major R. G. Leckie, but this ceased in October, 1910, and will probably not be resumed before a railway outlet is provided.

On the southwest side of Caribou lake, near its southeastern end, rich copper ores have been found in boulders of morainic origin, and some work has been done in the way of stripping with the aim of tracing up the ore-bearing blocks to their source in the bed rock. The boulders are of quartzite, and in one case a shaft sunk 25 feet disclosed quartzite also, but much poorer in ore. A little cobalt bloom occurs on the quartzite of the dump. High on a hill side some hundreds of yards to the southeast of the small shaft more quartzite boulders with very rich ore have been found as parts of the boulder clay.

Toward the west end of McCool lake, on the north side, a long quartz vein has been exposed by stripping extending several hundred feet. The quartz is sometimes five feet wide and is often rusty through the weathering of pyrite. Occasionally, specimens are rich in copper pyrites, but no gold was seen. This vein has a strike of 70° and runs between quartzite on the north and slate or greenstone toward the south. A little tillite shows beyond the strip of quartzite on a ridge to the north.

In general, one may say of the region that promising-looking quartz occurs at a number of places, but that free gold was seen only on the Wilson properties on Whiskey lake. Copper pyrites occurs at numerous places, and may be present in large enough quantity near the portage from Whiskey to Bear lakes to be of importance if railway communication is provided in the future. Small traces of cobalt minerals are found in quartzite on Whiskey and Caribou lakes, but no silver has been observed, so that they are probably of no importance.

It may be that an island of limestone on Caribou lake may some day be of value in a region so devoid of limestone in general, but this, of course, would require railway connections, of which there is at present little prospect.

THE MASSEY COPPER MINE AREA

By A. P. Coleman

Introduction

Copper ores have been found in many parts of northern Ontario, partly in association with nickel, and partly as independent deposits; but at present the only copper mined in the Province comes from the nickel-copper deposits of Sudbury, in which nickel is the more important metal. Of mines opened for copper alone within recent years the Massey and Hermina mines in Salter township are those on which most work has been done. In accordance with the instructions of Mr. T. W. Gibson, Deputy Minister of Mines for Ontario, the geology of the area, including these two mines, was studied by the present writer during the summer of 1912.

The Massey mine, or Massey Station mine, has been known for about thirteen years, and the history of its development may be found in several reports of the Bureau of Mines from 1901 to 1907.[1]

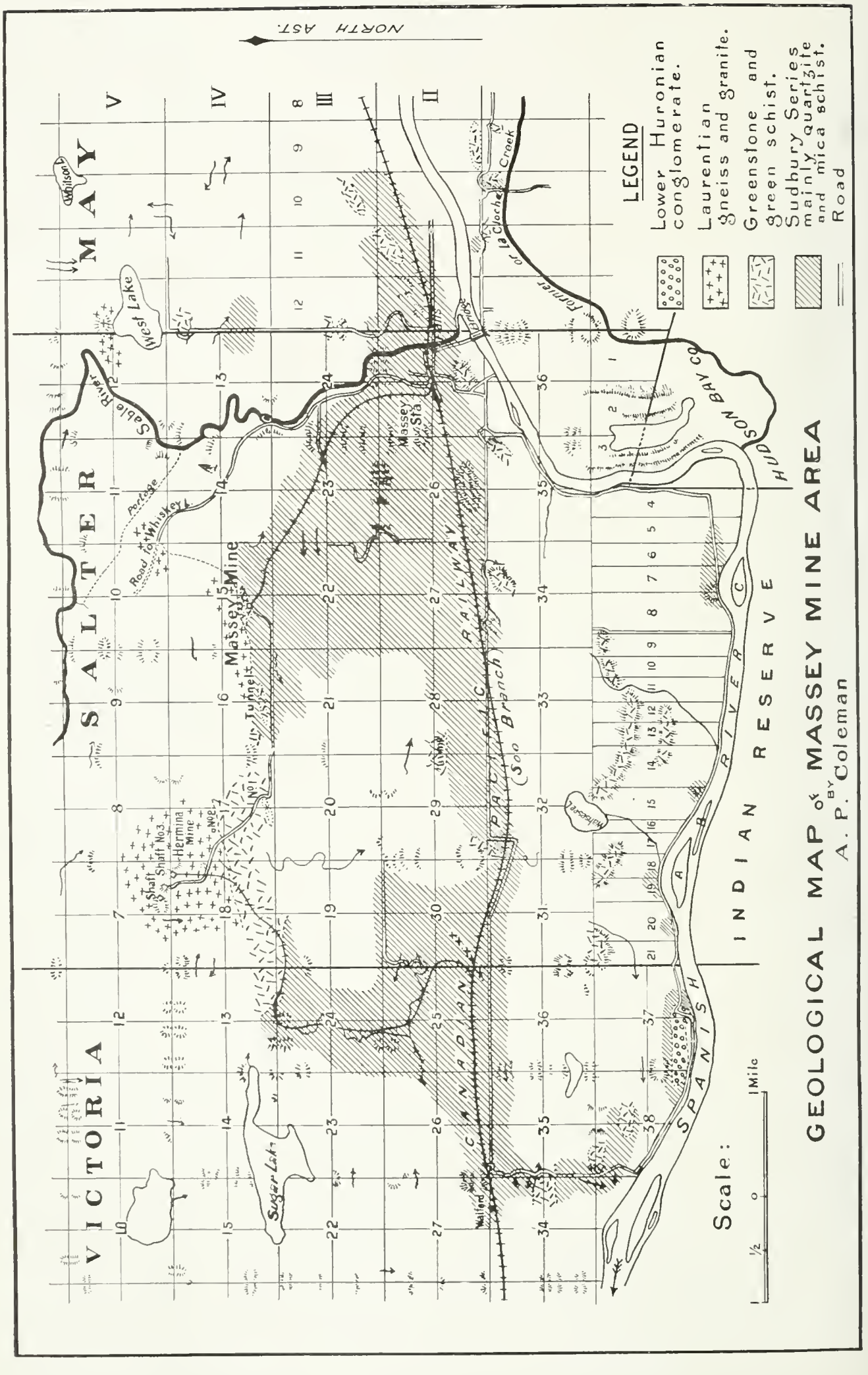
As stated by the Inspector of Mines, Mr. C. De Kalb, in 1900, the copper-bearing deposits were first traced on the surface by test pits for a mile east and west a little south of the contact of granite with green schist, and a shaft was sunk 80 feet on the main deposit. In later years the shaft was deepened to 550 feet and on seven levels more or less stoping was carried on, furnishing some thousands of tons of ore. Part of this was shipped to Copper Cliff and to Victoria Mines for use in connection with the smelting of the nickel ores, but apparently was not entirely suitable as a fluxing mixture. A plant was then erected in 1904 for treating the ore by the Elmore oil concentrating process, but this proved unsuccessful, and in 1907 the mine was closed down.

The Hermina mine was opened in 1903, and a shaft was sunk to a depth of 500 feet. In 1908 a smelter was constructed at Thessalon, partly to treat the Hermina ores and partly for custom work, but both mine and smelter have been closed down for some years. Both the Massey and the Hermina mines are connected by short railways with the Sault branch of the Canadian Pacific, the Massey mine branch ending at the station of the same name three miles southeast, and the Hermina branch, 4½ miles long, ending a little east of Walford, the next station beyond Massey.

Topography

The township of Salter, which includes the Massey and Hermina mines, extends northwards from Spanish river, here at the level of Georgian bay, which it enters a few miles to the west. The southern third of the township shows mainly old lake and river deposits, partly swampy and partly sandy, but largely consisting of good farming land rising not more than from 20 to 100 feet above lake Huron. The flat farm land along the river side, with an elevation of 620 to 640 feet above sea level, probably corresponds to one of the old Nipissing beaches; but to the north there are two terraces reaching elevations of 710 and 870 feet, which belong to lake Algonquin. Along the valley of Sable river, which comes into Spanish river from the north at the village of Massey, these terraces are of sand, deposited as delta materials by the river itself at the various old lake levels; and the valley of the Sable shows good sections through the sandy lake deposits. Farther to the west the flat alluvial deposits are loamy or clayey in character. The comparatively low plain of sand and clay is often very level along the north shore of lake Huron, and above it rise steep hills of the harder rocks, generally as ridges with the usual trend of the rock structures of the region, about north 70° east. These hills are often isolated and rise island-like above the farm lands to heights sometimes reaching 200 feet or more. The highest hills are generally of

[1]Bur. Mines, Ont., Vol. X., p. 120; Vol. XI., p. 81; Vol. XII., pp. 97-8; Vol. XIII., p. 78; Vol. XIV., p. 61; Vol. XV., p. 67; and Vol. XVI., p. 68.


NORTH AST.
MAY
SALTER
VICTORIA
INDIAN RESERVE
Sable River
West Lake
Portage
Road to Whiskey
Massey Mine
No. 1 Tunnel
No. 2
Shaft No. 3
Hermina Mine
Massey Sta.
Formerly La Cloche
Creek
Sugar Lake
Walford
Whitefish
Spanish River
Canadian Pacific Railway
(Soo Branch)
Hudson Bay Co.
LEGEND
Lower Huronian conglomerate.
Laurentian gneiss and granite.
Greenstone and green schist.
Sudbury Series mainly quartzite and mica schist.
Road
GEOLOGICAL MAP of MASSEY MINE AREA
BY A. P. Coleman
Scale:
1 Mile
½ 0 1

some variety of greenstone, though quartzite also forms hills, and toward the north of the township there are the usual rounded granite hills of a Laurentian country.

A large part of the township along the Spanish river and the Sable is of alluvial deposits, so that it is not possible to trace geological boundaries for any great distance continuously; but there are many and excellent outcrops of rock in the hills and also along the bed of Sable river.

No detailed map of the geology of the region has been published, though the topography was worked out more or less completely by land surveyors and by Dr. Bell and his assistants, and was represented on the Missasaga topographic sheet, No. 129, of which the Geological Survey was good enough to furnish a proof. It shows no details in Salter township which are not found on the original township map prepared by Chas. Unwin in 1861, with the addition of the "broken front" prepared by T. O. Bolger in 1884.

Since the railway from Hermina mine to Walford extends into Victoria township west of Salter, the eastern part of that township has been examined also. In general character it corresponds to the description given above. Most of the arable land in both townships is now occupied by prosperous-looking farms.

The whole of the area described is drained by Spanish river and its tributary Sable river, which with their bends enclose most of Salter township on three sides. There are fewer small lakes than in most parts of northern Ontario, probably because the widespread deposits of the great ancient lakes mentioned above filled up most of the original basins.

General Geology

So large a proportion of Salter township and of the townships of Victoria to the west and May to the east is covered with old lake deposits that the relations of the solid rock formations are not always clear. In many cases there are isolated hills of a single kind of rock separated by drift from the next hill, which may be of a different kind. In general, the solid rocks may be divided into sedimentary varieties and eruptives, the latter often penetrating the former. The sedimentary rocks undoubtedly belong to two distinct ages, since one group of them contains pebbles of the others.

Most of the sedimentary rocks are older than the greenstones and granites which penetrate them, and the granites are of the type generally classed as Laurentian. They are, therefore, apparently Pre-Laurentian. The later group of sediments, which covers only a small area, includes granite pebbles and boulders and is clearly Post-Laurentian. The Pre-Laurentian rocks must belong either to the Sudbury series or the Keewatin, and their general relationships correspond best to those of the Sudbury series.

The most natural classification is the following:

Pleistocene	Old lake deposits of sand and clay. Glacial deposits of boulder clay.
	Great interval.
Archæan	Lower Huronian—conglomerate and quartzite. Unconformity. Laurentian—granite and gneiss. Greenstones. Sudbury series—quartzite, phyllites, mica schist, etc.

Beginning with the oldest rocks, the Sudbury series consists of a band of sedimentary deposits running east and west through the townships with a width of four miles, in several places, however, more or less broken by ridges of greenstone, which have pushed up through them. As the beds are always steeply tilted, from 60° to the vertical, the thickness is great, certainly thousands of feet: but the strike and dip vary a good deal from place to place, and there has probably been folding and faulting, so that the real thickness may be much less than four miles, perhaps not more than one. The rocks here classed as belonging to the Sudbury series differ considerably from the typical Sudbury series as shown 50 miles to the east, mainly in being more

metamorphosed. Instead of quartzite showing its original bedding and cross-bedding, the rocks near Massey are usually quartz schists or mica schists with a good deal of mica, though there are some less changed quartzites. The schistose varieties are often coarse-textured with large flakes of muscovite which glitter in the sun. In places they contain the usual minerals of contact metamorphism, such as staurolite and garnet, features which cannot always be directly explained by the presence of outcrops of eruptive rocks in the neighborhood. Beside the more quartzose sediments there are smaller amounts of slate passing into phyllite and mica schist. Slate may be interbedded with quartzite; and in some places green chloritic schists are interbanded with mica schist.

The hills and ridges of greenstone which rise above the plain are at least in some cases younger than the Sudbury series, since they have heaved them up in a laccolithic way. It may be that some of the green schists are older and belong to the Keewatin, though this has not yet been proved.

The greenstones are often so changed into chloritic and hornblendic minerals that their original composition is uncertain, but anorthosite, hornblende, porphyrite, and diabase can sometimes be distinguished. The greenstones pass into green schists in places.

The granites and graintoid gneisses are pink in color and range from ordinary medium-grained rock to pegmatite. They make up a large part of the northern side of the townships and may be looked on as Laurentian. They are distinctly younger than the quartzite and also than the greenstone, both of which are penetrated by granite dikes and are carried off as fragments by the granite. In only one case has granite been found within the broad band of rocks of the Sudbury series, near mile 16 on the Sault railway crossing the boundary of Salter and Victoria townships. Here it forms a dike which can be traced for half a mile through quartzite, which it has penetrated and lifted up. The dike is 20 or 30 paces wide and is itself cut by irregular masses of pegmatite.

The copper ores of the Massey and Hermina mines are either in granite or not far from it, and may have been introduced by magmatic waters from the eruptive.

The Lower Huronian is confined so far as known to the north shore of Spanish river near the boundary of Salter and Victoria townships. A belt of quartzite or arkose containing scattered pebbles and boulders of granite and quartzite here runs for half a mile east and west, forming a prominent ridge. It is in places 900 feet wide with a band of quartzite to the north and flat fields of old lake deposits to the south. No stratification has been observed, and the outcrop is probably a somewhat thin flat sheet of tillite. Its matrix is much like that of the Lower Huronian north of Ramsay lake at Sudbury, but it is far less crowded with boulders.

It may be that a fine-grained arkose found a mile and a half northwest, to the east of the road from Walford, is of the same age. It contains no mica, and differs in appearance from the ordinary quartzite.

The Pleistocene of the Massey region consists of boulder clay in valleys between the rock hills toward the north above the old lake levels, and of stratified sand and clay below these levels toward the south. The sand extends for some distance on each side of Sable river, forming barren plains; but outside of this belt clay predominates. It is pale gray and well stratified and makes fair farm land. It burns to a pale red brick at a point a mile or two northeast of Massey, but some parts of it are calcareous enough to contain lime concretions.

The Massey Copper Mine

A railway three miles long connects Massey on the Sault branch with the Massey mine, running first north and then bending toward the northwest, the workings of the mine being in the southwestern quarter of section No. 15. The railway runs over old lake deposits except for half a mile of mica schist, where the line bends northwest. Beyond this no solid rock shows itself until the mine itself is reached, where a low

mound rises above the drift for 180 yards, consisting of quartzite toward the southeast and green schist to the northwest, both more or less brecciated and crossed by quartz veins. The bedding of the quartzite has a strike of 60° east of north. The rock dump consists mainly of green schist with a good deal of reddish-gray quartzite and some massive vein quartz. A hundred yards to the east there is another patch of quartzite and crush conglomerate, but otherwise the surface in all directions is drift-covered. Say 200 or 300 yards northwest at the outlet of a pond which was dammed for a water supply, a glaciated surface of greenstone shows itself; and a quarter of a mile through the woods to the northeast there is green schist with a little slate and quartzite on the flanks of a hill whose top consists of red granite. The greenstone and granite are the nearest eruptive rocks to be seen, but the covering of drift may hide granite or greenstone in the immediate vicinity of the mine.

There is little ore on the dump, chalcopyrite being the only visible copper-bearing mineral, and it seems to be associated with the green schist rather than the quartzite.

The rockhouse is connected by tramway with the concentrating plant a short distance to the west, but at the time of my visit the caretaker was away, and the buildings were locked up.

Reports of the Mine Inspectors during the years when the mine was in operation, as mentioned on a former page, give brief accounts of the results of mining. The ore was reported to run from 3½ to 6 per cent. of copper with traces of gold in 1901, when the mine was first opened;[2] but in 1902, when the shaft had been sunk to 230 feet, 3,000 tons of ore are said to average 3½ per cent.; and in 1906, a year of two after the Elmore oil plant had been installed, it had fallen to 2.7 per cent.[3] In 1904 the shaft is reported to have reached a depth of 550 feet with drifts from seven levels. It had an inclination of 87° to the north, and the ore bodies are said to be overlapping lenses in slate.[2]

Stripping is said to have shown the vein to extend for a mile; but only one of the other workings appears to have been of much importance. Half a mile west of the main shaft and 230 paces west of the line between sections 15 and 16, some stripping was done about 200 paces north of the road to Hermina mine. The rocks exposed on successive east and west ridges are alternating slate and quartzite with a nearly vertical dip. The stripping, which is extensive, shows from 4 to 6 feet of ore, containing small quantities of chalcopyrite. Two hundred or 300 paces north, after an interruption of drift, the east and west range of granite hills rise much as was described near the main shaft.

A quarter of a mile west of this stripping, where the Hermina road touches a hill of rock to the north, a large amount of work was done, including the driving of a tunnel 120 feet into the hill side. The hill consists mainly of quartzite, but with interbanded green schist, and quartzite extends north for 250 paces, beyond which there is drift. The rock dump at the tunnel shows mainly green schist with vein quartz enclosing some chalcopyrite.

The Hermina Copper Mine

A large amount of work has been done at the Hermina mine where several shafts were sunk along a distance of more than a mile, running from southeast to northwest. The nearest workings to the Massey mine are on a hill about two miles to the west, where shaft No. 1 was sunk to a depth of 400 feet, according to Mr. John Thomann, who was in charge of the property as caretaker. The shaft is in green chloritic schist, but a belt of coarse quartzite runs for 200 paces north 70° east, with a vertical dip a little to the southwest. The green schist is cut by veins of quartz with some chalcopyrite.

Shaft No. 2 is a little northeast of the road on quartz veins in coarse granite, and is said to be about 25 feet deep. Two other small openings in granite with some greenstone occur a little southeast.

[2]Bur. Mines, Vol. X., p. 120. [3]Ibid. Vol. XV., p. 67. [4]Ibid. Vol. XIII., p. 78.

No. 3 shaft, the most important of the Hermina workings, is said by the caretaker to be 500 feet deep, and a large amount of drifting has been done at different levels. The shaft is in a valley between hills of granite, including masses and bands of green schist. No quartzite was observed here. The granite is partly fine grained and partly coarse and pegmatitic. It has entirely the appearance of the Laurentian; and from the low hill tops one can see the pinkish granite and gneiss extending for a long distance to the north.. The rock dump shows much green schist and quartz.

A fifth of a mile northwest of shaft No. 3, there is another small shaft on a large quartz vein in granite, with strips of green schist. Granite and greenstone extend for a mile southwest from No. 3 shaft along the railway to Walford, and the whole surroundings of the mine suggest Laurentian and Keewatin rocks, except for a small patch of quartzite on the road between No. 3 and No. 2 shafts. The presence of this quartzite and of the strip near No. 1 shaft make it probable that both granite and greenstone are later than the Sudbury series.

From the descriptions just given it will be seen that the Massey and Hermina copper deposits follow roughly the contact of the granite with the sedimentary series, but that the ore is mainly found in green schist. They are not contact deposits in the strict sense, however, but may occur a quarter of a mile north or south of the actual contact either in the sedimentary series or in the mass of eruptives. There has been a considerable amount of faulting and fracturing of the rocks along this line, as shown by crush breccias and the numerous quartz veins, though the ore itself is more apt to accompany the schist than the quartz.

HUDSON BAY EXPLORING EXPEDITION 1912

BY

J. B. TYRRELL

M.A., M.Inst.M.M., F.G.S., &c.

Itinerary

On the 18th of April 1912 I received instructions from The Honourable the Minister of Lands, Forests and Mines of the Province of Ontario to organize a party, including a properly qualified Dominion Land Surveyor and assistants, and to proceed at as early a date as practicable direct to Port Nelson at the mouth of the Nelson river on Hudson Bay, and after due investigation to carefully select the lands, waterfront and easements to which the Province of Ontario is entitled under an agreement with the Province of Manitoba, ratified by an Order of the Privy Council of the Dominion of Canada, dated the twentieth of February, 1912.

After these lands had been selected, they were to be properly and accurately surveyed.

As much information as possible was to be obtained about the strip of country lying within fifty miles of the shore of Hudson Bay and extending from the southeastern bank of Nelson river to the western boundary of the Province of Ontario.

And, finally, if possible, I was to return home through that part of the District of Keewatin added by the Act of Parliament of Canada of last session to the Province of Ontario, and now known as the District of Patricia, obtaining such general information as to the character, resources and possibilities of this district as it might be possible to procure in the time at my disposal.

In accordance with these instructions, I engaged Professor Lewis B. Stewart, Professor of Surveying and Geodesy in the University of Toronto, as surveyor, and Mr. W. B. McPherson, B.Sc., as assistant surveyor and chainman, and at the same time made arrangements for an assistant geologist to go by ship to Port Nelson in order to accompany me on my journey home through the District of Patricia. I also engaged Mr. Hugh McDiarmid, of Maxville, Ontario, who had already spent some years on Hudson Bay, as a chainman and canoeman.

On the twenty-seventh of May, 1912, accompanied by Messrs. Stewart and McPherson, I left Toronto and proceeded to Nepigon, where, through the kind assistance of Mr. William McKirdy, four good Indian canoemen were secured, and thence the party proceeded to Selkirk, Manitoba. Here it was necessary to wait for a few days, for the steamboats declined to start for the north end of Lake Winnipeg until it was reasonably certain that the ice had disappeared from it. On the fourth of June we took passage on the steamer "Wolverine," belonging to the Northern Fish Company, and started from Selkirk. The boat was loaded with fishermen and their supplies for the summer, and it was necessary for us to stop at several fishing stations on the shore and islands of Lake Winnipeg on the way north. Nevertheless, we reached Warren's Landing, at the north end of this lake, where the Nelson river flows out of it towards Hudson Bay, on the morning of the sixth of June, and on the afternoon of the same day we continued down the Nelson river to Norway House, where the Hudson's Bay Company has one of its oldest and most important trading posts.

Here it was necessary, if possible, to obtain two more canoemen, for we had three canoes and I needed to have two expert Indian canoemen in each canoe. We had

already obtained four such men at Nepigon, but they knew nothing of the waters ahead of them, and I had purposely refrained from engaging more canoemen in Nepigon in order to be able to take two men from Norway House who knew the river from there to York Factory, with its rapids, falls and portages.

Unfortunately others wanted to go to Hudson Bay as well as ourselves. The number of canoemen at Norway House was limited and there was keen competition for them, so that a delay of several days occurred here before men could be obtained. As far as possible the time was employed in correcting instruments and getting everything in order for immediate work when we should reach the field of our proper labours.

Photo by J. B. Tyrrell, July 28, 1912.
Camp at extreme high tide, east shore of Nelson river.

Norway House to Hayes River

Having at length engaged two Indians, we left Norway House on the morning of the twelfth of June in three canoes, with such provisions as would be necessary to supply us for a month, and started northward down the Nelson river to the mouth of the Echimamish, up the Echimamish to its head, across the narrow rocky divide which bounds the waters of the Nelson river on the east, and then down the Hayes river to York Factory, the great historic trading post of the Hudson's Bay Company, built on the west bank of the river near its mouth, making a track-survey of our route, the distances on the rivers and smaller lakes being estimated, while the lengths of the larger lakes were measured with a boat log.

The Shamattawa river flows into the Hayes river sixty miles from where this latter stream empties into Hudson Bay, and as we were to explore a strip fifty miles wide from the shore of the Bay southward I decided to begin our survey at this point. Professor Stewart therefore began a careful survey of the Hayes river downwards from

the mouth of the Shamattawa, taking his bearings from the true meridian with a transit, and measuring his distances with a rod and stadia hairs, checked in several places by careful chainage. This survey, which shows both banks of, and the islands in, Hayes river, as well as the mouth of the Nelson river, is shown on the annexed map on a scale of 10 miles to an inch.

At the same time I went up the Shamattawa river for a few days to investigate the character of the country through which it flows.

Our journey from Norway House to the mouth of the Shamattawa, a distance of 260 miles, had been rather slow, as we were constantly delayed by head winds and stormy weather, but on the twenty-seventh of June Professor Stewart started his survey downwards from that point and continued it from that time until July 12th, when he reached the mouth of Hayes river. During the latter part of the time in which Professor Stewart was so occupied, I was at York Factory and on Nelson river making investigations as to the character of the surrounding country, and also of the country extending eastward, obtaining all the information that it was possible to obtain from the Indians who have their hunting grounds in this latter district.

Photo by J. B. Tyrrell, July 25, 1912.
Shore at low tide on the east side of Nelson river. Beach of rounded gravel.

Locating Ontario's Frontage

After Professor Stewart had made the survey of the Hayes river from the Shamattawa river to its mouth, he continued it round the point which separates that stream from the Nelson river, up Nelson river to Seal Island and down its west shore to Flamborough Head. As soon as this was completed I chose a frontage of ten miles on the east side of Nelson river, and Professor Stewart marked it with proper posts and mounds, which I also signed with him. We then cut lines back through the forest for a distance of a mile at the north end of the ten mile strip, and for five and a half miles at its south end, the eastern portion of this latter line crossing the Hayes river and connecting with the stadia survey which had been made of the banks of this latter stream.

After choosing the frontage for the Province of Ontario on the Nelson river it was necessary, in outlining a strip of land five miles wide from that frontage eastward to the western boundary of Ontario, to find a feasible crossing place for a railway across the Hayes river. On account of the shifting character of the channel of this stream near its mouth, and of the enormous floods and ice-jams to which it is occasionally sub-

jected in the spring, such a crossing place could not be found nearer than thirty-three miles from Hudson Bay, not far from the junction of a tributary called the Pennycutaway river which empties into the Hayes river from the west.

Therefore, as it was necessary to go up the Hayes river at least 33 miles before a crossing for a railway could be found, it was also necessary for me to bend the five-mile strip of land southward from the mouth of the Nelson river along the west side of the Hayes river at least as far south as the mouth of the Pennycutaway, and the survey of this strip so chosen was marked by substantial posts at various conspicuous places, as shown on the accompanying map of the lower portions of the Hayes and Nelson rivers.

It was impossible for me to explore the strip of land eastward from the Hayes river to the boundary of the Province of Ontario in the remaining time at my disposal, but I made a trip in a canoe up the Machichi or Fourteen river, which flows northward into

Photo by J. B. Tyrrell, Aug. 17, 1912.
Machichi river east of Hayes river, showing cliffs of till.

Hudson Bay across the country to the east of Hayes river, and obtained a fairly clear idea of the character of the country along its banks. This information, along with such other information as I was able to obtain from Indians and white men living in the country and from an inspection of the shore of the Bay itself, is set down on a later page of this report and on the accompanying map.

By the time Professor Stewart had completed the survey of the land chosen for the Province of Ontario in the vicinity of the mouth of the Nelson and Hayes rivers the summer was almost over, and it was necessary for him to return to Toronto to resume his duties at the University, so, accompanied by Messrs. W. B. McPherson and H. McDiarmid and the Indians from Norway House, he returned up the Hayes river to Norway House and thence down Lake Winnipeg to Selkirk and home to Toronto.

On the twentieth day of August the steamship "Stanley" arrived at York Factory, bringing Mr. P. E. Hopkins as assistant to accompany me on my journey homeward.

The annual steamer which brings out the supplies for the Hudson's Bay Company at York Factory had not yet arrived, and some lines of supplies, especially bacon and meat, had run short at this central depot. Consequently the Company was prevented

from furnishing the usual supply of meat to its trading posts on the Severn river, which I was about to visit. This was particularly unfortunate for us, because the bacon which had been sent to me on the steamer "Beothic" and delivered to me at the mouth of the Nelson river, was almost all decomposed and quite unfit for use when it was delivered. In spite of its bad condition, however, we were obliged to do the best we could with it and to use parts of it.

From York Factory Home via Severn River

On the twenty-sixth of August I left York Factory, accompanied by Mr. Hopkins and the four Indian canoemen from Nepigon, with two canoes, and took passage in a small sail-boat of the Hudson's Bay Company along the shores of Hudson Bay to Fort Severn, where we arrived eight days later.

On the 4th of September we started southward from Fort Severn in our two canoes heavily laden with provisions, for it was uncertain when or where we would be able to get any further supplies. We ascended the Severn river, hauling our canoes with lines, a distance of fifty-six miles, to the mouth of the Fawn river, which is a beautiful clear stream 150 yards wide at its mouth, with terraced banks 80 feet in height. Thence

Photo by P. E. Hopkins, Aug. 28, 1912.
Shore of Hudson Bay, near Cape Tatnam.

we ascended Fawn river, walking on the bank and hauling our canoes as before for a further distance of 180 miles, but through much of this distance the journey was made very laborious by the fact that the weather was rainy and stormy and the river was swift, deep and narrow, and overhung with tall willows, so that our progress was often very slow, the tracking line being constantly entangled in the overhanging willows. Fifteen days were occupied in this journey, and at the end of that time we welcomed the occurrence of heavy rapids, past which it was necessary to carry our canoes and supplies, but between which the water was not so swift as before, and it was possible to make some progress with our paddles.

Trout Lake

On the twenty-first of September Trout lake was reached and we had the pleasure of meeting Mr. H. C. Moir, the gentleman who is in charge of the Hudson's Bay Company's trading post for that Company. Here we were able to replenish our supply of flour, but it was impossible to obtain any meat, and our own supply of meat at that time consisted entirely of partly decomposed bacon.

Up to this time we had travelled from Severn House without anyone who had any local knowledge of the country, and guided entirely by the map on the scale of sixteen miles to the inch published by the Geological Survey of Canada. From Trout lake southward across the height of land to Cat lake, on the waters of the Albany river, the route

Photo by J. B. Tyrrell, Sept. 4, 1912.
Dwelling house at Fort Severn, near the mouth of Severn river, District of Patricia, Ontario.

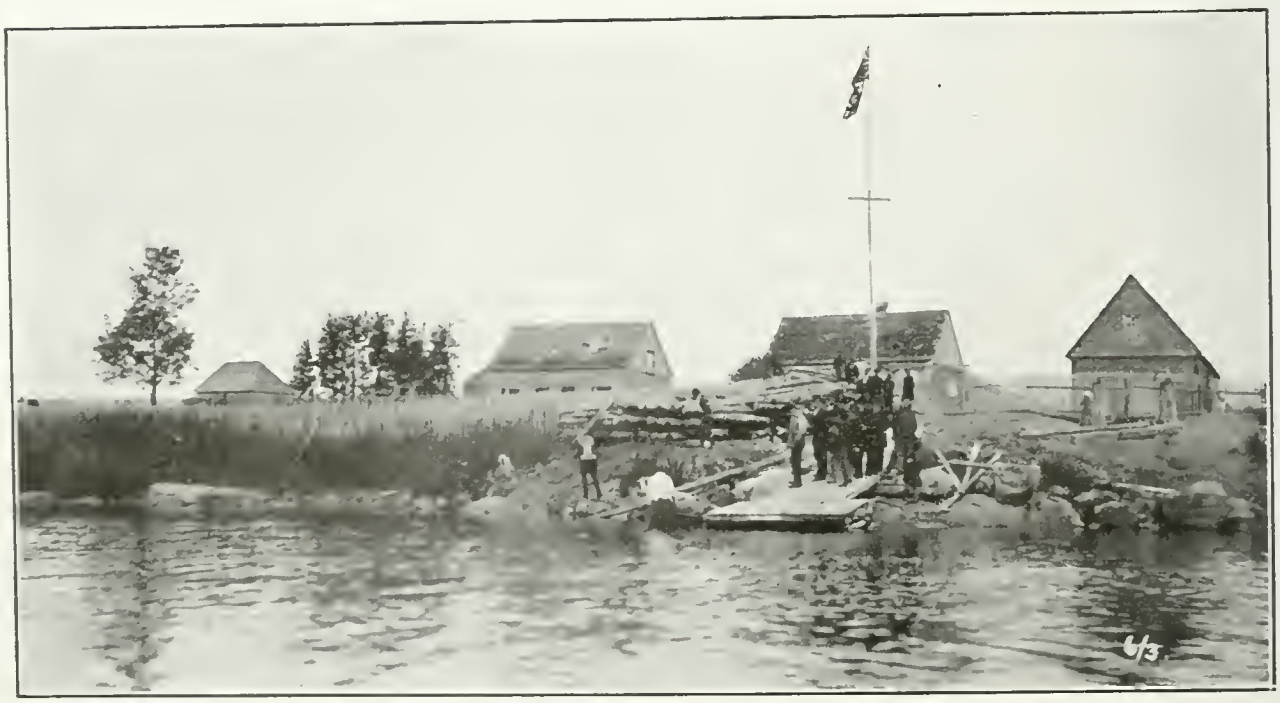


Photo by P. E. Hopkins, Sept. 24, 1912.
Hudson Bay Company's post at Trout lake, District of Patricia, as seen from the lake.

travelled by the Indians was not known, and as we wished to follow it, it was advisable, if possible, for me to employ an Indian here to go with us and show us the way by which he was accustomed to travel. The Indian obtained for us by Mr. Moir was a man of considerable intelligence named Adam Thunder, and on the morning of September the twenty-fourth we started across Trout lake with Adam and his wife and two children in a canoe of their own as guides.

Making for Cat Lake

From Trout lake we entered a small stream named Mishwamágan or Red Sucker river, and ascended it southward to its source in several small lakes, from one of which we carried our canoes and contents across to Kwiuswagami lake and thence into Makoop lake, which empties by an independent outlet westward into Severn river. Makoop lake is evidently good fishing ground, and some Indians have here two substantial log houses

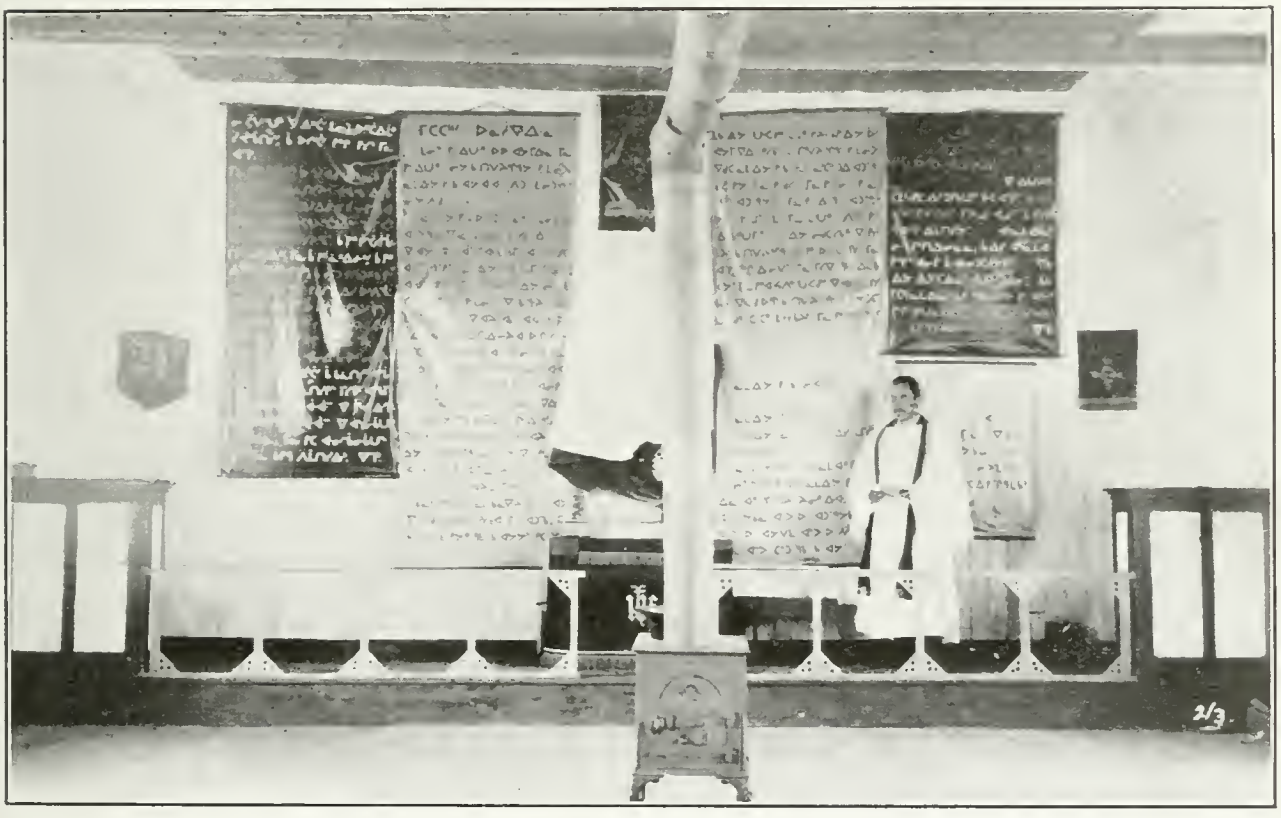


Photo by P. E. Hopkins, Sept. 24, 1912.
Interior of mission church at Trout lake, with Rev. Mr. Dick on right. The Lord's Prayer, etc., in Indian characters.

in which they live in the winter, although they move about from one part of their fishing ground to another in the summer.

From Makoop lake, instead of turning down stream, we entered Negigamo or Otter river and ascended it for a day's journey, when, though it was still a stream of considerable size, we left it and turned westward across a portage somewhat more than a mile in length to another tributary of Severn river, which, at the point we reached it, was ninety yards wide with low swampy banks on both sides.

On this river Adam, our guide, decided to leave his wife and family with some friends or relatives whom he met, and to take a seat in one of our canoes, where he would be more useful to us, both by assisting in paddling, and, being close at hand, he would be able to give us information about the country from time to time as the various features were observed.

This river is also a tributary of the Severn, but Adam said that it had no particular name. I have therefore called it Ningitowa river taking the name of one of the lakes

Photo by P. E. Hopkins, Oct. 17, 1912.
Lunch time on the banks of Cat river.

Photo by J. B. Tyrrell, Oct. 4, 1912.
Woods at the north of unloading portage, north of Weagamow lake.

on its course. We ascended it for three days through many lakes and over numerous portages to a lake with a name too long for intelligent English pronunciation, but it means Big White Fish lake.

From the south side of this lake is a portage twelve hundred yards in length across a rocky hill to a small winding stream which in a short distance flows into Weagamow lake, and this lake in its turn discharges by another independent stream westward into Severn river, and is fed by two streams from the east and south, known respectively as the Caribou and Saskatchewáwa.

Weagamow lake also seems to be a good fishing ground, for there was a large band of Indians camped near the place where we entered it, engaged in catching a supply of fish to feed them through the autumn and winter.

From Weagamow lake I had hoped that our route was to take us down stream to the Severn river and thence southward up the main river, but in this I was disappointed,

Photo by J. B. Tyrrell, Oct. 7, 1912.
Sandy shore of Windigo lake.

for instead of turning down stream we entered Saskatchewáwa river and ascended it to a small lake named Agutua lake, from which a number of high sand hills may be seen forming conspicuous features in the landscape.

Windigo Lake

From the southwest side of this lake we made a portage three and a half miles in length, over one of these sandy hills to Windigo lake, the largest body of water that we had encountered since leaving Trout lake. This, too, is a favourite fishing ground for the Indians, and on its eastern shore they have some small houses around which were gardens, where potatoes had been grown, though at the time of our visit they had been dug and were stored away. Windigo lake also discharges westward into the Severn river by an independent stream, which, however, we were unable to visit, but we were told

by Adam that it flowed westward to Niskib or Goose lake, in which it was joined by Weagamow river, and from which the united streams flowed into Severn river. Passing through the lake we ascended a small river for about fifteen miles, when, by a series of long portages, we passed out of it and into the Cedar branch of the Severn river, which we reached at Little Cedar or Geechika lake, the northern limit of growth of cedar trees.

Thus, on leaving Trout lake, we had ascended a small stream to the higher land lying between the watersheds of the Severn and Wenisk rivers, on which are a number of lakes, and we had travelled southward on the western side of the height of land through a chain of lakes, instead of travelling continuously up the main branch of the Severn river. This route leads through small streams and over many long and swampy portages which are often poorly cut out, but the reason why it is used by the Indians instead of the main river doubtless is that it leads through lakes in which fish are abund-

Photo by J. B. Tyrrell, Oct. 9, 1912.
Sandy shore of Geechika or Little Cedar lake, with small cedar tree just behind the figure.

ant, and where game is probably moderately plentiful. Whether it is easier for large canoes to navigate than a route up the main river is uncertain, because the river is as yet largely unexplored.

From Little Cedar Lake we journeyed southward up a small winding stream and over many portages to the height of land dividing Severn from Cat river, which is one of the upper tributaries of Albany river.

Cat Lake

On the thirteenth of October, we paddled up to the Hudson's Bay Company's post on Cat lake, and were kindly received by Mr. Lawson, the store-keeper in charge for the Company, and, as he was supplied with provisions for the winter's trade, we were able to get such staples from him as were necessary to carry us through to our destination at Sioux Lookout, on the Grand Trunk Pacific railway. A supply of nice fresh

bacon was particularly welcome, as we had become very tired of living on rotten bacon, and besides we had that day eaten the last of both that and our sugar, so that we were quite ready for a new supply.

We were now in the country that had previously been surveyed by explorers from the Geological Survey of Canada, and, as the season was far advanced, we made all haste southward down Cat river to Lake St. Joseph, across a portage to Root river, down Root river to Lac Seul, and thence southward to Sioux Lookout, where we arrived on the evening of the twenty-third of October, seven weeks from the date when we left the mouth of the Severn river. Here our canoes were stored, the men were taken eastward to Nepigon and paid off, and I and my assistant, Mr. Hopkins, returned to Toronto.

Surveys

During the season the following surveys were made, namely:

Survey of the mouth of the Hayes and Nelson rivers, with transit and chain, rod and stadia ..... 110 miles.

Photo by P. E. Hopkins, Oct. 14, 1912.

Our canoemen after arrival at the Cat lake trading post, with the trader and his boy on the right.

Track surveys where the distances on running water were estimated; on quiet water were measured with a Kay boat log; the lengths of portages were measured by pacing; the directions were taken with a compass checked by numerous observations for variation; and the whole survey was checked by numerous observations for latitude taken in a mercurial artificial horizon with a sextant of 7-inch radius.

		miles.
Echimamish river	water	36
	2 portages	
Hayes river, from source to Shamattawa river	water	260
	27 portages	4.25
Shamattawa river	water	40
Machichi river	water	20
	portages or on foot	5
Severn river to Trout lake post	water	285
	17 portages	2.25

		miles.
Severn river and tributaries; above Trout lake post	water	200
	57 portages	19.75
Albany river waters	water	20
	10 portages	3
In addition to which we examined the following routes, though without making definite surveys:		
Shore of Hudson Bay, Nelson river to Severn river		240
Albany and Winnipeg rivers	water	180
	19 portages	2.75
Total		1,428.00

DISTRICT OF PATRICIA

Physical Features

The District of Patricia is situated a short distance east of the geographical centre of Canada, between north latitudes 50° and 57°, and west longitudes 81° 30′ and 95° 15′, being bounded on the west by the Province of Manitoba, on the south by the older districts of Ontario, from which it is separated by the Albany and Winnipeg rivers, and on the north and northeast by Hudson Bay.

It is roughly triangular in shape, with a greatest length in a N.E-S.W. direction of 630 miles, and a greatest width in a N.-S. direction of 390 miles, and it has an approximate area of 150,000 square miles, or about one-fourth larger than the combined areas of Great Britain and Ireland.

It lies entirely within the drainage area of Hudson Bay, most of its surface being drained directly into the Bay through the Severn, Winisk, Trout, Ekwan, Attawapiskat and Albany rivers, though there is a small area in the southwestern portion of the district which is first drained westward into Lake Winnipeg, before its waters find their way by the Nelson river into Hudson Bay.

It has a shore line on Hudson Bay of 600 miles. The shore is low and flat, and for most of its length is marked by a beach of sand and gravel. From this beach the water recedes for a long distance at low tide, leaving a tidal flat which in places is hard and sandy, while in other places, especially near the mouths of rivers, it is soft and muddy, and is often dotted with boulders.

Back from the beach the land rises very gently in an alternating series of marshes and gravel ridges, the latter of which represent old shore lines when the land was lower than it is at present. The marshes are covered with grasses and sedges, for the forest does not usually descend below a line several miles distant from high water mark.

Low points of limestone are said to be exposed on the shore west of Cape Henrietta Maria, but elsewhere the beach is of sand, gravel, or mud, without sign of rock in place.

The District is a fairly distinct physiographic unit with its highest portion, consisting of a rocky granitic plateau with an elevation of 1,500 feet above the sea, in north latitude 52°, west longitude 92°. From this elevated area all the principal rivers in the district take their rise, and radiate to the several points of the compass, though the water from all of them finally reaches Hudson Bay.

Last summer our course across the district from the mouth of the Severn river to Lac Seul took us over the highest portion of this elevated area, the distance in a straight line between the extreme points being 440 miles, though the actual distance travelled would nearly double this figure.

From the highest point of land crossed, which has an elevation as determined barometrically of 1,470 feet, the country slopes gently southward to Lac Seul, at the average rate of three feet to the mile, and throughout the distance the surface is exceedingly rocky, with occasional sand plains and ridges. Lakes are very numerous, being simply bodies of water filling the depressions in the rocky surface.

North of the highest point of land the country slopes northward at an average rate of five feet to the mile. For the first hundred and fifty miles down this gentle slope the surface is often rough and irregular, with many sandy or stony hills and occasional rocky ridges, between which the intervening valleys are generally partly filled with clay or sand. Lakes are not as large or numerous as they are south of the high land, and such as do exist lie in shallow basins in the glacial clays, and not in rock basins, while most of the land between the waterstretches consists of clay, sand or glacial debris of some kind with low surface relief. The country is well watered, but the general impression which prevails with regard to the character of much of northern Canada, namely, that it is an extensive rocky country with bodies of water lying between the rocky hills, does not often apply here. To the south of the high land such is the character of much of the country, but to the north of it the rock basins are mostly filled with surface deposits, and the lakes are merely bodies of water filling shallow depressions in these surface deposits, irrespective of the underlying rock.

Trout lake lies near the northern boundary of this broken country with its irregular, variegated surface. From Trout lake northward to Hudson Bay, the slope continues as before at the rate of about five feet to the mile, but the rock soon disappears under glacial and postglacial deposits, and thence northward the country is covered with an even mantle of glacial clay or till, which in its turn is often covered with stratified marine clays and sands holding shells of *Saxicava rugosa*, and other marine bivalves.

Photo by P. E. Hopkins, Oct. 17, 1912.
Indian summer on Cat river, showing characteristic forest on the banks.

Extensive Peat Bogs

As this northern country is very new, geologically speaking, extensive valleys have not been formed in it, and the rainfall has no means of running off except in the narrow, immature channels of the rivers. Consequently great areas are still flat, and practically undrained, and such flat areas are now covered with peat bogs on which grow scattered forests of small stunted spruce and larch.

This boggy plain not only extends to Hudson Bay on the course of the Severn River, but it also stretches northward and westward from the Severn river to the lower portion of the Hayes river, and all the country within fifty miles of Hudson Bay between the western boundary of Ontario and the Hayes river is undoubtedly of this flat, bog-covered character. All the evidence that it was possible for me to collect pointed distinctly and conclusively to the fact that there are no rocky hills anywhere in this fifty-mile strip. However, near the southern boundary of this strip, or more probably a little to the south of it, there is a ridge of sand and gravel with lumpy gravel hills rising on it here and there, and near these hills are several small lakes. It was impossible for me to visit these hills and lakes in the time at my disposal, but the description given to me of them would indicate that they were part of a moraine of the Labradorean glacier which was laid down in water, and was afterwards modified by the action of waves, which gave rise

to the formation of beaches. The exact position and character of this ridge should be carefully and thoroughly investigated before a route is finally chosen from the western boundary of Ontario to the Hayes river.

East of the Severn river the plain underlain by glacial clays and marine sediments has been traced by other observers around to the Albany river, and the total area included in it would seem to be about two-fifths of the whole district, or about 60,000 square miles.

Lake Elevations

In order to give a clearer idea of the heights of different parts of the country the following elevations of some of the lakes passed through may be recorded, all the heights, except that of Lac Seul, being determined by readings of an aneroid barometer.

	Feet.
Lac Seul	1,140
Lake St. Joseph	1,220
Smooth Rock Lake	1,300
Cat Lake	1,330
Whitestone Lake	1,390
Height of Land Lake	1,470
Big Cedar Lake	1,400
Little Cedar Lake	1,250
Windigo Lake	1,200
Weagamow Lake	1,000
Trout Lake	770

Hayes River Route:—

Whitewater Lake	695
Oxford Lake	585
Knee Lake	550
Swampy Lake	500

Forest

The district as a whole, as far as could be seen from our line of travel, was not heavily forested. Here and there groves of trees of moderate size were growing on the slopes of hills, or on the well-drained banks of the valleys, but as a rule most of the timber was small, and much of it had been burned in comparatively recent years.

White and Red Pine (*Pinus strobus* and *resinosa*) are growing on sandy flats on the banks of Lac Seul.

Banksian Pine (*Pinus banksiana*) is growing of good size on a sandy plain on the banks of Fawn river below the mouth of Otter river.

Cedar (*Thuya occidentalis*) grows north as far as Little Cedar lake on Severn river, though it was not seen anywhere in great abundance.

Black and White Spruce (*Picea nigra* and *alba*) extend north to within sight of the shore of Hudson Bay.

Larch or Tamarac (*Larix americana*) is associated with white and black spruce to the northern limit of the district, but unfortunately most of the trees are dead.

White Birch (*Betula papyrifera*) is found growing freely as far north as the most northerly outcrops of Archæan rocks, and some scattered trees were seen farther down the Severn river.

Aspen Poplar (*Populus tremuloides*) grows as far north as a sandy ridge a few miles above the mouth of Fawn river, though the trees are there vary small.

Balsam Poplar (*Populus balsamifera*) occurs on the islands and banks of the rivers to within a short distance of Hudson Bay.

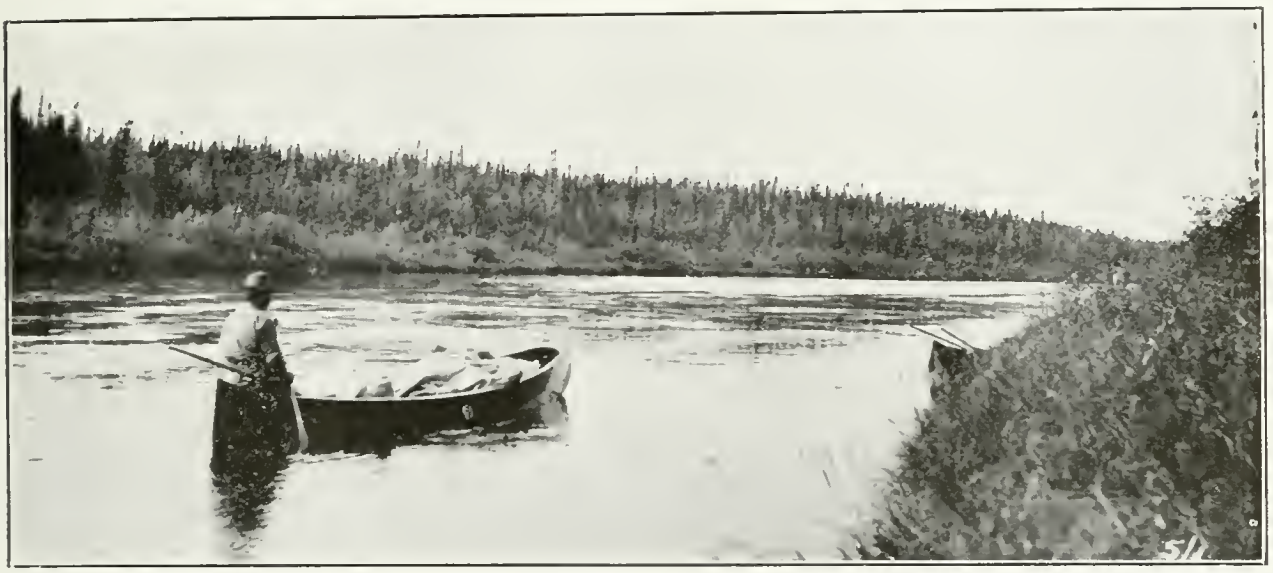


Photo by P. E. Hopkins, Sept., 1912.
Tracking up Fawn river. Flat boggy country on both sides.

Photo by P. E. Hopkins, Sept., 1912.
Fawn river in high water, showing the bank overhung with willows.

Climate

Little can be said on this subject, as my opportunities for observation were very limited. We left the shore of Hudson Bay on the 4th of September, and had windy and rainy weather for several days, or until we reached the vicinity of the mouth of Fawn river. After that we had some rain almost every day, with intervening periods of bright, clear weather, until we reached Trout lake on the 21st of September. During the last week of this time the leaves of the poplars, birches, and willows had assumed their brilliant autumn colours. In Manitoba the leaves on these trees would be changing colour at the same time.

On the 25th of September, while in the rock country just south of Trout lake, we had a moderately heavy fall of snow, after which, until the 23rd of October, when we reached the Grand Trunk Pacific railway, the weather was bright and mild with a few light showers of rain, but no more snow.

At my suggestion the Director of the Meteorological Service of Canada has consented to establish an Observing Station at Trout lake, so that within a very few years we shall have much more exact information about that important locality.

Inhabitants

The Hudson's Bay Company has a trading post just at the mouth of Severn river, and another at Trout lake, at each of which two white men are stationed. Doubtless a few more white men live at other trading posts farther east, but the total white population of the district is very small.

The native population consists of Crees and Ojibways, who are scattered here and there over the whole country, mostly on the banks of lakes and streams where a supply of fish can be depended on for food, and where fur-bearing animals can be caught, with the skins of which they may purchase ammunition, implements, clothing and such articles of white man's food as they may consider necessary.

In several places little groups of houses were seen in which the Indians pass the winter, and we were told of other groups of houses off our line of travel. When we passed them the houses were not occupied, and the Indians were away hunting or fishing elsewhere.

The people seemed to be generally healthy and comfortable. With the exception of a few coats and blankets or rabbit skin, they dress entirely in clothing obtained from the traders. The total Indian population of the district, as given me by Mr. D. C. Scott, Secretary of the Department of Indian Affairs for Canada, is as follows:—

Indians receiving pay from the Government under Treaty:—

Osnaburg	290	
Fort Hope	479	
Martin's Falls	99	
Fort Albany	741	
		1,609

Indians estimated:—

Fort Severn	250	
Trout Lake	500	
Winisk River	250	
Attawapiskat	150	
Sandy Bay	100	
Cat Lake	150	
		1,400
Total		3,009

Photo by J. B. Tyrrell, Oct. 13, 1912.
Woods on the portage past Pesew falls, just north of Cat lake. An Indian letter on the tree in the centre.

Photo by P. E. Hopkins, Oct. 2, 1912.
Indians on the bank of Ningitowa river. The boy sitting on the canoe is dressed in a coat of rabbit-skin.

Animals

Animals did not seem to be particularly plentiful anywhere throughout the district.

Polar bears (*Thelassarctos maritimus*) are occasionally found on or near the coast of Hudson Bay.

Black bears (*Ursus americanus*) roam through the forest almost everywhere.

Photo by P. E. Hopkins, Oct. 11, 1912.
Indian letter on portage on Severn river. "It was morning when the white chief passed very near the freeze up."

Barren Ground caribou (*Rangifer arcticus*) appear to regularly frequent the open country along the shore near and to the west of Goose river during the summer, turning inland in a westerly direction on the approach of autumn, whence they are said to go westward to spend the winter in the vicinity of Split lake, returning eastward again to the coast in the following spring.

The annual migration of this herd of caribou has often been observed. In May, 1792, David Thompson speaks of watching a vast herd cross the Hayes river in an easterly direction about twenty miles above York Factory. It took two days to cross the river, and he estimated that it included several million individuals. At the

present time, it is said that the herd usually crosses the lower portion of the Shamattawa river on its way inland in the autumn.

Woodland caribou (*Rangifer caribou*) are found scattered in small numbers throughout the district.

Moose (*Alces americanus*) are fairly abundant throughout the district as far north as Trout lake, and a few are occasionally met with to within 75 miles of Hudson Bay.

Virginia deer (*Odocoileus virginianus*) are occasionally killed near Lake St. Joseph, but they do not occur much farther north.

Photo by P. E. Hopkins, Sept. 24, 1912.
Rev. Mr. Dick with his pet black fox at Trout lake.

Of the smaller fur-bearing animals, the following are the most abundant, and the trade in them has constituted the chief industry of the country up to the present time: Black, cross and red foxes (*Vulpes vulgaris*), lynx (*Lynx canadensis*), Otter (*lutra canadensis*), marten (*Mustela americana*), Mink (*Putorius vison*), Weasel (*Putorius vulgaris*), Skunk (*Mephitis mephitica*), Beaver (*Castor fiber*), and Muskrat (*Fiber zibethicus*).

Waterfowl are not very abundant, except on the coast of Hudson Bay, but a few ducks breed on the rivers and lakes, and geese fly over the country in considerable numbers during their spring and autumn migrations.

Both the ruffed grouse and the spruce grouse (*Bonasa umbellus* and *Canachites canadensis*) were found everywhere in the woods throughout the district, though nowhere in great abundance. The sharp-tailed grouse (*Pedioecetes phasianellus*) seemed to be fairly abundant near Makoop Lake, and the willow ptarmigan (*Lagopus lagopus*) was found in the open country near the shore of Hudson Bay.

Fish form the staple food of the inhabitants of this country. The principal kinds so used are trout, whitefish, tullibee and suckers.

Photo by J. B. Tyrrell, Oct. 2, 1912.
Clay plain beside Ningitowa river.

Minerals

No minerals of economic importance have yet been recorded from the vicinity of the route travelled over last summer, but there is little doubt that fuller investigation will determine their existence.

Several areas of greenstone and other similar rocks of Keewatin age were crossed, especially on Trout, Windigo and St. Joseph lakes. Wherever rock of similar age and character to these have been thoroughly prospected in other parts of Canada, valuable minerals, usually including the precious metals, have been found in them, and there is no reason to suppose that the areas of Keewatin rocks here recorded will form exceptions to this rule. The Palæozoic limestone near the shore of Hudson Bay may also contain beds of salt, gypsum or other valuable minerals of similar character.

Agriculture

In other parts of this report, and especially under the description of the geological features of the country, I have shown that there is an enormous area consisting of fifty or sixty thousand square miles of country underlain by glacial clays, or marine clays

and sand, and that also north of the highest part of the land, there is a large additional area of unknown extent covered with loose glacial detritus of varying composition. Most of this country is now wet and undrained, and has a particularly uninviting and repellant appearance. However, much of it has a sufficient slope to permit of drainage, and as the clays themselves possess those qualities which should make rich fertile soil, the agricultural possibilities of the country are limited only by the climate, of which but little is yet known.

During the past summer, Mr. Moir, of the Hudson's Bay Company, and the Rev. Mr. Dick, the missionary, raised excellent crops of potatoes at Trout Lake on small patches of ground, and Indians also had good fields of potatoes at a number of other places in the district. Some years ago, the officer then in charge of the trading post at Trout lake for the Hudson's Bay Company kept cattle, and cultivated all the ordinary garden vegetables commonly raised in Manitoba, but the cattle were ordered to be killed, and all cultivation, except that of potatoes, was discontinued, for these grow freely, with very little expense for care and attention. I strongly recommend that suitable steps be taken to ensure the establishment of an experimental farm or garden at Trout lake, either with the co-operation of the Department of Agriculture of the Dominion of Canada, or by the Government of the Province of Ontario itself.

Photo by H. C. Moir, Hudson Bay Co.
Digging the garden at Trout lake.

Rivers Flowing Into Hudson Bay

The principal rivers flowing into the west coast of Hudson Bay, beginning at the north and proceeding southward, are:—

	Length.
Dubawnt with Chesterfield Inlet	900 miles
Kazan	500 "
Thlewiaza	300 "
Seal	250 "
Churchill	1,000 "
Nelson—Saskatchewan	1,700 "
Hayes	320 "
Severn	420 "
Wenisk	400 "
Attawapiskat	465 "
Albany	610 "
Moose	340 "

The exploration of the past summer had to do with only three of these rivers, namely, the Nelson, Hayes, and Severn, and, consequently, the remarks here made will be confined almost exclusively to these three streams.

As will be explained later, the land around Hudson Bay was formerly, relatively to sea level, depressed about 400 or 500 feet lower than it is now, and consequently the water covered much of what is now land, and the area of the Bay was considerably greater than it is at present.

On the western shore of the Bay, the land, even when the water stood at its highest level, sloped gently downwards into the sea, and erosion cliffs, marking old strand lines, are conspicuously absent. This feature is equally prominent on the present shore, for the land now rises very gradually back from the gravel beaches which form the confines of the water area of the Bay. From Eskimo Point, in north latitude 61° 04′, down the coast all the way to the mouth of the Moose river, there does not appear to be a single wave-cut cliff facing the ocean.

Photo by J. B. Tyrrell, July 12, 1912.
Tidal shore on west side of Hayes river, a short distance below York Factory.

The three rivers last mentioned flow down this gentle regular slope, and at and near their mouths have cut gorgelike valleys into the marine and glacial clays sometimes down to the underlying hard rock. All have many features in common.

The Severn

The Severn river, below Limestone rapids, where it has last cut down to the underlying rock, has a very juvenile character. Its banks are steep and often precipitous, with glacial clays at the bottom and marine clays above. Nearer the mouth the glacial clays disappear, and stratified clays and sands form the whole thickness of the sediments exposed in the banks. In places its channel is broken by islands, those higher up the stream being for the most part fragments cut off from the adjoining country as the river deepened its channel, while those nearer the mouth on the contrary have either been partly built up by sediments brought down by the current, or represent the old bed of the river past which the stream has cut new channels in comparatively recent times.

The Hayes

The Hayes river is similar in character to the Severn. Both are from half a mile to a mile in width ten miles above their mouths, with currents of about three miles an hour, the low islands within the tidal portion of the Hayes river being if anything more conspicuous than in the Severn. In both cases the rivers themselves are now cutting away the steep banks on their western sides, and are building low flats on their eastern sides.

Two opportunities presented themselves of measuring the rate at which the latter river cuts away its banks. In the year 1900 the Hudson's Bay Company had a reserve

Photo by J. B. Tyrrell, July 13, 1912.

Site of old York Factory on the bank of Hayes river, about half a mile below the present fort. On the left of the picture is a cellar of one of the old houses, with some of the timbers which covered it.

surveyed around York Factory, and posts were planted at the north and south ends of this reserve close to the top of the bank, or rather 75 and 20 feet respectively from it. The post at the north end is now 35 feet from the top of the bank, 40 feet having been washed away in twelve years, and the post at the south end has been washed away entirely, and a measurement from the southwestern corner of the reserve shows that about 35 feet of the bank has been carried away. These measurements would indicate that the river was cutting away its west bank at the rate of about three feet in a year.

Half a mile north of the site of the present York Factory is the site of old York Factory, from which the trading post of the Hudson's Bay Company was removed in

1789. Fortunately, we have a survey of this site made by Joseph Robson in 1745, which shows a little stream with four bends within or close to the stockades of the Fort. These bends of the stream provide an excellent measure for determining the former position of this Fort and of the shore line in front of it. Two of the bends have already disappeared, having been washed away by the stream, the other two being quite recognizable by a comparison of the old plan and one made at the present time. These two plans show distinctly that the bank has been cut back a distance of 168 feet since Robson's plan was made one hundred and sixty-seven years ago, or a recession of practically one foot a year in that time.

Another point of great interest is shown by the site of this old Fort. The line of the bank now cuts through a cellar which was evidently under one of the old houses at the Fort before it was destroyed by the French in 1782, and this cellar is now just at the top of high tide. As it is not likely that it was dug below high tide level, where it would have been subject to constant floods, it furnishes corroborative evidence to that which I obtained at Churchill in 1893 and 1894 that the land around Hudson Bay has reached a condition of stability.

Similar evidence of the present stability of the land is furnished by the existence of trees more than one hundred years old close to tide water on the banks of the Nelson river, and the strength of the beaches of sand and gravel which in many places form the present shore of the Bay would also indicate stability of the land for a moderate length of time to enable such strong beaches to be formed.

While it is evident, therefore, that the land on the shore of the Bay has now ceased to rise, it is equally evident from the character of the clay-covered plain around Hudson Bay, and the newness of the raised beaches on that plain, that it has risen several hundred feet within geologically recent times.

The Nelson

The Nelson river differs somewhat from the two rivers of which we have just spoken. Like them, and in fact like all the rivers flowing into Hudson Bay, it is cutting into the cliffs on its west bank, but unlike the Hayes and Severn rivers, these cliffs are of glacial till and not of marine sediments, and the bed of the river to its mouth is composed of similar hard till or hardpan, into which the river is actively cutting its channel. As the river is everywhere cutting down and deepening its channel, it is not now building up islands like those near the mouth of the Hayes river, but is carrying all the sediment derived from the bottom of the channel and from the bank on its western side down into the Bay. The two islands in the upper portion of the mouth of the river, namely, Seal and Gillam islands, are fragments cut off from the surrounding country by diversion of the channel, and have not been built up by the river itself.

The stream fills the lower portion of the valley of Nelson river from side to side. In places terraces may be seen at the mouths of tributary streams, such as at the mouth of the Seal river, a small tributary from the south, but if any terraces have existed in the main valley itself they have been swept away. The river has all the appearance of having originally been cut out by a smaller stream, probably the lower continuation of the Burntwood river, which drains a considerable portion of the country between the Saskatchewan and Churchill rivers. Afterwards a larger stream was introduced into it, and this stream is now actively widening and deepening the old valley, forming precipitous cliffs on one or both sides.

The facts that the stream is flowing over a bed of boulder-clay into which it is actively cutting its channel, and that it is not filling up its bed at its mouth, are of great importance in the consideration of any harbour improvements that may be made in it, for this boulder-clay, which however contains few boulders, can be readily dredged, and at the same time the dredged areas, if arranged so that they may be scoured out by the current, will have no tendency to fill up, and the excavated channels will remain as permanent improvements, much the same as if they had been excavated in solid rock.

In this connection it may be noticed that the Nelson river above the influence of high tide is practicaly a river of clear water, carrying very little sediment, and the mud which is held in suspension by the water in the mouth of the river is derived largely from the bottom of the river itself or from the clay cliffs which form its banks. If these cliffs are protected from denudation, and if the river below Seal island is diked into a channel of even width, so that the water will not spread out over the shallow clay flats on both sides, the water would probably be clear where it flows into the Bay, and there would be no trouble whatever in keeping a channel open out into the deeper water of the Bay. Such dykes as I have spoken of could be built by the dredge which was digging the channel, and they would prevent the incoming tide from spreading out over a very large area, and would consequently decrease the tremendous current which is now caused at the mouth of the river by both the flowing and the ebbing tide.

It is thus seen that the Nelson river differs materially from the other rivers flowing into Hudson Bay, and this difference is doubtless caused by the fact that the large stream draining Lake Winnipeg took possession of the lower portion of the smaller valley, probably of Burntwood river, in very recent times, and is now actually widening and deepening this older and smaller valley.

Photo by J. B. Tyrrell, July 25, 1912.
Shore on the east side of Nelson river at low tide. Boulders are lying on a hard till.

Geology

The rocks met with during the summer may be considered under the following heads in ascending order:—

Archæan.—Composed of granites, gneisses, greenstones, gabbros, anorthosites, and other igneous or highly altered sedimentary rocks such as are found almost everywhere throughout northern Canada.

It is probable that all these rocks should be included in either the Keewatin or the Laurentian series.

Palæozoic.—Ordovician and Silurian limestones and dolomites, mostly flat-lying. They overlie the Archæan Complex and extend southward from the south shore of Hudson Bay for a distance of sixty miles or more.

Pleistocene deposits, consisting of tills and glacial and inter-glacial clays and sands, with occasional beds of peat or lignite.

Recent deposits, composed of clays and sands laid down at or near the mouths of the rivers on Hudson Bay, and marine clays and sands, which extend inland from the Bay for varying distances up to about one hundred and fifty miles. The sands in many cases represent old shore lines. Besides these, the recent deposits include beds laid down in fresh water lakes and in the bottoms of the valleys of existing streams.

Archæan

The Archæan rocks outcropping in the country northward from Sioux Lookout on the Grand Trunk Pacific railway to Cat lake have been described by Dr. A. W. G. Wilson in a report to the Geological Survey of Canada, and as my observations added very little new information to that collected by Dr. Wilson, it is unnecessary for me to repeat here what he has already said, more especially as the rocks are mostly granites and gneisses, such as are commonly found in many parts of northern Canada and are usually classed as of Laurentian age, though associated with them are a few narrow bands of greenstones and amphibolites, some of which may be of Keewatin age.

Laurentian

Laurentian rocks, similar to those on Cat lake and river, were also found along the canoe route northward from Cat lake through Whitestone lake, across the height of land, down the Cedar branch of the Severn river to Cedar lake, and thence northeastward to the vicinity of Windigo lake.

On Windigo lake, rocks of Keewatin age were encountered, but these are described more in detail below. From Windigo lake northward through Weagamow and Makoop lakes, similar Laurentian rocks occur all the way to Trout lake, the south shore of which is formed of a rather prominent granite ridge. On Trout lake another belt of Keewatin rock occurs. On the northern side of this lake, Laurentian granites and gneisses again make their appearance and outcrop for a distance of sixty-one miles down the Fawn river, when they finally disappear under an overburden of surface clays and sands.

These Laurentian rocks are all of very similar character throughout, and the following descriptions by Mr. Ellis Thomson of specimens collected at various places along our line of travel will give a fair idea of their general character.

Portage 42, Windigo river.—A gneissoid rock of fairly fine grain, composed chiefly of quartz, orthoclase, microcline, biotite, and muscovite, but containing also considerable quantities of plagioclase, chlorite, and epidote. Apatite and magnetite are prominent accessory constituents the latter altered in places to limonite. It is a typical two-mica gneiss of fairly fine texture.

Mouth of Mishwamagan river.—A granitoid rock of gneissoid structure, composed for the most part of quartz, orthoclase, microcline, and biotite. Considerable plagioclase is also present. Apatite, magnetite, and limonite are more or less important accessory constituents, the first-named being quite prominent. Considerable of the biotite has been altered in places to epidote. It seems to be a biotite gneiss of medium grain, although scarcely schistose enough to be quite typical.

Trout lake at head of Fawn river.—A granitic rock, composed chiefly of quartz, orthoclase, biotite, and green hornblende in about equal amounts. Microcline and plagioclase are other feldspars present. Apatite, magnetite, and pyrite are all fairly common accessory constituents, while there are considerable quantities of chlorite and epidote present as alteration products of the hornblende and biotite. It may best be described as a hornblende-biotite granite.

Lowest granite outcrop on Fawn river.—A granitic rock of gneissoid structure composed chiefly of microcline, quartz, and biotite. Orthoclase and plagioclase are also present in subordinate quantities, while apatite and magnetite are prominent accessory constituents, the former as short stout crystals. A little muscovite is also present, and both the micas have been altered in places to chlorite and epidote. The quartz and the feldspar show a graphic intergrowth in some places. This specimen gives a beautiful illustration of the gridiron structure in the microcline.

Portage 20, Negigamo river.—A very schistose rock, consisting almost entirely of green hornblende and quartz grains. Magnetite is a rare constituent. The hornblende is slightly altered in places to chlorite. A typical hornblende schist.

Keewatin

Two important bands of rocks of this series were encountered during the summer within the district of Patricia, one at Windigo lake and the other at Trout lake. It is possible that other narrow bands of similar rock may have been crossed along the line of travel, but if so they were hidden by the overburden of sand and clay, and it was impossible to see them.

In the southern expansion of Windigo lake, green gabbros and diabases were seen in a number of places along our course. As a rule, they did not appear to have any very definite dip or strike, and no quartzites, conglomerates, or other clastic rocks were found associated with them.

Photo by J. B. Tyrrell, Sept. 24, 1912.
Shore of Big island in Trout lake, showing the greenstone rock with two sets of glacial markings running respectively North 40° West, and South 40° West.

The following descriptions of specimens taken from two places at which we stopped will give a good general idea of the character of the whole.

Island in Windigo lake.—A very much altered rock with ophitic structure, consisting for the most part of fine laths of plagioclase, shreds of chlorite, and grains of epidote, calcite, and magnetite. Pyrite is also present in small amounts. The calcite seems to be present in the form of little vein-like fillings.

Point on Windigo lake.—A fairly coarse-grained rock consisting of needles of plagioclase (labradorite?) and green hornblende, the latter very largely altered to chlorite. Considerable epidote and ilmenite are also present, the latter altered in places to leucoxene. Pyrite is a rare constituent. This rock appears to come in the diorite class, but shows the ophitic structure very plainly.

Trout lake occupies a basin excavated in green Keewatin schists and diabases north of a prominent granite ridge which now forms its southern boundary, and the many islands which rise above the surface of the water are mostly rounded glaciated knolls

of greenstone. The time at our disposal did not permit us to examine any of these, except such as lay directly on our course. However, the following descriptions of specimens collected from Big island and another island two miles to the southwest of it will give a clear idea of the character of the rock. In most places it shows the typical pillow structure characteristic of many of the Keewatin greenstones throughout northern Canada.

Big Island, Trout lake.—A very much altered rock of diabasic texture. It consists for the most part of laths of plagioclase with an ophitic arrangement, and green hornblende. The latter mineral has quite evidently been derived by a uralitization process from augite. The unaltered pyroxene still remains in several places, but is mostly altered at the edges to hornblende. Ilmenite and pyrite are two fairly prominent metallic constituents, the former being altered in a great many places to leucoxene. The hornblende is also altered in several places to chlorite. This rock seems to represent an intermediate type between the epidiorites and the true diorites, being probably closer to the diorite division. The ophitic structure of the original rock is still in evidence, proving that the rock was formerly a diabase.

Island 2 miles southwest of Big island, Trout lake.—A very much altered rock consisting chiefly of epidote, calcite, chlorite, and kaolinized material. Small quantities of magnetite and quartz are also to be found. This may best be described as an epidote rock, the alteration having gone so far that no conjecture can be made as to its original identity.

To the north of the greenstones, near the north shore of Trout lake, are a number of outcrops of a massive intrusive anorthosite, which is possibly of Keewatin age, though it may be newer. This rock has a coarse porphyritic and granitoid structure and forms a conspicuous feature on the shore. The following descriptions of thin sections which were examined under the microscope by Mr. Thomson will give a good idea of its general character.

Island, mouth of Fawn River.—A feldspar rock consisting chiefly of plagioclase (labradorite and bytownite), but containing considerable quantities of chlorite and epidote as well. Hornblende, magnetite, and limonite are also found in small quantities. It appears to be a typical anorthosite somewhat weathered.

Fort Island, Trout lake.—A feldspar rock consisting almost entirely of plagioclase, but containing some epidote as well as a little chlorite, magnetite, and limonite. It seems to be a typical anorthosite.

Island, 4 miles east of Fort island, Trout lake.—A feldspar rock consisting almost entirely of plagioclase (labradorite) and epidote. Considerable chlorite appears also, as well as a little magnetite and limonite. It appears to be a typical anorthosite, considerably weathered.

Northwest end Fort island, Trout lake.—This rock consists for the most part of plagioclase (labradorite), green hornblende, and magnetite. A good deal of the hornblende has altered to chlorite and epidote. Quartz and pyrite are rare constituents. It seems to be a typical diorite, slightly altered.

Palæozoic

Ordvician

In descending the Fawn branch of the Severn river, the last Archæan rocks seen in the bed of the stream are at a distance of about one hundred and sixty-five miles from the shore of Hudson Bay measured in a straight line, and from there northward for about one hundred miles, no hard rocks of any kind in place are to be seen. Then limestones of about the age of the Guelph formation in Ontario make their appearance. No older rocks of Ordovician or Silurian age were found on this river, but away to the northwest about two hundred miles distant, on a branch of the Hayes river called the Shamattawa river, there is a long exposure of limestone in the form of low cliffs extending for several miles beside the banks of the stream. The limestone is thin-bedded and lies in a horizontal attitude and is usually mottled, very much like that at East Selkirk in Manitoba. The total thickness exposed is about twenty-five or thirty feet.

From this exposure, and from the talus of broken fragments on the bank at the foot of the cliffs a number of fossils were collected, among which were the following:—

Columnaria rugosa, Billings;
Streptelasma corniculum, Hall;
Favosites aspera, d'Orbigny;
Tetradium fibratum, Safford;
Strophomena julia, ? Billings;
Rafinesquina lata, Whiteaves;
Rhynchotrema capax, Conrad;
Dinorthis pectinella, Emmons;
Maclurina manitobensis, Whiteaves, var. *acuta;*
Maclurea subovata, n. sp.
Trochonema umbilicatum, Hall;

Photo by J. B. Tyrrell, June 28, 1913.
Talus of Ordovician limestone on the north bank of the Shamattawa river.

Hormotoma sp.
Holopea sp.
Orthoceras sp.
Orthoceras lepidodendroides, n. sp.
Actinoceras bigsbyi, ? Stokes;
Actinoceras richardsoni, Stokes; var. magnum, n. var.;
Actinoceras sp.
Cyrtoceras manitobense, ? Whiteaves;
Poterioceras tyrrelli, n. sp.;
Ascoceras boreale, n. sp.;
Trochoceras insigne, Whiteaves;
Spyroceras meridionale, ? Whiteaves;
Illaenus americanus, Billings;

Professor W. A. Parks, University of Toronto, gives the following notes and descriptions of the species here enumerated:—

Corals:—

Columnaria rugosa, Billings.—One good specimen in a soft calcareo-argillaceous matrix.

Streptelasma corniculum, Hall.—Five incomplete specimens which are probably referable to this species as defined by Lambe.

Favosites aspera, d'Orbigny.—Two coralla, each about four inches in diameter. The corallites are of nearly equal size in the individual specimen, but in one example they average about 1.5 mm. and in the other 2.5 mm. in diameter. The tabulae are complete and closely set: in the coarser form they are about 1 mm. apart, and in the finer example, five occur in the space of 3 mm. The specimens do not reveal the slightest trace of septal spines or mural pores. In *F. aspera* the pores are situated at the angles of the corallites; unless these structures can be made out, the reference of the form to the present species is doubtful. It would seem that we are dealing with the same form referred to by Lambe in the following words. "Specimens of a *Favosites* have also been collected at East Selkirk and Lower Fort Garry, Manitoba, that are doubtfully referred to this species; they do not show the mural pores although otherwise the structure is well preserved. The rocks at this locality have been referred by Mr. Whiteaves to the Galena-Trenton, so that if through the medium of other specimens from these places the pores are found to be situated at the angles of the corallites, the downward extension of the range of *Favosites aspera* will be considerable."

Tetradium fibratum, Safford.—One specimen showing clearly the structure of the species.

Brachiopods:—

Strophomena cf. julia, Billings.—Four casts of a strophomenoid form which closely resembles Billings' species in the possession of widely spaced major striae radiating from the beak. Compare also *Leptaena unicostata*, Meek and Worthen.

Rafinesquina lata, Whiteaves.—A fragment of a single valve which is probably referable to this species.

Rhynchotrema capax, Conrad.—A single worn and partly decorticated valve of doubtful identification.

Dinorthis pectinella, Emmons.—Three decorticated specimens referable to this species or possibly to *D. subquadrata*, Hall.

Gastropods:—

Maclurina manitobensis, Whiteaves, var. *acuta*, var. nov.—One cast of the interior with a small portion of the shell adhering on the convex side and with nearly the whole of the test on the flat side preserved. The shell is 95 mm. in diameter and the height of the outer volution is 35 mm. In form, the specimen conforms closely to Whiteaves' description, but the characteristic lines of growth and surface ornamentation are wanting. The flat side is slightly depressed in the middle. The peripheral angle is acute and is accentuated by a slight depression just above the margin on the convex side.

Maclurea subovata, sp. nov.—One good cast of the interior and several fragments. The maximum diameter is 63 mm. and the height of the outer volution 33 mm. The form resembles *M. bigsbyi* but it differs in that the "flat" side of the outer volution is quite convex; the amount of the convexity being one-fifth the width of the whorl. This feature gives a subovate rather than a trapezoidal outline to the cross section.

Trochonema umbilicatum, Hall.—Seven specimens, all casts of the interiors.

Hormotoma, sp.—Two casts with a portion of the test indifferently preserved. Apical angle more acute than in *H. trentonensis*. This form must be compared with *H. arctica*, Ami, which is listed as a new species but without description in "The Cruise of the Neptune."

Holopea, sp.—One cast of the interior of a large specimen, 40 mm. wide by 30 mm. high. The specimen must be compared with *H. borealis*, Ami, listed without description in "The Cruise of the Neptune."

Cephalopods:—

Orthoceras, sp. indet.—One badly preserved cast of the chamber of habitation. Cross section oval, diameter 21 by 17 mm. Siphuncle small, central.

Orthoceras lepidodendroides, sp. nov.—One cast of the interior, showing portions of 8 camerae. Cross section ovate, 60 mm. by 30 mm., but the form is probably crushed. The whole surface is marked by distinct blunt nodes arranged in a quincuncial manner which gives the cast the appearance of a *Lepidodendron*. Siphuncle not observed. The surface ornamentation is very characteristic and is sufficient for the identification of the species.

Actinoceras cf. bigsbyi, Stokes.—Two badly preserved specimens with large nummuloid siphuncles which agree in shape and spacing with this species. The siphuncle is marginal and occupies fully two-thirds of the air chambers.

Actinoceras richardsoni, Stokes, var. *magnum*, var. nov.—One cast of the interior with septa and siphuncle preserved. If the shell is round the diameter cannot be less than six inches and is probably greater. The siphuncular annulations are 25 mm. in diameter, evenly rounded, and occur to the number of 12 in a length of 205 mm. A large endosiphuncle is observable having a diameter of 14 mm. The siphuncle is eccentric in position. This form agrees fairly well with *A. richardsoni*, but differs in the larger size of the shell and in the relatively smaller siphuncle.

Actinoceras, sp. indet.—One badly preserved siphuncle embedded in matrix. The specimen undoubtedly represents a different species, as the siphuncular beads are expanded anteriorly and are as much as 23 mm. apart. The form represents a transition to the genus *Huronia*.

Cyrtoceras cf. manitobense, Whiteaves.—Three fragments which are doubtfully referred to this species. The general size of the forms, the spacing of the septa and the position of the siphuncle agree fairly well, but the curvature of the septa is much less pronounced.

Photo by J. B. Tyrrell, Sept. 9, 1912.
Cliff of Silurian limestone at Assina rapid, Severn river.

Poterioceras tyrrelli, sp. nov.—Two well preserved casts of the interior, showing the characteristics of the chamber of habitation and of nine air chambers. The smaller and more perfect specimen gives the following measurements:

Maximum width at second septum, dorso-ventral, 48 mm.; lateral, 37 mm.
Width at ninth septum, dorso-ventral, 35 mm.; lateral, 30 mm.
Length of body chamber, 38 mm.
Diameter of orifice, dorso-ventral, 37 mm.; lateral, 22 mm.
Average spacing of septa, 3.5 mm.

The siphuncle is small and marginal in position. The body chamber contracts towards the mouth as shown by the above figures, but there is a sharp outward inflection of the shell at the aperture. On the posterior margin of the body chamber, the cast shows a ring of bead-like markings which occupy a space comparable with that of one air chamber. A photograph taken by Mr. Tyrrell of a specimen which he was unable to obtain shows this peculiar feature in a better manner than either of the specimens in hand.

Ascoceras boreale, sp. nov.—One cast of the interior; septa not preserved. This form differs in the curvature of the septal markings and in its general shape from *A. costulatum*, Whiteaves, and *A. canadense*, Billings.

Trochoceras insigne, Whiteaves.—A portion of a mould of the exterior. Whiteaves' only figure is of a cast of the interior, but there can be little doubt of the identification of the present example.

Spyroceras meridionale, ??? Whiteaves.—A small portion of a cast very doubtfully referred to this species.

TRILOBITES:—

Illaenus americanus, Billings.

These fossils would indicate that the rock is about the age of the top of the Trenton of Eastern Canada.

While there is no certainty that rocks of Trenton age occur as far eastward as the Severn river, it would seem not improbable that they may exist beneath the drift in the portion of the country where no exposures have been observed.

Silurian

As stated above, limestones which appear to be of about the age of the Guelph of eastern Canada, outcrop on the Fawn river at a distance of about sixty-five miles in a direct line southwestward from Hudson Bay, and continue to be exposed for a distance of fifty miles down the Fawn and Severn rivers to what is known as the Limestone rapids on the latter stream twenty-eight miles from the Bay. These rocks vary from thin-bedded limestones to thick-bedded Stromatoporoid dolomites, and while they most usually occur in the bed of the stream they often form low cliffs along its side. In the majority of exposures the limestone is horizontal, but at Limestone rapids of the Severn river it is undulating, a thin-bedded limestone rising over knolls of more massive dolomite.

Fossils are not abundant in many places, and even where found are often difficult to extract from the rock in a sufficiently perfect condition for identification, but, nevertheless the following species were collected at the various rock exposures on the Severn and Fawn rivers, all of which are of about the same geological horizon. The collection was made without delaying the survey or rate of travel, and mostly during a day when we were obliged to remain in camp by a heavy storm of wind and rain.

Actinostroma tenuifilum, Parks;
Favosites gothlandica, Lamarck;
Favosites hisingeri, Milne-Edwards & Haime;
Halysites catenulatus, Linnaeus;
Pycnostylus guelphensis, Whiteaves;
Zaphrentis stokesi, Milne-Edwards & Haime;
Streptelasma sp.;
Petraia ? *occidentalis*, Whiteaves;
Acervularia austini, Salter;
Aphyllostylus gracilis, Whiteaves;
Tyrrellia severnensis n. sp.;
Fenestella subarctica, Whiteaves;
Rhynchospira loxi, Whiteaves;
Hormotoma patriciaense, n. sp.;
Hormotoma whiteavesii, Clarke and Ruedemann;
Pentamerus oblongus, Sowerby;
Trimerella ekwanensis, Whiteaves;
Glassia variabilis, Whiteaves;
Spirifer crispus, Hisinger;
Delthyris sulcata, Hisinger;
Reticularia septentrionalis, Whiteaves;
Gypidula, sp.;
Stropheodonta, sp.;
Camarotoechia ekwanensis, Whiteaves;
Pleclambonites transversalis, Wahlenberg;

Meristina expansa, Whiteaves;
Bellerophon sp.;
Megalomphala robusta, Whiteaves;
Strophostylus filicinctus, Whiteaves;
Trepospira kokeni, Lindstrom;
Gyronema hudsonica, n. sp.;
Gyronema dowlingii, Whiteaves;
Gyronema speciosum, Whiteaves;
Coelocaulus macrospira, ? Hall;
Clathrospira sp.;
Eotomaria sp.;
Euomphalopterus tyrrelli, n. sp.;
Euomphalopterus sp.;
Euomphalopterus valeria, Billings;
Trochus, ? sp.
Lophospira, ? sp.;
Liospira, ? sp.;
Diaphorostoma perforatum, ? Whiteaves;
Pterinea, sp.;
Modiomorpha acuminata, n. sp.;
Orthoceras, sp.;
Gomphoceras, sp.;
Phragmoceras Whitneyi, n. sp.;
Phragmoceras lineolatum, Whiteaves;
Phragmoceras, sp.;
Cyrtoceras, n. sp.;
Barrandeoceras, ? sp.;
Endoceras hudsonicum, n. sp.;
Actinoceras hearsti, n. sp.;
Actinoceras, n. sp.;
Illaenus ioxus, Hall;
Encrinurus arcticus, ? Salter.

The short time at my disposal and the inability to carry a heavy load of specimens up the Fawn river and over the height of land to the head waters of the Albany and Winnipeg rivers so late in the season prevented me from collecting and bringing to Toronto as good and full a series of fossils from those Silurian limestones as I could have wished.

Professor Parks has supplied the following notes and descriptions, the localities from which I collected the fossils being at the same time carefully distinguished. Fuller descriptions, with figures, will appear in a later publication.

Silurian Fossils on Severn and Fawn Rivers

B.—Limestone Rapids, Severn River.

STROMATOPOROIDS:—

Actinostroma tenuifilum, Parks.—Three specimens in which the structure is largely destroyed, but which are probably referable to this species.

CORALS:—

Favosites gothlandica, Lamarck.
Favosites hisingeri, Milne-Edwards and Haime.
Pycnostylus guelphensis, Whiteaves.
Pycnostylus elegans, Whiteaves.—Some of the specimens referred to this species show certain differences which may demand the creation of a new species.
Zaphrentis stokesi, Milne-Edwards and Haime.
Aphyllostylus gracillus, Whiteaves.—One specimen in a poor state of preservation which is provisionally referred to this species.
Tyrrellia severnensis, gen. nov., sp. nov.—One specimen of a coral which does not seem to belong to any described genus. The corallites are single, cylindrical and elongated having a diameter of 5 mm. Septa numerous, reaching almost to the centre on the upper surface of each tabula, but not extending to the next tabula above except at the periphery. The septa therefore appear as a circle of radiating plates on each tabula, having the full height of the intertabular space at the periphery but diminishing to nothing at the centre. The tabulae are about 0.5 mm. apart: they are flat or slightly convex at the centre, but are sharply inflected downwards at their margins. No other endothecal structures are apparent.

Brachiopods:—

Rhynchospira lowi, Whiteaves.—One imperfect cast probably referable to this species.

Gastropods:—

Hormotoma patriciaensc, sp. nov.—One cast showing three whorls. Total height 100 mm. Width of body whorl about 50 mm. Sutures deep. Whorls evenly convex. Apical angle about the same as in *H. winnipegense*, Whiteaves, but the present species is more elongate; for a given height of whorl, the width is not more than two-thirds that of *H. winnipegense*. The form should perhaps be referred to the genus *Fusispira*.

Bellerophon, sp. indet.—Four casts of a bellerophon which probably represent a new species but which are too imperfect to warrant description at present.

Megalomphala robusta, Whiteaves.—One imperfect cast agreeing fairly well with Whiteaves' figures of this species.

Strophostylus filicinctus. Whiteaves.—One cast probably referable to this species.

Trepospira cf. kokeni, Lindström.—Cast and mould of a small shell which is probably related to the above form described by Lindström from the Silurian of Gothland.

Gyronema or *Poleumita hudsonica*, sp. nov.—Several imperfect casts of a large specimen of more than three inches in diameter, also a portion of the body whorl of a smaller individual. The specimens differ from *G. speciosum*, Whiteaves, in having the revolving carinae more widely spaced on the upper than on the lower side of the whorl. The spire is apparently depressed so that the general form is comparable with that of certain examples of *Poleumita scamnata*. Clarke and Ruedemann.

Coelocaulus cf. macrospira, Hall.—Imperfect casts of a form which must be closely related to this species. Practically indeterminable.

Clathrospira, sp.—A large but broken cast very closely resembling *C. deiopea*, Billings, from the Guelph of Ontario.

Eotomaria, sp.—A single cast with the upper part of the spira lacking. Resembles *E. durhamensis*. Whiteaves, from the Guelph of Ontario.

Euomphalopterus tyrrelli, sp. nov.—Portions of the internal cast of a large form measuring fully eight inches in diameter. The outer whorl has a width of two inches: it is evenly rounded on the inner side, but the outer side is convex above and slightly concave below with a sharp carina at the inferior margin. The whorls decrease in diameter very slowly so that there must be about seven volutions in all. Lacking any portion of the shell, generic relationships are hard to determine. The shape of the whorls, the wide open umbilicus and the slightly ascending spire seem to suggest the genus *Euomphalopterus*.

Euomphalopterus, sp.—A single cast of the interior which resembles that figured by Billings as *Pleurotomaria elora*. The present form is smaller and, lacking any portion of the shell, gives no indication of the external features characteristic of Billings' species.

Trochus ?? sp. indet.—Two small casts of interiors resembling some of the forms described by Lindström as *Trochus* from the Silurian of Gothland.

Lophospira or *Coelocaulus*, sp. indet.—One imperfect mould of the exterior. Most of the whorls show a rounded outline, but there is some evidence that an acute alation was present. The form is probably related to species described as *Pleurotomaria valeria* by Billings or as *P. velaris* by Whiteaves.

Liospira ?? sp. indet.—Two casts of a small shell with a very depressed spire and with an acute edge on the body whorl. Resembles the Ordovician genera *Raphistoma* or *Raphistomina*.

Diaphorostoma cf. perforatum. Whiteaves.—A broken cast of the apical portion of a shell which resembles Whiteaves' figure in its general contour.

Pelecypods:—

Pterinea, sp. indet.—An imperfect cast with the wing broken off. Compare also *Ambonychia septentrionalis*, Whiteaves.

Modiomorpha acuminata, sp. nov.—Several specimens, some with the shell preserved, very pointed at the anterior end, length about 70 mm. These shells will admit of accurate description.

Cephalopods:—

Orthoceras, sp.—Several specimens of an *Orthoceras* or possibly a slightly surved *Cyrtoceras*. Diameter posterior to the body chamber 35 mm. Siphuncle fairly large and slightly eccentric. This form probably represents a new species but it would be hazardous to describe it as such at present. The form is certainly not *O. ekwanense* of Whiteaves.

Phragmoceras whitneyi, sp. nov.—One cast of the body chamber of a very large form. The aperture is fully six inches across and the diameter of the body chamber at

its posterior end is four inches. The cast shows a faint indication of a beaded ornamentation. The general shape of the body chamber is much like that of *P. lineolatum*, Whiteaves, but the much greater size seems to justify the establishing of a new species.

?? *Phragmoceras lincolatum*, Whiteaves.—One crushed and broken cast of the body chamber and two air chambers. The ovate outline and the size and position of the siphuncle correspond with Whiteaves' figures, but the ears of the body chamber are broken off so that certain identification is impossible.

Phragmoceras, sp.—Several fragments of the separate portion of a species of this genus with the septa varying from 3 mm. apart on the concave side to 7 mm. on the convex. It is impossible to state whether these fragments belong to the other species listed.

Cyrtoceras, sp. nov.—Cast showing 16 air chambers in a length of 40 mm. Slightly curved. Siphuncle small, eccentric, but not marginal. Resembles *C. orodes*, Billings, but it is less curved and the siphuncle has a different position.

??*Barrandeoceras*, sp. indet.—Portion of the body chamber of a coiled Cephalopod possibly referable to this genus. Section ovate, 24 by 28 mm. in diameter.

Endoceras hudsonicum, sp. nov.—Shell large, four inches or more in diameter. Septa strongly curved, about 7 mm. apart as measured on the surface. Siphuncle 35 mm. in diameter. Funnels reach just to the next septum apicad. No endosiphuncular structures apparent. Siphuncle 20 mm. from the margin of the presumably ventral side. Possibly should be ascribed to the genus *Nanno*.

Actinoceras hearsti, sp. nov.—Shell large, gently tapering. The specimen shows a diameter of about 4 inches. Siphuncle strongly nummuloid, large and marginal, with a central endosiphuncle, diameter 50 mm. Nummuloid beads oblique at about 15 degrees. Rings not evenly convex but greatest anteriorly. Siphuncle less than 5 mm. from the margin. This specimen is much larger than *A. keewatinense*, Whiteaves; it resembles *A. richardsoni* magnum in which the siphuncle is of about the same size but in which the septa are much closer together, and in which the nummuloid beads are of a more regular outline.

TRILOBITES:—

Illaenus (Bumastus) cf. ioxus, Hall.—Portion of a buckler which seems to correspond with this species.

C.—The ten-mile stretch above the Limestone Rapids, Severn River; slightly newer geologically than B.

CORALS:—

Halysites catenulatus, Linnaeus.

Streptelasma, sp. indet.

BRYOZOA:—

Fenestella subarctica, Whiteaves.

BRACHIOPODS:—

Pentamerus oblongus, Sowerby.

Trimerella ekwanensis, Whiteaves.

Glassia variabilis, Whiteaves.

Spirifer crispus, Hisinger.

Delthyris cf. sulcata, Hisinger.—Two casts are very doubtfully referred to this species.

Rectricularia cf. septentrionalis. Whiteaves.—One cast of a small example of this species.

Gypidula sp.—Several specimens of casts of small Pentameroid shells requiring further investigation.

Stropheodonta, sp. indet.—Several small stropheodontoid casts impossible of identification.

CASTROPODS:—

Gyronema dowlingii, Whiteaves.

Gyronema speciosum, Whiteaves.—A small fragment doubtfully placed here.

Diaphorostoma perforatum, Whiteaves.—A crushed and broken body whorl possibly belonging to this species.

Bellerophon, sp. indet.—Apparently the same species as from the Limestone rapids.

CEPHALOPODS:—

Gomphoceras, sp. indet.—Two casts of the body chambers of small individuals of indeterminable species.

D.—Assina Rapids, Severn River.

CORALS:—

Favosites hisingeri, Milne-Edwards and Haime.
Zaphrentis stokesi, Milne-Edwards and Haime.
Acervularia austini, Salter.

BRACHIOPODS:—

Camarotocchia ekwanensis, Whiteaves.—One cast resembling this species. The specimen is somewhat less gibbous than the type.

GASTROPODS:—

Hormotoma whiteavesii, Clarke and Ruedemann.—Three casts of interiors indistinguishable from this species.

Euomphalopterus valeria, Billings.—One very perfect cast of the interior and one mould of the umbilical side. As far as can be judged from casts, these specimens belong to Billings' species.

Phragmoceras cf. whitneyi, sp. nov.—A fragment showing 14 air chambers. This septate portion might well accompany the body chamber herein described as *P. whitneyi*. There is no proof beyond the resemblance in size that the two portions represent the same species.

Actinoceras, sp. nov.—One siphuncular segment of a species evidently different from any other in the collection. The ring is about 55 mm. by 43 mm. with a very distinct endosiphuncle of 12 mm. in diameter. If the direction of the endosiphuncle represents the axis of the shell as it probably does, the siphuncular rings are inclined at a very high angle—considerably more than 45 degrees from the transverse position. The rings are therefore very asymmetric and appear to have been strictly marginal in position.

E.—Limestone Rapids, Fawn River.

CORALS:—

Halysites catenulatus, Linnaeus.
?? *Petraia occidentalis*, Whiteaves.—A small form of Streptelasma or Petraia resembling this form externally. Requires microscopic examination.

BRACHIOPODS:—

Rhynchospira lowi, Whiteaves.
Plectambonites transversalis, Wahlenberg.
Meristina expansa, Whiteaves.

TRILOBITES:—

Encrinurus cf. arcticus, Salter.—One badly preserved and partly exfoliated pygidium, possibly belonging to this species.

These fossils show that the rocks are similar in age to those found by Messrs. McInnis and Dowling on the Winisk and Equan rivers, and that they are approximately of the age of the Guelph limestones of Ontario or of the Middle Silurian of the ordinary stratigraphic series.

Pleistocene

Glacial and Post-Glacial

The hard rocks which have just been briefly described do not seem to have been covered by any sediments laid down between the end of the Silurian period and the beginning of Glacial times, or if such sediments were deposited on any parts of the country they have been completely removed and no trace of them is now to be seen.

The series of events which inaugurated the Glacial Period in this district would appear to have been somewhat as follows:—

From a centre lying to the west of the northern portion of Hudson Bay, somewhere in the vicinity of latitude 62, a glacier which, when I determined its existence in 1894, I called the Keewatin glacier, moved southwards and southeastwards far down across the basin of lake Winnipeg and an undetermined distance into the country east of lake Winnipeg. It brought with it clays, sands and fragments of rock from the western side of the basin of Hudson Bay and distributed them along its course.

After this Keewatin glacier began to shrink and to withdraw from the country which it had occupied for a long period of time, another great glacier formed on the higher level somewhere between Hudson Bay and Lake Superior and flowed northward, and doubtless also westward and southward, over the surrounding lower land. At the same time the basin of Hudson Bay itself was probably larger than it is at present, and was being filled by marine sedimentary deposits.

For this glacier, which has now been definitely recognized for the first time, I propose the name Patrician glacier, to distinguish it from the Keewatin glacier to the west and the Labradorean glacier to the east. The name proposed is derived from that of the immense new district in northern Ontario to which Her Royal Highness the Princess Patricia, daughter of His Royal Highness the Duke of Connaught, Governor-General of Canada, graciously permitted her name to be applied, for in it, somewhere between Trout Lake and the Albany River, this great glacier would appear to have had its centre and gathering ground.

Photo by J. B. Tyrrell, Oct. 4, 1912.
Point of glaciated rock at the south side of Weagamow lake.

As time went by this Patrician glacier gradually dwindled away and the Labradorean glacier assumed the most commanding size and position. It swept down from the highlands of Labrador, crossed the southern portion of the basin of Hudson Bay, and ascended to the watershed south of Hudson Bay, but whether it ever actually crossed this watershed or whether the more southern glaciers that have previously been regarded as portions of the Labradorean glacier have actually been parts of the older Patrician glacier or not, I am not as yet quite certain.

On its way the Labradorean glacier which, while crossing the basin of Hudson Bay, must have been buoyed up to a certain extent by water pressure, scooped up the marine sediments which had accumulated in the Bay and moved them southward over what is now land. This sediment so moved has now lost its sedimentary character, for it has been kneaded up with the shells and any other material contained in it into a homogeneous mass, with but few boulders, though those which it does contain are usually

Photo by J. B. Tyrrell, Sept. 30, 1912.
Surface of Kawagami moraine covered with burnt timber.

Photo by J. B. Tyrrell, Oct. 9, 1912.
Morainic hill of boulders overlying a gray gneiss on the second portage east of Geechika or Little Cedar lake.

striated. The Labradorean till or boulder clay is found to extend in a continuous sheet for about 150 miles back from Hudson Bay, while farther north there are also large, but probably discontinuous, areas covered with similar clay. It is possible that some of this till is now lying not very far from where it was first deposited as marine sediments, but nevertheless it has certainly all been moved and kneaded to some extent by the overriding glacier, for wherever the till had been completely removed the underlying rock was seen to have been strongly scored by this movement.

This clay would doubtless form a rich, fertile soil which could be easily worked by the agriculturist, for the amount of shelly material which is included in it makes it loose and friable.

Besides this vast expanse of till, the Labradorean glacier left a great series of moraines, with accompanying eskers and sand plains, stretched across the country. The last moraine formed on its retreat would appear to have been dropped into the waters of Hudson Bay.

After the Labradorean glacier had retired northward the sea occupied a position about four hundred feet higher than its present level, and marine sands and clays were deposited over the till, such marine deposits being seen on the tops of the cliffs overlooking the streams almost everywhere throughout the last hundred miles from Hudson Bay.

A detailed account of the beds of clay which occur along the course of the various streams followed on the way from Hudson Bay to the Grand Trunk Pacific railway is quite unnecessary here, as it is much better shown on the accompanying map, but nevertheless a few typical examples may be interesting.

On the lower portion of the Severn river till is first seen at a distance of about twenty miles from the mouth, where, in a cliff fifty feet high, the lower twenty-five feet are composed of dark brownish gray till with many striated boulders, among which are some of a hard red conglomerate, similar to the Athabasca sandstone and conglomerate which outcrops in the country northwestwards from Fort Churchill, and also many boulders of a fine-grained greenish-brown quartzite or graywacké which consists of quartz grains in a calcareous and argillaceous cement. Some roundish portions of this rock are much more calcareous than the rest, and these calcareous portions weather out fairly easily, making rounded white spots on the surface of an otherwise dark coloured boulder. On account of this peculiarity of weathering, these boulders are conspicuous and easily recognized, and as they are scattered throughout the till from the mouth of the Nelson river eastward at least to the Severn river, they must have been originally derived from an extensive area of quartzite. Up to the present, however, I have not been able to learn of anyone who has seen similar quartzite in place, and therefore the exact place of origin of these boulders is unknown. However, they are not very unlike the quartzite at Fort Churchill, and may possibly have been derived from an eastern extension of the Churchill quartzite. Besides these two rocks, boulders of granite, limestone, etc., which did not appear to have any specific characteristics were also common in the till.

Silurian Fossils on Nelson and Hayes Rivers

At the mouth of the Nelson river the till is very similar in character to that on the Severn river, but limestone pebbles are more numerous, and all appear to be of Silurian age. As proof of the age of these limestonese the following species of fossils were collected from loose fragments of limestone on the banks of the Nelson and Hayes rivers:

Favosites gothlandica.
Acervularia austini.
Conchidium decussatum.
Rafinesquina alternata.
Atrypa reticularis.
Phragmoceras parvum.

Cyrtoceras cordatum.
Actinoceras n. sp.
Isochilina grandis var. *latimarginata.*
Leperditia hisingeri.

Professor Parks supplies the following notes and descriptions of the above species:

F.—Drift at mouth of Nelson river:—
Favosites gothlandica. Lamarck.—A small and doubtful specimen.
Streptelasma or *Zaphrentis* sp. indet.
Acervularia austini, Salter.
Conchidium decussatum, Whiteaves.
?*Rafinesquina alternata.* Emmons.—Several *Strophomenoid* shells of which one strongly resembles this species. All are mere casts.
Phragmoceras cf. parvum. Hall and Whitfield.—Several casts of a species closely resembling this form.
Cyrtoceras cordatum, sp. nov.—One cast of the interior of the septate portion. Curvature, slight. Section, ovate, at the anterior end of the specimen, measuring 24 mm. dorso-ventrally and 19 mm. laterally. The venter is marked by a distinct cordate prominence, near which is situated the small elliptical siphuncle. The septa are about 2 mm. apart. This form suggests *C. cuneatum*, Whiteaves, but it is not co-specific, as the septa are 6 mm. apart in that species. The following remark by Dr. Whiteaves *re C. cuneatum* would apply equally well to this specimen. "It is evidently not a true *Cyrtoceras*, but a probably new generic type, which there is not yet sufficient material to define satisfactorily." In the same piece of rock is a species of *Lophospira*, not seen elsewhere in the collection.

H.—Drift on Hayes river, near York Factory.
Actinoceras sp. nov.—This form is nearer to *A. keewatinense*, Whiteaves, than any other in the collection. It is, however, less oblique and the rings are much narrower and closer together.
Isochilina grandis var. *latimarginata.* Jones.—Several casts closely resembling this form, but perhaps varying a little in the form of the tubercle.
Leperditia hisingeri, Schmidt.

K.—Drift on Hayes river.
Atrypa reticularis. Linnaeus.
Acervularia austini, Salter.—Several rolled pebbles of fine-grained corals or bryozoans which will require microscopic examination.

In addition to boulders of limestone, granite, diorite, etc., the till of this locality contains others of brownish quartzite with whitish eyes, similar to those mentioned above, greenish diabase, anorthosite, red Athabasca sandstone, Iron formation, and red porphyritic rocks similar to those which I found in 1893 occurring in the vicinity of Dubawnt Lake.

Mr. Ellis Thomson has furnished the following descriptions of microscopic sections of some of these boulders of red porphyry:—

No. 1.—A porphyritic rock with large phenocrysts of orthoclase and smaller ones of quartz in a medium-grained ground-mass of quartz, orthoclase and iron oxide. Ilmenite and apatite are rare constituents while the two alteration products, chlorite and leucoxene, are present in considerable quantities. The quartz crystals are for the most part fresh, but the feldspar phenocrysts are considerably weathered.

No. 2.—Another porphyritic rock with phenocrysts of plagioclase and orthoclase, as well as a very few quartz crystals, in a fine-grained ground-mass of needle-like feldspars (mostly plagioclase), quartz, chlorite, and hematite, the quartz showing granophyric structure. Magnetite and apatite are fairly prominent accessory constituents. The alteration products, chlorite, serpentine, and calcite, are also present in appreciable amounts. This rock probably corresponds most closely in composition to the micropegmatites or granophyres, similar to those found in the Sudbury district, although so greatly altered as to make this identification doubtful.

No. 3.—A highly weathered porphyritic rock with phenocrysts of plagioclase, orthoclase, and quartz. The ground-mass is very fine-grained, and is composed of quartz, feldspar, and iron oxide, the quartz showing granophyric structure. Magnetite, epidote, and chlorite are present in considerable quantities, while ilmenite, leucoxene, apatite, and fluorspar are more or less rare constituents.

The Northern Tills

On Hayes river the heavy bed of till extends up as far as Swampy lake, at an elevation of 500 feet above the sea. This is about the same elevation to which till extends as a regular uniform sheet on the Severn river farther east.

As we ascended the Severn river the underlying limestone was everywhere found to be covered by till similar to that above described. Also after leaving the Severn river and branching into its large eastern tributary which is known on the map as the Fawn river, though this name is unknown to the Indians of the vicinity, the banks continued to be formed of similar till. In many places there is a distinct horizontal dividing line in this till, and just beneath that line is often a well defined boulder pavement with the upper surfaecs of the boulders planed off and strongly grooved and striated in a direction north 10° west or south 10° east.

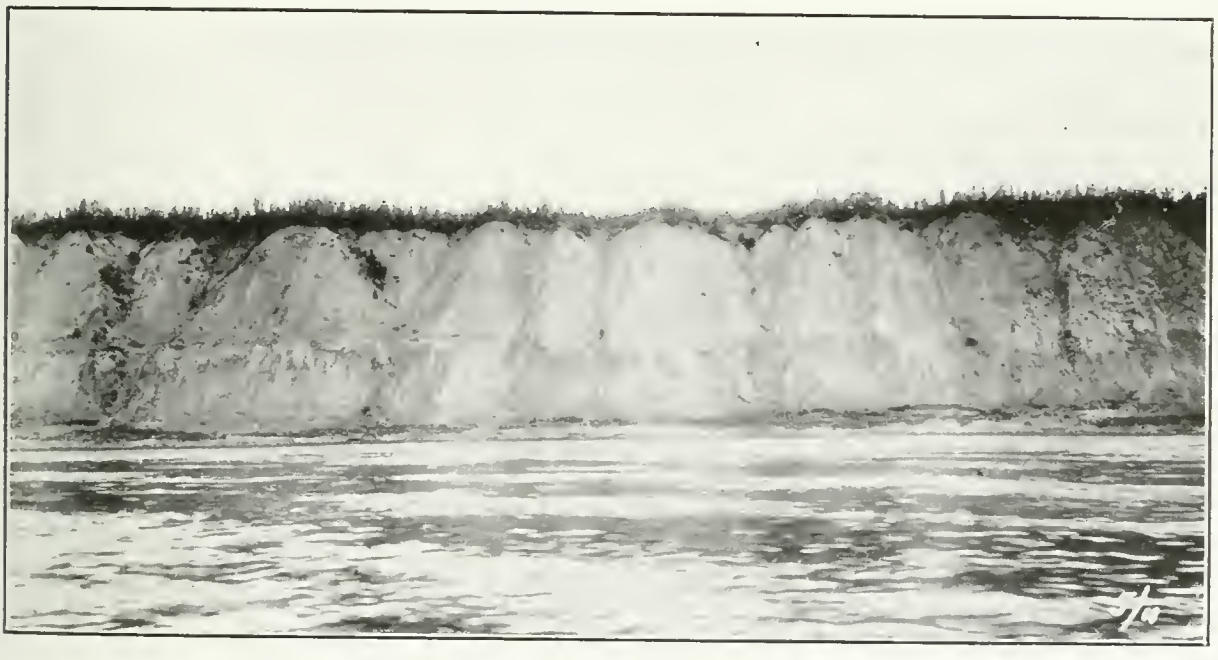


Photo by J. B. Tyrrell, June 29, 1912.
Cliff showing the upper and lower till on the bank of the Shamattawa river.

On the Hayes river the upper and lower tills are often separated by a bed of stratified sand or gravel in which I searched in vain for fossils of any kind; on the Shamattawa river this dividing layer of sand was also often conspicuous, and in one place in it, as well as for a foot or two up into the till above the sand, moss and wood, partly altered to lignite, were recognized.

These banks of till continued uninterruptedly all the way up the Severn river to within a short distance of the lowest granite outcrop, when they gradually disappeared.

Through much of the distance from the mouth of the Severn up to the first exposure of granite rock the till was overlain by a varying thickness of stratified sands and clays carrying marine fossils. The surface of the till beneath these marine deposits is for the most part remarkably even and regular, no prominent hills or valleys being recognisable, except such as have been formed by later denudation and erosion. This regularity in the old surface contour of the till is a remarkable feature. It emphasizes the mental impression created by the nature and character of the till itself, namely, that it is simply a marine deposit nearly in place, which has everywhere lost its definite stratified character. Wherever it is seen to be underlain by rock there is evidence that it has been moved over that rock, for the rock is strongly grooved and polished. The

boulders and pebbles which are contained in the till have been distinctly striated by movement over each other.

This vast area in the northern part of the district of Patricia, and in the adjoining portion of the Province of Manitoba, which is covered by till and marine sands and clays, has an average slope of about five feet to the mile northward towards Hudson Bay. This is abundantly sufficient to enable it to be effectively drained, and when drained it should prove to be a rich agricultural land, the southern portions of which would doubtless grow grains, such as are ordinarily grown in Manitoba and in the valley of the Saskatchewan, while the northern portions would furnish an abundant supply of grass and fodder for cattle and horses.

A short distance south of the mouth of Fawn river a ridge runs east and west roughly parallel to the shore of Hudson Bay. This ridge has not yet been explored, but judging from such information as was obtainable about it, it would appear to cross the Hayes river near the mouth of the Shamattawa, and thence to extend eastward as a series of lumpy hills, with intervening lakes, which constitute a famous hunting ground

Photo by P. E. Hopkins, Sept. 17, 1912.
Lowest exposure of granite on Fawn river, showing two sets of glacial grooves and striae running respectively North 30° West and South 40° West.

for some of the Indians at York Factory, and are known to them as the "Wachi" or Mountain. Thence it continues on, across the head waters of Goose river, Goose lake being one of the lakes by which it is broken, thence across the Severn river and away into the country towards the east. On looking at the map it may be seen that the lower course of the Fawn river and the long west to east course of the Winisk river are controlled by it. At first this ridge seemed to me to be simply an old shore line of Hudson Bay. While it is doubtless such a shore line, I am reasonably satisfied now that it follows an old water-laid moraine of the Labradorean glacier which was laid down in the bottom of Hudson Bay as the face of the glacier receded northwards. As it was laid down in the water it does not exhibit the same rough, irregular characters as many of the moraines hereafter to be described in the higher country farther south.

Near the first exposure of granite rock on Fawn river, which is at an elevation of about six hundred feet above the present sea level, the surface of the country assumes a more stony character than it had farther north, and gravel ridges which are either eskers or beaches of extra-glacial lakes make their apperance. Thus we have here evidently reached a point where we are above and beyond the post-glacial marine sediments.

Clayey till continues to fill the bottoms of all the depressions and, in fact, to cover all the country except the more prominent rocky points.

Still farther south the rocky points become more prominent and rise to somewhat higher positions above the till. However, the clayey till is still the governing factor in the country southward to Trout lake and beyond it.

On the south side of Trout lake a high granite ridge rises as a conspicuous feature. Our course was up Mishwamágan river, a small stream which flows into the south side of the lake and breaks through and across this granite ridge in a series of heavy rapids. On the top of and on the southern slope of the granite ridge a large number of boulders, chiefly of granite, but some of greenstone, are scattered over the surface, and these doubtless represent a moraine which marked the front of the Labradorean ice sheet at one time in its southern advance. As this is the first strongly marked land moraine recognized on our journey southward this summer it will be convenient to designate it as the Trout lake moraine.

Photo by J. B. Tyrrell, Oct. 4, 1912.
Field of potatoes at Hudson Bay Company's trading post, Trout lake, District of Patricia, Ontario.

From the Trout lake moraine southward the country for a number of miles has comparatively little soil on it, the gray granite forming the surface for considerable areas. The fact that the forest was burned some years ago, and that a new growth has not yet started, tends to give the district a decidedly forbidding aspect. The presence of a great number of lakes between the rocky hills also clearly indicates that the supply of loose material left here on the retirement of the glacier was small, not being sufficient to fill even the minor depressions on the surface.

The ascent of Mishwamágan river was broken by many rapids, past which it was necessary to carry the canoes and outfit on trails which had been moderately well cut out by the Indians.

Near the source of this river is a lake called Kawagami lake which is surrounded by stony morainic hills, giving evidence of the deposition of a heavy moraine on the top of a secondary height of land. This moraine is one of the strongest seen during the summer and may be designated as the Kawagami moraine. To the south of this moraine lie Kwyuswagami and Makoop lakes, both extensive bodies of water lying in the midst of comparatively low country, the surface of which is chiefly composed of stony clay or till interspersed with ridges of sand and rounded gravel. Both these lakes, but chiefly the latter, are recognized by the Indians as being excellent fishing places. There is a small and permanent Indian village on the shore of Makoop lake. It is interesting to note that the best fishing lakes in the northern parts of Canada usually lie in country which is more or less thickly covered with clay and soil, and that the bottoms of these lakes are composed of mud. Whitefish, on which the natives mostly rely for food, favour a mud bottom, on which they can obtain an abundant supply of the lower forms of animal life on which they feed.

At the Indian village on Makoop lake potatoes seem to be regularly grown, and I was surprised to see a number of sharp-tailed grouse or Manitoba prairie chicken flying about.

From Makoop lake southward to Weagamow lake the country is covered by glacial clays and sands, though higher rocky hills rise as bare knolls above the general level.

Weagamow lake itself is an extensive though shallow sheet of water which lies in a basin of glacial clay. The glacial clay extends southward along the course which we followed up the Saskatchewawa river to Agutua lake, which lies at the foot of a number of high, sandy, esker-like hills. These hills of sand and gravel in their turn rest, in some cases at least, on the tops of stony morainic ridges.

The canoe route that we were following crossed a portage three and a half miles long over the top of one of these esker ridges from Agutua lake to Windigo lake, the latter of which is also surrounded by banks of sand and clay.

The great moraine which crosses the country near Agutua lake may be designated the Agutua moraine, and it is not improbable that the last advance of the Labradorean glacier terminated at it or in its vicinity.

From Windigo lake southward to the height of land the clay-covered areas become less and less frequent and extensive, and from the height of land southward around Cat lake and down Cat river to lake St. Joseph such deposits of drift as exist consist mostly of stony and sandy ridges, many of which have a definite esker-like character, and sand plains, doubtless formed by overwash near the face of the glacier.

From the above description of the drift-covered parts of the district of Patricia it will be seen that the Labradorean glacier, as it advanced southward up the slope from Hudson Bay, distributed a covering of till over large areas of country, and most of this till is not too stony to be of definite value for agricultural purposes. The extent of the land so covered is as yet quite unknown, but it will undoubtedly amount to tens of thousands of square miles.

Evidences of Glaciation

It is evident from what has been said above that the clay-covered areas are dependent for their existence, present position and condition on the glacial history of the country.

A short summation of this history was given at the beginning of this chapter, but it may be interesting to enumerate in somewhat greater detail a few of the observations on which that summary was founded.

At the Limestone rapids, twenty-eight miles above the mouth of the Severn river, there is a thickness of about thirty-five feet of till above the limestone, and the surface of the limestone, where it has not been exposed for any length of time, is beautifully scored in a direction south 55 degrees west by the movement of the Labradorean glacier over it. In some protected recesses, grooves and striae running north 5 degrees east

were seen, caused by the northward movement of the Patrician glacier before the advance of the Labradorean glacier.

Farther up the Severn river the Labradorean glacier was evidently buoyed up or supported in some way so that it did not touch the underlying limestone for, throughout a distance of eight or ten miles, the rock is everywhere scored by grooves and striae pointing from north to north 10° west, the direction of the movement being often quite clearly defined. How the glacier was supported is not clear. It is hardly possible that the water could have been sufficiently deep to float it, so that it is likely that it slid over some of the till of the pre-existing glacier which had here remained frozen.

Near the mouth of the Fawn river, at a distance of sixty miles or thereabouts from Hudson Bay, the rock is again scored in a direction south 60° west by the Labradorean glacier, but on Fawn river, just where the limestone was last seen at the south end of a little cliff, the scorings of the Patrician glacier are again quite discernible bearing north 10° east.

Photo by J. B. Tyrrell, Oct. 12, 1912.
Glaciated gneiss on the height of land portage between Severn and Cat rivers. The rifle points in the direction of the striation, which is South 80° West.

At the first granite rock seen on the Fawn river the scorings of the two glaciations are quite distinct. The scorings of the first one trend north 30° west, and show in protected recesses on a slightly irregular surface generally scored by the Labradorean glacier which moved south 40° west.

Thence southward all the way to Trout lake the two sets of scorings are quite distinct and recognizable, the later ones belonging to the Labradorean glacier, having however rather more definite courses than those of the earlier Patrician glacier, which swung slightly more to the west as it went farther and farther south.

In Trout lake itself the evidences of these two glaciations are beautifully clear and distinct. Many low rocky islands rise a few feet above the surface of the water, and it is at once noticeable that these islands differ from most of those seen in glaciated countries, inasmuch as they are rounded up from almost all sides, the only rough broken surfaces being to the west. On a closer examination it is found that they have at first been heavily planed and scored by a glacier moving north 25°—north 40° west, after which they have been again planed and grooved by a glacier moving south

40° west. The first planation was caused by the Patrician glacier, which would appear to have had a centre somewhere in the high country to the southeast of Trout lake, while the second was caused by the Labradorean glacier from the northeast.

South of Trout lake the evidences of the two distinct glaciations are often much more difficult to decipher, but there is no doubt that the Labradorean glacier extended as far south as the height of land where it formed the great Agutua moraine, and at the same time it also formed the high eskers which now rise as steep hills on the height of land and constitute the most conspicuous features in the whole region.

South of the height of land the presence of the Labradorean glacier is not by any means certain, for it is quite possible that all the scorings, moraines, eskers, and other glacial phenomena may have been caused by the westward or southwestward moving portions of the Patrician glacier which had its centre east of our line of travel on the height of land itself. The absence or rarity of scoring on the rocks of the height of land would appear to support this latter conclusion.

Photo by J. B. Tyrrell, June 24, 1912.
Grooves and striae running South 25° East, made by the Keewatin glacier on "The Rock" in Hayes river.

West of the Severn river, and between it and the Hayes river, very few records of glacial conditions have been made, but on the Hayes river itself I found evidence at "The Rock," which is the lowest exposure on the river, that there was a western-moving glacier which was probably the western extension of the Patrician glacier, subsequent to which there was a southeastern advance of the Keewatin glacier. The hill on the east side of Hayes river, which is known as "The Hill" or Chacutinaw, is an esker from one of these glaciers resting on top of a morainic ridge which extends away to the east, the conditions being very similar to those at the sandy hills at the head waters of the Severn river.

The following list of glacial striae observed during the summer will give any glacialist a clear idea of the conditions as we found them.

Glacial Striae on the Severn, Albany and Winnipeg Rivers

Sept. 5.	Severn R. Limestone Rapid	1st.	N. 5°-10° E.
Sept. 7.	Severn R.	2nd.	S. 55° W.
Sept. 7.	Severn R. 2½ m. above Limestone Rpd.		N. 10° W.
Sept. 7.	Severn R. 3 m. above Limestone Rpd.		N. 10° W.
Sept. 7.	Severn R. 3½ m. above Limestone Rpd.		N.
Sept. 7.	Severn R. 3.6 m. above Limestone Rpd.		N. 10° W.
Sept. 7.	Severn R. 7.2 m. above Limestone Rpd.		N.
Sept. 9.	Severn R. Limestone cliff		S. 60° W.
Sept. 9.	Fawn R. Limestone cliff		S. 60° W.
Sept. 9.	Fawn R. Limestone cliff		N. 10° E.
Sept. 10.	Fawn R. Boulder pavement		N. 10°-20° W. or opp.
Sept. 17.	Fawn R. First rock	1st.	N. 30° W.
		2nd.	S. 40° W.
Sept. 17.	Fawn R. First Portage		S. 45° W.
Sept. 19.	Fawn R. Ninth Portage		S. 45° W.
Sept. 19.	Fawn R. Tenth Portage		S. 50° W.
Sept. 19.	Fawn R. Eleventh Portage		S. 50° W.
Sept. 20.	Fawn R. Twelfth Portage	1st.	N. 15° W.
		2nd.	S. 40° W.
Sept. 20.	Fawn R. 1 mile above Twelfth Portage	1st.	N. 15° W.
		2nd.	S. 40° W.
Sept. 20.	Fawn R. Thirteenth Portage	1st.	N. 20° W.
		2nd.	S. 40° W.
Sept. 20.	Fawn R. Between 14th and 15th Portages	1st.	N. 30° W.
		2nd.	S. 40° W.
Sept. 21.	Fawn R. Below Sixteenth Portage		S. 40° W.
Sept. 21.	Trout Lake Island, 4 miles w. of river	1st.	N. 25° W.
		2nd.	S. 35° W.
Sept. 21.	Trout Lake Island, 2 miles w.	1st.	N. 35° W.
		2nd.	S. 40° W.
Sept. 23.	Trout Lake, Hudson Bay Island	1st.	N. 30° W.
		2nd.	S. 40° W.
Sept. 24.	Trout Lake, Big Island	1st.	N. 40° W.
		2nd.	S. 40° W.
Sept. 24.	Island 2 m. s. of Big Island, Trout Lake	1st.	N. 40° W.
		2nd.	S. 40° W.
Sept. 27.	Mishwamagan River		S. 45° W.
Sept. 30.	Kwyuswagami		S. 80° W.
Sept. 30.	Makoop Lake		N. 65° W.
Sept. 30.	Makoop Lake		S. 85°-90° W.
Oct. 1.	Negigamo River		S. 20° W.
Oct. 2.	Ningitowa River		S. 55° W.
Oct. 2.	Ningitowa River, Ojiji Rapid		S. 60° W.
Oct. 2.	Ningitowa River, Wapekemung Rapid		S. 60° W.
Oct. 3.	Ningitowa River, Cheassin Lake		S. 25° W.
Oct. 4.	Ningitowa River, Kabadenegum Portage		S. 35° W.
Oct. 4.	Weagamow Lake		S. 55° W.
Oct. 4.	Saskatchewawa River		S. 55° W.
Oct. 5.	Saskatchewawa River		S. 55° W.
Oct. 8.	Windigo Lake, Island		S. 15° E.
Oct. 8.	Windigo Lake, Lunch		S. 5° E.
Oct. 8.	Windigo River, Chepowestik		S. 5° W.
Oct. 9.	Windigo River		S. 20° W.
Oct. 9.	Windigo River, 44th portage		S. 5° W.
Oct. 9.	Windigo River, 46th portage		S. 25° W.
Oct. 11.	Kishika River, 54th portage		S. 75° W.
Oct. 12.	Kishika River, S. 63rd portage		S. 85° W.
Oct. 12.	Wapasiniskak		N. 85° W.
Oct. 12.	Wapasiniskak		S. 85° W.
Oct. 13.	Cat River, 65th portage		S. 82° W.
Oct. 15.	Cat River, 70th portage		S. 55° W.
Oct. 15.	Cat River, Below 70th portage		S. 65° W.
Oct. 15.	Cat River, Smoothrock Lake, entrance		S. 60° W.
Oct. 15.	Cat River, Smoothrock Lake, Narrows		S. 60° W.
Oct. 15.	Cat River, Smoothrock Lake, Outlet	1st.	S. 10° E.
		2nd.	S. 25° W.
		3rd.	S. 55° W.
Oct. 16.	Cat River, 72nd portage		S. 52° W.

Oct. 17.	Cat River. Camp 16-17		S. 70° W.
Oct. 17.	Cat River. 75th portage		S. 65° W.
Oct. 17.	Cat River. 3 m. above Blackstone Lake		S. 47° W.
Oct. 18.	Lake St. Joseph		S. 55° W.
Oct. 18.	Lake St. Joseph		S. 45° W.
Oct. 19.	Root River		S. 40° W.
Oct. 21.	Lac Seul. Old H. B. Warehouse	1st	S. 65° W.
		2nd.	S. 50° W.
	Lac Seul. Lunch	1st.	S. 70° W.
		2nd.	S. 50° W.
Oct. 22.	Lac Seul. Lunch		S. 45° W.
Oct. 23.	River		S. 45° W.

Striae Observed on the Hayes River in Manitoba

Hayes River:—			
June 24.	The Rock	1st.	S. 65° W.
		2nd.	S. 85° W.
		3rd.	S. 20° E.
June 24.	1 mile above The Rock		S. 25° W.
June 24.	Rocky Rapid, $4\frac{1}{2}$ miles above "The Rock"	(grooves)	S. 20° W.
		(grooves)	S. 60° W.
		(grooves)	N. 75° W.
		(striae)	S. 40° W.
June 23.	2 miles below Nisotaniga Rapids		East or West.
June 19.	Oxford Lake		S. 50° W.
June 17.	Pot-hole point, Pine Lake		S. 50° W.
June 17.	Jackpine Rapid		S. 50° W.
June 14.	Near upper end Robinson portage		S. 45° W.
June 13.	Echimamish River		S. 42° W.
June 12.	Nelson River		S. 50° W.

Recent Deposits

On the maritime plain in the northern part of the district of Patricia the recent deposits are represented chiefly by clays and sands which have been laid down in the receding waters of Hudson Bay on top of the previously formed beds of glacial till. In most cases these deposits are rather thin, for the supply of sediment appears not to have been abundant.

On the lower portion of the Hayes river, however, the stratified clays and sands are very much thicker than usual, for there would appear to have been a deep embayment in the Post-glacial shore line at this point, into which a mud-laden stream probably emptied and deposited its load of mud and sand as it reached quiet water. The lower beds in this old embayment were probably deposited close to the receding face of the Labradorean glacier, for though they are of soft dark gray clay, they contain a considerable number of glaciated boulders, most of which are lying at a definite horizon near the top of a well defined clay bed, associated with marine shell in considerable abundance. The higher overlying beds are chiefly of fine or coarse sand and they also contain many well preserved marine shells.

The embayment or valley was not of very great width, for the west banks of the Hayes river to the west of it and the banks of the Machichi river to the east are both composed almost entirely of till.

The causes which led to the formation of this embayment or depression in an otherwise evenly till-covered country are not quite clear. It can hardly have been caused by subaerial erosion in Post-glacial times, for no other evidence of elevation of the land and subsequent subsidence and re-elevation such as would be necessary to permit of the erosion of such a valley were observed, and all other evidence at hand indicates clearly that there has been only one elevation of the land since the retirement of the Labradorean glacier from the country. It seems possible however, that this valley or embayment marked the western limit of the Labradorean glacier, and of the till formed under it, on Hudson Bay, and that the till on Nelson river, west of this old valley, was formed entirely either by the Keewatin or Patrician glacier or by both.

Subsequently, in Post-glacial times, this old valley of the Hayes river was filled with marine sediments to the level of the surrounding till-covered plain.

As a general rule the maritime plain, over which the marine sediments were spread in a sheet of varying thickness, extends inland from the shore of Hudson Bay to distances varying in different places from 75 to 150 miles. Across this plain a number of gravel ridges extend more or less continuously in a direction roughly parallel with the present shore of Hudson Bay, the more southern ones being constantly higher than the ones farther north. These ridges represent old shore lines of the Bay formed as the land rose very gradually to its present elevation and as the water receded to the shore which it now washes.

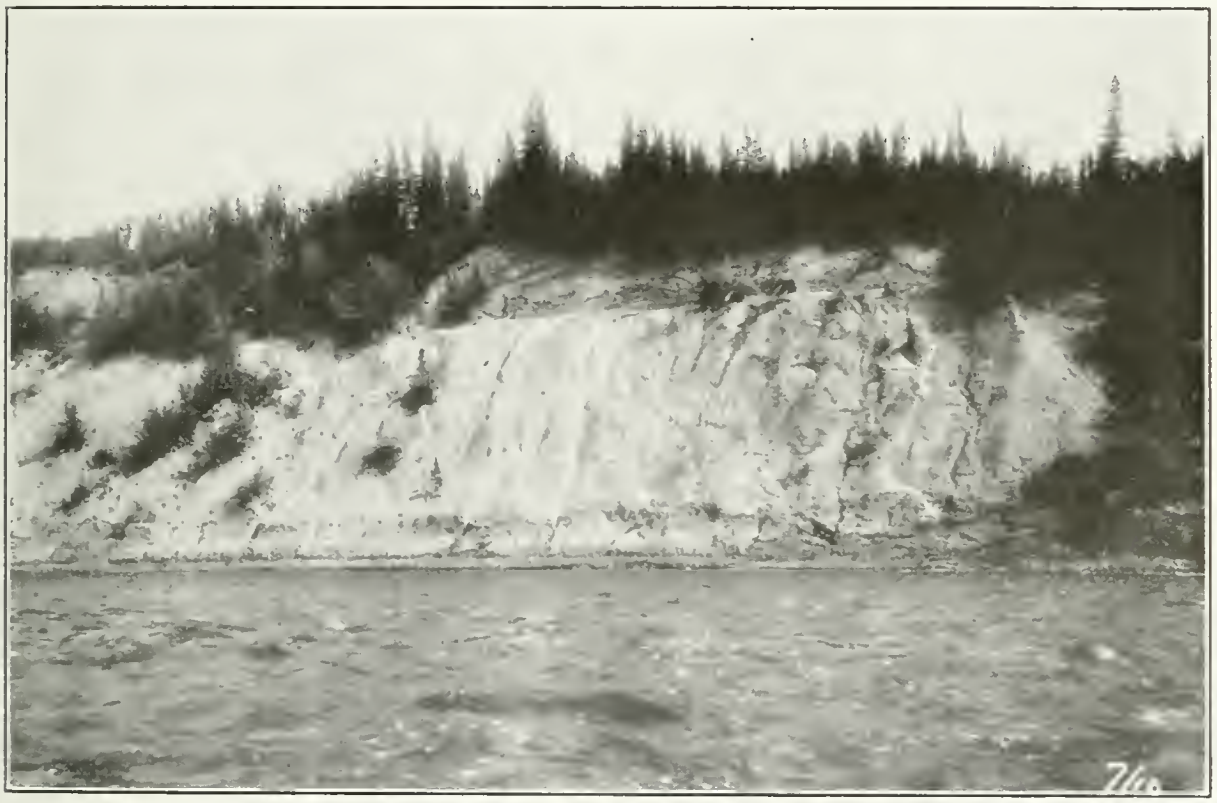


Photo by J. B. Tyrrell, June 25, 1912.

Cliff of till overlain by stratified marine sands on the east side of Hayes river.

Among the lowest of these old beaches one of the strongest may be seen on the west bank of Severn river 650 yards south of the trading post of the Hudson's Bay Company, with its crest 40 feet above high tide of Hudson Bay. On it a Mission church has been built, and behind the church an Indian trail starts northwestward and follows it for many miles as it forms a narrow dry belt through the adjoining swamp.

Farther up Fawn river, a branch of the Severn river, and near the mouth of Otter river, an extensive sand plain would appear to represent the highest of these old marine shore lines, where a delta had been formed at the mouth of some inflowing stream.

Farther inland, south of the maritime plain, most of the recent stratified deposits observed were formed immediately in front of either the Labradorean or the Patrician glacier, or they were directly connected with one or other of these two glaciers, but the areas covered by such extra-glacial deposits did not appear to be anywhere very extensive.

THE LAKE OF THE WOODS AND OTHER AREAS

By Arthur L. Parsons

Introduction

In accordance with instructions received from Mr. T. W. Gibson, Deputy Minister of Mines, the writer left Toronto on May 16, 1912, to do additional work in the vicinity of Lake of the Woods. In anticipation of the meeting of the 12th international Geological Congress to be held in Toronto in 1913, instructions were given to prepare a suitable excursion to show the essential features of the geology of the region. It was consequently necessary to review the work that had been done not only by the writer but by other geologists in that part of the lake within twenty-five miles of Kenora, so that the visiting geologists might have an opportunity of seeing typical examples of the larger divisions of the Keewatin as well as the less prominent but no less interesting Laurentian and Keweenawan rocks. In this work a few minor changes in the mapping of the Keewatin and Laurentian have been made and four Keweenawan dikes of quartz diabase have been traced. Most of the mines where work had been done in the preceding year were visited, and some prospects were examined, but most of the early part of the summer was primarily devoted to the preparation of the Congress excursion. The guide book for this excursion has been prepared and it is accompanied by a map showing the geology of the region covered by the proposed excursion.

On finishing this part of the work a geological section of the country between Kenora and the Manitoba border was made, which was later supplemented so as to give such a section as could be made on the train from Winnipeg, Manitoba, to Cartier, Ontario. The results of this work are embodied in the annotated time-table of the excursion of the International Geological Congress from Toronto to the Pacific Coast.

About the middle of August supplementary instructions were received to co-operate with Dr. A. E. Barlow in the preparation of excursions at Port Coldwell, Loon lake and Port Arthur, and the remainder of the field season was devoted to this work. Brief guides to the geological features near Loon lake and Port Arthur have been prepared by the writer, while the Port Coldwell guide was prepared by Dr. Barlow.

In carrying out the work of the season, Mr. C. W. Greenland, of Port Arthur, my assistant, rendered most efficient aid and was particularly valuable in the region around Port Arthur and Loon lake, with the geology of which he was very familiar, so that time and labour were saved in preparing the excursions at these places.

While in Lake of the Woods region, the party was further supplemented by a canoeman who also acted as cook, and in this capacity Mr. James Smith and Mr. Charles Flett, of Kenora, and Mr. Edward Wright, of Dryden, rendered efficient service.

Result of Summer's Work

The work of the season was necessarily limited to regions which have been the subject of careful study by other geologists, and in most cases it is only necessary to confirm their work. Several minor changes have, however, been noted which are indicated on the accompanying maps. The most important additions are the remarkable Keweenawan dikes, which have been traced entirely across the northern part of Lake of the Woods. In addition, a new granite area was found on the north side of Andrew bay and a smaller outcrop of granite at the south end of the Devil's Gap channel. Near Bare point an outcrop of sericite schist has been differentiated from the adjoining traps, and the boundaries of the clay slates, traps and granite near the Canadian Homestake (formerly the Scramble) mine have been materially revised. Three hitherto unmapped lakes on the north side of the Grande Presquile were found and a compass survey made. An examination of numerous granite outcrops gives

Northern part of Lake of the Woods, scale 4 miles to the inch.

strong grounds for correlating the Laurentian granites and those to which a later origin has heretofore been assigned. Evidence was also found near the Keweenawan dikes which strongly suggests, but does not definitely prove, that the rocks which are mapped as clay slates, etc., are merely highly altered phases of the more common types of Keewatin rocks.

Geology

The rocks of the Lake of the Woods region all belong to the pre-Cambrian and are divided into three general ages—Laurentian, Keewatin and Keweenawan (?). The earlier work by Dr. Robert Bell shows the Keewatin as Huronian, and the presence of the Keweenawan was not mapped. Later, Dr. A. C. Lawson showed that the rocks mapped by Dr. Bell as Huronian were different from any known Huronian rocks, and suggested the term Keewatin for these ancient traps and schists. He also found several outcrops of the Keweenawan diabase, and made a differentiation between some of the granites, assigning part to the Laurentian and others to a later period. The series as mapped by him are as follows:—

LAURENTIAN.

KEEWATIN.

Hydromica schists, etc.
Clay slate, etc.
Agglomerates
Hornblende schists and altered traps.

LATER GRANITES.

LATER DIABASE.

In addition, he indicated several outcrops of carbonaceous schist, dolomite and serpentine, the last of which may in some instances be found to be connected with the Keweenawan. His later work in the Rainy Lake region resulted in a further subdivision of the Keewatin as follows:—

Altered traps, etc.
Conglomerates
Altered quartz porphyries, etc.
Fragmental rocks, graywackés, volcanic tuffs, agglomerates
Soft glossy gray schists and slates
Gabbro
Serpentine

For purposes of mapping the writer has adopted the classification given by Dr. Lawson in the map of Lake of the Woods.

Laurentian and Later (?) Granites

In addition to the enormous areas of Keewatin rocks in the Lake of the Woods region are great masses of granite and gneiss which have been referred to the Laurentian. This term has been used by some in a rather loose sense to indicate a granite gneissic rock, without any attempt to define the geologic age to which it might belong, but by others more definite age has been assigned to these rocks. In his work on Lake of the Woods, Dr. A. C. Lawson made a distinction between some of the granites, referring part to the Laurentian and others to a later date. The committee on pre-Cambrian nomenclature for the Lake Superior region has recommended that those granitic masses which protrude through the Keewatin and antedate the Huronian, should be called Laurentian, but does not restrict the term to such masses, though when the name is used for later granites an explanatory term should be added.

In the Lake of the Woods region it is well nigh impossible to determine the exact age of these masses, because no rocks are known except the granites between the Keewatin and Keweenawan. It is possible that some of the rocks which are now looked upon as Keewatin may at some time be found to be Huronian, but so far as our present

knowledge goes we can merely say that most of the granites are post-Keewatin and pre-Keweenawan, and the writer would adopt for all of the granite that he has seen, with the possible exceptions of the Log bay and Regina bay masses, the term Laurentian. In apparent contradiction to this view, those masses which have been classed as later granite by Dr. Lawson are indicated on the maps accompanying this report as possible later granite. In this way the smaller detached areas which may be of different age from the large masses are kept separate.

It may be said of the Laurentian masses that they are by no means simple, and very frequently as many as four distinct generations of rock may be seen in one small outcrop. This condition is usually near the contact with the Keewatin rocks, and a common phase shows inclusions of highly altered Keewatin in Laurentian gneiss with dikes of granite and pegmatite cutting the gneiss. This is well shown in a cut on the Canadian Pacific railway at a point about 18 miles west of Kenora.

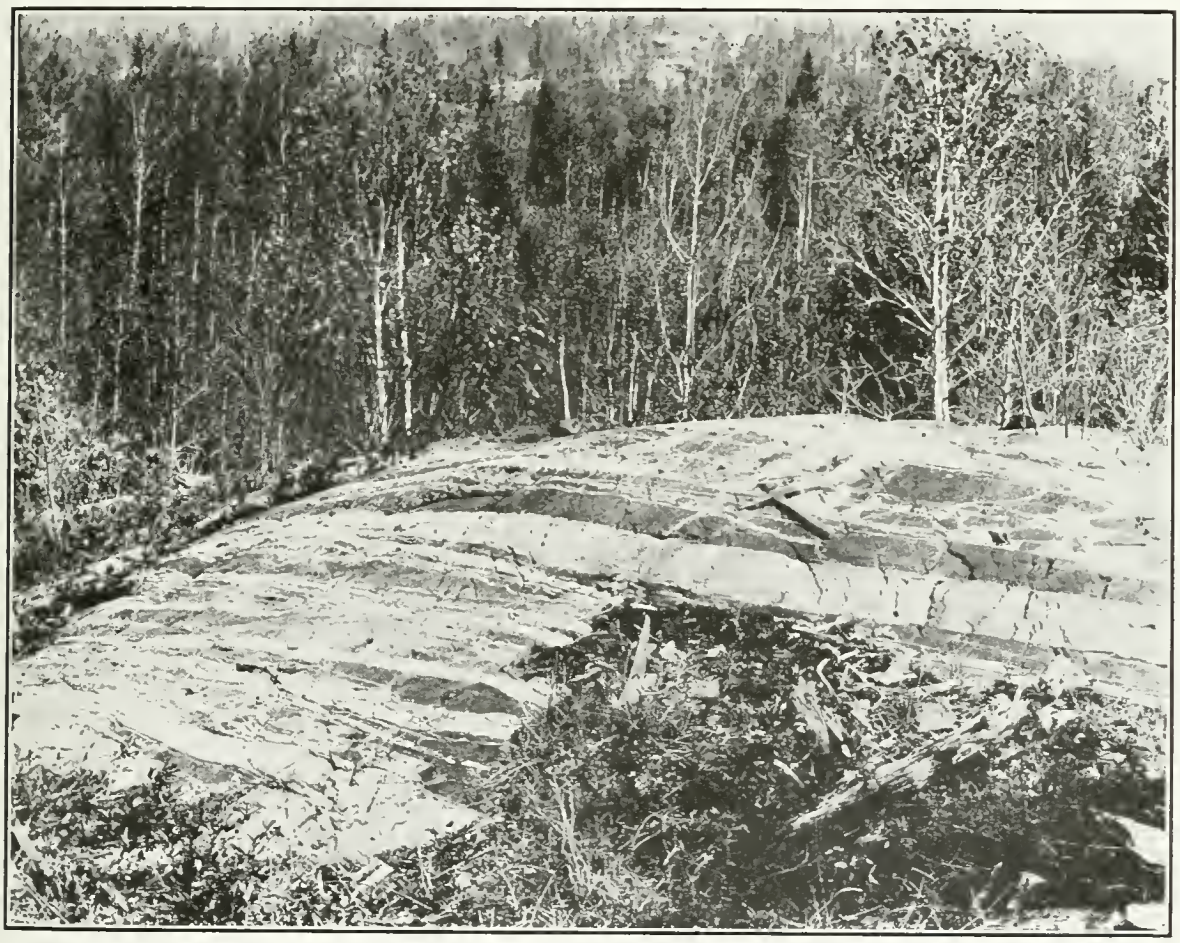


Fig. 1.—Contact breccia between granite and Keewatin schists, Sultana mine.

In comparing the outcrops of the Laurentian with the so-called later granite, it is found that where the contact relations are shown the accompanying phenomena are apparently the same. Usually the granite appears as a rounded boss or series of bosses protruding through the Keewatin. The summit of the boss has generally been denuded of all traces of Keewatin rock, but lower down the contact is marked by a contact breccia, which varies in its appearance as a result of the differences in the adjoining rock. In some cases the breccia resembles a banded gneiss. This is due to schistosity in the adjoining Keewatin rock which permitted the molten granite to force its way between the planes of schistosity. An excellent example of this type of breccia from Sultana island is shown in the accompanying illustration (fig. 1).

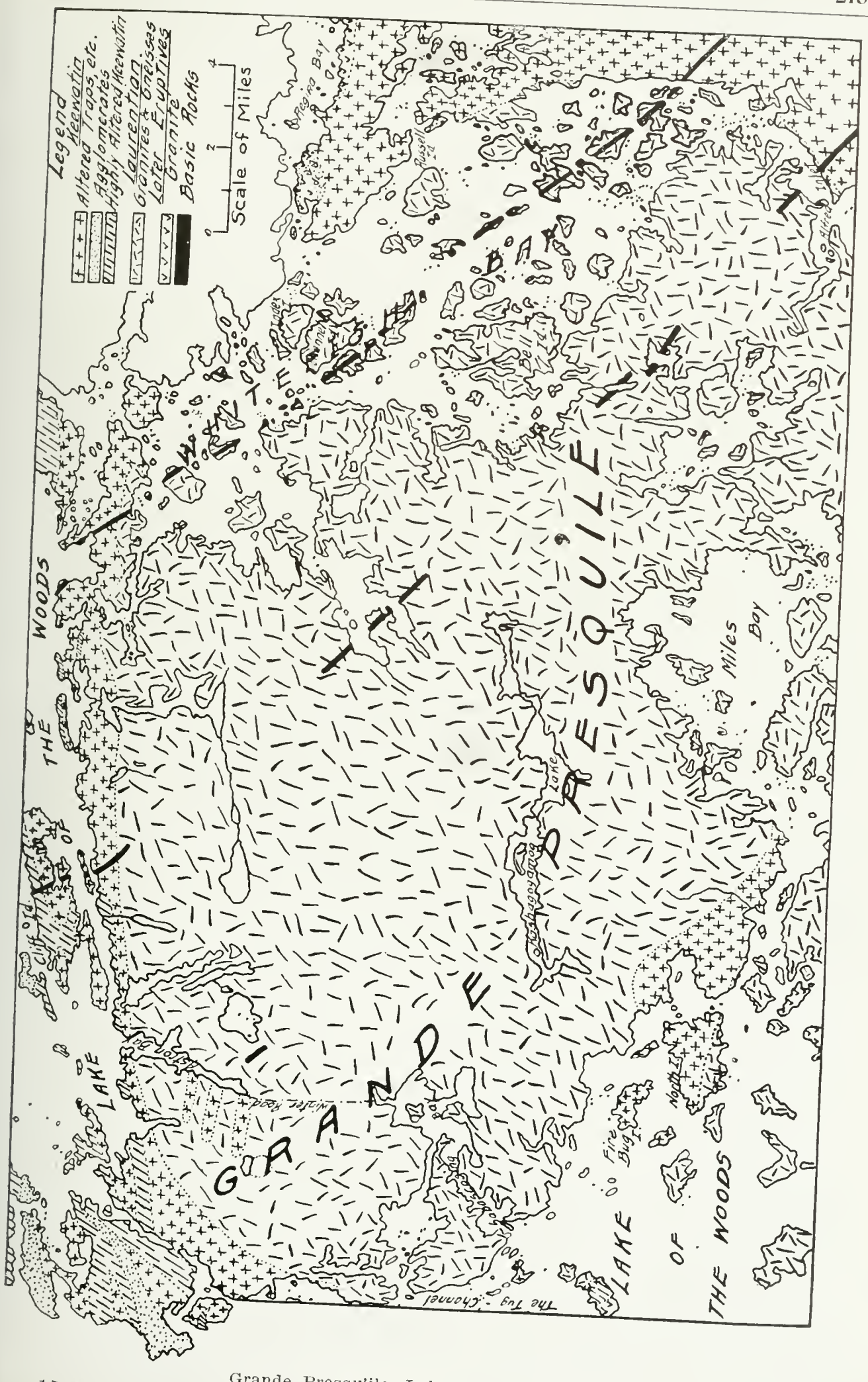
The other type of contact breccia results from the fracturing of massive Keewatin rock and is more common than the banded type. It is particularly well developed on the west side of Bottle bay, where the so-called later granite is exposed. It is also

well developed on the north shore of Andrew bay, where a similar granite occurs. Much of the Laurentian granite along the Canadian Pacific railway near Kenora also shows this type of breccia (fig. 2).

The bosses of granite are usually dome shaped and this form is ordinarily attributed to glaciation. This view is, however, only partially correct. Near the north side of Bottle bay the bosses show traces of the contact breccia over the entire surface, while between the protruding masses the typical Keewatin traps and schist are to be seen. Evidently the dome-like shape of the granite mass at this point is due to the form originally assumed by the cooling mass of granite, so that the glaciation has only re-

Fig. 2.—Breccia, Berry lake.

moved the softer overlying rock and the *roches moutonnées* are only indirectly the result of glaciation. On the west side of Bottle bay all possible stages of the removal of the overlying material may be seen. Here the Keewatin rock may be seen arched above granitic masses. In some cases the Keewatin is highly altered and re-crystallized and forms a dark coating over immense domes which are presumably granite, though this can only be inferred from the similarity of the topography to the granite domes which have been denuded of their covering. Other bosses show the granite protruding at the summit and the contact breccia grading into the unbroken Keewatin near the base. The same phenomenon may be seen on the Grande Presquile at the contact of the Laurentian and Keewatin. This great peninsula consists of almost innumerable bosses of granite which have to a large extent been denuded of any covering of Keewatin rock, but near the contact with the Keewatin the same type of contact breccia is developed as is seen in Bottle bay.



Grande Presqu'ile, Lake of the Woods.

Information was secured which tends to group part of the so-called later granite with the Laurentian. A small outcrop on the east side of Micrometer island is cut by one of the dikes of later (Keweenawan) diabase at the water's edge. Most of the dike has been eroded, so that the relations might easily be overlooked. The contact was found in tracing the dike which crosses Ptarmigan bay, and the nature of the contact is shown by the accompanying photograph of a thin section of the rock (fig. 3). The finding of this intrusion of diabase forces us to the conclusion that this particular granite is of the same age as the granites on the Grande Presquile, and that both are older than the Keweenawan. In like manner the granites on Darlington bay and Whitefish bay may be correlated, as they are both cut by the Thomson island dike. So far as our information goes the pre-Keweenawan age can only be shown for one of the outcrops of granite that has hitherto been classed as a later granite, but it can hardly be doubted that the granite on Crow Rock island is of the same age as that on Micrometer island; and if this is granted the granite on Shammis, Mather and

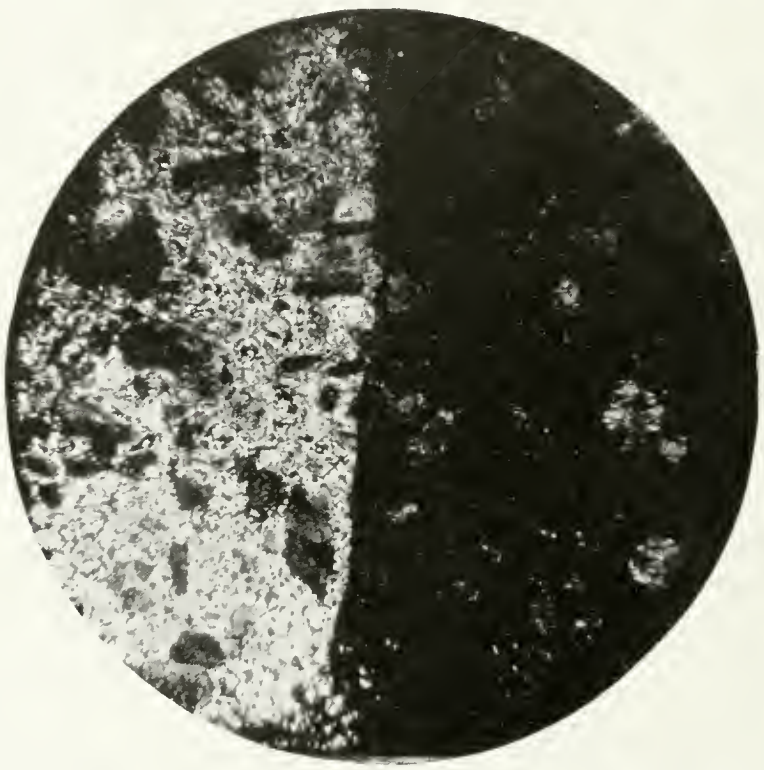


Fig. 3.—Contact of granite and Keweenawan (?) trap, Micrometer island, Lake of the Woods.

Allie islands must be brought into the same age. In this way this granite area is presumably correlated with the Laurentian, and it is difficult to conceive of a different origin for the other granite areas occupying an intermediate position between the Micrometer island exposure and the outcrops on Darlington bay or Whitefish bay.

This correlation, however, still leaves the exact position of these granite masses in doubt, as no known Huronian rocks are present to aid in the determination of the age.

A series of granite domes which has hitherto been unmapped was discovered on the north shore of Andrew bay. The surface has been burned over in recent years so that their character could be easily observed. The shore is bordered by Keewatin schists of various types and in various stages of alteration. Through these schists several domes of granite rise to a height of 60 to 100 feet. The granite exhibits the typical contact breccia of fragments of highly altered Keewatin and contains a profusion of small quartz veins.

Clay Slates

This series, which consists principally of highly altered Keewatin rocks, is found most abundantly in close proximity to the great granite areas of the region. While some of the outcrops are probably altered slates, much of the material is metamorphosed

igneous rock, which has been more or less re-crystallized. The rocks are mostly hornblende and biotite schists, which contain a greater or less quantity of garnet, epidote, magnetite and pyrrhotite in addition to quartz and plagioclase. Metamorphism resulting in similar rocks is found in the sericite schists which are cut by the dikes of later (Keweenawan) diabase, though in the latter case the extent of the metamorphism is limited to a few feet. Considerable diversity of opinion has been expressed as to the desirability of making a distinct division of the Keewatin to include this series. By some the series is looked upon as principally composed of altered sediments. The Committee on pre-Cambrian nomenclature in the Lake Superior region look upon them as highly altered phases of the Keewatin traps and schists. To the writer, this latter seems to be the true explanation for the greater part of the rocks of this series, but in some cases it would appear that sediments are present.[1] The explanation of the relations of these rocks can apparently be worked out only by comparing them with the other Keewatin rocks which have been altered by igneous intrusion.

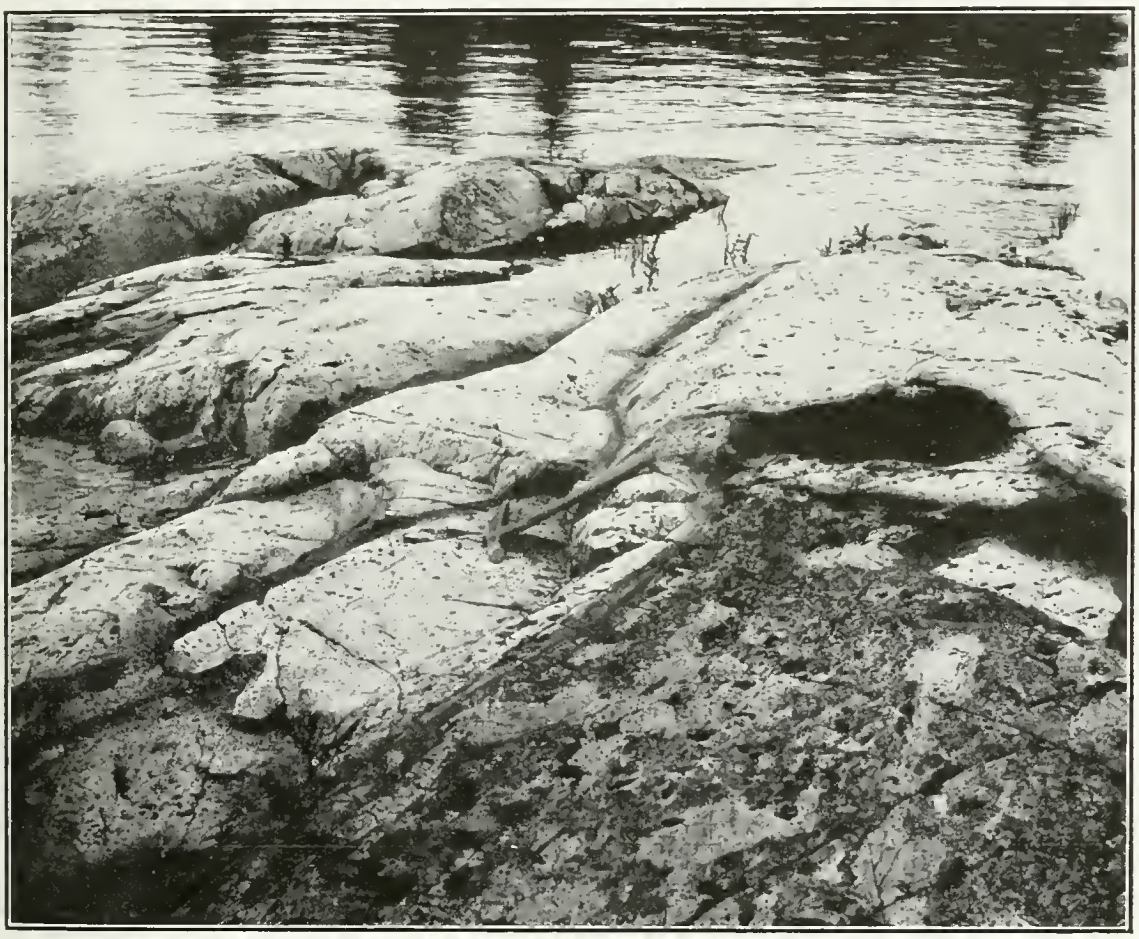


Fig. 4.—Ellipsoidal trap, Ash bay, Lake of the Woods.

In the alteration of the common ellipsoidal trap of the Keewatin large quantities of ankerite or ferro-dolomite have been formed, and by a movement in the rock or by pressure schistosity is induced. The schists are of several types, but are all more or less micaceous, chloritic or hornblendic. From the more acid traps sericite schist, containing a considerable percentage of ankerite, is formed. From the more basic traps chlorite and hornblende schists result. With the other minerals in these schists crushed feldspar and secondary quartz are almost universally present. Even in the traps which are apparently only slightly altered, the interstices between the ellipsoids are filled with ankerite, quartz and some hornblende and epidote. The schists resulting from the alteration of the traps are cut by Keweenawan dikes in several places. On Slate island the schists are metamorphosed to a distance of about 20 to 30 feet from a dike, and in place of the sericite and chlorite schist with abundant carbonate, we

[1]Bur. Mines, Vol. XXI., Pt. I., p. 202.

find a schist characterized by hornblende and epidote. In addition to these minerals, magnetite and hematite occur in small quantities near the contact of the same dike with the schists on Thomson island. It will thus be seen that the common minerals in the clay slate series, with the exception of garnet, are represented in the schists that result from the metamorphism of the ordinary Keewatin schists.

Agglomerates

Under this title are grouped fragmental rocks of extremely varied texture and origin. In some cases volcanic ash beds may be represented, in other instances the term is used to include friction breccias, while a considerable number of the exposures are volcanic breccias.

The first mentioned type has not been definitely identified by the writer, but the friction breccia type is quite common and is well shown on the unnamed islands be-

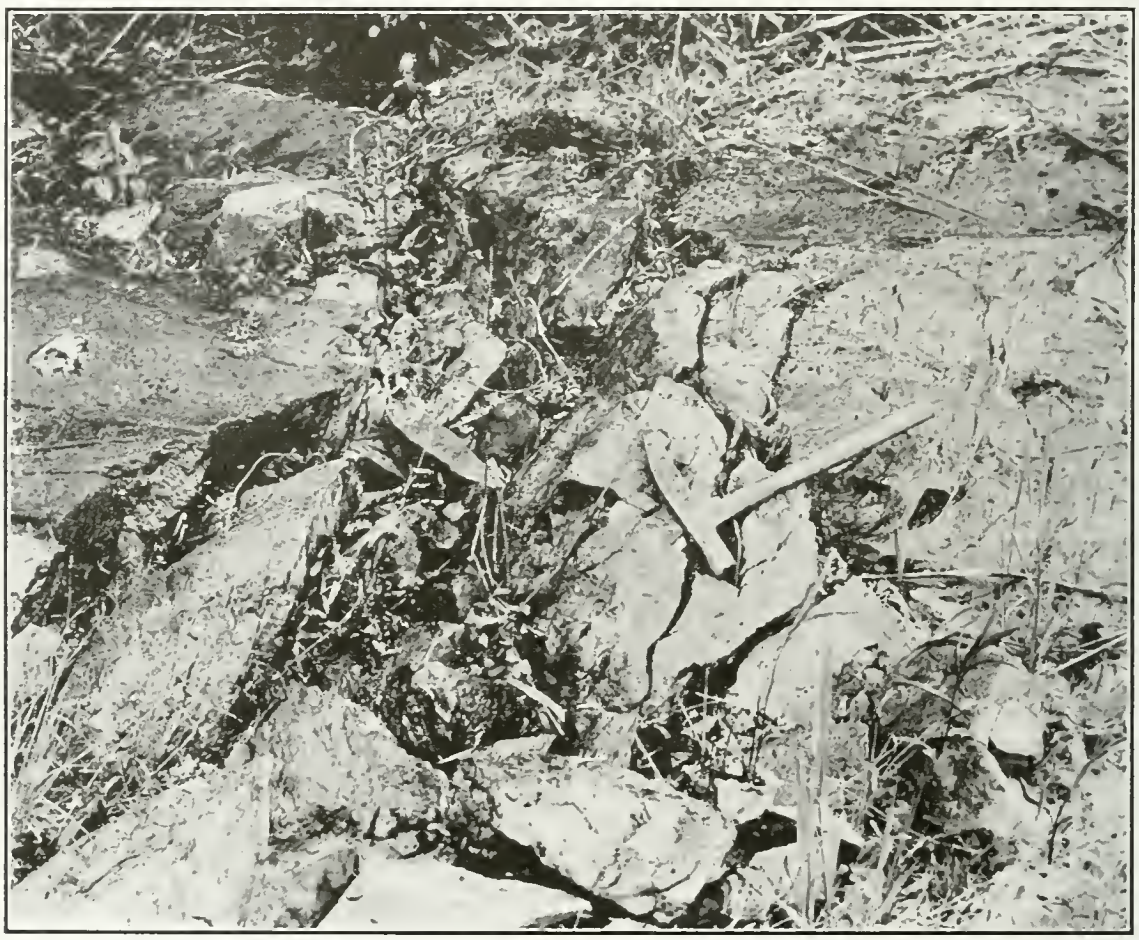


Fig. 5.—Ellipsoidal trap on right, breccia on left, Ash bay, Lake of the woods.

tween Queer island and Mather island. The rock is usually light coloured, and the interstitial material between the angular fragments is generally schistose and characterized by the presence of sericite. It is, in fact, an intermediate stage in the formation of the sericite schists from the lighter coloured Keewatin traps.

The volcanic breccia type of agglomerate is found well exposed near the old saw mill in Kenora and in Ash bay. The general character of this rock is illustrated in a former report,[2] which shows the rock at Kenora. The derivation of this rock from the ellipsoidal trap is not shown at this place, and a different origin was suggested by the writer, but in Ash bay the ellipsoidal trap is found exceptionally well developed (fig. 4). This rock is broken by a dark trap, which contains fragments of the lighter coloured rock, as shown somewhat imperfectly in the accompanying illustrations (figs. 5, 6, 7), the first of which shows the somewhat shattered ellipsoidal trap under the

[2]Bur. Mines, Vol XXI., Pt. I., pp. 170, 171 and 182.

hammer and the dark trap with the fragments of the former rock. The second illustration overlaps the first and shows a more agglomeratic development. The third illustration overlaps the second and shows the darker trap with very few inclusions of the lighter trap. A more extensive development of this type of agglomerate in Ash bay (fig. 8) is almost identical with that in Kenora.

Altered Traps, Hornblende Schists and Chlorite-Schists

For purposes of mapping it is convenient to group these rocks together, and in general it may be said that the hornblende and chlorite schists represent an alteration of the ancient Keewatin traps. It must also be stated, however, that no close line of demarcation can be drawn between this series on the one hand, and the agglomerates,

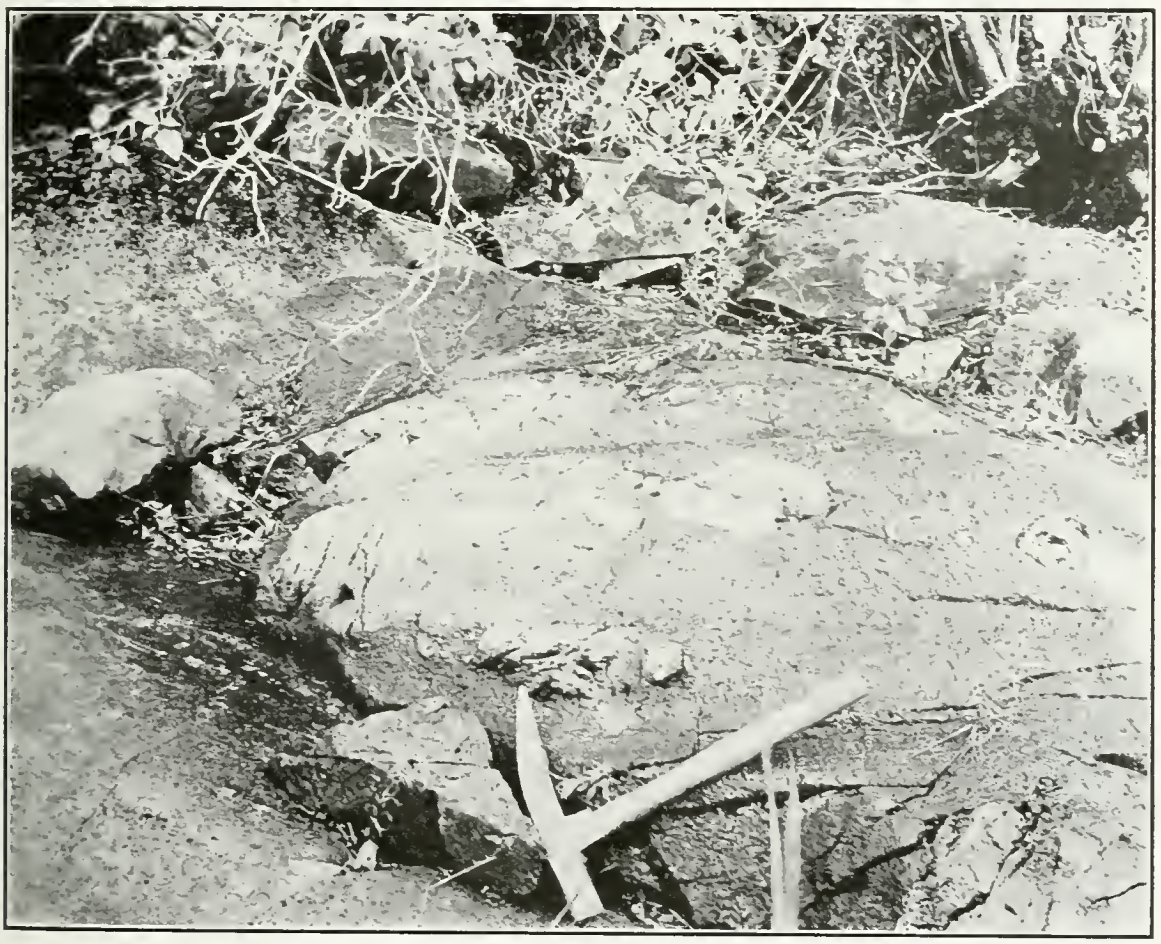


Fig. 6.—Igneous breccia, Ash bay, Lake of the Woods.

sericite schists, and clay slates on the other; but between the more characteristic phases there is an easily recognizable distinction which permits an approximate determination of the boundaries of the principal types of rock. In general it may be said that the ancient traps are diorites, in which is developed a well defined ellipsoidal or pillow structure. In material which has suffered little alteration these ellipsoids are generally characterized by a light-coloured interior and a narrow band of darker rock on the outside which appears to be a basic segregation, though both portions may be classed as diorite. In the interstices between these ellipsoids is a filling of ankerite or ferro-dolomite with quartz and in some cases epidote and hornblende. Usually in weathered specimens this interstitial material has been removed. The ellipsoidal structure is a very persistent characteristic of these older traps, and it can be traced with a little care in the chlorite, hornblende, and sericite schists, which result from this alteration. So persistent is this characteristic of the traps that it may be said to be almost universal for the original rock and the slightly altered phases. Particularly fine examples of this structure may be seen, however, in the Devil's Gap passage, the west side of Big Stone bay, and on the east side of Ash bay.

In the alteration of these older traps two general types of rock result, depending largely upon the amount of hornblende and augite in the original rock. In case hornblende and augite are abundant in the original material, the resulting alteration product is chlorite or hornblende schist, with an appreciable percentage of calcite and ankerite. In case there is little augite or hornblende the resulting rock is sericite schist, with calcite and ankerite. In the latter case a brecciated transition stage is common, which gives rise to large areas of agglomerate, but this stage is not prominent in the formation of the chlorite schists. In connection with these older traps it may be said that a second type of trap has been recognized, which has been referred to by Dr. A. C. Lawson as the "paste of the agglomerate," which is apparently of an intrusive nature, but appears to belong with the Keewatin. This rock is dark in colour and alters uniformly to chlorite and hornblende schists. The extent of this intrusive

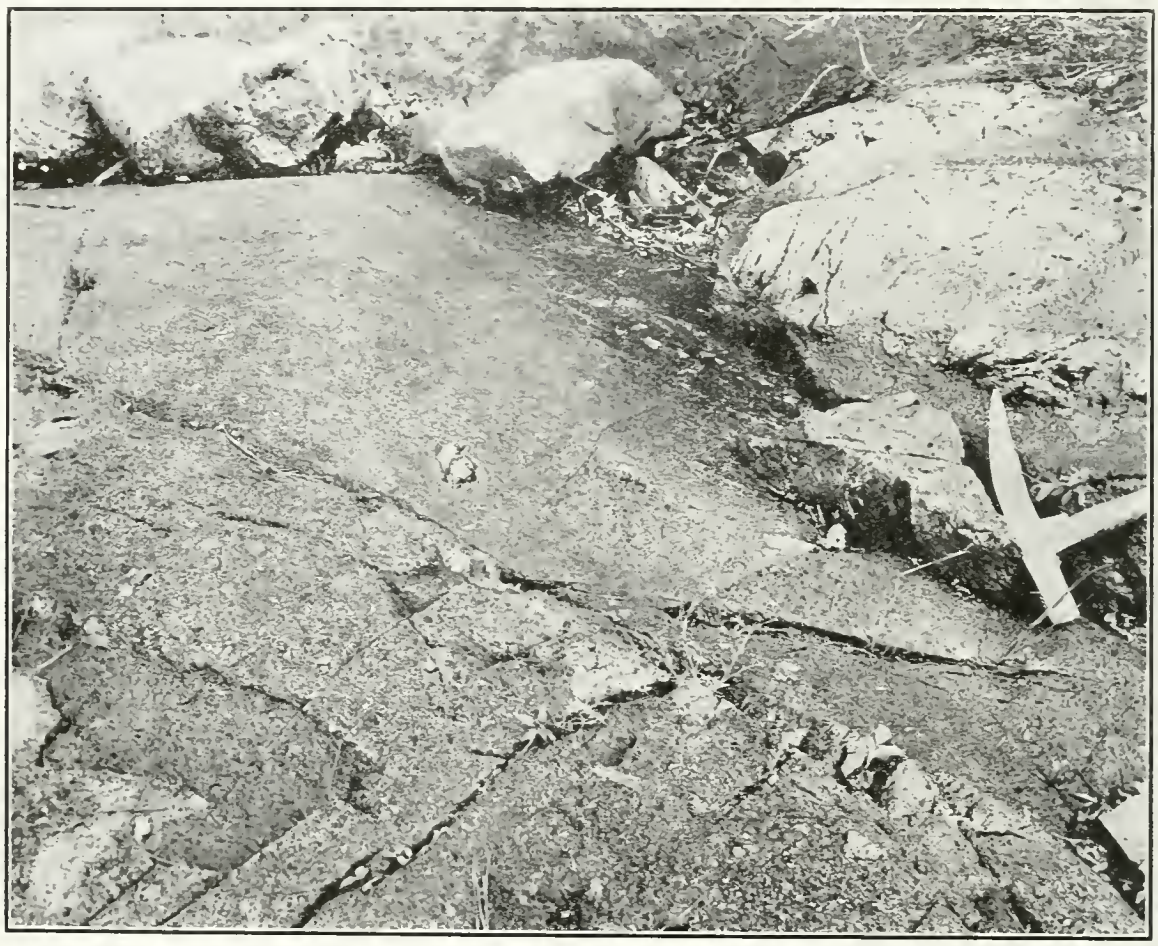


Fig. 7.—Igneous breccia, Ash bay, Lake of the Woods.

material is unknown, and it has been positively differentiated in only one place by the writer. The locality where it has been seen is on the east side of Ash bay, where it is in contact with the older ellipsoidal trap, and by brecciating this material has formed an agglomerate (see figs. 5-8).

At the contact of the Keewatin with the Laurentian (and other ?) granites is a metamorphosed rock which in some places appears to result from the recrystallization of these ancient traps. In many cases it is impossible to judge from an examination of the contact zone whether these highly altered rocks represent a different kind of rock or are merely re-crystallized Keewatin traps, since the softer unmetamorphosed rock has been entirely removed. It was found, however, on the north side of Andrew bay and on the west side of Bottle bay that the highly altered dark-coloured hornblendic rock in contact with the granite grades into the less altered Keewatin traps and schists. This highly altered rock is very liable to be brecciated by intrusions of the underlying granite, and the resulting breccia serves as an indication of the contact when most of the trap has been denuded.

Ankerite Deposits

In most of the schists and accompanying most of the veins is an appreciable percentage of ankerite or ferro-dolomite. In many cases the quantity is not sufficient to be of more than scientific interest. Three outcrops of considerable size were observed during the past summer. The first is a small islet east of Whiskey island, which has weathered to an ochre yellow. On taking samples it was found that the rock is principally a light-coloured carbonate with small quantities of sericite and quartz. It apparently results from the alteration of a squeezed agglomerate of the friction breccia type.

A second outcrop was found on a small islet north of Square island. This is of the same character as the former, but contains more sericite. This second body of ankerite apparently continues across Square island, as another outcrop appears on the mainland east of Square island in the same line of strike.

From an economic point of view these are of little value at the present time except as gold may accompany them. In case an iron industry were developed in this region, the first mentioned might furnish a valuable flux.

Fig. 8.—Igneous breccia (agglomerate), Ash bay, Lake of the Woods.

Carbonaceous Schists

Among the less prominently developed rocks of this region may be mentioned a series of black schists, which are known as graphitic or carbonaceous schists. These rocks split very easily, and usually present a black glossy surface. They are generally, if not always, associated with the sericite schists, and are looked upon as an indication of the sedimentary origin of these rocks. It has, however, been suggested that these bodies are more of the nature of vein material; and there is much to be said for each theory of origin. In structure they vary from a black fissile schist to a dark slaty rock, and much of the material is characterized by spherical cavities surrounded by quartz. The cavities often contain pyrite either in a fresh condition or altered to limonite. The schist contains crystallized pyrite also, which has been distorted by pressure, and the crystals frequently are more than half an inch across. The vesicular portion of this rock has been sectioned, and its character is shown in fig. 9. In this illustration the dark portion represents the carbonaceous material, the lighter coloured fibrous portion is quartz of somewhat chalcedonic character, and the intermediate tone

shows the cavities. The picture was taken with polarized light, but the nicols were inclined at an angle of about 75°, so that the contrast might be shown between the cavities and the quartz and carbonaceous material. The body from which this sample was taken is located near the northwest point of Corkscrew island, and is probably an easterly extension of the outcrops of the same material about three miles southwest of Zig-Zag point. The vesicular structure can probably be best explained by the expansion of gaseous matter in the rock, and is probably due to the caking of carbon compounds which may have been coal-like deposits or an asphalt vein filling. In either case a natural coke would be formed similar to such deposits in later geological horizons in Virginia. The quartz surrounding the cavities is undoubtedly due to the percolating of water containing silica, and the pyrite is due to crystallization from solution.

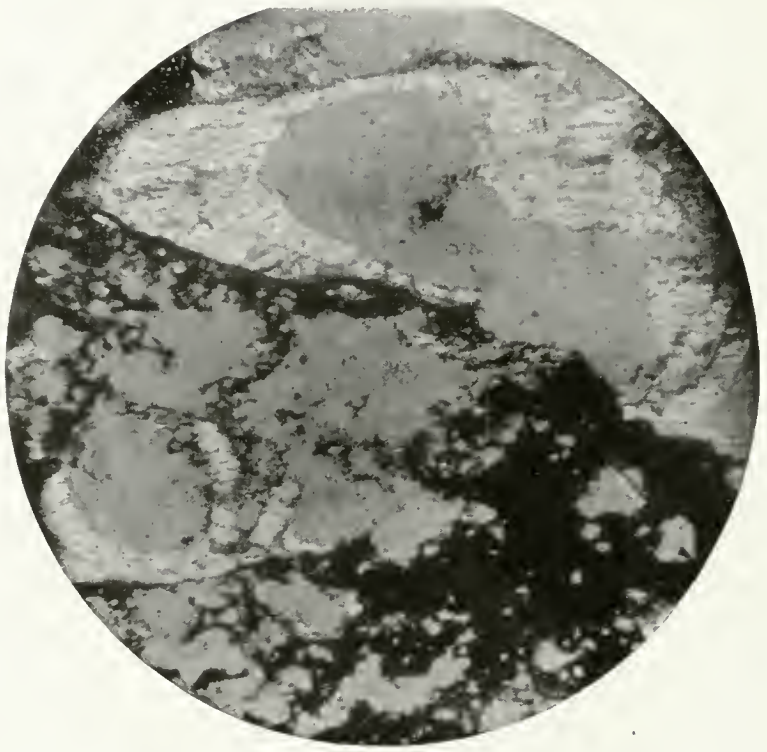


Fig. 9.—Carbonaceous schist, Corkscrew island, Lake of the Woods.

Keweenawan Eruptives

A remarkable series of dikes which are probably of Keweenawan age crosses Lake of the Woods and Shoal lake in a general northwest-southeast direction. The continuation of some of these has been traced in the Rainy lake region, and a minimum length for some of the better developed dikes is roughly one hundred miles. The most northerly outcrop of the dikes shows them to be as well developed as they are in other parts and it is unknown how much farther they may be found, but there is no indication that they are about to disappear. In their petrographic character they are quite distinct from the other basic rocks of the region, and with their clean-cut contact and brown colour they are easily recognized even at a distance. The age of the dikes cannot be definitely determined in the Lake of the Woods region, but it is later than any of the crystalline rocks there. From a comparison with the eruptive rocks of Minnesota it would probably not be wise to refer them to a later age than the Keweenanan. They are later than the Laurentian, much of which is post-Lower Huronian in age.

The general character of the dikes and the petrographic description has been given by Dr. A. C. Lawson,[3] and for the most part the writer agrees with his description.

Petrographically, the main mass is a quartz-diabase consisting of labradorite, augite, quartz, and ilmenite. This composition is, however, not constant, as quartz is not found in all the sections, though the other constituents are never lacking except in

[3]Geol. Surv. Can., Vol. III., Pt. F., pp. 147-163.

altered rock. The ilmenite is quite largely altered to leucoxene and is a very characteristic constituent of the rock. Dr. Lawson mentions the presence of garnet in these dikes as an original mineral, but no trace of this was found in the writer's sections. The augite in some cases has been uralitized, with the formation of secondary hornblende. At the contact of the dike with the adjoining rocks the character is very different from the central portion, being a porphyritic diabase with phenocrysts of augite and enstatite in a dark ground-mass. On Micrometer island a dike cuts the later granite and the contact is marked by a band about an inch wide which shows an abundance of moderately large crystals of augite and a few long narrow crystals of enstatite. This is succeeded by a fine grained trap with few phenocrysts of augite and relatively more enstatite in a ground-mass which is of about the same character as in the contact zone (figs. 3, 10, 11). From this point the texture becomes coarser and the typical ophitic texture becomes apparent until at the centre the rock has assumed almost a granitoid appearance. The metamorphic effect upon the granite is not very pronounced, but some

Fig. 10.—Keweenawan trap, two inches from granite contact, Micrometer island, Lake of the Woods.

crushing is to be noted. The effect of the dike in metamorphosing the adjoining rocks is best shown when in contact with sericite schist. On the east side of Slate island a good example of this is to be seen. The character of the dike is very similar to that on Micrometer island, but shows more enstatite and some feldspar in addition to the augite. The contact is very sharp (fig. 12), and shows no indication of any solvent action by the dike, but the character of the adjoining rock has been changed both by crumpling (fig. 13) and by the formation of new minerals. In the original rock, which may be seen in a comparatively unaltered condition about twenty feet from the dike, the prominent constituents are sericite and ankerite or ferruginous dolomite. In the metamorphosed contact zone they are sericite and epidote with some hornblende. On Thompson island the schist near the contact contains not only the above-mentioned minerals, but also grains of magnetite and hematite.

In decomposing, the dike usually shows a brown surface, but on Allie island it appears to give rise to a green serpentine rock which contains copper, though this mineral has not been found in other parts of the dikes. It would seem that the situation of the dike in this place has resulted in a difference of conditions for alteration, as the copper-bearing portion is in a sheltered bay, where wave action would not remove

the decomposed material so that greater alteration is apparent than usual. It is possible that the altered material represents a more basic phase of the dike than is common, which would possibly shed light on the interpretation of the rocks at a few places where the dikes are apparently interrupted.

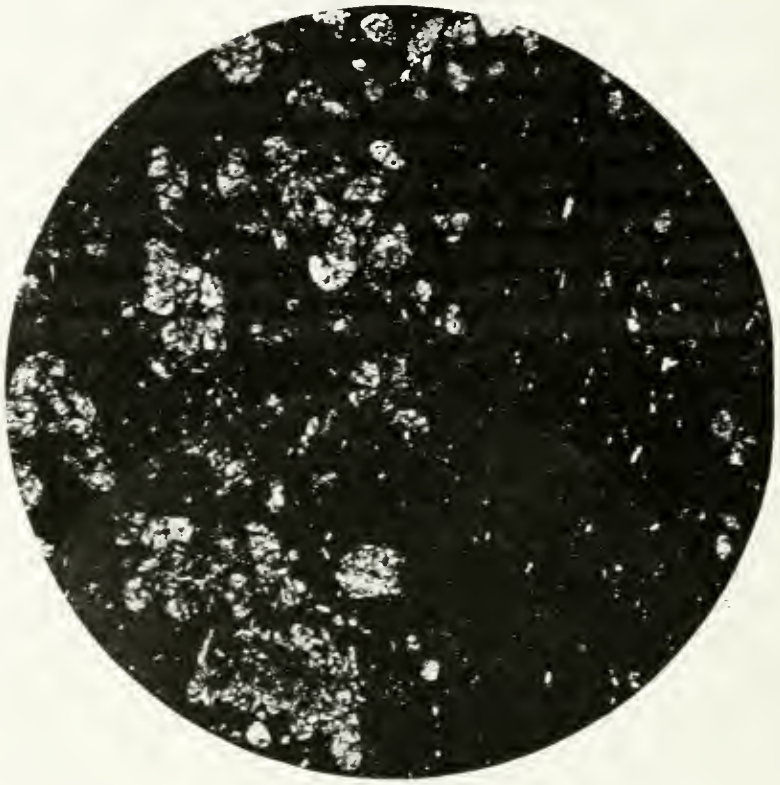


Fig. 11.—Keweenawan trap, one inch from granite contact. Micrometer island, Lake of the Woods.

Fig. 12.—Keweenawan trap and Keewatin schist, Slate island, Lake of the Woods.

The extent of these dikes is not fully known, and others will probably be found. At present there are four well-defined dikes having a northwesterly-southeasterly strike and one having a northeast-southwest strike. Two of these, the Thompson island dike and the Massacre island dike, were partially mapped by Dr. Lawson, and the other three

were found by the writer during the past summer. It is possible that the Whiskey island dike unites with the Welcome channel dike, and the latter with the Thompson island dike, but the exact relations are not known. It is known where the Welcome channel dike intersects the Thomson island dike, as they can be traced to the water's edge and are not more than fifty feet apart on the shore, but it cannot be definitely shown whether they are of the same or of different age, as their contact is under water. The Welcome channel dike, however, differs materially in its petrographic character from most of the outcrops of the other dikes. The thin sections show it to be an almost completely serpentinized porphyritic pyroxenite (fig. 14), and it might be supposed that it represents a different type of eruption from the other dikes. This, however, is probably not the case, as a similar rock is found in the line of strike of the Thomson island

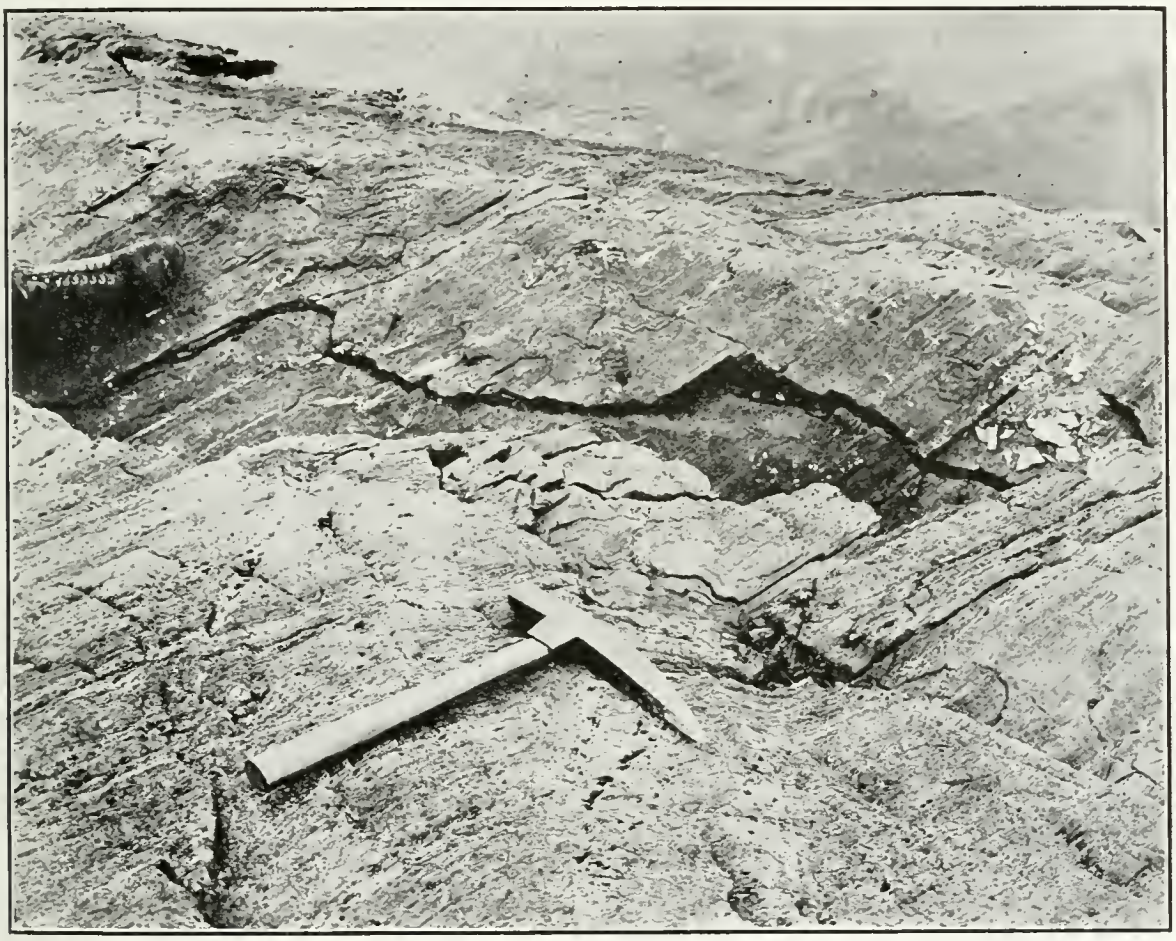


Fig. 13.—Altered sericite schist, showing crumpling near Keweenawan dike, Slate island, Lake of the Woods.

dike on the channel between the Tangle islands and Rat Portage bay. At this point no outcrop of the typical quartz diabase could be found, and it was supposed that the dike was interrupted. It would seem, however, that in some places these dikes are much more basic than is ordinarily the case, and it is probable that the Welcome channel dike represents a more basic phase of the Keweenawan, similar to the copper-bearing rock on Allie island, though not so much decomposed as this latter.

The Thomson island dike has been traced with but few apparent interruptions from the north side of Darlington bay to the southeast side of Whitefish bay, and what is probably its continuation has been mapped by Dr. Lawson on the Rainy Lake map. The Ptarmigan bay dike has been traced from the north side of Clearwater bay to the south side of Sabascong bay, with the exception that it was not found on Narrow lake. The Whiskey island dike is the narrowest of those found, and was only traced from Wolf island to the small island just west of Oliver island. It is suggestive, however, that at two places in Whitefish bay narrow outcrops of later trap were seen cutting the Laurentian granite about midway between the Thomson island and Ptarmigan bay dikes.

Gold Mines

During the summer there were three mines in which work was carried on to a greater or less extent; the Olympia, Cameron Island and Canadian Homestake (formerly the Scramble).

Prospecting and assessment work was carried on by Mr. F. Moore in the region between the Canadian Homestake mine and Black Sturgeon lake. Considerable work was also done by Mr. Gauthier on a property just west of the old Nonesuch mine on Ptarmigan bay, and also by Mr. Dorion on an island near Yellow Girl point.

Olympia Mine

This mine was visited July 2nd. At this time the caretaker, Mr. Hubner, with one man, was engaged in making an upraise in the tunnel near the mill. During the preceding winter 14 men were employed here, and Mr. Hubner reported that three gold bricks, of a value of about $3,000, were turned out.

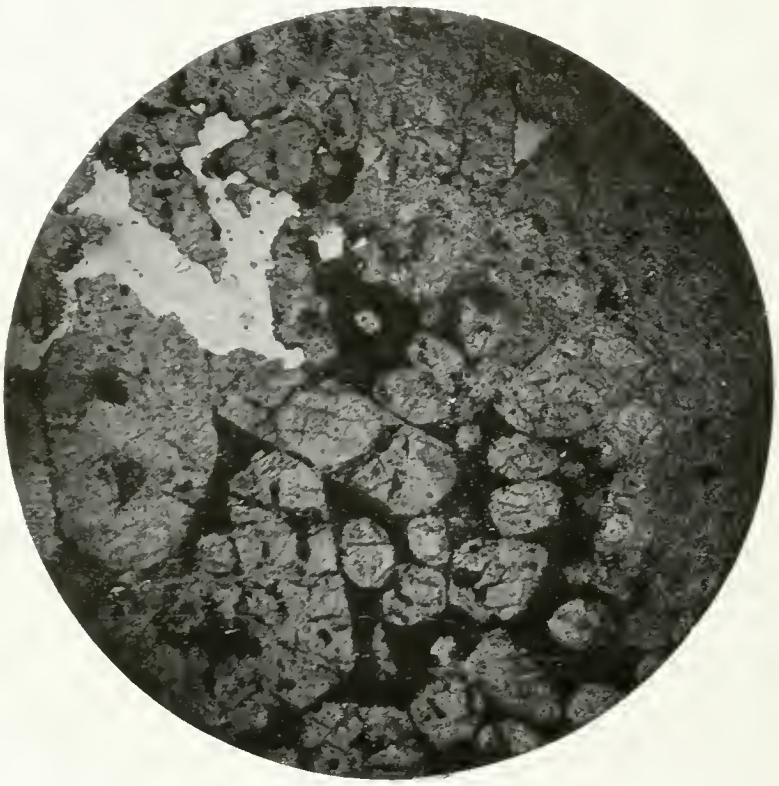


Fig. 14.—Serpentinized pyroxenite, Welcome channel, Lake of the Woods.

Ophir Mine

During the winter of 1911-12, Mr. R. B. Nickerson, M.E., sunk the shaft to a depth of about 160 feet. Work had been discontinued before the opening of the field season, and it was possible to visit only the first and second levels, the shaft below the second level being filled with water. The shaft follows the vein down to the second level, but below that point it is stated that it is in the foot wall. This statement is borne out by the evidence on the dump, or at least the rock on the dump would indicate that the lower part of the shaft is off the vein. Good camps and a new boiler-house and shaft-house were constructed.

The vein is in the porphyritic granite which is found at the Sultana mine in contact with the Keewatin traps, but at the Ophir none of the Keewatin rock appears. At the southwest end of the second level, 39 feet from the shaft, the vein consists of three distinct bands of quartz, 32, 6 and 9 inches wide respectively, with micaceous and chloritic schist between them. The total width of schist and quartz between the vein walls is 6 feet 8 inches, of which 3 feet 11 inches are quartz. One of the bands of schist is 15 inches wide and contains numerous lenses of quartz, which materially increase the total width of quartz given above, but exact measurements cannot be secured. The

other band of schist is 18 inches wide and apparently contains very little quartz. At the northeast end of this drift the vein is very narrow. The southwest face of the drift on the first level shows three bands of quartz, 4, 4, and 24 inches wide respectively between granite porphyry walls, and separated from each other by two bands of the same rock. Apparently these are the same bands as those seen on the lower level, but the widest one on this level is the intermediate one of the second level, and the 32-inch band is here represented by only four inches of quartz. It is interesting to note that the granite bands of this level are replaced by schist bands in the lower level. Every facility for examining the property was furnished by Mr. James Morton, who was in charge.

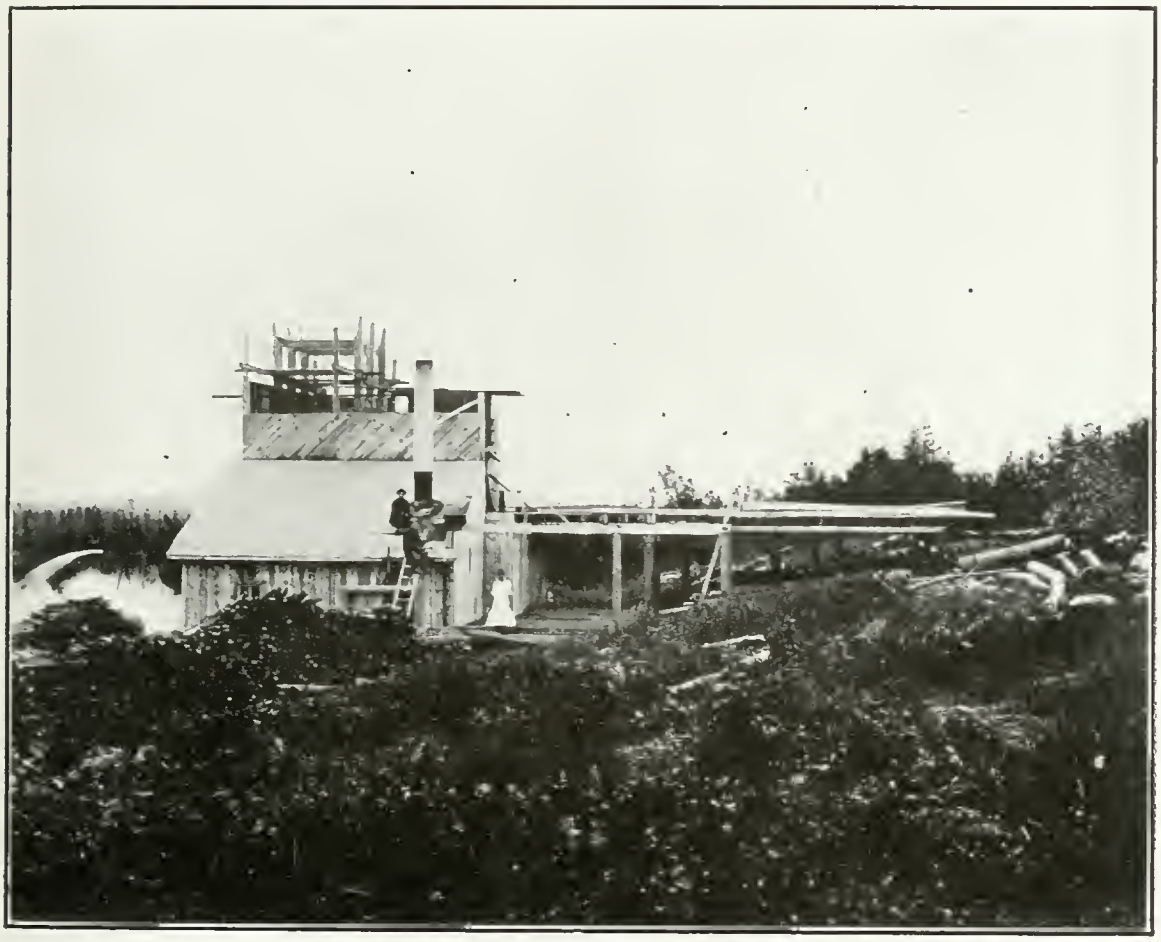


Fig. 15.—Shaft house of Canadian Homestake mine in course of erection.

Canadian Homestake Mine

During the preceding year development work was continued on the Canadian Homestake mine, under the management of Mr. Joseph Hicks, of Kenora. The equipment at the time of the writer's visit was of a temporary nature, and consisted of a small boiler, hoist, pump, compressor and drill. It was the intention to replace this equipment with electrical machinery, and the poles for the power line from Kenora had been put in place. It is reported that the permanent machinery has since been installed. It was not possible to see all the workings, as operations had been temporarily discontinued on account of performing assessment work on adjoining claims. It was, therefore, impossible to go below the 50-foot cross-cut on account of water, and no very good idea of the vein could be secured. The ore body consists of a fahlband or schistose band about 30 feet wide, which contains veins and stringers of quartz and ankerite and considerable pyrite. The company claim an average value for the ore of about $3.50 per ton.

A new shaft house was in course of erection at the time of the writer's visit, and the progress is shown in the accompanying illustration (fig. 15).

Cameron Island Mine

On July 1st, the Cameron Island mine was visited. Work at the mine had been resumed only a few days previous, and ten men were employed. The mine had been pumped out and an upraise started in the second level. The mill had also been overhauled. Just as the preliminary work was nearly finished, the manager, Mr. F. Pfan, died, three days before the writer's visit. The underground conditions were practically the same as seen on the visit two years before, as only about three days' work had been done in starting a stope. Underground work had not been resumed, as the men were awaiting the arrival of Mr. D. M. Cameron, trustee of the Cameron Island Syndicate, who was expected that day. Since that time it is reported that a mill run has been made, and that preparations are being made to erect a smelter.

The Sultana, Regina, Mikado, Combined and Bully Boy mines were all in charge of caretakers, and no work had been done on any of them in the preceding year. It is expected that work at the Mikado will be resumed in the near future, and negotiations looking to reopening of the Regina are reported.

Fig. 16.—Nepheline syenite, showing concentric weathering, Port Coldwell.

Dryden District

In this region considerable development work has been done in the past year.

Mr. G. Larson has sunk a shaft 40 feet deep in a great fahlband or schistose vein about 20 feet wide on mining location S.V. 372. The vein is well mineralized with pyrite, chalcopyrite, galena and a little sphalerite.

Test pits have been sunk on four veins on the northwest quarter of the south half of 7 in the first concession of Van Horne township by Mr. E. Rognon. The widest of these veins shows five feet of quartz, and the owner reports satisfactory values.

The Gold Moose shaft has been sunk to a depth of 114 feet, and Mr. Rognon reports that the vein, which at the surface is about 18 inches wide, shows a width of four feet at the bottom of the shaft.

On the Gordon claim, the Dryden Mining Company have sunk two shafts, one 90 feet deep and the other 43 feet deep. Two cross cuts, of 21 and 18 feet respectively, and a drift 50 feet long have been opened up in the first of these.

At the League mine the shaft is 80 feet deep, and a drift has been started toward the east at a depth of 72 feet for the purpose of making a mill-run and testing a new type of amalgamator and amalgam trap.

On the Good Luck claim two shafts have been sunk to a depth of 65 and 45 feet respectively.

Port Coldwell

The work at Port Coldwell was limited to two days, which were entirely devoted to outlining the Congress excursion. The rocks in this region have been described by H. L. Kerr.[4] The beauty of the rocks at this place, combined with the excellent shipping

Fig. 17.—Nepheline syenite, showing concentric weathering, Port Coldwell.

facilities both by rail and water, should result in the opening of quarries and the development of an important industry. The nephaline syenite, with its deep orange-red mottling from the alteration of the nephelite, would furnish a most beautiful stone for interior work, though it is probable that it would not be satisfactory for outside work. The red syenite and the darker laurvikite are both suitable for exterior work, and should find a ready sale in the larger cities on the great lakes, both in Canada and the United States.

Some peculiar effects of weathering are to be seen in this region (figs. 16, 17), by which large rounded boulders result from the decomposition of the syenite. This seems to be the ordinary concentric weathering which is not uncommon in traps, but is not known to be common in the pre-Cambrian rocks of Ontario. It suggests the question whether many of the granite boulders in this region may not have a similar origin, and bears directly upon the problem of the glaciation of the region.

[4]Bur. Mines, Vol. XIX., Pt. I., pp. 194-232.

Loon Lake

The work at Loon was devoted entirely to preparing for the Congress excursion. At the present time no mining is being done in this vicinity, and conditions seem to be about the same as they were at the time Mr. L. P. Silver[5] made his report on this region. In visiting the remarkable conglomerate one mile west of Loon (fig. 18) it was found that some of the boulders consist of compact datolite of a creamy pink colour. This material should, if found in sufficient quantity, make an attractive gem stone. It is comparatively soft for this purpose, but has about the same hardness as the thomsonite and chlorastrolite which are sold in large quantities in Port Arthur.

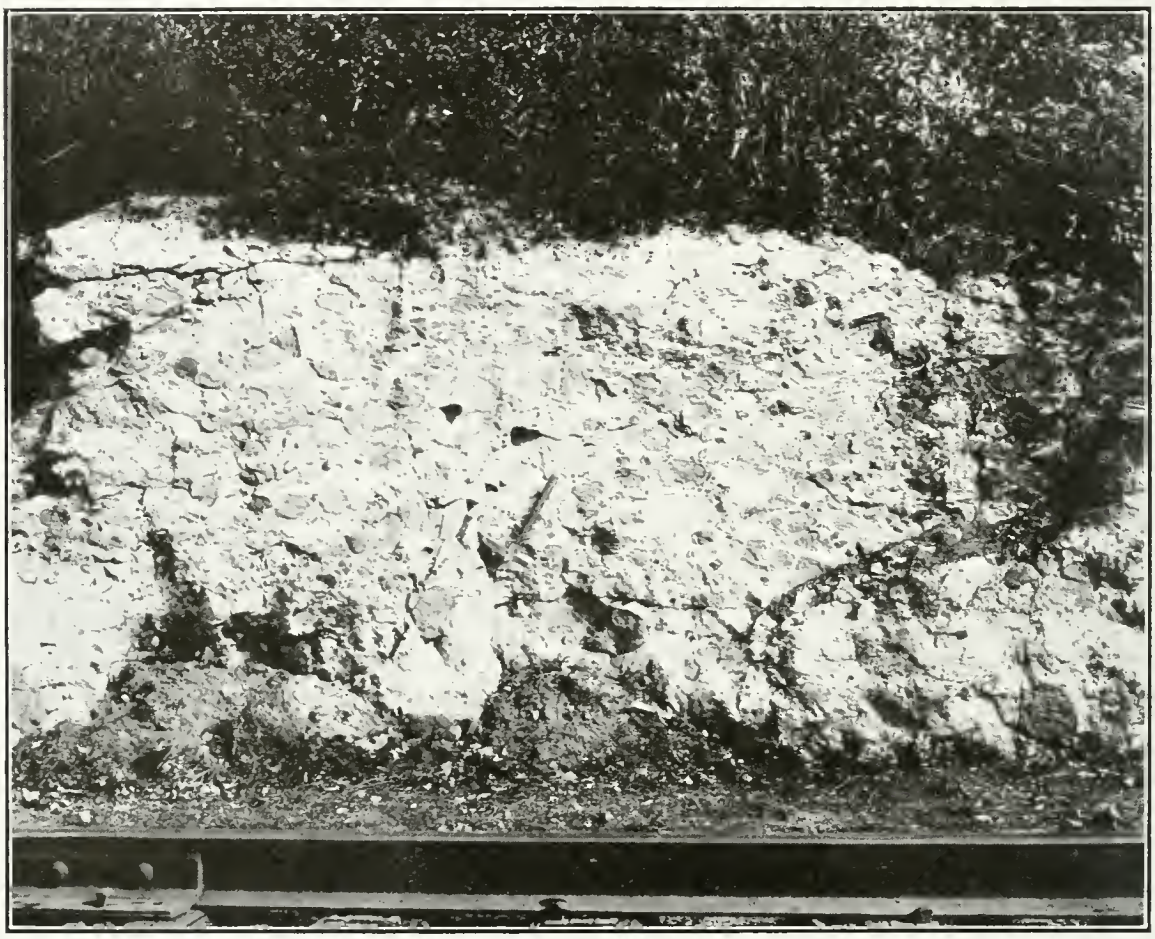


Fig. 18.—Keweenawan conglomerate, one mile west of Loon.

Geologic Section Cartier to Manitoba Border

The section along the Canadian Pacific railway was made primarily for use in the guide books of the International Geological Congress. The part between Margach and the Manitoba boundary was made carefully on foot, the other part was hastily covered according to later instructions, and represents what can be seen from the railway train.

The region traversed by the Canadian Pacific railway between Cartier and the Manitoba boundary is characterized by pleistocene deposits of glacial debris and stratified sands, gravels and clays. Underlying this and in most places protruding through the later deposits are great masses of pre-Cambrian rocks which belong to four or possibly five formations, Laurentian, Keewatin, Lower Huronian, Animikie (Upper Huronian) and Keweenawan. In this description no attempt is made to differentiate the Keewatin from the Lower Huronian, and all doubtful rocks are classed as Keewatin.

Because of the uneven surface of these rocks the region contains unnumbered lakes and numerous rivers which give diversity to the scene. These lakes and rivers are the principal avenues of communication with the region at a distance from the railway.

[5]Bur. Mines, Vol. XV., Pt. I., pp. 156-172.

Along the north shore of Lake Superior the country has a different aspect but, except where the Animikie and Keweenawan are present, the difference is more apparent than real, as the region to the north abounds in lakes.

The predominant series of rocks is the Laurentian, which consists of granites and gneisses. These are so abundant that no tabulation of outcrops is given. Unless otherwise specified the rocks are Laurentian.

Keewatin and Lower Huronian

Outcrops of Keewatin and Lower Huronian are exposed at the following places:—

3	miles to	12½	miles	west of	Cartier, near Geneva, Bennet and Stralak.
62	"	64	"	"	"	between Roberts and Sheldon.
66	"	67	"	"	"	" Sheldon and Ramsay.
9½	"	11½	"	"	Chapleau, between Esher and Pardee.
47½	"	58	"	"	"	near Dalton, Carry, Cowslip and Missinabie.
61	"	72½	"	"	"	" Missinabie, Gutelius and Lochalsh.
87	"	88	"	"	"	" Williams.
19½	"	22	"	"	White River, between Bremner and Montizambert.
24½	"	41	"	"	"	" near Montizambert, Trudeau, Struthers and Hemlo.
46	"	61	"	"	"	" " Pringle, Melgund, Heron Bay and Peninsula.
84	"	100	"	"	"	" " Middleton, Ripple, Steel, San Toy and Jackfish.
117	"	119	"	"	"	" " Schreiber.
0	"	5	"	"	Schreiber.
106	"	107½	"	"	"	near Beck.
115	"	120	"	"	"	" Mackenzie.
18	"	42	"	"	Fort William, near Kaministiquia, Finmark and Buda.
72	"	west of Fort William, near Savanne.						
84	"	87	miles	west of	Fort William, near Upsala.
10	"	23	"	"	Ignace, near Butler, Raleigh and Bigsby.
26	"	65	"	"	"	" Taché,—Dyment, Brulé,—Dinorwic, Wabigoon, Barclay and Dryden.
108	"	110	"	"	"	between Edison and Snell.
111	"	west of Ignace, between Edison and Snell.						
123	"	west of Ignace, near Hawk.						
140	"	146	miles	west of	Ignace, near Kenora.
0	"	7	"	"	Kenora, near Kenora, Norman and Keewatin.

Animikie and Keweenawan

The rocks of these two formations are usually exposed together along the railway. The Animikie is represented principally by slates and iron formation, while the Keweenawan is represented usually by sills of diabase intruding the Animikie. Near Loon lake the Keweenawan is also represented by a conglomerate.

The outcrops are seen at the following places:—

35	miles to	38	miles	west of	Schreiber, near Hartley.
41	"	50	"	"	"	" Dublin.
52	"	54	"	"	"	" Ozone.
59	"	60½	"	"	"	" Ruby.
62	"	75	"	"	"	" Nipigon, Red Rock and Sprucewood.
85	"	88	"	"	"	" Dorion.
100	"	106	"	"	"	" Loon.
121	"	128½	"	"	"	" Port Arthur.

Nepheline Syenite Series

Near Port Coldwell is a series of nepheline syenites and associated rocks extending from 61 miles to 84 miles west of White River.

Regions in which the rock is covered to such an extent that it was not possible to definitely determine the relationships:—

29	miles to	34	miles west of Schreiber.	
38	"	41	" " "	near Gurney.
54	"	59	" " "	" Fire Hill and Ruby.
61	"	west of Schreiber, near Ruby (contact zone).		
75	"	85	west of Schreiber, near Hurkett.	
128½	"	132	" "	between Port Arthur and Fort William (probably underlain with Animikie).
0	"	17½	Fort William, near Westport and Murillo (probably underlain with Animikie).	
48	"	50	Ignace, near Wabigoon (probably underlain with Keewatin).	
70	"	80	" "	Oxdrift Minnitaki and Eagle River (probably underlain with Laurentian).

Regions not seen:—

88	miles to	91	miles west of Schreiber.	near Ouimette.
97½	"	100	" " "	" Pearl.

THE WEST SHINING TREE GOLD AREA

By R. B. Stewart

Late in May, 1912, the writer was instructed by the Provincial Geologist to proceed to West Shining Tree and continue the examination of that area made during September, 1911.

Mr. Dowler Freeman served as assistant.

Transportation facilities have improved during the year. The regular train service on the Canadian Northern railway has been extended to Ruel, sixty-six miles from Sudbury. Two dams were built in the fall of 1911, on the Opickinimika river in order to deepen its shallow portions. This enables small gasoline boats or pointers to run from Ruel to the north end of Allin lake, which is 1½ miles from West Shining Tree lake. Mr. Thomas Clemow, of Ruel, had two boats on the route during the season, giving a tri-weekly service to West Shining Tree lake.

A wagon road will be built during the coming season into the area from mileage 80 on the Canadian Northern railway.

Mr. John Moore, of Sudbury, has established a general store and accommodation for travellers on the south side of West Shining Tree lake. In September, a post office (Tungsten) was established at the store with Mr. Moore as postmaster.

During the year considerable development work has been done. Assessment work was performed on a large number of claims, and a number of the most promising properties and adjacent holdings have been surveyed. In several places, shafts 20 to 50 feet deep have been sunk, and in other places open cuts have been made, chiefly on properties under option.

Geology of the Area

The rocks of the area are chiefly of Keewatin age. They consist of ellipsoidal basalts, altered diabases, amphibolite and hornblende schist. The ellipsoidal rocks predominate. Small areas of quartz porphyry, syenitic porphyry and felsite resembling rhyolite are also present.

A schistose structure exists in most of the Keewatin, but is most pronounced in narrow shear zones that have a general east-west trend, and the developed schists dip nearly vertical. Ferruginous calcium and magnesium carbonates are present in much of the schist.

A lamprophyre dike cutting the older Keewatin rocks was observed on the boundary between Churchill and McMurchy, about 20 chains from the southwest corner of the latter township.

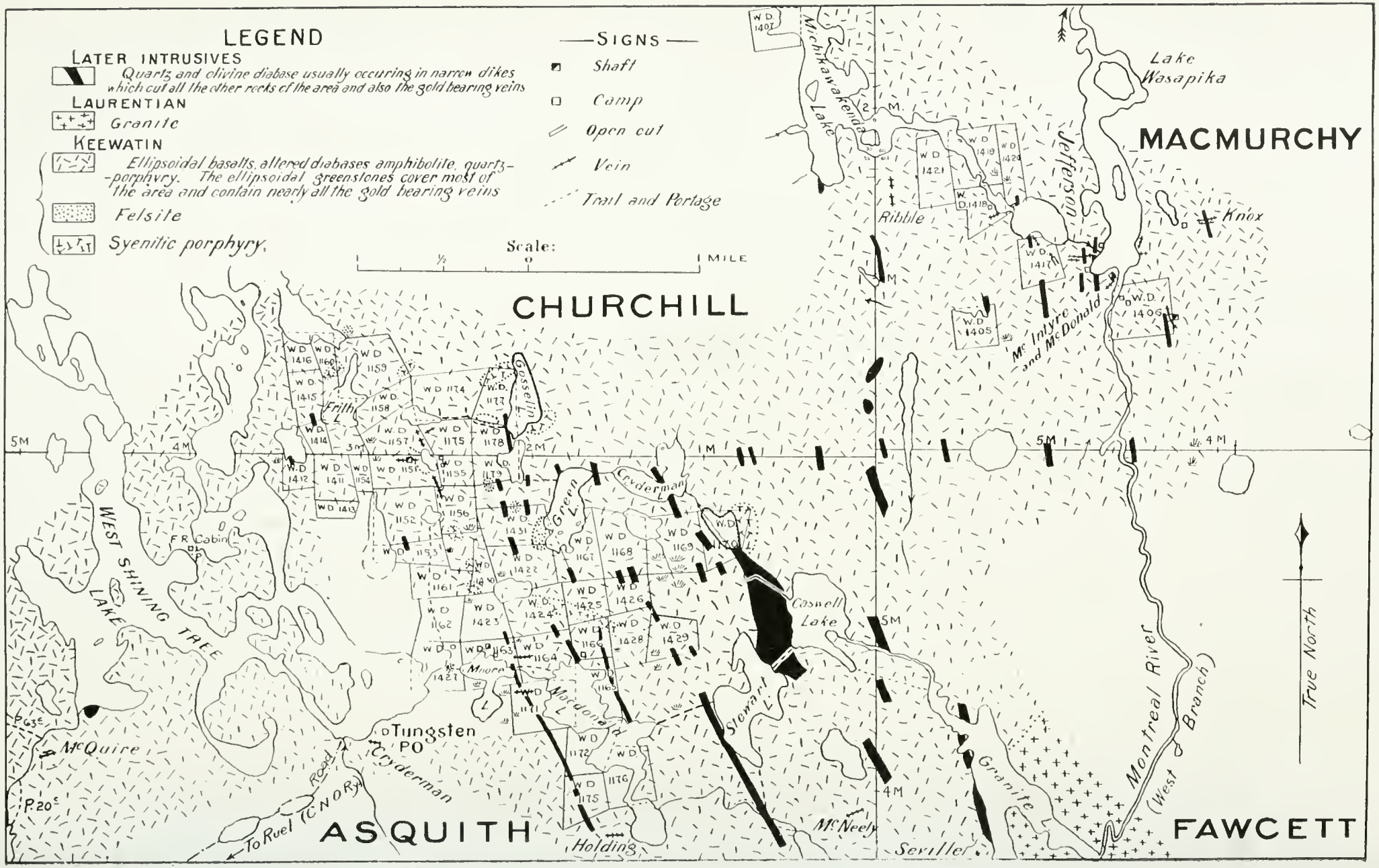
Numerous dikes and small areas of fresh quartz and olivine diabase are found in the area. The diabase dikes intrude all other rocks, and also cut the gold-bearing veins.

Auriferous Quartz Veins

A large number of quartz veins occur in the Keewatin rocks and many of them contain visible gold. Most of the veins are in the ellipsoidal basalt, but two gold-bearing veins have been found in the hornblende schist.

The veins vary in width from 15 feet to a few inches, but most of them are less than 4 to 6 feet across in the widest parts. They present little uniformity in width. They pinch out or narrow to mere stringers in a few yards, then widen again or break up into stringers. The dip of the veins is usually nearly vertical, but several dip at much lower angles,—45 degrees or less.

Considerable variation is presented in the strike of the veins. Many veins occur in the east-west shear zones, and conform in a general way to the strike and dip of the enclosing schists. Others having an approximate north-south strike occur in the more massive rocks.



Sketch Map, showing geology in the vicinity of West Shining Tree Lake.

Several irregular masses of quartz or quartz and schist occur. The largest one that has been found, so far, is on W.D. 1157. It is roughly 160 feet long and 60 feet wide.

The veins and adjacent country rock are usually well mineralized with iron pyrites. Specular hematite and barite are sometimes present. Much rusty decomposed material resulting from the oxidation of the pyrites and the decomposition of the ferruginous carbonates is almost invariably associated with the veins.

Several small areas of felsite and porphyritic syenite are found in the vicinity of the veins just east of West Shining Tree lake. The latter rock occasionally contains many stringers of quartz cutting it in a very irregular manner and sometimes veins of quartz 3 to 4 feet wide.

Gold occurs in many of the quartz veins and to a small extent in the enclosing schists. Much of the gold in the quartz is in a fine state of division, but nuggets several grains in weight are frequently found. Examination of several specimens showed that a large amount of the gold has been deposited along fracture lines in the quartz. The schist immediately adjacent to the veins appears to be impregnated with quartz to a certain extent, and contains some gold, but assays of several samples of schist taken in the vicinity of the veins do not indicate that the amount of gold in the schist is of importance.

Gold Claims

Gosselin

The mining locations, W.D. 1151-52 and W.D. 1155-56-57-58 and 59, are commonly known as the Gosselin claims. The first discovery of gold in the area was made on these claims. A mass of quartz about 160 feet in length and 60 feet wide occurs on W.D. 1157. Gold has been found in this outcrop. Just east of this quartz body is a vein 3 or 4 feet wide, striking about north and uncovered for about 100 feet. About three chains to the north of this vein is a mass of quartz 50 feet long and about 15 feet wide that contains some visible gold, and immediately east of here on W.D. 1175 is a mass of quartz extending 70 feet in a northeasterly direction and about 15 feet wide. Near the northern boundary of W.D. 1151 is a vein 1½ to 2½ feet wide, having an east-west strike and dipping to the north at about 45 degrees. Gold was observed in this vein. Another vein has been located southeast of this claim and extends into W.D. 1156. It has been traced for 8 or 9 chains. The vein strikes a little west of north and varies in width from a few inches to 15 feet. Gold was seen in several places. This is a promising looking vein.

A company from Duluth had an option on the properties early in the year. Surface work was carried on to determine the extent of the quartz bodies and these were systematically sampled. A shaft was put down 50 feet on the incline on the east-west vein on W.D. 1151.

Caswell Claims

Claims W.D. 1418-19-20-21 constitute the Caswell property. They are situated west of lake Wasapika, in MacMurchy township. Several veins have been located, but the one which has attracted most attention occurs on the south end of W.D. 1410 and appears again across the lake on W.D. 1418. The vein is of the east-west type and is seldom over a foot wide. The rusty weathering schist alongside the vein contains many stringers of quartz.

The claims were under option during the winter. Most of the development work carried out was done on the vein described above. An open cut 25 feet in length and 12 feet deep at the face was put in on the east shore of the lake on W.D. 1420. Some very fine specimens of gold were obtained, but the work was discontinued when the option had expired.

Seville Claim

Claim W.D. 1417 is located west of the south end of lake Wasapika. The outcrop of a vein that appears to strike several degrees west of north occurs near the east side of the claim. An open cut 30 feet in length and 16 feet deep at the face has been made

here. The quartz at the face is about 6 feet wide and well mineralized with pyrites. A little gold was observed in the bottom of the cut. The vein pinches out about 30 feet north of the cut, but comes in again for a short distance and then is concealed by the drift. Along the strike of this outcrop another one occurs near the northern boundary of the claim. The quartz is about a foot wide and contains visible gold. Another outcrop 3 feet wide and uncovered for a chain and a half occurs at the south boundary of W.D. 1418. These three outcrops probably belong to the same vein.

Jefferson Claim

The claim is not surveyed. It is situated immediately east of the Seville property. Gold was first found on this property in a vein that occurs on the west side of lake Wasapika. This vein has an east and west strike and dips 60 degrees to the north. It has been uncovered for over a chain. The quartz is about four feet wide, but pinches out several times. Considerable iron pyrites occurs in the quartz. Finely divided gold was observed about the centre of the outcrop.

Six chains west of this vein, another outcrop has been uncovered for about 200 feet. It has a similar strike and dip to the one described, but the quartz is narrow and irregular.

Two chains north of the latter vein, another has been uncovered for about 200 feet. It strikes a little south of east and is nearly vertical. The quartz is about 2 feet wide and maintains its width fairly well. Pyrites is abundant in the quartz. Much gold was observed in many places in this vein.

The Bennett Claim

This claim (W.D. 1406) is situated on the east side of the Montreal river just south of lake Wasapika. During the fall of 1911, a vein carrying visible gold was discovered along the eastern side of the claim and running into the adjoining property. It appears to strike about northwest, and has been uncovered for about four chains. The quartz in the vein is seldom over a foot wide, but many stringers occur in the vicinity of the vein. Gold was observed in several places in the quartz. An option was secured on the property to the east, and a shaft 34 feet deep was sunk just east of the line. Encouraging quantities of gold were found in the quartz taken from the shaft. This vein occurs in the ellipsoidal greenstone.

Knox's Claim

The claim is located east of lake Wasapika. Several veins varying in width from three to fifteen inches occur in a greenish-gray schist. Their general strike is a little north of east. Coarse gold was observed in one of the veins.

MacDonald and MacIntyre Claim

This property is located just south of lake Wasapika. Very little work has been done on it during the year. Outcrops of quartz and small areas exposed by surface work extending a distance of 8 to 10 chains seem to indicate the existence of a vein running southwest from the west side of the Montreal river and gradually bending to the west. The quartz is four feet wide in places. No gold was observed in this vein, but farther north a vein has been uncovered for a short distance that contains considerable free gold. The latter vein seems to strike west of north and dips to the east. It is two feet wide in some parts. The formation is rather massive greenstones, but some schistosity is developed. Much rusty material occurs in the vicinity of the veins. An option was taken on the property in September, and a shaft was commenced on the vein where the free gold occurs.

Moore and MacDonald Claims

These claims are situated in the vicinity of Moore lake. Several east and west shear zones, 60 feet wide or more, have been located on the properties. The shear zone on W.D. 1164 has been traced for 9 or 10 chains. What is apparently a continuation of this one has been located on W.D. 1163 and on W.D. 1427. Similar areas have been located on W.D. 1171. These shear zones contain many quartz veins and stringers, and are usually well mineralized with iron pyrites. The quartz is seldom over a foot wide, and constitutes a small fraction of the mineralized areas. Much rusty, leafy schist adjoins the quartz and good colors can frequently be obtained from this material on panning. Considerable gold was observed in the quartz veins and stringers on W.D. 1171.

The MacQuire Claim

This claim is located south of the southwestern bay of West Shining Tree lake. Several veins 8 to 10 inches wide occur in hornblende schist and are uncovered for a short distance. The veins dip to the north. A large amount of iron pyrites occurs in the quartz and schist. It is reported that rich samples of gold were obtained here.

Holding's Claim

In September of this year, Mr. R. Holding, of Chapleau, made a promising discovery of gold west of the south end of MacDonald lake. The formation here is amphibolite and hornblende schist. Gold occurs in the quartz and decomposed schists. Surface work was in progress when the writer left the field.

Surveyed Claims

Following is a list of mining claims surveyed at West Shining Tree lake, with the names of their stakers or owners. These are shown on the map, page 234.

Bennett, W.D. 1405-6-7.
Beilby, W.D. 1173-74.
Caswell, W.D. 1418-19-20-21.
Clark, W.D. 1169-70.
Coleman, W.D. 1411-12-13.
Coombs, W.D. 1175.
Coulson, W.D. 1166-67-68.
Frith, W.D. 1157-58-59.
Fulton, W.D. 1162.
Gosselin, W.D. 1151-52.
Hanch, W.D. 1430.
Johnston, W.D. 1426, 1428-29.
Lennon, W.D. 1415-16.
MacDonald, W.D. 1163, 1164, 1172.
Moore, W.D. 1177-78, 1431, 1165, 1171.
Odlum, W.D. 1154.
Pendleton, W.D. 1161.
Peterson, W.D. 1422-23.
Seville, W.D. 1417.
Speed, W.D. 1155-56.
Thompson, W.D. 1176, 1424-25, 1427.

GLACIAL PHENOMENA OF TORONTO AND VICINITY[1]

By A. P. Coleman

Introduction and Geological Summary

Toronto began about 100 years ago as a village at the mouth of the small river Don, where a sand bar, now called Toronto island, enclosed an excellent harbor. It has since expanded six miles west to the Humber river, four or five miles to the east and as much to the north. Its geographical centre is not far from the Meteorological Observatory, on Bloor street West, which is in lat. 43° 40′ 0.8″ and long. 79° 23′ 54″. Toronto is situated on the north shore of lake Ontario about forty miles from its western end.

In discussing the geology of the region, it will be advisable to include the suburbs of the city as far east as Highland creek, 13 miles from the Don, and as far north as York Mills, 6 miles from Toronto bay.

Physiographically, the region may be divided into two parts, a terrace formed by ancient lake Iroquois, sloping gently upwards from lake Ontario to a height of 176 to 200 feet, and a somewhat higher upland formed of rolling hills of glacial origin, reaching at its highest points 380 feet above the lake, which is 246 feet above the sea.

The comparatively level surfaces of the terrace and the morainic region beyond are broken by the deep valleys of the Don and Humber rivers and their tributaries, which have been cut almost to base level for a mile or two from the shore and ramify as steep walled ravines for several miles inland.

The lake shore is greatly varied, including the flat sand and gravel spit which projects westwards from the Don and then bends northward to enclose Toronto bay, as well as the cliffs of Scarboro heights to the east, which rise 355 feet above the water and form the highest point on the whole shore of lake Ontario. This line of cliffs, extending for nine and a half miles, has been carved by wave action from an ancient promontory and has provided the materials which have been transported ten miles west by the easterly storms to build up Toronto island.

The vicinity of Toronto includes only small outcrops of solid rock, Lorraine shale of Ordovician age; but has a varied and interesting series of Pleistocene deposits unequalled in complexity and importance by any other North American locality. Its thick series of interglacial beds, the Toronto Formation, gives evidence of an interglacial time far longer than the post-glacial period and with a warmer climate than that of the present.

The geological succession may be arranged as follows:

Recent—River and lake Deposits.

Pleistocene
- Iroquois Beach Materials.
- Glacial complex (four beds of till with interstratified clay and sand).
- Toronto Interglacial Formation (Scarboro beds, Don beds).
- Earliest Boulder clay.

Palæozoic—Lorraine shale.

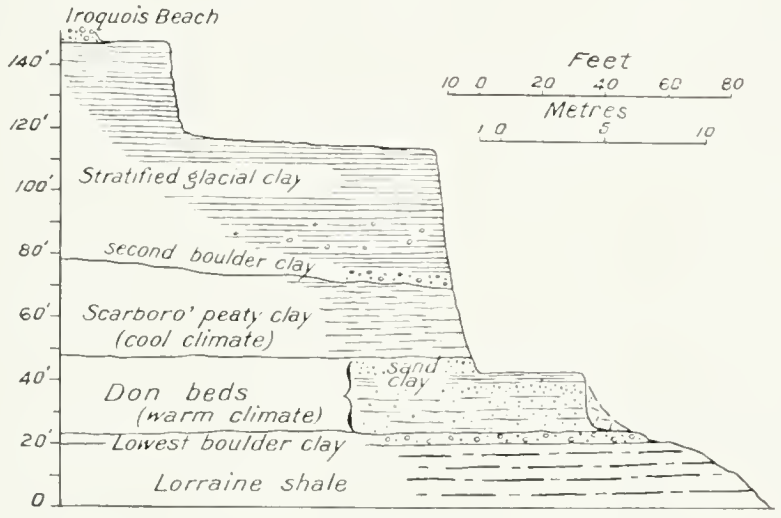
These will be described in succession from below upwards.

[1]This article and the one following (page 256), entitled "Moraines North of Toronto," descriptive of the glacial geology of Toronto and neighborhood, by Dr. A. P. Coleman and Mr. Frank B. Taylor respectively, were prepared for the use of the International Geological Congress which met in Toronto in August, 1913, and were published in Guide Book No. 6 for the excursions of that Congress. They are of more than fugitive interest and importance, and are accordingly reprinted in this Report so as to be available for future reference.

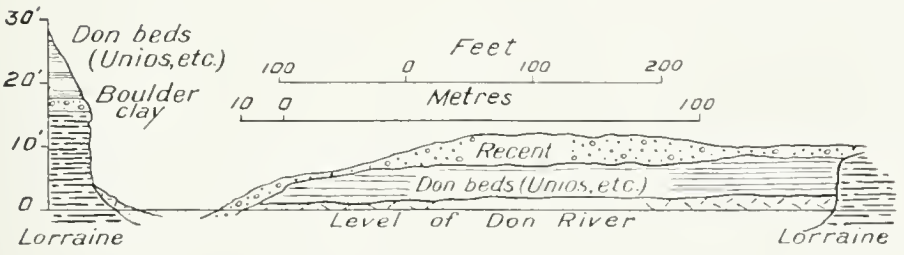
The Lorrain Shale

The bed rock of Lorraine shale (Ordovician or Lower Silurian) is generally buried under the drift deposits of the Pleistocene and comes to the surface at comparatively few points and in a quite inconspicuous way. Along the western lake front on Humber bay there are low outcrops rising not more than two or three feet above the water at Exhibition park and west of the Humber river. The shale rises higher along the sides of the river valleys, forming cliffs that reach 30 or 40 feet within the first three or four miles up the Humber, and 10 to 16 feet at the "Bend of the Don," about two miles from the mouth of the river.

All of these natural outcrops are greatly weathered, as might be expected in so easily attacked a rock as shale, and only the harder limey or sandy layers resist the action of rain and frost.



Section at Don Valley Brickyard, Toronto.



Section at Bend of Don River.

Artificial exposures in connection with the brickyards give the best opportunities to study the unweathered rock, the one most easily reached being at the Don Valley brickyard, where a great open pit from which shale is being quarried shows 60 feet of the formation. There are thin seams of impure limestone at frequent intervals in the shale and these have to be selected out before it is crushed for brickmaking. The weathered surfaces of the discarded limestones provide the best fossils in the Don region. The brickyard may be reached by taking a Church street car to Glen road, walking north to Binscarth road and then east to the edge of the Don valley, where a path leads down to the shale pit.

There are numerous exposures of the shale along the Humber, extending from near lake Ontario to Lambton Mills, two and a half miles up. The best outcrop for a study is just south of the bridge over the Humber at Lambton, where the river flows rapidly over the harder beds, many slabs of which are exposed along its shores. Here, in addition to the limestone layers, there are well ripplemarked sheets of shaly sandstone. The surfaces of the slabs display not only fossils, but a variety of markings supposed to be due to physical causes.

About two miles farther up the valley on the west side, there is a large shale pit from which materials are got for the manufacture of paving brick. This also affords a good collecting ground. The Lambton outcrops may be reached by taking a Dundas street car to the end of its route and then a Lambton suburban car to Lambton Mills.

The fossils found on the Humber differ somewhat from those at the Don brickyard, as determined by Prof. Parks, the western shale belonging to a somewhat higher horizon owing to a gentle southwesterly dip of the beds. Many of the fossils, however, are common to the two localities, and they are not separated in the list prepared by Prof. Parks. The most striking fossil is *Isotelus maximus* (sometimes called *Asaphus platycephalus*), which is occasionally ten inches in length. The fauna of the Don beds contains some species typical of the Eden of Ohio, while the Humber beds more closely resemble the Lorraine of New York.

List of fossils at Toronto:

Hydrozoa:—
Diplograptus pristis, Hisinger.

Echinoderms:—
Glyptocrinus decadactylus, Hall.
Heterocrinus juvenis. Hall.
Iocrinus subcrassus. M. and W.
Palasterina rugosa, Bill.

Vermes:—
Nereidavus varians. Grinnell.

Brachiopods:—
Leptæna rhomboidalis, Wilckens.
Rafinesquina alternata, Emmons.
Plectambonites sericeus. Sowerby.
Schizocrania filosa, Hall.
Zygospira modesta, Conrad.
Catazyga erratica. Hall.
Dalmanella testudinaria. Dalman.
Lingula, sp.
Trematis millepunctata. Hall.
Schizambon cf. *lockei*. W. and S.

Gastropods:—
Crytolites ornatus, Conrad.
Lophospira cf. *perangulata*, Hall.
Protowarthia cancellata. Hall.
Archinacella, sp.

Pelecypoda:—
Byssonychia grandis. Ulrich.
Byssonychia radiata. Hall.
Byssonychia imbricata. Ulrich.
Byssonychia alveolata, Ulrich.
Whitcavesia pholadiformis. Ulrich.
Modiolopsis concentrica. Hall and W.
Modiolopsis modiolaris, Conrad.
Cymatonota recta. Ulr.
Cymatonota pholadis. Ulr.

Orthodesma parallelum, Hall.
Orthodesma parvum, Ulr.
Lydrodesma poststriatum, Emmons.
Whitella hindi, Bill.
Whitella ventricosa, Ulr.
Cleidophorus neglectus, Hall.
Psiloconcha inornata, Ulr.
Modioledon obtusus, Ulr.
Pterinea demissa, Hall.
Ctenodonta cf. *carinata*, Ulr.

Cephalopoda:—
Orthoceras crebriseptum, Hall.
Endoceras proteiforme, Hall.

Pteropods:—
Conularia formosa, Miller and Dyer.
Tentaculites starlingensis, Meek.

Bryozoa:—
Heterotrypa frondosa, D'Orbigny.
Heterotrypa inflecta, Ulr.
Monotrypa undulata hemispherica, James.
Amplexopora discoidea, Nicholson.
Bythopora delicatula, Nich.
Leptotrypa irregularis, Ulr.
Arthropora schafferi, Ulr.
Peronopora vera, Ulr.
Spatiopora cf. *maculosa*, Ulr.
Atactopora maculata, Ulr.
Dekayella ulrichi, Nich.
Bythopora aretipora, Nich.
Aspidopora, sp.
Paleschara beani, James.
Chiloporella, sp.
Callopora subplana, Ulr.
Callopora dalei, M-E and H.
Bythopora gracilis, Nich.
Hemiphragma whitfieldi, James.

Trilobites:—
Isotelus maximus, Locke.
Calymene callicephala, Green.
Trinucleus concentricus, Eaton.

Pleistocene Beds

The surface of the shale beneath the city had a high relief before the first Pleistocene ice sheet moved down upon it. A wide valley had been carved 200 feet below the general level by a great river which flowed south from the present Georgian bay region, the Laurentian river of Dr. Spencer. Probably a thick layer of preglacial weathered material once covered the surface, as the region is supposed to have been dry land since Palæozoic times, but this was completely swept away, perhaps by the advancing ice, leaving no record between the Ordovician and the end of the Pliocene.

Immediately upon the ancient marine shale one finds a sheet of boulder clay formed by land ice; and succeeding it in some places there are four other till sheets, each

separated from the one below by interglacial beds of stratified gravel, sand and clay, piled up at Scarboro' to a thickness of nearly 400 feet.

The earliest and most important interglacial series includes 185 feet of delta deposits; but the later ones are seldom more than 30 or 40 feet in thickness, and may represent relatively short recessions of the ice. The retreat of each ice sheet in the series was doubtless followed up by a great glacial lake in which stratified deposits were formed. That of the latest (Wisconsin) ice sheet was accompanied by the waters of lake Iroquois, which lasted for thousands of years and left behind the terrace and gravel bars and shore cliffs which are such marked physiographic features at Toronto.

The earliest sheet of till consists of tough blue clay, evidently made largely from the local shale, and containing many angular slabs of its harder layers picked up close by. With them occur some well rounded polished and striated boulders of blue Trenton limestone, smaller boulders of black Utica shale, and many large or small boulders of granite, gneiss, greenstone or schist from the Archæan. No smoothed or striated surface has been found beneath the lowest boulder clay, which seems to pass down into the disturbed Lorraine shale; but the direction of the ice motion is indicated by the boulders of Utica and Trenton rocks, which are found in place in eastern Ontario.

The lowest boulder clay is usually not more than three or four feet thick, and in a few places it is wanting, having been swept away by interglacial rivers. Its best exposure is in a shore cliff near the west end of King street in Parkdale, where it rises four or five feet above the lake and is capped for 800 feet by a well-laid boulder pavement. Above the pavement there are 25 or 30 feet of less solid till formed by the next ice advance, with no interglacial beds intervening.

The flat upper surfaces of the stones in the boulder pavement are usually well and uniformly striated, the direction ranging from 290° to 315° with an average of 300°. The striæ run 30° north of west instead of south of west, as might have been expected. The glacial lobe which had followed the depression of lake Ontario from the east began to spread out towards its west end. A similar boulder pavement occurs in a shore cliff near Port Credit ten miles to the west.

Such boulder pavements imply a long interval between the two ice sheets in which the weather or running water or more probably wave action could remove the clay and allow the boulders to accumulate on the surface. The second ice sheet must have come on gently at first until the boulders were firmly sunk into the clay below, so as to withstand the later grinding, polishing and striation.

The Toronto Formation

After the recession of the first ice sheet, there was a long period of erosion and river action, in places removing the boulder clay and cutting down into the shale. Afterwards a great lake filled the basin, laying down the beds of clay, sand and gravel of the Toronto Formation upon the eroded surface.

The Toronto Formation is naturally divided into two parts, the lower being the Don beds and the upper the Scarboro beds. These two divisions differ greatly in their fossils and were formed under different climatic conditions, the Don beds including fossils proving a warmer climate than the present and the Scarboro' beds others that indicate a cooler climate. The two are never well displayed in the same exposure, but the order of succession is certain, and there are places which show the Don beds underlying conformably the lowest portion of the Scarboro' beds. Both were probably delta deposits, though of different types; but in the western part of Toronto there are interglacial beds having the tumultous cross bedding and irregularity characteristic of strong currents and probably formed by a large river. The exact position of these beds with reference to the others is not quite certain, though they belong to the same interglacial period.

The Don Beds

The best outcrop of the Don beds is to be found just north of the shale pit referred to before in the Don Valley brickyard, to the east of Rosedale. The Pleistocene section

is 130 feet in thickness and includes not only the Don beds, but an overlying series of unfossiliferous clays which were formed much later when the ice front was not far off. The section is divided into three parts corresponding to the three working levels of the clay pit, and rises to the Iroquois terrace.

Resting on the shale there are three feet of boulder clay, followed by from 14 to 17 feet of stratified materials, consisting of a foot or two of bluish clay below and brown or yellow sand with thinner clay beds above, the whole somewhat irregularly distributed probably by a river coming into a lake 60 feet higher than lake Ontario at present.

This exposure is highly fossiliferous, some beds being crowded with shells, while flattened trunks and branches of trees often occur, and in one thin layer of clay, now run out, many leaves of trees have been found.

Ascending above this part of the section one must go about 50 feet farther north to find its continuation. The next bed is of blue clay 3½ feet thick above which there

Interglacial Beds at Bend of Don River.

are five feet of yellow and brown sand, the last member of the characteristic Don beds. The total thickness above the lower boulder clay is from 23 to 25 feet. The brown sand was evidently deposited in shallow water where oxidation was taking place, since some of the coarser beds of gravelly sand in the section are cemented with limonite.

Bluish gray finely laminated clay, overlying the Don beds conformably to a thickness of from 7 to 22 feet, was laid down in much deeper water, and shows no fossils except a little peaty matter. It represents the lowest part of the Scarboro beds.

A thin sheet of boulder clay, the second in order, rests upon the eroded surface of the stratified clay just mentioned, followed by 80 feet of rather coarsely laminated clay sometimes containing subangular striated stones. The source from which this clay was derived must have been the ice margin not many miles away. The lower stratified clay, which is interglacial, is formed of well leached material and burns to red brick; while the overlying stratified clay is so strongly charged with lime as to burn to a buff brick.

The top of the section consists of a few feet of brown sand and loam with large boulders, resulting from the wave work of lake Iroquois. The stones have evidently been washed out of an overlying sheet of till, which may still be seen in the old shore cliff half a mile to the north.

The lower 25 feet of Don interglacial beds are crowded with fossils and form the

most important part of the section. From them wood or leaves of thirty-two species of trees have been obtained and forty-one species of shell-fish, of which twelve are unios or anodons, in addition to undetermined beetles, cyprids, etc.

The following list of interglacial plants was supplied by the late Professor Penhallow:

Acer pleistocenicum.
" *spicatum.*
" *torontonicnsis.*
Asimima triloba.
Carya alba.
Chamacyparis spharoidea.
Clethra alnifolia.
Crategus punctata.
Cyperacea sp.
[2]*Drepanocladus capillifolius.*
Ericaulon sp.
Festuca ovina.
Fraxinus quadrangulata.
" *sambucifolia.*
" *americana.*
Gleditschia doncnsis.
Hippuris vulgaris.
Hypnum sp.
Juniperus virginiana.
Larix americana.
Maclura aurantiaca.
Ostrya virginica.
Picea nigra.
" sp.
Pinus strobus.
Platanus occidentalis.
Populus balsamifera.
" *grandidentata.*
Prunus sp.
Robinia pseudacacia.
Quercus obtusiloba.
" *alba* (?).
" *rubra.*
" *tinctoria.*
" *oblongifolia.*
" *macrocarpa.*
" *acuminata.*
Salix sp.
Taxus canadensis.
Thuya occidentalis.
Tilia americana.
Ulmus americana.
" *racemosa.*
Vaccinium uliginosum.
Chara.

Inadvertently he included two specimens from the Scarboro beds some miles to the east, *Picea nigra* and *Larix americana*, belonging to a later and cooler stage of the interglacial period.

*Determined by Mr. A. J. Grout.

The shell-fish were determined a number of years ago by Dr. Dall and his assistants at the Smithsonian institution, the list being as follows:—

Unio unduiatus
" *rectus* } Still living in lake Ontario.
" *luteolus*
" *gibbosus*
" *phascolus*
" *trigonus* } Still living in lake Erie, but not reported from lake Ontario.
" *coccineus*
" *occidens*
" *solidus* } Not known in the St. Lawrence system of waters, but living farther south.
" *clavus*
" *pyramidata*

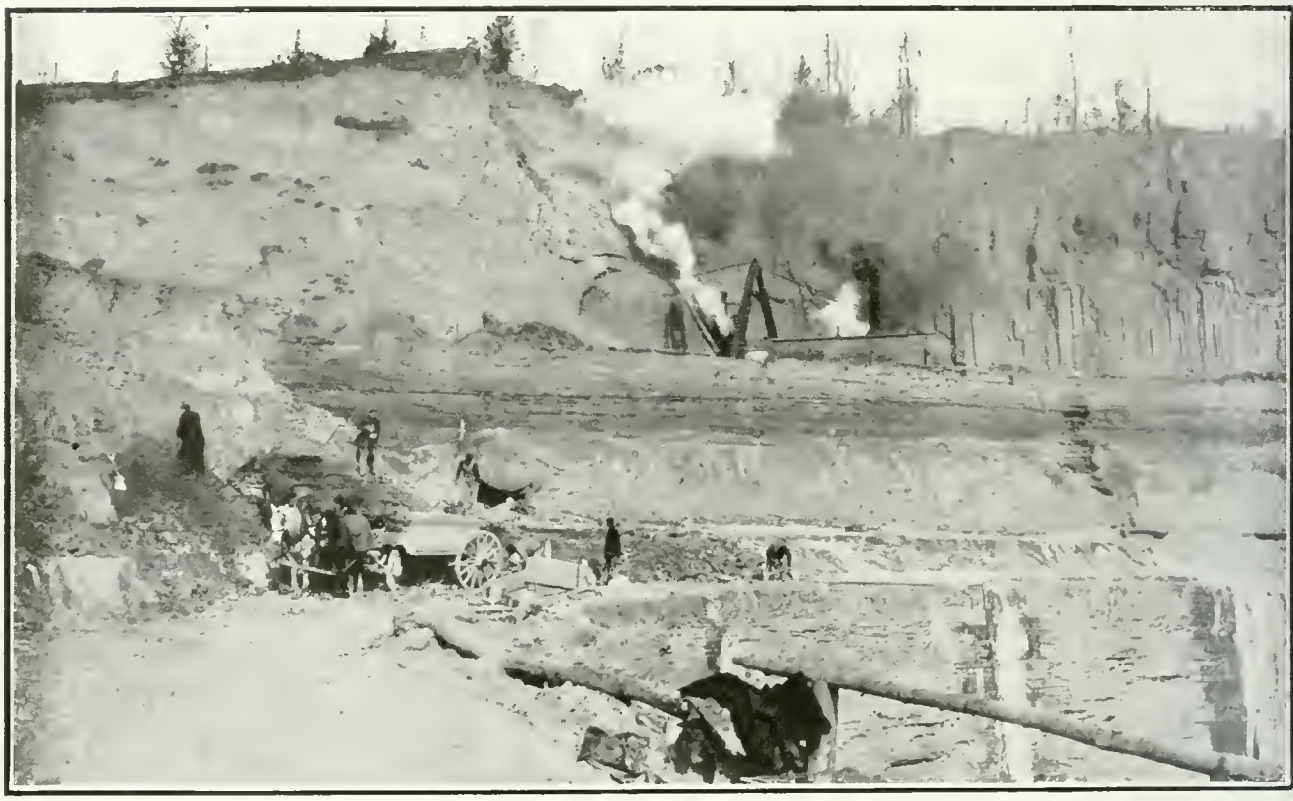
Anodonta grandis.—Not reported from Canada.
Sphærium rhomboideum.
" *similis* (?).
" *soliaulum.*
" *striatinum.*
" *sulcatum.*
Pisidium adamsi.
" *compressum.*
" *novaboracense* (?).
Pleurocera subulare.
" *elevatum.*
" *lewisi* (?).
Goniobasis depygis.
" *haldemane.*
Limnæa decidiosa.
" *elodes.*
" *bicarinatus.*
Planorbis parvus.
Amnicola limosa.
" *porata.*
" *sagana.*
" *ancillaria.*
Physa heterostropha.
Succinea avara.
Bithinella obtusa.
Somatogyrus isogonus.
Valvata sincera.
" *tricarinata.*
Campeloma decisa.
Bifidaria armata (land snail).

Of mammals the Don Valley brickyard has supplied a bone of a large bear and bones or horns of bison, of a deer like the Virginia red deer, and of a deer related to the caribou.

Of the trees, seventeen are near their northern limit and scarcely reach Toronto at present, while ten or eleven of the unios and other shell-fish do not now live in lake Ontario, but inhabit Mississippi waters. The whole assemblage of plants and animals implies a warmer climate than the present, such as that of Ohio or Pennsylvania, as suggested by Prof. Penhallow and Mr. White. There could have been no great ice sheet within hundreds of miles of the region when the rich Don forest grew, with its paw-paws, osage oranges and red cedars.

A walk of half a mile up the Don valley to a second brickyard, just beyond a bend of the river, discloses another section of the Don beds of a somewhat different kind. To the west of the valley Lorraine shale rises 16 feet above the river, followed by boulder clay, on which rests sand with unios like the deposits just described. Two hundred yards to the east the shale can be seen rising eight or ten feet, but between these two points the boulder clay and shale were cut away by an interglacial river, which afterwards began to deposit materials on the shale in the rising waters of a lake.

At the base of the section there are three or four feet of coarse shingle mixed with matted reeds, leaves and wood. Above this there are eleven feet of sand and clay with many shells. The whole is covered by a few feet of recent sand deposited by the Don before its bed had been cut as low as at present. The trees include red cedar, elm, oak and pawpaw, showing that the climate was warm at the earliest stage of the Don beds.



Don Valley Brickyard.

If we add these lower beds to the better exposed section at the Don valley brickyard, the total thickness is 40 or 45 feet.

Similar beds of sand and clay containing wood and unios are found at several places along the Don for about two miles to the south, and wood and shells have been obtained from excavations and wells at many points in the city to the west and below the level of the lake at Scarboro also, so that the Don beds cover several square miles, though the exact boundaries are not known.

A deposit of sand and gravel containing wood and shells has been found near Thornhill, fourteen miles north of lake Ontario, while boring for water. It underlies 200 or 300 feet of clay, and is no doubt the northward extension of the Don beds along the channel of the interglacial river which formed the delta.

The Scarboro Beds

The upper interglacial beds at the Don valley brickyard, consisting of laminated clay with no fossils except peaty materials, are found at several outcrops to the north and northwest, growing thicker in those directions and reaching, north of Reservoir

park, an elevation of about 150 feet above lake Ontario. They are also found to the east of the Don and at Scarboro heights, where they are best exposed. In the brickyard 672 laminæ were counted in a height of 19 feet 9 inches, probably representing as many years of deposition. Above this a foot or two were too much broken up by the later ice advance to be counted. The counting was done by Baron de Geer's method, devised for the marine clays of Sweden, the limits of the layers being marked on strips of paper.

Since the Scarboro cliffs give the best opportunities for the study of these beds, they will be described as typical. The splendid Scarboro section was worked out by Dr. George Jennings Hinde many years ago, demonstrating the first series of interglacial beds recognized in America. His work was so good as to require scarcely any change in later times. At Scarboro the Don beds are not visible in the cliffs, but wells sunk on the beach show that they exist a few feet below the lake and have a thickness of 36 feet. They consist of yellowish sand with some beds of clay, containing unios and pieces of wood as in the Don sections.

Above the water level, where the interglacial section is most complete, there is not only laminated clay like that referred to above, but also a great thickness of sand resting upon it.

The thickest section includes 36 feet of Don beds and 5 feet of peaty clay below water, with 85 feet of peaty clay above water followed by 55 or 60 feet of stratified sand, making in all 186 feet of interglacial beds. The general section shown in the cliffs will be described first, and then the fossils will be taken up.

The Scarboro Section

At Victoria park, toward the east end of Toronto, the flat sandy shore ends and boulder clay shows above the water, standing up as a comparatively low cliff capped with Iroquois sand beds. Toward the east the cliff rises and becomes more complex in structure until it reaches a height of 355 feet four miles from Victoria park, after which it descends and finally reaches lake level at Highland creek, 9½ miles from its commencement. This fine section shows not only the greater part of the interglacial beds, but a series of four tills with interbedded stratified sand and clay, and also nearly 100 feet of Iroquois sands towards the western end. The upper series of boulder clays and interstratified beds is confined to a small part of the section at its highest point. To the east and west of this only one sheet of boulder clay can be seen, but it stretches almost continuously along the upper part of the section, though with great variations in thickness.

It is evident that the interglacial beds were greatly eroded by river action before the second ice advance, as may be seen at the "Dutch Church," where a river valley was cut to a depth of 166 feet, having a width of 1,200 feet at lake level and nearly a mile on top. The layer of boulder clay, after rising to 150 feet, rapidly dips down to the level of the lake at this point and then rises again beyond it. This is in reality the second sheet of till in the succession, the lowest one being 40 feet below the lake, underlying the unio beds mentioned above.

The waves of lake Ontario undercut the cliff, especially in seasons of high water, after which slices slip down and are removed by storms. Where there are several successive years of low water in the lake much of the face of the cliffs becomes covered with vegetation, though they are too vertical in the neighborhood of the Dutch Church to permit of much plant growth. The earliest reliable survey of Scarboro was made fifty years ago, and another survey made during the past year shows an annual recession of 1.62 feet per annum. The boulders from the boulder clay remain at the base of the cliff, when not removed by man, and the interglacial sands when washed by the waves on the shore show thin sheets of red garnet or black magnetite.

The interglacial clay rising about 85 feet above the lake has certain well marked features. It is often well stratified in laminæ running from a fraction of an inch to two or three inches in thickness, though there are a few layers three or four feet thick in which the bedding is indistinct or wanting. Where typically bedded each lamina

consists of a darker layer of fine gray clay, and a paler part of a silty nature. Often the silty part widens and contains more or less peaty matter with mica scales. Occasionally the peaty bands expand to half an inch or an inch in thickness, and rarely twigs or small bits of wood are found. Every few feet in the section shows a thin sheet of impure siderite which stands the weather better than the rest of the beds and is broken on the beach into flat shingly pebbles, which slowly oxidize to limonite. The iron ore and the peaty layers make distinctive features by which this interglacial clay is easily recognized. It burns to a red brick.

The "Dutch Church," Scarboro.

From the peaty matter mosses, bits of leaves and bark, seeds and parts of beetles may be obtained, by washing away the clay, drying the peat and examining it with a lens. The late Dr. Scudder, of Harvard University, determined seventy-two species of beetles from materials obtained here, the list being as follows:—

Fauna of Cool Climate, Chiefly from Scarboro

Arthropoda (almost wholly beetles):
Carabidæ (9 gen. 34 sp.).
Elaphrus irregularis.
Loricera glacialis.
" *lutosa.*
" *crita.*

Nebria abstracta.
Bembidium glaciatum.
" *Haywardi.*
" *vestigium.*
" *vanum.*
Bembidium præteritum.
" *expletum.*
" *damnosum.*
Patrobus gelatus.
" *decessus.*
" *frigidus.*
Pterostichus abrogatus.
" *destitutus.*
" *fractus.*
" *destructus.*
" *gelidus.*
" *depletus.*
Badister antecursor.
Platynus casus.
" *Hindei.*
" *Halli.*
" *dissipatus.*
" *desuetus.*
" *Hartii.*
" *dclapidatus.*
" *exterminatus.*
" *interglacialis.*
" *interitus.*
" *longævus.*
Harpalus conditus.
Dytiscidæ (3 gen. 8 sp.).
Coelambus derelictus.
" *cribrarius.*
" *infernalis.*
" *disjectus.*
Hydroporus inanimatus.
" *inundatus.*
" *sectus.*
Agabus perditus.
Gyrinidæ (1 sp.).
Gyrinus confinis, LeG.
Hydrophilidæ (1 sp.).
Cymbiodyta extincta.
Staphylinidæ (11 gen. 19 sp.).
Gymnusa absens.
Quedius deperditus.
Philonthus claudus.
Cryptobium detectum.
" *cinctum.*
Lathrobium interglaciale.
" *antiquatum.*
" *debilitatum.*
" *exesum.*
" *inhibitum.*
" *frustum.*

Oxyporus stiriacus.
Bledius glaciatus.
Geodromicus stiricidii.
Acidota crenata, Fabr. (var. *nigra.*).
Arpedium stillicidii.
Olophrum celatum.
" *arcanum.*
" *dejectum.*
Chrysomelidæ (1 gen. 2 sp.).
Donacia stiria.
" *pompatica.*
Curculionidæ (4 gen. 6 sp.).
Erycus consumptus.
Anthonomus eversus.
" *fossilis.*
" *lapsus.*
Orchestes avus.
Centrinus disjunctus.
Scolytidæ (1 sp.).
Phloeosinus squalidens.

Of these all but two are extinct, as stated by Dr. Scudder.

Mr. A. J. Grout has determined the following mosses from the same beds:—*Hygrohypnum palustre* (?), *Drepanocladus vernicosus* (Lindb), and *Hylocomium* sp.

The Scarboro interglacial sands are less extensive than the clays just described, since they are the uppermost beds and suffered far more from superficial destruction by rain action and river erosion in the later part of the interglacial interval.

Where best developed the sands have a thickness of 55 or 60 feet, the lower four or five feet having clayey layers showing a transition to the peaty clay. The sand is generally coarse, but free from pebbles, and some layers are cross-bedded, showing that the deposit was made in shallow water. There are in some places many concretions of brown iron ore, once no doubt, siderite.

Toward the bottom of the sand and immediately above the clay there is often a thick bed of coarse peaty materials, including many chips of wood and bark and bits of branches. The trees recognized are *Larix Americana* and *Abies balsamea.* A few small shell-fish are found also, *Spharium rhomboideum, S. fabale, Limnæa* sp., *Planorbis* sp. and *Valvata tricarinata.*

The sand extends for five miles along the cliffs and has been found in ravines several miles north of the shore.

The Scarboro interglacial beds were formed in a northern bay of an interglacial lake, which reached at least ten miles inland from the present shore. They are delta deposits laid down by a great river coming from the Georgian bay region, draining the basins of the present upper lakes, and they began with a water level somewhat below that of lake Ontario.

Above the second till sheet there is stratified clay and sand, followed by a third sheet of till, and in the highest part of the cliffs a fourth and a fifth sheet of boulder clay have been found with intervening stratified sands and clays. There were three well-defined recessions of the ice during which lake deposits having thicknesses of from 25 to 36 feet were deposited. How long these later interglacial periods lasted is unknown. No important erosion intervals are known in connection with them, and except for a few small shells in one of the beds they are without fossils; so that they seem to have been of much less importance than the Toronto interglacial period.

The total thickness of these upper glacial and interglacial deposits at the highest point of the Scarboro section is 203 feet.

The magnificent Scarboro section may be seen to the best advantage by taking a King street car as far east as possible and then walking eastwards along the shore. This,

however, demands a good deal of time, and the highest and most interesting parts of the section may be seen more expeditiously by taking a King street car to the Woodbine and there transferring to a suburban car running along Kingston road. This ascends the sandy slopes of the long spit which enclosed the ancient Don bay of lake Iroquois, and then runs for two miles east along the old gravel bar, which is well disclosed by numerous gravel pits. The road then climbs the Iroquois shore cliff to the gently rolling upland of boulder clay. At stop 32 a lane leads south from Kingston road past a Topographical Survey tower to the edge of the cliff, a distance of about three-quarters of a mile. The highest point on the actual shore of lake Ontario is reached a short distance to the east. From this point, 355 feet above the lake, there is a steep descent, mostly through a small growth of trees to the shore. The section described above is shown in bare cliffs on each side of the path, a sheet of boulder clay, followed by stratified clay and sand, another sheet of boulder clay, succeeded by silty sand with its upper layers crumpled by the advancing ice, a third comparatively thin sheet of boulder clay with cross-bedded sand beneath it, and a fourth boulder clay resting on the eroded sand beds of the great interglacial formation, under which the peaty clay extends to the shore of lake Ontario.

The section has been worked out as follows:

	Feet.	
Boulder clay, No. 5	48	Glacial Complex, 203 ft.
Stratified sand and clay	36	
Boulder clay, No. 4	32	
Silty sand, upper layers crumpled	25	
Boulder clay, No. 3	9	
Cross-bedded sand	29	
Boulder clay, No. 2	24	
Scarboro Interglacial beds ..... Sand .... 59 / Peaty clay 92		Above level of lake Ontario, 151 ft.
Don beds (unios and wood)... Peaty clay 5 / 36		Below level of Lake Ontario, 41 feet.
Boulder clay, No. 1		
Lorraine shale		
Total Pleistocene beds	395	

A walk of less than a mile westwards along the beach brings one to the "Dutch Church," where an interglacial river valley has been filled with the second boulder clay followed by stratified glacial clay. The gradual rise of the boulder clay on each side of the fossil valley is well exposed.

The steepest cliffs of the section are cut from this thick mass of hard clay which stands vertical to a height of 150 feet. Small streams coming in have cut extraordinary ravines, one of them with the aid of rain erosion shaping the tower and buttresses of the "church." A stairway leads up 170 feet from the shore at the Dutch Church to the Iroquois terrace, here beautifully displayed with a shore cliff more than 100 feet high; and a walk of three-quarters of a mile brings one to the Kingston road, at Halfway House, where a car may be taken to the city.

Interglacial Beds in the Western Part of Toronto

The order of succession and relative ages of the deposits thus far described are well ascertained, but in the western part of Toronto, north of Bloor street and near Christie and Shaw streets, there are fossiliferous beds of uncertain position. Eighty feet of tumultuously cross-bedded sands and gravels here underlie the second till sheet, so that they are clearly interglacial; but they differ so much in character from both the Don

and Scarboro beds that they cannot be classed with either. They were evidently formed by a powerful river which sometimes deposited coarse materials in its bed and then cut them away again by some shifting of its channels, a type of work quite different from the quiet deposit of clay and sand in the interglacial delta of the Don and Scarboro sections. They may be older than the Don beds or younger than the Scarboro beds.

These western beds contain a few fragments of unios as well as *Sphœriums*, *Pleuroceras* and other small shells, all of which occur in the Don beds. A little wood found in these sand pits is still undetermined. The most interesting fossils obtained are scattered bones of mammals, including bison, deer and mammoth or mastodon. A horn of *Cervalces borealis*, as determined by Prof. Bensley, an atlas vertebra of bison and part of a lower jaw of a bear (O. P. Hay) have been found also, and several fragments of ivory have been picked up. All of these remains seem to have been waterworn and may have been transported for some distance. There is no certain evidence as to climate in the fossils thus far found.

Shaw Street Sand Pit.

From the lists given above it will be seen that the Toronto Formation has furnished a wide range of fossils, including 42 trees and other flowering plants with several mosses, 41 shell-fish, 72 insects, and 5 or 6 mammals—about 165 or 170 species all told.

Outline of Climatic and Physical Changes

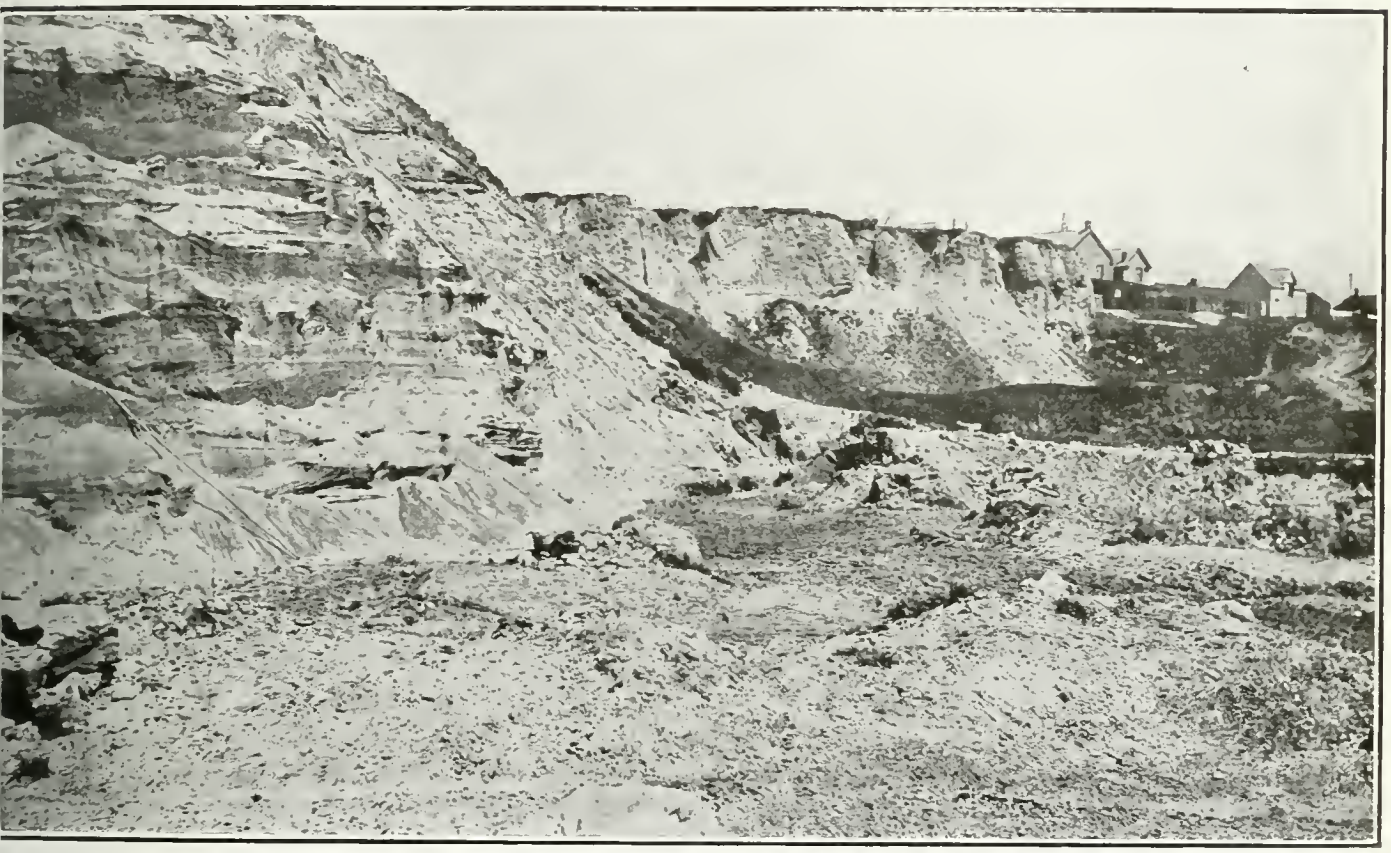
The Toronto interglacial period included great changes in climate and in physiographic features. During the retreat of the first ice sheet no doubt the climate slowly changed from Arctic to subarctic and finally to temperate, and probably the valley was at first occupied by a great glacial lake when thawing had proceeded so far as to free the basin, but not its outlet toward the northeast. These earlier stages of the interglacial time have left no visible record, though they must have required thousands of years to accomplish.

The first episode in the Don beds shows a river flowing into a lake lower than the present, with a rich deciduous forest on its shores. There followed a rise of water in

the lake, probably by the upwarping of its outlet, to 60 feet above the present level. This time of warm climate lasted long enough for the deposit of 45 feet of sand and clay in a delta several square miles in area, and for the growth of generations of forest trees.

At length there came a rise of the waters to 150 feet or more above the present lake, when delta beds were laid down covering more than 100 square miles. At one point there are 672 annual layers in less than 20 feet, so that the whole thickness must have required some thousands of years to deposit. The climate had become colder, as shown by the plants and insects, and was like that of northern Ontario at present.

Next, the great lake was drained to a level 16 feet below lake Ontario, and three river valleys were carved in the delta, a wide one toward the west at the present site of Toronto, a narrower one at the Dutch Church and another wide one towards Highland



Christie Street Sand Pit (Interglacial). Upper Boulder Clay to Right.

creek. These valleys had gently sloping sides and were much more mature than the present valleys of the Don and the Humber. To cut them the rivers must have required several thousand years.

Finally, Arctic conditions came on and the ice advanced once more from the northeast, covering the eroded surface of the region with a second sheet of boulder clay. The climatic cycle was complete.

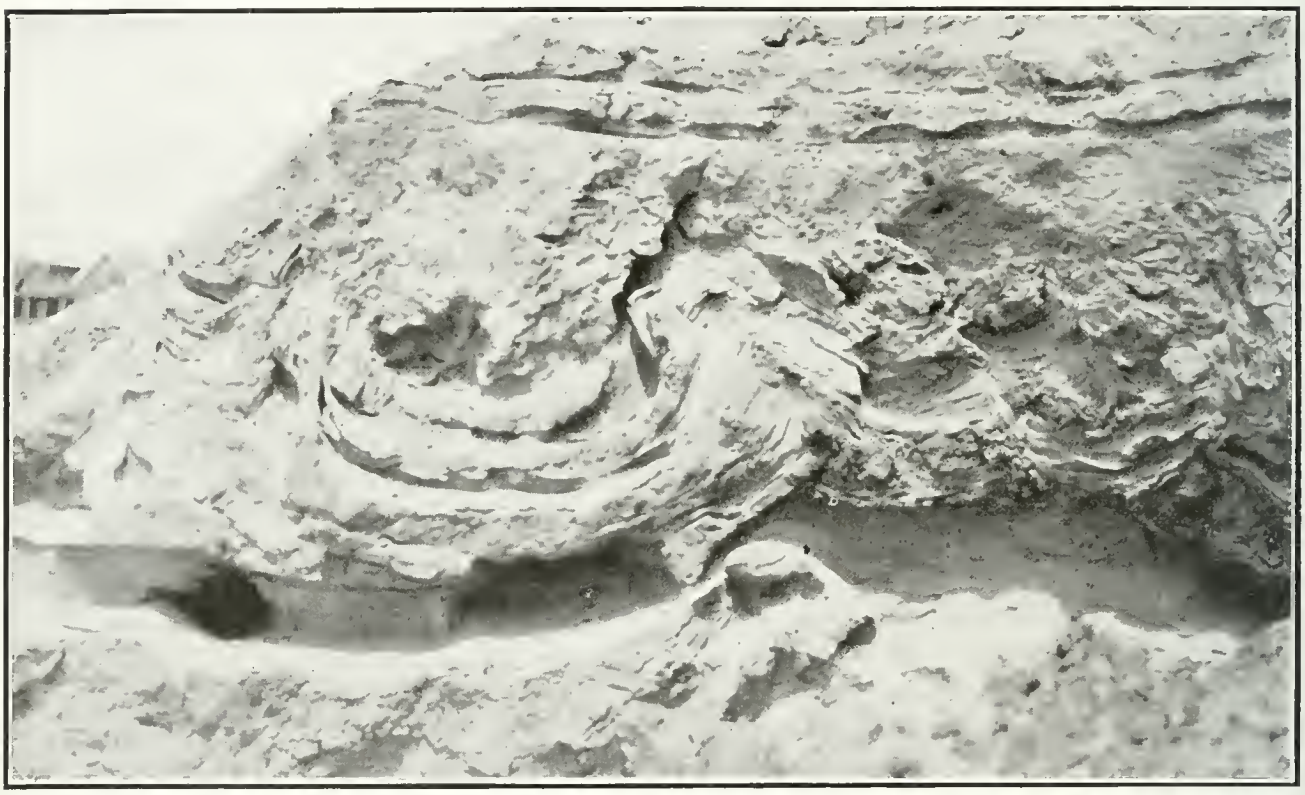
The Iroquois Beach Deposits

After the last ice age, when the retreat was well under way, the basin of lake Ontario was freed from ice while its outlet at the Thousand Islands was still blocked. The water escaped by the Rome outlet, in the state of New York, to the Hudson, and a lake which has been named Iroquois by Dr. Spencer, occupied the basin at a much higher level than that of lake Ontario. The southern slope of Toronto is largely covered with its deposits, the old shore cliff runs east and west through the city, and at each end a great gravel bar extends across the present river valley.

The Iroquois beach is deformed and rises from 176 feet above lake Ontario at the

Humber gravel bar toward the west to 196 feet at the York gravel bar crossing the mouth of the ancient Don bay, and to 200 feet at Scarboro heights. The shore cliff within the city north of Davenport road averages about 75 feet in height, but at Scarboro reaches in places 170 feet. At the highest point of the Scarboro cliff it is completely cut off by the shore of lake Ontario for half a mile, the only known point at which the waves of Ontario have encroached on the ancient shore line.

Lake Iroquois began its work at least 70 feet below its latest well marked beach, but none of the earlier stages is shown at Toronto. Beside the cutting of a terrace in the Pleistocene deposits with the cliff at its rear the lake did much work in distributing materials, filling in former depressions in the terrace, and building the two great gravel bars in west and east Toronto respectively. Each of these bars began on the east side of its bay and grew westwards, crowding the river out of its earlier channel and forcing it to the western shore of the bay.



Crumpled Beds (Iroquois Deposit) near Pape Avenue.

The bar in west Toronto crossing the Humber bay extends west as a uniform and rather narrow ridge of gravel and sand rising 20 feet above the slope to the south, while the York (or east Toronto) bar enclosing the Don bay is more spread out and contains lagoons. It had much the size and shape of the present Toronto island.

Both of these ancient bars are being rapidly destroyed, the sand and gravel being used for building purposes in Toronto.

The Iroquois deposits are sometimes 100 feet thick and include coarse materials in the gravel bars, sand of varying character on the lakeward slope, as well as silt and clay within the Don and Humber bays. At one point near Reservoir park shells have been found in the gravels, species of *Campeloma*, *Pleurocera* and *Sphærium*, all still living in lake Ontario. The commonest fossils are horns of caribou, which are often found in the west Toronto gravel bar. Less frequently teeth of mammoth have been obtained. The mammoth and the caribou suggest a cooler climate than the present. The caribou is essentially a northern animal, and has not been found within 150 miles north of Toronto during historic times. It is natural to suppose that the waters of lake Iroquois, which had a shore of ice toward the northeast, were colder than those of Ontario, and that the climate was cool, if not even subarctic.

When lake Iroquois was drained through the melting of the ice dam at the Thousand islands, the water sank to sea level, but there is no evidence of marine deposits on its shore. The marine episode was comparatively short and the water was probably kept fresh by the Niagara river. The outlet was still rising toward the northeast, so that the water was backed up toward the southwest end of the lake. On the lower reaches of both the Don and the Humber there is dead water owing to this rise of the lake level, and well borings near the mouth of the Don show 100 feet of stratified sand built up in the old channel. The growth of Toronto island is, however, the most evident work of lake Ontario near Toronto in recent times. Its materials have been transported westwards from Scarboro heights, and have been built out into deep water enclosing Toronto bay. The growth of the island has been shown by Sir Sandford Fleming, from a comparison of maps more than 100 years old, to have been extensive.

MORAINES NORTH OF TORONTO[1]

By Frank B. Taylor

The moraines to be visited on this excursion were made at a relatively late stage in the retreat of the last or Wisconsin ice sheet, and are the first moraines formed north of lake Ontario. One was made along the southern edge of the Trent valley-lake Simcoe ice lobe. At the locality visited the ice which made this moraine, was moving towards the south and the moraine faces in that direction. The main movement in that lobe, however, was towards the southwest, shown by the axes of many drumlins and drumloids and by striæ and the direction of boulder transportation in the Trent valley and lake Simcoe regions. The direction in this area was about the same during the maximum extent of the ice and during the whole time of its retreat. The other moraine to be visited lies close south of the first and was formed along the northern edge of the ice lobe which lay in the basin of lake Ontario.

At the greatest extent of the ice sheet, its front reached nearly to Cincinnati, Ohio, about 400 miles southwest from Toronto. The ice which reached this point was part of the great ice stream which moved southwestward through the basins of lakes Ontario and Erie. At the same time the ice front in a direction south-southeast from Toronto reached only to Salamanca, New York, about 120 miles from Toronto. This was on account of the Alleghany plateau, the high mass of which obstructed the southward movement in western New York and Pennsylvania and in northeastern Ohio, and turned the current towards the southwest along the axis of the lake basins. The central axis of the great ice stream passes about 30 miles south of Toronto, and there was not much change in its position during the retreating phase, until the ice front had receded to the northeast end of lake Erie. By the time it had reached this position, however, the relatively deep basin of lake Ontario became the controlling factor in the ice movements of this region. This was the position of the ice front a short time before the moraines to be visited were made. The ice field was then confluent and continuous over the whole region between the lake Ontario basin on the south and the Trent valley, the lake Simcoe basin and the basin of Georgian bay on the north. At this time the ice front rested against the face of the Niagara escarpment from Hamilton northward to Georgian bay, and the ice lay as an unbroken sheet over the whole region to the east. It was already growing thin, however, over the ridge north of Toronto, and with further steps of retreat the ice soon parted and the ridge began to emerge.

The first parting of the ice lobes in the manner described probably occurred during the time of lake Arkona, but was temporary, for the pronounced readvance of the ice to the Crystal beach (Alden, Port Huron) moraine carried the ice front back again to the base of the escarpment, and the moraines which had just been made were overridden and destroyed. This episode of glacial history is not established on evidence seen in the localities visited on this excursion, but is fully supported by facts recorded in other parts of Ontario and in Michigan and New York. Then, when the ice front retreated again, the ridge was once more uncovered and the moraines now seen on the heights 20 miles north of Toronto began to be formed. This was probably during the times of lakes Wayne and Warren, but later phases farther east were probably correlatives of lake Lundy.

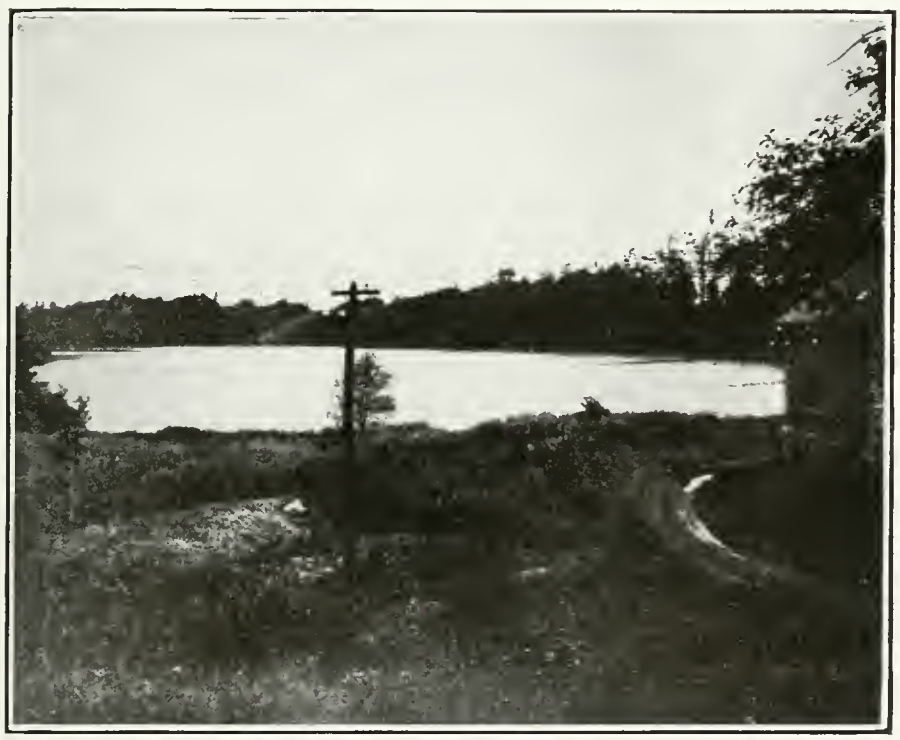
The two moraines were formed on the top of the emerged ridge, first at the west end near the base of the Niagara escarpment, and later at places farther east. As the flanks of the ridge were gradually uncovered, lake waters stood high upon them, but these waters were only narrow arms that reached northward from the main lake in the basin of lake Erie and made no perceptible record by wave action.

At this stage of retreat the ice did not enter the western part of the lake Ontario basin over the ridge north of Toronto, but came in at the northeastern end chiefly in

[1]See footnote on p. 238 of this Report. The fact that this article was written primarily for the guidance of members of the International Geological Congress (August, 1913) explains the phraseology.

the gap between Trenton, Ontario, and Oswego, New York. At this time the lake Ontario ice lobe had become sharply differentiated, so that in the western half of the basin the ice was spreading from the central axis towards the margin on all sides except the east, where the ice stream was entering. From this circumstance it happens that the ice at this stage moved towards the northwest over Toronto and vicinity. A few miles east of Toronto its movement was directly north. These movements were respectively transverse and nearly opposite to the southwestward movements over this region at the time of maximum extension. The relations in this area afford a fine illustration of the changing and increasing influence of topography upon the movement of the ice as the ice grew thinner.

The drift, as Professor Coleman has pointed out, is quite deep in the vicinity of Toronto. But it is certainly much deeper along the line of the great moraines 20 miles to the north; and its depth is also considerable in the region west and southwest of lake Simcoe. Much the greater part of the deep drift in the region around Toronto is of pre-Wisconsin age, but beyond this general statement its precise age has not been determined even approximately, except by Coleman, in the remarkable exposures in Toronto.



Bond Lake, looking East. Probably due to partly buried Ice Block which afterwards melted out.

It is quite clear, however, that the pre-Wisconsin beds or some of them, have a wide extension in easterly, northerly and northwesterly directions from Toronto. In many localities the Wisconsin drift is only a thin sheet, sometimes even discontinuous, over a great mass of the older drift. The bulky moraines north of Toronto appear to rest upon a deep substructure of these older deposits.

Suburban cars leave the Toronto and York Radial station on North Yonge street. The station stands a little below the level of the beach of glacial lake Iroquois, and the car ascends the old lake cliff immediately after leaving the station. On reaching the top, the traveller finds himself on an undulating plain trenched by small streams running towards the southeast. The stream valleys have been cut to only moderate depths, the deepest being the west branch of the Don river, which at York Mills reaches a depth of about 100 feet.

The surface forms that meet the eye as soon as the car leaves the old lake bluff are readily recognized as products of glacial action, perhaps partly constructional, but mainly destructional in character—a smoothing and rounding off of an uneven surface

by the ice sheet. In the first mile or two several hills resembling drumlins are seen, none of them perfect types, however, but sufficiently near to be called drumloid forms. Glacial action is not recorded alone in these hills, for the whole surface is characterized by long drumloid profiles on the interstream ridges, and the troughs have the same character, and both troughs and ridges are strongly aligned after the fashion of drumlins in the direction of the latest ice movement. This kind of surface has been happily characterized by Fairchild as "drumlinized," meaning by this that the drumlin-forming process gave the surface its character, although no perfect drumlins were formed.

At York Mills the sands in the high bank south of the Don river and west of the track are reported by Coleman to be of pre-Wisconsin age. Between York Mills and Richmond Hill several partially drumlinized forms are seen towards the east. At Thornhill a bored well penetrated 600 feet of drift, or about to sea level, before reaching rock. A large part of the material was reported to be sand.

A Pond and Morainic Topography in the Northern Moraine, looking South three miles West of Aurora.

Approaching the moraine north of Richmond Hill, the drumloid forms disappear and the plain merges smoothly into the southern slope of the moraine. This slope is notably smooth and lacks the hummocky surface which usually characterizes terminal moraines. The southern margin takes this form all along from King southward to Maple and then northeastward and eastward for 100 miles. This smooth slope is the side on which the ice front rested while building the moraine. The moraine, therefore, faces northwest and north, its north side being its front slope and its south side its rear.

On reaching the summit of the ridge this and the northward slope are found to be more irregular and hummocky than the south slope, more characteristic of ordinary terminal moraines. There are many knobs and basins, and within two miles there are three moraine lakes and several similar hollows that do not now contain lakes. The car line passes along the west side of Bond lake and the party will walk northward from the power house to Schomberg Junction, noting the very steep slopes bordering this lake and the rugged nature of the ground, and also the sections of the drift exposed along the newly-made highway. Much of the drift in the north slope of the moraine is more or less sandy, suggesting glacio-fluvial deposition, but no extensive bodies of outwash are associated with the moraine in this vicinity. The south or rear slope, in addition to the smoothness described above, is more generally composed of till and

shows almost no evidence of glacio-fluvial action. Some of the lakes and basins are no doubt due merely to the irregular heaping of the drift during deposition by the ice, but some, like Bond lake, appear to mark the sites of ice blocks, surrounded or partly buried by drift, the lake basin remaining when the ice melted out.

From the Junction one looks to the north and west across a flat valley half a mile to a mile wide, and just beyond it lies a splendid moraine formed by ice moving southward over the lower region to the north. The flat valley is a narrow till plain lying between two moraines that face toward each other. It extends eastward from the Junction to Willcocks lake, which lies partly in the southern moraine, but mainly in the plain. The party will walk eastward from the Junction along the south side of the plain, gradually ascending the front of the southern moraine and passing along the south and east sides of the lake. From the lake shore the valley is seen to pass on towards the northeast and north. It extends in this direction for about a mile, where

Looking North over Willcocks Lake, the Northern Moraine in the distance.

it appears to vanish into the air. But a glacial drainage course marked by a train of sandy gravel comes from the outwash area to the east and appears to connect with it. Northeast of the lake the valley has the character of a large drainage channel or old river bed lying between the two moraines, which form its banks on either side. In the early phase of this pause of the retreating ice, a large river issued from the narrow space between the two ice fronts and flowed out to the west. This river carried the accumulated drainage from a long way to the east and northeast. There are low sand and gravel beds on the valley floor north and northeast of the lake that record the action of the river.

The main bulk of the gravels, however, lies at a slightly lower level than the head of the channel, and marks a change of the drainage by which it continued along the rear side of the northern moraine to another slightly lower passage farther west. Such a passage occurs about eight miles west of Aurora or one mile east of Linton, and the gravels appear to end at that place. Outwash gravels form the crest of the hill along the north side of the creek for two miles west from Van Dorf.

These old river gravels form a sort of terrace along the north or rear slope of the north moraine. It is well defined where the electric line crosses it at the cemetery a mile south of Aurora.

The deposit stands considerably above the lower country to the north. It is cut by many small gullies, but is substantially continuous from the large outwash deposit six or seven miles east of Aurora to the gap east of Linton. This deposit is not outwash issued from the front of the ice while the moraine was being built, for it rests on the rear slope of the moraine. It appears to have been deposited by a river flowing westward along the ice front in the last or closing phase of the relatively long pause during which the moraine was built. The ice had ceased advancing apparently and had become practically inert along its edge. The river during this phase had fallen a little below the passage to Willcocks lake and probably escaped southward through the gap east of Linton.

Two miles east of Willcocks lake there are well-developed eskers and associated troughs cutting through the southern moraine from southeast to northwest. These also show with great clearness that the ice here was moving toward the northwest, normal to the trend of the moraine at this place. The esker stream cut through the moraine and issued into the drainage channel a mile and a half northeast of Willcocks lake.

End of Part I.

INDEX VOL. XXII., PART I.

REPORT OF THE BUREAU OF MINES

VOL. XXII., PART II.

The Pre-Cambrian Geology of Southeastern Ontario

BY

WILLET G. MILLER and CYRIL W. KNIGHT

With an Appendix on The Correlation of the Pre-Cambrian Rocks of Ontario, Western Quebec and Southeastern Manitoba

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty

1914

Printed by
WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO.

CONTENTS

ILLUSTRATIONS

MAPS

TABLE

Fig. 1. Index map of part of southeastern Ontario, showing the Belmont Lake, Actinolite-Cloyne, Madoc, Hazzard's Corners, Palmerston or Ompah, Gilmour, and Queensboro areas.

THE PRE-CAMBRIAN GEOLOGY OF SOUTHEASTERN ONTARIO

By WILLET G. MILLER and CYRIL W. KNIGHT

INTRODUCTION

From time to time during the last six or seven years, when opportunity offered, the authors have made a study of the pre-Cambrian rocks of part of southeastern Ontario. Owing to the necessity for field work in other sections of the Province, time has not permitted of the mapping and detailed examination of all of the district described in the following pages. Seven distinct areas were selected, along a strip of country sixty-five miles in length, which were considered to present the best conditions for the study of the characters and relations of the rocks. In other words, these may be called key areas for the district.

The areas lie in the counties of Peterborough, Hastings, Addington and Frontenac, within thirty or forty miles of the north shore of the east half of Lake Ontario. Their relative positions and their location are shown on the index map, Fig. 1. They have been mapped on scales varying from 800 feet to one-half mile to the inch. A geological map of each of the seven areas accompanies this report.*

The region, embracing the district under review with its continuation into the adjoining Province of Quebec, is classic ground to the student of pre-Cambrian geology. To its rocks was first applied the name Laurentian, which received world-wide recognition. The descriptions of the characters and relations of these rocks and of the Huronian, found farther to the northwest beyond the region, made the work of the early Canadian geologists famous.

While the Laurentian, as first defined, has been shorn of most of its members, not now including crystalline limestones and certain other rocks, and while there are some geologists who would even discard the term, it still has great significance in Canada. The name is retained for the oldest granites and granite gneisses which occupy vast areas in this country.

Within this region was also found, at several somewhat widely separated localities, the *Eozoon Canadense*, Fig. 2, which appealed strongly to the imaginations of geologists and biologists of a past age and led to many animated discussions and a few acrimonious controversies.

In addition to being of such interest from the standpoint of pure science, the rocks of the district are of economic importance. Many mineral deposits, and structural and decorative materials, are found in association with them. Ores, or metallic minerals, that have been or are being mined, include those of gold, lead, zinc, iron, copper, arsenic and sulphur. Within the areas mapped, or at no great distance from them, have also been produced talc, mica, feldspar, corundum, sodalite, graphite and actinolite. Beautiful marble is quarried, and trap, the best of road materials, is being shipped from the dis-

* Maps Nos. 22a, b, c, d, e, f, o. Most of the maps contain notes giving summaries of the geology of the areas. They were distributed during the meeting of the Int. Geological Congress in Toronto, in August, 1913.

trict. Lying so near the more populous parts of the Province, and containing such mineral resources, in addition to prosperous farms in certain localities, and possessing attractions for the fisherman, the hunter and the summer tourist, the district will receive more attention in the future than it has in the past. It is, therefore, believed that the maps and the report will be of service and will tend to make the resources and the attractions of the district better known.

While we believe that the descriptions, on following pages, of the relations of the rocks give a fairly complete geological history of the region, in so far as it can be determined from the exposures, we have not been able to decide on the age of rocks in certain outcrops. Difficulties are due chiefly to the severe dynamic metamorphism to which the region has been subjected and to the fact that much of the surface is covered with glacial and recent deposits. Further reference will be made in the descriptions of the various areas to the doubtful interpretation of certain evidence.

Of the maps published with this report, we may be permitted to say, in the words of Van Hise and Leith " . . . . . A geologic map represents an approximation to the

Fig. 2—Eozoon Canadense.

Weathered surface of specimen, natural size, (Geology of Canada, 1863, page 49). The layers are composed of pyroxene, while the interstices are filled with calcite. The material is not now considered to be of organic origin. The eozoon-like structures found in some of the areas described on following pages consist of quartz, in place of pyroxene, and calcite or dolomite.

truth, limited in its accuracy and adequacy by the general stage of advancement of the science, and perhaps falling short of this limit if the map maker does not fairly represent that advance. The maps published with this monograph are closer approximations to the truth than the maps previously published. These maps in turn will be superseded by better approximations as facts accumulate and geologic knowledge advances. It is hoped that the user of these maps will measure them by their advance over pre-existing maps rather than by the distance they fall short of the ideally perfect map."*

We desire to express thanks and high appreciation to Mr. W. R. Rogers, topographer of the Bureau of Mines, for the kindly interest he has taken and the valuable work he has done in connection with the preparation of the maps. He has also written a general description of the topography of the region.

To Messrs. A. G. Burrows, N. L. Turner and W. K. McNeill, we are under obligation for most of the analyses of rocks that are to be found in the report.

We are also indebted to Mr. P. E. Hopkins who spent a few weeks in the area during the autumns of 1911 and 1912. His paper on the pyrite mines near Queensboro accompanies this report.

* U. S. Geol. Surv. Monograph LII, The Geology of the Lake Superior Region.

SUMMARY OF CONCLUSIONS

The chief results of our work are the following:

(1) It has been proved that rocks of Keewatin age, similar in character to those of northern Ontario and the Lake Superior region, occur in large volume in southeastern Ontario. Heretofore it has been held by certain writers that Keewatin rocks do not occur here and that no basement for the Grenville sediments was to be found in this part of the Province. In some areas, rocks that in the past were called amphibolites, and were considered to be in whole or in part of sedimentary origin, are found to be more or less highly metamorphosed Keewatin lavas.

(2) The Grenville sediments have been classified and their relations determined. These sediments were deposited on the surface of the Keewatin lavas, and consist, normally, at the base of greywacké or quartzite, fine in grain, rusty schist (clay rock), and iron formation (banded chert or jaspilyte); the last-named rock had not previously been recognized in southeastern Ontario, Fig. 7. Although at times the sediments may be more or less mixed or interbedded, above those mentioned come crystalline limestone that is essentially magnesian, and finally crystalline limestone that is essentially non-magnesian. No unconformity has been observed within the Grenville.

While it seems likely that erosion of part of the surface of the Keewatin preceded or accompanied the deposition of the Grenville sediments, an unconformity has not been proved to exist between the latter and the Keewatin lavas.

It is also not unlikely that sedimentation and the outpouring of lava took place partly contemporaneously. Sediment, especially the finer fragmental material, from submarine lavas is difficult to distinguish, under conditions in which the Grenville rocks are now found, from land-derived sediment. It is believed by most authorities that clays and certain other materials in the deeper parts of the ocean are formed, by decomposition in sea water, from fragments of submarine lavas and from other inorganic material transported from a distance. If such sediments were submitted to the extreme metamorphism that the Grenville rocks have undergone, they would, in all probability, be indistinguishable from ordinary land-derived material.

(3) Granites of two ages have been recognized. The older of the two (Laurentian) which is gneissoid in character, intrudes both the Keewatin and the Grenville, but is older than certain pre-Cambrian conglomerates and other sediments of the region. The younger granite intrudes all the sediments. Granites of both ages are extensively developed, and, heretofore, they have not been differentiated as regards their age.

(4) Conglomerates and other pre-Cambrian fragmental sediments of the region were at one time grouped with the less highly metamorphosed, or blue, crystalline limestones, and the name Hastings was applied to them. We place most of the blue limestones in the Grenville and restrict the name Hastings to the conglomerates, with some limestones, and other sediments that we have proved to be post-Laurentian in age. The Hastings rocks, as here defined, have been found at various places across a strip of country sixty-five miles in length, from the township of Belmont in Peterborough county on the southwest to the township of Palmerston in Frontenac county on the northeast. On following pages reference is made to the views that have been held concerning the Hastings and Grenville series.

(5) Intrusives, later in age than the Hastings sediments, are represented by gabbro with extrusive facies (basalt and tuff), and granite.

(6) The crystalline limestones and other Grenville sediments in southeastern Ontario constitute a series of great thickness, and are found to be of pre-Laurentian age. The great volume of the sediments older than the Laurentian appears not to justify the separation of the Laurentian and earlier rocks from those of later pre-Cambrian age. In other words, a dual subdivision of the pre-Cambrian into an upper characteristically sedimentary group above the Laurentian and a lower igneous complex, including the Grenville, is not logical. Hence the writers do not make use of the terms Algonkian and Archean, or Proterozoic and Archeozoic, employed by many authors.

AGE CLASSIFICATION OF THE ROCKS OF THE REGION

The following table gives the classification of the rocks, according to their age relations, employed in this report and on the accompanying maps:—

Pleistocene	
GLACIAL AND RECENT	Boulder clay, sand and gravel.
Paleozoic	
ORDOVICIAN	Black River limestone and basal sandstone.
(Great unconformity)	
Pre-Cambrian	
POST-HASTINGS INTRUSIVES	Granite, gabbro, diabase, basalt.
(Intrusive contact)	
HASTINGS (TEMISKAMING?) SERIES	Conglomerate, greywacké, quartzite, slate, thin beds of crystalline limestone, and the metamorphosed equivalents of these rocks.
(Unconformity)	
LAURENTIAN	Gneissoid granite and syenite.
(Intrusive contact)	
GRENVILLE SERIES	Crystalline limestone, iron formation, slate, quartzite, greywacké, largely altered to various schists and gneisses.
KEEWATIN COMPLEX	Green schists, pillow lavas, basic gneiss and other rocks.

COMPARISON WITH NORTHERN AND NORTHEASTERN ONTARIO

From the preceding table it will be seen that the geology of southeastern Ontario is much like that of the northeastern part of the Province, e.g., Cobalt and surrounding region, distant two hundred miles or more. The Keewatin is present in large volume in both regions, but the Grenville sediments have a much greater thickness in the southeastern than in the northeastern region, owing to greater erosion in the latter. The Laurentian in one region possesses similar features to those of the other. The Hastings series in character and relations appears to be comparable to the Temiskaming series of the region surrounding Cobalt. The later granite, Moira, resembles in character and relations the Lorrain granite of Cobalt. The post-Hastings basic intrusives, marked on the maps as being doubtfully of Keweenawan age, are more altered or decomposed than the Nipissing diabase of Cobalt, and may be of about the same age as the lamprophyre dikes of Cobalt and the pillow lavas, post-Sudbury series, of Sudbury. Fragmental rocks, comparable in age with the rocks to which the name Cobalt is applied, have not been recognized in the southeastern region.

The two regions are separated by a territory which is underlain chiefly by granite and granite gneiss, and in which pre-Cambrian sediments later in age than the Grenville series are not known to occur.

Following the nomenclature usually employed in the description of fragmental rocks next younger than the Laurentian, both the Hastings and Temiskaming series might be called, provisionally, Lower Huronian.

In the appendix to this report is given a comparative table of the age relations of the pre-Cambrian rocks of all the areas in Ontario that have been mapped systematically.

W. E. Logan

(1798-1875).

Sir William Edmond Logan, F.R.S., Provincial Geologist of the Province of Canada (Ontario and Quebec), 1843-1867, Director of the Geological Survey of the Dominion of Canada, 1867-1869.

(From the painting in the Canadian Institute, Toronto, by Berthon, 1856.)

GEOLOGICAL LITERATURE ON THE DISTRICT

As the table on a preceding page shows, the rocks of the district, exclusive of the Pleistocene, fall naturally into two groups: the Paleozoic and pre-Cambrian. While notes on the former group are given in the description of the various areas, no detailed study has been made of it by the authors. This report, therefore, deals essentially with the pre-Cambrian rocks. From the time the rocks were first studied in southeastern Ontario and adjacent areas, in the fifth decade of the last century, until its last decade, the name Laurentian was applied to all of them. They included granites and granite gneisses, crystalline limestones and other rocks, together with what was called the Upper Laurentian or Norian. Papers by Logan, Murray and other authors of the earlier period, and those by Vennor, Selwyn, Adams, Barlow, and Ells during the last quarter of the century, and more recently, show the views that have been held, and the discussions that have taken place concerning the so-called Laurentian of this region.

Alexander Murray, C.M.G.
(1810-1884).

Mr. Murray was Assistant Provincial Geologist of Canada (Ontario and Quebec) from 1843 to 1864, and Director of the Geological Survey of Newfoundland from 1864 to 1883. He was Sir William Logan's co-worker in the Canadian pre-Cambrian. The picture is from a photograph taken in 1865.

On following pages, extracts from papers and reports give the opinions of various authors in the past concerning the character and relations of the rocks of the district.

All the literature on the district up to 1908 has been summarized by Van Hise and Leith.*

Views Held in 1897 and Earlier

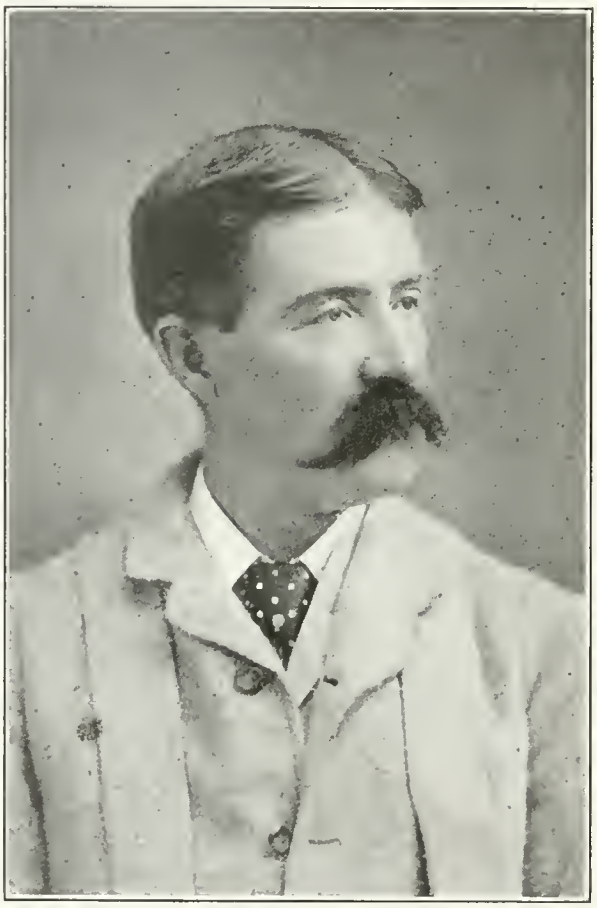
In 1897, the late Dr. Geo. M. Dawson, then Director of the Geological Survey of Canada, gave an excellent summary of the literature, and of the opinions then held, of the nature and relations of the more ancient rocks of North America.† The following quotations are taken from Dr. Dawson's address:—

"It was along the Ottawa valley, in 1845, that the rocks subsequently classed under

* Pre-Cambrian Geology of North America, U. S. G. S. Bulletin, No. 360, pp. 448-483.
† Presidential Address, Section C, Brit. Ass. Ad. Science, 1897.

the Laurentian and Huronian systems were first examined in some detail.* In that year Logan met with and accurately described, severally, rocks which we now refer to (1) The Fundamental Gneiss; (2) The Grenville Series; and (3) The Huronian. He speaks of the rocks of the first class as being in the main syenitic gneisses 'of a highly crystalline quality, belonging to the order which, in the nomenclature of Lyell, is called metamorphic instead of primary, as possessing an aspect inducing a theoretic belief that they may be ancient sedimentary formations in an altered condition.' In what we now call the Grenville Series, he describes the association of crystalline limestones and interbedded gneisses, adding that it appeared to be expedient to consider this mass as a separate metamorphic group, supposed to be newer than the last. Of the Huronian, the relations were at that time left undetermined, although it is observed that its beds hold pebbles of the underlying rocks, here the Fundamental Gneiss.

. . . . . .



Henry G. Vennor, F.G.S.
(1840-1884).

Mr. Vennor was a member of the staff of the Geological Survey of the Province of Canada (Ontario and Quebec) from 1860 to 1867, and of that of the Dominion of Canada from 1867 to 1881. The most of his work was in connection with the pre-Cambrian rocks of southeastern Ontario and the adjacent part of Quebec. The picture is from a photograph taken about 1876.

"In the Report for 1852-53 (published 1854), the name Laurentian was adopted for what had been previously designated merely as the 'metamorphic series,' and in the geological sketch printed in Paris in connection with the Exhibition of 1855 (which follows next in order of publication), this system is stated to consist almost exclusively of much altered and disturbed sedimentary beds. It is also, however, made to include some recognized intrusives, such as granite and syenites, forming parts of the mass, as well as the Labradorite rocks, which were afterwards for a time named Upper Laurentian, and to which further allusion will be made in the sequel.

. . . . . .

* The Huronian rocks were found on Lake Temiskaming, an expansion of the upper part of the Ottawa river, in northeastern Ontario. This lake is beyond the region under review in the present report. M. & K.

Very truly Yours
E. J. Chapman

(1821-1904.)

E. J. Chapman, Ph.D., LL.D., Professor of Mineralogy and Geology in the University of Toronto and University College, 1853 to 1895, and the author of many papers on the Mineralogy and Geology of Ontario.

(From a photograph taken about 1891.)

"In the summary volume of 1863 . . . . the existence of an Upper Laurentian, Labradorian or Norian Series was first tentatively indicated in a supplementary chapter. It is unnecessary to follow here the history of the rocks so classed, for the supposed series has not stood the test of later discussion and research, due chiefly to Selwyn and Adams. The apparently stratified rocks often included in it are now understood to be foliated eruptives. The recognition achieved by this and by other more or less hypothetical series about this time may be traced to the brilliant chemico-geological theories advanced by Hunt, previous to the general acceptance of modern petrographical methods.

"In a similar manner, and very justly so, Logan, as a field geologist, was influenced by the views held by Lyell in the early editions of his 'Principles' to accept without reservation the foliation of crystalline rocks as indicative of original bedding.

. . . . . .

"No reference has so far been made to the development of Archæan [pre-Cambrian] rocks, known as the 'Hastings Series.' The rocks thus named occupy considerable tracts to the south of the Ottawa River, west of the City of Ottawa. They were originally classed by Logan and Murray with the Grenville Series of the Laurentian, although Murray soon after insisted on their peculiar features, and they came to be recognized by the above geographical name during subsequent discussions as to their systematic position, by the authors above referred to, and by Hunt, Vennor, and Macfarlane. These rocks are particularly alluded to now, because later work seems to show that both the Grenville Series and the Huronian are represented in the district—in so far, at least, as lithological characters may be depended on. They include a preponderance of thinly bedded limestones and dolomites, finer in grain and usually less altered than those of the typical Grenville Series, associated with conglomerates, breccias and slates still retaining complete evidence of their clastic origin.

. . . . . .

"Reverting to the original classification of the Archæan [pre-Cambrian] of the Canadian Survey, as developed in the field by Logan and his assistants, we may now enquire—In how far does this agree with the results of later work above outlined? In the main, this classification still stands substantially unaltered, as the result of all honest work carefully and skillfully executed must. The nomenclature adopted is still applicable, although some of our conceptions in regard to the rocks included under it have necessarily undergone more or less change.

"The Laurentian is still appropriately made to include both the Fundamental Gneiss and the Grenville Series; although at first both were supposed to represent 'metamorphic' rocks, it was even then admitted (1855) that these embraced some plutonic masses practically inseparable from them. Later investigations have increased the importance of such plutonic constituents, while at the same time demonstrating the originally supposed sedimentary origin of the characteristic elements of the Grenville Series; but the admission of so large a plutonic factor necessarily invalidates in great measure the estimates of thickness based upon the older reasoning, under which any parallelism of structure was accepted as evidence of original bedding.

. . . . . .

"The subsequently outlined Labradorian [Norian or Upper Laurentian] has been eliminated as a member of the time-series, and the rocks of the so-called 'Hastings Group' remain yet in a doubtful position, but with the promise that they may afford a clue to the true relations of the Grenville Series of the eastern and the Huronian of the western province of the Protaxis."*

Conclusions of Adams in 1901

For several years Messrs. F. D. Adams and A. E. Barlow were engaged in mapping and working out the geological structures of the Haliburton and Bancroft areas, which include about 4,200 square miles. The work having been completed in 1901, the results were summarized by Dr. Adams in the following words:—†

"With the completion of this work it may be appropriate to state very briefly what has been accomplished.

. . . . . .

"The survey has shown that the northern half of the area mapped consists almost exclusively of granite-gneisses of igneous origin which would in all probability have been classed by Logan as Fundamental gneiss. The southern half of the area, on the other hand, consists chiefly of a series of very ancient sedimentary rocks, largely limestones, which rests upon the gneissic series, but which has been invaded and altered by it. Large areas of the sedimentary series have been so shattered and penetrated by the granite-gneiss that a sort of breccia on an enormous scale has resulted. Great bathylites of the granitic rock arch up and break through the sedimentary series elsewhere, the latter being wrapped around the bathylites in great sweeping curves.

* In the Geol. Sur. Report for 1877-78, p. 10A, the conclusions concerning the relations of the Hastings and Grenville series are summarized by Dr. A. R. C. Selwyn.

† Geol. Sur., Canada, Vol. XIV, 1901, pp. 148-149A.

"The same bathylite structure is observable in the northern gneisses also, and can be traced by the curving strikes of the foliation of the gneiss, but here the limestones have been swept away by erosion.

"In the south-eastern portion of the area the limestones are found in a comparatively unaltered condition and are associated with great volumes of amphibolite and other foliated rocks, as well as with occasional bands of conglomerates—some of which, at least, have been shown by Dr. Barlow to be of autoclastic origin. The amphibolites are in part altered volcanic tufas."

International Committee's Conclusions, 1906

In 1906 an international committee, consisting of Canadian and United States geologists, representing the federal surveys of the two countries, was appointed to consider the "Correlation of the pre-Cambrian Rocks of the Adirondack Mountains, the 'Original Laurentian Area' of Canada, and Eastern Ontario." The following extracts, from the report made by the committee, show the conclusions to which it came.*

"The committee considers that over the whole area covered by their investigations—namely, the Adirondack Mountains, that portion of Eastern Ontario which they examined, the 'original Laurentian area' in the province of Quebec and its continuation to the east as far as the river St. Maurice—the pre-Cambrian sedimentary development is represented by one great series. This series is essentially identical in petrographical character throughout the whole region.

"The only locality where the possible (Coleman would say probable) existence of a second unconformable sedimentary series was suggested by the facts observed, was that on the Queensboro road, east of Madoc, Ontario. It is, however, still a matter of uncertainty as to whether the conglomerate here developed marks the base of an overlying, infolded, unconformable series or not.

"In Logan's original classification of the Laurentian this term—apart from the Upper Laurentian which was proved to be composed essentially of anorthosite intrusions—included two series differing in character, namely, the Lower Orthoclase (Fundamental) Gneiss and the Grenville series. Now that investigations have shown that these two series differ in origin, one being essentially a great development of very ancient sediments, and the other consisting of great bodies of igneous rock intruded through them, it becomes necessary to separate these two developments in drawing up a scheme of classification.

"As the great intrusions of gneissic granite, forming what has been termed the 'fundamental gneiss' have an enormously greater areal development than the overlying sedimentary series, constituting, as they do, a very large part of the whole northern protaxis, the committee recommend that the term 'Laurentian' be restricted to this great development of igneous gneisses. The nomenclature suggested for the pre-Cambrian rocks of this eastern region will thus conform, so far as the use of this term is involved, with that suggested by the Special Committee for the Lake Superior region.

"For the overlying sedimentary series the committee recommend the adoption of the name 'Grenville series,' as it is the name originally given by Logan to the series as typically developed about the township of Grenville in the 'original Laurentian area' on the north shore of the Ottawa river, in the province of Quebec, between the cities of Montreal and Ottawa. The term 'Hastings series' in the opinion of the committee should be abandoned as a serial name, seeing that the development to which this name was applied by Logan is merely the Grenville series in a less altered form, as Logan in giving the name had conjectured was probably the case. The committee, however, think that it may in some cases be advantageously employed as a qualifying term to designate the less highly altered phase of the Grenville series, which may thus be referred to as the 'Hastings phase' of the Grenville series.

"In Canada this Grenville series everywhere on going north is invaded by and frays away into the great Laurentian bathyliths, while in the Adirondacks it is cut to pieces by the great intrusions of that area which, when worked out in detail, may prove also to have a more or less similar bathylithic form.

"The following succession in this region is therefore recognized and adopted by the committee:

"CAMBRIAN—	Potsdam sandstones, etc.
(Unconformity)	
"PRE-CAMBRIAN—	
Grenville series	
(Intrusive contact)	
Laurentian.	

"The committee consider that it is inadvisable in the present state of our knowledge to attempt any correlation of the Grenville series with the Huronian or Keewatin, so

* Journal of Geology, April-May, 1907, pp. 191-217.

extensively developed in the region of the great lakes. The Grenville series has not as yet been found in contact with either of these, and until this has been done and the relation of the several series have been carefully studied, their relative stratigraphical position must remain a mere matter of conjecture."*

Conclusions of Miller and Knight, 1907

In 1907, the authors prepared a brief paper on the district under review.† In that paper, conclusions given as to the age relations of the rocks were practically the same as those in the present report. It was shown that the Grenville series had a basement, Keewatin rocks having been found to occur in the district. The iron formation, which was discovered in that year, was placed with the Grenville sediments. Conglomerate and other rocks were definitely separated from those sediments, the name Hastings being retained for them.

Since the paper was written, a larger territory has been examined and a more complete knowledge of the character of the Grenville sediments, and their relations one to another, has been obtained. The age relations of the various intrusives have been determined, and the discovery of numerous erosive contacts between Hastings conglomerate on the one hand, and granite-gneiss, Keewatin rocks and various members of the Grenville series on the other, has enabled a more complete geological history to be written.

More Recent Publications

While the papers and reports issued within the last six years add nothing to our knowledge of the age relations of the rocks, during this period, one of the most important and detailed reports has been published that has yet been written on the pre-Cambrian of any Canadian area.‡ The authors are F. D. Adams and A. E. Barlow, and the

---

* Notes by M. & K.—The following notes and extracts show that the conglomerates and their limestone pebbles were known to early workers in the field. The stratigraphical relations of the conglomerates were, however, left in doubt, as they were by the International Committee report, quoted above.

In the Report of the Geological Survey of Canada for 1852-53, Murray described the conglomerate on the Queensboro road and the limestone pebbles that are to be found in it. He also mentions the occurrence of conglomerate near the village of Madoc and at Belmont lake.

Macfarlane, in the Report for 1863-66, page 93, said: "Conglomerates, consisting of pebbles, generally of quartzite, in a schistose matrix, and lithologically not unlike some of the Huronian rocks, are frequently met with in Madoc." In a footnote to this statement, Logan does not agree with Macfarlane's suggestion that the rocks are Huronian. He says "The rocks of Marmora, Madoc, and other townships in Hastings, have provisionally been classed with the Laurentian series, with which they appear to be conformable, and in common with which they hold *Eozoon Canadense*, in which, however, the canals and interspaces of the fossil are filled with carbonate of lime instead of any of the silicates filling them in other parts. These Hastings rocks may be a higher portion of the Lower Laurentian series than we have met with elsewhere. It is not to be inferred from the presence in them of a schistose conglomerate that therefore they are Huronian. As shown in the Geology of Canada, p. 31, conglomerates occur in the Laurentian, as well as in the Huronian series."

The conglomerates and their limestone pebbles are also described by Mr. H. G. Vennor in the Report for 1866-69, pp. 143-171. In the Report for 1869-70, the same author regards the conglomerates as probably of Huronian age.

From 1866, for about twelve years, Mr. H. G. Vennor was engaged in studying the Laurentian system, which then included the Grenville and Hastings series, in southeastern Ontario and the adjacent part of Quebec. His conclusions, after these years of study, are given by Dr. A. R. C. Selwyn, at that time Director of the Geological Survey. In the Report for 1877-78, p. 10A, Dr. Selwyn said: "Since 1866, Mr. H. G. Vennor, of the Geological Corps, has been occupied in a careful examination of the stratigraphical relations of the Laurentian rocks. . . . . Thus, at the commencement of Mr. Vennor's investigation in 1866, it was supposed that the limestones and calcareous schists of Tudor and Hastings holding *eozoon* together with certain associated dioritic, felsitic, micaceous, slaty and conglomerate rocks, were a newer series than those already examined and described by Sir W. E. Logan, and they were accordingly designated in the report published in 1870, the *Hastings series*, and it was further supposed, from its apparent stratigraphical position and from certain lithological resemblances, that it might be of Huronian age. The gradual progress of the work, however, from west to east, has now, I think, conclusively demonstrated that the Hastings group, together with the somewhat more crystalline limestone and gneiss groups above referred to, [i.e., Grenville series], form one great conformable series."

From this quotation it will be seen that the conclusions arrived at by Selwyn and Vennor on the work between 1866 and 1878, and the conclusions of the International Committee in 1906, on the work done after 1892, are the same, viz.: that the Hastings and Grenville form one conformable series.

† Ontario Bureau of Mines, Vol. XVI., Part I, pp. 221-223.

‡ Geological Survey of Canada, Memoir No. 6, 1910. Geology of the Haliburton and Bancroft areas, by Frank D. Adams and Alfred E. Barlow.

report describes the geology of the Haliburton and Bancroft areas, which lie to the north and northwest, almost beyond the limits of the district we have examined. The field work on which the report is based was done chiefly between the years 1892 and 1902.

The authors say, pp. 49-51:

"The geological history of the area may be briefly summed up as follows:—

"The district was, in pre-Cambrian times, covered by a sea, in which there was deposited an immense series of sediments aggregating many thousand feet in thickness. The thickness of the series shows that the period of deposition was a long one, and the prevailing calcareous character of the sediments shows that it was probably of marine origin. That there was land, however, in the vicinity, is shown by the fact that a certain amount of argillaceous and arenaceous sediment found its way into this sea. It was deposited at a time of violent volcanic activity, for there is reason to believe that a large part of the great volume of amphibolite interstratified with the normal sedimentary material represents volcanic ashes and other clastic material of volcanic origin, which was, from time to time, thrown out into the sea in which normal sedimentation was going forward. There are also flows of porphyritic lava, and bosses of plutonic rocks, probably representing the deeper parts of volcanic centres.

"Concerning the nature of the basement upon which this immense accumulation of sedimentary material was laid down we have no certain knowledge, for no part of it can be recognized at the present time as the original floor.

"This great series was then folded in a general direction, N. 30° E., and probably contemporaneously with the folding, was invaded by an enormous body of granite.* This granite slowly rose in the form of great batholiths, into the overlying series, disintegrating it and becoming filled with countless fragments of the invaded rock. In the case of the limestones this granite not only disrupted them, but changed them into amphibolite. The amphibolite produced in this way, as well as that referred to above as occurring interstratified with the limestones, and of different origin, was, in many places, dissolved by, or incorporated into, the substance of the granite, taking the form of basic streaks or schlieren.

"While in the southeast corner of the area the sedimentary cover is thick, and almost continuous, on going toward the northwest it becomes, as the result of more intense erosion, progressively thinner, while the volume of granite breaking up through it gradually becomes greater until the northern limit of the Bancroft sheet is reached, where the sedimentary series is fretted away, and is represented only by occasional shreds and patches of amphibolite scattered through the batholiths of gneiss, and arranged in lines conforming to the strike of the foliation of the latter. The erosion to the north has thus cut down into and laid bare a deeper part of the section, where all the rocks, both invaded and invading, everywhere show indisputable evidence of great movement while in a soft or plastic condition.

"Here are displayed the roots of the mountains. From what has been said it will be seen that there are presented in this great area precisely the same phenomena as those seen elsewhere in North America, and the evidence available seems to indicate that this statement may be extended to all parts of the world. Where the oldest stratified, or stratiform formations are exposed, these rest upon great bodies of granite, usually gneissic in structure, which penetrate them in great batholithic masses, the contact being an intrusive one. Thus the Keewatin, which in the region of the Great Lakes, on the border of the Canadian shield, is the oldest series, and which, although containing a large amount of volcanic material, abounds also in ordinary sedimentary deposits in many districts, rests upon granite which is intruded through it. Farther to the east, all along the border of the same shield or protaxis in Ontario and Quebec, as well as in the Adirondack mountains, the Grenville, which forms the base of the sedimentary series, shows precisely the same relations."

*Note by M. & K.—The intrusive character of granite in other parts of southeastern Ontario, has been referred to by various writers. For instance, in speaking of part of the Madoc-Marmora area, Coste says: "Fiftee large igneous masses and numerous smaller ones are to be found there in an area of 500 square miles. They have cut the Archæan or primitive rocks to pieces and have completely metamorphosed large areas of the rocks of that system, so much so, that I estimate these metamorphosed rocks (principally metamorphosed by injection) and the igneous masses to occupy about half the area of the Archæan of that part of the country." Report Geol. Surv., Can., 1886, p. 20A.

THE ROCKS OF THE DISTRICT

The following notes on the rocks supplement those in the summary on a preceding page:—

The Keewatin.—The most ancient rocks which have been recognized consist essentially of green schists. It can be shown that they are of igneous origin, because they sometimes pass gradually into altered basalts which still retain ellipsoidal structures, Fig. 20, and because chemical analyses prove that their composition is similar to basic lavas. The rocks have been correlated or classed with the Keewatin, mainly for two reasons: (*a*) They have the same mineral composition and appearance as many of the Keewatin schists in Northern and Northwestern Ontario, and are, in part, altered pillow lavas. (*b*) They occur in the same stratigraphic position as these rocks, namely, at the base of the geological column.

In other parts of Ontario the Keewatin period is considered to have been one of great volcanic activity, during which enormous quantities of lavas were erupted, probably largely under the surface of the ocean. It is not known upon what kind of rocks these lavas originally rested.

Owing to rock decay, and especially to migrating solutions from the limestones, the Keewatin and other members of the pre-Cambrian are often highly impregnated with calcite and dolomite.

The Grenville Series.—The volcanic activity of the Keewatin was succeeded by a period during which sediments, known as the Grenville series, and now represented by crystalline limestone, greywacké, quartzite, slate and iron formation, were deposited. It has not been proved that contemporaneous lava-flows occurred during the deposition of the Grenville sediments. Such, however, may have been the case, as the intense volcanic activity of the Keewatin would not probably abruptly change to a long-continued era of sedimentation. If interbedded flows of lava do occur it may be difficult to distinguish them from the basement flows, Keewatin, on which the Grenville sediments rest.

These rocks are of great thickness, and are considered by some authors to be the thickest pile of sediments known on the earth's crust, having been estimated by Vennor* at 50,000 to 60,000 feet, and later by Adams at 94,406 feet.† The present writers, however, believe that certain Keewatin lavas have been included in these measurements, thus giving to the Grenville series too great a thickness. At Madoc the thickness appears to be at least half a mile.

Generally speaking, the base of the Grenville series, where seen in contact with the Keewatin, consists of greywacké, Fig. 21, and quartzite, which pass upwards into limestone. We have not been able to prove that the surface of the Keewatin was eroded before the deposition of the Grenville, but the presence of quartzite and greywacké beds would seem to indicate that there was a land surface. A striking characteristic of the Grenville sediments is the absence of coarse material.

The iron formation, which is very subordinate, consists of pyritiferous schist, and of granular or cherty quartz, jaspilyte, grey to red in color, and containing sometimes considerable iron oxides. The jaspilyte is regarded as a chemical precipitate.

It is believed that the Grenville sediments were deposited in part on the ropy surface of sub-marine lavas belonging to the Keewatin.

The Laurentian.—After the deposition of the limestones and other sediments of the Grenville series, both the Keewatin and Grenville rocks were invaded by vast masses of granite and syenite. The intrusion caused the older rocks to become folded, crumpled and altered to schists and gneisses. Thus their bedding or schistose planes now rest in vertical or highly inclined positions. The invasion of the granites also appears to have destroyed, in many areas, the Keewatin lavas, so that the basement on which the Grenville sediments originally rested is frequently not seen, or, at least, not recog-

* Geological Survey of Canada, 1876-77, pp. 299-300.
† Geology of the Haliburton and Bancroft areas, Province of Ontario, Memoir No. 6, p. 36, Geological Survey of Canada. Journal of Geology, Vol. XVI, 1908, p. 630.

nized. Further, it is conceived that masses of the granite magma forced their way through great cracks or channels of the Keewatin rocks reaching up into the Grenville sediments; hence the latter now rest directly on the granite with irruptive contact. In other cases where the sediments rest on the granite with irruptive contact it may be that the Keewatin basement was absorbed by the granite magma.

A characteristic feature of the Laurentian gneisses is that they are often more or less strikingly banded, due to alternate layers of dark or light-colored material. It can frequently be shown that the dark bands were originally fragments of the Keewatin or Grenville series which were caught up by the molten granite magma and flattened out into long lenses by pressure. The banded structure has also been caused by the intrusion of narrow parallel tongues or dikes of the granite between the schistose or bedding planes of the older rocks.*

The granites composing the Laurentian complex were probably intruded at various times during the Laurentian period. For instance, west of the village of Flinton, in Addington county, the granite-gneiss invades a mass of syenite. This occurrence is described in following pages.

The Hastings Series.—Movements connected with the invasion of the Laurentian granites into the Keewatin and Grenville are thought to have raised these rocks above sea level and formed mountain ranges. Erosion of the mountains took place. The weathering and denudation thus begun must have been deep and long continued, for over vast areas were removed the overlying Keewatin and Grenville rocks, exposing to view the deep-seated granites and gneisses. This period of erosion was followed by total or partial submergence of the land surface below the ocean, and beds of conglomerate, Fig. 10, and quartzite—holding pebbles of Keewatin, Grenville, Fig. 11, and Laurentian rocks—were deposited. Remnants of these Hastings sediments occur here and there throughout a stretch of country 65 miles long, in the form of narrow lenses or bands, closely infolded with the older rocks. The conglomerates and quartzites are schistose; in fact, in many places they are altered to schists which are indistinguishable from the schists of the older Grenville series. It is obvious that the forces which acted on the conglomerates and quartzites of the Hastings series, causing them to become schistose, must also have acted on the older granites and syenites of the Laurentian, causing the latter to assume gneissoid structures. It is believed also that the gneissoid structures of the granites and syenites were formed in part when the granite was still in a plastic state.

Conglomerates and other fragmental rocks of the Hastings series occur in parts of the district, outside of the area mapped, viz., near Sulphide, a station on the Canadian Pacific Railway east of Tweed, and near the crossing of the Madoc-Marmora wagon road over the Moira river, east of Deloro. The conglomerate, southeast of the Actinolite-Cloyne area, in the Bald mountains, near the Addington road, is described on a following page. Its relations to the granite-gneiss are instructive.

From what has been said in preceding paragraphs, it will be seen that the term "Hastings series" is used in a more definite and a more restricted sense in this report than it has been by other writers. In earlier reports the term covered the blue crystalline limestones, most of which we place with the Grenville, together with conglomerates and other sediments. We thus employ the term to cover part of the rocks to which it was formerly applied, but not all of them. In the same way the name Laurentian, for example, now stands for only a part of the rocks to which it was applied by Logan and the earlier field men, the Grenville and Norian now not being included in the group.

* It has already been stated that Sir William Logan, in the early days of the Canadian Geological Survey, mistook this banded structure for bedding planes. British geologists at the time held the same opinion concerning the banded and foliated rocks in the Highlands of Scotland. (*See* Memoirs of the Geological Survey of Great Britain.—The Geological Structure of the North-West Highlands of Scotland, page 13.).

Post-Hastings Intrusives.—The youngest pre-Cambrian rocks include granite, diabase and basalt. The Moira granite at Moira lake, Hastings county, and the diabase-basalt at Belmont lake, Peterborough county, are examples of these later intrusives. The massive structure of the granite helps to distinguish it from the older Laurentian granites, which are generally gneissoid; but where the Hastings conglomerate is absent it may be difficult or impossible to separate the older from newer granites.

The intrusion of these younger rocks probably rendered the Hastings sediments schistose and tilted them into vertical position.

Paleozoic System.—After the invasion of the post-Hastings granites and more basic rocks, the surface of the earth again fell below sea-level, and limestone, sandstone and shale of the Paleozoic system were deposited. These rocks, since their elevation to land surface, have remained in a practically undisturbed state to the present day. Faults with small throw are, however, occasionally found.

Fig. 2a. Fragment of eozoon-like material from Big island, Belmont lake. Natural size

TOPOGRAPHY

Mr. W. R. Rogers, topographer of the Bureau of Mines, has written the following description of the topography of southeastern Ontario:

Introduction.—Southeastern Ontario presents a great variety of topographic features which are to a certain extent expressions of the intricate geological structure of the region. What is true of the particular localities embraced by the isolated map sheets, the positions of which are indicated on the accompanying key plan, Fig. 1, is applicable in a general way to adjacent areas.

Pre-Cambrian rocks occur to the north of a line joining the south end of Georgian Bay and the east end of Lake Ontario. That part of the Province of Ontario lying to the south of this line is underlaid by undisturbed Paleozoic formations, dipping at low angles away from the old land to the north. Granitoid gneiss is the predominant rock to the north, limestone to the south. It is on the border line of these two main divisions that the larger mapped areas lie, and, in consequence, areas embraced by the geological sheets accompanying this report possess physiographic features common to both the pre-Cambrian and the Paleozoic.

The main line of the Canadian Pacific Railway, Toronto to Montreal via Peterborough, traverses the southern part of the areas embraced by the Belmont and Actinolite-Cloyne sheets.

Near the southwest end of the latter are situated three small areas, namely, Madoc, Hazzard's Corners and Queensboro. The Gilmour and Ompah areas are respectively 26 and 18 miles north of the above-mentioned railway line. Gilmour station, on the line of the Central Ontario Railway, has a high elevation, 1,018 feet above the sea, or 762 feet above Lake Ontario. Immediately to the east of the Ompah area, and one and a half miles south of Lavant station on the Kingston and Pembroke Railway is the summit, elevation 905 feet. These two areas are situated in the Ontario Highlands on the height of land between Lake Ontario to the south and the Ottawa River to the north.

It is to the five southern sheets that this topographic description applies more particularly, as the writer did not visit either the Gilmour or Ompah areas.

A few high hills of rock, that have resisted glacial action to a greater extent than the surrounding country, stand out in bold relief, and have been utilized by the Dominion Geodetic Survey for the location of primary triangulation stations. One of these observation towers is situated on the Bald mountains, about three miles west of Kaladar station on the Canadian Pacific railway. Another, about ten miles northeast of Queensboro, is located on the highest point of Mount Maria, lot 23, concession II, township of Grimsthorpe. There is also a tower situated near the Ompah area, about two miles east of Lavant station on the Kingston and Pembroke railway. These triangulation towers are prominent landscape features, visible for many miles from elevated points where a clear view is obtainable.

The region has been the scene of lumbering operations for a number of decades until practically all the valuable timber has been removed, including both coniferous and hardwood varieties. Fires also have destroyed much valuable forest from time to time. Many of the rough, broken, or sandy areas, where settlers now barely eke out a livelihood from agricultural pursuits, if placed under government control could be reforested. A national asset would be created in this way, and, in addition, general climatic advantages would ensue.

Survey lines, marking township, concession and lot boundaries have become so obliterated that it is a difficult matter to retrace the original surveys, many of which were made about 100 years ago. In consequence it was found necessary to traverse practically all the roads and tie in the old surveyed lines wherever possible in order to secure a topographic base for the accompanying geological maps, more particularly the Actinolite-Cloyne, Belmont and Queensboro sheets.

Pre-Cambrian.—Pre-Cambrian topography is remarkably uniform throughout Ontario, and has been described by many writers. Various terms—Canadian shield, Laurentian peneplain, and Archean protaxis—have been applied to designate this outstanding physiographic province, the backbone of central Canada.

The singularly even sky-line, perhaps the most characteristic topographic feature, may be noted from almost any prominent hill where a clear view can be obtained. Only in this way will the casual observer note the plain-like character of the upland surface, interrupted occasionally by greater elevations standing out in relief. Very rarely does an elevation exceed the height of the adjacent depression by more than 200 feet.

In detail the pre-Cambrian peneplain is rough, and towards the margins is more rugged. Rolling areas are the rule, hummocky ones the exception. Monadnocks are infrequent. In most cases the surface elevations present a rounded appearance, devoid of overburden, and plainly show the results of glacial sculpturing.

The region presents a perfect network of lakes connected by streams that are noted for rapids and waterfalls. In parts the water area approaches 25 per cent.* of the whole. In fact all the characteristics, including imperfectly developed drainage, are indicative of a youthful stage in the present cycle of erosion.

Throughout Canada the average elevation of the pre-Cambrian is approximately 1,000 feet, and, so far as is known, the maximum elevation in Ontario is in the neighborhood of 2,100 feet above sea level.

Paleozoic.—Paleozoic topography, in contrast with pre-Cambrian, presents an entirely different aspect. The general character of the country is rolling and drift-covered for the most part. Drainage is better developed, and agriculture is the chief industry.

The present line of contact between pre-Cambrian and Paleozoic is intricate. Flat-lying sedimentary outliers are numerous. Sometimes these are separated by many miles from the main Paleozoic mass to the south. Consequently the topography of the areas embraced by the accompanying map sheets is varied, partaking partly of pre-Cambrian and partly of Paleozoic characteristics.

Through the counties of Northumberland and Hastings the main lines of the Grand Trunk and Canadian Pacific railways parallel one another and both traverse the Paleozoic areas. The former follows the shore of Lake Ontario, while the latter is inland a distance varying from twenty to twenty-five miles. The average elevation of the lakeshore railway is 50 feet above Lake Ontario while that of the inland line is 450 feet above the lake. Thus we have a gradient of 15 feet to the mile towards the south. Railways usually follow lines of depression, yet, in the absence of contoured topographic maps of this area, the above data are the best available to represent the surface gradient. It is also worthy of note that the entire southern watershed from Gilmour to Lake Ontario, embracing both the pre-Cambrian and Paleozoic formations, has a uniform surface gradient.

Topographically, the most important feature in connection with the Black River limestones is the cuesta whose escarpment front extends along the entire northern boundary of the Paleozoic. Through the counties of Hastings and Addington the cuesta is only partly visible owing to drift deposits. One prominent outcrop marks the southern shore of Moira lake where the plateau rises to an elevation of 150 feet above the wide valley to the north. This limestone escarpment has a talus slope reaching well up towards the crest. Another exposure of the cuesta occurs two and one-half miles north of Tweed, lots 8 and 9, concession XII., Hungerford township. On the Belmont sheet there is a precipitous cliff, 70 feet high, with talus slope abutting the southern shore of Round lake.

*Physiography of the Archean areas of Canada, by A. W. G. Wilson. Eighth International Geographic Congress.

Paleozoic Outliers.—Outliers of flat-lying sediments are numerous and vary greatly in size. The large ones are marked usually by an escarpment front with talus slope facing the direction from which the thrust of the glacier came. In most cases the lateral faces have had the talus débris worn away, while the lea side is usually marked by the presence of more or less rectangular blocks trailing away in a southwesterly direction.

From an agricultural standpoint these Paleozoic outliers mark oases in the rugged and unproductive pre-Cambrian, supporting farming communities where dairying is the specialty.

On the Queensboro sheet there is only one small erosion remnant. On the Actinolite-Cloyne sheet there are four very small Paleozoic outliers to the northeast of Moira Lake; another, somewhat larger, is situated on lots 10 and 11, concession II., Elzevir township. On the Hazzard's Corners sheet a larger area, showing a prominent escarpment, occurs on lot 14, concession VII., Madoc township. Another outlier, three-quarters of a square mile in area, shown on the Belmont sheet, is known locally as the Round Lake settlement.

Pleistocene.—About two miles northwest of Havelock, concession X., Belmont, there is an occurrence of narrow sand and gravel ridges, evidently of glacio-fluvial origin, having a general northeast and southwest axial direction. These narrow hog's-backs, probably eskers, rise quite steeply to 20 or 30 feet above the surrounding plain, the altitude of which is approximately 725 feet above sea level. The same broken ridges are said to extend southwesterly to Peterborough.

The most striking feature in proximity to these ridges is the prevalence of small rounded kame-like domes, in some cases rising as high as the ridges above the level plain.

Another prominent morainic ridge occurs near the southeast corner of the Belmont sheet, three-quarters of a mile north of the Canadian Pacific Railway. The main travelled road from Havelock to Marmora follows its summit for a distance of one-half mile.

Near the boundary of Belmont and Seymour townships, a couple of miles south of the Belmont sheet, W. A. Johnston describes a drift-covered area which is a remarkable jumble of limestone boulders and boulder clay ridges, probably morainic in character. A short distance farther south, near Healy Falls on the Trent river, is the farthest point to the northeast that a well-developed beach of glacial lake Iroquois has been definitely recognised.

Physiographic history.—The pre-Cambrian series of crystalline rocks occupies a large part of the district embraced by the map sheets. These formations, comprising rocks in greatest variety, have experienced intense metamorphism and a complicated folding chiefly in a northeast and southwest direction. As a result of this folding minor valleys and ridges trending in the above direction are the dominant features of the upland topography. The Actinolite-Cloyne sheet demonstrates this point in an ocular manner. Frequently swamp areas of considerable extent are found between the rocky ridges, e.g., the Boundary swamp between the townships of Kaladar and Barrie.

Pre-Cambrian areas which have been uncovered most recently near the Paleozoic escarpment represent very nearly the old pre-Paleozoic floor. Erosion probably took place continuously for a relatively long period during which the Paleozoic sediments were worn down and the pre-Cambrian boundary shifted southerly, leaving behind numerous limestone outliers. Recent dissection, including the forces of normal erosion and glacial scouring, has accentuated the roughness by further incising the old valleys. Belmont lake probably owes its existence to the erosion of softer sediments by glacial action.

However, the present land surface is essentially pre-glacial in origin. All the evidence points to the minor part played by the ice invasion in shaping and modifying the topography. The escarpment which fronts the old pre-Cambrian land is largely the

result of normal drainage development along the northerly edge of alternately hard and soft strata dipping away from the old land to the north.

The general gradient of the pre-Cambrian interior rarely exceeds 4 feet per mile.* Near the margin the dip increases to as much as 20 feet per mile toward the Paleozoic sediments. North of Lake Ontario the pre-Cambrian floor on which the Paleozoic rocks rest, has an average southeasterly gradient of 23.7 feet per mile. From data which Mr. Wilson furnishes, this Paleozoic basement gradient in Hastings county amounts to 25 feet per mile dipping from north to south. More recent work in the Peterborough and Simcoe regions has verified the dip of the limestones.** This dip is S.S.W. on the average, amounting to about 25 feet per mile, but varied somewhat by slight undulations, folds, and occasionally steep dips near the pre-Cambrian boundary where the thickness of the limestones is slight. The limestones, however, are rarely faulted.

A study of the beaches of glacial lakes †Algonquin and ‡Iroquois shows that the region along the pre-Cambrian southern boundary has experienced differential uplift during and subsequent to the existence of these ancient lakes. The warped beaches exhibit a decided increase in uplift towards the N.N.E. The Algonquin beach uplift amounts to 6 feet per mile in the vicinity of Orillia, and the Iroquois beach differential elevation is as much as 5 feet per mile in Huntingdon township about 10 miles south of the Madoc sheet.

It is still believed by many that the uplift since glacial times was an isostatic movement due to relief from the burden of the ice sheet. In this connection§ F. B. Taylor, who has studied the Pleistocene of southern Ontario for several years, sounds a note of caution. He states that the relations between the boundaries of the ice and the uplifted lands are somewhat discordant and that the preponderance of evidence only slightly favors the idea of resilience following depression by the ice weight. The other hypothesis of such deformation and uplift incident to creeping movements is regarded as more tenable.

Many interesting problems await solution which cannot be intelligently studied until contoured topographic maps are available. At present topographic mapping is being carried on in Eastern Ontario by the Department of Militia and Defence, Ottawa. The sheets already published are on a scale of one and two miles to the inch, and show all the topographic features, viz.: hydrography, hypsography and culture.

DESCRIPTIONS OF THE AREAS

On following pages are given descriptions of each of the seven areas that have been mapped by the authors. The most western area, that of Belmont lake, is first described. This is followed by the descriptions of the Actinolite-Cloyne and the other areas that are shown on the index map, Fig. 1.

*Physical Geology of Central Ontario, by A. W. G. Wilson. Transactions Can. Inst., Vol. VII, Part I.

**W. A. Johnston, Summary Reports, Geol. Survey, 1906-11.

† J. W. Goldthwait, Memoir No. 10, Geol. Survey, 1910.

‡ A. P. Coleman, Bureau of Mines' Report, Vol. XIII, 1904.

§ F. B. Taylor, Glacial and post-glacial lakes of the great lakes region, Smithsonian Report, pp. 291-327, 1912.

THE BELMONT LAKE AREA

INTRODUCTION

This area, in Belmont township, Peterborough county, contains within its borders both Belmont and Round lakes. Havelock station, a divisional point on the Canadian Pacific Railway, one hundred miles east of Toronto, lies in the southwest corner of the map sheet which covers approximately 50 square miles.* Belmont lake occupies a depression in the pre-Cambrian rocks near the northern edge of the Paleozoic area which stretches southward to Lake Ontario, distant 35 miles.

In addition to its interest from the geological point of view, the area possesses other characteristics that make it worthy of being mapped in more detail than it had been up to the time that our work began. The two lakes possess attractions for summer visitors and campers. On the shores of both, a number of cottages have been built. Bass and "lunge," or maskinonge, fishing is good. During each of three years small-mouthed black bass, caught in Belmont lake, have taken the first prize, offered by certain sporting journals and newspapers for the fish of this class of the greatest size. Fish have been sent in competition with those from this lake not only from many parts of Ontario, but from the northern United States as well. A few of the smaller streams have been stocked with speckled trout. Being so conveniently situated for visitors from Toronto and other centres of population, the area cannot fail to grow in popularity as a tourist resort.

Moreover, the area possesses attractions for the student of forestry and arboriculture. The writers have seen no better examples of the conditions requisite for the seeding and growth of pines than are shown on the point of Belmont lake at the north end of Wilson bay. Years ago the area was visited by heavy fires which destroyed all but a few of the pine trees that were numerous and made the area important for its timber. On the part of the lake referred to, a few red pines and one or two white ones escaped the fire and were left as seed trees. Poplars have since grown up and now have a height of fifty or sixty feet or more. Back from the shore where the seed has been blown, in the shade of the poplars, there is now a pretty growth of young pine trees four or five feet in height.

The area is deserving of more attention than it has received as a site for apple orchards. Much of the land is rough, and, not being well adapted to the growth of ordinary crops, it can be bought at a low price. Apple trees, in spite of the fact that they do not receive the attention given to orchards in established fruit districts, do well. In 1912, the trees were loaded with fruit, without the aid of fertilizers or spraying solutions.

Within the area, at the present time, there are being worked the gold mine at Cordova, the iron mine on the property adjacent to the south, and the trap quarry of the Ontario Rock Company, whose plant, with a nominal capacity of 500 tons a day, is on a spur of the railway, about three miles east of Havelock. Additional notes will be given on these industries on later pages.

* Map No. 22a. A careful topographic survey of the lake and islands was made by Mr. W. R. Rogers; the islands, which are numerous, have been numbered from south to north.

ROCKS OF THE AREA

The rocks of the Belmont Lake area are classified, by the authors, as follows:—

Pleistocene	
GLACIAL AND RECENT	Boulder clay, sand and gravel.
Paleozoic	
ORDOVICIAN	Black River limestone with basal sandstone and conglomerate.
	(Great unconformity.)
Pre-Cambrian	
POST-HASTINGS INTRUSIVES	Belmont amygdaloidal basalt and tuff. Belmont gabbro-diabase.
	(Igneous contact.)
HASTINGS (TEMISKAMING?) SERIES	1. Slate, quartzite and greywacké, thin beds of conglomerate and limestone. 2. Conglomerate and subordinate beds of slate.
	(Unconformity.)
GRENVILLE SERIES	1. Blue and white crystalline limestone, essentially non-magnesian, together with subordinate beds of fine-grained quartzite or chert. 2. Quartzose, dolomitic, crystalline limestone and sedimentary material lying between limestone and Keewatin. 3. Iron formation (banded chert, jasper, or granular quartz.) 4. Rusty quartz-mica schist. 5. Fine to medium-grained, quartz-feldspar gneiss of doubtful origin.
KEEWATIN COMPLEX	Hornblende and chlorite schists essentially of submarine volcanic origin.

The rocks, beginning with the oldest series, will be described in the following paragraphs:—

THE KEEWATIN COMPLEX

A belt of green schist, striking N. 15°E. and dipping steeply to the east, occurs along the west side of Belmont lake. The schist, which is fine to medium in grain, consists of green hornblende, chlorite, epidote, zoisite, biotite, feldspar, calcite, quartz and magnetite. Here and there in the rock occur round or oval masses, made up largely of epidote and over a foot in diameter. These masses are probably bombs. The following analysis shows the schist to have the composition of a basalt, and to be, therefore, of igneous origin. The sample analyzed was a composite one taken at various points along the west short of Belmont lake.

SiO_2	44.85
Al_2O_3	20.53
Fe_2O_3	5.45
FeO	12.96
MgO	2.45
CaO	9.88
Na_2O	2.16
K_2O	.35
H_2O	1.35
	99.98

A second belt of greenstone schist extends northerly from the northeast part of Round lake. In places the rock is a coarse hornblende-schist. On lot 25, in the sixth concession of the township of Belmont, beyond the northern boundary of the map, it is a fine-grained hornblende-schist consisting for the most part of green hornblende blades, together with lesser amounts of clear grains of quartz or feldspar, epidote and calcite. At the northwest corner of this lot, 100 feet from the corner post, the schist still retains numerous amygdules, about one-eighth of an inch in diameter, filled with epidote and calcite, Fig. 15.

Like the Keewatin of northern Ontario, this schist is associated with iron formation or jaspilyte, described on following pages.

THE GRENVILLE SERIES

(1) *Blue and white crystalline limestones, essentially non-magnesian, together with subordinate beds of fine-grained quartzite or chert.* Those crystalline limestones, which

Fig. 3.—Contorted crystalline limestone of the Grenville series, Belmont lake. The dark beds consist of quartzitic or cherty material; the light colored beds are limestone.

contain low amounts of magnesia, occur for the most part on the east side of the lake and on some of the islands, and also in minor beds on the west side. They have a light, bluish grey, drab, or white color, and have been called "blue" limestones by other writers. Banding, or bedding, due to the alternation of bands of slightly different color, is commonly found, but the banded structure is also due to the presence of beds of slaty quartzite or chert which vary from a fraction of an inch to several feet in thickness, Fig. 3. It is difficult, at times, to distinguish these beds from the quartzite and slate of the Hastings series.

The limestones, as will be seen from the following table, are characterized by high lime and low magnesia content. Good examples occur to the east of the north end of Belmont lake, especially along the road to the Cordova gold mine.

Table Showing Composition of Blue and White Crystalline Limestones on East Side of Belmont Lake and on Islands in Lake

No.	CaO.	MgO.	Al_2O_3 Fe_2O_3	Insoluble.	Loss on Ignition.	Graphite.	Total.
1	51.21	1.02	3.04	4.83	40.08	.....	100.18
2	50.27	2.90	0.44	4.84	41.77	.....	100.22
3	43.84	1.81	1.38	16.38	35.94	.....	99.35
4	7.60	1.08	2.98	76.90	7.08	4.12	99.76
5	21.30	2.25	2.04	54.66	19.45	.....	99.70
6	34.30	1.16	2.40	33.54	28.42	.....	99.82

1. Deer bay, northeast corner of Belmont lake.

2. Green island, Belmont lake.

3. East shore Belmont lake, opposite north part of Green island, at boat house.

4. Graphitic limestone, 50 feet south of No. 3.

5. Saw-mill bay, southeast end of Belmont lake, small patch of micaceous, crystalline limestone at water's edge.

6. Ten chains east of Saw-mill bay, southeast end of Belmont lake; patch of grey limestone, 25 feet long, resting in porphyritic phase of basalt. Not shown on map.

Subordinate beds of blue limestone also occur on the west side of Belmont lake, at times interbedded with magnesian limestones. The following table shows their composition.

Table Showing Composition of Blue and White Crystalline Limestones on West Side of Belmont Lake.

No.	CaO	MgO.	Al_2O_3 Fe_2O_3	Insoluble.	Loss on Ignition.	Total.
1.....	37.88	2.25	3.70	27.80	28.00	99.63
2.....	51.62	1.23	0.20	4.40	42.25	99.70
3.....	52.32	1.32	0.92	3.42	42.20	100.18
4.....	46.40	5.58	1.10	4.48	42.16	99.72
5.....	48.66	4 78	0.70	1.40	44.15	99.69
6.....	51.51	0.72	0.41	7.30	40.10	99.84
7.....	35.29	1.35	0.63	33.14	29.26	99.67
8.....	52.10	1.41	0.30	2.36	.....	.....
9.....	50.06	1.27	0.80	7.10	40.39	99.62
10.....	45.22	1.56	0.64	15.00	37.72	100.14
11.....	41.13	1.56	1.66	21.88	33.46	99.69
12.....	49.09	1.34	1.22	7.75	40.07	99.47

1. Northwest corner of Belmont lake at shore; contains slate-like laminæ.

2. Same part of lake as No. 1, about 150 feet west of shore.

3. First point north of Deer river, northwest part Belmont lake.

4. First point west of Squaw point, at mouth of North river.

5. Same place as No. 4.

6. Roddy bay, south of the mouth of North river, Belmont lake; bluish white, medium-grained limestone, one foot from contact of schist.

7. Same place as No. 6.

8. Taylor island at mouth of North river, Belmont lake.

9. Schooner island, west side of Belmont lake; greyish white, medium-grained limestone.

10. Same place as No. 9.

11. North end of Breckenridge bay, Belmont lake; blue limestone.

12. Limestone on east side of small band of iron formation about 150 feet east of bridge over Deer river, north of Belmont lake; pale, flesh-colored limestone.

(2) *Quartzose, dolomitic, crystalline limestone, and sedimentary material lying between limestone and Keewatin.*—The limestone included in this group is a fine-to-medium-grained, greyish brown rock containing more magnesia than the "blue" type. It is often lacking in banded or bedded structures, and in places contains much granular quartz, Figs. 4 and 6.

The quartz in the limestone sometimes occurs in banded or laminated structures, shown in Fig. 4, which are suggestive of "eozoon" forms, Fig. 2. The banding is due to alternate, parallel layers of quartz and calcite or dolomite. These forms, which are

Fig. 4.—Eozoon-like forms contained in crystalline limestone of Grenville series, Belmont lake.

found on the west part of Big island and at the northeast part of the lake, are of importance in a stratigraphic way because pebbles and boulders of them have been found in the overlying Hastings conglomerate, Fig. 5, proving the unconformity between the crystalline limestone and the conglomerate.

The dolomitic limestone, which occurs largely on the west side of Belmont lake, is also found on some of the islands, including Big island, and at the northeast part of the lake. The following table shows the composition of specimens; it will be noted that many of them have almost the theoretical composition of dolomite.

Table Showing Composition of Dolomitic Crystalline Limestones at Belmont Lake

No.	CaO	MgO	Al_2O_3 Fe_2O_3	Insoluble	Loss on Ignition	Total
1	30.42	21.64	1.10	0.48	46.76	100.40
2	30.12	18.15	1.00	8.60	41.48	99.35
3	30.62	17.78	4.90	3.50	43.03	99.83
4	30.22	20.85	0.98	1.82	45.89	99.76
5	29.78	21.54	0.84	1.74	46.46	100.36
6	29.82	19.57	0.80	6.70	43.38	100.27
7	30.70	17.89	0.66	7.10	43.46	99.81
8	31.78	19.81	1.20	0.88	45.96	99.63
9	30.14	21.06	1.76	1.28	46.30	100.54
10	27.65	17.90	2.80	11.60	40.12	100.07
11	30.19	20.80	1.58	1.24	46.06	99.87
12	7.20	4.34	0.60	77.88	9.58	99.60
13	25.34	16.50	0.50	20.08	37.96	100.38
14	23.02	17.05	0.50	23.46	36.11	100.14
15	19.66	13.75	0.84	36.46	29.56	100.27
16	31.50	20.87	0.74	0.28	46.90	100.29
17	28.70	19.13	.....	6.28	43.22	.....
18	29.74	20.67	.....	2.73	44.48	.....
19	30.60	20.38	1.14	1.20	46.56	99.88
20	30.50	21.35	0.70	0.30	47.10	99.95
21	28.40	18.12	1.70	8.76	42.85	99.83
22	12.42	8.77	0.80	59.70	18.10	99.79

1. Northwest corner of Belmont lake, about 75 feet west of shore; fine-grained, yellowish brown limestone.
2. Same locality as No. 1, but sample was taken about 200 feet from shore; fine-grained, yellowish brown.
3. West shore Belmont lake, south of Deer river; fine-grained, light brown limestone.
4. West shore Belmont lake, northwest of Twin islands; fine-grained, greyish yellow limestone.
5. West shore Belmont lake, southwest of Twin islands; fine-grained, pink or flesh-colored limestone.
6. North end of Breckenridge bay, Belmont lake; fine-grained, greyish brown limestone.
7. First point north of King bay, southwest end of Belmont lake; pale, flesh-colored limestone.
8. East side of Belmont lake, opposite Sammy island; long, narrow belt of limestone weathering to a brown or yellow color, but having a bluish grey appearance on fresh fracture.
9. Same belt as No. 8.
10. Same belt as No. 8.
11. East shore Belmont lake, second outcrop of limestone north of Crow river; grey in color.
12. Same place as No. 11.
13. Big island, Belmont lake, west side of island, 200 feet from shore on knoll; grey limestone.
14. West side of Big island, Belmont lake, on shore; grey limestone.
15. Centre of east shore of Big island, Belmont lake; yellowish brown limestone.
16. First point west of Squaw point at mouth of North river, Belmont lake.
17. Same place as No. 13.
18. Same place as No. 13.
19. West Twin island, Belmont lake, fine-grained, grey limestone.
20. East side of Birch island, Belmont lake.
21. East side Birch island, Belmont lake; fine-grained, yellowish brown limestone.
22. East side Birch island, Belmont lake; fine-grained, yellowish brown limestone.

On the west side of Belmont lake calcareous, quartz-mica schist intervenes between the Keewatin greenstone schist and the Grenville dolomitic limestone. This quartz-mica schist is probably an altered quartzite or greywacké, corresponding in stratigraphic position to similar rocks in the Actinolite-Cloyne area, which resemble the Couchiching of northwestern Ontario. At the southwest part of Belmont lake, in Contact bay, this

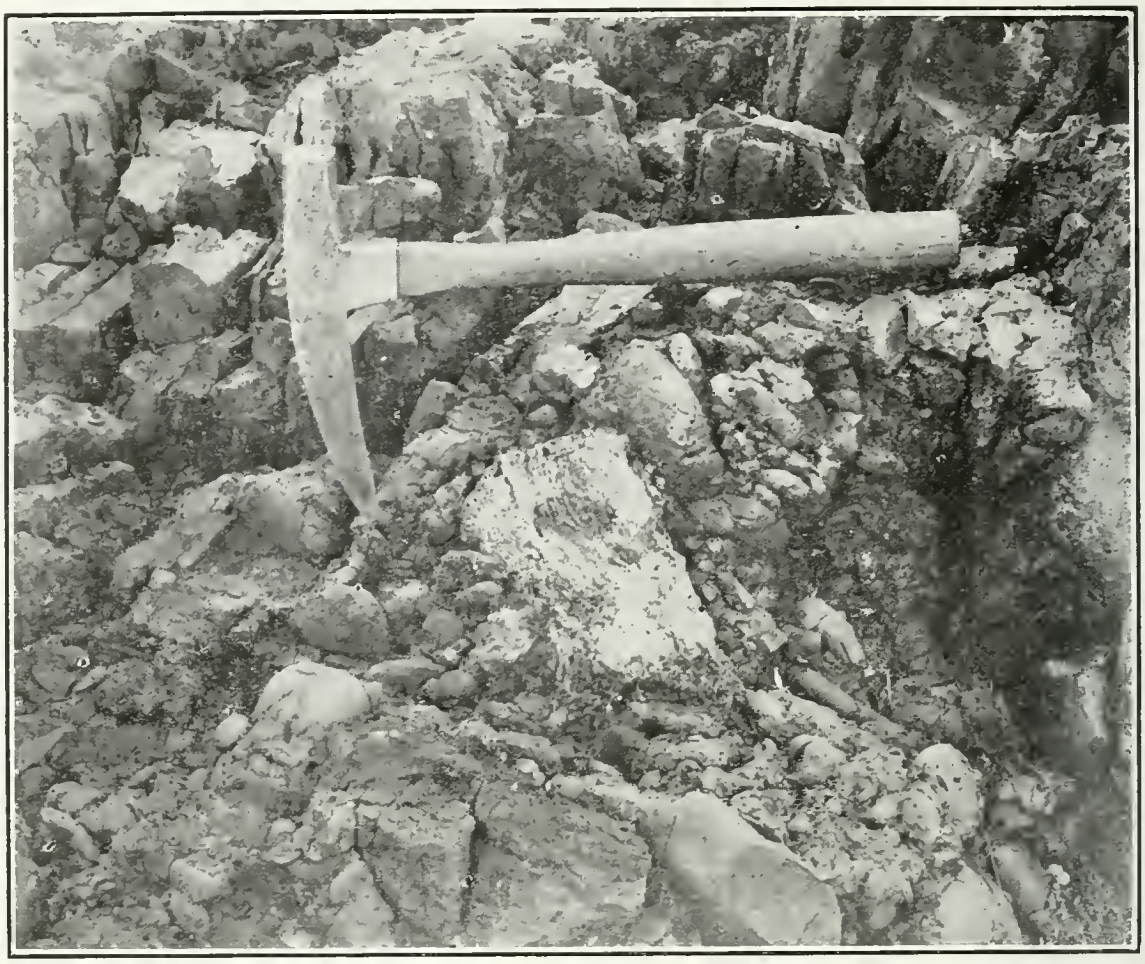


Fig. 5.—Conglomerate of Hastings series, holding a boulder, below the pick, of so-called "eozoon", near Crow River point, Belmont lake.

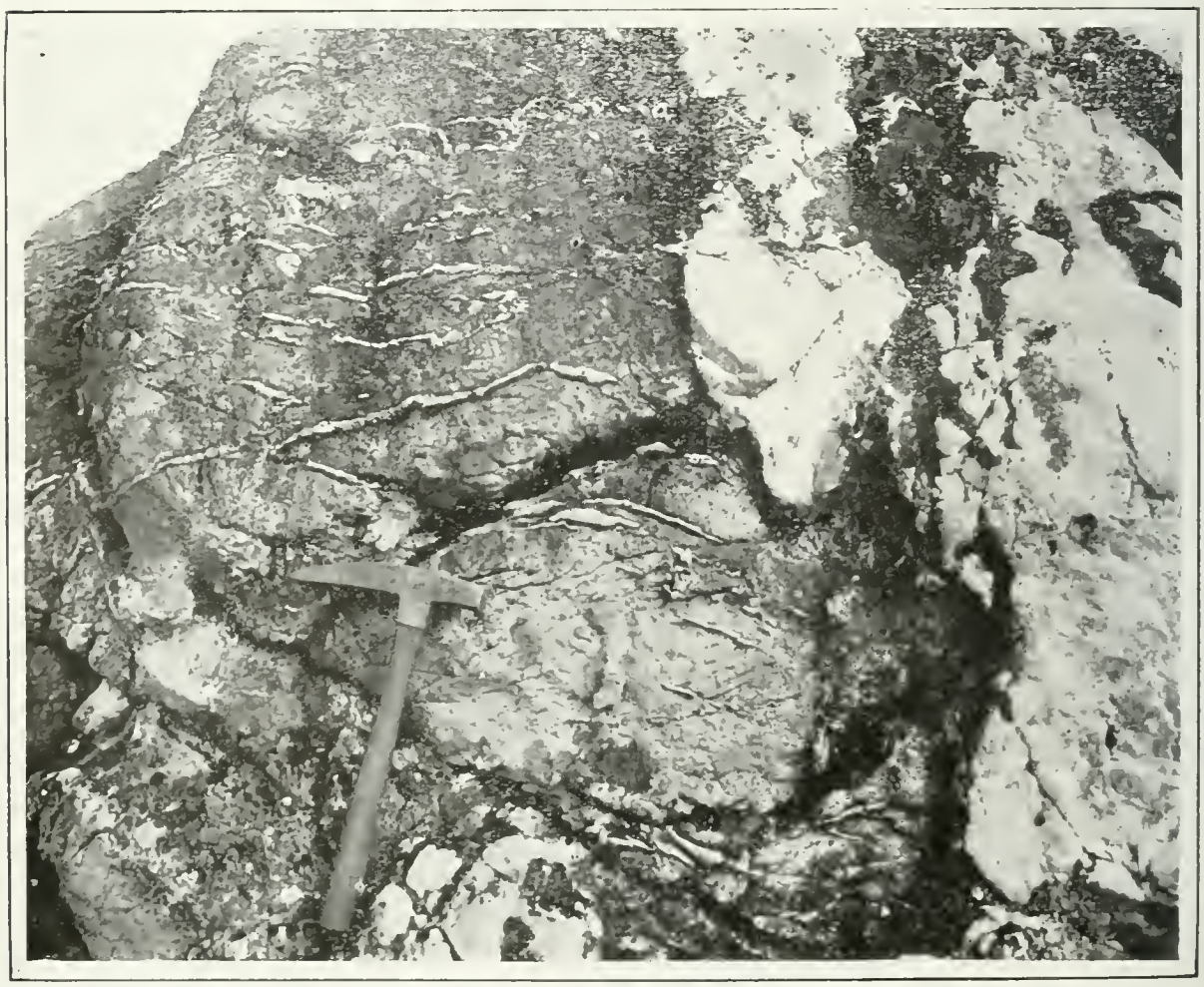


Fig. 6.—Quartzose, magnesian, crystalline limestone of the Grenville series. The white parts and veinlets are quartz. Big island, Belmont lake.

schist is about two hundred feet wide, measured across the schistosity, while in Roddy bay, near the mouth of the North river, the schist is very much thinner. There appears to be a gradual transition, in ascending order, between the greenstone schist, quartz-mica schist and limestone.

(3) *Iron formation (banded chert or granular quartz).*—The iron formation has been so-called on account of its resemblance to certain cherty rocks of the iron ranges in the Vermilion district of the Lake Superior region and elsewhere. In the Belmont lake area three belts have been found, viz.: (a) One hundred feet east of the bridge over Deer river at the north end of Belmont lake, a belt about twenty feet wide and two hundred feet long is exposed. It is made up of dark red, coarse chert, or granular quartz, interbanded with calcite. The cherty bands are from an inch to two feet thick, each band sometimes showing alternate lines of darker and lighter chert. Thin sections show

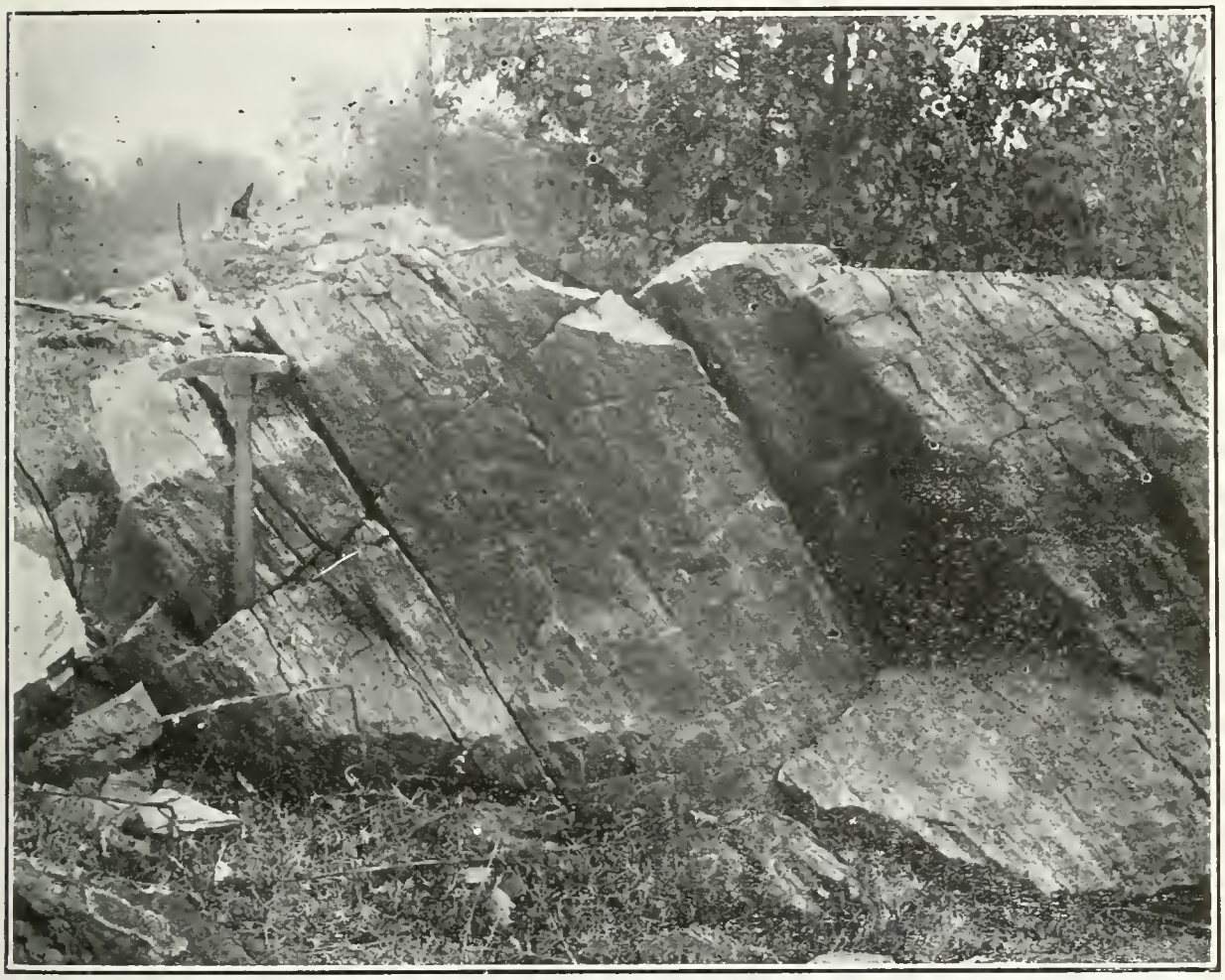


Fig. 7.—Iron formation (jaspilyte), Grenville series. About one-half mile west of Deer bay, Belmont lake.

the material to be made up of interlocking grains of quartz which form the base. Magnetite and hematite grains occur disseminated among the quartz grains, without showing any tendency to surround individual grains. The octahedra of magnetite can occasionally be detected with the naked eye, but they are for the most part in minute grains. The hematite can be recognized with high powers of the microscope in blood-red grains, but it occurs also in thin layers which lie roughly parallel to the strike and dip of the rocks in general in this area. It is the hematite in dust-like condition that gives the chert its reddish, jasper-like color, while hematite and magnetite together produce a dark purple effect. Two analyses for metallic iron gave 11.8 and 15 per cent. respectively, the former probably being nearer an average. (b) About half a mile southwest of the outcrop described there occurs a larger exposure of iron formation, Fig. 7. It rests on the Keewatin schist with sharp contact and is about a quarter of a mile long by fifty or

sixty feet wide. It has the same microscopic character as that just described but carries little or no carbonate, and at the north end of the exposure more of the iron oxides is present. In some cases the bands of iron oxides are a quarter of an inch wide. An analysis of this part of the iron formation gave the following percentages: metallic iron, 24.06; sulphur, .024; phosphorus, .126. There is, however, very little of this richer zone exposed, since this end of the formation disappears under the swamp to the north. (c) On lot 25 in the sixth concession of Belmont, north of Round lake, a third patch or remnant of iron formation was discovered. It lies just to the north of the colored part of the map, and has a width of 250 feet, but can be traced a distance along its strike of only 150 feet. It rests in the green schist.

It may be added that a little of the iron formation is to be seen in the Keewatin at other places, e.g., near the boat landing on King bay.

(4) *Rusty quartz-mica schist.*—A band of rusty quartz-mica schist runs northerly from the northeast corner of Round lake. It rests in Keewatin green schist into which it gradually passes. Exposures of the rock occur at the power house on the North river. A thin section of the rock from this place shows it to be composed largely of grains of quartz, in the interstices of which lie minute plates of biotite; calcite is present in small quantities. The rusty color is due to iron oxides resulting from the decomposition of iron pyrites or other sulphides.

(5) *Fine-to-medium-grained quartz-feldspar gneiss of doubtful origin.*—To the north and northwest of Round lake the map shows a considerable area of rocks grouped with the Grenville series. They are quartz-feldspar gneisses, generally fine-grained and with a grey to pinkish-grey color. They often contain calcite, while in places calcareous bands two or three feet wide occur, as may be seen at the first falls one mile north of the iron bridge on the North river, in the eighth concession of Belmont township. In places, too, the gneisses are quartzose and garnetiferous. The following results of a chemical analysis of the gneiss point to a sedimentary origin.

SiO_2	75.78
Al_2O_3	12.91
Fe_2O_3	.83
FeO	4.07
MgO	.53
CaO	1.63
Na_2O	1.67
K_2O	1.10
H_2O	1.51
CO_2	.57

THE HASTINGS (TEMISKAMING ?) SERIES

The Hastings series consists of conglomerate, quartzite, greywacké, slate and limestone. The rocks are all more or less schistose, and the pebbles of the conglomerate have generally been elongated by pressure, Fig. 10. The series appears to be a conformable one, no evidence of a break having been observed. On the west side of Big island, just to the south of a knoll of crystalline limestone, original bedding is still clearly preserved, showing a gentle dip to the southwest. The bedding may be recognized by the alternation of fine and coarse pebbly bands; the schistosity here occurs at right angles to the bedding planes. On the east shore of Belmont lake, opposite island number 29, and at the northeast corner of the lake, bedding may alse be recognized, Fig. 12; at the latter place delicate cross-bedding was observed. On the map the Hastings series has been divided into two groups: (a) That composed largely of conglomerate, and (b) that composed largely of slate. The limestone is present in thin bands or laminæ, interbedded with the slate or conglomerate. While it is probable that the Hastings series in the district is of considerable thickness, extending, as it does, along a stretch of country 65 miles in length, nevertheless but little is known regarding its actual thickness.

Fig. 8.—Island 27, Belmont lake, Peterborough county. Crystalline limestone of the Grenville series on right, Hastings slate on left. A few pebbles occur near the contact.

Fig. 9.—Part of Belmont lake, looking north towards Sidonia island.

Conglomerate

The pebbles of the conglomerate are water-worn, and consist of quartz-porphyry, feldspar-porphyry, granite-porphyry, felsite, fine-grained greenstone, fine-grained grey or greenish grey schist, crystalline limestone, Fig. 11, chert varying from fine to coarse in grain and from greyish white to red in color (jaspilyte), white quartz and "eozoon" fragments.

The porphyry pebbles are grey to pink in color, and consist of a fine-grained matrix of quartz, feldspar and biotite in which are set phenocrysts of the first two minerals which are often remarkably well preserved. Sometimes these phenocrysts of feldspar show albite twinning lamellæ. The porphyry pebbles are of common occurrence and may be observed in the conglomerate on several of the islands of Belmont lake, including Sidonia and Big islands.

The fine-grained greenstone pebbles are seen under the microscope to consist of a network of plagioclase rods, green mica and magnetite, in which matrix are set phenocrysts of feldspar and subordinate blades of hornblende.

Pebbles of crystalline limestone that have been found in the conglomerate on the east and west side of Big island, have the same composition as the magnesian crystalline limestone which is exposed in several places on the island. Limestone pebbles also occur in the conglomerate on Sidonia island, Fig. 11, and elsewhere around the lake. The following table shows the composition of three of these limestone pebbles from Big island:

CaO	MgO	Fe_2O_3 Al_2O_3	Loss on Ignition.	Insoluble.	Total.
29.13	18.22	2.92	44.30	5.68	100.25
29.19	19.98	2.76	44.21	4.24	100.38
29.04	15.08	18.54	36.26	0.72	99.64

Pebbles of chert or granular qūartz are commonly found in the conglomerate, and those having a red color (jasper) at once attract attention. A thin section of one of the jasper pebbles consists of interlocking grains of quartz scattered through which are magnetite or hematite specks. Several pebbles of what, for convenience of description, have been called "eozoon" were observed in the conglomerate. One of these, which is shown in Fig. 5, occurs about one hundred yards south of Crow River point, on the east side of Belmont lake.

On the northeast side of Deer bay, at the boat landing, the rock at the water's edge is crystalline limestone. Overlying it is conglomerate which contains well rounded pebbles an inch or two in diameter set in a limestone matrix. The pebbles are rather uniform in size and consist essentially of cherty material.

It may be of interest to note that the conglomerate at Belmont lake was described by Mr. Alexander Murray in the middle of the last century. Mr. Murray said:

"On the east side of the largest of the islands and on a small one to the N.N.E. there occur beds of conglomerate, which according to the dip, would overlie the previous rocks; they are interstratified with talcose slate, and the matrix of the conglomerate exhibits a slaty structure and talcose character, at the same time that it is calcareous or dolomitic . . . . The general color in fresh fractures is greenish or reddish white, but the external surface weathers a dark brown. The pebbles are distinctly rounded or flattened, the flat sides usually but not always lying parallel with the bedding. They are of various sizes, the largest being about five or six inches in diameter, while the smallest do not exceed the size of a snipe shot. The prevailing color of the pebbles is a very dark grey; they have a flat conchoidal fracture, with a very close impalpable grain; they are harder than steel and appear to be a quartz rock."*

Quartzite, Greywacké and Slate

Quartzite and greywacké are associated with the conglomerate on Big island and at other points. At the northeast corner of Belmont lake, impure quartzite, or greywacké, having a peculiar greyish green color, is well exposed and often shows distinct bedding planes, Fig. 12. A thin section shows the rock to be made up of angular fragments of quartz and feldspar together with many scales of brown mica; the feldspar sometimes

* Report Geol. Sur., Can., 1852-3, pp. 104-107.

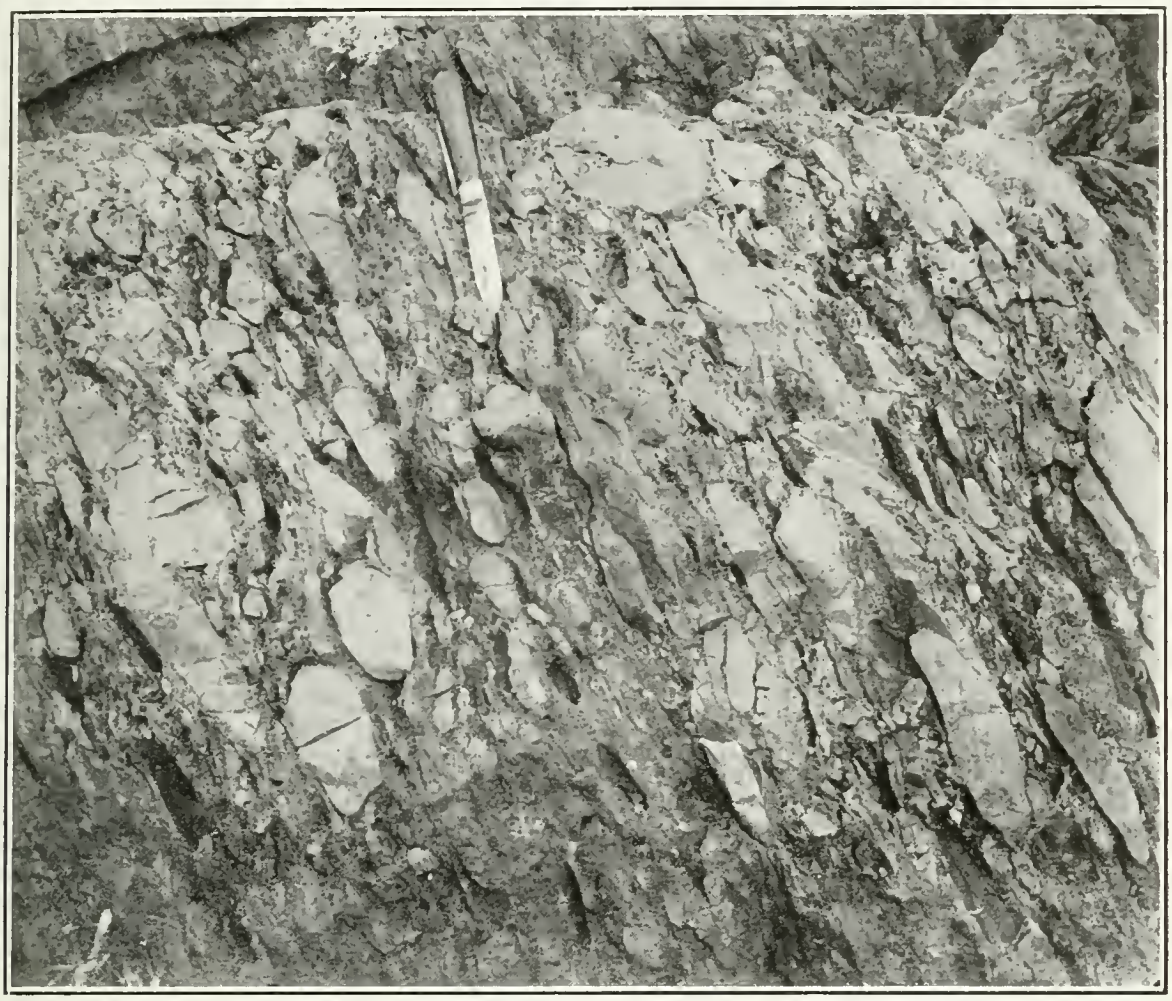


Fig. 10.—Hastings conglomerate showing pebbles elongated by pressure. Sidonia island, Belmont lake.

Fig. 11.—Pebbles of Grenville crystalline limestone in Hastings conglomerate. Sidonia island, Belmont lake.

shows twinning lamellæ. On the east shore of the lake, north of Wilson bay, there is a bed of quartzite or greywacké about 100 feet wide. It has a pinkish brown color, and consists of angular fragments, one-eighth of an inch in diameter, of blue quartz, orthoclase and plagioclase set in a fine-grained matrix of the same minerals together with a little calcite, sericite and iron oxides. The rock passes to the east into a dark grey, finely banded slate, consisting largely of greenish brown mica and subordinate quartz, epidote, calcite, zoisite and iron oxides. This rock then passes into a conglomerate, the position of which is shown on the map.

Slate-like rocks occur on the east shore of Belmont lake between Green island and Crow river. They appear to be a fine-grained facies of the greywacké and are often very finely banded or bedded, the bedding being due to interbanding of coarse and fine material. Thin sections show the slate to be made up of a fine-grained matrix of dark-colored mica, quartz, feldspar, calcite, and iron oxides. In this matrix angular fragments of quartz and feldspar occur. The conglomerate on Big island is sometimes interbedded with slate, but it has not been found practicable to show it with a separate color on the map. Along the northwest shore of this island the slate is well exposed, and consists

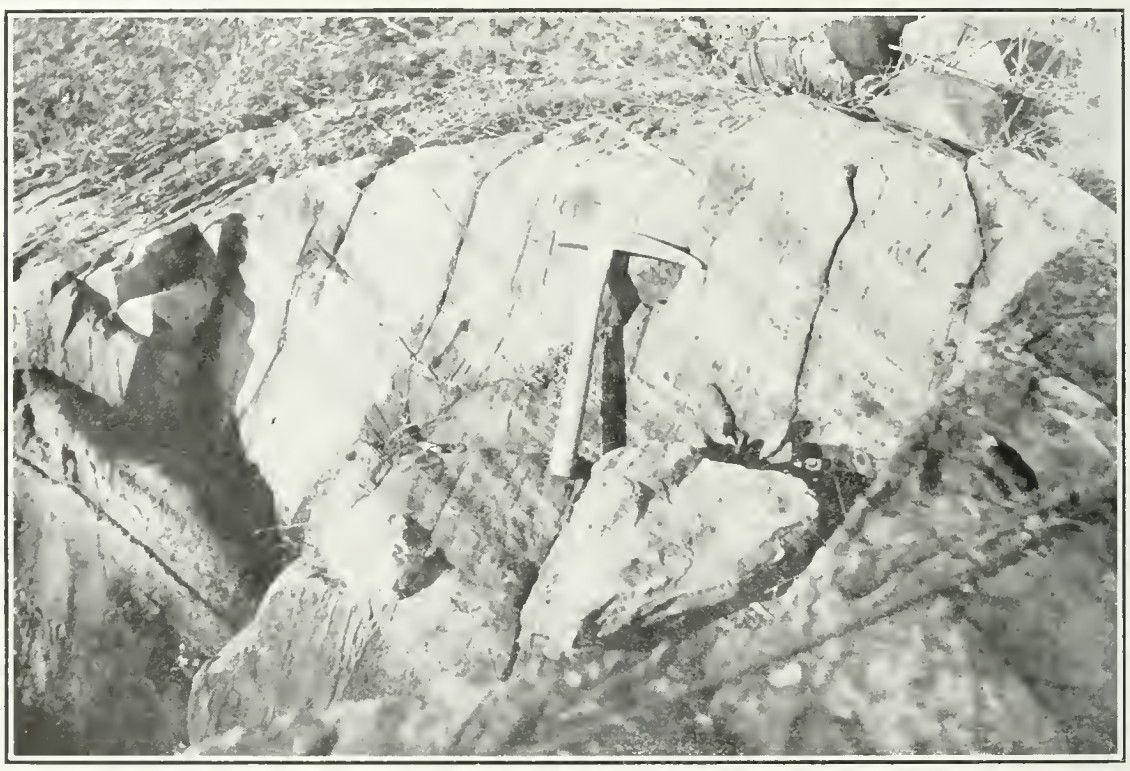


Fig. 12.—Greywacké, Hastings series, showing bedding. Belmont lake.

of brown mica, muscovite, quartz, chlorite and iron oxides. On the east shore of Belmont lake, one hundred yards south of Crow River point, a narrow band of blackish brown slate is interbedded with coarse conglomerate, the latter containing a light-colored boulder of "eozoon," Fig. 5; the conglomerate here was referred to in a preceding paragraph. This interbedding of coarse boulder conglomerate and slate shows that conditions of deposition must have rapidly changed during Hastings time. The slate on the west part of island No. 27, one of the Twin islands, is very fine-grained and compact, and consists of grains of quartz and feldspar together with considerable brown mica scales, iron oxides and a little calcite. The map does not show this bed on account of the small size of the island, but Fig. 8 is a photograph of the slate, showing its contact with magnesian, crystalline limestone of the Grenville series. On the west part of Birch island there occur calcareous slates which have been provisionally classed with the Hastings series; it is possible, however, that they should be grouped with the Grenville sediments.

The slate on the east side of the lake, north of Crow river is often impregnated with rhombohedra of ferruginous carbonate.

Limestone

Limestone does not appear to have formed an important part of the Hastings sediments at Belmont lake but three places where it occurs may be mentioned; (1) At several points on the east shore of the lake, north of Crow river, the slates are interbedded with limestone bands about an inch in thickness; (2) The map shows, at the northeast corner of the lake, near Deer bay, a bed of blue limestone lying in the Hastings greywacké. The relation of this limestone bed to adjacent rocks is not clear. It may be interbedded with the greywacké, which seems the most obvious explanation; or, it may be a long ridge of the Grenville basement on which the Hastings greywacké was deposisted; or, it may be a slice of the Grenville limestone faulted against the greywacké; (3) A band of yellowish brown limestone 15 inches wide appears to be interstratified with the conglomerate and calcareous schist at the north end of Big island, though this may not be the true relationship. An analysis showed this band to have the following percentage composition: insoluble, 9.54; Al_2O_3 and Fe_2O_3, 2.78; CaO, 27.75; MgO, 18.63; loss on ignition, 41.48.

Certain narrow bands of limestone in the Hastings fragmental sediments, lying parallel with the strike or schistosity, are clearly of secondary origin.

Fig. 13.—Amygdaloidal basalt, post-Hastings age. Belmont lake.

POST-HASTINGS INTRUSIVES

The series consists of gabbro-diabase, basalt with associated ash beds, and basic and acidic dikes.

On the map the rock that is more of the plutonic type is shown in a deeper color than that which possesses volcanic characteristics.

The coarse-grained rock at the Cordova gold mine, at the northeast corner of the map, has sometimes the texture of a diabase and sometimes that of a gabbro, one facies passing gradually into the other. It has been, therefore, called the Belmont gabbro-diabase, the word "Belmont" referring to the lake or township of the same name. The feldspar, which is labradorite, is partly decomposed to saussurite and other secondary materials. The other chief constituent is pyroxene, and it is frequently altered to chlorite and green hornblende. Pyrite, apatite and titaniferous magnetite or ilmenite are present in the usual subordinate quantities.

The Belmont basalt is a dense green rock, frequently amygdaloidal, Fig. 13, and more rarely scoriaceous or ropy, Fig. 17, showing its volcanic or surface origin. It is almost always fine-grained, but, at times, as for example, in the hills east of Wilson bay and Sawmill bay, on the east side of Belmont lake, it becomes coarsely porphyritic, containing phenocrysts of feldspar an inch or more in length, having both tabular and lath-like outlines. Generally it is too fine-grained to distinguish any of the minerals with the naked eye. Under the microscope specimens seem to consist essentially of plagioclase feldspar, hornblende and magnetite. A mineral with a green color appears to be mica, and is subordinate in quantity. The feldspar is more or less decomposed, but some of it is comparatively fresh. The amygdules average perhaps less than a quarter of an inch,

Fig. 14.—Bombs in ash beds. Belmont lake.

but some are microscopic while others are an inch in diameter. The minerals filling the amygdules are quartz, epidote, chlorite, calcite, magnetite and rarely biotite. Quartz and epidote are most common.

Associated with the basalt there are restricted areas of volcanic tuff or breccia, the fragments of which are angular or sub-angular and are made up of fine-grained basic lavas or more acid fine-grained rocks. Some of these fragments, a foot or more in diameter, shown in Fig. 14, are bombs; they are round or oval in outline, possessing a pistachio-green color, and are made up largely of epidote, together with small quantities of biotite, calcite and magnetite.

Along the east shore of Belmont lake, a short distance north of Sawmill bay, the best exposure of the fragmental facies of the lava, observed in the area, is to be seen. It consists of consolidated ash beds or tuff, containing bombs a foot or more in diameter, Fig. 14. Large boulders of the tuff lie near the shore and similar material in place is to be seen in a wooded hill near at hand.

Generally speaking the basalt and gabbro are distinctly massive, but attention may be called to the fact that they have been rendered schistose in places. The gabbro-diabase at the Cordova mine has in a few cases a gneissoid structure.

The contact between the gabbro-diabase and the basalt is of interest. One rock passes gradually into the other in a distance of two or three hundred feet, but the transitional facies and also the normal gabbro-diabase and basalt have been much brecciated, and the cracks have been filled with aplite and micropegmatite. It would seem that this acidic material represents the last phase of the cooling gabbro-diabase-basalt mass. The aplite, which is really at times a medium-grained granite, is often dark in color, due to the presence of hornblende. Several of these acid dikes are shown on the map. A well exposed contact showing the relation between the gabbro-diabase and the basalt occurs on lot 17 in the second and third concessions of Belmont township.

The gabbro-diabase solidified at some distance below the surface of the earth and is merely a deep-seated part of the basalt.

The following table shows the composition of a sample of the basalt, or "trap" rock as it is commercially known.

SiO_2	47.14
Al_2O_3	14.08
Fe_2O_3	10.84
FeO	12.02
MgO	2.65
CaO	9.67
Na_2O	1.60
K_2O	1.07
H_2O	1.50
	100.57

Three silica determinations were also made of other parts of the basalt, giving 42.00, 43.76 and 46.54 per cent., thus showing the basic nature of the rock.

The map shows several diabase or other basic dikes, which cut the conglomerate, crystalline limestone and Keewatin green-schist. One of these on the west side of Big island is dark green, medium in grain, and contains glistening flakes of mica. Under the microscope it is seen to be made up essentially of biotite, and calcite, together with muscovite, quartz and some feldspar; many of the minerals appear to be secondary. Other dikes are fresher than this. One on the west shore of Belmont lake is fine-grained and dark green in color and shows a diabasic texture. Under the microscope it is seen to consist largely of green pleochroic hornblende. Plagioclase occurs in rods and stout prisms and has crystallized out before the ferro-magnesian mineral. There is also present epidote, brown mica, serpentine, and ilmenite partly altered to leucoxene. Another specimen has about the same composition but does not show the ophitic texture.

The gabbro-diabase series is important from the economic point of view, as in it at Cordova are the auriferous veins of the Cordova mine. Moreover, at two or three places, where the gabbro-diabase has intruded the crystalline limestones and associated rocks, there occur bodies of magnetite, such as those at the Blairton mine on the shore of Crow lake, to the east of the borders of the map of the Belmont lake area, and at the Belmont iron mine, immediately south of Cordova. The finer-grained variety of the rock makes good road material.

PALEOZOIC SYSTEM

The Paleozoic system is represented by horizontal beds of Ordovician, Black River, limestone, with usually, at the base, calcareous sandstone often of a red color due to the presence of iron oxides. At other times the pure limestone rests directly on the pre-Cambrian rocks and holds a few angular fragments of them.

Analysis of Paleozoic Limestone

A sample of limestone from a small quarry just east of Havelock was found to have the following chemical composition, showing it to be, like most Black River limestones, low in magnesia:*

Lime	51.22
Magnesia	0.70
Alumina	2.37
Ferric oxide	0.61
Sulphur trioxide	0.24
Carbon dioxide	40.75
Loss	2.29
Silica	1.96
Total	100.14

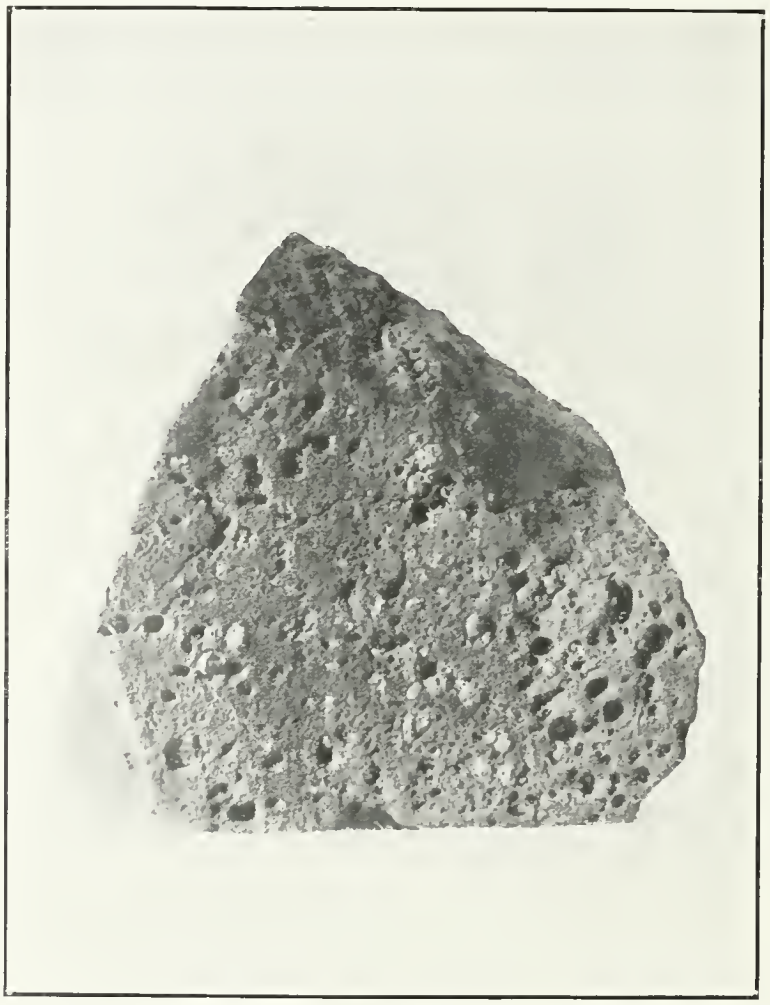


Fig. 15.—Greenstone of Keewatin series in which the amygdules are still preserved. Lot 25, concession 6, Belmont township.

Relationships

Relation of Grenville series to the Keewatin.—The Keewatin green schists, originally essentially volcanic rocks, are considered to form the basement. On the ropy, tufaceous and uneven surface of the Keewatin were deposited sediments now represented by calcareous quartz-mica schist, iron formation, dolomitic limestone, and finally by pure limestone. No erosion unconformity preceding that immediately below the Hastings series has been observed. The deposition of the older sediments, including the iron formation and dolomitic limestone, probably closely followed the submarine lava flows of the Keewatin. The purer or non-dolomitic limestone is the youngest of the pre-Hastings

* Ont. Bur. Mines, Vol. XIII, Part 2, p. 98.

sediments, and was deposited towards the close of a prolonged period of submergence which began with the Keewatin lava flows and ended with the deposition of the limestone.

Certain schists of indefinite character lie between the magnesian limestone and the Keewatin. They are considered to represent a co-mingling of sediments and volcanic rocks, the former having been deposited on the uneven, ropy and vesicular surface of the latter. Intense dynamic metamorphism has produced schists difficult to describe but which are now represented by calcareous quartz-mica schists or slates, and probably were originally, in part, quartzites or greywackés. These schists may be seen in Contact bay at the southwest end of Belmont lake, and at Roddy bay, near the mouth of the North river. We have not been able to find any evidence which would tend to show that the Keewatin greenstones are in intrusive contact with the Grenville sediments; hence, it is inferred that the greenstones formed the basement on which were deposited the Grenville sediments.

Relation of Hastings series to Keewatin and Grenville.—The Hastings conglomerate, quartzite and slate were deposited unconformably upon the surface of the Keewatin and Grenville series. The evidence for this statement is twofold: (1) The Hastings series is less altered or metamorphosed than the Keewatin and Grenville, (2) The conglomerate holds pebbles of some, but not all, of the older rocks exposed in this area. The

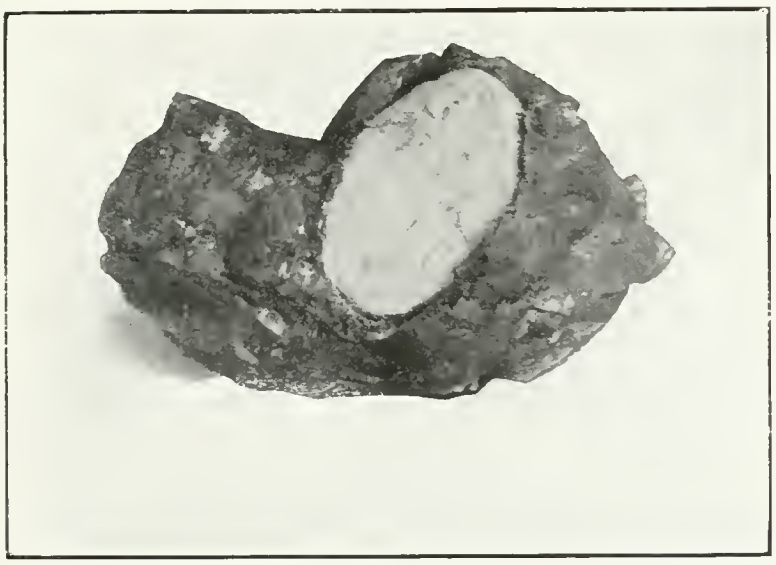


Fig. 16—Pebble of crystalline limestone of Grenville series in Hastings conglomerate. Belmont lake.

water-worn pebbles of crystalline limestone, Figs. 11 and 16, which occur in the conglomerate, are similar to the underlying limestone, proving the unconformity between the two series. But perhaps the most convincing evidence consists in the occurrence of pebbles and boulders of what we have called "eozoon," Figs 4 and 5, which cannot be mistaken for anything else. These "eozoon" forms, which have been described in this report, occur in the Grenville limestone, and their presence as pebbles and boulders in the conglomerate is proof of the erosion interval between the conglomerate and crystalline limestone. The pebbles of red chert and jasper are similar to the iron formation which occurs at the northwest corner of Belmont lake, and it is probable that they have been derived by erosion from that formation.

The conglomerates at Belmont lake now rest, in so far as can be seen, wholly on crystalline limestone, but in the Actinolite-Cloyne area, described in later parts of this report, they have been found in actual contact with most of the pre-Hastings rocks. At Belmont lake the basal member of the Hastings is sometimes conglomerate and at other times slate. Thus on the west part of Big island, at the most western point near the shore, the conglomerate may be seen resting directly on the Grenville crystalline limestone. The two series pass into each other in a few feet, the conglomerate holding occasional limestone pebbles derived from the underlying limestone. About 300 yards

southeast of here, and to the south of a knoll of crystalline limestone, slate several feet thick is succeeded by conglomerate, but it is not known whether or not this slate rests directly on the limestone without basal conglomerate, since the contact is not exposed. It is probable, however, that on this island conglomerate was first deposited and was followed by slate and then by a second bed of conglomerate.

The east side of Birch island is composed of quartzose, crystalline limestone, on the western flank of which rests Hastings conglomerate, the contact between the two being drift-covered.

Slate of the Hastings series may be seen resting directly on the Grenville limestone at several points, including the following, (1) West Twin island, No. 27, is made up largely of crystalline limestone, with the exception of a narrow strip of slate on the west side, Fig. 8. The latter is in vertical position and rests against the limestone, holding a few pebbles of this rock. (2) On the east shore of Belmont lake, opposite the south

Fig. 17 —Scoriaceous or ropy facies of post Hastings basalt. Belmont lake.

end of Green island, the limestone and slate may be seen in sharp contact at the water's edge, there being no conglomerate present. (3) South of this place a few hundred yards fine-grained, bedded greywacké and slate rest on each flank of a long rib of magnesian limestone. At one point there is present a doubtful conglomerate, holding fragments of limestone. (4) The second patch of limestone on the shore, north of Conglomerate point, is shown on the map. Against this limestone rests fine-grained slate or schist of the Hastings series.

In the Belmont lake area the presence of water-worn fragments of igneous rocks, like quartz-porphyry, shows that somewhere part of the basement on which the Hastings rests must have been composed of these types, but if such basement does exist it is covered by later formations, or completely eroded.* This facies of the basement has, however, been found farther to the northeast in the Actinolite-Cloyne area.

* A similar phenomenon has been observed in connection with the pre-Cambrian rocks of Scotland, certain pebbles in the Torridonian sandstone having been derived from rocks not now known to occur in the region. See "The Geological Structure of the North-West Highlands of Scotland," p. 5, Memoir of the Geological Survey of Great Britain.

It may be added that it is necessary to exercise care in distinguishing squeezed or drawn-out pebbles of crystalline limestone in the conglomerate from secondary calcite or dolomite.

Relation of post-Hastings intrusives to Keewatin, Grenville and Hastings series.—These intrusives, which are composed of gabbro-diabase, basalt, and basic and acid dikes, are younger than the Keewatin, Grenville and Hastings series. Intrusive contacts of the gabbro-diabase with the crystalline limestone may be seen north of the school house of Cordova village, at the northeast corner of the map and elsewhere. North of Round lake several oval or round masses of gabbro intrude the quartz-feldspar gneiss.

Dikes of altered diabase intersect the Hastings series. Three of these dikes, cutting the conglomerate, have been mapped on Big island. Similar dikes intrude the crystalline limestones; (1) on the west side of Belmont lake, north of the North river; (2) on Sammy and Silver islands; (3) on lot 19, in the second concession of Belmont township, and at other places. These dikes also cut the Keewatin green schists. One of them is shown on the map in Clark bay at the southwest part of Belmont lake.

The basalt has been found in intrusive contact with the older rocks at the following places among others: (1) On the east part of lot 17 in the second concession of Belmont township; here the basalt has altered the crystalline limestone to a rock which is composed largely of garnet, and subordinate amounts of epidote. (2) North of Wilson bay on the east side of Belmont lake; the basalt, which is here sometimes scoriaceous and ropy, is in intrusive contact with steeply dipping beds of the Hastings conglomerate.

The acid dikes, which as already explained, are the end phase of the cooling gabbro-diabase-basalt mass, intersect the crystalline limestone and the Hastings conglomerate. They may be seen to cut the latter rock about 300 yards northwest of the Belmont iron mine. On the north part of lot 20 in the first concession of Belmont township the dikes are coarse granite-pegmatite in places.

Relation of Paleozoic to Pre-Cambrian.—The Paleozoic rocks, represented by horizontal beds of Ordovician, Black River, limestone, rest with great unconformity on the pre-Cambrian.

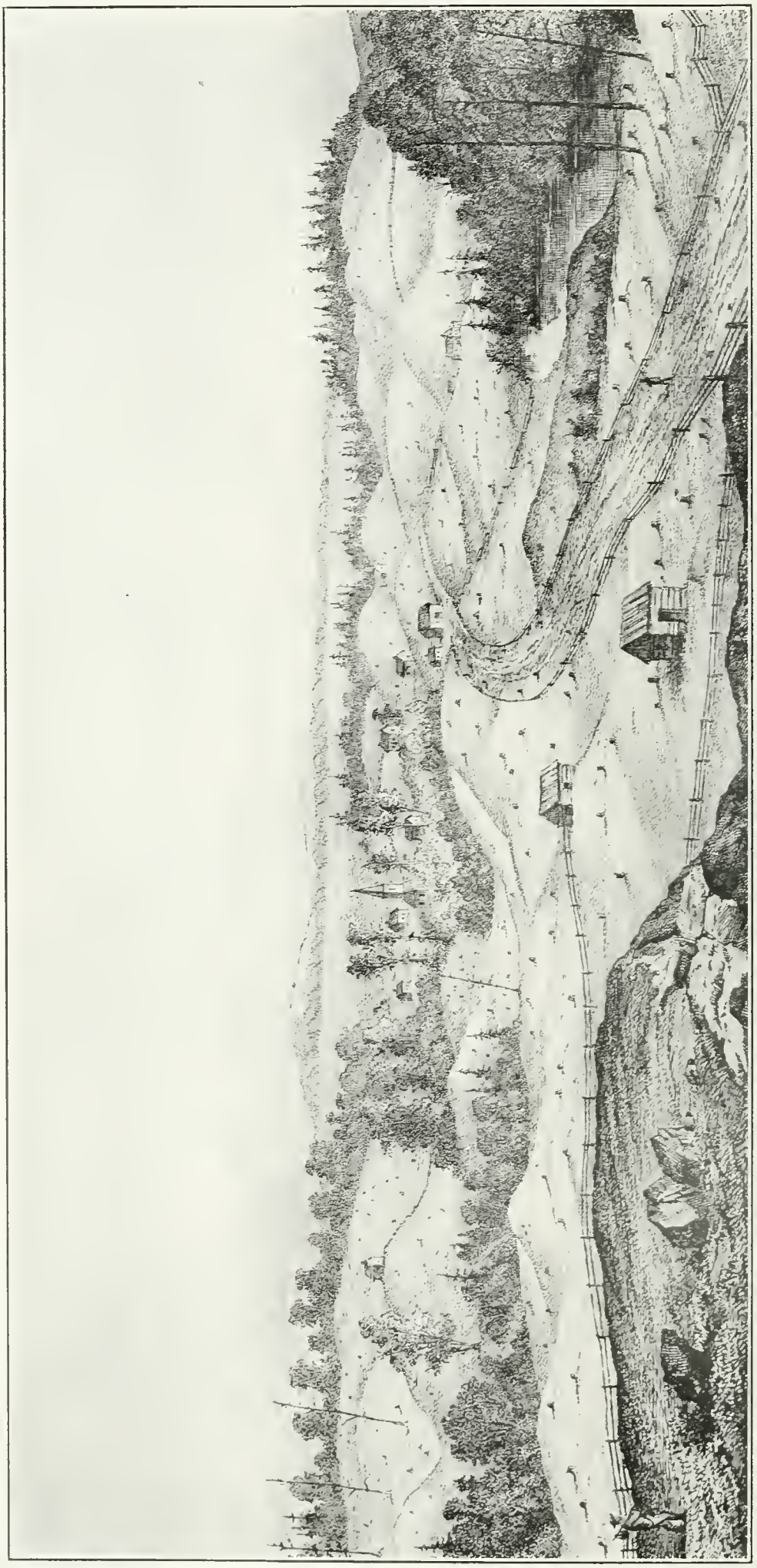


Fig. 18.—Keewatin greenstone hills with Laurentian in the distance. Actinolite, township of Elzevir.

(Illustration taken from the Report of the Geological Survey of Canada, 1872-73. The title has been changed to conform with present views as to the ages of the rocks.)

THE ACTINOLITE-CLOYNE AREA*

INTRODUCTION

The Actinolite-Cloyne area occupies a belt of country thirty miles long and about eight miles wide, the map being the largest of the seven that accompany the report. It stretches in a northeasterly direction across three counties, namely, Hastings, Addington and Frontenac, and lies immediately to the east of the Madoc area. The outline of the map was determined solely by the remarkable form of the belts of Hastings conglomerate which occupy the central parts of the area. One of these belts is about twenty-two miles long and a mile wide at the widest part. The conglomerate has been referred to by the early workers, including Logan, Murray and Vennor, but no attempt has hitherto been made to connect up the isolated outcrops, a few of which were briefly alluded to by these writers. The stratigraphic significance of the conglomerate was not appreciated. References to the literature are given on preceding pages.

The Keewatin series consists of green schists which, at the northeast part of the map, pass into typical pillow lavas, Fig. 20, thus proving the igneous origin of these schists. The order of deposition of the Grenville sediments, which rest on and are younger than the Keewatin lavas, has been determined in this area as well as at Belmont

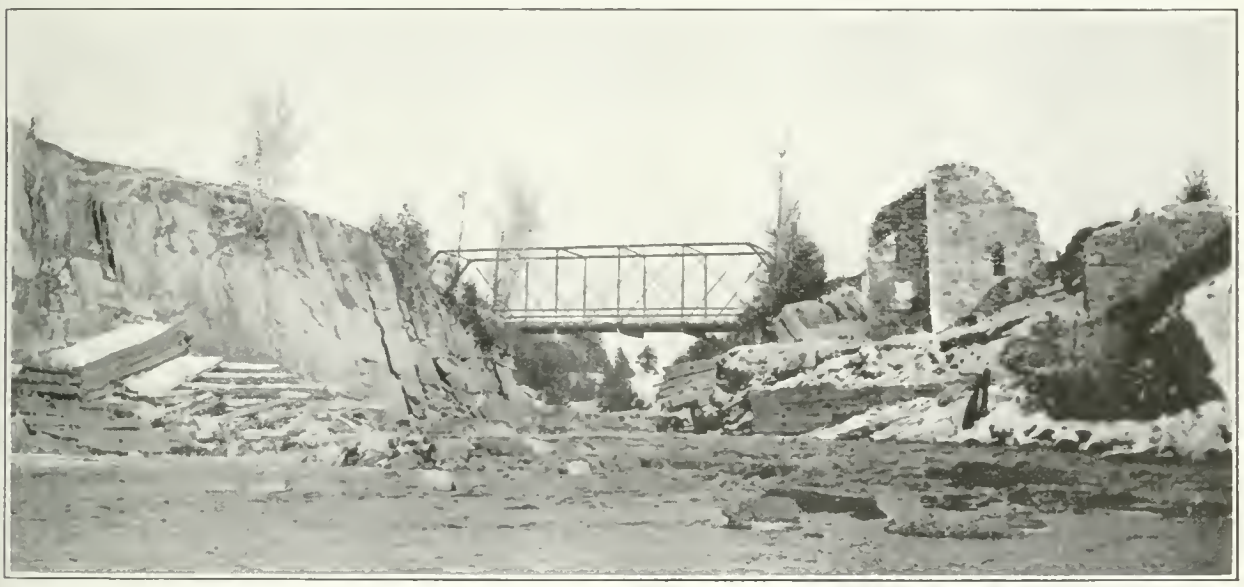


Fig. 19.—Channel of Skootamatta river through crystalline limestone at Actinolite.

lake. The basal members of these sediments consist of quartzite and greywacké, together with at times rusty schists and jaspilyte; these rocks are succeeded by limestones. The Keewatin and Grenville series were intruded by Laurentian granite and syenite, and, after a prolonged period of erosion, the Hastings conglomerate was laid down on the three older series of rocks, namely, Keewatin, Grenville and Laurentian.

It will be noted that our map shows that much of the area consists of Laurentian granites and gneisses, but it is possible that some of the rocks mapped as Laurentian may be intrusive into the Hastings conglomerate. When a granite has not been found in contact with the Hastings conglomerate it is difficult to determine its stratigraphic position.

Intruding the Keewatin, Grenville, Laurentian and Hastings are granite, pegmatite, basalt, diabase, and other rocks.

The description of the area brings out several facts that, heretofore, have not been recognized, viz.: the presence of Keewatin rocks, the order of deposition of the Grenville sediments and their relation to the Keewatin, the presence of an older granite-gneiss (Laurentian) and a younger acidic group (Moira granite), and finally the age relations of the conglomerates and other sedimentary rocks of the Hastings series.

The Paleozoic is represented in the area by Black River limestone with basal sandstone.

* The village of Actinolite was formerly known as Bridgewater.

ROCKS OF THE AREA

The rocks of the Actinolite-Cloyne area are classified by the authors as follows:

Pleistocene	
GLACIAL AND RECENT	Boulder clay, sand and gravel.
Paleozoic	
ORDOVICIAN	Black River limestone, with basal sandstone and conglomerate.
(Great unconformity.)	
Pre-Cambrian	
POST-HASTINGS INTRUSIVES	Diabase, grey felsite, Moira granite, coarse granite-pegmatite.
(Intrusive contact.)	
HASTINGS (TEMISKAMING?) SERIES	Conglomerate and quartzite, in part altered to mica-schist and gneiss.
(Unconformity.)	
LAURENTIAN	Felsite, partly altered to sericite-schist or gneiss, gneissoid granite and syenite, quartz-porphyry, feldspar-porphyry.
(Intrusive contact.)	
GRENVILLE SERIES	Non-magnesian and magnesian crystalline limestones. Iron formation (banded chert, jasper, or granular quartz). Rusty schist. Grey gneiss, quartz-mica schist, greywacké, quartzite.
KEEWATIN COMPLEX	Hornblende-schist, ellipsoidal basalt, and other rocks.

The rocks will be described, beginning with the oldest series.

THE KEEWATIN COMPLEX

The Keewatin series in the Actinolite-Cloyne area, like that at Belmont lake, consists of hornblende and chlorite schists having a green color; but other rocks occur, including ellipsoidal and amygdaloidal basalt, greyish-green, hornblende gneiss of intermediate composition, and serpentine rock. The greenstones have for the most part recrystallized, although to the northwest of Actinolite they are occasionally massive and retain what appear to be original feldspar crystals. The hornblende and chlorite schists pass by insensible gradation into pillow lavas, thus proving their igneous origin; while these lavas still retain their pillow structure, they, on the other hand, appear to have entirely recrystallized. The rocks are generally impregnated with calcite or dolomite, and along certain zones are garnetiferous.

North of the village of Cloyne, along the Addington road, and on the shores of Loon lake, which is about three miles northwest of the village and beyond the confines of the map, fine and coarse-grained hornblende schist and gneiss are exposed. On the northeast shore of Loon lake these rocks are intersected by numerous narrow dikes of felsite. Between Cloyne and the south end of Mazinaw lake, which lies two and one-half miles north of Cloyne, the greenstones gradually become grey in color and pass

into grey gneisses, having a well-banded structure in places. The banding seems to be due to original bedding; thus these rocks are more properly classed with the Grenville series, and probably represent sediments which were deposited on the surface of the pillow lavas.

At Harlowe, which lies southeast of Cloyne six miles, the greenstone series is represented by a diorite-like gneiss, or hornblende gneiss, in which are sometimes developed zones of garnets. Northwest, north and northeast of Harlowe, the rocks vary from basic to intermediate in composition, and from grey to green in color. There is also a subordinate amount of intrusive, medium-grained granite or felsite. It may be that some of these grey gneisses are altered Grenville sediments; or, on the other hand, very highly metamorphosed greenstones or acid lavas. The metamorphism could be due to the great intrusion of granite gneiss at Gull lake.

About a mile and a half south of Cloyne, near what is locally known as Bishop Corners, there is a small schoolhouse, immediately southeast and north of which are low hills, well exposed, of ellipsoidal basalt, or pillow lava, often containing considerable quantities of calcium or magnesium carbonates. Amygdules occur around the border of the ellipsoids, as is commonly the case in similar rocks elsewhere. The pillow structure, Fig. 20, is similar to that in the Keewatin basalts at Coablt or Porcupine, and may be seen, with more or less distinctness, over an area of some two square miles; but, as the more metamorphosed parts are approached, the structure gradually disappears. Some three hundred yards south of Bishop Corners the basalts are amygdaloidal, though the ellipsoidal structure is not seen. The amygdules are filled with quartz, calcite and chlorite.

At Flinton areas of green schists occur, resting in and invaded by Laurentian granite and syenite. Twelve miles southwest of Flinton, in the vicinity of Actinolite (Bridgewater), the greenstone is a calcareous, fine-to-coarse-grained hornblende schist, rarely showing ellipsoidal structure. Traces of the ellipsoids were, however, observed about two and a half miles west of the village, at a point seventy-five yards northwest of the bridge crossing Black creek. Thin sections of the hornblende schist, that occurs one mile northeast of Actinolite, show the rock to consist dominantly of green hornblende, together with clear grains of quartz and feldspar. A little magnetite and calcite occur. The hornblende sometimes has a poikilitic texture due to the presence of quartz or feldspar inclusions.

Northeast of Actinolite two or three miles, the greenstones are sometimes altered to actinolite and serpentine, which have in past years been ground and used for roofing material.

It may be that parts of the areas mapped as Keewatin include intrusions of basic igneous rocks which are later in age than the Grenville series next to be described.

THE GRENVILLE SERIES

The Grenville series in this area is divided into four groups, which are presumably of sedimentary origin, viz.: (1) Magnesian and non-magnesian crystalline limestones, (2) "Iron formation" (banded chert, jasper or granular quartz), (3) Rusty schist, (4) Grey gneiss, quartz-mica schist, greywacké, and quartzite. On the Actinolite-Cloyne map, groups (1), (2) and (4) are shown by distinctive colors, while on the large scale map showing the iron pyrites deposits near Queensboro, the rusty schist, group (3), is also separated from the other rocks by a color.* These rocks, which sometimes retain bedding planes, constitute a thick sedimentary series which rests on the Keewatin green schists.

(1) *Crystalline limestones.*—Five important areas or belts of limestone are shown on the map. The first lies in the southwestern corner of the sheet; in it are found the Henderson and Connolly talc mines. The second belt lies in the vicinity of Actinolite and has a width at its widest part, measured across the strike, of a mile and a

*Map No. 22e.

Fig. 20. Pillow lava of Keewatin age. Two miles south of the village of Cloyne, and 200 yards east of the Addington road, township of Barrie, Frontenac county.

quarter. The third is shown near the northeast part of the map, to the south of the village of Cloyne. The fourth occurs south of Harlowe post office, and the fifth southwest of Queensboro. The limestones, many of which are magnesian, vary from coarse to fine in grain and weather to various tints of brown, grey and blue. Those having brown colors are highly magnesian, and those having blue or grey colors are generally low in magnesia. At times as much as 50 per cent. of silica is present, occurring in bands and irregular vein-like areas, sometimes showing "eozoon" structure similar to that already described at Belmont lake, Fig. 4, and Madoc. The rocks on the south part of lot 1, in the third concession of Elzevir, resemble the magnesian limestone at Belmont lake. On the east part of the same lot there are present bands of actinolite or tremolite in the limestone. Sometimes the limestones have a banded structure, as may be seen immediately behind the hotel at the village of Actinolite. For the most part the banding is not marked, though it may be present in vague outlines. It is difficult to determine whether the banding is due to original bedding or to pressure.

The following results of analyses, made from different portions of the limestones, show that many of the samples are dolomitic:—

	CaO	MgO	Loss on Ignition	Insoluble	Fe_2O_3	SO_2
1	51.96	0.64	41.48	4.49	.....	.....
2	47.49	6.82	43.91	1.14	.56	.18
3	27.90	17.25	41.96	9.16	.....	.....
4	45.53	1.08	37.94	12.50	.....	.....
5	40.44	1.99	34.59	21.10	.....	.....
6	51.96	2.79	43.06	1.75	.....	.....
7	51.96	2.90	42.78	1.79	.....	.....
8	53.64	.99	42.92	2.54	.34	.34
9	29.90	19.13	45.50	3.20	.....	.....
10	30.15	17.72	45.16	2.70	.....	.....
11	29.84	19.64	44.10	3.17	.....	.....
12	30.95	18.28	43.12	4.04	.....	.....
13	50.47	2.01	42.28	4.90	.....	.....
14	30.89	20.53	43.48	1.18	.....	.....

1. Fairly coarse-grained limestone, weathering grey, but having on fresh fractured surfaces a greyish white color with a faint suggestion of very pale blue. Immediately behind the hotel at Actinolite.

2. Harrison's quarry, Actinolite.

3. Grey to brown-weathering limestone, south part of lot 1 in the third concession of Elzevir.

4. Medium-grained, grey to slate-colored limestone, one mile northeast of Actinolite.

5. Medium-grained, brown-weathering limestone, east side lot 1, in the second concession of Elzevir, beside Queensboro road.

6. Medium-grained, white limestone, Hastings quarry (formerly Ellis quarry), beside railway track one and a quarter miles south of Actinolite.

7. Same locality as number 6.

8. Same locality as number 6.

9. Brown-weathering limestone 100 yards east of Hawkins bay on the Moira river, from a prospect pit.

10. Brown-weathering limestone one-quarter mile east of Bishop Corners.

11. Grey to brown-weathering limestone, 650 yards south of Bishop Corners, on Addington road.

12. Grey limestone, one and a half miles east of Bishop Corners.

13. Bluish band of limestone, twenty feet wide, in dolomite; same locality as number 12.

14. Grey limestone, same locality as number 12.

(2) *Iron Formation.*—Between Harlowe and Bishop Corners the map shows six bands of so-called "iron formation," colored carmine; the largest has a length of a

mile and a half and a maximum width of 250 feet. It is difficult to give this rock a specific name. Thus, it might be described by different writers as coarse chert, granular quartz, or quartzite. Although much of it is too coarse in grain to be called a chert, nevertheless that term will be found convenient in describing the rock. It is usually grey in color, though sometimes having a light pink or reddish-brown tint, due to the presence of iron oxides. The rock generally has a banded or bedded structure, similar to the Keewatin iron formation, and is of the same nature as the iron formation at Belmont lake, but is lighter in color, coarser in grain, and contains only small amounts of iron oxide. Thin sections show the rock to be made up of interlocking grains of quartz, together with subordinate sericite, iron oxides and a little iron pyrites. Its appearance under the microscope resembles somewhat the quartz-mica schists or quartzite schists described under group (4) below. A chemical analysis of the rock from the larger band west of Harlowe gave the following result:—

SiO_2	87.05
Fe_2O_3	2.05
FeO	1.23
Al_2O_3	5.52
CaO	0.10
MgO	0.34
Na_2O	0.83
K_2O	1.50
CO_2	nil.
S	0.10
H_2O	1.55
Total	100.27

(3) *Rusty Schists.*—South of the village of Harlowe a few hundred feet, and east of Bishop Corners the same distance and also southwest of Queensboro, are bands of fine-grained, rusty schists a hundred yards, more or less, in width. They are similar to the rusty schists at Gilmour, chemical analyses of which show them to be of sedimentary origin, page 85. The rusty color is due to the decomposition of iron pyrites or pyrrhotite. At Harlowe these schists lie in the greenstone, the strike of the rocks coinciding. At Bishop Corners they are associated not only with the greenstones, but with the crystalline limestones, and there is evidence here to show that the rusty schists are a facies of the iron formation (banded chert), since the one passes into the other.

These rocks are of economic importance at the pyrite deposits southwest of Queensboro, where a narrow band has been mapped in detail by P. E. Hopkins. The map accompanies this report. A deposit of pyrite on the Canadian Sulphur Ore Company's property occurs near the contact of this rusty schist and an intrusive body of felsite. The rusty schist here is interbedded with quartzite and greywacké.

(4) *Greywacké, Quartzite, Grey Gneiss, Quartz-Mica Schist.*—Under this heading have been grouped, for convenience of description, several varieties of schistose and gneissoid rocks of sedimentary origin which include grey to brownish or greenish colored gneiss, quartz-mica schist, garnet schists, quartzite, schists, quartzite, greywacké, and more rarely, dark green amphibolite. The gneiss and schist are believed to have been derived by metamorphism from greywacké, quartzite and other sedimentary rocks. These rocks are all more or less calcareous or dolomitic, and they pass into each other generally by easy gradations. It is possible that parts of the lighter colored, coarser-grained, grey gneisses may be a facies of the Laurentian granite gneisses, as, for example, on lots 2 and 3 in the sixth and seventh concessions of the township of Elzevir, and again on lots 7, 8 and 9 in the twelfth and thirteenth concessions of the township of Hungerford. It is likewise possible that parts of the calcareous amphibolite are more closely related to the Keewatin greenstones than to the Grenville series.

Some of the quartzites and quartz-mica schists may be metamorphosed Hastings sediments. But, on the whole, this group has a distinctive enough appearance in the field to permit of its separation on the geological map. Moreover, pebbles of quartzite, quartz-mica schist, and grey gneiss occur in the Hastings conglomerate.

The quartzite and greywacké at the Canadian Sulphur Ore Company's property, southwest of Queensboro are well bedded, and are interbanded with the crystalline limestone. A thin section of a greywacké near this mine shows the rock to have a fragmental texture, and to consist of angular grains of quartz and feldspar set in a matrix of the same minerals. This fragmental texture is not, however, often observed under the microscope. Parts of the quartzite resemble the so-called "iron formation," described under group No. 2 above.

Thin sections, Nos. 356, 357, 358, of the quartz-mica schist, about a mile northeast of Actinolite and immediately southeast of the road, show the rock to consist largely of interlocking grains of clear quartz, often showing little or no wavy extinction.

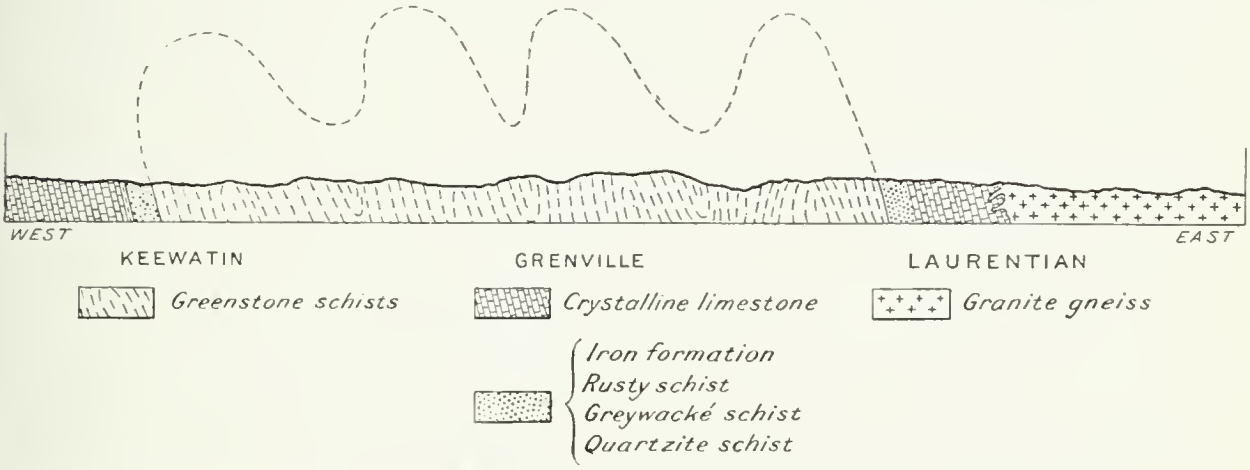


Fig. 21.—Cross-section in Elzevir township, Hastings county, showing relation between the Keewatin and Grenville series. Beginning on the west, the section passes through the property of the Canadian Sulphur Ore Company near Queensboro, and thence continues easterly to a point one mile northeast of the village of Actinolite. The Keewatin pillow lavas, now largely altered to green schists, form the nucleus or core on each side of which rest Grenville sediments, namely: quartzite, greywacké, iron formation, and, finally, at the top of the series, crystalline limestone. The Grenville sediments are closely and intricately infolded in the Keewatin lavas; erosion has left only the lower parts of one of the major folds of sediments resting on each side of the greenstone.

The felsite, intrusive into the sediments on the western part of the section, is not shown. As in the Belmont Lake area, the lower part of the crystalline limestone is high in magnesia, while the higher part is low in this constituent. The section, which is not drawn to scale, should be compared with Section A B F on the Actinolite-Cloyne map.

Brown biotite or sericite, or both of these micas, are present in varying amounts, and give the schistose texture to the rock. Magnetite and calcite also occur. A thin section, No. 355, of a quartzite schist, occurring about two hundred yards east of the abandoned railway bridge over the Skootamatta river at Actinolite, shows the rock to consist of interlocking grains of clear quartz, with subordinate sericite.

Mica schist occurs at the south edge of the Hastings conglomerate in Kaladar township, on lots 13, 14 and 15 in the second and third concessions. This schist may be a Grenville sediment, because the granite appears to be intrusive into it on lot 13 in the second concession, on the east side of Stony creek.

THE LAURENTIAN

Gneissic Granite.—The Laurentian of southeastern Ontario has been defined by the International Committee as the great masses of gneissic granite, also known as the Fundamental gneiss, which invade the Grenville series.* However, the age relations of these granite masses were not definitely determined by the Committee, and the authors believe that certain of them are younger than the Laurentian and are of Moira or post-Hastings age. The petrographic characters of the granites, which occur in the form of batholiths in Haliburton, Peterborough and Hastings counties, have been fully described by Adams and Barlow.† In mapping the Actinolite-Cloyne area a grey granite gneiss of uniform character was found in the southeast part of the area. It is classed as

* Journal of Geology, Vol. 15, 1907, pp. 191-217.
† Memoir No. 6, Geol. Survey of Canada.

Laurentian, because pebbles similar to it have been found in the overlying Hastings conglomerate and because it does not invade the latter sediment. The gneiss is exposed for many miles, commencing at the northeast end of the map and continuing southwesterly, just to the south of the village of Actinolite, thence southerly towards the town of Tweed, where it is covered by horizontally lying limestones of Paleozoic, Ordovician, age. In the area southeast of Actinolite the gneiss has a pink or pinkish-grey color, becoming dark and basic in certain areas, especially near its contact with the Grenville series.

The northwest part of the map is also extensively occupied by the gneissoid granite.

Gneissic Syenite.—About a mile and a half southwest and south of the village of Flinton there occurs an area of gneissoid syenite occupying several square miles. The syenite is clearly penetrated by dikes from the Fundamental gneissic granite on lot 20, concession 1, Kaladar township, immediately east of the cheese factory, Fig. 22. It is thus evident that the Laurentian series consists of rocks of at least two ages: (1) a younger gneissic granite, and (2) an older gneissic syenite. A similar syenite outcrops about three miles west of Bishop Corners on the prominent hill westerly from the bridge (locally known as O'Donnell's bridge) over the Skootamatta river. The relationship of this syenite to the granite is not so clear as that at Flinton, five miles to the southwest.

The gneissic granite south of Harlowe sends dikes of felsite and fine- or medium-grained granite and quartz-porphyry into the Keewatin green schists. It is therefore certain that these felsite dikes are of the same age as the gneiss, because they may be directly traced into it. In other parts of the Keewatin, however, there occur felsite and quartz-porphyry dikes, which, although they cannot be directly connected with the Laurentian gneiss, may be of the same age, since they are more or less schistose. Examples of these dikes are found, (1) about a mile northeast of Actinolite, (2) on the Addington road near the northeast corner of Kaladar township, and at other places.

Pink Felsite and Sericite Schist or Gneiss.—A fine- to medium-grained, pink felsite schist, or felsite, is found southwest of Actinolite. It is evident that this rock is Laurentian in age, because pebbles of it occur in the Hastings conglomerate. West of Hawkins bay it is about one and a quarter miles in width, measured across the strike. As the rock is traced to the northeast towards Actinolite the band becomes gradually narrower, until at the Queensboro road it is about 250 feet wide; it rapidly pinches out seven hundred yards farther east. At times the rock is more or less massive, but often it is altered to a sericite schist, showing glistening flakes of sericite. Under the microscope several thin sections, Nos. 371 to 375 inclusive, show the rock to consist of quartz, feldspar, sericite and small amounts of calcite.

An old stone mill, originally a grist-mill, stands near the bridge crossing the Moira river at the point where it leaves Moira lake. Several hundred yards northeast of the mill the felsite schist has been crushed, forming an autoclastic conglomerate.

A composite sample of the felsite schist, consisting of thirteen chips taken at various points for two miles along the strike, gave the following results on analysis:—

	Per cent.
SiO_2	71.24
FeO, Fe_2O_3	4.80
Al_2O_3	15.38
CaO	0.49
MgO	0.44
Na_2O	2.68
K_2O	4.10
H_2O	1.06
Total	100.19

The silica content of three other samples of the schist was found to be 72.4, 68.34 and 72.37 per cent., respectively.

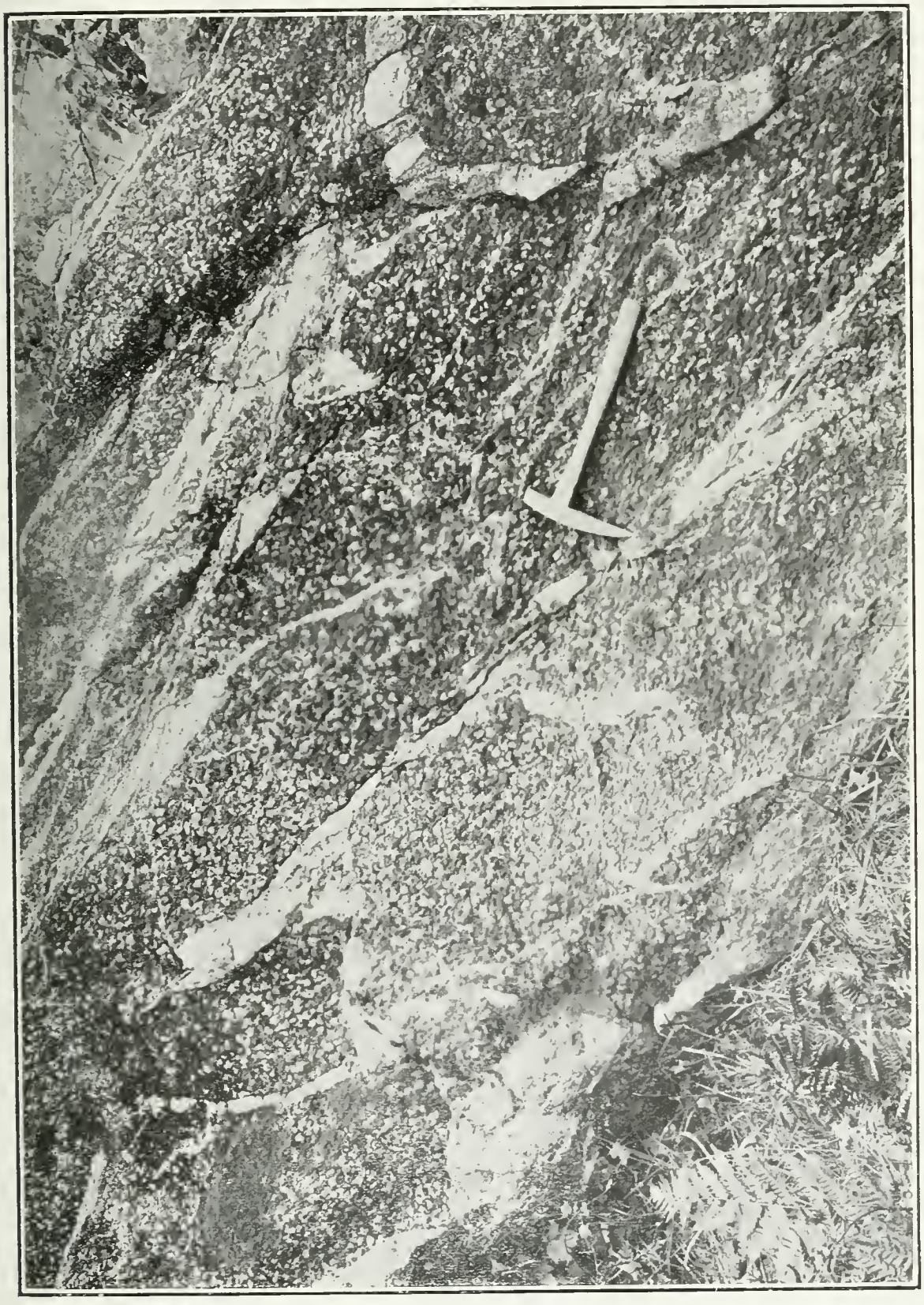


Fig. 22. Syenite intruded by granite dikes from Laurentian granite-gneiss. Lot 20, concession 1, Kaladar township, Addington county.

Granite.—West of O'Donnell's bridge, referred to above, is exposed for three-quarters of a mile a medium-grained, pink granite. The rock holds large masses many feet in diameter of the syenite, and these inclusions are intersected in an intricate manner by dikes from the granite. This medium-grained granite has not been found in contact with the Hastings conglomerate, hence its relative age, whether pre-Hastings or post-Hastings, is not known. A few hundred yards west of the village of Flinton medium-grained granite dikes invade the Laurentian gneiss, and they also penetrate the syenite to the southwest of Flinton. Similar dikes are also seen at the schoolhouse at Actinolite invading the Fundamental gneiss. The age of these dike rocks is not definitely known.

It is probable that the areas mapped as Laurentian may contain masses of granite, or granite gneiss, which are younger than the Hastings conglomerate.

THE HASTINGS SERIES

The map of the Actinolite-Cloyne area shows the distribution of the Hastings sediments, which consist of conglomerate, Fig. 23, quartzite, mica-schist, slate and gneiss, but in which limestones are not known to occur. About a dozen belts or exposures, extending in a northeasterly and southwesterly direction, have been mapped. The largest of these is about twenty-two miles long, with a maximum width, measured across the strike, of about a mile; other lenses are smaller, being patches a few hundred feet in length. It is probable that all of these outcrops, since they are alike in lithological character and in the extent of their metamorphism, form part of what was once a continuous series, the thickness of which there is no means of approximating. The sediments, like almost all the pre-Cambrian rocks in southeastern Ontario, have been subjected to pressure exerted in a northwesterly-southeasterly direction, causing the matrix to become schistose, and the pebbles to be drawn out so that at times the longer diameters are several times the shorter. The contact of the conglomerates and other Hastings sediments with adjacent rocks is more or less vertical, coinciding with the dip of the schists.

The conglomerate has a grey or pink color, due to the fact that the major part of the rock is made up of pebbles of coarse chert and quartzite, derived from the "iron formation" and quartzite of the Grenville series. While these constitute the main mass of the rock, the following pebbles also occur: granite, granite gneiss, quartz and feldspar-porphyry, green schist, felsite, white quartz, black chert (jeweller's touchstone), red jasper and crystalline limestone. Although the number of pebbles of granite and other igneous rocks is subordinate compared with the quartzite and chert, they are, nevertheless, of profound significance, denoting, as they do, the existence of a great unconformity between the granites, greenstones, and other rocks, and the conglomerates. The character of this unconformity is dealt with on following pages, under the heading "Relationships."

Much of the conglomerate and other sediments are now represented by sericite or biotite schist, and gneiss, in which few pebbles can be detected. Quartzite is a common rock in the Hastings series. The members of the series pass gradually one into another. Original bedding in the sediments is seldom seen. Thus, it is not possible to estimate the thickness of this fragmental series. Many exposures occur at various places which will be mentioned in the discussion of the relationships of the series to other rocks.

POST-HASTINGS INTRUSIVES

These intrusives consist of diabase, grey felsite, Moira granite and coarse granite-pegmatite.

A diabase dike is shown on the map two and a quarter miles west of Actinolite, and about 300 yards south of the main road. It is from 50 to 200 feet wide, of medium grain, dark in color, and sometimes weathers rusty. Under the microscope it is seen to consist of hornblende, plagioclase and iron oxides. The feldspar, which is fresh, occurs in irregular rods set in the hornblende, producing the ophitic texture.

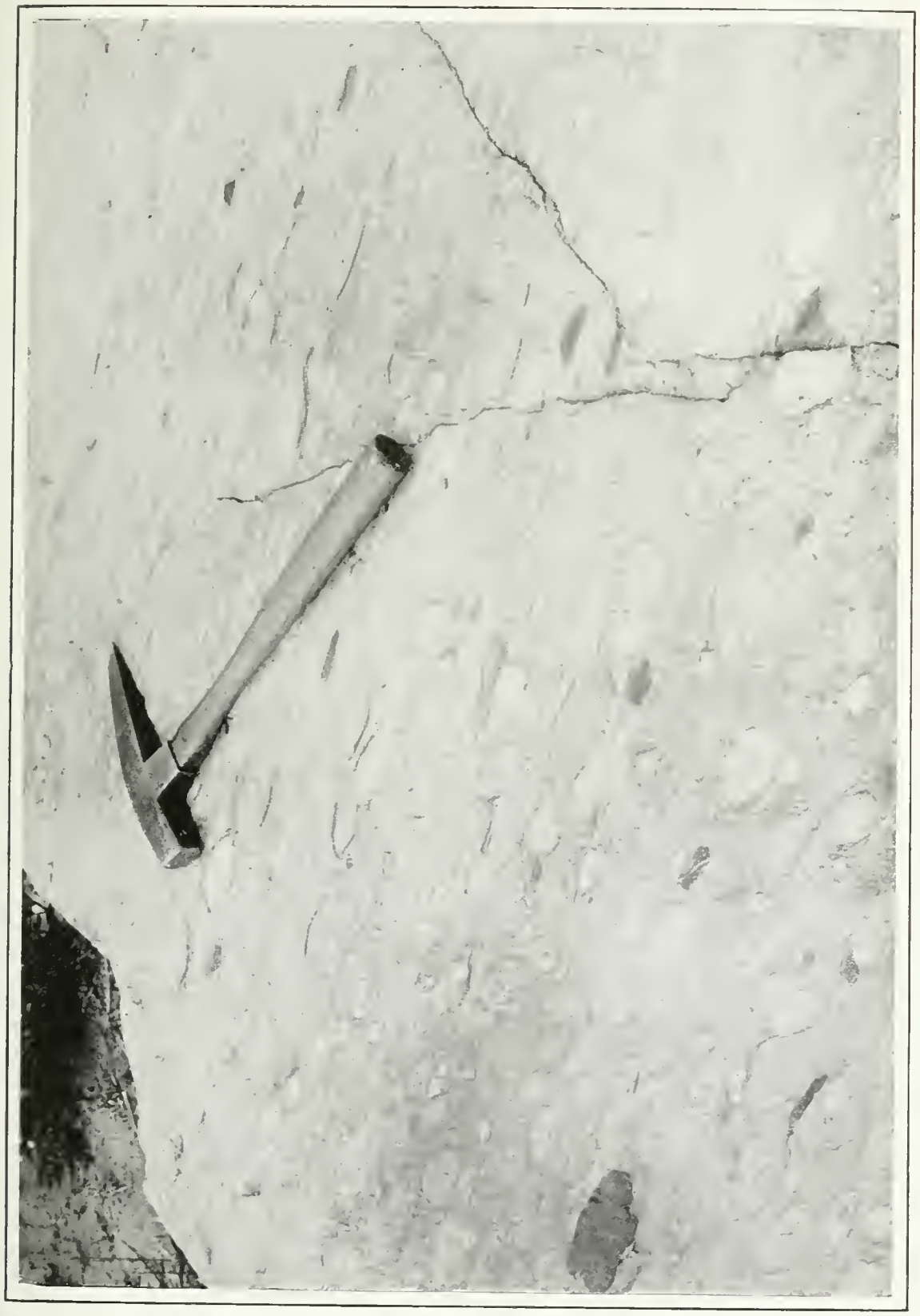


Fig. 23. Hastings conglomerate. Golden Fleece mine, Kaladar township, Addington county.

Dikes of altered diabase also occur at the pyrite mines southwest of the village of Queensboro, on the property of the Canadian Sulphur Ore Company.

An intrusion of a massive, fine-grained, grey felsite occurs at the property mentioned in the preceding paragraph. Thin sections examined under the microscope show the rock to consist of tiny phenocrysts of feldspar set in a fine-grained matrix of quartz or feldspar. In places the rock is brecciated, and in others schistose.

The Moira granite, named after Moira lake, is well exposed on the south and east end of the lake. The rock also occurs in the Madoc area. It is a massive, pink rock, and where it has been subjected to pressure shows slickensides. It is sometimes schistose or gneissoid, and contains in places iron oxides. Under the microscope it is seen to consist of quartz and feldspar, much of the latter showing albite twinning lamellæ. Some scattered grains of calcite or dolomite are present.

Dikes, or other intrusions, of coarse granite-pegmatite are of common occurrence.

Relationships

Relation of Keewatin to Grenville.—The Grenville series of this area has already been shown to consist of four members: (1) Crystalline limestone; (2) "iron formation"; (3) rusty schist; (4) grey gneiss, schist, quartzite and greywacké. This very ancient series of sediments is so disturbed and metamorphosed that original sedimentary textures have been largely obliterated. The grey gneisses or schists, as mapped, may include igneous rocks in the form of dikes, sills, or interbedded lava flows, but owing to the general metamorphism none have been recognized; nor has the presence of tuffs been proved.

The question regarding the basement upon which the Grenville sediments were laid down may now be dealt with.

The structural relationship between the Grenville and Keewatin is shown by cross-section A B F, lying about a mile and a quarter west of Actinolite. The greenstone schists form a nucleus, or core, on each flank of which occur quartzite, greywacké, gneiss, schists and crystalline limestone of the Grenville series. At the northwest end of the section, near Queensboro, the succession in descending order is as follows: (1) crystalline limestone with minor beds of greywacké; (2) greywacké, rusty schist and quartzite; (3) Keewatin greenstone schist. At the southeast end of the section the succession is about the same, but the quartzite and greywacké are altered to schist and gneiss, and in addition there are present lenses of younger, infolded, Hastings conglomerate. Thus it is seen that there rest directly on the greenstone nucleus quartzite and greywacké, and that this type of sediment is followed by crystalline limestone. Contacts of the greenstone schists and sediments may be seen at both ends of the cross-section, and east and west of the village of Actinolite for two or three miles. About a mile northeast of the village, at the side of the Flinton road, the Keewatin green schist passes into a quartz-mica schist of the Grenville series in a few feet. In fact it may be said that this transitional type of contact is characteristic of all the known exposures between the two series. Fig. 21, page 45.

Let us now consider the age relationship between the greenstone nucleus and the sediments on each side of it. In the first place it is clear that the greenstone is not a deep-seated intrusive, or batholith, invading the Grenville sediments. It is a volcanic or surface rock, retaining in places an ellipsoidal or pillow structure, and a fine or medium-grained texture. The ellipsoidal structure shows that the green schists, probably, were originally submarine lava flows. In the second place, the greenstone does not send dikes into the sediments, nor give other evidence of being intrusive into these rocks. It is thus inferred that the quartzite, greywacké, and limestone are younger than the pillow lavas.

There is no evidence, such, for example, as the presence of greenstone fragments in the quartzite, to show that the greenstones in this particular area were eroded before

the deposition of the quartzite and other Grenville sediments. It is probable that the sediments were deposited directly on the surface of the submarine, Keewatin lava flows.

At Bishop Corners, 21 miles northeast of Actinolite, basic lavas of the Keewatin series, showing ellipsoidal structure and amygdaloidal texture, have already been described. The ellipsoids are remarkably well preserved, Fig. 20, although the rock seems to be altered to secondary minerals, including hornblende and other varieties. Magnesian limestone, rusty schist, iron formation and greywacké or its schistose representative are all exposed between Bishop Corners and Cloyne, two and a half miles to the north. These sediments lie east of the Addington road and rest on the ellipsoidal lava. The greywacké, rusty schist and "iron formation," which are, however, not shown by a separate color on this part of the map, occur between the lava and the limestone, suggesting that they were first deposited and were followed by the limestone. This succession is similar to that on section line A B F described above.

Relation of Laurentian series to Keewatin and Grenville.—The Laurentian granite and syenite are intrusive into the Keewatin and Grenville series. The intrusive character of the Laurentian may be seen at various localities in the Actinolite-Cloyne area. South of Harlowe post office, for instance, on lot 30 in the second concession of Kennebec township, the contact of the gneissoid granite and Keewatin greenstone is exposed a few hundred yards south of the road. Here the granite sends long tongues or dikes into the greenstone, parallel to the schistosity of the latter, producing a banded structure in the rocks not unlike that commonly found in the Laurentian gneiss in various other parts of Ontario. A few of these parallel tongues, or dikes, of granite are first met with in the greenstone; as the granite mass is approached the dikes become more numerous, and, when finally the granite is entered, long lenses or bands of the greenstone are found enclosed in the granite.

A little west of here, at the northeast corner of Kaladar township and at the roadside, the granite magma, in place of sending parallel dikes into the green schist, has, on the other hand, partly dissolved the latter; half digested fragments still remain in the granite. The banded structure has not been produced.

One of the best localities in which to observe the banding caused by the intrusion of granite into the Keewatin-Grenville complex is at Mazinaw lake, which lies two and a half miles north of Cloyne and beyond the confines of the map. The lake, which is narrow and about nine miles long, is one of the most beautiful in southeastern Ontario. Near the middle of the lake, on the east shore, there is a perpendicular cliff rising some 200 feet or more above the water. On the face of the cliff the Laurentian gneissoid-granite holds many long lenses of dark-colored gneiss which vary from a foot to 100 feet in width. The latter may be either metamorphosed Grenville sediments or Keewatin greenstones. The rocks dip steeply to the southeast, but, as the north end of the lake is approached, the dip becomes more gentle. It would appear that the granite was forced, in the form of sills or dikes, between the schistose layers of the dark-colored gneiss.

Contacts of the gneissoid granite and greenstone may also be seen two or three miles west of Cloyne, along the east side of the Skootamatta river, where the granite penetrates the greenstone and holds fragments of it.

The intrusive contact is particularly well exposed about three miles northeast of Actinolite. Here the gneiss contains immense blocks of the Keewatin greenstone.

At the marble schoolhouse of Actinolite, the granite sends dark-colored dikes into the crystalline limestone of the Grenville series. It may also be observed here that the Fundamental gneiss is cut by medium-grained granite dikes, and that these are intersected again by coarse granite-pegmatite dikes. Thus, at Actinolite four distinct groups of igneous rocks, differing in age, are recognized. These are in descending order: (1) coarse granite-pegmatite dikes; (2) medium-grained granite dikes; (3) gneissoid granite or Fundamental gneiss of the Laurentian series; (4) Keewatin greenstone.

West of Actinolite, about a mile and a quarter, and immediately east of the Queensboro road, on lot 1 in the third concession of Elzevir, a dike from the pink felsite schist, described under the Laurentian series, penetrates the grey gneiss of the Grenville series.

The syenite of Flinton invades the greenstones. This may be seen about one and a half miles south of the village, near the Skootamatta river.

Relation of Hastings conglomerate to Keewatin, Grenville and Laurentian series.— In the Actinolite-Cloyne area, the Hastings fragmental series, consisting of conglomerate, quartzite and other rocks, has been found to rest unconformably on each of the following, viz.: (1) greenstones and green schists of the Keewatin series; (2) crystalline limestone, grey gneiss and iron formation of the Grenville series; (3) gneissoid granite of the Laurentian series. The conglomerate, which holds pebbles of all of these rocks, rests on the older series in the form of long, closely infolded belts or lenses, the contacts being about vertical. It will be convenient to describe these conglomerate lenses and their contacts with adjacent rocks by beginning first at the southwest corner of the map and then following the rocks for 30 miles to the northeast.

The first belt is met with on lots 2 and 3 in the eighth, ninth, tenth and eleventh concessions of Madoc township, through which the main road between Madoc and Actinolite runs.* The belt is two and a quarter miles long and about one-quarter of a mile wide at its widest point. At the west end it disappears under a covering of heavy drift, while at the east end it thins out to a point. On the south part of lot 3 in the ninth concession, along the banks of a creek which has exposed the rocks to view, the schistose conglomerate may be seen in contact with a small area of dolomitic limestone of the Grenville series. The conglomerate holds, besides other fragments, elongated pebbles of the limestone, proving the unconformity between the two rocks. One of the limestone pebbles has two veinlets of quartz cutting it, but the quartz does not cut the conglomerate; the veinlets were, therefore, probably formed in the limestone before the latter was eroded. There may be a fault at the contact of the two rocks. About half a mile east of here, at the cross-road between the ninth and tenth concessions, lots 2 and 3, a good exposure of the conglomerate is to be seen, Fig. 24. Besides pebbles of limestone, several other varieties may be recognized, including quartz-porphyry, fine-grained pink felsite, granite, red chert or jasper, coarse granular quartz, and mica schist or gneiss. A few hundred yards to the northeast of this cross-road, near the southwest corner of lot 3 in the tenth concession, the schistose greenstone and conglomerate may be seen in contact for a few feet, but the metamorphosed character of the junction does not throw light on the relationships.

Southeast of the cross-road about three-quarters of a mile, on the road to the village of Tweed, two lenses of conglomerate occur, one on each side of the road. That on the east side is made up largely of chert fragments, some of them jasper-like in appearance. About one mile farther south the road crosses the Moira river, parallel to which and at a distance of 100 yards, there is a narrow lens of much disturbed conglomerate about one mile long. The pebbles are mainly a pink or grey quartzite and chert and the lens rests in a schist or gneiss of the Grenville series. Much of this conglomerate, however, has altered to a mica-schist in which the occurrence of pebbles is rare, making the line of contact between the two rocks, i.e., Grenville schist and Hastings conglomerate, more or less indistinct. The map shows two small conglomerate lenses, about two hundred

* Many years ago H. G. Vennor described this conglomerate and pointed out the presence of limestone pebbles. (Geological Survey of Canada. Report of Progress, 1866-69, page 157). Vennor says: "At the village of Bridgewater [now Actinolite] conglomerate layers abound in a band of mica-schist 120 feet thick, having a streaked surface from the alternation of grayish and reddish layers. The enclosed pebbles are of red and white quartz, occurring in parallel beds, from two inches to five feet in thickness, which are separated by mica-schist layers holding only a few scattered pebbles. Westward from this a similar band of conglomerate is seen on the north side of the road leading from Bridgewater to Madoc, ... which appears to me to be a continuation of that of Bridgewater. Here, however, it is associated with one of the coarser conglomerate bands rising in large rounded ridges from the field. The matrix appears to be chiefly a black silicious slate, and it is more or less charged with well-rounded fragments of quartz and syenite. Adjoining this, but below it, there occurs a conglomerate with a schistose dolomitic matrix, the pebbles themselves sometimes being of dolomite, interstratified with similar black silicious slates."

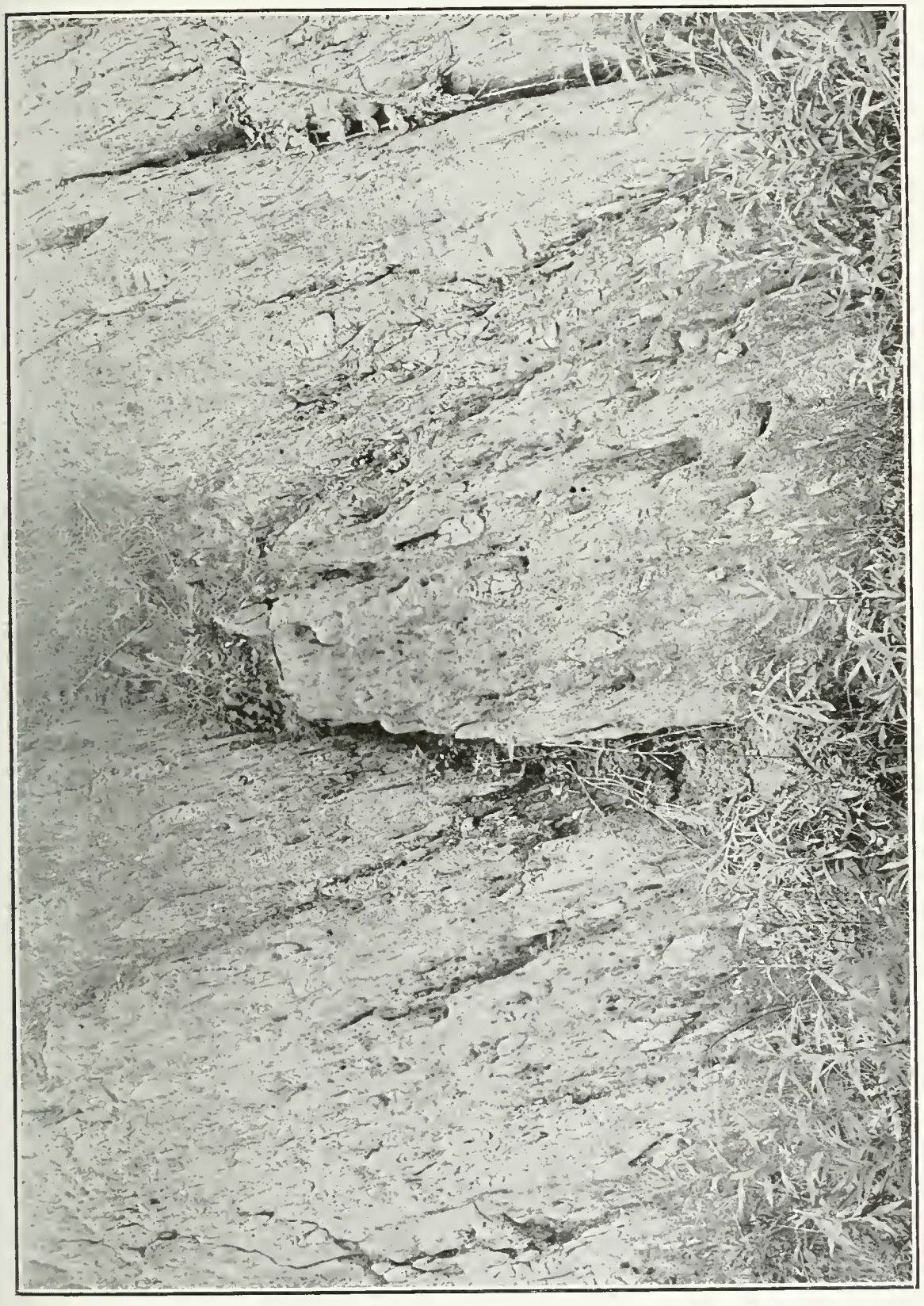


Fig 24. Hastings conglomerate holding pebbles of crystalline limestone. Northeast corner of lot 2, concession 9, Madoc township. astings county. This conglomerate was described by Vennor in the Report of the Geological Survey of Canada for 1866-69.

yards long, lying adjacent to the last mentioned lens; the one which is farthest from the road contains a few grey, granite-gneiss pebbles, one of them about a foot long. A thin section, No. 369, of the latter shows the pebble to be a biotite granite consisting of quartz, feldspar, some of which shows albite twinning lamellæ, and biotite; it has been crushed, resulting in rims of crushed feldspar surrounding parent grains. This lens of conglomerate is easily reached by an old road which runs along the northwest bank of the Moira river.

A few hundred yards west of the village of Actinolite, the second lens of conglomerate and quartzite is exposed. It has a maximum width of a quarter of a mile and may be followed for two and a quarter miles to the west. At the southern edge, about 200 yards east of Black creek, the conglomerate holds several pebbles of granite. A thin section of one of these showed the pebble to be made up of quartz, feldspar and brown mica. The conglomerate is enclosed in a schist or gneiss of the Grenville series. The contact of the two rocks may be seen on the north and south sides of the belt at several points. There is a gradual transition between the two rocks, the transitional part being several feet or more wide; because of this transition the unconformity between the two series cannot be directly proved, and the line of contact shown on the map is arbitrary. There is indirect evidence, however, that an unconformity exists. This consists in the fact that the pink felsite, shown on the map to occur in the form of a long tongue lying south of the conglomerate a few hundred feet, sends a dike into the Grenville schist, proving that the schist is older than the felsite. A few pebbles of the felsite occur in the conglomerate, showing further that both the felsite and the schist are older than the Hastings conglomerate. The felsite dike referred to occurs on lot 1 in the third concession of Elzevir, about 100 feet east of the Queensboro road; this dike has already been mentioned on page 52. The majority of the pebbles in the conglomerate, near this road, consist of pink and grey colored chert or quartzite, often showing fine banding similar to that in the Grenville iron formation. The percentage of silica, determined in fourteen samples of these pink and grey cherts, is as follows:

No.	Per cent.
1	94.23
2	93.98
3	90.06
4	95.22
5	94.26
6	93.86
7	94.73
8	86.24
9	92.26
10	85.12
11	80.74
12	87.96
13	87.40
14	89.60

The longest and most important belt of conglomerate is first exposed about three miles east of Actinolite. It is about 22 miles long and a mile wide at its widest point. West of the postoffice of Northbrook, in the north part of Kaladar township, Addington county, it divides into two arms which continue northeasterly until they finally pinch out south of Gull lake in the extreme northeast, beyond the confines of the map. The conglomerate rests successively upon rocks of Keewatin, Grenville and Laurentian age, and may be seen in actual contact with them at several places. Contacts of Keewatin green schists and Hastings conglomerate occur at the following points: (1) South of Harlowe postoffice, on lot 31 in the second concession of Kennebec, the conglomerate lies sharply against calcareous greenstone schist. Pebbles of the green schist were not observed in the conglomerate. (2) About a mile and a half north of the postoffice of Northbrook, the Addington road takes a sharp bend to the northeast. Here, on the west side of the road, the conglomerate passes gradually into the greenstone in a few yards.

(3) At the Golden Fleece mine, about a mile and a half northeast of Flinton the Hastings sediments are in contact with the green schists.* The contact zone has, however, been disturbed and impregnated with quartz and other minerals. Hence not much light is here thrown on the relative ages of the two series. Fine examples of conglomerate occur on the property, Fig. 23.

The long conglomerate lens or belt, referred to in the preceding paragraph, lies almost wholly in Laurentian gneissoid granite and syenite between the village of Actinolite and Flinton. Contacts between the conglomerate and other rocks occupy, for the most part, drift-covered valleys or other depressions, and are therefore difficult to find, but on lot 9 in the first concession of Kaladar township, near Stony creek, the two series are exposed in such a manner that their relations seem clear. The gnessoid granite at the contact becomes more distinctly gneissoid or schistose, and gradually, in a distance of a few yards, pebbles of coarse grey quartzite or chert appear. There appears to be no evidence that the granite gneiss is in igneous contact with the conglomerate.

Pebbles of gneissoid granite, similar to the Laurentian gneiss, are not of common occurrence in the Hastings conglomerate, but many of them may be seen about four miles easterly from Actinolite on lots 2 and 3 in the ninth concession of Elzevir township. These pebbles have been drawn out by pressure.

The granite gneiss is also in contact with the conglomerate northeast of Northbrook postoffice, on lot 31 in the ninth concession of Kaladar township. The nature of the contact is similar to that near Stony creek, just described, i.e., there is a gradual transition between the conglomerate and gneiss. The latter gradually gives place to a rock containing pebbles of coarse quartzite or chert. The prominent hill of conglomerate on this lot contains a few pebbles of quartz-porphyry and granite, but it may be noted, that, as usual, chert and quartzite pebbles constitute the dominant part of the sediment. There is no evidence that the granite is intrusive into the conglomerate, but, on the other hand, this same granite invades the Keewatin greenstone about a mile to the east of the lot last mentioned. The intrusive contact has been described on page 51.

The characteristics of the banded, grey chert of the "iron formation" have been discussed on page 44. Contacts of this formation and the long lens of Hastings conglomerate, described in preceding paragraphs, occur at the following points: (1) At the Ore Chimney mine, three miles southeast of Cloyne, good exposures of both rocks are found. The conglomerate is made up almost wholly of pebbles which are exactly similar to the chert. The actual contact may be seen at the mine, where the conglomerate lies against the bevelled and eroded edges of the banded chert. This is probably one of the clearest cases of an unconformity in the pre-Cambrian yet discovered in southeastern Ontario. (2) Easterly from here, and about a mile west of Harlowe postoffice, the banded chert is also well exposed. The conglomerate lens, which is 600 yards wide,

* Mr. H. G. Vennor examined the conglomerates in the vicinity of Flinton in the year 1872 (Report Geol. Survey of Canada, 1872-73, pp. 150-1), Vennor says: "The diorites, green slates, schists and conglomerates are particularly well developed around the village of Flinton, situated on the twenty-first and twenty-second lots of the third and fourth concessions of Kaladar. Here, much of the rock is a light green slate, graduating into a finely speckled hornblendic schist impregnated with reddish brown garnets. A short distance beyond this village, on the road leading to the Addington road, the first conglomerate is met with. In it the pebbles, which are of quartzite, are enclosed in a matrix of sand and mica, or micaceous quartzite, and are clearly seen to be flattened out, and elongated along the plane of bedding. They are mostly small, or would appear to be so from an inspection of the mere worn surface of the rock; but, on fracture, the pebbles, which on the surface shew only perhaps a cross measurement of say from a-half to one inch, are found to have a length of from five to ten inches, the length being generally proportional to the thickness. They are easily removed from the matrix, and a number were found lying loose in the soil, near the outcrop of the band. In some localities the character of this conglomerate changes in a most marked manner. Instead of interstratified layers of pebbles, we have alternate layers of vitreous quartz or quartzite and glistening mica schist, with here and there something like an enclosed pebble; and again—on the course of the same outcrop—we find these layers of quartz or quartzite pinched out into lenticular or eye-shaped forms, and entirely surrounded by mica schist. Still higher in the series, and about 60 chains farther along the Flinton road, a second conglomerate is met with of a coarser description. In it, the pebbles, which are much larger, and of different shades of color, are enclosed in a greyish and greenish hornblende schist. This is separated from the first by green slates and greyish hornblende schists with garnets, and similar rocks again overlie it. . . . . Northeastward from Flinton village, similar green schists, with an interstratified conglomerate, cross the Addington road a short distance above the Kaladar postoffice [now Northbrook postoffice], namely on lots thirty and thirty-one in the seventh, and thirty-one and thirty-two in the eighth concessions. They here follow the general course of the road, and form a high ridge along its western side up to the boundary line of Anglesea and Barrie"

rests upon and against the chert. Pebbles of the latter form the dominant part of the conglomerate. The contact of the chert and conglomerate may be followed for several hundred yards. The evidence here appears to the writers to be sufficient to warrant the statement that an unconformity exists between the banded quartzite or chert and the Hastings conglomerate. Interbedded with the conglomerate is quartzite similar in character to that from which the pebbles in the conglomerate were derived, thus producing in certain outcrops a somewhat puzzling structure.

Another lens of conglomerate, resting in Keewatin greenstone, is exposed at Bishop Corners. A good contact with the greenstone schist occurs half a mile southwest of the corners immediately to the north of what is locally known as the "river road," which crosses the Addington road at right angles. The base of the conglomerate is exposed for several feet, and holds pebbles of greenstone schist which are similar to the adjacent Keewatin schist, proving the unconformity between the two series. Three-quarters of a mile north of here, along the same contact, the conglomerate is again exposed where it crosses the Addington road. The base for several feet consists of a conglomerate schist containing pebbles of white quartz about an inch in diameter; this passes into a very fine-grained, grey schist or slate. About 300 yards farther north, on the east side of Addington road, the conglomerate lies against a fine exposure of ellipsoidal basalt; the contact between the two is vertical and sharp.*

Conglomerate Southeast of the Actinolite-Cloyne Area

During the course of our work many areas, beyond the boundaries of the maps accompanying the report, have been examined. One of these areas consists of prominent ridges locally known as the "Bald Mountains," because of the scant vegetation which they support. These hills stretch in a northeast-southwest direction for some fifteen or twenty miles and lie between the southeast boundary of the Actinolite-Cloyne area and the Canadian Pacific railway, partly in the southern portion of Kaladar township, Addington county. The Addington road, which crosses the railway at Kaladar station, 148 miles east of Toronto, runs in a northerly direction over the ridges and thence north to the village of Cloyne and many miles beyond. The distance from Kaladar station to Cloyne by the sinuous road is about eighteen miles.

Our reconnaissance work on the Bald mountains resulted in the discovery of an important lens of Hastings conglomerate which crosses the Addington road about two and a half miles north of Kaladar station just to the north of a great beaver meadow.

The conglomerate is similar to other lenses already described in the Actinolite-Cloyne area, but is probably more metamorphosed. Owing to its being in contact with granite-gneiss it is worthy of description. It strikes in a northeast direction and dips steeply to the southeast. The rock, which is schistose and has its pebbles generally drawn out into long lenses, may best be examined about a mile to the northeast of the road. The base of the series is well exposed here, and is seen to consist almost wholly of granite-gneiss boulders and pebbles similar to the granite-gneiss mass with which it is in contact on its northwest edge. Some of the boulders are four feet long. The contact between the granite and conglomerate, which shows unconformable relations between the two rocks, is not indicated by a well-defined line, one rock passing gradually into the other within a distance of a few feet. The materials comprising the basal member of the conglomerate have been derived directly from the underlying granite basement.

In the Bald mountains the conglomerate, containing numerous fragments, passes upward into a conglomerate which contains few granite pebbles, and slowly acquires fragments of amphibolite and chert or quartzite, finally passing into a variety in which chert or quartzite pebbles compose almost the whole rock. The latter is sometimes

* R. W. Ells, about 18 years ago, made brief mention of the conglomerates to the south of Mazinaw lake and Cloyne. He says: "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 usually elongated along the lines of schistosity. They are well seen in the township of Kaladar, near the gold mine, not far from Flinton." Report Geol. Survey of Canada, Vol. IX, p. 58 A.

interbedded with schistose quartzite. The fragmental series along this cross-section is 1,500 feet or more in thickness. Beyond this, to the southeast, the sediments are followed by pink gneisses, various schistose rocks and crystalline limestone.

All of these rocks, namely: granite gneiss, conglomerate, pink gneiss, schists and crystalline limestone, are intruded by dikes and bosses of massive granite sometimes several hundred feet in diameter.

Other Conglomerate Areas

A small patch of conglomerate, less than 400 feet long, occurs about one and a half miles south of Bishop Corners, at the extreme southeast corner of the township of Anglesea. This small patch is shown on the map. Dikes of quartz-porphyry cut across the strike of the Keewatin schists. The dikes are sheared and altered to sericite schist which, nevertheless, still retains "eyes" of quartz representing original phenocrysts. A lens of grey chert of the Grenville series rests in the schist. The conglomerate is in contact with and holds pebbles of the chert. The conglomerate also contains several long flat pebbles of soft sericite schist which probably represent altered pebbles of the quartz-porphyry.

Three-quarters of a mile east of Flinton the contact of another lens of conglomerate and green schist is exposed immediately north of the main road. The junction between the two rocks is abrupt. This lens, which continues six miles to the northeast, is parallel to the main conglomerate belt already described. At a point about a mile and a half west of Northbrook postoffice it contains, at its western edge, several pebbles of massive granite three or four inches in diameter. The lens continues as far as the Addington road at the southeast corner of the township of Anglesea, where, at an abrupt turn in this road, the base of the conglomerate is exposed for several feet resting on the green schists. This is seen immediately west of the road on a low knoll. The basal member of the conglomerate is composed largely of fragments of the underlying green schists. On the east side of the road, at a distance of about 300 yards, in the field, a fine outcrop of conglomerate occurs, containing, besides other fragments, numerous pebbles of quartz-porphyry.

Immediately south of Harlowe postoffice, the rusty schists and coarse-grained greenstone schists are intruded by quartz-porphyry dikes. Numerous pebbles of quartz-porphyry occur in the conglomerate southeast of this postoffice, on lots 19 and 20 in the first concession of Barrie, which is evidence to show that not only the porphyry but also the rusty schist and greenstone schist are older than the conglomerate.

Relation of post-Hastings intrusives to Keewatin, Grenville, Laurentian and Hastings series.—The intrusives have already been shown to consist of (1) diabase, (2) grey felsite, (3) Moira granite, (4) coarse granite-pegmatite. These rocks have not often been found in contact with the Hastings conglomerate, but, judging solely from their massive and fresh characters as compared with the schistose conglomerate, it is certain that they are younger than the Hastings sediments.

At the property of the Canadian Sulphur Ore Company, southwest of Queensboro, altered diabase dikes intersect not only the Keewatin greenstone and Grenville limestone, but also the grey felsite. A diabase dike intrudes the Grenville limestone and schist about two miles east of Madoc.

A body of grey felsite, at the property mentioned in the preceding paragraph, invades the Keewatin greenstone and the Grenville sediments.

Dikes of Moira granite intrude the Grenville schist or gneiss at the east end of Moira lake, about 75 yards west of the point where the Madoc-Tweed road crosses the Moira river. Near the northwest corner of Hungerford township, at the contact of the granite and Grenville schist, the rocks have been crushed to an autoclastic conglomerate.

Coarse-grained pegmatites occur between Actinolite and Flinton. They intersect in every direction, not only the Laurentian gneissoid granite, but also the Hastings conglomerate.

Generally speaking, it may be stated that the basic post-Hastings intrusives are younger than the acid post-Hastings intrusives.

Relation of Paleozoic to the pre-Cambrian.—Horizontal beds of Black River limestone with basal sandstone and conglomerate rest with strong unconformity upon the pre-Cambrian rocks. Areas of these Paleozoic rocks are shown on the map.

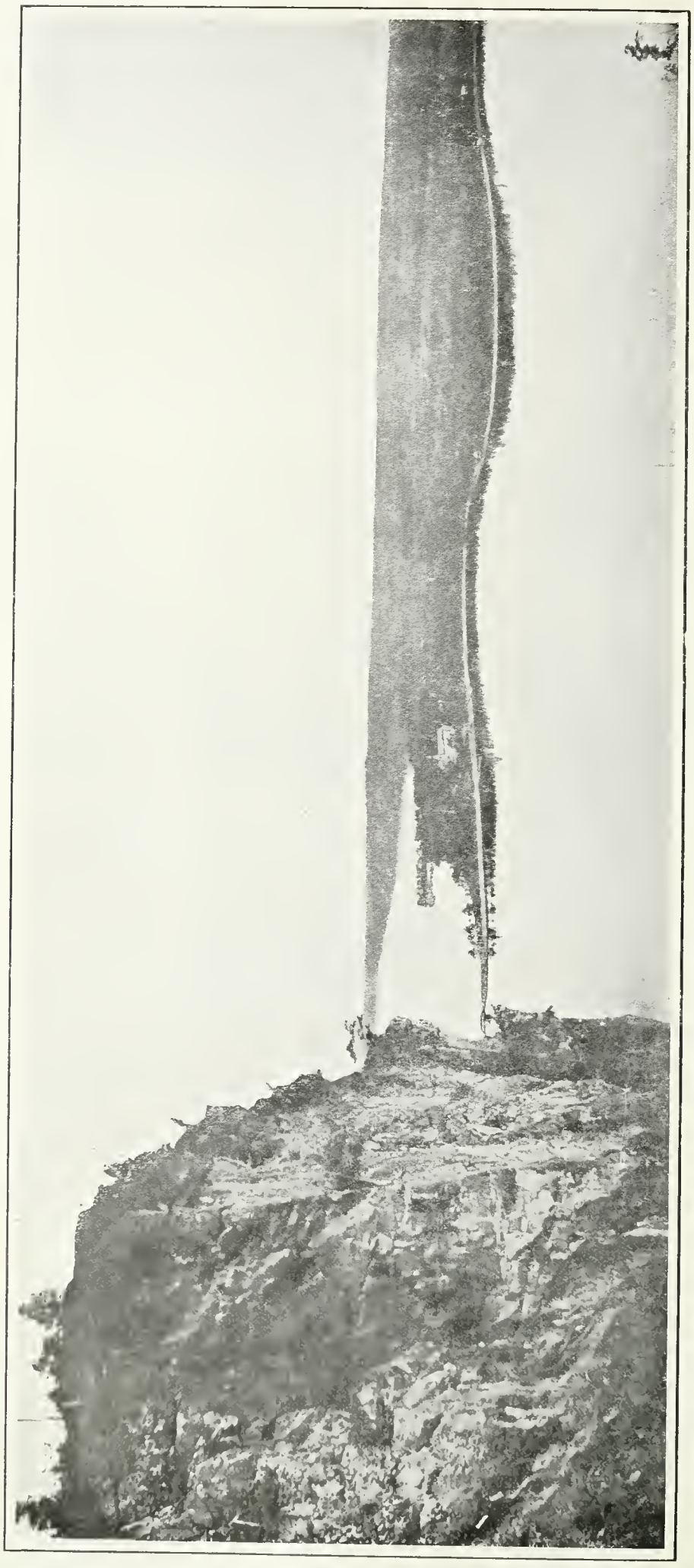


Fig. 25. Part of Mazinaw lake, township of Barrie, beyond the northeastern limits of the Actinolite-Cloyne map. On the left of the illustration are the "pictured" cliffs of granite-gneiss, and across the expanse of the lake in the foreground is Bon Echo Inn, stretching beyond which is the peneplain.

ONTARIO
DEPARTMENT OF LANDS, FORESTS & MINES
BUREAU OF MINES

MAP
OF THE
MADOC AREA

TOWNSHIPS of MADOC and HUNTINGDON. HASTINGS COUNTY
PROVINCE OF ONTARIO

To accompany Part II, Volume 22, Report of Bureau of Mines, 1913

Hon W H Hearst *Minister* Willet G Miller, *Provincial Geologist*

Scale 1/2000 or 1,000 Feet = 1 Inch

3000 Feet
Kilometre

LEGEND

PALEOZOIC

Black River limestone (Ordovician), including also drift-covered areas.

GREAT UNCONFORMITY

PRE-CAMBRIAN

Basic dikes.
Moira granite and felsite.
Slate.
Greywacke and quartzite.
Conglomerate and limestone.
Agglomerate and tuff; crush-breccia; felsite intrusions containing inclusions of schist, crystalline limestones and other rocks.
Madoc andesite and rhyolite with some agglomerate and tuff.
Blue and white crystalline limestone, essentially non-magnesian.
Brown and grey magnesian crystalline limestone.

NOTE.—*The relative ages of certain groups of rocks in this area have not been definitely determined. Hence in this legend the age relations of the pre-Cambrian rocks, one to another, are not indicated.*

SIGNS

- *House.*
- *Hill.*
- *Road or Street.*
- *Swamp.*
- *Shaft.*
- *Prospect Pit.*
- *Quarry.*
- *Strike and Dip.*
- 575 *Elevation in feet above sea level.*

SOURCES OF INFORMATION

Map of the "Madoc and Marmora Mining District" by E. Coste and J. White, 1886; with topographic additions by W. R. Rogers, 1912.

Geologically re-surveyed by Willet G. Miller *and* Cyril W. Knight, *1912.*

SECTION B D

SECTION A B C

Map No 22 d

THE MADOC AREA

INTRODUCTION

The Madoc area shown on the accompanying map, No. 22d, contains about seven square miles, occupying parts of the townships of Madoc and Huntingdon, Hastings county.

The town of Madoc, in the township of the same name, the centre of a prosperous farming community, was the site of a pioneer iron industry, a small furnace, built in 1837, being operated for eight or nine years, using wood and charcoal as fuel. The iron ore was obtained from the Seymour mine, distant about three miles north of the town. In the year 1866 the town witnessed great mining excitement, caused by the discovery of a pocket of rich gold ore at a point, afterwards known as Eldorado, about eight miles distant. There was scarcely a lot or homestead in the immediately surrounding country on which pits or shafts were not sunk. Since then iron ore, copper pyrites, gold and other minerals have been spasmodically mined in the vicinity. At the present time,

Fig. 26. International Geological Congress party at contact of limestone "conglomerate" and Madoc andesite, August, 1913.

however, the Henderson talc mine, on the outskirts of the town, and the Canadian Sulphur Ore Company's pyrite mine, which lies several miles to the northeast of Madoc, are being successfully operated.

In the reports of the Geological Survey of Canada are to be found notes and papers on the area, by Logan, Murray, Macfarlane, Coste and other writers.

THE PRE-CAMBRIAN GEOLOGY

The age relations of certain groups of pre-Cambrian rocks in the Madoc area, as explained in the legend of the geological map, have not been satisfactorily determined. From their own examination of the field, the writers could not come to a decision as to the relations. During the meeting of the Geological Congress, and at other times, while on visits to the area, they had the advantage of conferences with workers familiar with the oldest groups of rocks in various parts of the world. But certain problems still remain unsolved. Good outcrops present features that lead to different interpretations, and the difficulties are increased by the fact that fully one-half of the area is overlain by Paleozoic and later deposits which hide important contacts.

Certain groups of rocks in the area are different from those found in any of the other six areas described in this report. This statement applies to the interbedded lime-

stone "conglomerate" and slate, and to the conglomerate or agglomerate on the north edge of the town, to the north of the Catholic church, Fig. 30. Section A B C on the map, passes over, near both its eastern and western ends, exposures of interbedded "conglomerate" and slate. Near the middle of section B D is the outcrop, with rounded outline, of the agglomerate and other rocks.

By most observers who have visited the area the limestone "conglomerate" is considered to be a true conglomerate. It consists almost entirely of rounded fragments of limestone, some of which are a foot or more in diameter, Figs. 27, 28, 31, 32. A small percentage of dark slaty substance is present as cement material. Interbedded with the "conglomerate" are beds of a dark rock which on analysis proves to be slate, the beds of which are little fractured. If the rock containing limestone fragments is a true conglomerate, it is one of the most remarkable rocks of the class ever observed. On the other hand, if it is a pseudo-conglomerate, or autoclastic rock, the question arises as to

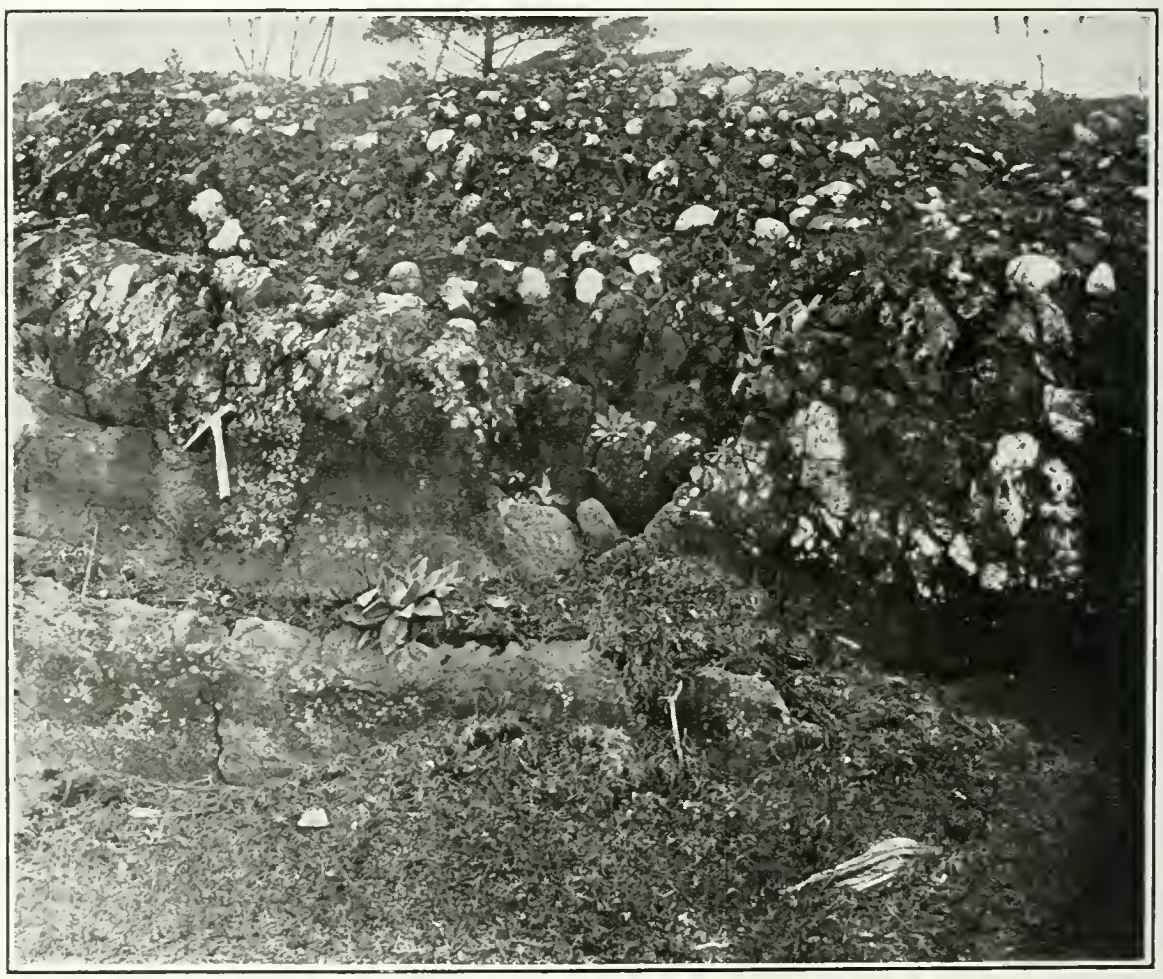


Fig. 27. Contact between Madoc andesite and limestone "conglomerate." Lot 4, concession 5, Madoc township, Hastings county. Contact is at hammer.

why, when the beds of limestone were fractured and the fragments rounded by pressure, the interbedded slate practically escaped fracturing. At one point, near section line A B, lot 4, in the fifth concession of Madoc township, a bed of sandstone or quartzite, about two feet thick, is interbedded with the limestone "conglomerate." By those who consider the limestone rock to be a true conglomerate, this bed of sandstone is believed to lend support to the opinion held by them.

If we consider the rock containing the limestone fragments to be a true conglomerate, and to be succeeded in conformable sequence upward by the thin bed of sandstone, interbedded slate and conglomerate, together with the great thickness of limestone described on page 67 we have a section different from any found in other parts of southeastern Ontario. Elsewhere no such succession of strata is known as is indicated by the limestone "conglomerate" and slate with the overlying great thickness of limestones. If the rock is a true conglomerate it represents the erosion product of crystalline limestone older than the great thickness of these rocks now exposed in the Madoc area.

Unconformable Groups

On the other hand, in spite of the fact that the dip and strike of all the rocks are the same, as shown in the section at the bottom of the map, it may be that what apppears to be a conformable succession of sediments, from the limestone "conglomerate" at the base upward through the two feet of sandstone to slate and crystalline limestone, is separable into two unconformable groups. The limestone "conglomerate," sandstone and slate may be a younger unconformable series resting on the magnesian and non-magnesian limestones. Here the younger group would thus bear a relationship to the older rocks similar to that which the Hastings series of fragmental rocks bears to the Grenville crystalline limestones elsewhere in the district.

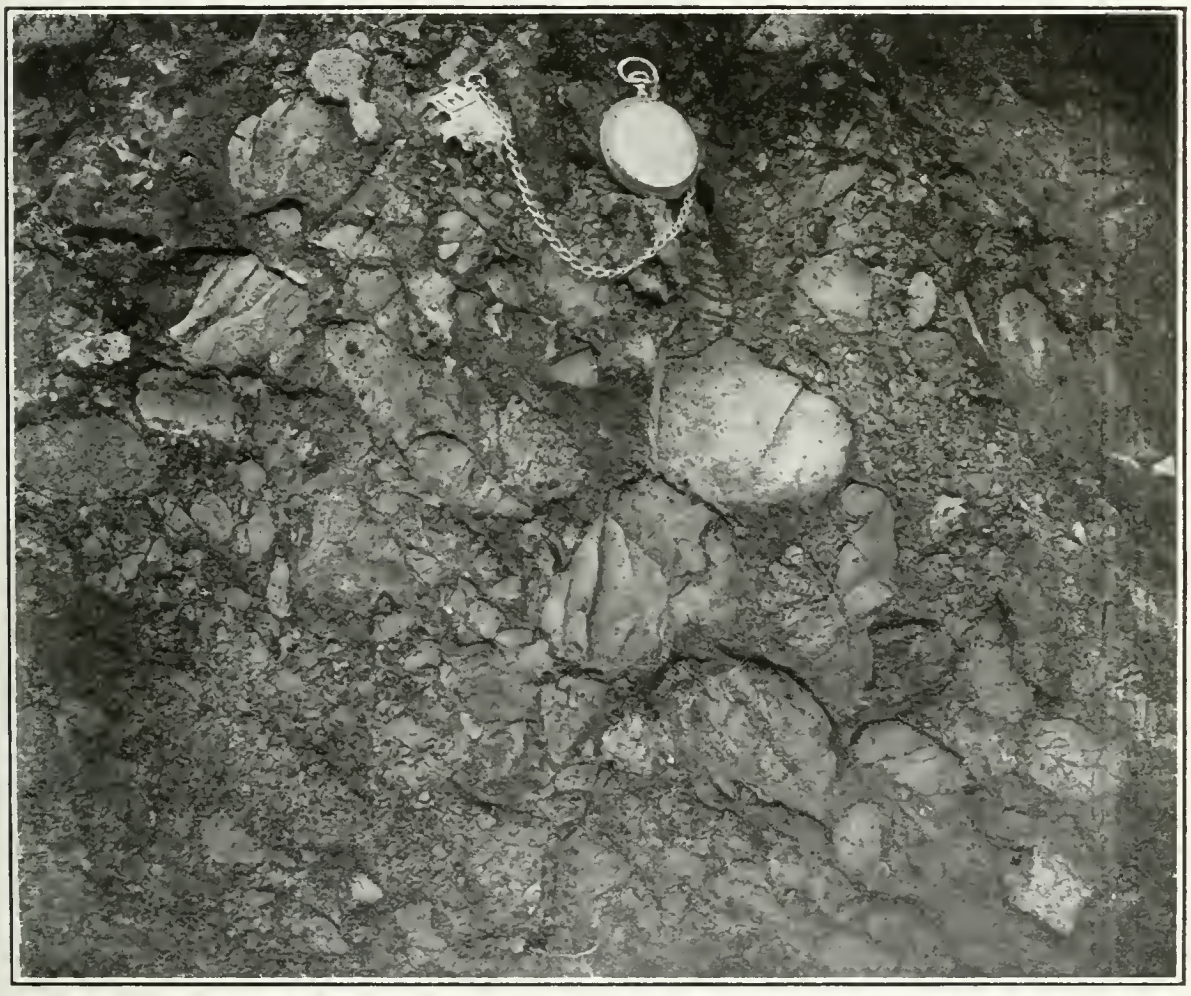


Fig. 28. Limestone "conglomerate." Lot 4, Concession 5, Madoc township, Hastings county.

Autoclastic Origin of "Conglomerate"

As already suggested the other hypothesis as to the origin of the "conglomerate" is that it is a pseudo-conglomerate, having been formed by the fracturing of limestone bands, the interbanded slate having escaped fracturing. The whole series of sediments, viz: limestone "conglomerate," narrow bed of sandstone, slate and great thickness of limestone would thus be classed as Grenville, the "conglomerate," sandstone and slate representing the base of the series. But it may be repeated that elsewhere in the Grenville no such interbanding of crystalline limestone and slate is known.

Relation of Andesite to Limestone "Conglomerate"

Not only is the origin of the limestone "conglomerate" in dispute, but the relation of the Madoc andesite to this rock is not understood. To certain observers it has appeared that the "conglomerate" rests on the eroded surface of the andesite and contains frag-

ments of it. Other observers are of the opinion that the andesite is intrusive into the "conglomerate" and that the fragments of andesite are due to the breaking up of small dikes which penetrated the "conglomerate." Two or three competent observers, who visited the area, would not express an opinion as to whether the andesite is intrusive or not.

Comparison with Other Areas

Considering what is known of the relations of similar rocks in other areas described in this report, the andesite should be intrusive into the "conglomerate," whether the latter is a true or a pseudo-conglomerate. In other areas, the series of rocks that physically resembles most closely the Madoc andesite and felsite is the Belmont basalt. Both series of volcanic rocks occupy considerable of the surface of their respective areas and show various phases—amygdaloidal, porphyritic and tufaceous. They also show approximately the same degree of metamorphism or alteration. The Belmont rock is younger than both the Grenville limestones and the Hastings conglomerate. On this basis, the Madoc andesite should be considered to be younger than the "conglomerate" with which it is in contact, whether the latter is a true conglomerate or an autoclastic limestone—unless, however, it is a conglomerate younger than the Hastings conglomerate.

Having stated some of the difficulties in determining the relationships of the rocks in the Madoc area, it may be added that the failure to make a satisfactory determination does not affect the solution of the larger problems considered in this report. Doubtful evidence in the Madoc area may be discarded, there being sufficient data in the other areas described to show the age relationships of the Keewatin, Grenville, Hastings and other groups of rocks in the district.

ROCKS OF THE AREA

Without reference to the age relations of the members of the pre-Cambrian, one to another, the rocks of the area may be grouped as follows:

Paleozoic

ORDOVICIAN. Black River limestone and basal sandstone.

(*Great unconformity*)

Pre-Cambrian

(1) Basic dikes.
(2) Moira granite and felsite.
(3) Greywacké and quartzite.
(4) Slate.
(5) "Conglomerate" and limestone.
(6) Agglomerate and tuff; crush-breccia; felsite intrusions containing inclusions of schists, crystalline limestones and other rocks.
(7) Madoc andesite and rhyolite with some agglomerate and tuff.
(8) Blue and white crystalline limestones, essentially non-magnesian.
(9) Brown and grey magnesian limestones.

In following paragraphs are given descriptions of the various groups.

(9) *Brown and grey magnesian limestones.*—Rocks of this class are shown on the map at the Henderson talc mine, about a mile southeast of the town, and on lots 2, 3, 4 and 5 in the fifth, and lot 5 in the sixth concession of Madoc township, about a mile northwest of the town. Other small areas are also indicated. These crystalline limestones, which are fine to medium in grain, weather to a brown or grey color, and, at times, contain bands of granular quartz, resembling what has been called "eozoon" at Belmont Lake, Fig. 4. The limestone immediately to the north and south of the Hen-

derson talc mine contains many of these peculiar bands. The chemical composition of the rocks is shown in the following table:

No.	CaO.	MgO.	CO_2	$Fe_2O_3+Al_2O_3$	Insoluble.
1.	28.15	19.00	42.54	1.66	8.36
2.	29.29	15.53	43.67	...	4.62

1. Centre of lot 4, in the fifth concession, Madoc township, Hastings county.

2. Henderson talc mine, lot 14, in the fourteenth concession, Huntingdon township, Hastings county.

Notes on both the pre-Cambrian and Paleozoic limestones of Madoc and vicinity will be found in earlier Reports of the Bureau of Mines.*

(8) *Blue and white crystalline limestones, essentially non-magnesian.* These limestones are the most common sedimentary rocks of the pre-Cambrian at Madoc. They have, generally, a peculiar bluish or drab color which is suggestive of certain beds in the Ordovician; indeed, it has been thought by some investigators, that there is a possibility of finding fossil remains in them. They are, however, highly crystalline, and sometimes white in color, and are often interbedded with schistose greywacké and quartzite. It will be seen from the table, given below, that they differ chemically from the brown and grey limestones in containing little magnesia. There is probably some of the magnesian limestone included in the areas mapped as the blue variety. The wonderful purity of certain of these ancient limestones is noteworthy.

No.	CaO.	MgO.	$Fe_2O_3+Al_2O_3$	Insoluble.	Loss on ignition.
1.	37.38	1.50	2.94	26.74	31.60
2.	50.28	1.63	1.00	5.64	40.95
3.	54.00	.50	.54	1.10	43.75
4.	45.12	.67	.36	16.76	36.62
5.	53.45	.36	1.32	1.08	43.40
6.	50.10	3.88	.82	1.37	43.32

1. Along the railway track, south part lot 4, in the fifth concession of Madoc township, Hastings county.

2. About 100 yards northwest of old black marble quarry, lot 1, in the sixth concession of Madoc township.

3. Three feet west of felsite intrusion on north part of lot 13, in the fourteenth concession of Huntingdon township, Hastings county.

4. Same locality as No. 3, but on east side of felsite.

5. Same locality as No. 2; both Nos. 2 and 5 were collected a few feet from a basic dike several feet wide. The intrusion of this dike evidently has not had much effect on the magnesia content of the blue limestone.

6. Old marble quarry, Madoc.

(7) *Madoc andesite and rhyolite, with some agglomerate and tuff.* This volcanic series is shown on the northwest part of the map, but it extends for a few miles to the north of here. Chemical analyses show that the rocks vary in composition from a rhyolite to an andesite, the former occurring, for example, on lot 6, in the sixth concession of Madoc, the latter on lots 4, 5 and 6, in the fifth concession. There is a gradual transition between the two types, and both facies are in places amygdaloidal, Fig. 29, and contain agglomerate and tuff, showing the volcanic character of the rocks. The andesite variety, which, at times, contains much hornblende, is a massive, greenish, brown to grey colored rock, fine or medium in grain, and at times strikingly porphyritic. Thin sections show it to be made up of plagioclase, microcline, hornblende, biotite, and quartz. The amygdules, which are filled with calcite or quartz, are not seen in all parts of the mass, but good examples may be observed on the north part of lot 5 in the

* Vol. 13, part 2, pp. 59 et seq.

fifth concession of Madoc, to the south of the bend in the road. The following results of analyses will show the composition of the andesite facies.

	(1)	(2)
SiO_2	60.34	54.44
Al_2O_3	15.01	17.63
Fe_2O_3	3.71	7.18
FeO	10.57	6.12
CaO	1.05	2.83
MgO	.05	3.19
Na_2O	2.72	4.03
K_2O	3.23	1.49
H_2O	1.22	2.04
CO_2	2.57	1.64
	100.47	100.59

Fig. 29. Amygdaloidal facies of Madoc andesite. Lot 4, concession 5, Modoc Township, Hastings County.

The rhyolitic variety, which is fine in grain, has a peculiar light grey or pinkish color, and consists essentially of quartz, feldspar and sericite. Its composition is as follows:

SiO_2	72.20
Al_2O_3	13.62
Fe_2O_3	2.61
FeO	2.59
CaO	0.60
MgO	0.29
Na_2O	2.54
K_2O	4.98
Loss on ignition	0.82
	100.25

It may be noted here that the andesite and rhyolite both show evidence of alteration and metamorphism in various parts of their masses. The rhyolite is slightly schistose at times, and the andesite appears to have in part recrystallized.

A good contact of the andesite with the peculiar limestone "conglomerate" is to be seen on the northwest part of lot 4 in the fifth concession of Madoc township, near the western end of section A B. At the contact the andesite rises with steep face against the "conglomerate." The intrusive relation of the andesite is disputed, certain observers claiming that the "conglomerate" rests on the eroded surface of the andesite. The contact of the two rocks is exceptionally well exposed for fifty yards or more, Figs. 27 and 32. At the contact the andesite does not possess its typical character, considerable biotite in coarse flakes occurring in it, at times. Thin sections, taken a few inches from the contact, show the rock to consist of biotite, hornblende, sericite, quartz or feldspar grains, and magnetite. The biotite and hornblende occur in phenocryst-like forms set in the other minerals. Several feet from the contact the andesite is distinctly amygdaloidal, and is impregnated with calcite or dolomite.

At the Sexsmith mine and elsewhere the rhyolite clearly intrudes the crystalline limestone.

(6) *Agglomerate and tuff; crush breccia; felsite intrusions containing inclusions of schist, crystalline limestone and other rocks.* This group of fragmental rocks, together with felsite, is shown on the map immediately north of the town, and on lots 4 and 5 in the sixth concession of Madoc. The hill north of the town exposes these rocks in an excellent manner, Fig. 30. Such a prominent outcrop naturally attracted the early workers, and it was described by Sir Wm. Logan in 1863, as a conglomerate. Logan remarks that: "In a field a little way north from the village of Madoc, still in ascending continuation of the section, a ridge of a somewhat micaceous schist occurs; it is slightly calcareous, of a bluish color, weathering greenish, and holds numerous fragments of rock different in character from the matrix, all being without calcareous matter, and some of them resembling syenite or greenstone. North from this ridge another succeeds, consisting of micaceous schists, beyond which, for 300 yards, ridges of a decided conglomerate, with distinctly rounded pebbles enveloped in a matrix of micaceous schist, alternate with ridges of schist containing few or no pebbles. The exact dip of the strata has not been satisfactorily ascertained."*

A more detailed examination of these rocks has shown that they are not all water worn conglomerates, but are complex in origin, part being an agglomerate or tuff, part autoclastic, and part consisting of felsite dikes containing inclusions of the adjacent rocks. They have obviously been considerably disturbed, for, in several places zones of red garnets have been developed. The fragments vary from microscopic in size to those which are eighteen inches or more in diameter. The outlines are angular, subangular or round, Fig. 30. They consist of felsite or rhyolite, devitrified glass showing flow textures, amygdaloid, fine-grained acid porphyries, quartz, feldspar, crystalline limestone, slate, fine-grained greywacké or quartzite, and chert; sericite, calcite, garnet and biotite have been developed as secondary minerals.

While some of the fragmental material is agglomeratic in character, other parts are more like normal conglomerate or agglomerate that has been worked over by water. The chemical composition of some of the crystalline limestone fragments, obtained from the hill north of the village of Madoc, is shown in the following table:

No.	CaO.	MgO.	Loss on ignition.	Insoluble.
1.	49.37	1.41	40.30	3.44
2.	48.86	2.08	40.93	3.44
3.	46.06	.76	....	6.50
4.	45.19	.95	36.44	11.64

* Geology of Canada, 1863, pp. 32-33.

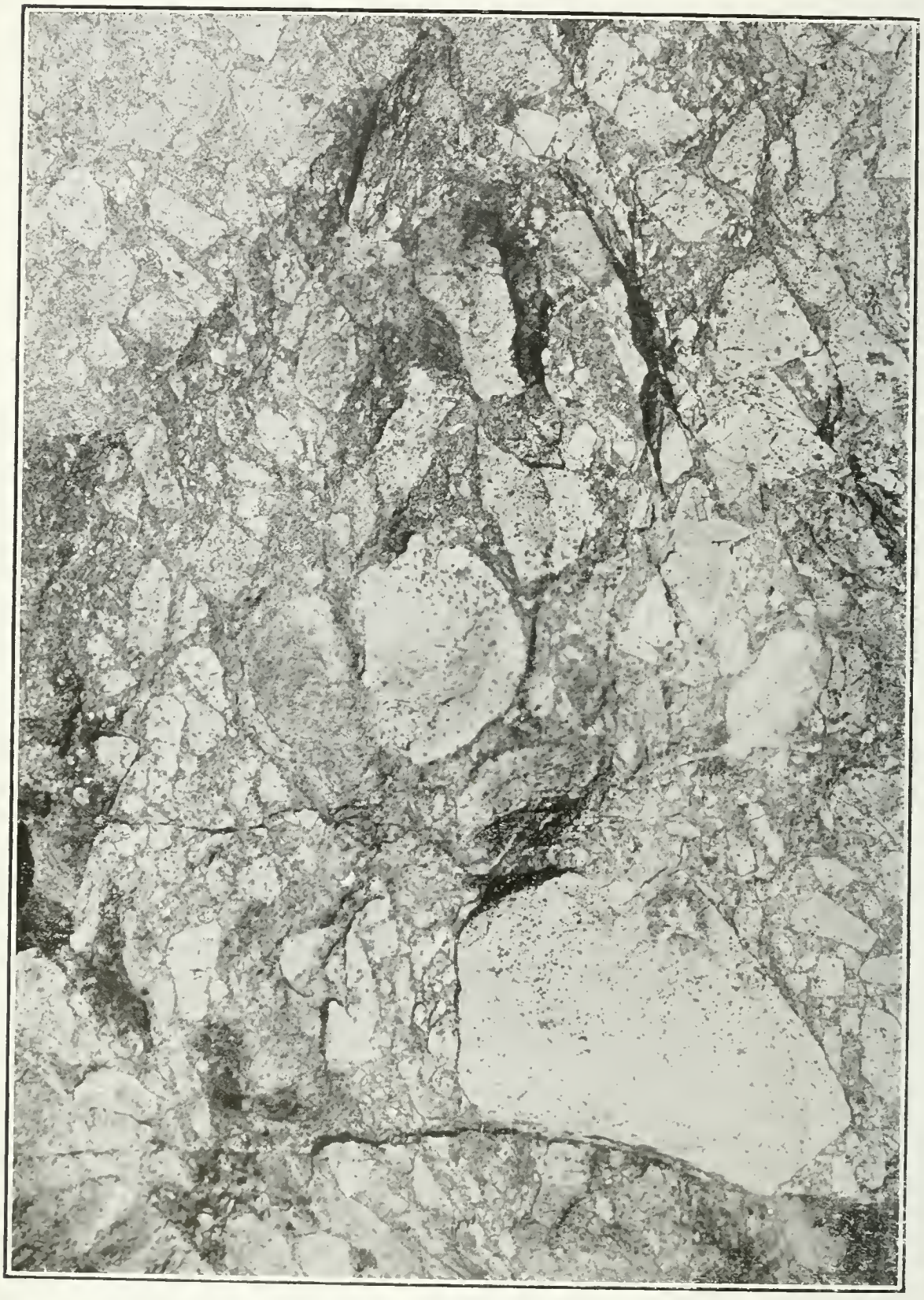


Fig. 30. Agglomerate. Madoc village, Hastings county.

The varieties of these rocks, here grouped together, although differing widely in origin, have not been separated on the geological map. Examples of the agglomerate and tuff are exposed two or three hundred yards northeast of the Catholic church. The autoclastic rock, or crush-breccia, may be seen at the edge of the creek southwest of the Catholic cemetery, while felsite intrusions, holding fragments of the country rock, occur a few hundred yards east of the Grand Trunk railway station, and just to the south of the hematite pit on lot 5, in the sixth concession of Madoc. The felsite dikes near the Grand Trunk station contain fragments of crystalline limestone. The fragmental rocks exposed on the hill north of the town also contain many limestone fragments.

Outside of the places mentioned in the preceding paragraph, felsite occurs, as will be seen from the map, on lots 1, 4 and 5 in the sixth concession of Madoc, and on the north half of lot 13, concession fourteen, of Huntingdon.

(5) "*Conglomerate*" *and limestone.* The largest, and almost continuous, exposures of the rocks, included under this heading on the map, form a belt which extends, in a northeast direction, from lots 3 and 4 in the fourth concession of Madoc township through lots 4, 5 and 6 in the fifth into lot 6 in the sixth. The "conglomerate," as explained on a preceding page, is composed essentially of more or less rounded fragments of crystalline limestone, Fig. 28. Fragments of quartz, resembling that which is frequently found in veinlets or in irregular forms in Grenville limestone, are common. There are also fragments of a greenish material which may represent fractured dikes of the andesite, with which the "conglomerate" is in contact, or erosion products from this rock. As previously said, different opinions are held as to the relations of the andesite to the "conglomerate," Figs. 27, 32.

The chemical composition of two of the limestone fragments, or pebbles, in the "conglomerate" is given in the following table:—

CaO.	MgO.	Loss on ignition.	Insoluble.
22.18	15.22	35.24	23.10
29.76	20.27	45.02	2.80

The massive crystalline limestone in the vicinity of the "conglomerate" has the following composition, showing that the limestone, like the "conglomerate" fragments, contains considerable magnesia.

CaO.	MgO.	Loss on ignition.	Insoluble.
29.84	21.07	46.02	1.28
29.39	20.06	44.80	3.18

On the lots referred to, as shown by the map, and section A B, two beds of "conglomerate" are separated by a bed of slate, which has a thickness of about 65 feet. One of the beds of the "conglomerate" is in contact with andesite and the other is succeeded to the eastward by slate and the latter by magnesian limestone.

Near the northeastern corner of the town of Madoc, viz., on the north edge of lot 2 in the sixth concession of Madoc township and on the south part of lot 3 in the same concession, an interbanding of limestone "conglomerate" and slate, similar to that described in preceding paragraphs, is to be seen, Fig. 31.*

In a general way the longer belt of interbanded "conglomerate" and slate, extending from lot 3 in the fourth concession to lot 6 in the sixth, might appear to be the base of a sedimentary series forming one side of a syncline and the beds of similar rocks on lots 2 and 3 in the sixth concession part of the other side.

(4) *Slate.* Shown on the map are four main bands of slate interbedded with limestone "conglomerate." The largest occurs to the northwest of the town and runs through lots 3 and 4 in the fourth concession of Madoc township to lot 6 in the sixth

* The color on the map for the limestone "conglomerate" here is not correctly shown. It should have horizontal white lines through the blue, as on lots 4 and 5 in the fifth concession and adjacent lots.

Fig. 31. Bedding in pre-Cambrian sediments. 1 and 3 are slate, 2 and 4 limestone "conglomerate." Madoc, Hastings county.

Fig. 32. Contact between Madoc andesite and limestone "conglomerate." Lot 4, concession 5, Madoc township, Hastings county.

concession. The rock is a very fine-grained, drab-colored type that breaks with a marked slaty cleavage, so marked, indeed, that an outcrop was at one time worked as a slate quarry at the northwest corner of lot 5 in the sixth concession. It was found, however, that the cleavage was too coarse and irregular to render the slate of economic value. Under the microscope the fine-grained facies is seen to consist of sericite, biotite, quartz, calcite and iron oxides.

The slate on the north edge of lot 2 and on the south part of lot 3 in the sixth concession, interbedded with limestone "conglomerate," is shown in Fig. 31.

Three analyses were made of the slate, and the results are given in the following table:

	1	2	3
SiO_2	56.40	52.92	53.90
Al_2O_3	17.80	16.69	20.71
Fe_2O_3	7.52	9.75	8.31
FeO	1.53		
CaO	3.67	4.36	3.15
MgO	3.45	2.38	0.34
Na_2O	.75	0.80	0.76
K_2O	4.38	5.36	5.83
H_2O	4.42	7.32	6.88
CO_2	Trace		
Total	99.92	99.58	99.88

1. Old slate quarry, northwest corner, lot 5, in the sixth concession of Madoc.
2. North part of lot 2 in the sixth concession of Madoc, near boundary of lot.
3. North part of lot 2 in the sixth concession of Madoc, near boundary of lot.

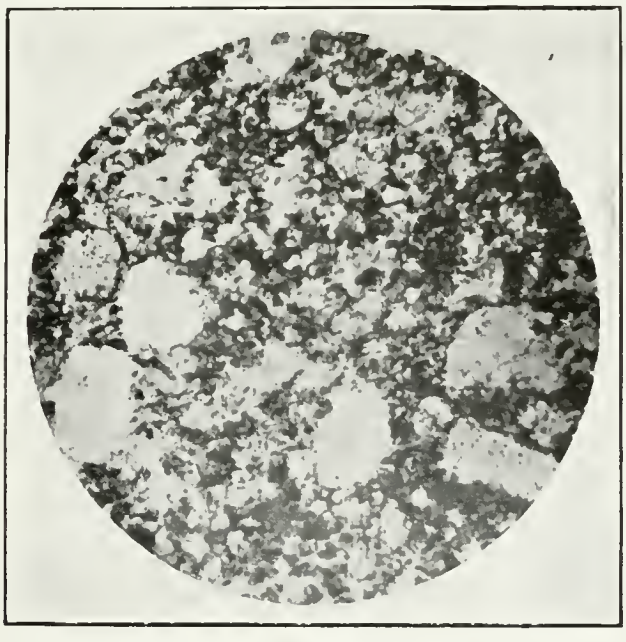


Fig. 33. Photomicrograph of greywacké of Grenville series, crossed nicols, Madoc.

(3) *Greywacké and quartzite.* These rocks, as will be seen from the map, are of common occurrence in this area. They are dark colored, generally fine-grained types which are for the most part schistose. The original sedimentary texture was found to be present at one point, namely, about 400 feet northwest of the talc mill, which is located opposite the Grand Trunk Railway station. The rock here is a medium-grained greywacké, Fig. 33, in which small fragments of quartz may be distinguished with the naked eye. Under the microscope the rock is seen to consist of quartz and feldspar fragments, set in a matrix, which consists of biotite, sericite, quartz, feldspar and calcite.

The quartzites are hard, dark, fine-grained rocks, in which the original sedimentary textures have been destroyed, and the dark color of which is due to the presence of secondary ferro-magnesian minerals. Quartzite, apparently conformable with blue, crystalline limestone, is exposed along the Hastings road, on the east part of lot 3 in the fifth concession of Madoc.

About the middle of lot 13 in the fourteenth concession of Huntingdon, the rocks of this group are impregnated with iron sulphides and resemble the "rusty schists" of the Grenville iron formation.

While the quartzite and greywacké outcrops have all been given one color on the map, it has not been definitely proved that all of these rocks in the area occupy the same stratigraphical position.

The following table gives the results of an analysis of the altered greywacké which occurs two or three hundred yards to the southwest of the Presbyterian church:

SiO_2	70.52
Al_2O_3	16.73
Fe_2O_3	.74
FeO	1.47
CaO	1.47
MgO	.05
Na_2O	.93
K_2O	4.27
H_2O	1.62
CO_2	1.90
	99.70

(2) *Moira Granite and Felsite.* A few small areas of the Moira granite and felsite are shown on the Madoc sheet. The rock, which is massive and usually free of gneissoid facies, has a pink color and varies from coarse to fine in grain; the finer-grained variety is commonly known as felsite. The rock is developed on the south and northeast parts of Moira lake, but occurs in greatest volume to the northwest of Madoc, where it is represented by a batholith, exposed in the Huckleberry hills beyond the confines of our map.*

On lots 12 and 13 in the fourth concession of Madoc township, the coarse-grained, fresh Moira granite appears to pass gradually into a fine-grained, volcanic facies of the Madoc andesite and rhyolite. Erosion has removed the fine-grained, surface-formed phase of the intrusive, exposing the deeper-seated, coarse-grained core.

The dikes of felsite, at times, contain numerous fragments of limestone, producing a rock of a striking and puzzling character, especially when the dikes are fractured and take on the appearance of a true sedimentary rock. Dikes with such inclusions occur a few hundred yards east of the Grand Trunk Railway station, and immediately south of the hematite pit on lot 5 in the sixth concession of Madoc township.

The relation of these intrusives to the mineral deposits of the area is referred to on a following page.

(1) *Basic Dikes.* These dikes occur at several places, including three points in the rock cuts of the abandoned Grand Trunk Railway, on lot 1 in the fifth and sixth concessions of Madoc. They are dark, generally fine-grained rocks often referred to as "trap." One of these basic dikes appears to intersect a felsite dike, indicating that the latter is older than the former. This occurrence is to be seen in the village of Madoc, on the north side of Livingstone avenue, on the west bank of Deer creek.

* *See* "Geological and Topographical Map of the Madoc and Marmora Mining District," by Eugene Coste and James White, Geol. Sur., Can., 1886.

Thickness and Structure of Sediments

The thickness and general structure of the "conglomerate," slate, limestone, quartzite and greywacké, that have been described in preceding paragraphs, will be seen from the cross-sections on the map. Along cross-section A B the sediments dip at an angle of about 37 degrees to the southeast. Beginning with the most western sediments on the cross-section, on lot 4 in the fifth concession, the thickness of the different rocks, to the point B on the Hastings road, is as shown in the following table. Judging from the dip, the group of sediments might form a conformable series, with the greywacké and quartzite as the uppermost member, but, as stated on preceding pages, the relationship of the sediments, one to another, has not been definitely determined.

	Thickness in feet.
1. Limestone "conglomerate," including a two-foot bed of brown impure quartzite a thin section of which consists dominantly of quartz grains and subordinately of calcite or dolomite. An analysis of a fresh sample of the quartzite showed it to contain 79.44 per cent. of silica, while an analysis of a sample, in which the carbonate seemed to be weathered out, showed 89.82 per cent. of silica	42
2. Fine-grained, grey slate	65
3. Limestone "conglomerate," similar to No. 1	80
4 Fine-grained, grey slate, similar to No. 2	435
5. Grey magnesian limestone	330
6. Blue limestone, low in magnesia, and containing many small beds, an inch or so in thickness, of hard cherty material	1,305
7. Dark, impure, fine-grained quartzite	300
Total thickness	2,557 feet

Another, but much smaller, section of the sediments is exposed a few hundred yards to the northeast of Madoc, on the north part of lot 2, in the sixth concession. Fig. 31 shows the appearance of four of the beds. The east part of section BC includes these beds, but does not show all of the details. From west to east the beds may be described as follows:

	Thickness in feet.
1. Fine-grained, grey slate	4+
2. Brownish grey limestone "conglomerate." The rock also contains fragments of quartz. The contact of the slate and limestone "conglomerate" is not sharp, part of the slate encroaching on the "conglomerate" in an irregular branching manner. A little slaty matter is found in the matrix of the "conglomerate"	6
3. Fine-grained, grey slate, similar to bed No. 1. It includes a bed of limestone about two inches thick. The "conglomerate" of bed No. 2 thins out in a distance of 35 feet to the north, and gives place to the slate beds Nos. 1 and 3, which then join each other.	3
4. Limestone "conglomerate," similar to bed No. 2. The last mentioned bed is succeeded to the eastward by slate	22

The chemical composition of limestone fragments from beds Nos. 2 and 4 is shown in the following table:

No.	CaO	MgO	Fe_2O_3+ Al_2O_3	Loss on ignition.	Insoluble.
1.	30.03	19.57	1.28	44.32	4.32
2.	30.25	20.18	1.16	45.36	2.58
3.	42.18	1.38	1.39	34.89	19.84
4.	52.58	1.00	1.24	41.96	2.92

5. Soft, calcareous, grey slate, including a thin bed of crystalline limestone	5
6. Grey quartzite, becoming conglomeratic, owing to the presence of small pebbles of granular quartz	1½
7. Grey slate, similar to beds 1 and 3. It includes several calcareous beds one inch thick	250
8. Hard, dark-colored, fine-grained quartzite or greywacké	75+
	366½+

Fig. 34. International Geological Congress party near Bishop Corners, Anglesea township, Addington county August, 1913.

e town-
an four
of the
of this
stalline

rate.

talline

e lime-
bedded

nesian,
iety is
e rock
quartz
ole:

)
5
9

orner,

orner,

ONTARIO
DEPARTMENT OF LANDS FORESTS & MINES

BUREAU OF MINES

MAP
OF THE
HAZZARD'S CORNERS AREA
TOWNSHIP OF MADOC, HASTINGS COUNTY
ONTARIO

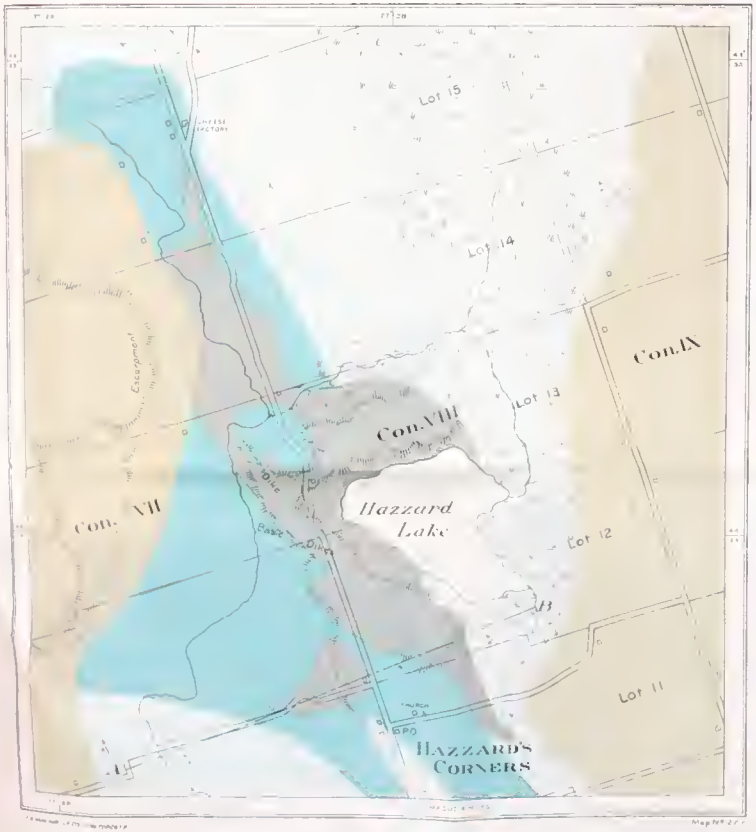
To accompany Part II, Vol. 24, Report of Bureau of Mines, 1915.

Hon. W. H. Hearst, *Minister of Lands, Forests and Mines* Willet G. Miller, *Provincial Geologist.*

SCALE 1/15,840 or 1/4 Mile = 1 Inch.

0 1 Mile

Metres 0 1 Kilometre



SECTION AB

SCALE { Horizontal 1320 Feet = 1 Inch. / Vertical 660 Feet = 1 Inch.

LEGEND

PALEOZOIC

Ordovician

Black River limestone and basal conglomerate.

UNCONFORMITY

PRE-CAMBRIAN

Hastings

Conglomerate and quartzite.

UNCONFORMITY

Grenville

Blue and white non-magnesian crystalline limestone, including also subordinate areas of magnesian limestone.

Brown and grey crystalline limestone, magnesian. A few bands of rusty schist are included.

NOTE. The Pre Cambrian rocks are cut by felsite and basic dikes.

SIGNS

House
Swamp
Hill
Road
Strike and Dip

SOURCES OF INFORMATION

Map of the Wollaston and Marmora Mining Districts by E. Cade and J. White, 1896, with topographic additions by W. H. Rogers, 1911.

Geologically re-surveyed by Willet G. Miller and Cyril W. Knight, *1912.*

THE HAZZARD'S CORNERS AREA

The Hazzard's Corners area lies four miles northeast of Madoc village, in the township of Madoc, Hastings County. The area mapped is small, comprising less than four square miles.* But it includes important beds of conglomerate and other rocks of the Hastings series, which are, perhaps, as little disturbed as are any of the rocks of this series described in this report. They rest with striking unconformity on crystalline limestone of the Grenville series, Figs. 35, 36.

The rocks of the area have been classified as follows:

Pleistocene

GLACIAL AND RECENT — Boulder clay, sand and gravel.

Paleozoic

ORDOVICIAN — Black River limestone and basal conglomerate.

(Great unconformity)

Pre-Cambrian

HASTINGS SERIES — Conglomerate, greywacké and quartzite.

(Unconformity)

GRENVILLE SERIES — (1) Blue and white non-magnesian, crystalline limestone.

(2) Brown and grey magnesian, crystalline limestone. A few beds of rusty schist are interbedded with this limestone.

Grenville series.—Crystalline limestones, magnesian and essentially non-magnesian, largely compose the Grenville series at Hazzard's Corners. The magnesian variety is fine-to-medium in grain and weathers to a light grey or brown color; at times the rock has a bluish color on fresh fractures. It contains, as usual, varying amounts of quartz and other impurities. The chemical composition is shown in the following table:

	CaO	MgO	CO_2	Fe_2O_3 Al_2O_3	Insoluble.	Total.
1.	30.36	20.20	44.34	3.70	1.00	99.60
2.	31.12	20.11	45.79	1.60	1.13	99.75
3.	30.42	20.25	44.62	1.70	2.60	99.59
4.	26.30	18.40	.....	1.28	13.30	

1. Fresh fractures have blue color; rock weathers to grey color. Northwest corner, lot 11, concession VIII, Madoc township.

2. Fresh fractures have blue color; rock weathers greyish brown. Northwest corner, lot 11, concession VIII, Madoc township.

3. Northwest corner, lot 11, concession VIII, Madoc township.

4. Southwest corner, lot 12, concession VIII, Madoc township.

*Map No. 22c.

The crystalline limestone which contains low amounts of magnesia weathers to a blue or drab color. The following table shows the chemical composition of the rock.

	CaO	MgO	CO_2	Fe_2O_3 Al_2O_3	Insoluble.	Total.
1.	45.61	3.40	39.36	1.44	9.70	99.52
2.	50.40	.01	42.20	....	3.20	

1. Blue limestone, south part lot 12, concession VIII. Madoc township.
2. Blue limestone, south part lot 12, concession VIII, Madoc township.

Fig. 35. Crystalline limestone of Grenville series in foreground, Hastings conglomerate and quartzite in background. Hazzard's Corners, Madoc township, Hastings county.

Hastings series.—The rocks comprising the Hastings series consist of conglomerate, greywacké and quartzite. They may be best seen on the south face of the prominent hill on lot 12, concession VIII, in Madoc township, where the beds, resting in highly inclined position, are well exposed. The pebbles have not been elongated by pressure, and the rocks are thus less metamorphosed than similar rocks in most parts of southeastern Ontario. The conglomerate contains pebbles of felsite, medium-grained granite (rare), quartz, dark ferruginous chert, and crystalline limestone. The quartzite has a peculiar brownish-grey color; under the microscope it is seen to be made up of grains of quartz and feldspar irregular in outline, together with some calcite or dolomite. The composition of one sample was found to be: CaO, 3.56; MgO, 1.91; CO_2, 3.93; insoluble, 84.61. Part of the dense, fine-grained brown rock, mapped as quartzite, may be silicified crystalline limestone.

The conglomerate of the area has a somewhat peculiar appearance, due apparently to incomplete sorting.

Ordovician.—Horizontal beds of Black River limestone occupy the eastern and western portions of the area.

Unconformity between Hastings conglomerate and crystalline limestone.—The conglomerate, as shown in the cross-section at the bottom of the map, is closely infolded with the crystalline limestone, so that a discordance in dip between the two series is not noticeable. But the unconformity is clearly shown by the presence of pebbles and boulders of limestone in the conglomerate, Fig. 36. These may be seen on lots 14 and 15 in the seventh concession of Madoc, along the west side of the road south of the cheese factory.

Dikes.—Both the Grenville and Hastings are intruded by felsite and basic dikes.

Fig. 36. Hastings conglomerate, holding boulder of crystalline limestone of Grenville series. Hazzard's Corners.

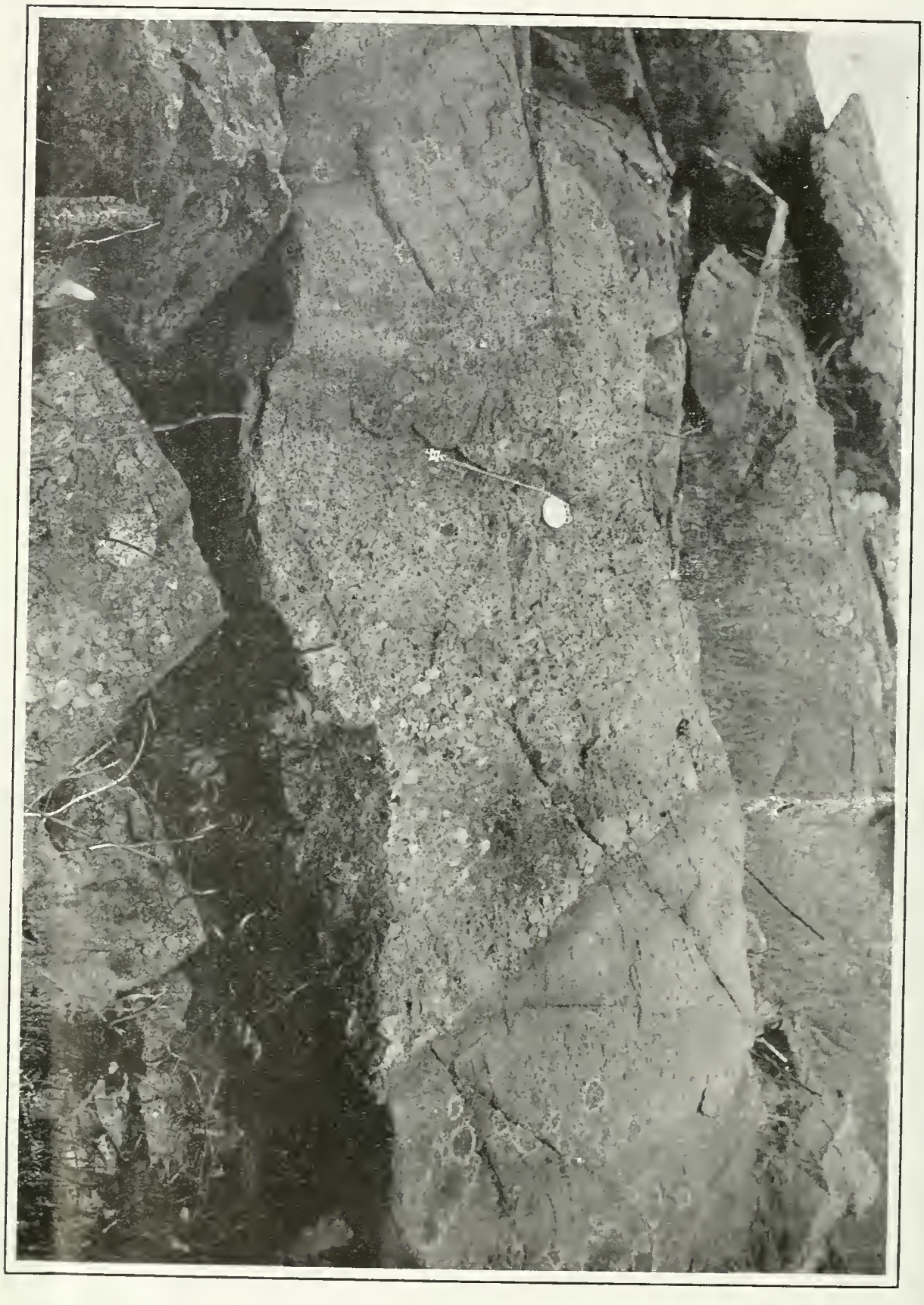


Fig. 37. Hastings conglomerate, showing bedding planes. Hazzard's Corners, Madoc township, Hastings county.

, lies
f the
. Its
map,
nd is
ke of

areas
tones
occur
enses,
lens
ıtains
veral
ıtiate
lime-

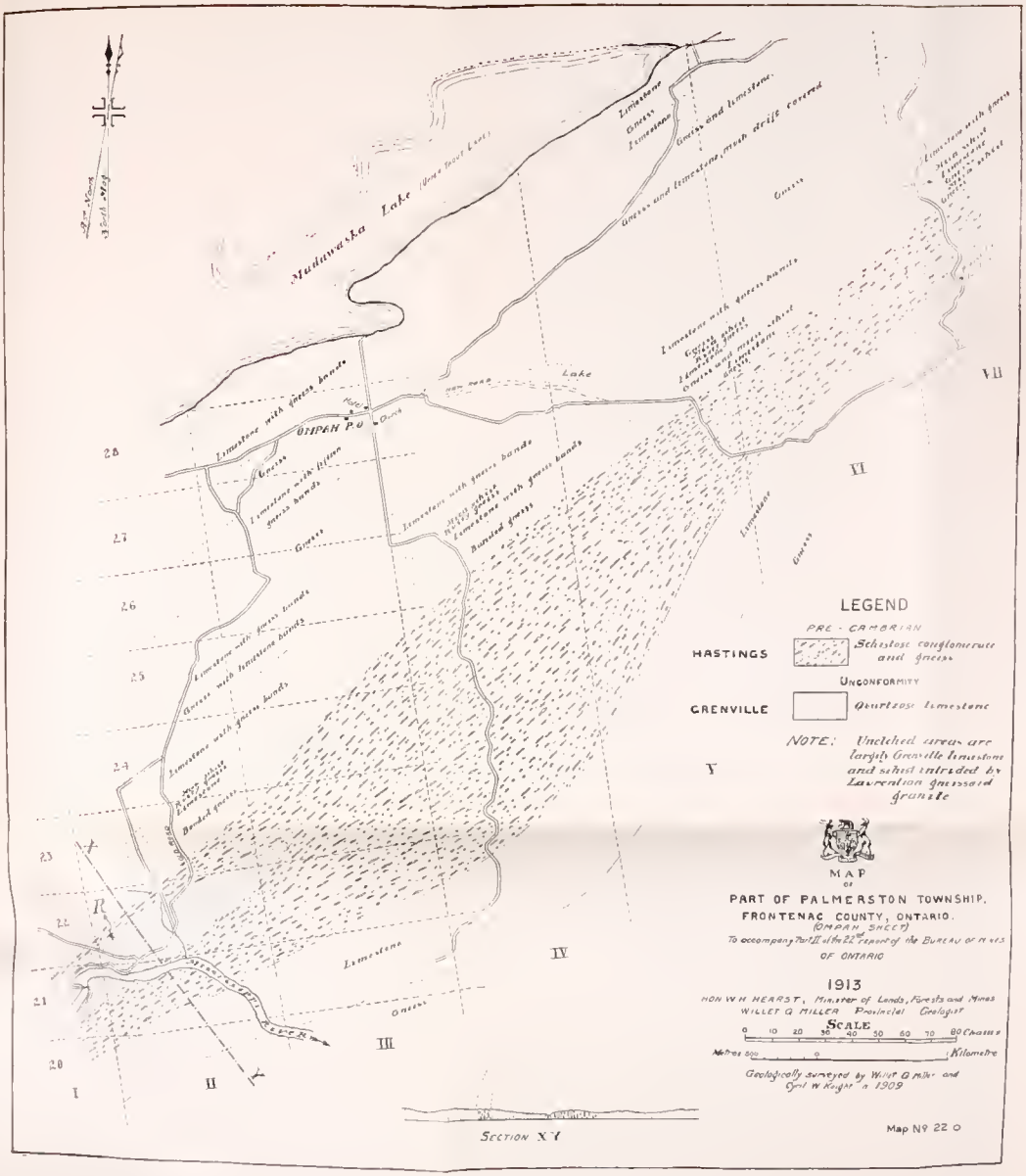
sions,

corner
ch in
rtzite
bands
ds of
vary
one is
tes in

The

al

32
60
12
91
93
16
.89
.29
.71
.18
.26


Mudinaska Lake
Limestone
Gneiss
Limestone
Gneiss and limestone
Gneiss and limestone, much drift covered
Gneiss
Limestone with gneiss bands
Lake
OMPAH P.O
Limestone with gneiss bands
Gneiss
Limestone with gneiss bands
Limestone with gneiss bands
Gneiss
Limestone with gneiss bands
Gneiss with limestone bands
Limestone with gneiss bands
Limestone
Gneiss
Limestone
Gneiss
Limestone
IV
Gneiss
III
II
I
V
VI
VII
28
27
26
25
24
23
22
21
20
R
Section X Y
LEGEND
PRE-CAMBRIAN
HASTINGS
Schistose conglomerate and gneiss
UNCONFORMITY
GRENVILLE
Quartzose limestone
NOTE: Unclothed areas are largely Grenville limestone and schist intruded by Laurentian quiescent granite
MAP
OF
PART OF PALMERSTON TOWNSHIP,
FRONTENAC COUNTY, ONTARIO.
(OMPAH SHEET)
To accompany Part II of the 22nd report of the BUREAU OF MINES OF ONTARIO
1913
HON W H HEARST, Minister of Lands, Forests and Mines
WILLET G MILLER Provincial Geologist
SCALE
0 10 20 30 40 50 60 70 80 Chains
Metres 500 0 Kilometre
Geologically surveyed by Willet G Miller and Cyril W Knight in 1909
Map No 22 O

THE PALMERSTON OR OMPAH AREA

The Palmerston area, in the township of the same name, Frontenac county, lies about nine miles west of Lavant station on the Kingston and Pembroke branch of the Canadian Pacific railway. The area is sixty-five miles northeast of Belmont lake. Its relation to the other areas, described in this report, will be seen from the index map, Fig. 1. The accompanying sketch map, No. 22o, covers about twenty square miles and is traversed by four wagon roads, which cut more or less diagonally across the strike of the rocks, affording sections for study.

The rocks are probably more metamorphosed than are those of the other areas described in this report, and are now gneissoid or schistose in texture; the limestones are whiter in color and coarser in grain. The gneisses, schists and limestones occur interbanded with one another in long, narrow lenses. The general strike of the lenses, which may be from a few inches to a mile in width, is N. 50° E. The limestone lens immediately south of Ompah post office is about eight hundred feet wide, and contains some fifteen bands of gneiss, while in other cases the gneissic belts may contain several limestone lenses. Because of this complexity it was found possible to differentiate only two groups: (1) a schistose conglomerate, and (2) a quartzose, magnesian limestone. The latter is placed in the Grenville series, the former in the Hastings.

It is probable that the remaining rocks, not included in the above two subdivisions, are largely Grenville and Laurentian in age.

THE GRENVILLE SERIES

The limestone classed with the Grenville series is shown at the southwest corner of the map. It is a medium-to-coarse-grained, brownish-weathering marble, which in parts is very impure and carries about fifty per cent. of granular quartz or quartzite with smaller quantities of light-colored amphibole. The quartz occurs in irregular bands and has a white to light pinkish-grey color. A few grey to dark-colored bands of gneiss are found running parallel with the general strike of the limestone. They vary in width from a few inches to about a dozen feet. For the most part the limestone is massive, but parts of it have a banded structure due to the segregation of silicates in lines, or to alternate bands of limestone having a slightly different color.

The table given below shows the average composition of this limestone lens. The specimens were taken from various points.

No.	CaO	MgO	$Al_2O_3 + Fe_2O_3$	Insoluble	Loss on Ignition	Total
1	30.45	16.27	.....	3.06	44.54	94.32
2	28.24	14.74	.....	6.70	42.92	92.60
3	45.65	1.13	2.42	13.44	37.48	100.12
4	31.43	18.85	1.70	2.60	45.33	99.91
5	46.00	1.83	3.18	10.08	38.84	99.93
6	31.44	16.20	3.50	4.70	44.32	100.16
7	29.89	16.60	1.60	10.30	41.50	99.89
8	31.43	2.05	4.60	35.00	27.21	100.29
9	49.48	1.30	1.40	6.70	40.83	99.71
10	30.42	2.08	2.80	39.90	24.98	100.18
11	44.10	4.00	1.66	12.10	38.40	100.26

THE HASTING SERIES

The rocks classed with the Hastings series are shown on the map to occur in a lenticular belt running northeasterly across it. They consist of schistose or gneissic conglomerate which passes into gneiss and schist.* The pebbles are made up dominantly of medium-grained, granular quartz, or quartzite, of a pinkish-grey color; others are pure white, coarser in grain, and resemble vein quartz. In parts of the belt these quartzite pebbles make up almost the whole conglomerate, the matrix being sandy, micaceous or calcareous; but most of the belt consists essentially of a grey to dark-colored gneiss with mica and hornblende and at times garnet. In this gneiss it is difficult to recognize with certainty any pebbles except quartz. Although the quartzite and granular quartz pebbles make up most of the conglomerate, a few granite, limestone, and dark-colored gneiss pebbles have been found.

In all cases the pebbles have been flattened so that their longer diameters are generally several times their shorter ones, Fig. 38.

Regarding the thickness of the conglomerate it can merely be said that the hills composing this rock rise to a height of about one hundred feet. This has not much significance because little evidence of original bedding remains.

Fig. 38. Pebble elongated by pressure, Hastings conglomerate. Palmerston township, Frontenac county.

A thin section of the gneissic or schistose matrix of the conglomerate shows it to be made up of green hornblende, quartz, biotite and a little plagioclase feldspar, all of the constituents being fresh. Much of what has been classed with the conglomerate consists of similar gneissic material containing few recognizable pebbles.

Under the microscope, a pebble of granular quartz, or quartzite, similar material to that which makes up most of the conglomerate, is seen to consist of interlocking grains of quartz together with a little sericite and iron ores.

A thin section of a medium-grained, pink granite pebble shows it to be made up of twinned and untwinned feldspar, and quartz. The feldspar is partly altered to sericite and calcite. The occurrence of granite pebbles in the conglomerate is rare.

Relation of Hastings conglomerate to Grenville limestone and Laurentian.—The evidence for believing that an unconformity occurs between the conglomerate and limestone is found on the southwest part of the area near the Mississippi river, at the point marked "R" on the map. Here a cliff about 35 feet high cuts across the strike of the rocks, so that the contact of the conglomerate and the Grenville limestone is well exposed. The latter contains at this point about fifty per cent. of a medium-grained, granular quartz or quartzite. The pebbles in the conglomerate are similar to this quartzose facies, and it is, therefore, believed that they have resulted from its disintegration. The

* This conglomerate was briefly described by Dr. R. W. Ells, Report Geol. Sur., Canada, Vol. XIV, 1901, p. 47 J.

presence of a few limestone pebbles in the conglomerate is additional evidence of an unconformity between the two series.

If the conglomerate be followed from this point to the southwest for about half a mile, the pebbles will be found to gradually decrease in number until the rock becomes a mica-schist. Similarly, at the northeast end of the belt, the conglomerate facies passes into various schistose and gneissoid rocks.

Fig. 39. Hastings conglomerate, Palmerston township, near the village of Ompah, Frontenac county The part of the cliff shown in the photograph is about 15 feet high.

In some places a mica-schist or gneiss occurs at the contact of the Grenville limestone and the conglomerate. Here the structure has the appearance of a conformable relationship, if the unconformity above described were not taken into consideration.

The conglomerate contains pebbles of dark-colored gneiss, and, more rarely, of granite. The presence of these pebbles is evidence of an unconformity between the conglomerate, on the one hand, and granite and dark-colored gneiss on the other.

THE LAURENTIAN AND GRENVILLE SERIES

Much of the area shown on the accompanying sketch map is unetched, indicating that the rocks have not been subdivided, but, as already pointed out, it is believed that they are largely of Laurentian and Grenville age, since pebbles of granite, limestone and dark-colored gneiss occur in the Hastings conglomerate. This part of the map is somewhat complex, consisting, as it does, of hundreds of limestone and gneiss lenses, resting in more or less vertical attitude, and interbanded with one another.

The problem of the quartz-feldspar gneisses associated with the limestones is not a simple one. For example, the road for about a quarter of a mile north and south of the village of Ompah passes over some twenty parallel bands of gneiss, which vary from a few feet to 800 feet in width, and average about 30 feet. The gneisses are interbanded with crystalline limestone, and the question arises: Does this alternation of gneiss and limestone represent a sedimentary succession?

In order to determine its origin, whether igneous or sedimentary, one of the typical gneissoid lenses, several feet wide, north of the hotel was sampled. The rock has a grey color, is of medium grain, and is made up of an acid plagioclase, microcline and quartz, together with biotite, muscovite and a few grains of calcite. An analysis gave the following results:

Typical grey gneiss, northeast of hotel at Ompah, Palmerston township, Frontenac county.

	Per cent.
SiO_2	67.42
Al_2O_3	15.74
Fe_2O_3	.35
FeO	3.46
MgO	1.86
CaO	3.36
Na_2O	2.94
K_2O	1.73
H_2O	3.55
CO_2	.31
Total	100.72

The analysis shows that the gneiss is of igneous origin. It would seem probable, therefore, that many of these gneissoid bands are parallel dikes or sheets which have been intruded between the schistose or bedding planes of the Grenville limestone in much the same manner that the Laurentian has invaded the Grenville sediments at Mazinaw lake or at Harlowe. The two latter places are described in connection with the Actinolite-Cloyne area.

Another analysis was made of a band of gneiss, 6 inches wide, which occurs in the limestone near the north end of the bridge over the Mississippi river. The gneiss has a pinkish grey color, and consists essentially of twinned and untwinned feldspar, together with subordinate amounts of biotite. The analysis of the rock gave the following results:

	Per cent.
SiO_2	47.56
Al_2O_3	24.65
Fe_2O_3	.36
FeO	4.54
MgO	5.15
CaO	6.58
Na_2O	1.00
K_2O	5.62
H_2O	4.32
CO_2	Trace.

The analysis shows that this six-inch band of gneiss has the composition of an igneous rock, and was probably a dike which intruded the crystalline limestone.

The composition of many of the crystalline limestone bands, associated with the gneisses, is shown in the following table:—

No.	CaO	MgO	$Al_2O_3 + Fe_2O_3$	Insoluble	Loss on Ignition	Total
1	43.30	6.94	3.34	13.30	32.61	99.59
2	32.43	18.86	1.34	2.70	44.40	99.73
3	49.80	1.36	0.90	6.48	41.12	99.66
4	52.52	0.58	0.60	4.44	41.60	99.74
5	40.79	3.92	.....	4.55	42.60	.....
6	27.20	15.72	.....	3.78	44.05	.....

1. Thirty chains southeast of bridge over Mississippi river at edge of small pond.
2. Lot 24, concession II, Palmerston township, on old road.
3. East part lot 25, concession II, Palmerston township, at road side.
4. Lot 23, concession II, Palmerston township, north part of lot on old road.
5. Twenty chains east of Ompah post office at road side.
6. Two and a half miles east of Ompah, near talc prospect.

GRANITE AND PEGMATITE INTRUSIVES

These acid intrusives are the youngest rocks in the area, and have been found at several places, including the following: (1) At the northeast end of Madawaska (Upper Trout) lake a coarse-grained, massive granite, showing at times a well-developed graphic texture, cuts the crystalline limestone, (2) A few hundred yards northeast of Ompah post office a coarse-grained, granite-pegmatite cuts diagonally across the strike of the gneiss and limestone. These granites and pegmatites may be of the same age as the Moira granite at Madoc.

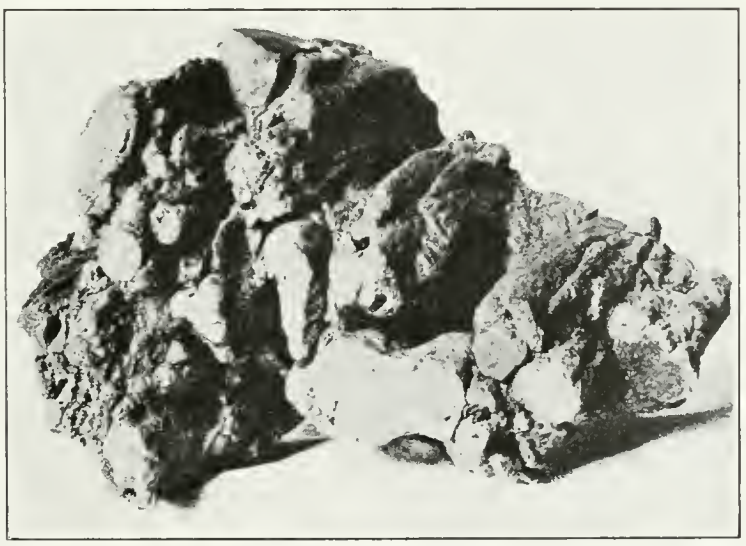


Fig. 40. Hastings conglomerate, showing squeezed pebbles Palmerston township, Frontenac county.

Fig. 41. Crystalline limestone containing beds of quartzite or chert. Palmerston township, Frontenac county.

Fig. 42. Specimens of staurolite from lot 26, concession 10, Clarendon township, Frontenac county.

Limestone occurs to the south of the staurolite schist, quartz-feldspar gneiss to the north. This series of altered, pre-Cambrian sediments strikes E. 10° N. and dips about 60 degrees to the north. The staurolites, which are sometimes as long as three inches, are embedded in a groundmass of white and green mica. Garnets are commonly found in the schist, and also a light grey mineral with good prismatic cleavage which is probably cyanite, but is not definitely determined.

Geology, Vol. XV, pp. 191-217.
§ *See* map No. 22 f.

ONTARIO
DEPARTMENT OF LANDS FORESTS & MINES

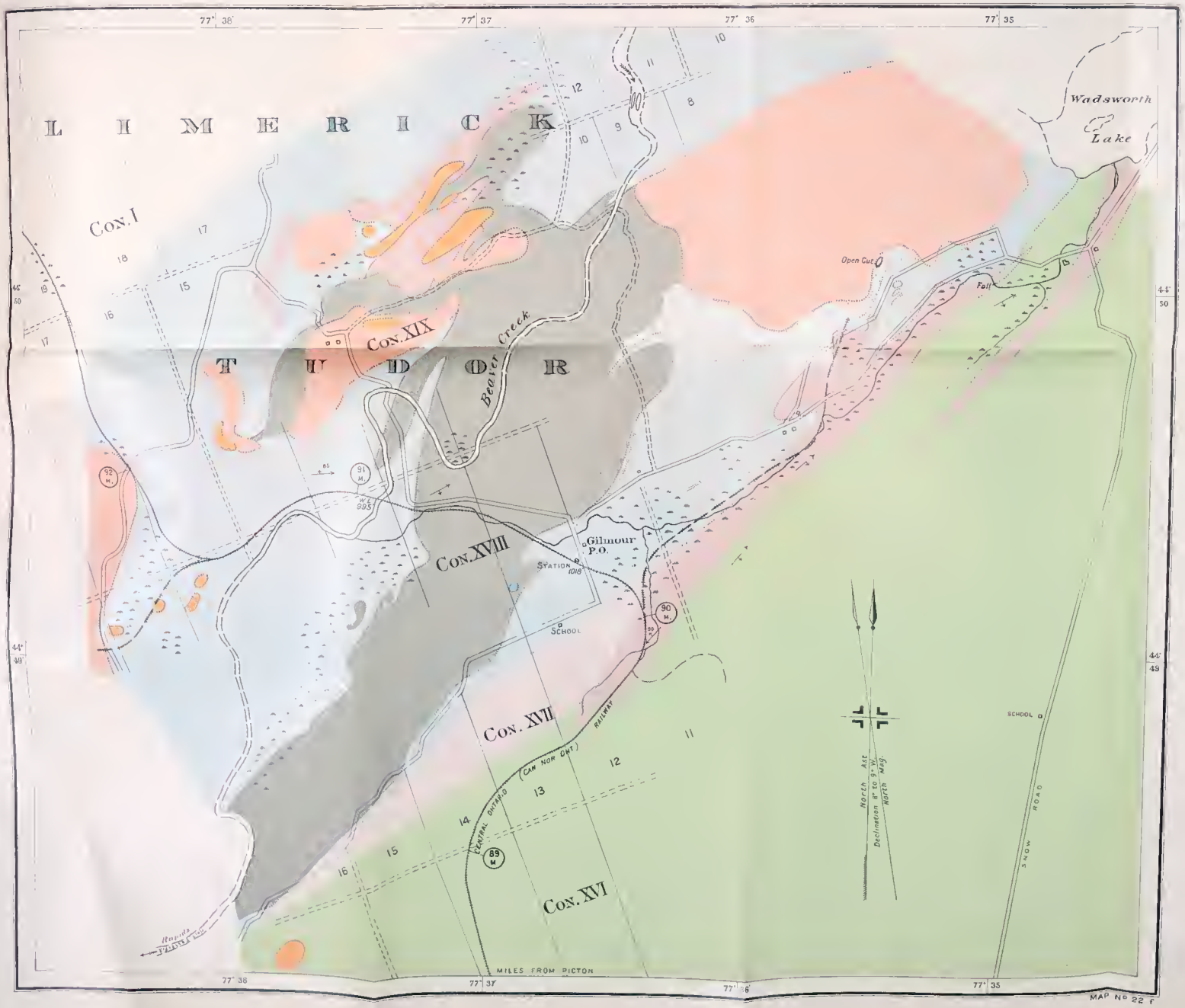
BUREAU OF MINES

MAP
OF THE
GILMOUR AREA
TOWNSHIPS of LIMERICK and TUDOR, HASTINGS COUNTY
PROVINCE OF ONTARIO

To accompany Part II, Volume 22, Report of Bureau of Mines 1913.

Hon W H. Hearst, *Minister* Willet G Miller *Provincial Geologist*

Scale : $\frac{1}{15,840}$ or $\frac{1}{4}$ Mile = 1 Inch



LEGEND

PRE-CAMBRIAN

Post-Hastings Intrusives

- *Granite*
- *Gabbro*

INTRUSIVE CONTACT

Hastings

- *Conglomerate and gneiss, the former in part auto-clastic.*

UNCONFORMITY

Grenville

- *Blue and white crystalline limestone, essentially non-magnesian, and subordinate areas of magnesian limestone.*
- *Magnesian limestone.*
- *Garnet-epidote rock (altered limestone?)*
- *Rusty schist.*
- *Grey gneiss*

Keewatin.

- *Greenstone schists.*

SIGNS

- *House.*
- *Hill*
- *Road*
- *Swamp.*
- *Strike and dip.*
- *1018' Elevation in feet above sea level.*

SOURCES OF INFORMATION

TOPOGRAPHY

Central Ontario Railway plan.
Township plans; Department of Lands, Forests and Mines.
Pacing and compass survey by C. W. Knight.
Bancroft map by Drs Adams and Barlow.
Compilation by W. R. Rogers

GEOLOGY

Geologically surveyed by Willet G. Miller and Cyril W Knight

THE GILMOUR AREA

INTRODUCTION

The Gilmour area, which covers about ten square miles, is included in the Bancroft map* of Adams and Barlow, and occupies a small portion of the township of Tudor, Hastings county. We have mapped the rocks in somewhat greater detail than that shown on the Bancroft sheet, in an endeavor to throw further light on a peculiar conglomerate which was discovered by Dr. Barlow several years ago.† The nature of some of this conglomerate is still uncertain. The members of the International Committee, who examined the occurrence in 1906, were not agreed as to its origin.‡ Barlow considered it to be autoclastic in origin, and believed that the rock has been produced by crushing and brecciation. Other members of the committee regarded the conglomerate "to be in part of autoclastic origin, and, in all probability, in part of volcanic origin, representing tufaceous material derived from volcanic centres now represented by the masses of granite associated with it." Messrs. Cushing and Adams, members of the committee, found that the conglomerate was interstratified with limestone, and consequently of the same age as these rocks. The committee concluded that the conglomerate is of interformational origin, and has no special structural significance.

In this report we have classified certain rocks as of Keewatin age, believing them to have been originally basic lavas, and have separated them from the Grenville sediments. The supposed thickness of these sediments is thus reduced.

The area is not an ideal one in which to work out the age relations of the sediments, because the latter have been intruded by masses of gabbro and granite which have helped to metamorphose them and render their relationships obscure. It is considered, however, reasonably certain by the senior author of this report that the conglomerate is largely a true water-worn sediment, and that it rests unconformably on the Keewatin greenstones and the Grenville sediments.

ROCKS OF THE AREA§

We classify the pre-Cambrian rocks of the Gilmour area as follows:—

Pre-Cambrian

POST-HASTINGS INTRUSIVES	Granite, acid dikes, gabbro.
(Intrusive contact)	
HASTINGS SERIES	Conglomerate and gneiss, the former in part autoclastic.
(Unconformity)	
GRENVILLE SERIES	(1) Blue and white crystalline limestone, essentially non-magnesian, and subordinate areas of magnesian limestone. (2) Magnesian limestone. (3) Garnet-epidote rock (altered limestone). (4) Rusty schist. (5) Grey gneiss.
KEEWATIN	Greenstone schist.

The rocks, beginning with the oldest series, are described in following paragraphs.

* Geological map of portions of Hastings, Haliburton, and Peterborough counties, Province of Ontario, by Frank D. Adams and Alfred E. Barlow. The map, No. 770, accompanies Memoir No. 6 of the reports of the Canadian Geological Survey. While the map shows in detail lithological distinctions, age relations of the rocks are not indicated.

† On the Origin of some Archean Conglomerates.—The Ottawa Naturalist, Feb., 1899, Vol. XII, pp. 205-217.

‡ Special Committee on the Correlation of the pre-Cambrian Rocks of the Adirondack Mountains, the "original Laurentian area" of Canada, and Eastern Ontario.—Journal of Geology, Vol. XV, pp. 191-217.

§ *See* map No. 22 f.

THE KEEWATIN

The Keewatin series consists of fine or medium-grained green schists, resting in almost vertical position, and composed largely of hornblende and chlorite, together with occasional remnants of plagioclase phenocrysts. The general name amphibolite has been applied to these green schists and many other dark-colored rocks, and they have been considered by Adams and Barlow to be mostly altered sediments.* In the Gilmour area, however, the chemical composition of the green schists, and the presence of amygdules and volcanic fragmental material, show that the rocks were originally basalts, and therefore of igneous origin. The fragmental facies may be seen about half a mile south of the railway station at Gilmour, on the west side of the track, and also on the east side of what is locally known as the "Snow" road, one mile south of Macdonald's siding. The two analyses given below show that these green schists have the composition of basalts, and should not be grouped with the Grenville sediments.

	1.	2.
SiO_2	48.10	46.34
Al_2O_3	17.14	19.31
Fe_2O_3	6.69	5.80
FeO	11.83	10.14
MgO	4.33	1.13
CaO	7.09	10.22
Na_2O	2.68	2.07
K_2O	0.48	1.00
H_2O	2.00	2.08

Nos. 1 and 2, green schists south of Gilmour station, Tudor township, Hastings county.

An analysis was also made of some of the volcanic material associated with the schists. The fragments which are basic and schistose are not more than a few inches in diameter and have been flattened out parallel to the prevailing schistosity of the rocks. The outcrop is several feet in diameter and cannot be separated from the green schists with which it is in contact.

Volcanic fragmental material, associated with the greenstone schists, one mile south of Gilmour, on the west side of the railway track.

	Per cent.
SiO_2	49.14
Al_2O_3	20.47
Fe_2O_3	2.09
FeO	9.56
MgO	3.34
CaO	4.74
Na_2O	1.94
K_2O	0.39
H_2O	5.80
Co_2	2.95
	100.42

It may be noted that the greenstone schists which are here classed as Keewatin have a strong resemblance to rocks of similar age in other parts of Ontario. Moreover, we have found a few narrow bands, several inches wide, of jaspylite, resting in these schists, and it is considered that the presence of this characteristic iron-formation further strengthens the reason for classing the rocks with the Keewatin.

* Geology of the Haliburton and Bancroft areas, by F. D. Adams and A. E. Barlow. Memoir No. 6. Department of Mines, Geol. Survey Branch.

THE GRENVILLE SERIES

The Grenville series consists of sediments which include limestone, rusty schists and grey gneiss, the latter probably being an altered greywacké or closely allied rock. These sediments, which are all schistose, lie in more or less vertical position closely infolded not only with the Keewatin greenstone schist, but also with the younger Hastings conglomerate, later to be described. They are considered to constitute a conformable series which was deposited on the surface of the submarine Keewatin lavas.

Grey gneiss.—The grey gneiss was probably originally greywacké or other sedimentary material, but it is now altered to a gneissic or schistose rock consisting of quartz, feldspar, mica and other minerals which do not show the original fragmentary texture.

Rusty schist.—Rusty schists are well exposed south of Gilmour station and elsewhere in the area. They are fine-grained rocks, the rusty color of which is due to the decomposition of pyrite or pyrrhotite. Similar rocks have been described by Adams and Barlow, and are believed by them to be of sedimentary origin; one of these areas occurs about six or seven miles north of Gilmour, between Ormsby Junction and Ormsby, which is said by the last-mentioned writers to be the thickest body of typical rusty weathering schist in the Bancroft area, it having a thickness of a mile. Thin sections of the rusty schist at Gilmour examined under the microscope show the rock to consist essentially of biotite, quartz, feldspar, calcite, pyrite and limonite. In certain other parts of southeastern Ontario these schists contain graphite, as at the Canadian Sulphur Ore Company's mine, southwest of Queensboro. Two analyses of samples from the rusty schist at Gilmour were made. They indicate a sedimentary origin.

	1.	2.
SiO_2	63.12	73.78
Al_2O_3	3.94	9.44
FeO	4.04	4.93
Fe_2O_3	....	1.03
MgO	2.65	2.37
CaO	4.99	1.09
Na_2O	.73	2.72
K_2O	1.30	1.51
H_2O	1.33	2.57
CO_2	4.67	.63
FeS_2	13.32	...
	100.09	100.07

No. 1. Rusty schist, one mile east of Gilmour, Tudor township, Hastings county.
No. 2. Rusty schist, second railway cut, south of Gilmour station, Hastings county.

Garnet-epidote rock (altered limestone?).—The map shows on the southern edge of the granite, to the east of Gilmour, a rock which is made up largely of the minerals garnet, epidote and hornblende. This garnet-epidote rock appears to have been originally a limestone which has been altered by the intrusion of granite. There is generally a contact zone of only a few inches between the unaltered limestone and the garnet-epidote rock. It may also be noted that the granite sometimes comes in contact with the blue limestone, producing little or no alteration. The contact action of the granite on the limestone is described by Messrs. Cushing and Adams in the following words: " . . . . . that the granite mass immediately about its contact with these rocks, exerted a very pronounced exomorphic contact action, changing the limestones for a distance of at least 100 yards into a mass of reddish-green rock, consisting of an admixture of epidote, garnet, pyroxene and other minerals."*

* Journal of Geology, Vol. 15, pp. 202-203.

Magnesian crystalline limestone.—The crystalline limestone at Gilmour is largely the blue, essentially non-magnesian variety, but our map of the Gilmour area shows a very small exposure of magnesian limestone about a quarter of a mile southwest of the railway station. It is less than 100 feet long and occurs at the edge of a swamp in contact with the Hastings conglomerate. This dolomitic limestone weathers to a yellowish-brown color, is fine-grained and resembles the magnesian limestones already described in other parts of this report, especially at Belmont lake. An analysis of the rock showed it to have the following percentage composition:

CaO	29.13
MgO	18.70
CO_2	43.90

Blue and white crystalline limestones, essentially non-magnesian.—These limestones, which are fine-to-medium in grain, predominate in Gilmour. Their composition is shown in the following table:

	1.	2.	3.	4.	5.	6.
CaO	51.84	40.00	48.26	51.42	52.71	52.08
MgO	1.07	.03	.74	.89	.01	.03
CO_2	42.76	31.56	39.86	40.65	42.30	40.46
Insoluble	2.91	26.06	8.84	5.02	1.34	2.25

Specimens Nos. 1, 2 and 3 were taken a few hundred feet north of Gilmour post office, at distances of 10, 15 and 100 feet respectively, south of the contact of the limestone and conglomerate. No 4 is from the first railway cut south of the station. No. 5 is a blue limestone about one and a half miles northwest of Gilmour; it has been partly brecciated into fragments, Fig. 43, from a few inches to four feet long, and these have been cemented together by a brown calcite, the analysis of which is given under No. 6. Analyses Nos. 5 and 6 tend to show that the chemical composition of the crystalline limestones of the region, viz., whether they contain high or low percentages of magnesia, does not depend on the degree of dynamic metamorphism to which they have been subjected.

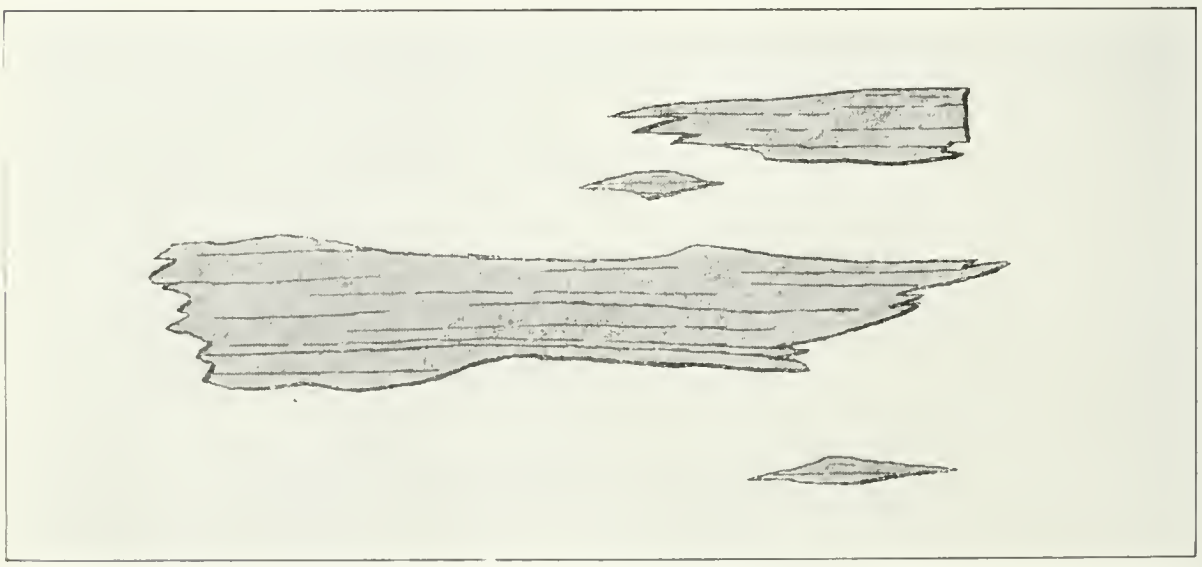


Fig. 43. Brecciated "blue" limestone. The fragments are set in a matrix of brown limestone which has a similar chemical composition to the fragments. Township of Tudor, near Gilmour.

THE HASTINGS SERIES

The Hastings series at Gilmour consists of conglomerate, much of which is, however, a fine-to-medium-grained, grey, calcareous and micaceous gneiss, in which it is difficult to distinguish the fragments from the matrix. This is especially true on fresh-fractured surfaces. The best places to observe the fragments of the conglomerate are on weathered joint planes which lie at right angles to the strike of the rocks. The fragments, which are in form angular or round, consist of feldspar-porphyry, quartz-porphyry, felsite, grey schist, and crystalline limestone. Thin sections of the fine-grained matrix of the conglomerate show it to consist of quartz, feldspar, biotite, calcite and other minerals, this facies having the appearance of a greywacké. Bedding planes have not been recognized.

It is certain that some of the " conglomerate " is not a true water-worn sediment. For example, immediately west of the railway track, at mile post 92, there are granite dikes in the crystalline limestone; both rocks have become crushed and brecciated, the harder granite being squeezed into, and thus intermixed with, the softer limestone. This process has produced a rock which resembles a conglomerate, and which has had various names applied to it, e.g., autoclastic conglomerate, pseudo-conglomerate, and crush-breccia.

The analysis given below shows the composition of the schistose matrix of the conglomerate, the sample being composed of fifteen chips from various parts of the rock in order to obtain an average example:—

SiO_2	61.59
Al_2O_3	19.47
Fe_2O_3	1.96
FeO	3.07
MgO	1.09
CaO	2.60
Na_2O	3.32
K_2O	2.58
H_2O	1.48
CO_2	.06

POST-HASTINGS INTRUSIVES

The igneous rocks included under this head are gabbro, granite and acid dikes.

The gabbro occurs in dikes and in irregular masses, some of which are shown on the map.

Medium-grained granite occurs in several places, and it is probably the youngest rock in the area.

A few hundred yards northeast of the railway station there are present peculiar acid dikes, having a light grey or cream-like color. They are fine in grain, and under the microscope consist largely of muscovite, together with feldspar and quartz. The quartz, which has a clear, purple color, is not common, and occurs in the form of round phenocrysts. The following is an analysis of one of these peculiar-looking dikes:—

SiO_3	60.18
Al_2O_3	27.29
Fe_2O_3	1.31
FeO	0.66
MgO	.03
CaO	.84
Na_2O	4.82
K_2O	1.37
H_2O	1.12
CO_2	.69
MnO	Trace
	98.31

Relationships

Relation of Grenville sediments to Keewatin.—In the Actinolite-Cloyne area the normal succession of the Grenville sediments is : (1) Quartzite, greywacké, rusty schist, and iron formation; followed by (2) magnesian and non-magnesian limestones. At Gilmour this succession does not appear to hold, and it is found that grey gneiss (altered greywacké), rusty schist and crystalline limestone rest successively on the Keewatin schists. Southwest of the post office, for instance, the grey gneiss rests upon the greenstone schist, there being a gradual transition between the two rocks. Southeast of Gilmour the rusty schist lies directly on the greenstone schist, but, where the contact between the two rocks could be observed, it was found that the juncture between them was sharp and well defined. Again, immediately south of Wadsworth lake, the crystalline limestone seems to lie directly on the greenstone schists, although in places there may be a small thickness of greywacké or quartzite, now altered to schistose material, lying between the two rocks. Along these contacts we have not found any evidence that the Keewatin greenstones are intrusive into these sediments, and it is, therefore, believed that the greenstones originally formed a basement on which the sediments were deposited, in the same manner as has already been described at Belmont lake and in the Actinolite-Cloyne area.

It is probable that among the greenstone schists, which have been correlated with the Keewatin series, there are later intrusions of basic rock which are younger than the Grenville sediments. Thus, a few miles south of Gilmour station at mile-post 87 there occurs on the east side of the track a small area of crystalline limestone having the following percentage composition: CaO 52.67, MgO 1.24, CO_2 43.38. The greenstone near at hand appears to be intrusive into this patch of limestone, and is probably of the same age as the gabbro to the southwest, which is a post-Hastings intrusive.

Relation of Hastings to Keewatin and Grenville.—Although bedding planes have not been recognized in the conglomerate, this rock is considered to be a true conglomerate on account of the presence of round pebbles, which look like water-worn fragments. A contact of the conglomerate and crystalline limestone occurs about a quarter of a mile southwest of Gilmour railway station where a small patch of brown crystalline limestone occurs. The conglomerate here holds pebbles of the limestone, and these pebbles may also be seen at several points to the northwest. Their presence in the conglomerate shows that an unconformity occurs between the crystalline limestone and the conglomerate. An analysis of one of these limestone pebbles gave the following results: CaO 22.71%, MgO 14.46%, CO_2 33.75%.

This is the only place in the Gilmour area where there is direct evidence of an unconformity between the Hastings conglomerate and the limestone member of the Grenville series. An unconformity is, however, inferred to exist between the rusty schist and grey gneiss of the Grenville and the greenstone schist of the Keewatin, on the one hand, and the Hastings conglomerate on the other, because this unconformity is known to occur between similar rocks in other parts of southeastern Ontario already described.

The rocks which yielded pebbles of quartz-porphyry and feldspar-porphyry have not been observed in the Gilmour area, but they are present in the Actinolite-Cloyne area.

Relation of post-Hastings Intrusives to Keewatin, Grenville and Hastings.—The granite and gabbro intrude the Hastings, Grenville and Keewatin rocks, and are therefore younger than these three series. The granite may be observed to intrude the conglomerate, the crystalline limestone, the garnet-epidote rock and the rusty schist. The gabbro intrudes the conglomerate, the crystalline limestone and the rusty schist. It also invades the greenstone schist; this intrusion may be seen at the southwest corner of the map, on the south side of the road.

The relation of the gabbro to the granite is not always clear. About a quarter of a mile east of mile-post 92, however, a few granite dikes intrude the gabbro, showing that the latter rock is older than the granite.

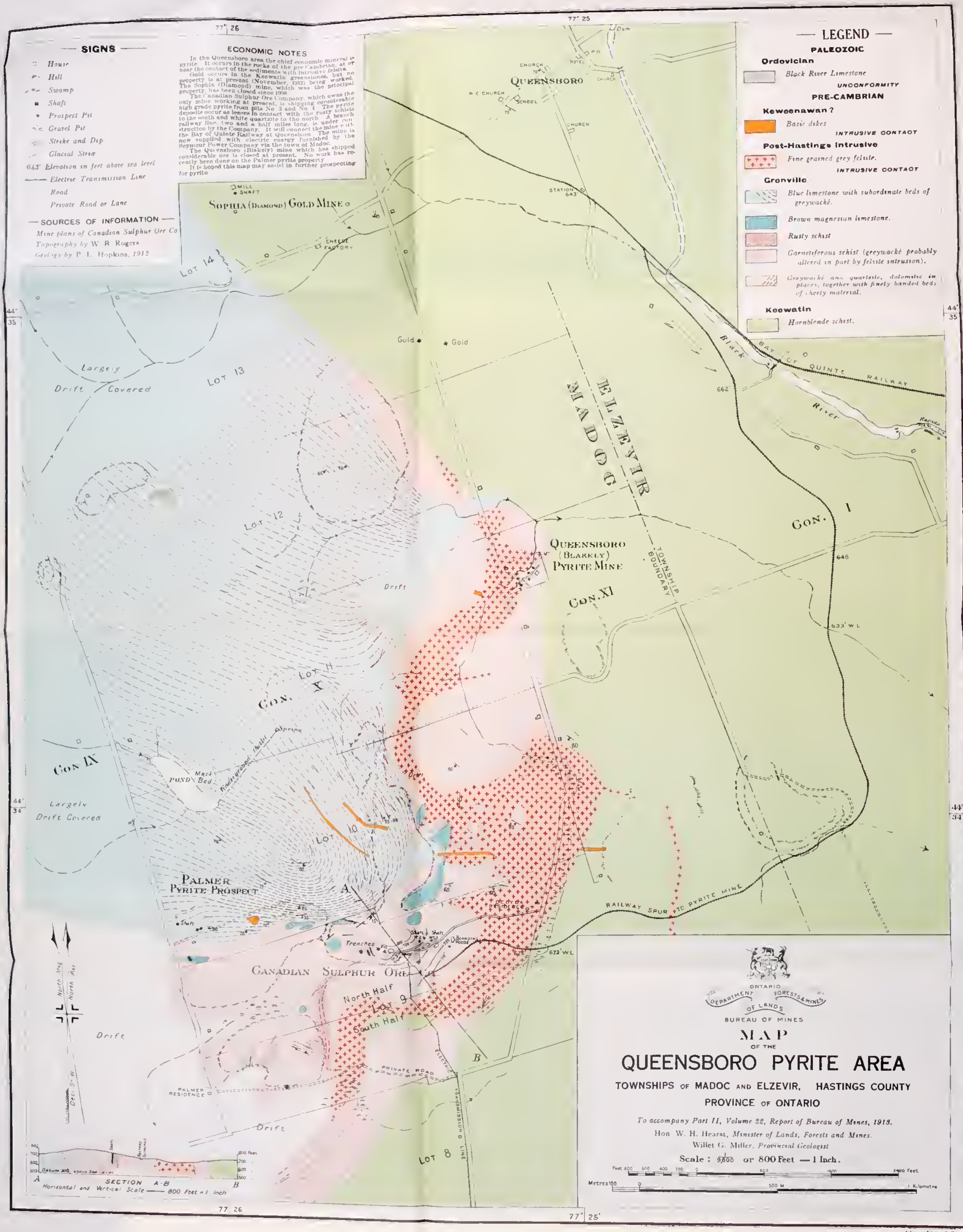
ety
ike
ınd
ved
fty
uc-
na-
ım,
eas
on-
ely
of
an,

age
not
The
the
ear

ary
on

fac-
ion
pro-
at

red
s.


SIGNS
House
Hill
Swamp
Shaft
Prospect Pit
Gravel Pit
Strike and Dip
Glacial Striæ
643' Elevation in feet above sea level
Electric Transmission Line
Road
Private Road or Lane
SOURCES OF INFORMATION
Mine plans of Canadian Sulphur Ore Co
Topography by W. R. Rogers
Geology by P. L. Hopkins, 1912
ECONOMIC NOTES
In the Queensboro area the chief economic mineral is pyrite. It occurs in the rocks of the pre-Cambrian, at or near the contact of the sediments with intrusive felsite.
Gold occurs in the Keewatin greenstones, but no property is at present (November, 1912) being worked. The Sophia (Diamond) mine, which was the principal property, has been closed since 1908.
The Canadian Sulphur Ore Company, which owns the only mine working at present, is shipping considerable high grade pyrite from pits No 3 and No 4. The pyrite deposits occur as lenses in contact with the rusty schists to the south and white quartzite to the north. A branch railway line, two and a half miles long, is under construction by the Company. It will connect the mine with the Bay of Quinte Railway at Queensboro. The mine is now supplied with electric energy furnished by the Seymour Power Company via the town of Madoc.
The Queensboro (Blakely) mine which has shipped considerable ore is closed at present. No work has recently been done on the Palmer pyrite property.
It is hoped this map may assist in further prospecting for pyrite.
LEGEND
PALEOZOIC
Ordovician
Black River Limestone
UNCONFORMITY
PRE-CAMBRIAN
Keweenawan?
Basic dikes
INTRUSIVE CONTACT
Post-Hastings Intrusive
Fine grained grey felsite.
INTRUSIVE CONTACT
Grenville
Blue limestone with subordinate beds of greywacké.
Brown magnesian limestone.
Rusty schist
Garnetiferous schist (greywacké probably altered in part by felsite intrusion).
Greywacké and quartzite, dolomitic in places, together with finely banded beds of cherty material.
Keewatin
Hornblende schist.
QUEENSBORO
CHURCH
HOTEL
R C CHURCH
SCHOOL
STATION 643'
MILL
SHAFT
SOPHIA (DIAMOND) GOLD MINE
CHEESE FACTORY
Gold
ELZEVIR
MADOC
TOWNSHIP BOUNDARY
QUEENSBORO (BLAKELY) PYRITE MINE
CON. XI
CON. I
CON. X
CON IX
LOT 14
LOT 13
LOT 12
LOT 11
LOT 10
LOT 9
LOT 8
North Half
South Half
Largely Drift Covered
Drift
Black River
BAY OF QUINTE RAILWAY
RAILWAY SPUR TO PYRITE MINE
ELECTRIC TRANSMISSION LINE
PRIVATE ROAD
POND
Marl Bed
PALMER PYRITE PROSPECT
PALMER RESIDENCE
CANADIAN SULPHUR ORE CO
Trenches
662'
646
633' WL
673' WL
77° 26
77° 25'
44° 35
44° 34
North Mag
North Ast
Dec 9° W
SECTION A-B
Horizontal and Vertical Scale — 800 Feet = 1 Inch
ONTARIO
DEPARTMENT OF LANDS FORESTS & MINES
BUREAU OF MINES
MAP OF THE
QUEENSBORO PYRITE AREA
TOWNSHIPS OF MADOC AND ELZEVIR, HASTINGS COUNTY
PROVINCE OF ONTARIO
To accompany Part II, Volume 22, Report of Bureau of Mines, 1913.
Hon W. H. Hearst, Minister of Lands, Forests and Mines.
Willet G. Miller, Provincial Geologist
Scale: 9600 or 800 Feet — 1 Inch.
Map No 22 e

THE QUEENSBORO IRON PYRITES DEPOSITS

and

ECONOMIC MINERALS AND ROCKS OF OTHER AREAS

INTRODUCTION

It has frequently been pointed out that there occurs in southeastern Ontario a variety of minerals and rocks of economic value, probably as great as in any district of like size on the North American continent. Some of these deposits, including marble and trap, are inexhaustible. Others, including talc, Fig. 57, and iron pyrites, have proved to be of considerable economic importance. From time to time, during the last fifty years, the following minerals and rocks have been mined or quarried with varying success: gold, iron pyrites, zinc blende, copper pyrites, galena, mispickel, magnetite, hematite, talc, actinolite, mica, marble, ophicalcite, feldspar, fluorite, apatite, corundum, graphite and sodalite. Not all of these minerals occur in the comparatively small areas included in the map sheets accompanying this report and it will be necessary to confine the descriptions to those deposits which are found within the boundaries, or closely adjacent to, these mapped areas. All of the economic materials, with the exception of fluorite, appear to be of pre-Cambrian age. The fluorite veins penetrate the Ordovician, Black River, limestone.

The primary object of the work in the field being the determination of the age relations of the rocks, as a basis for future economic investigations, an attempt has not been made in this report to give a detailed description of the mineral resources. The iron pyrites occurrences near Queensboro have been investigated in some detail; the descriptions of these are by Mr. P. E. Hopkins. The notes on the Sophia gold mine near Queensboro are also from the pen of the same writer.

IRON PYRITES OF THE QUEENSBORO AREA

The iron pyrites deposits, described in following pages, lie close to the boundary of Madoc and Elzevir townships, Hastings county, near the village of Queensboro, on the Bay of Quinte Railway.

The chief economic mineral in the area is iron pyrites, which is used in the manufacture of sulphuric acid. The pyrites occurs in the Grenville sediments in close association with a felsite intrusion. The Canadian Sulphur Ore Company owns the principal property. Gold is also known to occur in the Keewatin greenstones, but no property is at present working. Gravel pits are numerous and afford material for road making.

The area was mapped in November, 1912, and accompanying this report is a colored geological map on a scale of 800 feet to the inch,* embracing about four square miles.

*Map No. 22 e.

The rocks of the area may be subdivided as follows:—

Pleistocene		
	GLACIAL AND RECENT	Boulder clay, gravel and sand.
Paleozoic		
	ORDOVICIAN	Black River limestone.
	(*Great unconformity*)	
Pre-Cambrian		
	POST-HASTINGS INTRUSIVES	Basic dikes.
	(*Intrusive contact*)	
		Fine-grained, grey felsite.
	(*Intrusive contact*)	
	GRENVILLE SERIES	Blue limestone, with subordinate beds of greywacké; brown, magnesian limestone; rusty schist; garnetiferous schist (probably greywacké in part altered by felsite intrusion); greywacké and quartzite, dolomitic in places, together with finely banded beds of cherty material.
	KEEWATIN	Hornblende-schist and pillow lavas.

The geological history of the area is similar to that for the district in general, given in the introductory pages of this report.

THE KEEWATIN

The Keewatin rocks are the oldest and among the most abundant rocks of the area. They consist dominantly of medium-grained, dark-green hornblende-schist with some chlorite-schist. At some points a less metamorphosed phase of the schist shows the ellipsoidal structure, as on lot 11, in the eleventh concession of Madoc township, which suggests that the original rock may have been a submarine basalt flow. At a rock-cut on the spur railway, about 2,400 feet from the main line, the rock is gneissoid. Dark layers of hornblende and chlorite are interbanded with light layers of secondary calcite, quartz and feldspar. The strike of the schist, which is shown in several places on the map, is usually parallel to the contact with the younger rocks.

The Keewatin greenstones were the basement upon which the rocks of the Grenville series were laid down.

THE GRENVILLE SERIES

Lying on the Keewatin greenstones are greywackés and gneisses, with occasional quartzite beds and thin bands of cherty material, garnetiferous schist, thin bands of rusty schist, and magnesian and non-magnesian crystalline limestones, classed as Grenville. On the map the quartzite and cherty bands are included with the greywacké, while the other formations are differentiated. These rocks are almost completely re-crystallized and dip nearly vertically.

Greywackés.—The greywackés, which are extensive, occupy a relatively high hill. Included with them are occasional white quartzite beds together with finely banded beds of cherty material which in places is dolomitic. The greywackés are almost entirely re-crystallized, and the original sedimentary texture destroyed by the later intrusions and by the folding of the rocks. However, the microscope occasionally shows original angular fragments of quartz and feldspar set in a fine-grained matrix of quartz, feldspar, sericite and chlorite. Iron pyrites is abundant in places. Coarse and fine bedding is also of frequent occurrence.

The field observations clearly show the greywackés to be sedimentary, for the coarse and fine bedding is prominent in places. Moreover, light bands of massive quartzite beds alternate with the more argillaceous and darker layers. Some of the grey gneiss may originally have been a greywacké.

Several fresh samples of the greywacké were collected, and an analysis of a composite sample, by Mr. W. K. McNeill, gave the following results:—

	Per cent.
Silica	61.02
Alumina	21.40
Ferric oxide	0.37
Ferrous oxide	3.43
Lime	4.40
Magnesia	0.41
Potash	2.52
Soda	1.82
Sulphur	0.35
Carbon dioxide	1.74
Water	2.23
	99.69

Fine-grained, white quartzite occurs in short bands, frequently up to 100 feet wide, with the greywacké and limestone. In places it has been rendered so vitreous by the intense metamorphism as to be scarcely distinguishable from the white felsite or quartz occurring in veins. Around the workings on the Canadian Sulphur Ore Company's property the quartzite is very pure. Certain bands contain 80 or 90 per cent. silica, the accessory minerals being calcite and iron pyrites.

Garnetiferous Schist.—The garnetiferous schist is a dark, medium-grained rock containing garnets sufficiently abundant to characterize the rock as such. It occurs at and near the margin of the felsite intrusion. The garnets have the usual red color, and range in size from very small grains to crystals half an inch across. They often show crystal faces, but frequently occur massive in thin continuous bands. The weathered surface is characteristic, for everywhere the garnets have resisted the forces of weathering more than the groundmass, and presents a very rough appearance.

Under the microscope the rock is seen to consist of garnet, often showing crystal outlines, and an occasional feldspar crystal, both minerals being set in a fine-grained groundmass of quartz, feldspar and biotite. Iron pyrites, magnetite, chlorite and sericite are abundant.

A chemical analysis of the garnet shows it to be almandite.

	No. 1.	No. 2.
Silica	46.06	39.12
Ferric oxide	8.18	33.28
Ferrous oxide	17.75	
Manganous oxide	0.24	0.80
Lime	3.84	5.76
Magnesia	1.05	....
Alumina	22.62	21.08
	99.74	100.04

No. 1 is a garnet near Queensboro. No. 2 is an analysis of a garnet from Dana's "System of Mineralogy," 6th Edition, p. 441.

From the greywacké analysis in a preceding paragraph, it will be seen that the silica and alumina are abundant while the iron is low to yield much garnet directly from the greywacké. It is possible that the iron necessary to form such extensive garnet zones may have come from the felsite magma, for in places the garnetiferous schist passes gradually into greywacké. Some of the garnetiferous schist may be altered hornblende schist.

Rusty Schist.—The rusty schists, Fig. 44, or pyritous slates, are perhaps the least extensive of any of the sediments, but they are important economically on account of the pyrite deposits being in close association with them. They occur in disconnected belts, rarely exceeding 100 feet in width, and disappear beneath the drift to the southwest. They are fine-grained, grey to black in color, and possess a slaty cleavage in places. Their composition is variable, and they include quartzose and feldspathic facies with iron pyrites, and in places pyrrhotite disseminated through them. In addition to iron pyrites, graphite occurs in fine flakes, and sometimes predominates over any other mineral, giving the rock its dark color.

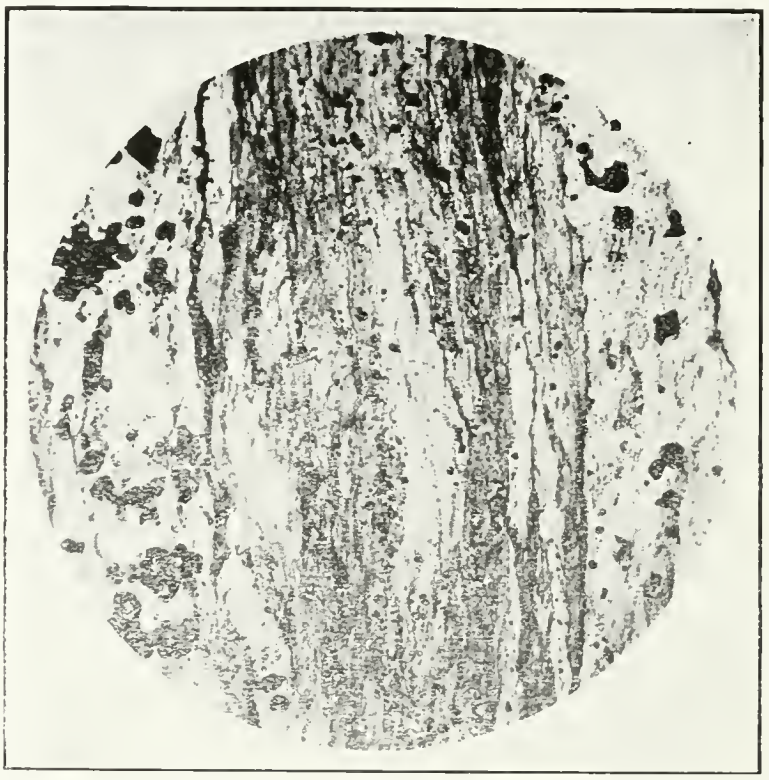


Fig 44—Pyrite schist, or rusty schist, from iron pyrites mine of Canadian Sulphur Ore Company, Queensboro. Black spots are iron pyrites. One nicol in place.

The microscope shows over half the rock to be sericite with impregnations of quartz and veinlets of calcite. The presence of so much iron pyrites and calcite favors rapid weathering, which explains the brown, burnt-like capping the schist takes on, hence the name, rusty schist. The schists originally were probably shales and sandstones. They can be seen to grade into quartzite in a distance of six feet in pit No. 3 on the Canadian Sulphur Ore Company's property.

In other parts of this report rusty schists are described (1) near the village of Harlowe, (2) east of Bishop Corners, (3) near Gilmour and elsewhere. The chemical composition of the rusty schists points to a sedimentary origin.

Magnesian Limestone.—The magnesian limestone is light brown in color and granular. It occurs almost continuously along the base of the blue limestone and as remnants in the greywacké.

An analysis by Mr. W. K. McNeill shows it to be an impure dolomite.

	Per cent.
Insoluble	15.20
Ferric oxide and alumina	1.54
Lime	26.50
Magnesia	17.61
Loss on ignition	39.51
	100.36

This sample was taken from a point 200 feet northwest of No. 2 shaft on the Canadian Sulphur Ore Company's property. The insoluble material is chiefly silica.

Blue Limestone.—In this area the blue limestone has nearly as great a volume as the Keewatin. The rock is fine-grained and of a blue or drab color. Analyses show that the percentage of magnesia is very low. Interstratified with the limestone are thin layers of greywacké and fine-grained quartzite which give the appearance of original bedding.

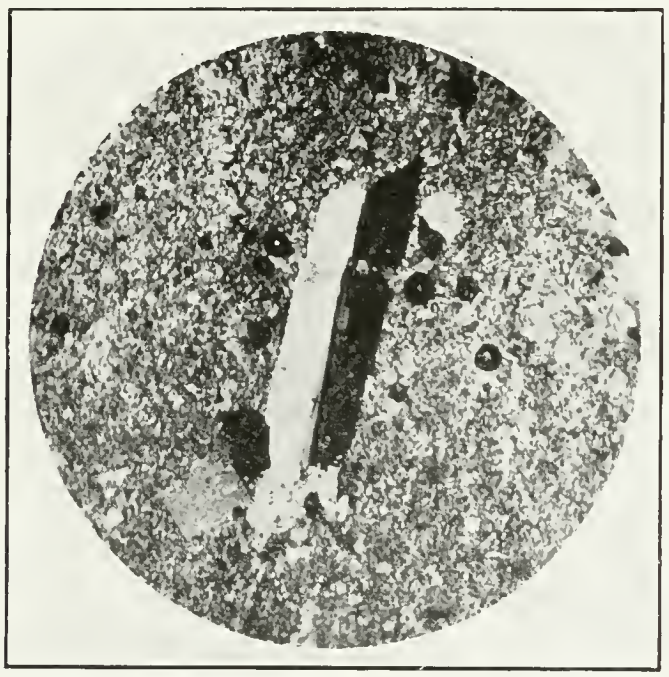


Fig. 45.—Photomicrograph of felsite at iron pyrites mine of Canadian Sulphur Ore Company, Queensboro. Crossed nicols.

The rock is greatly folded and contorted. The strikes and dips are recorded on the map. Around the workings on the Palmer, and in a few other places, the blue limestone is altered to white marble. Some of the iron pyrites on the Palmer property occurs in the limestone near the greywacké.

All of the Keewatin and Grenville rocks described are cut by acid and basic intrusives.

POST-HASTINGS INTRUSIVES

Felsite.—A very irregular, lens-shaped body of felsite occupies the central part of this area. It is very fine-grained, pink to grey in color, and resembles chert. Under the microscope, however, it has an igneous texture. An occasional small plagioclase phenocryst, Fig. 45, occurs in a very fine-grained groundmass of quartz and feldspar. Secondary grains of magnetite are scattered through the rock.

On the whole the felsite is very fresh-looking and unaltered; but felsite-schist and felsite-breccias occur immediately to the west of the Blakely workings and to the southwest of the Canadian Sulphur Ore Company's workings. The brecciation, which was

probably caused by the intrusion of the trap dikes, may have assisted in the circulation of the iron and sulphur solutions.

On lot 10, in the tenth concession of Madoc township, are five small garnetiferous schist areas surrounded by felsite, which suggest that the felsite may be a sill of which the present surface represents the top or bottom of the sill. The true structure may be determined by further development work.

Basic Dikes.—Narrow dikes of altered diabase, up to 40 feet in width, are the youngest pre-Cambrian rocks in the Queensboro area. They consist essentially of hornblende with small amounts of plagioclase and biotite. The secondary minerals are sericite and chlorite. Much magnetite is present. The diabasic texture can frequently be seen both megascopically and microscopically. The dikes have been somewhat fractured, the small fissures being filled with chalcopyrite, quartz and calcite.

Fig. 46.—Gossan at pit No. 4, Canadian Sulphur Ore Company, Queensboro.

BLACK RIVER LIMESTONE

One small remnant of Black River limestone and sandstone, a few feet in thickness, lies unconformably on the crystalline limestone of Grenville age. The Black River limestone resembles the lithographic type, but is impure, due to numerous quartz grains being scattered through it.

GLACIAL AND RECENT

The direction from which the ice movement took place, as shown by the striæ which are well preserved on the hard felsite, is about 30 degrees east of north.

Deposits of gravel, sand, clay and some marl cover a large area, containing fine farming and grazing land.

Gossan

The gossan, Fig. 46, forms the upper part of the pyrites-bearing deposit, due to the pyrites readily oxidizing. It is dark brown in color, somewhat porous in texture, and comparatively light in weight. One sample on analysis gave 19.5 per cent. iron and 5.4 per cent. sulphur. The weathered material is conglomeratic in places with limonite as the cementing substance. Some of the rusty capping may be leached rusty schist. Its depth varies from two to thirty feet, the average on the Delyea farm being about twenty feet.

There is often a slight depression in the surface immediately above the iron pyrites deposits, due to the pyrites weathering more rapidly than the surrounding rocks. Such a depression is often a good indicator for the prospector, although at times the heavy gossan may represent the oxidized root of a lode with no ore beneath. At the bottom of the gossan there is often a water channel.

Fig. 47.—General view of Canadian Sulphur Ore Company's property, looking northwest, Queensboro.

Iron Pyrites Deposits

The iron pyrites deposits occur in the sedimentary rocks of the Grenville series and in close association with the post-Hastings felsite intrusion. The deposits are copper-free, for the most part, lenticular in outline and conform in a general way with the strike and dip of the surrounding rocks. Much of the pyrites is rich enough to ship directly without concentrating. It is also largely free from impurities which are objectionable in the manufacture of sulphuric acid. The mineral ranges from heavy dense material, containing about 50 per cent. of sulphur, to silicious pyrites containing about 35 per cent.

After describing the deposits in more detail, the genesis of the pyrites will be considered.

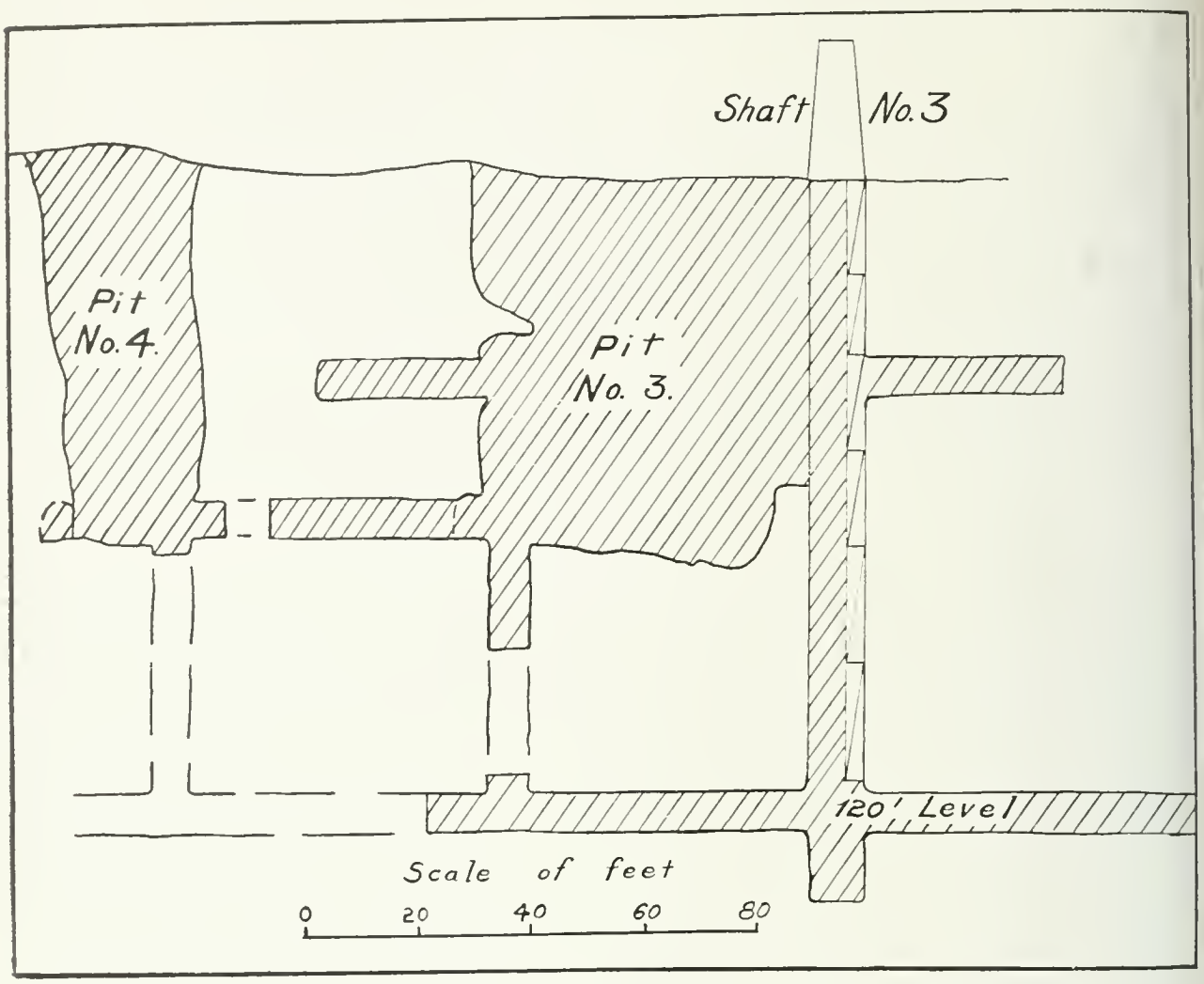


Fig. 48.—Part of underground workings, Canadian Sulphur Ore Company, April, 1913. Queensboro.

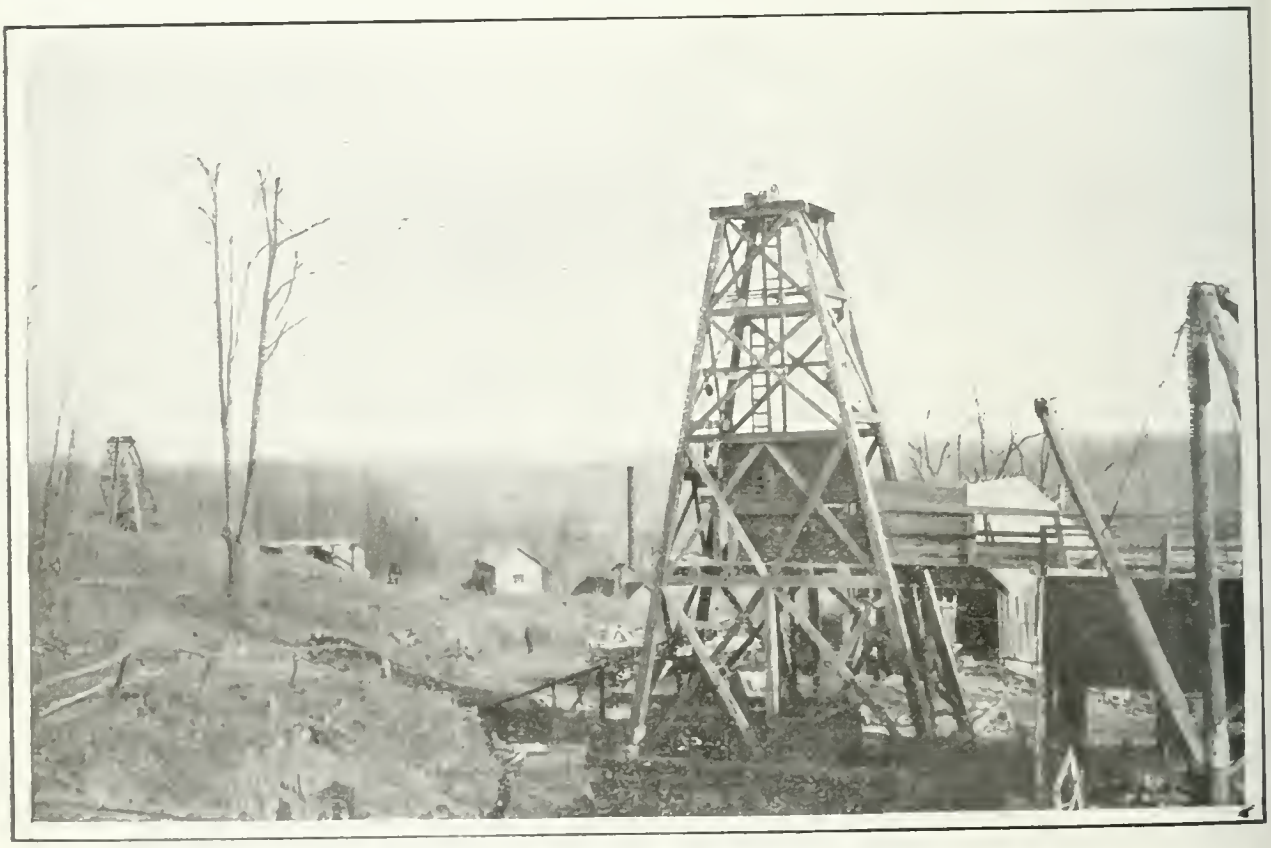


Fig. 49.—Canadian Sulphur Ore Company's property, looking east Queensboro.

DESCRIPTIONS OF PYRITES PROPERTIES

Canadian Sulphur Ore Company's Iron Pyrites Property

This is the only property in the area which was being worked in April, 1913. It includes the north half of lot 9 in the tenth concession of Madoc township, the east half being known as the Delyea farm, Figs. 47 and 50.

Mr. Stephen Wellington, noticing the very red soil on the freshly ploughed Delyea farm, decided to prospect for iron ore. On further examination, gossan was found on the hillside, and later merchantable iron pyrites was discovered.

In 1906, Mr. E. L. Fraleck described this property, then known as the Wellington prospect, as follows: "A series of pits and trenches have disclosed a belt of gossan over five hundred feet long, two hundred feet wide, and about twelve feet in depth. The gossan is mainly conglomerate with iron oxide as a cementing material. Certain portions, however, are a fairly fine limonite. Here and there throughout this material are found boulders of high-grade pyrite up to twelve inches in diameter. Although the outside of these is oxidized, the angular outline is still discernible. Prospecting has as yet failed to reveal the parent ledge."*

By sinking shafts Nos. 1 and 2, Mr. Wellington encountered a pyrites lens, from which a carload was shipped in 1908.

Later, the Canadian Pyrite Syndicate, under the management of Mr. G. H. Gillespie, bought the property, installed a small plant and shipped a few hundred tons of pyrite. In 1909, Mr. E. T. Corkill, Inspector of Mines, said:† "A shaft has been sunk 50 feet deep on the ore, and drifts started. Another shaft, 75 feet southeast, is 20 feet deep. About 500 tons of ore have already been shipped. Two small boilers are used to furnish steam for drills and hoist."

In the spring of 1910 the property was handed over to the present Company, which began shipments three months later and has continued shipping to the present. The workings have been described each year by Mr. Corkill.‡

Mine Workings.—The pyrites is mined by underground and open-cut methods. The development work consists of three shafts and two open cuts, with some diamond-drill borings. Nos. 1 and 2 shafts, which are 75 and 100 feet deep respectively, are both filled with water at present. All the work is now confined to shaft No. 3 and the two open pits which are shown in the accompanying section, Fig. 48. No. 3 is a vertical shaft, with a cage and ladder compartment. It is 120 feet deep, with levels at 50 and 120 feet. At the second level there are drifts 75 feet east and 75 feet west in pyrites which runs 46 to 49 per cent. sulphur. The largest quantity of the pyrites has come from the open cuts, which are sunk largely in pyrites, although pieces of slate, quartzite and calcite are partially or entirely enclosed in it. The surface of No. 3 pit is oval-shaped, 60 feet from east to west, 25 feet wide and 60 feet deep. Pit No. 4 is cylindrical in shape, having a diameter of 25 feet and a depth of 75 feet. Many trenches have been dug, but the overburden and gossan are so thick that the unaltered pyrites was seldom reached. A number of diamond drill holes have been put down to a depth of about a hundred feet.

*Ont. Bureau of Mines Report, Vol. XVI, 1907, p. 161.
† " " " Vol. XVIII, 1909, p. 136.
‡ " " " Vol. XX, 1911, p. 109, Vol. XXI, 1912, p. 160.

The pyrites deposits.—The accompanying plan, Fig. 50, shows the geology and the workings on the south slope of perhaps the largest hill in the area. As already stated, the pyrites deposits are marked by gossan outcrops which extend from two to thirty feet in depth, and the bottom of the gossan is generally well defined and forms a water channel. The mineral beneath consists of pyrites in lenticular masses at the contact of the rusty schist and white quartzite. Occasionally horses of country rock are enclosed in the pyrites. The strike of the deposits is slightly north of east, while the dip is almost vertical, inclining a little to the south. Insufficient development work has been done to definitely outline the deposits, but lenses are known to occur from one to 25 feet in width, while the length is undetermined. In shaft No. 2 the pyrites is said to range from one inch to 15 feet in thickness. There are 18 inches of solid pyrites in pit No. 5. The great bulk of the mineral, however, has come from the open pits, Nos. 3 and 4, where the lenses are as wide as 25 feet, Fig. 48.

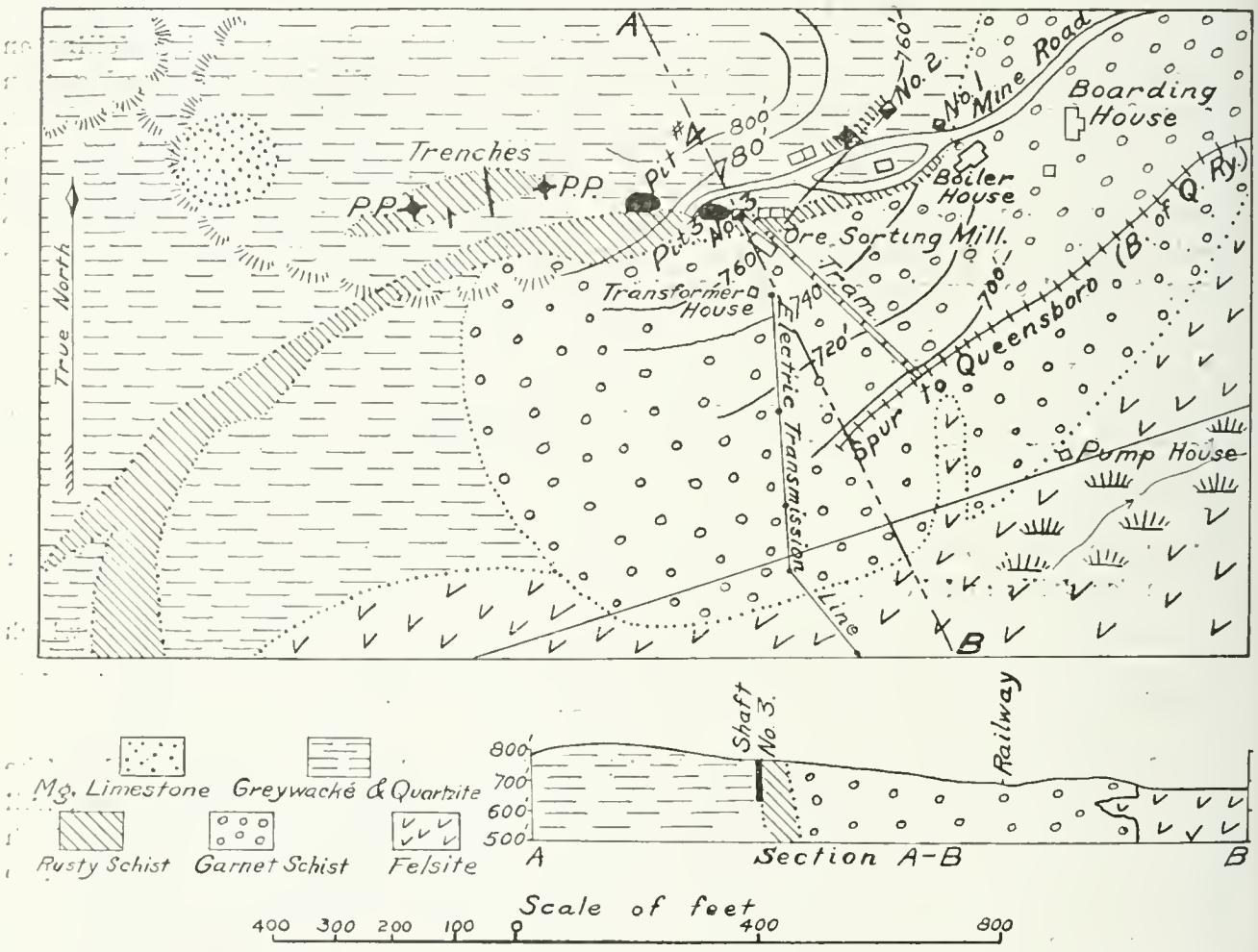


Fig. 50.—Plan of Canadian Sulphur Ore Company's property, north half of lot 9, concession 10, Madoc township, Queensboro.

The pyrites is of two grades. The low-grade is a silicious, distinctly banded pyrites which contains about 35 per cent. of sulphur. At times it passes into pure quartzite in a short distance. The better quality of mineral, which is hard and dense, is faintly banded in places and contains from 46 to 49 per cent. of sulphur. The richness of the mineral may depend to some extent on the nature of the country rock. The pyrites, as well as the adjacent rock, is fractured in all directions, the cracks being filled with small veinlets of quartz, calcite, and more coarsely crystallized pyrites. Very small, angular, black particles of the rusty schist are also disseminated through the high-grade pyrites lenses. Under the microscope these particles are seen to consist largely of sericite, with some chlorite and quartz. They may be portions of unreplaced rock.

It is evident that metamorphic agencies have greatly altered the pyrites deposits, the pyrites having been brecciated. The deposits consist of large angular pieces of pyrites, slate and quartzite cemented by quartz, calcite and secondary pyrites. The brecciated mineral occurs to a depth of 30 feet in pit No. 4, and diamond drilling has also revealed it at greater depths. In pit No. 4, a very little pyrrhotite and chalcopyrite were deposited at the same time as the later generation of pyrites. The pyrrhotite from this pit gave a trace of nickel. There is also much pyrrhotite disseminated through the rusty schist at the bottom of No. 3 shaft on the south side. This rusty schist on analysis gave a trace of gold and 17.23 per cent. sulphur.

The deposit for the most part is copper-free and non-nickeliferous. Gold is also absent. The mineral contains no impurities, such as arsenic, zinc and lead, which are objectionable in the manufacture of sulphuric acid. The pyrites is rich enough to ship directly without concentration.

The contact of the pyrites and the rusty schist is sometimes well marked, a selvage of a clayey material lying between the two. This more or less impervious selvage may have played an important part in guiding or deflecting the mineral solutions and thus

Fig. 51.—Shaft No. 3 as seen from top of shaft No. 2, Canadian Sulphur Ore Company, Queensboro.

promoted a better concentration of the sulphide. On the other hand, on the quartzite side the pyrites is frozen to the wall, and some country rock has to be blasted to get out all of the mineral.

It is important to know the depth to which the black rusty schists extend. It is probable that in the widest parts they go down to a considerable depth, as the dip is about vertical.

In the old workings, on the 50-foot level, the walls are covered in places with minute flakes of epsomite, $MgSO_4+7H_2O$.

Equipment.—The mine is equipped to produce from 50 to 100 tons of iron pyrites per day, yielding 40 per cent. of sulphur. Since December 11th, 1912, it has been run by electricity supplied by the Seymour Power Company, via Madoc. The three-phase, 130-horsepower motor runs a compressor which supplies air for two hoists, two pumps and five drills. The surface and underground workings are lighted by electricity. About 50 men are employed.

As the pyrites comes from the mine it is dumped on a table, where it is raked over and the barren rock eliminated. The work of the pickers is facilitated by washing the dirt and dust from the pyrites by water from the mine pump. Plans are being made to transfer the pyrites a distance of about 300 feet from the bins to the railway cars by a gravity tram.

The pyrites, at present, is being shipped by contract to The Grasselli Chemical Company, Hamilton, and to The Nichols Chemical Company, Sulphide. The buyers purchase the pyrites as "run of mine," and do their own sizing.

The Operating Company is the Canadian Sulphur Ore Company, Limited, of which Mr. A. Longwell is president and Mr. A. B. Willmott secretary and treasurer. The head office is 404 Lumsden Building, Toronto, and the mine address is Queensboro. Thanks are due to Mr. Willmott for permission to make use of the mine plans.

Fig. 52 —Queensboro (Blakely) Iron Pyrites Mine, near Queensboro.

Blakely or Queensboro Pyrites Mine

The Blakely or Queensboro iron-pyrites mine, which was the first mine of the kind to be opened in this area, is situated in lot 11 of the eleventh concession of Madoc township, Fig. 52. The mine lies about a mile west of the village of Queensboro, and about a mile north of the Canadian Sulphur Ore Company's property. The mine, up to the autumn of 1906, shipped 65 carloads of pyrites running about 45 per cent. sulphur.

Mr. E. L. Fraleck described the property in 1907 as follows:*

"The deposit lies in a depression at the contact of a garnetiferous crystalline schist to the south, resembling that at Hungerford, and an intrusion of light grey granite [felsite] to the north.

"A small spring creek ran through the depression over a part of the deposit. This it was necessary to divert, and a shaft has been sunk, at the edge of the old creek bed, to a depth of eighty-five feet. At fifty feet in depth, water came in to such an extent that a drift was driven to the east for thirty feet and a cistern constructed into which,

*Ont. Bureau of Mines Report, 1907, Vol. XVI, pp. 160-161.

by means of wall plates and troughs, the water was trapped. At the bottom of the shaft a drift has been run to the west for twenty-five feet, and a cross-cut made twenty feet to the north. At the present time work in this shaft consists of drifting to the west from the fifty-foot level.

"One hundred and fifty feet to the west another shaft has been sunk to a depth of thirty feet.

"About one hundred feet southwest of the main shaft a zone of highly pyritous rock is being worked. Through this run several lenses up to four or five feet thick of medium-grade pyrite shading off into leaner ore. One lens contains disseminated copper pyrites. This is being worked by an open pit.

. . . . . .

"The pyrite is hauled by teams to Queensboro station and there shipped to the Contact Process Company at Buffalo. The first twenty-one cars shipped averaged forty-seven per cent. of sulphur, and shipments up to the fall of 1906 amounted to sixty-five carloads.

"The highest-grade ore comes from a series of lenses close to the granite contact. That on which the main shaft is sunk has at the shaft a width of fifteen feet and a length of about fifty feet, thinning out towards the ends. To the west is a similar lens, as yet undeveloped, which shows a width, in a surface trench, of twenty feet of very high grade pyrite. The iron pyrites in these lenses is a hard, heavy, dense ore resembling a massive magnetite, the only impurity being thin veinlets of quartz. To the south is an extensive area of more or less imperfect impregnation, yielding places from which a thirty-five per cent. sulphur ore can be quarried.

"A noteworthy feature at this deposit is a small vein to the west of the workings which has a north-west strike and is about two feet wide. It has been opened by a trench sixteen feet long and four feet deep. It cuts the formation at an angle of 45 degrees and appears to possess well defined walls. The vein is composed of quartz, pyrite, copper pyrites and argentiferous jamesonite. This vein is of later age than the pyrite deposit. The jamesonite fills the interstices and is formed around crystals of pyrite. This vein possesses an interest on account of the rare occurrence of jamesonite in this country, and the present high price of antimony."

The above description still applies, except that the granite referred to in Mr. Fraleck's description is a fine-grained felsite which has been described in a preceding paragraph. The main shaft is now said to be 135 feet deep in practically solid pyrites, with a 100-foot drift to the west at the 50-foot level. The mine workings are at present full of water, the operations having ceased in 1908. Some rich mineral, coated with melanterite, still lies on the dumps.

The felsite, near the contact with the garnetiferous schist, is schistose and contains numerous brown crystals which appear to be vesuvianite. Along this contact, in the southwest pit on the property, is a pyrites deposit with a few interbedded layers of zinc blende, a fraction of an inch in width. The deposit passes gradually into the garnetiferous schist, which is impregnated with pyrites some distance from the deposit.

The Palmer Iron Pyrites Deposit

The Palmer property is the west half of lot 10 in the tenth concession of Madoc township. Blue crystalline limestone, interbedded with occasional thin beds of greywacké and quartzite, occurs over the greater part of the property. The limestone is cut by narrow trap dikes. In the limestone, in certain places near the deposit, are small pieces of marble and crushed greywacké presenting the aspect of a conglomerate.

The small open pit was filled with water and débris at the time of my visit. On the surface one or two feet of pyrites occur in the crystalline limestone and greywacké. The pyrites is cut by quartz veinlets, some of which are two inches in width.

Mr. H. Palmer, of Madoc, the owner of the property, discovered the gossan in 1907. After sinking five feet through it he reached pyrites, upon which he sank a pit nine feet deep, which is said to expose a deposit 15 feet wide.

Mr. M. J. O'Brien took an option on the property, and installed a small plant consisting of steam boiler, one drill and a pump. An open pit was sunk, from which a few carloads of pyrites were shipped.

Operations have been suspended and the plant has since been removed; however, some pyrites still lies on the dump. A great part of it is granular and friable, the

grains and crystals being lightly cemented by films of calcium carbonate. Much of the pyrites is crystallized in the form of pyritohedrons and cubes. This crystalline character shows that the pyrites is of secondary origin. No graphite was noticed in the pyrites. Mr. Palmer has since uncovered pyrites in a few other places on the property.

Genesis of the Iron Pyrites Deposits

Certain iron pyrites deposits of Ontario are closely associated with the iron ranges, while others are to be found along contacts of igneous rocks with schists or limestones. In this area the pyrites bodies occur along contacts, which are zones of weakness, in the rocks of the Grenville series near a felsite intrusion.

Of the three groups of sulphide deposits in the Queensboro area, those on the Canadian Sulphur Ore Company's property are at the contact of the rusty schist and quartzite, Fig. 53; those on the Blakely at or near the junction of the intrusive felsite and garnetiferous schist, while those on the Palmer are at the contact of the greywacké and limestone. The larger pyrites deposits lie in or near the rusty schist beds, which leads one to associate these rocks with the origin of the pyrite.

No tourmaline was noticed, which would suggest igneous origin; but stringers of quartz, calcite, and highly crystallized pyrites cut the deposits. A few sharp contacts on the edge of the deposits may represent fault planes..

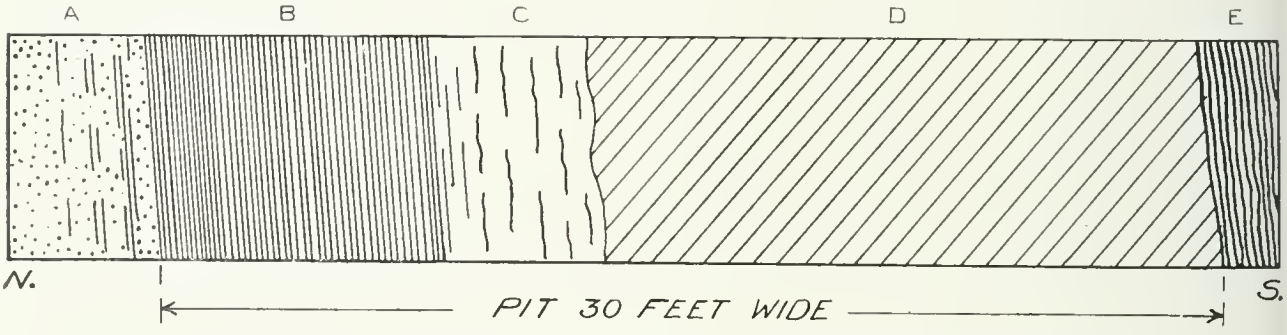


Fig. 53.—Section through west end of pit No. 3, Canadian Sulphur Ore Company's property. (A) Quartzite wall rock; (B) banded, silicious iron pyrites; (C) horse of calcareous quartzite, slightly mineralized; (D) high grade iron pyrites; (E) rusty schist wall rock.

The sulphide was probably originally precipitated in considerable quantity with clays, now rusty schist, in sea water. If the sulphide was deposited after the beds were folded, it would be difficult to account for the sulphide on the whole being somewhat evenly distributed in layers parallel to the banding of the rocks which are not equally porous. On the other hand, if the sulphide in the rusty schist is secondary, pyrites should be found abundantly filling the cracks and surrounding the fragments in the brecciated beds; this condition, however, does not always exist. Nevertheless pyrites, at times, forms the ground mass in this brecciated material and often cuts across the bedding at all angles, showing that part of it was deposited after the rock was formed.

The unleached schist is high in sulphur. One sample, across six feet of rusty schist at the bottom of No. 3 shaft on the Canadian Sulphur Ore Company's property, gave 17.23 per cent. of sulphur. A sample across six feet, near the surface of pit No. 3 on the same property and perhaps on the same rusty schist band, gave 3.73 per cent. of sulphur. A third sample, taken across 20 feet on the surface at pit No 5, gave 0.73 per cent. of sulphur. The low sulphur content near the surface is due to the pyrites having been leached out by surface waters.

It is apparent that the pyrites occurs sufficiently abundantly in the rusty schist bands, or falhbands, to form large pyrite deposits if suitable conditions for concentration were present. The rusty schist and banded cherty material may be the equivalents of the pre-Cambrian iron formation, jaspilyte, in other areas.

The pyrites has been concentrated along fracture zones, produced by the folding of the schist and by igneous intrusions, which form favorable channels for the percolation of the iron and sulphur-bearing solutions.

That the felsite and lodes are intimately related is indicated by the fact that the iron pyrites deposits are always not far distant from the felsite. After the pyrites was deposited further shearing took place along these lines of weakness which brecciated part of the pyrites together with some of the wall rock. This fracturing probably took place during the intrusion of the various trap dikes in the vicinity. Numerous highly crystallized veinlets of pyrites, together with quartz, calcite, some chalcopyrite and a little pyrrhotite traverse the fractured pyrites and at times penetrate the wall rock. The pyrites appears to occur in at least three generations.

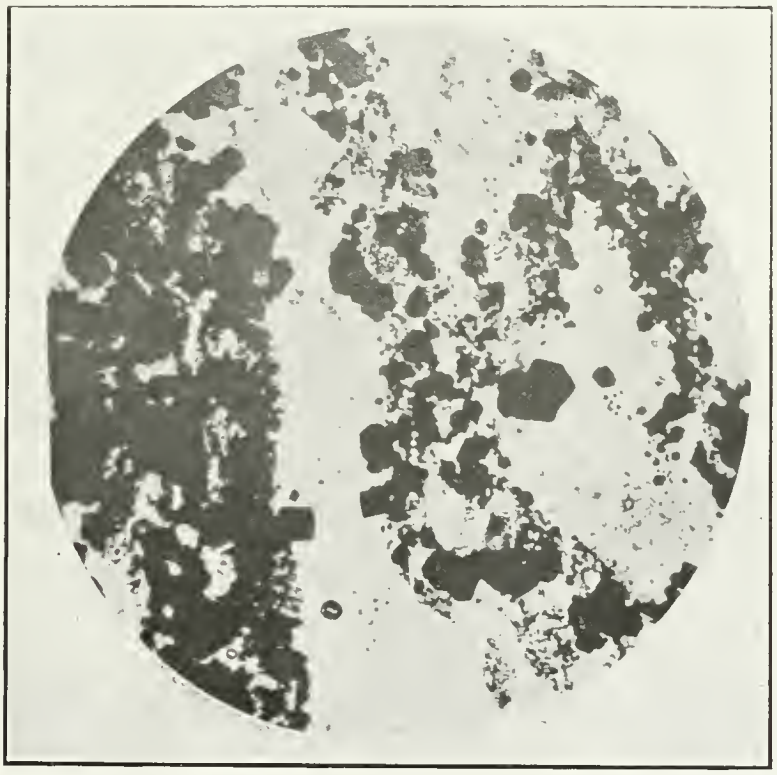


Fig. 54.—Photomicrograph of quartzite, of Grenville series, impregnated with iron pyrites. One nicol in place. Canadian Sulphur Ore Company's property.

The deposits have been greatly enlarged by replacement of the walls with pyrites. The mineral can be clearly seen replacing the quartz grains of the quartzite, Fig. 54, and the microscope shows much of the pyrites to have formed later than the other minerals. The wall rocks generally have pyrites in increasing quantities near the deposits.

Conclusion

In conclusion it may be said that one would expect to find iron pyrites deposits occurring in other areas along these rusty schist beds, where the conditions are similar to those which prevail at the Canadian Sulphur Ore Company's deposits. Pyritous schist areas, in which intrusives are present, are worthy of careful examination. However, the heavy drift over much of the country makes prospecting difficult.

The iron pyrites industry in Ontario, while small compared with the nickel, silver and gold industries, is nevertheless of importance, as the following table of statistics, compiled from Reports of the Bureau of Mines, will show.

Table showing the Production and Value of Iron Pyrites in Ontario for the Thirteen Years 1901—1913.

Year.	Tons.	Value.
1901	7,000	$17,500
1902	4,371	14,993
1903	7,469	21,693
1904	13,451	43,716
1905	7,325	21,885
1906	11,090	40,583
1907	15,755	51,842
1908	20,970	69,980
1909	28,946	78,170
1910	33,812	98,353
1911	43,629	118,457
1912	20,744	71,043
1913	71,620	171,687
Total	286,182	$819,902

Fig. 54a. Cordova gold mine, mill and shaft-houses, Belmont township, Peterborough county.

MISPICKEL

About a decade ago the production of white arsenic from the mispickel and quartz deposits at Deloro, in Hastings county, formed an important part of the white arsenic consumed on the North American continent.* In 1902 the output of this material, which was manufactured wholly by the Canadian Goldfields, Limited, was valued at $48,000.00. The following year, however, it fell to $15,420.00, and by 1904 the Company had ceased operations. But during the last mentioned year 72 tons of arsenic contained in ore from Cobalt, marked a new era in the production of arsenic in Ontario, which, in the year 1912, was valued at about $79,000.00.

In southeastern Ontario there are no deposits of mispickel which are being worked at the present time. During the period when the Canadian Goldfields, Limited, at Delora, was producing gold and white arsenic, several other properties in the immediate area were being operated. These ore bodies, including those of the Canadian Goldfields, which consist of irregular quartz veins containing gold and mispickel, all occur near the contact of the western edge of a bathylith of granite known as the Moira granite, which covers an area of about 18 square miles, and occupies parts of the townships of Marmora and Madoc in Hastings county. The quartz veins and their associated minerals are probably connected genetically with the granite intrusion.

Other deposits of mispickel occur at the following places: (1) The Jeffry prospect, in the ninth concession of Faraday township, seven miles west of L'Amable station, Central Ontario Railway, Hastings county; (2) James property, at the village of Actinolite, Hastings county; (3) Kennefic property, lot 7, in the fifth concession of Anglesea township, Addington county; (4) Rebstock property, lots 2 and 3, in the fifth concession of Kaladar township, Addington county; (5) Cook property, located five miles southeast of Plevna village, Clarendon township, Frontenac county. Details concerning these properties are given in an article by J. Walter Wells, in the Eleventh Report of the Bureau of Mines, pp. 101-105.

FLUORITE

Several veins of fluorite, or fluorspar, varying in width from a few inches to six or seven feet, occur within a radius of two or three miles of the village of Madoc, on lot 11, concession XIII, and lot 10, concession XIV, Huntingdon township, lot 1, concession IV, and lot 2, concession III, Madoc township. They are all probably post-Ordovician in age, since one of them intersects limestone beds of the Black River formation. The others occur in various rocks of pre-Cambrian age, including felsite and crystalline limestone. Associated with the fluorite is barite in subordinate quantity.

The uses† of fluorspar depend primarily on its chemical composition and its neutral fluxing power. In the first instance it serves for the production of hydrofluoric acid and hydrofluosilicic acid—the latter serving as the electrolytic solution used in the production of electrolytic lead and antimony. As a flux it is used to reduce the melting heat and assist in elimination of impurities in the manufacture of enamels, glass and metals, especially in the manufacture of iron and steel. The open-hearth steel process consumes 75 per cent. of the production of fluorspar, while the remaining iron and steel processes consume 5 per cent. The mineral is used in increasing quantity in foundry practice, for which purpose it effects a smelt in about half the time were no fluorspar used. It is also used in the manufacture of sanitary ware and for other purposes.

The effect of fluorspar is, in addition to reducing heat and time of smelt in iron-steel manufacture, to assist elimination of sulphur and phosphorus.

---

*Fourteenth Report Bureau of Mines, Ont., Part I, p. 22.
†The Mineral Industry, 1912, p. 313.

IRON ORES

The Belmont and Blairton Iron Mines

The Belmont iron mine is in Belmont township, Peterborough county, and lies about three-quarters of a mile south of the Cordova gold mine. Like the ore bodies of the latter, it is associated with the intrusive mass of gabbro-diabase. The ore, which is magnetite, occurs at the contact of this rock with crystalline limestone. The iron deposit has been worked in the past from time to time in a small way, mostly as an open cut, but recently a shaft has been sunk and a shaft-house erected. A branch of the Central Ontario Railway runs from the property to Marmora station.

Several miles to the southeast of the Belmont iron mine, beyond the confines of our map, is located the Blairton iron mine, at the west end of Crow lake, from which has been shipped considerable magnetite from large open pits. The property has been idle for many years. The ore body also occurs at the contact of crystalline limestone, and the mass of gabbro-diabase, referred to in the preceding paragraph. The deposit lies at the northern edge of beds of Ordovician limestone, which lie uncomformably on the ore body and its associated pre-Cambrian rocks.

The Blairton iron mine, formerly known as the Big Ore bed, is one of the oldest mines in the Province of Ontario. In the year 1820 a blast furnace was erected on the Crow river, at Marmora, several miles to the east, to treat the magnetite from this property, and between that year and 1875 various attempts were made to smelt the ore, causing total losses to those engaged in the business of at least $500,000.*

At the present time it is difficult to obtain much knowledge regarding the extent of the deposit or the amount of ore shipped since the mine was first worked. A large, open pit, 250 feet wide by 120 feet long, may be seen, but it is now filled with water, and we did not ascertain its depth. One of the old reports of the Canadian Geological Survey, however, states that in 1873 ore was being hoisted from a depth of 120 feet.† A second opening, also full of water, lies to the south of the first, but is much smaller in size. Like most of the magnetite of southeastern Ontario the Blairton ore contains objectionable amounts of iron pyrites, which, during early attempts to smelt the ore at Marmora, gave rise to difficulties.

Statistics regarding production from the property in past years are very meagre, but the following information, which is derived from Reports of the Canadian Geological Survey, will give some idea of the amount of ore shipped. In 1867, for instance, a section of railway eight miles long, was built from Blairton to Healy's Falls, on the Trent river; the ore was transported from this point on the river by steamers to Rice lake, and from the latter place to Cobourg by road, a distance of twelve miles. During that year 300 men were employed in mining and sorting the ore, and towards the end of the season 150 tons per day were carried to Cobourg, and there shipped to the American side, where the cargo was forwarded to Pittsburg. In 1870 there were employed 135 men who produced 17,120 tons of ore valued at $44,300 at the mine.

A few years later, in 1873, the output of the Blairton was greater than that of any other iron mine in the country, and is said to have amounted to nearly 30,000 tons. In July of that year the ore was being shipped to Pittsburg at the rate of 300 to 400 tons a day. Incomplete as these statistics are, it is evident that the mine probably produced 100,000 tons of ore; how much more it is difficult to estimate.

The cost of labor in those days makes an interesting contrast with present day wages. During the year 1873, for instance, 150 men were employed at the Blairton, receiving $1.20 to 1.30 per day, according to the special kind of work in which they were engaged. They were furnished with cottages at the rate of $1.50 per month. And yet, in spite of these low labor costs, compared with present day schedules, a writer at about that time referred to the high cost of labor as one of the burdens which militated against the successful mining and smelting of iron ores in Canada.

*Report of the Royal Commission on The Mineral Resources of Ontario, 1890, pp. 321-322.
†Geol. Sur. Can., 1873-4, p. 244.

The difficulties under which these pioneers in the smelting of iron ore labored may be realized if we consider the case of one of them, Mr. Van Norman.* "In the fall of 1847 he moved to Marmora, and after expending a large sum in fitting up the furnaces, putting in machinery, ovens and blowing apparatus, erecting and repairing buildings, cutting cordwood and making charcoal for fuel, he got the furnace started in the summer of 1848. But the amount of iron produced from a given quantity of fuel was a sad disappointment, and nothing but disappointment and loss attended every effort. After the iron was made it had to be carted a distance of 32 miles to Belleville, over rocks and log-crossings and roads so rugged that waggons were constantly breaking, and the shoes of the horses were pulled off between the logs and stones. The obstacles were such that it was found impossible to bear up under them, and a new route was tried. A road nine miles long was built from the ore bed on Crow lake to Healy's Falls, on the Trent river; a steamer on the river carried the pig iron to Rice lake, and thence it was carted twelve miles to the dock at Cobourg. The cost of carriage by this route was cheaper than the other, and the pig iron sold readily at $30 to $35 per ton. But about this time the St. Lawrence canals were completed and foreign pig iron began to be brought up and sold at Belleville and Cobourg at $16 per ton. This circumstance alone settled the question of producing charcoal iron in the province except at a ruinous loss to those engaged in the business, and Mr. Van Norman was compelled to close his works with the loss of everything."

Some general notes by Mr. B. J. Harrington on the iron industry in Canada during the early seventies are of interest.† He remarks—"From what has been said it is evident that exceedingly little has been, or is being, done in the way of iron smelting in Canada; nor is there any prospect of an immediate increase in this important industry, except in the Province of Nova Scotia. This is due to a variety of causes, and among them, in some instances, to scarcity of fuel, in others to difficulty and cost of transportation, or to cost of labour. Notwithstanding such drawbacks, however, there seems little doubt that, with proper management, iron might be profitably made in many localities.

"The owners of iron mines, instead of smelting their ores on the spot, are more and more turning their attention to shipping them to the United States, as this has been found, in most instances, to yield a fair profit. During the past year [1873] they were worth from $6.00 to $9.00 a ton in Cleveland. . . . . The total production of iron ore in the year ending June 30, 1873, was, therefore, in round numbers, about 60,000 tons,—a quantity exceedingly small, though far ahead of previous years. Nearly the whole of the ore shipped has been from four or five mines."

It may be added that in the last few years the Blairton mine has been explored by diamond drilling with a view to ascertaining the extent of the ore body. These operations have not as yet resulted in the active working of the property. The Mines Branch of the Department of Mines, Ottawa, has also recently made magnetic surveys of the Blairton and Belmont iron mines. Other magnetite deposits of Ontario have been mapped by the Mines Branch, from which department copies of the maps may be obtained.

A few years ago Mr. G. C. Mackenzie undertook experiments on the magnetic concentration of iron ore from various deposits in Ontario, including the Blairton and Belmont ore bodies.‡

The Mines in the Vicinity of Madoc

Within a few miles of the village of Madoc, in Hastings county, there are several deposits of both magnetite and hematite, none of which are being worked at the present time. Among these may be mentioned the Dominion, the Seymour, the St. Charles, and the Sexsmith, all of which produced magnetite, and the Wallbridge, and what is now known as the Eldorado copper mine, the two latter having produced hematite. These

*Royal Commission on the Mineral Resources of Ontario, 1890, p. 321.
†Geol. Sur. Can., 1873-74, p. 257.
‡The Iron and Steel Industry of Ontario, 17th Report, Bureau of Mines of Ontario, p. 273.

deposits occur in crystalline limestone and other rocks near the contact of the Moira granite. They were comparatively small producers, and it is doubtful if their combined output amounted to 100,000 tons. Some attention was attracted to the Dominion mine, on lot 2, concession II, Madoc township, in 1892, by the discovery of small quantities of smaltite and cobalt bloom,* which minerals at that time were of rare occurrence in Ontario. The magnetite is associated with volcanic fragmental rocks classed with the Madoc andesite and rhyolite. The Seymour mine, on lot 11, concession V, Madoc township, was one of the earliest producers of iron ore in Ontario. Ore from this property was smelted at Madoc village in 1837. In that year a blast furnace was erected by Mr. Seymour, and according to government reports an excellent grade of iron was produced, although the venture, which was operated for about eight years, was not a financial success.† The St. Charles mine, which is situate on lot 4, con. VI, of Madoc township, occurs in a complex of rocks, which to the north a few hundred yards are seen to consist of volcanic fragmental material. To the east of the ore body less than 100 yards, an outcrop of the massive Moira granite occurs. At the Sexsmith mine, on lot 8, concession VII, of Madoc township, the magnetite occurs at the contact of a fine-grained, pink, acidic phase of the Madoc rhyolite, and crystalline limestone. Just to the northeast of the ore body a fine-grained felsite dike intersects the crystalline limestone.

The Eldorado copper mine, near Eldorado village, township of Madoc, was originally worked for hematite, but the ore gradually passed with depth into iron and copper sulphides, proving that the hematite was an alteration product due to the surface weathering of the sulphides. The oxidized zone varied between 60 and 80 feet in depth. Mr. E. L. Fraleck has some interesting remarks on this subject:‡ "Several hematite localities in Eastern Ontario are known to be underlain with pyrites deposits. These have as yet been unexplored, but in years gone by various hematite properties were worked for iron ore, until contamination from pyrite became so great as to prevent further shipments, when in every instance the property was abandoned. The workable depth for iron ore varied between 50 and 70 feet. From the bottom of the largest hematite deposit in Eastern Ontario, the writer has seen pieces of ore with ān inner core of high grade pyrite upwards of a foot in diameter. In some instances the ore consists of the soft red hematite, and in others the hard dense pyrite. There seems to be no doubt that these hematite deposits were at one time the gossan capping of the sulphide ore bodies. . . . In only one case of this kind has development taken place, namely, at the Eldorado copper mine, where it has been shown that a hard dense hematite has resulted from the alteration of a copper and iron sulphide underneath. The depth of alteration there varied between 60 and 80 feet."

The deposit occurs in crystalline limestone at the contact of an intrusive mass of Moira granite, oval in surface outline, and about half a mile in length by 500 or 600 feet in width. In other parts along this same contact occur small deposits of magnetite, and it may also be added that the Richardson gold mine, which was worked in the sixties, occurs in crystalline limestone near the contact with the granite.

---

*Mr. W. F. Ferrier, in 1892, detected cobalt bloom, or erythrite the hydrous arsenate of cobalt, and smaltite at the old Dominion iron mine, lot 2, concession II, Madoc township, Hastings county. Regarding the occurrence Mr. Ferrier says:—"Blocks of the iron-ore sometimes show surfaces of over nine inches square, coated almost completely with thin-bladed crystals and earthy coatings of the erythrite, which still retains its beautiful peach-red and pink tints of color, although exposed so many years to the action of weather. Little masses of earthy erythrite also occur, filling cavities, and this mineral appears to have been largely derived from the alteration of smaltite, etc. The smaltite, of a tin white color on a freshly fractured surface, is distributed through the iron ore, usually in small, but very perfect, crystals, mainly cubes and octahedrons, which, when weathered, tarnish, and greatly resemble iron pyrites. The massive mineral has also been observed. The minute crystals are often thickly aggregated together so as to form small patches in the iron ore." Report Canadian Geol. Sur., Vol. VIII, p. 129A.

Mr. Ferrier also detected erythrite from the Cross mine, Madoc village, Hastings county. (Report Canadian Geol. Sur., Vol. X, p. 117A.) More recently the mineral has been found elsewhere in the vicinity of the village.

†Geology of Canada, 1863, p. 675.

‡Ont. Bureau of Mines, Vol. XVI, p. 182.

Mr. E. T. Corkill * makes the following notes on the Eldorado copper property: "This mine, which was originally opened for iron, but which has for the last couple of years been worked for copper, is owned by the Medina Gold Mining Company. . . . The ore is chalcopyrite, and was found at a depth of 75 feet, displacing the hematite, which constituted the ore body to this depth. Some very fine samples of chalcocite are also found in the ore. The north or hanging wall of the ore body is granite, and the south or foot wall crystalline limestone. The ore body runs east and west in a wide, open fissure, in the contact between the granite and limestone. The open cut worked for iron is 75 feet in depth. From this level a shaft has been sunk 75 feet, with drifts and cross-cuts at different levels. At a depth of 35 feet in the shaft a level has been driven, and 105 feet of drifting done. Twenty feet deeper in the shaft another level has been run and 170 feet of drifting done. At the 75-foot level there are 175 feet of drifting. The ore body, which occurs as a shoot, dips to the northeast. At the lower level drifts have been run into it and sinking on it has begun. . . . The first copper smelter in eastern Ontario was blown in at this property on June 25th, 1906. The furnace is south of the mine, on the side of the hill, which furnishes ample ground for slag dump, and is so situated that the swinging arm derrick used for hoisting ore from the mine dumps the ore at the door leading to the charging floor. The furnace is four feet in diameter, round, water-jacketed, manufactured by the Allis-Chalmers Company, of Chicago, is equipped with the regular style of settler, and has a capacity of about 50 tons per day. The height from base of furnace to charging floor is 12 feet."

To the south of the Eldorado copper mine two miles, occurs the Wallbridge hematite deposit beside the Hastings road. The large open pit is partly filled with water at the present time, and there is scant reference in the literature to the mine. The ore body has been described† as "a large mass of ore in dolomite with no defined walls." Mr. Courtenay De Kalb‡ inspected the property in the year 1900, and said: "This mine, on the east half of lot 12, concession V, Madoc, is still in operation, with some promise of continuing to be a steady producer. The ore is a soft red hematite. Operations have been carried on for four months, yielding from 15 to 20 tons of ore per diem. The old shaft, extending 35 feet below the present working, is now filled with debris, but will be cleaned out as mining proceeds. The depth from the edge of the pit to the working place is 60 feet."

If it be assumed that the hematite at this property is the gossan capping of a sulphide deposit, then it may be noted that the oxidized zone in sulphide ore bodies in southeastern Ontario is generally not so deep as that at the Wallbridge and Eldorado mines. This may be due to the fact that at these two properties the oxidized zone was partly protected from glacial scouring by the covering of Paleozoic sediments. The latter completely surround the ore body at the Wallbridge mine, leaving an opening about the size of the pit. The Paleozoic sediments also surround the Eldorado copper mine, but are distant from half a mile to a mile from it.

*Ont. Bureau of Mines, 1906, Vol. XV, Part I, p. 90.

†Report of the Royal Commission on the Mineral Resources of Ontario, 1890, p. 132.

‡Bureau of Mines, 1901 Vol. X, p. 129.

GOLD MINES AND PROSPECTS

The Cordova Gold Mine

The Cordova gold mine is in the township of Belmont, at the eastern border of Peterborough county. The property was worked for several years by an English company, but operations ceased in the fall of 1903. It then lay idle until about three years ago, when the mine was unwatered and worked by Mr. Peter Kirkegaard, of Toronto. The property is equipped with a mill having 30 stamps of 850 pounds each, 6 Wilfly tables, and a cyaniding plant for treating the concentrates. A compressor, capable of generating 800 horse power, is located at the foot of Deer lake about two and a half miles north of the property, where a waterfall is utilized.

The ore-bodies occur in a coarse-grained gabbro-diabase which invades the Grenville and Hastings series. The veins are of quartz, with which are associated iron pyrites, feldspar and calcite. The wall rock has been altered to a chlorite-schist, or chlorite-mica schist, sometimes 50 feet wide, there being a gradual transition between the fresh gabbro-diabase and the schist. The latter is impregnated with quartz veinlets, parallel to the schistosity. Consequently there is not a definite boundary line between the ore and the shistose wall rock. The ore body is low-grade, the hand-culled material which is treated in the mill averaging between $5.00 and $6.00 per ton.

The deposits may have been formed by hot solutions which followed the intrusion of the gabbro-diabase.

There are several shafts on the property, two of which have reached depths of four or five hundred feet, while some of the stopes connected with shaft No. 1 are twenty feet or more in width. Details of the underground workings will be found in the reports of the Bureau of Mines.

The Deloro Mine

Reference to the Deloro gold and mispickel mine, in Marmora township, has been made on a preceding page. This mine, probably the best known gold property in southeastern Ontario, is outside the boundaries of any of the areas mapped by us. The deposits that have been worked occur on lot 9 in the eighth concession and on adjoining lots. Numerous notes descriptive of this mine and adjacent properties are to be found in the reports of the Geological Survey of Canada, in those of the Ontario Bureau of Mines and elsewhere.*

The ore bodies at the Deloro mine and adjacent properties lie near the contact of the intrusive granite, of the western edge of the Huckleberry hills, with dark Keewatin schists and associated crystalline limestone of Grenville age. Overlying these rocks unconformably is Black River limestone.

The ore bodies consist essentially of quartz lenses in the schist which contain visible gold and mispickel. The lenses conform to the strike of the schist and cut across dikes of granite which intrude the latter. Near the surface the ore was comparatively rich, but the value gradually decreased in depth. At a depth of 500 feet in the inclined shaft the gold represented only two or three dollars a ton, but massive mispickel was present. Two factors contributed to the closing of the mine, viz.: the encountering of a heavy flow of water in the lower levels, and the discovery of rich arsenical ores at Cobalt. Deloro was the pioneer white arsenic producer in North America, but the ores now treated there all come from Cobalt.

The ore of the Deloro mine and of adjacent properties appears to be genetically connected with the Moira granite intrusion. The openings occupied by the ore bodies were probably formed by the contraction of the granite mass on cooling, and the ores came from the waters that followed the intrusion.

Other mispickel and gold deposits in Marmora and adjacent townships are described in the report to which reference has been made in a preceding paragraph, page 105.

*See Report of Ontario Bureau of Mines, Vol. XI, pp. 195, 196.

The Sophia (Diamond) Gold Mine

This mine, Fig. 55, is on lots 14 and 15 in the tenth concession of Madoc, about one mile west of the village of Queensboro. Gold was discovered here about 1896, and two veins were uncovered in the hornblende and chlorite schist. One was a long vein of rather massive quartz, five feet wide in places, while the other was a narrow mispickel vein containing rich showings of gold.

In a report written a dozen years ago, Mr. Courtenay De Kalb, then Inspector of Mines, said:* "There are two veins on the property, viz., the 'mispickel vein,' with a course due north and south, and the 'free milling vein,' running north-west and south-east. The workings consist of the following: On the mispickel vein, No. 1 shaft, with a cross-section of 9 by 18 feet, and a depth of 60 feet. Drifting has just commenced at that depth. Hoisting is still done by hand windlass operating a bucket on a skidway. On the free milling vein is the principal working shaft known as No. 2. This has

Fig. 55.—Sophia (Diamond) gold mine. Lots 14 and 15, concession 10, Madoc township, Hastings county.

a cross-section of 9 by 18 feet and a depth of 105 feet. There are two levels, the 60-foot and the 100-foot. On the 60-foot level there is a north-west drift 20 feet long and a south-east drift 10 feet long. . . . . A skipway was being installed, and an inclined trestle carried the track to the upper part of the mill, where was located the hoisting engine. The skip will thus be drawn directly from the mine into the mill and then dumped. No. 3 shaft is also on the free milling vein. This is 60 feet deep with the same cross-section as the other shafts. . . . . The equipment comprises a 7 x 10-inch Blake crusher, 10 stamps of 900 lbs. each, a Wilfly concentrator, a 70-h.p. return flue boiler, and a 50-h.p. Corliss engine. There is also a blacksmith shop 100 feet south of shaft No. 2, and an assay office 150 feet south of this shaft."

Operations were suspended from the spring of 1901 until 1908, when Mr. E. T. Corkill states that, at the time of his inspection, July 27th, 1908, the No. 3 shaft was being unwatered and the mill overhauled.

*Tenth Report Bur. of Mines, 1901, p. 117.

No further work has been done. References to this property may be found in the following Bureau of Mines Reports: Vol. 7, pp. 92-93; Vol. 8, pp. 41, 288; Vol. 10, p. 117; Vol. 11, pp. 102, 200, 236; Vol 17, p. 83.

Prospect pits are shown on the map about three-quarters of a mile to the southeast of the Diamond property. Some rich gold samples came out of the pit on the east side of the road, lot 13, concession 11, Madoc township.

Golden Fleece

The Golden Fleece mine, on lot 25 in the sixth concession of the township of Kaladar, was worked in a small way several years ago, but the low-grade nature of the ore body has not encouraged extensive exploration. In 1901 the senior author of this report spent a few weeks in southeastern Ontario examining the gold deposits, and his report was published in the Eleventh Report of the Bureau of Mines, pages 186-207. The following is an extract from this article: "The deposit lies near the contact of the diorite schist and a conglomerate. The ore is found in association with the schist where it occurs in quartz in the form of a vein, and in quartz more or less mixed with the schist. A shaft about 25 feet deep has been put down on the vein, and there is a pit of considerable size in the schist. Material taken from these openings was milled, with what is claimed were satisfactory results. The sulphide in the ore is pyrite. The schist which strikes southwestward contains quartz stringers through it for a considerable distance along the strike. Exposures of quartz also occur on the more northern part of the property. Very rich specimens of gold-bearing quartz were obtained at the top of the shaft when the property was discovered. At the present time there is no difficulty in obtaining 'shows' of gold by panning the quartz and impregnated schist. The deposit cannot be considered a high-grade one. Any attempt to work it should be made on the assumption that it is a large low-grade ore body." Later work has shown that the diorite schist referred to belongs to the Keewatin greenstone series and the conglomerate to the Hastings series.

The plant consists of a 3-drill compressor, a hoist, a 50-h.p. boiler, and a 10-stamp mill. In 1907 the shaft was sunk to a depth of 85 feet vertically, and about 50 feet of cross-cut driven. No development was done in drifting on the vein on the 85-foot level. The ore milled in that year was taken from surface workings.*

Other Gold Deposits

Descriptions of other gold deposits of the district, most of which do not lie in the areas we have mapped, will be found in the reports of the Ontario Bureau of Mines and in those of the Geological Survey of Canada.

*Report, Bureau of Mines, Vol. XVII, p. 83.

TALC

A large body of talc, known as the Henderson talc mine, Fig. 57, is located on the southern outskirts of the town of Madoc, its position being shown on the map of the area. Until about two years ago this mine was the only important producer of talc in Canada, and it has therefore attracted considerable attention. The existence of the deposit has been known for fifteen years or more, but it is only within the last five years that it has developed into a large producer. The success of the talc industry at Madoc is due to the untiring efforts of Mr. George H. Gillespie.

The material, of which there is little or no waste, is drawn in wagons to the talc mill at the railway station in the village of Madoc, where it is ground and separated into various grades. The talc is the massive variety, with a prevailing white color.

The deposit occurs in a brown, quartzose, crystalline limestone of the Grenville series, an analysis of which shows it to have the following composition: CaO 29.29 per cent., MgO 15.52 per cent., CO_2 43.67 per cent., insoluble 4.62 per cent. The talc has a width which varies from 25 feet or less to 40 feet, and it has been mined a distance of about 500 feet horizontally, but the extent of the body has not yet been determined in the underground workings. The surface on every side of the hill on which the property is located is covered with drift. The crystalline limestone on both sides of the deposit contains bands of white quartz several feet or more wide, often having the eozoon structure shown in Fig. 4. A horizontal plan shows the talc to occur in the form of a horseshoe, or the letter "V," due to the strata having been sharply folded.

It is certain that the talc has resulted from the alteration of the magnesian limestone, since many parts of the occurrence still show distinct traces of the original bedding. But the various changes which took place, before the deposit reached its present condition, are not altogether clear. It is probable that the limestone was first altered to tremolite, which later became changed to talc. At any rate this process can be seen to have played at least some part in the formation of the material, as may be observed in the crystalline limestone fifty or a hundred feet from the deposit. Here hand specimens may be obtained which show tremolite in the limestone, and it may be seen that the tremolite is altering to talc.

The ultimate production of talc from magnesian limestone requires the introduction of silica and water and the removal of lime. The silica and water may have been supplied through the intrusion of the Moira granite, which no doubt gave off silica-holding waters. The granite occurs several hundred yards to the east and west of the deposit. If, however, the original magnesian limestone contained sufficient quartz, the talc might have been formed through the agencies of regional metamorphism, i.e., heat, pressure, and circulating water, in which case it would not be necessary to suppose that the granite intrusion had any genetic connection with the deposit.

The Connolly talc property, owned by the Canadian Talc and Silica Company, occurs a few hundred feet to the northeast of the Henderson talc mine, on an adjacent lot. Very little work has been done on this deposit, but, although the intervening area is drift-covered, it would appear that the two deposits may be continuous.

Powdered talc* is used in the manufacture of toilet powders, of soap and of various kinds of paper. It is readily incorporated, and its fibrous structure makes it superior to clay on account of its strength. Powdered talc is also coming into use for admixture in wall plasters, in waterproof paints, and in steam-pipe coverings. It is also used for foundry facings and facings of rubber moulds, and for the dressing of skins and leathers. For the sizing of cotton cloth, freedom of grit is more essential than any particular color, so as not to dull the cutting knives.

In the form of soapstone, it is used for griddles, hearth stones, gas tips, marking pencils, switchboard panels and other electrical uses.

*The Mineral Industry, 1912, p. 819.

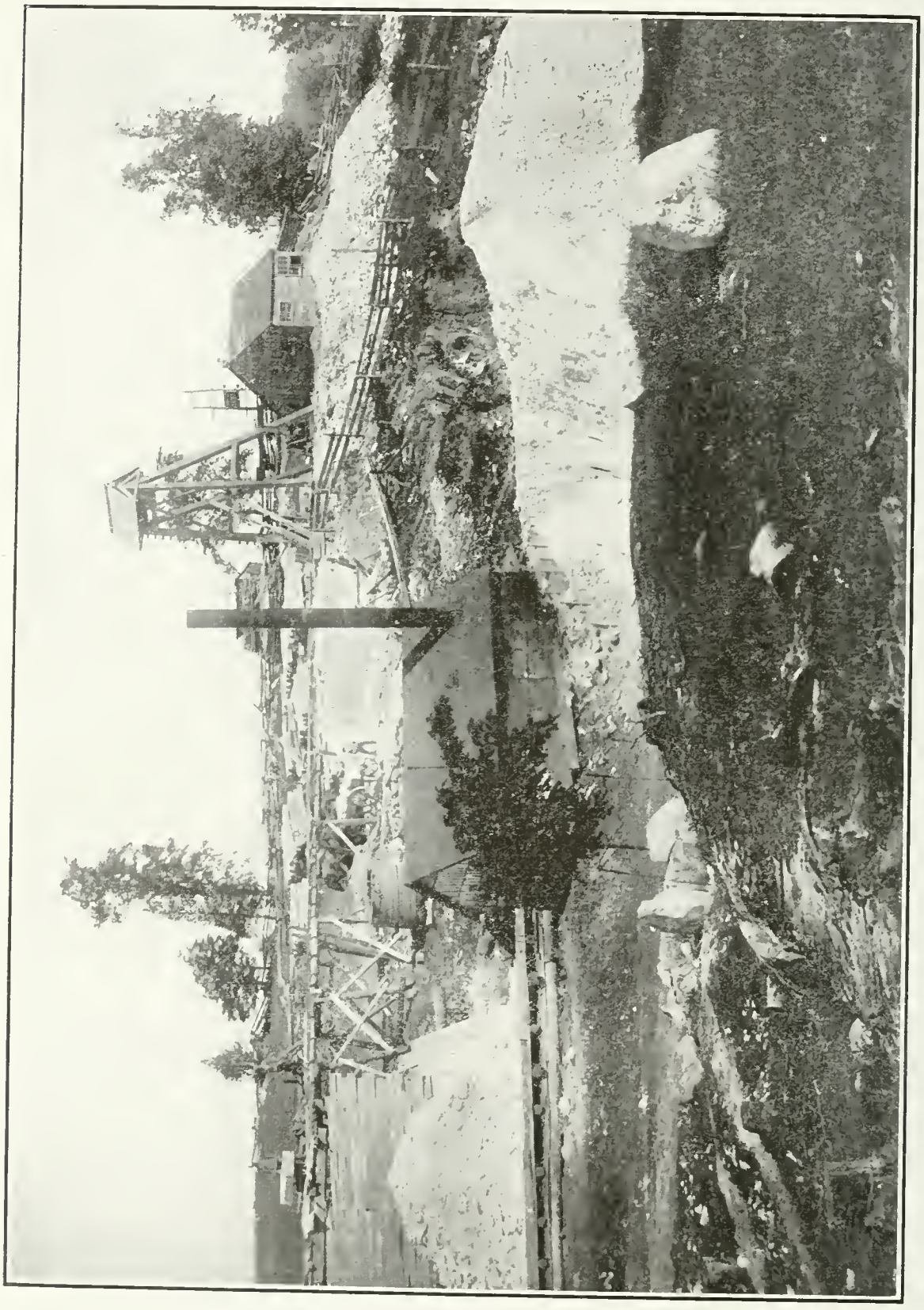


Fig. 56.—Henderson talc mine, Madoc, Hastings county.

The statistics regarding talc, prepared by the Bureau of Mines, show that some 40,000 tons of the material have been mined during the years 1899-1913, inclusive, almost all of which came from the Henderson talc mine. The balance was obtained from deposits at Eldorado and Gananoque. It was not until September, 1908, that the material was ground in Ontario. In that year the talc mill began operations at Madoc under the management of Geo. H. Gillespie, and the following table shows the rapid increase in the production of the material after this date. It may be added that in 1911 a plant for grinding talc was erected at Eldorado by the Canadian Talc and Silica Company, Limited, which is now producing, the crude talc being obtained near the village.

Table Showing Production of Talc in Southeastern Ontario, 1899-1913.

Year.	Tons.	Value.
1899	100	$ 500
1900	1,000	5,000
1901	400	1,400
1902	697	930
1903	920	2,625
1904	1,313	2,919
1905	1,120	2,240
1906	1,235	3,030
1907	1,870	5,010
1908	1,016	3,048
1909	4,350	8,700
1910	5,824	46,592
1911	5,404	47,725
1912	6,726	61,358
1913	8,238	74,500
Total	40,213	$265,577

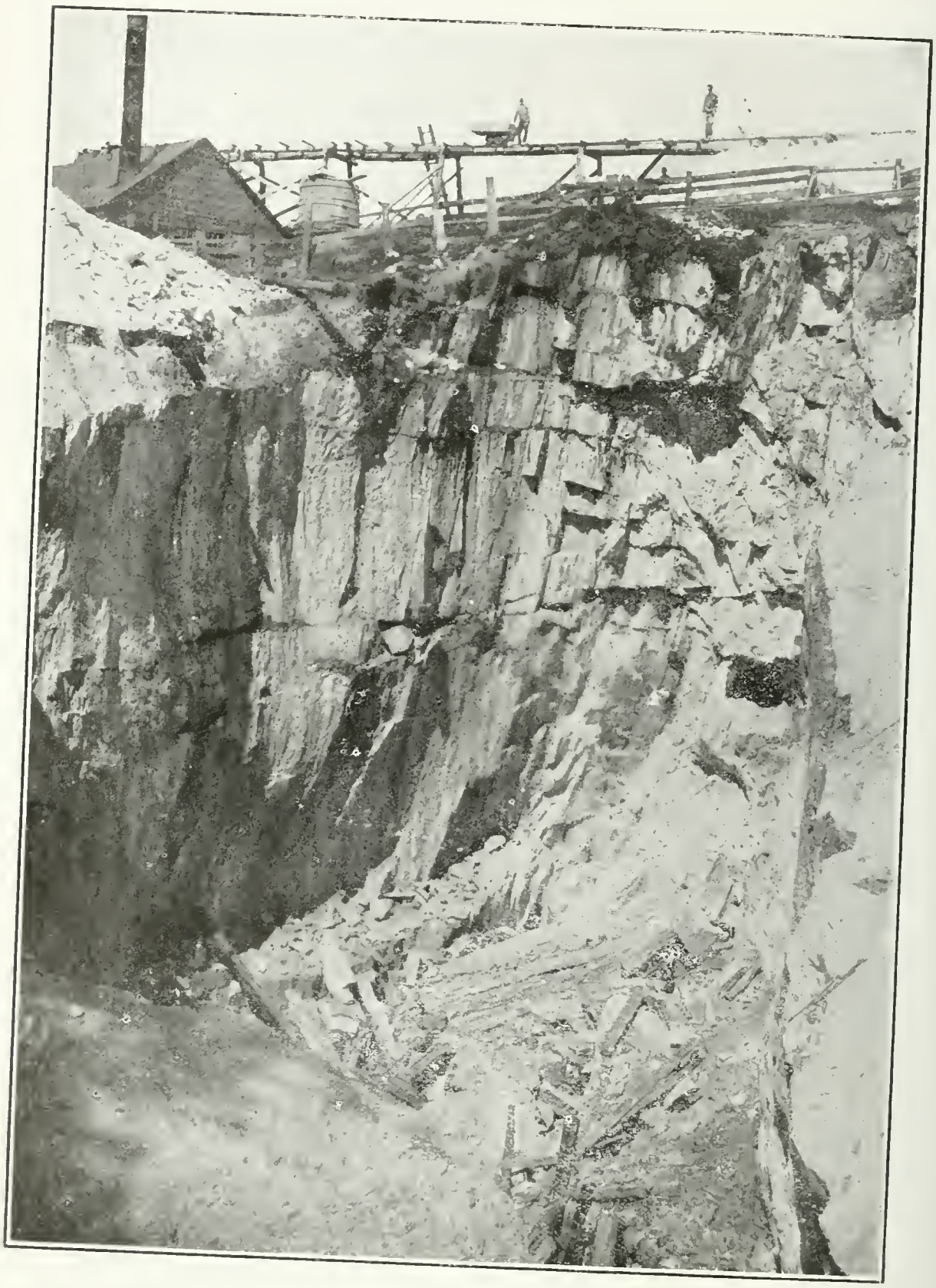


Fig. 57.—Open pit, Henderson talc mine, Madoc, Hastings county.

ACTINOLITE

Large bodies of actinolite occur in the townships of Elzevir and Kaladar in Hastings and Addington counties. Hundreds of tons of the material, with which is often associated serpentine or talc, have in past years been ground, and used for roofing purposes. Buildings in several cities of the United States are roofed with this material. None of the occurrences are at present being worked.

Seven of the more important open cuts, from which the actinolite has been shipped, are shown on the map.* Some of these occur on lots 4 and 5 in the seventh concession of Elzevir township, about three miles east of the village of Actinolite. The material here is clearly a metamorphosed basalt, or other greenstone, of the Keewatin series, which has been altered by the great intrusian of Laurentian granite-gneiss. The latter sends immense dikes into the greenstone and holds great blocks of it. In places the greenstone has been entirely altered to serpentine, which contains stringers of asbestos a fraction of an inch in width. This may be seen on lot 4 in the seventh concession of Elzevir.

The largest belt of actinolite occurs on lots 7 and 8 in the eleventh concession of Elzevir, crossing into lots 8 and 9 in the first concession of Kaladar. The actinolite here has associated with it little or no serpentine. The origin of this belt is not as clear as that described in the preceding paragraph. As will be seen from the map, it occurs in the form of a lens a mile and a half long and six or seven hundred feet wide, closely infolded in the Hastings conglomerate. Here and there parts of the belt show small patches which in their texture suggest that the lens was originally an altered gabbro or other basic rock. There is, however, considerable ferruginous carbonate or dolomite intimately associated with the actinolite of this lens, and the authors have kept in mind the possibility that the lens is an altered crystalline limestone.

Some of the actinolite appears to be suitable for decorative purposes, as, for example, the lens which occurs on lot 12 in the second concession of Kaladar, four miles southwest of the village of Flinton. This occurrence is found at the contact of a mica and chlorite schist and granite. The actinolite here has a beautiful radiated texture and some large blocks have been quarried and shipped from Kaladar station.

Actinolite was first ground in Ontario for roofing in 1883 at the village of Actinolite, which, at that time, was called Bridgewater. The process consisted of crushing in a Blake crusher and grinding in attrition mills to 60 mesh without destroying the fibre, water power being obtained from the Skootamatta river. A proportion of mica was added to increase the bond. When applied to a roof, eleven gallons of coal tar, or its equivalent, were mixed with 100 pounds of the ground material and the mixture was spread on the roof while hot, the total thickness, including the felt on which it was spread, being half an inch. For six or seven years after operations began in 1883 the value of the output was $6,000 per annum. Following this the mill was operated at intervals, but statistics regarding production are not available until the years 1901, 1902 and 1903, when the output was valued at $3,126, $6,150, and $1,650, respectively. The industry was brought to a standstill in June, 1904, by the destruction of the mill dam.

It may be added that a new mill, at Actinolite railway station, has recently been constructed, but the output to date has been very small, some 32 tons being produced in 1910.

Mr. Joseph James has been closely associated with the actinolite industry since its inception.

ROAD MATERIAL AND BUILDING STONES

Of the various materials which are used for road "metal" trap rock is unsurpassed. The trade name "trap" is given to various fine-grained, dark-colored igneous rocks which are generally basalt or diabase. In southeastern Ontario there is an unlimited supply of this material.

In the Belmont Lake area, in Peterborough county, there occur several square miles of a dark, fine-grained basalt, detailed descriptions of which have already been given in

*Actinolite-Cloyne sheet.

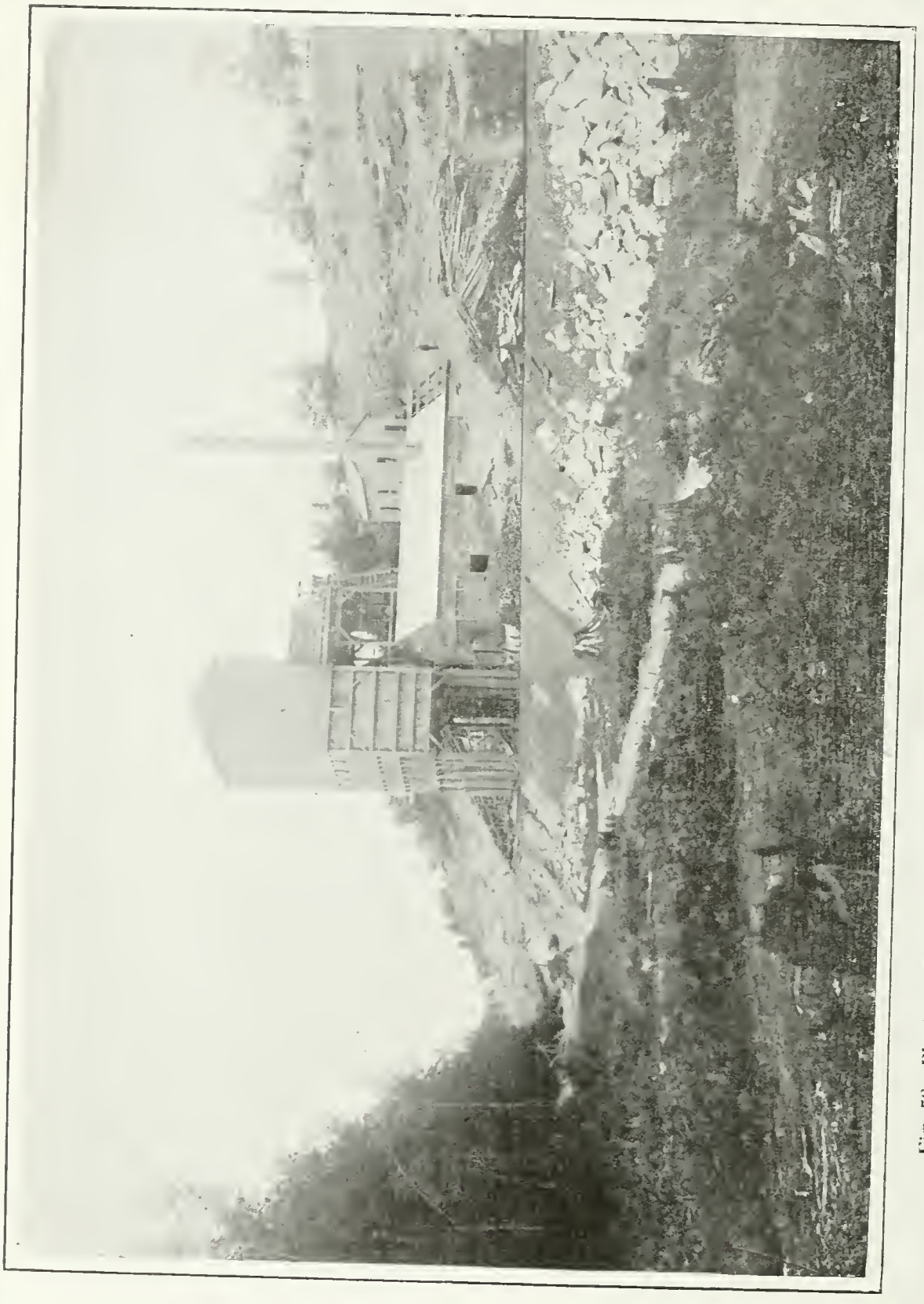


Fig. 58.—Plant and quarry of Ontario Rock Company, three miles east of Havelock, Peterborough county.

another part of this report. The rock is being quarried and crushed by the Ontario Rock Company, Fig. 58, at a point three miles east of Havelock, a divisional station on the Canadian Pacific railway. The company built a spur line, three-quarters of a mile long, from the railway, which gives direct connection with the large centres of population. The company has also installed a crusher having a capacity of four or five hundred tons per day. While at present the demand for this high-grade road metal is limited, there is little doubt that in a few years a much larger market will develop, on account of the good roads movement recently inaugurated.

Other areas of good road metal occur north of Crow lake, which lies a few miles to the east of Belmont lake, and also in the vicinity of Cordova gold mine, at both of which places there are outcrops of gabbro-diabase. Suitable material may also be obtained about two miles northwest of the village of Madoc, on lot 6 in the fifth concession of the township of Madoc, and, still farther east, on lot 6 in the tenth concession of the last-mentioned township, and in the vicinity of lot 10 in the second concession of the township of Elzevir. All of these areas lie either immediately adjacent to a railway, or within a few miles of one.

Large supplies of Paleozoic limestone for use in concrete and for other purposes are available, at points convenient for shipping. In various parts of the district near Belleville, on Lake Ontario, this limestone is extensively employed in the manufacture of Portland cement.

Granite, as will be seen from the maps, occurs in various parts of the district. A pink, medium-grained variety of this rock is exposed on the south shore of Moira lake, Madoc township. Prominent hills in the vicinity consisting of the rock, near the line of the Grand Trunk railway, offer sites for quarries. Other outcrops of granite that are fairly accessible for shipping purposes are to be found in vicinity of the village of Actinolite and of the Deloro mine.

LITHOGRAPHIC STONE

The occurrence of limestone of lithographic character in Ontario has been known for many years. Several quarries have been opened with a view to establishing an industry, and those near Marmora, Hastings county, may be particularly mentioned. The senior author of this report has dealt with this subject in another publication.*

The following extract, giving the general characteristics of the Black River limestone, as well as its lithographic qualities, is taken from this report:

"The only limestone which has been found to be perfectly suited for use in the lithographic art, is, peculiarly enough, that first employed for the purpose, which is obtained from the Upper Jurassic strata at Solenhofen, in Bavaria. The stone is not only rare, but valuable. It has been sought for in many parts of America, but with little success. Stone from various States has been used to a limited extent. Ontario has probably produced as much as any other part of America. Although, however, attempts have been made to establish an industry here during the last fifty years, little progress has been made, and no lithographic stone has been quarried for some years.

"The requirements for a good stone are that it shall be fine in grain, of a homogeneous texture, not too dark in color, and free from quartz, pyrite and other minerals which are commonly found in limestone. It should, moreover, possess sufficient porosity to absorb ink and be soft enough to be worked readily with an engraver's tool. Varieties which possess most of the other requisites are often brittle and cannot be gotten out in pieces with large surfaces.

"In Ontario lithographic stone has been quarried chiefly in the Black River formation near the village of Marmora, in Hastings county. This formation, which bounds, on the south, the Laurentian area, runs in a band from Kingston city to the Georgian bay. Certain strata in the formation through the whole distance possess lithographic properties, but usually are defective owing to the development of small crystals of calcite. In the township of Rama, on Lake St. John and Lake Couchiching, similar strata to those of Marmora have been tested. Thin sections taken respectively from the Marmora and Bavarian stone showed considerable difference when examined microscopically by the writer. The Marmora stone exhibited a more uneven texture owing to the presence of secondary crystals of calcite, while the Bavarian was uniform in character."

*Ont. Bureau of Mines, Vol. XIII, Part II, p. 6.

The lithographic stone near Marmora, on lot 9, concession III, of Marmora township, was studied by C. W. Volney,* who made two analyses of the material, which are given in the following table. A third is added, for comparative purposes, from Solenhofen.

	1.	2.	3.
Insoluble silicate	3.71	3.60	2.00
Organic matter	.40	1.29	.72
$CaCO_3$	89.98	88.03	90.93
$MgCO_3$	2.78	2.50	3.57
Soluble silica	.73	.49	.52
Al_2O_3	...	.57	.58
Fe_2O_3	.15	.35	.23
FeO	.10	.04	.13
H_2O	1.25	1.36	.40
Total	99.10	98.23	99.08

1. Light blue-grey stone from Crow lake, near Marmora, Hastings county.
2. Dark blue stone from Crow lake, near Marmora, Hastings county.
3. Dark blue stone from Solenhofen.

Mr. Volney says: "The dark blue variety of Canadian stone is from a layer about 70 feet below the general surface of the country near Marmora, showing at the borders of Crow lake. Here some fifty feet of the overlying strata have been broken and washed away, not only exposing on the faces the different layers, but also enabling me to reach those underneath to the level of the lake. Of some twenty-seven layers examined by me only one gave encouraging results, and this is the dark blue variety [No. 2], analyzed by me as above."

Half a mile west of the quarry examined by Mr. Volney, on lot 7, concession III, of Marmora township, there is another quarry.† "The ground where the quarry was opened is ten feet above the level of the lake, and the rock is covered with only a few inches of drift . . . . The quarry is 100 feet long by 50 wide, and has been opened to a depth of 25 feet. The jointings are in straight lines, and far enough apart for blocks to be taken out of any size that is likely to be required. The first layer of lithograph stone is seven feet from the surface, and has a thickness of ten inches. It is marked with a white cloud, and is not of uniform texture. Three inches below it is the second layer 7 inches in thickness. The third layer has a thickness of 16 inches, the fourth 12 inches, the fifth 15 inches, and the sixth, seventh, eighth and ninth, from 6 to 8 inches. All these layers are separated from each other by beds of limestone ranging from 3 to 14 inches in thickness, and suitable for building stone. The several layers below the first differ from each other more or less in color and texture, one being of a dark cream color, and the others of varying darker shades from grey to blue. The fifth is a dark blue stone, but very fine in texture."

MARBLE

Varieties of crystalline limestone suitable for decorative material, known as marble, are found in various parts of the district. The quarries at Bancroft have demonstrated that there occur in southeastern Ontario marbles of striking beauty, having great variety of color and texture. These marbles are now being used with success for interior decorative purposes, and a fine example of the effects obtained may be seen in the main

*Report of the Bureau of Mines, Vol. II, pp. 182-183.
† " " " Vol. III, p. 137.

office building of the Standard Bank, Toronto. There is, undoubtedly, in this part of the province an inexhaustible supply of marble both for ornamental and building purposes. Government reports describing these marbles have been published.*

Crystalline limestone is also being employed for the production of a material known as Roman stone, which is used for building purposes. Limestone for this purpose is quarried at the Hastings quarry on the Bay of Quinte railway one mile south of the village of Actinolite.

The chemical composition of the crystalline limestones has been given in other parts of this report.

*Report of Ontario Bureau of Mines, Vol. XIII, Part II, by W. G. Miller. Memoir No. 6, by F. D. Adams and A. E. Barlow, Geological Survey of Canada. Building and Ornamental Stones of Canada, by W. A. Parks, Mines Branch, Ottawa.

Fig. 59—Map showing distribution of pre-Cambrian and Paleozoic rocks in the Province of Ontario.

APPENDIX

CORRELATION OF THE PRE-CAMBRIAN ROCKS OF ONTARIO, WESTERN QUEBEC AND SOUTHEASTERN MANITOBA

During their study of the pre-Cambrian geology of southeastern Ontario, the authors have attempted to correlate the rocks of this district with those of other areas which they have examined in considerable detail within recent years. On page four a general account of the conclusions arrived at is given. In comparing the descriptions by other authors of various areas in Ontario, western Quebec and southeastern Manitoba, some of which the present authors have not had the opportunity of examining, a striking similarity in the character and age relations of the groups is found. It was, therefore, thought that it would serve a useful purpose if the pre-Cambrian rocks of all the areas that have been described in some detail, especially those that contain conglomerates as well as the older igneous and sedimentary rocks, were shown on one table. The accompanying table has accordingly been prepared. In making use of this table the reader should, however, remember that the classification of the rocks of certain areas is based on descriptions in reports which the present authors may not have correctly interpreted, and which they have not had an opportunity to verify.

The following notes, in reference to the table, give the reasons which have induced the authors to adopt the classification made use of and the names employed for the various groups of rocks.

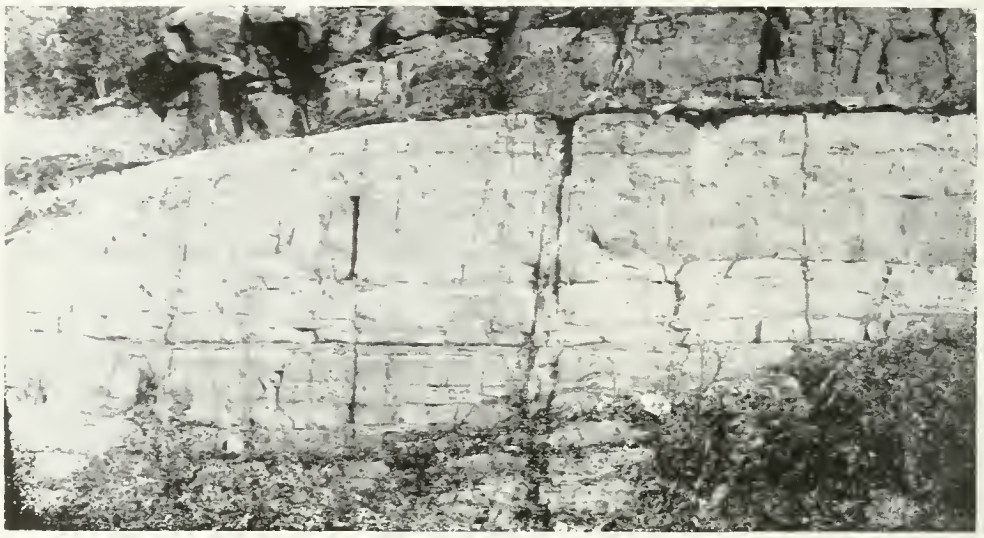
The Huronian.—In the table the authors have not employed the classic name Huronian. There are several reasons for this, among which may be mentioned:—

The rocks to which this name has been applied include representatives some of which occur above and others below a profound unconformity. In addition to their being separated by the unconformity, which represents a great time interval or period of erosion, the so-called Huronian rocks, as will be seen from the first two vertical columns on the left hand side of the table, bear different relations to an intrusion of granite and gneiss, here called Algoman, which occupies large areas and is regional in its distribution. Certain so-called Huronian rocks are intruded by the Algoman, while others lie on its eroded surface.

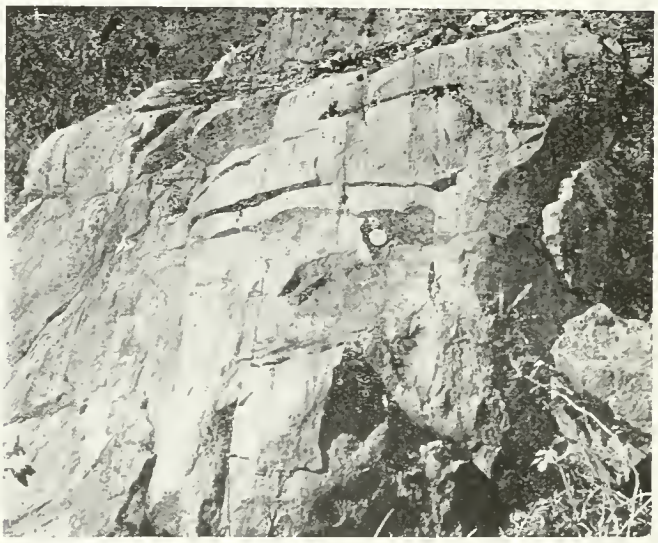
During recent years the Huronian rocks have been sub-divided into (a) Lower, (b) Middle, (c) Upper or Animikie. It has generally been held that the Middle Huronian is of minor significance, the unconformity between it and the Lower having been considered by many authors to be local. Hence, only the Lower and Upper will here be considered.

The Upper or Animikie rocks occur characteristically around Thunder Bay on the north shore of Lake Superior. With them should be grouped, in the opinion of competent observers, the sediments, Whitewater series, of the Sudbury basin (*See* A. P. Coleman, Ontario Bureau Mines, Vol. XIV, part 2, pp. 10 and 14, and The Nickel Industry, Mines Branch, Ottawa, 1913, p. 9; Van Hise and Leith, U.S.G.S. Bulletin 360, pp. 24 and 439).

On the other hand the fragmental rocks on the north shore of Lake Huron, in the vicinity of Thessalon and elsewhere, and the Cobalt series of Cobalt and surrounding region have been classed as Lower Huronian. The present authors, however, have come to the conclusion that the Whitewater series, or Animikie, of the Sudbury basin, the Ramsay Lake conglomerate of the same area, the Cobalt series, and the less disturbed pre-Cambrian sedimentary rocks on the north shore of Lake Huron should all be classed as Animikean. Thus rocks are grouped together some of which, heretofore, have been called Lower Huronian and some Upper Huronian or Animikie. While all the rocks to which we apply the name Animikean may not be of exactly the same age, they are all of post-Algoman age.



A. Animikean sediments in horizontal beds.



B. Temiskamian sediments with vertical dip.

C. Contorted Grenville sediments.

Fig 60.

A shows Animikean sediments in characteristic horizontal beds; B, more or less schistose Temiskamian sediments with vertical dip; C, contorted, schistose Grenville sediments. There is a normal progression in metamorphism from the Animikean through the Temiskamian to the Grenville.

Moreover, the authors group together, under the name Temiskamian, the Temiskaming series of Cobalt, the Sudbury series, the so-called Huronian rocks of the Lacloche mountains and elsewhere of Lake Huron, and the Hastings series of southeastern Ontario. These rocks are of pre-Algoman and post-Laurentian age.

It is seen, therefore, that according to the view of the authors, there has been considerable confusion in the use of the names Upper and Lower Huronian, and that the Huronian has been made to include rocks that are separated by a profound unconformity. It has accordingly been considered advisable not to employ the name Huronian in the table.

It may be added that Animikean is more closely related, as regards age, to the Keweenawan than to the group to which we have applied the name Temiskamian in the table. If the name Huronian is to be retained, the question arises as to whether it should be applied to the Animikean or to the Temiskamian or to both. If it is applied to both, then it should include the Keweenawan as well, since the latter is more closely connected with the Animikean as regards age relations than is the Animikean with the Temiskamian. But it does not appear advisable to group together rocks that are separated by such a profound unconformity as are the Animikean and Temiskamian.

Moreover, the older writers applied the name Huronian indiscriminately to the Animikean rocks of Lake Huron and of Lake Temiskaming (the Cobalt series) as well as to the Temiskamian rocks of Lake Huron (Lacloche mountains and elsewhere), of Lake Superior (the Doré series) and of Lake Temiskaming (the Temiskaming series). It would therefore appear that, if the name Huronian is to be retained, the Temiskamian rocks are as much entitled to the appellation as are the Animikean, and *vice versa*. But the authors prefer, for the present at least, not to make use of the term Huronian.

In the authors' opinion there appears to be no logical reason for a dual sub-division of the pre-Cambrian into Archean and Algonkian, or Archeozoic and Proterozoic, either on the basis of proportion of sediments or on that of life development. As regards metamorphism, there is a normal progression downward from that of the younger to the older groups, Fig. 60. The Temiskamian rocks are more highly metamorphosed than are the Animikean, and less metamorphosed than the Grenville. Moreover, the thickness of the pre-Laurentian sediments is great.

The Keweenawan.—No comment, in addition to the notes in the table, is required concerning the definition of the name Keweenawan (Kē-wēen-ä′-wän). It is here employed in the sense made use of by practically all authors in recent years.

The Animikean.—The name Animikean (An-ĭm-ĭ-kē′-an) is employed by Chamberlin and Salisbury (Geology, Vol. II, pages 60 and 183), and by other authors, for the series of rocks to which the name Animikie is commonly applied. In our table, as has been said in a preceding paragraph, the name is applied not only to the Animikie of the north shore of Lake Superior and of the Sudbury basin, but also to certain rocks of the north shore of Lake Huron and to the Cobalt series of Cobalt and surrounding region. Thus in the Animikean, or so-called Upper Huronian, are placed certain rocks that have heretofore been classed as Lower Huronian. Further reference is made to the Animikean in the notes on localities.

The Algoman.—(Ăl-gō′-măn). This name, introduced by A. C. Lawson (Int. Geol. Congress, 1913), appears to the authors to be a good one. Their investigations in southeastern Ontario, as well as at Cobalt and surrounding region, have proved that granite and gneiss of post-Temiskaming and pre-Animikie age are of wide extent. Ten years ago the authors gave to granite of this age in the Cobalt area the name Lorrain granite, and later they gave to a granite of similar age in southeastern Ontario the name Moira. On the north shore of Lake Huron granite of similar age has been called Killarney. Algoman now being preferred, although not having priority, Lorrain, Moira and Killarney may be discarded or used locally. In the descriptions of many areas Algoman granite and gneiss have in the past been classed as Laurentian, age relations not being definitely known.

Fig. 61—Index Map showing Localities named in Table of Correlation of the Pre-Cambrian Rocks of Ontario, Western Quebec and Southeastern Manitoba.

Table Showing Correlation of the Pre-Cambrian Rocks of Ontario, Western Quebec and Southeastern Manitoba

Compiled by WILLET G. MILLER and CYRIL W. KNIGHT

To Accompany Part II of the 22nd Report of the Ontario Bureau of Mines, 1913

Localities, Names and Characters of Rocks

	[illegible] of Rocks	[illegible]	1 NORTH SHORE OF LAKE HURON	2 COBALT	3 TEMAGAMI	4 GOWGANDA	5 KIRKLAND AND LARDER LAKES AND SWASTIKA	6 PORCUPINE	7 ABITIBI LAKE	8 WESTERN QUEBEC	9 SUDBURY
KEWEENAWAN	Upper [illegible] Lake Superior, Upper Group ([illegible] Can, [illegible]). [illegible] Keweenawan [illegible] name[illegible] of present in use in [illegible] and United States)	[illegible] rocks of [illegible]. The sediments are little altered and rest in almost horizontal position	Nipissing diabase	Nipissing diabase	[illegible]issing diabase	Nipissing diabase	[illegible]ipissing diabase	Diabase	[illegible] diabase	[illegible] diabase	Nickel eruptive (Norite, &c.)
							Unconformity				
ANIMIKEAN	[illegible] Lake [illegible] Lower Group [illegible]. [illegible] Middle [illegible] part of Lower [illegible] Huron of various [illegible]. [illegible] of Upper Huronian of Lake [illegible] of the Sudbury basin, [illegible] and Ramsay Lake series. Cobalt series of Cobalt and surrounding region	The [illegible] rocks are [illegible] folded. Locally, at times, they are much disturbed	[illegible]	Cobalt Series Quartzite Arkose Conglomerate Quartzite Greywacke Conglomerate (Local unconformities)	Cobalt Series Quartzite Arkose Conglomerate Quartzite Greywacke Conglomerate (Local unconformities)	Cobalt Series Quartzite Arkose Conglomerate Quartzite Greywacke Conglomerate (Local unconformities)	Cobalt Series Quartzite Arkose Conglomerate Quartzite Greywacke Conglomerate	Cobalt Series Conglomerate		Cobalt Series Quartzite Arkose Conglomerate Quartzite Greywacke Conglomerate	Whitewater & Ramsay Lake Series Sandstone Slate Tuff Conglomerate
							Great Unconformity				
[illegible] ALGOMAN	Laurentian [illegible] (Int. Geol. Con. 1913) [illegible] in part of some authors and Huronian granite of others [illegible]. Moira granite of Hastings county. Killarney granite of north shore of Lake Huron	[illegible], sometimes [illegible], typically [illegible]	[illegible]	[illegible] granite	Lorrain granite	Lorrain granite	Lorrain granite and syenite porphyries	Lorrain granite	Lorrain granite	Lorrain granite and [illegible]	Granite
				Lamprophyre dikes	Basic dikes		Lamprophyre dikes				Pillow lavas
TEMI[illegible]	Includes part of the Huronian of Logan and Murray and of some other authors [illegible] Van Hise [illegible] Miller (Eng. [illegible], 1911 and Ont. [illegible] XIX, part 2). [illegible] Nickel [illegible] 1913)	[illegible] schistose [illegible]	[illegible]	Temiskaming Series Slate Greywacke Quartzite Conglomerate	Temiskaming Series Greywacke Quartzite Conglomerate	Temiskaming Series Greywacke Quartzite Conglomerate	Temiskaming Series [illegible]	Temiskaming Series Slate Greywacke Quartzite Conglomerate	Temiskaming Series Conglomerate	Temiskaming, Hall and Broad Back Series Greywacke Quartzite Conglomerate	Sudbury Series Greywacke Slate Quartzite Conglomerate
							Great Unconformity				
[illegible] (LAUR[illegible])	[illegible]	General[illegible] typi[illegible]	[illegible]		Granite and gneiss					Granite and gneiss	
LOGA[illegible]	[illegible] Gren[illegible] the Coutchi[illegible]	The [illegible] rocks are highly [illegible]	[illegible]	[illegible]	Iron formation Greywacke	Iron formation	[illegible]	[illegible]	[illegible]	[illegible]	Crystalline limestone Iron formation
			[illegible]	[illegible]	Keewatin complex	Keewatin complex	Keewatin complex	Keewatin complex	Keewatin complex	[illegible]	Keewatin complex

	10 MICHIPICOTEN	11 THUNDER BAY	12 LAKE NIPIGON	13 LAKES SAVANT AND ABRAM	STEEP ROCK LAKE	RAINY LAKE	16 EASTERN MANITOBA Wanipigow R.	17 [illegible] LAKE	18 SUTTON MILL LAKES	19 SOUTHEASTERN ONTARIO HASTINGS COUNTY, &c.
KEWEENAWAN	Diabase Tuff	Keweenawan Diabase Marl Sandstone Conglomerate	Keweenawan Diabase Marl Sandstone Conglomerate	Diabase					Diabase	Basic dikes
					Unconformity					
ANIMIKEAN		Animikie Series Slate Iron formation Conglomerate							[illegible]	
					Great Unconformity					
[illegible] ALGOMAN	Granite	Granite	Granite	Granite	Granite	[illegible]	Granite and gneiss			Moira granite
	Lamprophyre dikes	[illegible]								[illegible]
TEMI[illegible]	Doré Series Slate Greywacke Quartzite Conglomerate	Greywacke Quartzite Conglomerate	Slate Greywacke Quartzite Conglomerate	Slate Greywacke Quartzite Conglomerate	Steep Rock and Seine Series Limestone Slate Greywacke Quartzite Conglomerate (Relations of these are not definitely determined)	Seine Series Mica schist Conglomerate	Wanipigow Series Arkose Greywacke Conglomerate	[illegible]		Hastings Series Limestone Slate Greywacke Quartzite Conglomerate
					Great Unconformity					
[illegible] (LAUR[illegible])	Granite and gneiss	Granite and gneiss	Granite and gneiss	Granite and gneiss	Granite and gneiss	[illegible] gneiss	[illegible] gneiss			[illegible] granite and gneiss
LOGA[illegible]	Iron formation	Iron formation	Iron formation	Iron formation	Iron formation	[illegible]				Grenville Series Limestone Iron formation and schistose [illegible] and [illegible]
	Keewatin complex	Keewatin complex	Keewatin complex	Keewatin complex	Keewatin complex	Keewatin complex	[illegible]			Keewatin complex

The Temiskamian.—The name Temiskamian, (Tem-ĭs-kă'-mĭ-ăn), as used by the authors, covers the pre-Algoman and post-Laurentian sedimentary rocks including the Temiskaming, Sudbury and Hastings series, together with part of the so-called Huronian of the north shore of Lake Huron. From the table it will be seen that the Temiskamian rocks are even more widespread than the Animikean.

The Laurentian.—The name Laurentian, as used in the table, has the meaning given to it by the International Committee of 1904 (Journal of Geology, 1905, pp. 89-104). It is applied to granite and gneiss of pre-Temiskamian and post-Loganian age.

The Loganian.[1]—Since the relation between the Grenville and Keewatin is such that, for the most part, they are not separated by an unconformity or an eruptive contact, it seems best to group them under one general heading, Loganian, giving to the sediments the old name Grenville and to the igneous material the name Keewatin.[2] Moreover, since similar sediments to those to which Lawson gave the name Couchiching are found as one of the members of the Grenville, it does not seem to be necessary to retain the name Couchiching, except for use locally in northwestern Ontario. It is held by Lawson that the Couchiching in certain northwestern Ontario localities is older than the Keewatin represented there, but the authors are of the opinion that on the whole the pre-Laurentian sediments, Grenville and Couchiching, are younger than the Keewatin, although a minor part of the Keewatin may be intrusive into the sediments. In this connection it should be noted that, especially in localities where Temiskamian sediments are absent, certain post-Temiskamian igneous rocks may readily be mistaken for Keewatin rocks.

Localities

The index map, Fig. 61, shows the localities that are numbered from 1 to 19 in the table. In the following notes are given references to literature on the various localities, together with comments.

1. NORTH SHORE OF LAKE HURON

The pre-Cambrian rocks of the north shore of Lake Huron were divided by Logan and Murray into two major groups: (1) The Laurentian, consisting of granite and gneiss, and (2) the Huronian, consisting of conglomerate and other sediments, with which were grouped certain greenstones.

The name Laurentian was here given to granite and gneiss, similar in appearance to the rocks farther to the east, in the Ottawa valley and elsewhere, to which it had been applied. From statements such as the following, however, it is seen that Logan and Murray did not claim to have definitely determined the relations between the Laurentian and Huronian on the North Shore of Lake Huron, but that they knew that certain parts of the areas there mapped as Laurentian contain granite that is intrusive into the gneiss and into certain of the so-called Huronian sediments:

"In that part of the country on the north shore of Lake Huron which lies between the Mississagui and St. Mary's Rivers, where the Huronian series has been more completely examined, the immediate contact of the gneiss with the overlying rocks has not been observed. . . . The gneiss extends to the vicinity of a small stream about a mile and a half above Les Grandes Sables, and what is supposed to be the lowest Huronian mass of that part occurs about half a mile above the stream. It consists of a grey quartzite which abuts against one mass of gneiss and runs under another and appears to be much broken by and entangled among the intrustive rock."[3]

"The intrusive granite occupies a considerable area on the coast of Lake Huron, south of Lake Pakowagaming [Pakowkami]. It there breaks through and disturbs the gneiss of the Laurentian series, and forms a nucleus from which emanates a complexity of dikes, proceeding to considerable distances. As dikes of a similar character are met with intersecting the rocks of the Huronian series, the nucleus in question is supposed to be of Huronian age, as well as the greenstone dikes which intersect it."[4]

[1] The name Ontarian was proposed by A. C. Lawson (Bull. G.S.A., Vol. I, pp. 176-177) for the pre-Laurentian rocks of northwestern Ontario. But the name Ontaric, introduced in 1843, is employed by the geological survey of an adjoining state, New York, as synonymous with Siluric. In order to avoid confusion, it does not seem advisable to retain Lawson's name.

Since the Grenville, especially, is characteristic of the district in southeastern Ontario and the adjoining part of Quebec first described by Logan, we propose the name Loganian for the pre-Laurentian rocks.

[2] The relation of the Grenville to the Keewatin is described in preceding pages. *See* p. 50.

[3] Geology of Canada, 1863, p. 55.

[4] Ibid., p. 58.

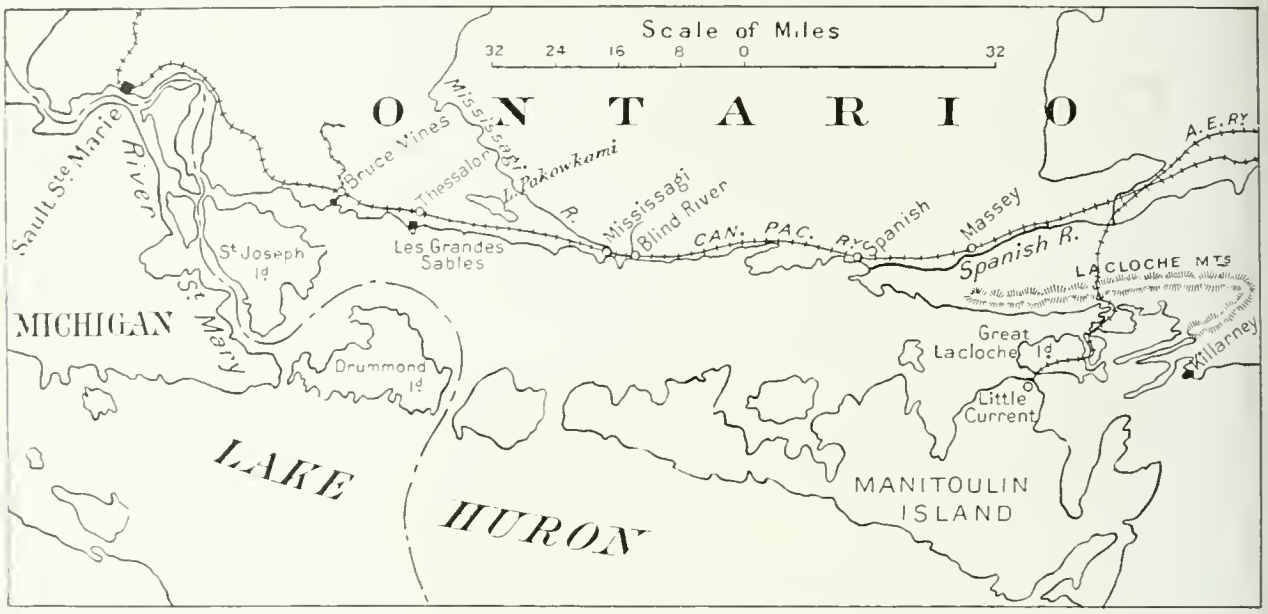


Fig. 62—Sketch map, North Shore of Lake Huron.

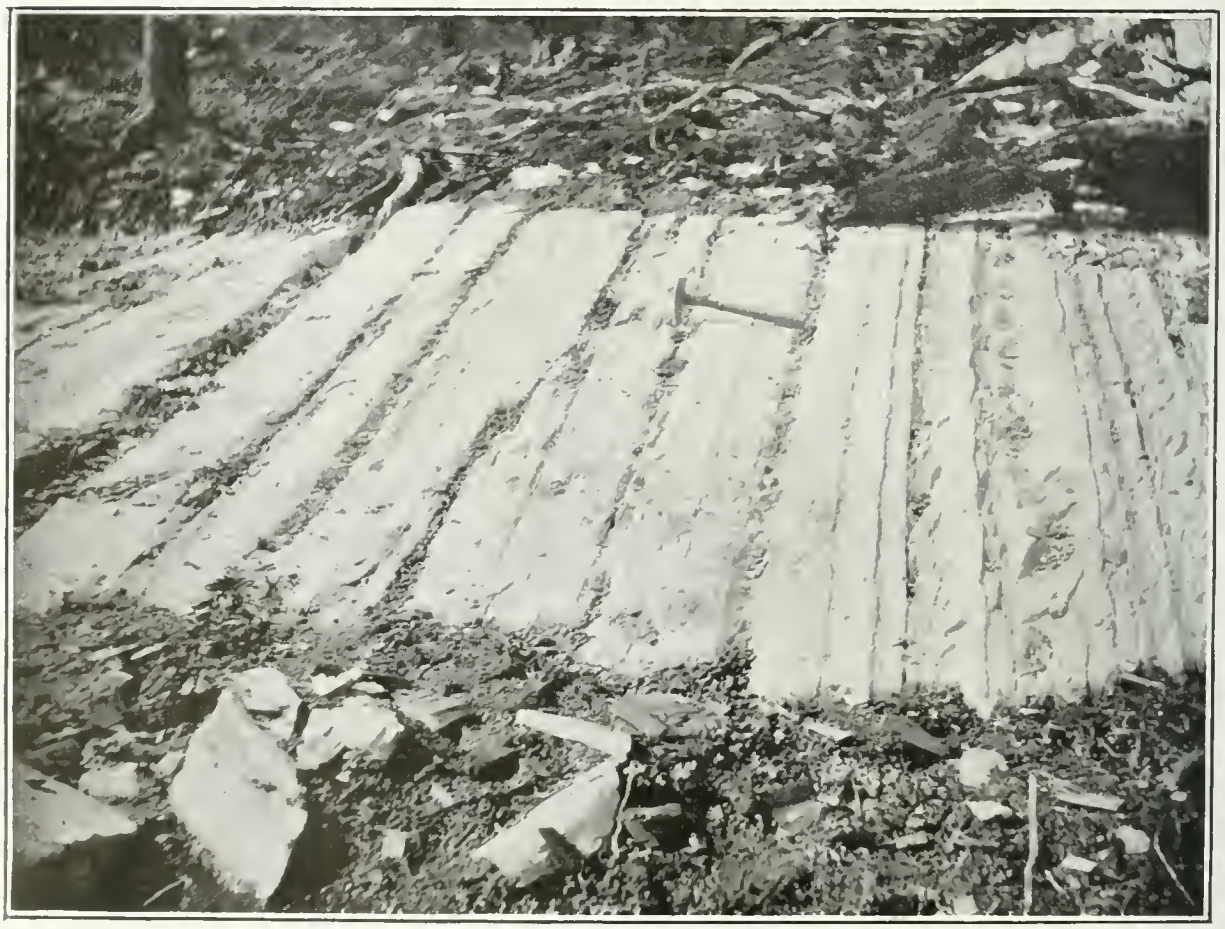


Fig. 62a—Interbedded quartzite and slate of the Temiskaming series. North Dome mine, Porcupine.

"On Lake Huron the rocks of this [Huronian] series occupy the coast from Shebahahnahning [Killarney] to the mouth of the Mississagui River; and in the valley of the Spanish River they appear to have a breadth northward from Lacloche of about ten miles. The rock which there limits them on the north is probably a part of the Laurentian gneiss, though it has been found difficult to distinguish the gneiss in that part from an intrusive granite."[1]

While these extracts show that Logan and Murray recognized granite and gneiss of at least two ages, they also bring out the fact that these investigators intended that the name Laurentian should here be applied to only the older granite and gneiss and not to that which is intrusive into the sediments. But they, like later workers, did not recognize that the pre-Cambrian sedimentary rocks in the region, to all of which they gave the name Huronian, are divisible into two great groups, separated by a pro-

Fig. 63—Boulder of conglomerate of Temiskaming series enclosed in conglomerate of Cobalt series (Animikean), lot 7, con. 4, township of Bucke, near Cobalt. During the period of erosion that produced the sediments of the Cobalt series, the Temiskaming rocks in certain localities were completely removed.

found unconformity. Had this unconformity been recognized, it is scarcely likely that a stratigrapher of Logan's ability would have applied the name Huronian to all of the sediments. Distinct names would doubtless have been given to both the older and the younger groups.

There is an older group of sediments, called by the present authors the Temiskamian, which, as shown by the preceding quotations, Logan and Murray recognized as being younger than the Laurentian gneiss and older than the later (Algoman), or as they called it, the Huronian granite. But these workers did not recognize, nor did their successors, that part of the pre-Cambrian sediments along the north shore of Lake Huron are younger than the later granite (Algoman) which intrudes the earlier sediments. This failure to recognize the stratigraphic position of the later sediments has led to great confusion, not to say amusing controversies. It so happens that the con-

[1] Geology of Canada, 1863, p. 61.

glomerate and other rocks of the later group of sediments (Animikean) are in the more conspicuous outcrops, or in localities that have been examined by most investigators, and these rocks have, in almost all cases, been classed as Lower Huronian, indicating that they are at the base of the pre-Cambrian sedimentary series of the region. The younger granite or gneiss (Algoman), on the eroded surface of which this later conglomerate has been found to rest, has been mistaken for the Laurentian (*See* Van Hise and Leith, Bull. 360, U.S.G.S., pp. 414-415, 425-426, 435 *et seq.*, and A. C. Lawson, "A Standard Scale for the pre-Cambrian Rocks of North America," Int. Geol. Congress, 1913, pp. 12 and 21).

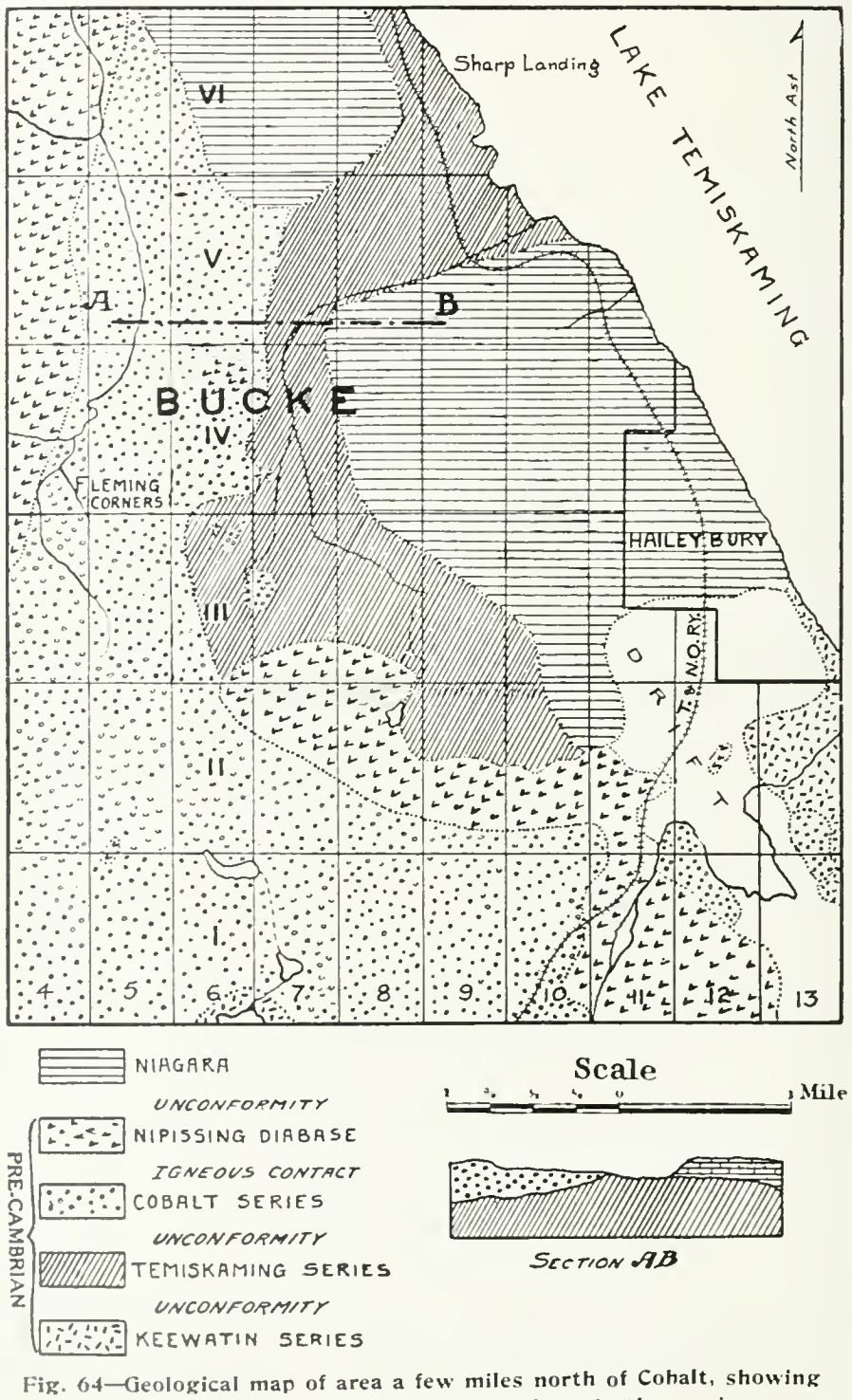


Fig. 64—Geological map of area a few miles north of Cobalt, showing distribution of the Temiskaming, Cobalt and other series.

The Thessalon greenstones, a volcanic series, grouped with the Huronian by Logan and Murray, have in recent years been classed as Keewatin, but it seems to the present authors that these rocks may be post-Temiskamian, and that they may occupy a place

in the geological column similar to the pillow lavas, "older norite," of Sudbury and the lamprophyre dikes of Cobalt.

Unconformities between the sediments in certain localities along the north shore of Lake Huron have been described. These unconformities are of two kinds. In one case they separate Temiskamian rocks from Animikean; in the other they are what have been called interformational or local unconformities, similar to those found within the Cobalt series in the region to the northeast.

Much arduous and detailed work remains to be done on the north shore of Lake Huron.

The list of Animikean rocks placed in the vertical column in the table under the heading, North Shore of Lake Huron, is provisional. The relations to the Laurentian and Algoman of those that lie beneath the unconformity have not been definitely determined.

2. COBALT

The base of the geological column at Cobalt consists of pillow lavas and of other rocks of Keewatin age. Associated with these are remnants of iron formation.

Unconformably on the lavas and iron formation rests a thick series of slates, quartzites, greywackés, and conglomerates, which now lies in highly inclined attitudes and holds, in addition to fragments of Keewatin lavas and iron formation, pebbles and boulders of Laurentian granite and gneiss. The Laurentian, however, is not exposed in the Cobalt area proper but occurs in the surrounding region. These sediments are known as the Temiskaming series. They are well exposed along the west shore of Lake Temiskaming between Haileybury and New Liskeard.

The Temiskaming series and all of the older rocks were fissured and intruded by lamprophyre dikes and masses of diabase. Following this igneous activity an enormous batholith of granite, called the Lorrain granite, invaded all of the rocks mentioned.

The Temiskaming sediments, the stratigraphic position of which was first worked out in the Cobalt area, have been found to be widespread throughout Ontario, western Quebec and southeastern Manitoba, and are correlated with the Sudbury series of Sudbury, the Doré series of Michipicoten, and with rocks in other areas, as shown in the table.

After the intrusion of the Lorrain (Algoman) granite there followed a prolonged period of erosion and there was laid down on the older rocks a series of slates, greywackés, quartzites and conglomerates which was named, ten years ago, the Cobalt series. It resembles in lithology and in degree of metamorphism the younger pre-Cambrian sediments in the area surrounding Thessalon and Bruce Mines on the north shore of Lake Huron; limestone, however, does not occur at Cobalt. Logan showed in 1847 that the rocks which we now call the Cobalt series rest unconformably on the adjacent granite and gneiss along the shores of Lake Temiskaming.

All of the previously mentioned rocks were intruded by the Nipissing diabase, and later by dikes of olivine diabase. The Nipissing diabase is regarded by most writers as Keweenawan in age.

Literature

The Cobalt-Nickel Arsenides, and Silver Deposits of Temiskaming, fourth edition, by Willet G. Miller, 19th Report, Bureau of Mines, Ontario, Part 2.

Notes on the Cobalt Area, by Willet G. Miller, "Engineering and Mining Journal," Vol. 92, Sept., 1911, pp. 645-649.

3. TEMAGAMI

The pre-Cambrian succession in the area surrounding Lake Temagami is one of the most complete of the nineteen areas mentioned in the table. In addition to the rocks occurring at Cobalt, which have been briefly described above, the Laurentian granite and gneiss are present.

There are local unconformities in the Cobalt series, one of which may be seen at the boat landing on the northeast arm of Lake Temagami, near the railway station.

Literature

Summary Report, Geol. Survey of Canada, 1903, pp. 127-128 A.
Map No. 944, published by the Geol. Survey of Canada.
The Laurentian System, by Willet G. Miller and Cyril W. Knight, 20th Report, Bureau of Mines, Ontario, Part I, pp. 280-284.
The Cobalt-Nickel Arsenides and Silver Deposits of Temiskaming, fourth edition, by Willet G. Miller, 19th Report, Bureau of Mines, Ontario, Part 2, p. 60.

4. GOWGANDA

The succession of rocks in the Gowganda area is the same as that at Cobalt if two exceptions be made: (1) The lamprophyre dikes have not been found at Gowganda; (2) Crystalline limestone, according to W. H. Collins, occurs in the Cobalt series at Gowganda, while it is absent at Cobalt.

There are local unconformities in the Cobalt series at Gowganda which have been described by A. G. Burrows.

Literature

Report on the Geology of the Area along the T. & N. O. Railway Trial Line between Gowganda and Porcupine, by J. G. McMillan, Toronto, 1912.
The Geology of the Gowganda Mining Division, by W. H. Collins, Memoir No. 33, Geol. Survey of Canada.
The Gowganda Silver Area, by A. G. Burrows, 19th Report, Bureau of Mines, Ontario, Part 2, pp. 165-186. See also 18th Report, Part 2, pp. 1-20.
The Shining Tree Silver Area, by R. B. Stewart, 19th Report, Bureau of Mines, Ontario, Part 2, pp. 187-193.

5. KIRKLAND AND LARDER LAKES AND SWASTIKA

The geology of this area is similar to that of Cobalt and requires little comment. The rocks have been mapped in detail by A. G. Burrows and P. E. Hopkins who found that lamprophyre dikes are of very common occurrence and occupy the same stratigraphic position as do similar rocks in the Cobalt area.

Literature

The Larder Lake District, by R. W. Brock, 16th Report, Bureau of Mines, Ontario, Part I., pp. 202-218.
The Swastika Gold Area, by E. L. Bruce, 21st Report Bureau of Mines, Ontario, Part I., pp. 256-265.
Geology and Economic Resources of the Larder Lake District, Ont., and adjoining Portions of Pontiac County, Que., by M. E. Wilson, Memoir 17-E., Geol. Survey of Canada.
Map No. 23a., Kirkland Lake and Swastika Gold Areas, by A. G. Burrows and P. E. Hopkins. Published by the Ontario Bureau of Mines, Nov., 1913.

6. PORCUPINE

The rocks of this area are also similar to those at Cobalt. The greenstones of the Keewatin occur in large volume, but the Cobalt series is sparsely represented.

Literature

The Porcupine Gold Area, by A. G. Burrows, 20th Report, Bureau of Mines, Ontario, Part 2, pp. 3-33.
The Porcupine Gold Area, by A. G. Burrows, 21st Report, Bureau of Mines, Ontario, Part I, pp. 205-249.
Notes on the Cobalt Area, by Willet G. Miller, "Engineering and Mining Journal," Vol. 92, Sept., 1911, pp. 645-649.

7. ABITIBI LAKE

The rocks surrounding Abitibi lake are almost wholly of igneous origin, and consist of Keewatin greenstones, Lorrain granite and Nipissing diabase. But the area is of interest owing to the presence of schistose conglomerate of the Temiskaming series which is intruded by the Lorrain granite. M. B. Baker, who mapped the area, was one of the first to recognize the stratigraphic relations of this conglomerate.

Literature

Lake Abitibi Area, by M. B. Baker, 18th Report, Bureau of Mines, Ontario, Part I, pp. 263-283.

8. WESTERN QUEBEC

Several distinct areas, somewhat widely distributed, are included under the heading "Western Quebec." These areas lie in: (1) the Keekeek and Kewagama Lakes region; (2) the basins of the Harricanaw and Nottaway rivers; (3) the Chibougamau region; (4) Broadback river area; (5) Fabie township; and (6) other parts of Pontiac

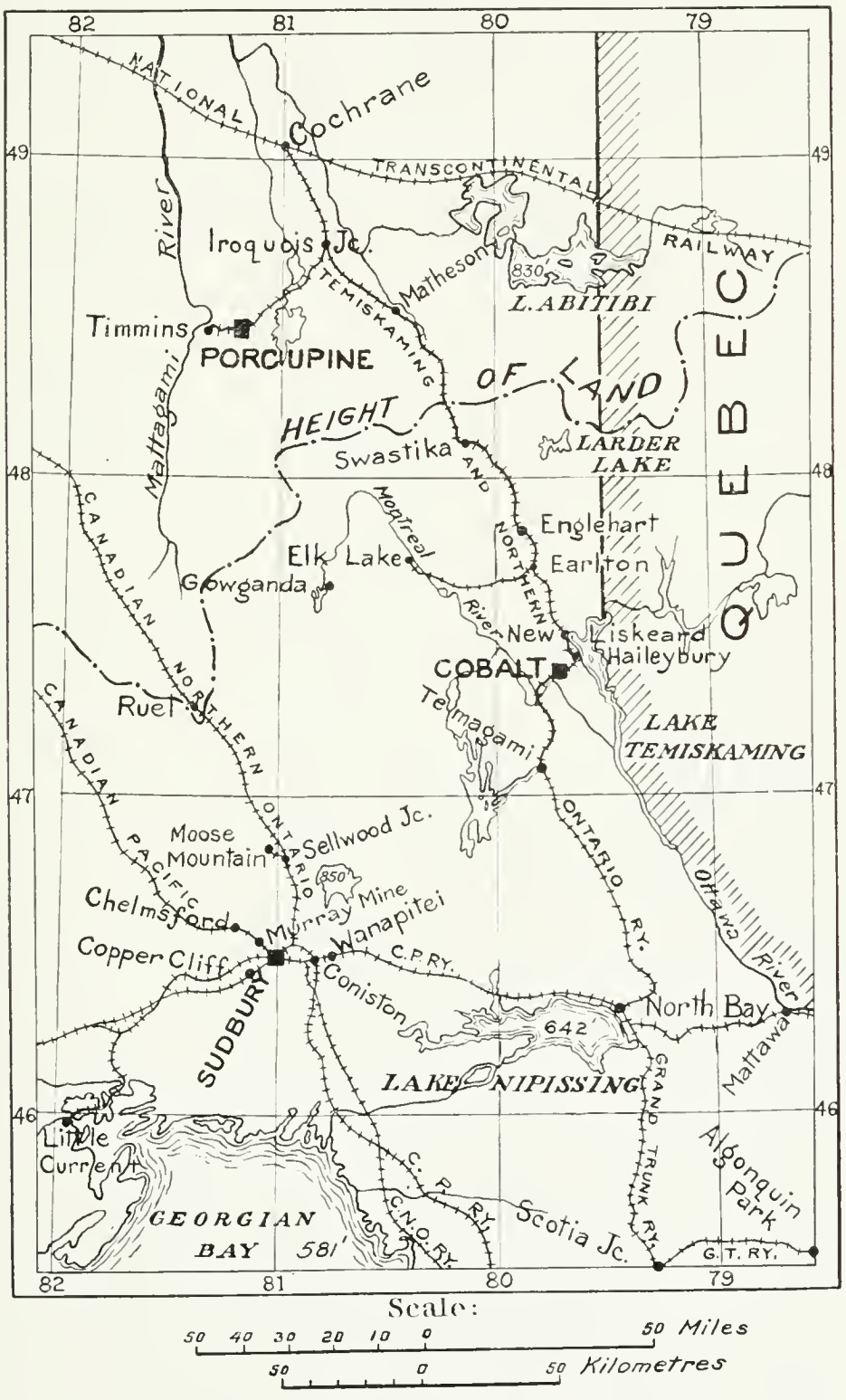


Fig. 65—Map of the Sudbury-Cobalt-Porcupine region.

county. The Temiskaming series appears to occur in large volume in some of these areas. The Matagami series resting unconformably on granite gneiss, the relationships of which have been so well described by J. A. Bancroft, and the Broadback series of H. C. Cooke should apparently be correlated with the Temiskaming. Both series are invaded by

granite which appears to be of Algoman age. Thus it is seen that there are also pre-Cambrian granites or granite-gneisses of two ages in this part of the province of Quebec.

The Animikean rocks are of common occurrence in parts of western Quebec. In their lithological character and in their degree of metamorphism they are similar to the Cobalt series at Cobalt and surrounding region. The unconformity between these rocks and the older Temiskamian is profound.

The crystalline limestone[1] of the Grenville series, referred to in the table, was discovered some years ago by the senior author on Kipawa river, which lies to the east of Lake Temiskaming in the province of Quebec.

Literature

Report on the Geology and Mineral Resources of the Chibougamau Region, Quebec, by E. R. Faribault, J. C. Gwillim, and A. E. Barlow, Mines Branch, Quebec, 1911.

Geology of a Portion of Fabre Township, Quebec, by R. Harvie, Mines Branch, Quebec, 1911.

Report on the Geology and Mineral Resources of Keekeek and Kewagama Lakes Region, by J. A. Bancroft, Report on Mining Operations in the Province of Quebec during the year 1911, pp. 160-207, Mines Branch, Quebec.

A Report on the Geology and Natural Resources of Certain Portions of the Drainage Basins of the Harricanaw and Nottaway Rivers, to the North of the National Transcontinental Railway in Northwestern Quebec, by J. A. Bancroft, Report on Mining Operations in the Province of Quebec during the year 1912, Mines Branch, Quebec.

Geology and Economic Resources of the Larder Lake District, Ont., and adjoining portions of Pontiac County, Que., by M. E. Wilson, Memoir 17-E., Geol. Survey of Canada.

Map. No. 95a (Issued 1913), Broadback River, Mistassini Territory, Quebec; by H. C. Cooke, Geol. Survey of Canada.

9. SUDBURY

The pre-Cambrian groups in the Sudbury area are almost complete, but the Laurentian granites and gneisses, i.e., those granites and gneisses which are older than the Sudbury series, have not been identified.

The Keewatin greenstones and iron formation occur at Moose mountain, to the north of the Sudbury area proper, and near the north shore of Lake Wanapitei. Several miles to the south of the Sudbury area, in the township of Dill, A. P. Coleman has described crystalline limestone, coarse white quartzite and fine-grained grey gneiss and schist which he has classed with the Grenville series. He remarks that the grey gneiss is not unlike the Couchiching of western Ontario.

Succeeding these rocks there is a series of sediments, 30,000 feet in thickness,[2] consisting chiefly of quartzite but including arkose, greywacké, slate, and conglomerate. This series has been named by Coleman the Sudbury series, and has been correlated by the present authors with the Temiskaming series. The basement on which this Sudbury series rests has not been discovered, but, judging from the composition of the sediments, it is almost certain that the series was deposited in part on, and largely derived from, Laurentian granites and gneisses.

After the deposition of the Sudbury series there were erupted various greenstones, including "older norite" and pillow lavas, which appear to be approximately of the same age as the lamprophyre dikes of Cobalt and other areas. The recognition of these pillow lavas as post-Sudbury in age is important, and gives rise to surmises that some of the pillow lavas classed as Keewatin in other areas may really be much younger in age than the Keewatin. The volcanic rocks at Thessalon should be considered in this connection.

Later than the "older norite" and pillow lavas there occurred great intrusions of granite and gneiss, which are probably of Algoman age.

All of the rocks mentioned were subjected to a prolonged period of erosion and the Whitewater series and the Ramsay Lake conglomerate were laid down. The Whitewater series is classed as Animikie by Coleman and other writers. In the accompanying table it is correlated with the younger sediments along the north shore of Lake Huron, as is also the Ramsay Lake series.

The deposition of the Whitewater series was followed by the intrusion of the nickel eruptive (norite and micropegmatite), which occurs, according to Coleman, in the form of a boat-shaped sill about a mile and a quarter in thickness.

Dikes of olivine diabase and a few dikes of granite penetrate all of the older rocks in the area.

[1] American Geologist, January, 1901.
[2] The Nickel Industry, by A. P. Coleman, Mines Branch, Ottawa, 1913.

Literature

The Sudbury Nickel Field, by A. P. Coleman, 14th Report, Bureau of Mines, Ontario, Part 3.

The Nickel and Copper Deposits of Sudbury, Ontario, by A. E. Barlow, Geol. Survey of Canada, Vol. 14, Part H.

The Nickel Industry with Special Reference to the Sudbury Region, Ontario, by A. P. Coleman, Mines Branch, Ottawa, 1913.

Sudbury, Cobalt and Porcupine Geology, by Willet G. Miller and Cyril W. Knight, The Engineering and Mining Journal, June 7, 1913.

Map of the Sudbury-Cobalt-Porcupine Region, Province of Ontario, published by the Ontario Bureau of Mines, July, 1913.

Guide Book No. 7, 12th Int. Geol. Congress, 1913, Excursions to Sudbury, Cobalt and Porcupine.

10. MICHIPICOTEN

The Keewatin series and iron formation are well developed in this area. In addition, there is an important belt of schistose conglomerate, the pebbles of which are clearly derived from Keewatin greenstones and Laurentian granite and gneiss. An actual contact between the conglomerate and the greenstone-granite complex has not been found. This conglomerate, which is locally called the Doré conglomerate, is correlated with the Temiskaming series. The conglomerate is penetrated by dikes of quartz-porphyry, which Coleman considers to be off-shoots of granitoid gneiss.

Literature

The Michipicoten Iron Region, by A. P. Coleman and A. B. Willmott, 11th Report, Bureau of Mines, Ontario, pp. 152-185.

The Iron Ranges of Michipicoten West, by J. M. Bell, 14th Report, Bureau of Mines, Ontario, Part I, pp. 278-355.

Iron Ranges of Eastern Michipicoten, by A. P. Coleman, 15th Report, Bureau of Mines, Ontario, Part I, pp. 173-206.

The Geology of the Lake Superior Region, by Van Hise and Leith, Monograph LII, U. S. Geol. Survey, pp. 150-155.

11. THUNDER BAY

The succession of rocks in the Thunder Bay area is almost complete, though the Laurentian is not present. It is thought, however, to occur in the granitic hills to the north.

The Temiskaming series is present, and it has been intruded by greenstone, which may be of about the same age as the lamprophyre dikes of Cobalt and Kirkland Lake and the post-Sudbury pillow lavas of Sudbury. It will be seen from the notes on various areas and from the table that these lamprophyre dikes, altered greenstones and pillow lavas are widespread in the pre-Cambrian of Ontario and occupy a well-defined position in the geological column. At Thunder Bay, as in the other areas, these igneous rocks are older than the Algoman granite.

Unconformably on these rocks rests the Animikie series. The name Animikie was first applied by T. S. Hunt to these rocks in 1873. The authors correlate with the Animikie series, the Cobalt series, the Whitewater series, the Ramsay Lake series, and the younger sediments on the north shore of Lake Huron at Bruce Mines, Thessalon and other areas. They are all of post-Algoman age.

Above the Animikie sediments rests the Keweenawan series. Unconformities between the two occur at Loon Lake, 25 miles east of Port Arthur.

Sills of diabase, known as the Logan sills, intrude all of the rocks in the area. These sills, which are of Keweenawan age, are correlated with the Nipissing diabase of Cobalt and surrounding region, the nickel eruptive at Sudbury, and with the diabase sills on the north shore of Lake Huron.

Literature

Report of the Special Committee on the Lake Superior Region, with Introductory Note, Journal of Geology, Feb.-Mar., 1905, pp. 97-98.

The Animikie Iron Range, by L. P. Silver, 15th Report Bureau of Mines, Ontario, pp. 156-172.

The Geology of the Lake Superior Region, by Van Hise and Leith, Monograph LII, U. S. Geol. Survey.

12. LAKE NIPIGON

The geology of the Nipigon basin is given in a monograph by A. W. G. Wilson. A series, called Lower Huronian by Wilson, occurs in important volume, and consists principally of schistose conglomerate. The authors have not had an opportunity of examining this conglomerate, but, judging from Wilson's descriptions, it appears to be similar to the Temiskaming series.

Literature

Iron Ranges East of Lake Nipigon, by E. S. Moore, 16th Report, Bureau of Mines, Ontario, pp. 105-135.

Iron Ranges East of Lake Nipigon, by A. P. Coleman and E. S. Moore, 17th Report, Bureau of Mines, Ontario, pp. 136-189.

Geology of the Nipigon Basin, by A. W. G. Wilson, Memoir No. I, Geol. Sur. of Canada.

13. LAKES SAVANT AND ABRAM

In the vicinity of these two lakes there occur prominent areas of a schistose conglomerate called by E. S. Moore Lower Huronian. It contains numerous boulders of Laurentian granite and gneiss, and apparently should be correlated with the Temiskaming series. In the Lake Savant area the conglomerate was discovered by Moore to rest unconformably on the Laurentian granite, the granite showing a weathered surface. This contact was considered by Collins[1] to be an igneous one. Moore also suggests that there may be granites of two periods of eruption in this area, since part of the granite looks much fresher and less metamorphosed than does the greater portion. The younger granite, if present, is probably of Algoman age.

Fig. 66—Schistose conglomerate of Temiskaming series, Lake Savant area.

Literature

Lake Savant Iron Range Area, by E. S. Moore, 19th Report, Bureau of Mines, Ontario, pp. 173-193.

Vermilion Lake Pyrite Deposits, by E. S. Moore, 20th Report, Bureau of Mines, Ontario, Part I, pp. 199-213.

14. STEEP ROCK LAKE

From the descriptions of this area the writers consider that the Temiskaming series is present. One series, consisting of conglomerate and fossiliferous limestone which rest unconformably on the Keewatin and Laurentian, is known as the Steep Rock.

In addition to the Steep Rock series there is a series of conglomerates and other rocks which Lawson has named the Seine series and of which the Shoal Lake conglomer-

[1]A Geological Reconnaissance of the Region Traversed by the Nat. Trans. Ry. between Lake Nipigon and Clay Lake, Ont., Rep. Geol. Sur. Canada, 1909, p. 34.

ate forms a part. Lawson believes that the Seine series lies unconformably on the Steep Rock series, but this is not as yet proved. Therefore, both the Seine series and the Steep Rock series are correlated, provisionally, in the accompanying table with the Temiskaming. The Seine series is penetrated by granite gneiss, to which Lawson has applied the name Algoman.

Literature

Structural Geology of Steep Rock Lake, Ontario, by H. L. Smyth, Am. Jour. Science, Third Series, Vol. 42, 1891, pp. 317-331.

The Geology of the Lake Superior Region, by Van Hise and Leith, Monograph LII, U. S. Geol. Sur., pp. 147-149.

The Geology of Steep Rock Lake, Ontario, by A. C. Lawson, Memoir No. 28, Geol. Sur. of Canada.

A Standard Scale for the Pre-Cambrian Rocks of North America, by A. C. Lawson. Published by the 12th Int. Geol. Congress, Toronto, 1913.

Fig. 67—Trap of Keweenawan age, Sutton Mill Lakes, District of Patricia

15 RAINY LAKE

In the Rainy Lake area a series of conglomerates and other rocks, named by A. C. Lawson the Seine series, occurs at Shoal lake and Rat Root bay. These sediments rest unconformably on the Keewatin and Laurentian series, and apparently should be correlated with the Temiskaming.

In 1887 Lawson described a series of rocks, consisting mainly of mica-schists, which he named the Couchiching series. He considered that this series occurs structurally below the Keewatin. Later, in 1904, the International Committee found that part of Lawson's Couchiching, namely, the Shoal Lake conglomerate, is post-Laurentian in age. Since the committee's report was published, Lawson has recognized the correctness of their conclusions regarding the Shoal Lake conglomerate, but after spending the summer of 1911 in re-examining the area, he concluded that the Couchiching rocks in the vicinity of Bear's Passage and Rice Bay "underlie the Keewatin and that this relation is due to sequence of deposition."

Literature

Report on the Geology of the Rainy Lake Region, by A. C. Lawson, Geol. Sur. of Canada, Annual Report, 1887, Part F.

Report of the Special Committee on the Lake Superior Region, with introductory Note, Journal of Geology, Feb-Mar., 1905.

A Standard Scale for the pre-Cambrian Rocks of North America, by A. C. Lawson. Published by the Int. Geol. Congress, 12th Session, Toronto, 1913.

16. SOUTHEASTERN MANITOBA

In that part of the Province of Manitoba situated between the southern portion of Lake Winnipeg and the western boundary of Ontario there occurs, along the Wanipigow river, a schistose conglomerate which appears to belong to the Temiskamian group. Locally the series has been named by E. S. Moore the Wanipigow series. It contains granite pebbles, but is intruded by granite and gneiss which is probably of Algoman age.

The presence of granite fragments shows that the Laurentian is present in the area, but R. C. Wallace remarks in this connection that "when more detailed work is done on the mapping of the acid intrusives of this and other districts it may be found that the Laurentian in the sense of pre-Huronian [Temiskamian] plutonics occupies—in some areas, at any rate—a very unimportant place."

Wallace describes an iron formation which belongs structurally with the conglomerate series and probably should be correlated with the Temiskamian iron formation mentioned by the senior author at Cobalt.

Literature

The Rice Lake Gold District of Manitoba, by R. C. Wallace. Transactions Canadian Mining Institute, Vol. XVI, 1913, pp. 538-544.

Map No. 96 A, Wanipigow, Manigotagan and Oiseau Rivers, Manitoba, by E. S. Moore, Geol. Survey of Canada, issued 1913.

17. WUNNUMMIN LAKE

Wunnummin lake is situated about the centre of the district of Patricia, its position being shown on the map, Fig. 61. Regarding the rocks on this lake, William McInnes says: "The most conspicuous rocks occurring in the belt are heavy beds of coarse conglomerate, very similar to that of Abram Lake on the English River below Minnitakie Lake." Judging from this description it would appear that the conglomerate should be correlated with the Temiskaming series.

Literature

Report on a Part of the North-West Territories of Canada drained by the Winisk and Attawapiskat Rivers, by William McInnes, Geol. Survey of Canada, Vol. XV, Part AA, pp. 100-108; and Vol. XVI, Part A, pp. 153-160.

The District of Patricia, 21st Report, Bureau of Mines, Ontario, pp. 119, 131.

18. SUTTON MILL LAKES

Rocks comparable to the Animikie, at Thunder Bay, Lake Superior, or to the Nastapoka series of the east coast of Hudson Bay, are found at Sutton Mill lakes, and outcropping through the Paleozoic on the Winisk river, 26 miles from its mouth. At the former locality they are intruded and overlain by diabase, thus giving rise to conditions similar to those which exist in the silver area at Thunder Bay and at Cobalt. These sediments at Sutton Mill lakes may be correlated with the Animikean, and the diabase with the Nipissing diabase and Logan sills.

Literature

Report on a Survey of the Ekwan River and of the Route through Sutton Mill Lakes Northward, by D. B. Dowling. Geol. Survey of Canada, Vol. XIV, Part F.

The District of Patricia, 21st Report, Bureau of Mines, Ontario, pp. 149-153.

19. SOUTHEASTERN ONTARIO (HASTINGS COUNTY, ETC.)

A description of the pre-Cambrian geology of southeastern Ontario is given in the accompanying report.

GENERAL REPORTS ON PRE-CAMBRIAN GEOLOGY

Geology of Canada, 1863.

Report of the Special Committee on the Lake Superior Region, with Introductory Note, Jour. Geol. Feb.-Mar., 1905.

A Summary of Lake Superior Geology with Special Reference to Recent Studies of the Iron-bearing Series, by C. K. Leith, Trans. Am. Inst. Min. Eng., Vol. 36, 1906, pp. 101-153.

Report of a Special Committee on the Correlation of the pre-Cambrian Rocks of the Adirondack Mountains, the 'Original Laurentian Area' of Canada, and Eastern Ontario, Jour. Geol. April-May, 1907.

The Problem of the pre-Cambrian, by Chas. R. Van Hise, Bulletin of the Geological Society of America, Vol. 19, pp. 1-28.

The basis of pre-Cambrian Correlation, by Frank D. Adams, Journal of Geology, Vol. XVII., Feb.-Mar., 1909.

Pre-Cambrian Geology of North America, by Van Hise and Leith, Bulletin 360, U.S. Geol. Survey.

The Geology of the Lake Superior Region, by Van Hise and Leith, Monograph LII, U. S. Geol. Survey.

A Standard Scale for the pre-Cambrian Rocks of North America, by A. C. Lawson. Published by the 12th Int. Geological Congress, Toronto, 1913.

The Cobalt-Nickel Arsenides and Silver Deposits of Temiskaming, fourth edition, by Willet G. Miller, 19th Report, Bureau of Mines, Ontario, Part 2.

INDEX

ANNUAL REPORT

OF THE

Inspector of Division Courts

FOR THE

PROVINCE OF ONTARIO

FOR THE YEAR

1912

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1913

Printed by
WILLIAM BRIGGS
29-37 Richmond Street West
TORONTO

To His Honour COLONEL THE HONOURABLE SIR JOHN MORISON GIBSON,
K.C.M.G., ETC., *Lieutenant-Governor of Ontario.*

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present to Your Honour the Report of the Inspector of Division Courts, of the Province of Ontario, for the year ending 31st December, 1912.

Respectfully submitted,

J. J. FOY,

Attorney-General.

Toronto, February 27th, 1913.

SIR,—I have the honour to submit herewith, to be presented to His Honour the Lieutenant-Governor, the Report of the Inspector of Division Courts, for the year ending 31st December, 1912.

I have the honour to be, Sir,

Your obedient servant,

J. B. MACDONALD,

Inspector.

To the Honourable J. J. FOY, K.C., M.P.P.,

Attorney-General, Toronto.

ANNUAL REPORT

OF THE

Inspector of Division Courts

FOR THE

Province of Ontario

FOR THE YEAR ENDING 31st DECEMBER, 1912.

TORONTO, FEBRUARY 27, 1913.

To His Honour, Colonel The Honourable SIR JOHN MORISON GIBSON, K.C.M.G.,
Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit the Annual Report of the business of Divisions Courts of the Province of Ontario for the year ending 31st December, 1912.

Table A in this Report shows a decrease of 4,459 in the number of suits entered (60,914) exclusive of transcripts of judgments and judgment summonses, as compared with the previous year, and an increase in the amount entered for suit of $183,869, making a total of $2,230,017.61 entered.

The list of clerks with their Post Office addresses appears in table B, and table C gives the same information with reference to Bailiffs.

The boundaries of the limits of the several divisions are given in table D., and the names of the judicial officials of the different Counties and Districts will be found with them.

ALTERATION OF LIMITS.

The boundaries of the limits of the Divisions in the District of Kenora were changed at a meeting of the Division Court Board, held at Kenora, and a new court established at Sioux Lookout.

At a meeting of the Board held at Gore Bay, the Fourth Division Court of the District of Manitoulin was abolished and the territory added to the First Division.

A continuous inspection of the offices goes on. and I have much pleasure in testifying to the interest taken by the officials and the efficiency with which they perform their duties.

All of which is respectfully submitted.

I have the honour to be,

Your Honour's obedient servant,

J. B. MACDONALD,
Inspector.

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.		
Algoma	1	802	31,986 37	21	1,193 52	18	585 23	17,219 56	16,408 46	1,396 33	778
	2	45	1,824 61	6	408 82	.....	.....	824 45	824 45	.....	30
	3	153	4,137 50	5	450 52	6	282 85	2,497 36	2,359 24	138 12	147
	6	42	1,259 46	4	321 85	2	.....	954 42	954 42	.....	41
	7	176	5,470 71	3	49 25	6	278 50	1,942 41	2,002 53	218 38	164
Brant	1	722	26,357 31	42	2,020 19	49	380 18	9,066 46	8,948 25	498 39	681
	2	150	4,539 99	13	1,035 15	9	17 87	1,490 44	1,508 31	.....	144
	3	58	2,008 25	3	125 01	.....	.....	851 96	851 96	.....	56
	4	78	2,599 32	3	60 00	4	17 13	1,596 91	1,576 91	20 00	69
	5	22	750 78	1	48 43	.....	.....	439 36	439 36	.....	.....
Bruce.....	1	87	2,902 55	5	477 10	6	.....	1,605 18	1,605 18	.....	9
	2	34	1,419 79	8	356 57	.....	1 00	996 06	915 06	81 00	31
	3	66	2,596 48	1	.....	3	191 63	1,133 63	1,158 39	166 87	48
	4	82	3,286 96	3	78 72	6	.....	1,878 84	1,878 84	.....	63
	5	68	2,280 54	7	332 99	3	.....	1,006 25	1,006 25	.....	64
	6	8	227 25	6	218 88	.....	.....	155 94	155 94	.....	8
	7	78	3,028 68	5	192 10	3	.....	576 98	576 98	.....	54
	8	174	5,998 22	11	720 43	17	20 36	2,043 16	1,947 12	116 40	166
	9	19	860 85	2	68 25	.....	1 60	482 88	482 88	1 60	17
	10	48	1,491 81	2	207 78	4	.....	319 76	319 76	.....	47
	11	49	2,142 10	3	132 73	1	.....	1,176 26	1,176 26	.....	25
	12	97	2,993 22	2	59 38	5	.....	555 57	555 57	.....	92
Carleton	1	2,412	100,857 36	41	2,995 76	481	1,040 01	25,851 62	25,191 55	1,700 08	2,223
	2	23	1,076 38	6	480 39	.....	.....	756 71	756 71	.....	22
	3	37	1,739 56	5	327 74	4	.....	704 20	684 10	18 50	31
	4	17	805 79	2	150 06	2	51 26	836 99	805 24	31 75	18
	5	25	1,823 18	3	233 35	1	.....	995 33	995 33	.....	19
	6	52	2,253 75	4	261 51	2	20 90	1,571 33	1,587 63	5 00	47
	7	128	2,471 30	2	97 20	11	14 30	668 74	577 29	105 75	128
Dufferin	1	82	3,098 99	10	567 15	12	40 04	1,975 60	1,973 21	42 43	76
	2	90	3,325 50	6	.....	.....	20 05	880 95	722 65	178 33	86
	3	18	673 81	1	25 31	2	.....	144 23	144 23	.....	17
	4	11	591 68	.....	.....	.....	.....	359 07	359 07	.....	8
	5	55	2,611 61	1	129 60	2	37 75	1,252 44	1,390 19	.....	47
Elgin	1	253	10,402 89	26	787 61	46	.....	5,308 12	5,308 12	.....	200
	2	27	1,197 72	5	240 91	4	.....	377 23	373 05	4 18	24
	3	908	30,449 31	23	1,040 50	62	5 57	14,535 17	14,519 79	20 95	859
	4	95	3,797 28	13	619 29	2	9 49	2,134 24	2,129 24	5 00	90
Essex	1	31	965 00	1	68 98	10	27 60	573 70	558 10	15 60	34
	2	105	3,238 22	4	191 53	9	20 00	1,528 54	1,548 54	.....	100
	3	75	3,245 90	3	126 07	9	80 77	1,624 68	1,705 45	.....	65
	4	83	1,990 64	2	239 87	6	37 00	1,564 57	1,592 04	9 53	54
	5	145	5,138 87	13	746 73	17	126 44	2,911 48	2,867 38	170 54	137
	6	27	872 48	3	159 67	2	3 00	504 83	503 82	1 00	26
	7	602	17,623 12	29	125 08	198	597 97	8,205 15	7,723 60	481 55	321
	8	183	7,599 86	13	1,442 24	26	146 86	4,283 84	4,353 90	76 80	170
	9	53	2,122 56	6	437 84	3	29 51	1,828 08	1,753 13	104 46	46
	10	No	business.	.....	.....	.....	.....	.....	.....	.....	.....

A.

to the 31st day of December, A.D. 1912, inclusive, shewing:

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of jury trials by jurors called in pursuance of section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of section 43 D.C.A.
						$ c.		$ c.	$ c.		$ c.			$ c.	$ c.	$ c.
26	.....	.....	3	97	.....	.....	....	.....	.....	2	10 00	1	1	1,765 25	.....	....
3	.....	.....	.....	12	.....	.....	....	.....	.....	.....	.....	.....	....	85 80	82 88	....
5	.....	.....	.....	41	.....	.....	....	.....	.....	.....	.....	.....	....	252 32	250 00	....
1	.....	.....	.....	7	.....	.....	....	.....	.....	.....	.....	.....	....	83 18	94 07	....
8	.....	.....	.....	47	.....	.....	....	.....	.....	.....	.....	2	....	221 00	125 03	....
41	10	4	1	172	.....	.....	....	23 93	.....	2	18 00	7	....	1,378 00	605 39	
6	.....	.....	2	55	.....	.....	....	2 41	.....	.....	.....	.....	....	334 45	186 27	....
4	.....	.....	.....	11	1	12 00	....	1 99	.....	.....	.....	.....	....	102 85	41 78	....
4	1	.....	1	15	1	12 00	....	1 75	.....	.....	.....	1	....	159 55	63 59	....
.....	2	.....	.....	5	1	12 00	....	48	.....	.....	.....	.....	....	39 50	.....	....
9	.....	.....	.....	26	1	12 80	1	4 01	.....	.....	.....	.....	....	155 39	135 66	....
3	.....	.....	.....	3	1	16 30	1	1 38	.....	.....	.....	.....	....	93 15	59 89	....
4	.....	.....	.....	19	.....	.....	1	1 78	.....	1	5 00	.....	....	120 20	79 62	....
4	.....	.....	.....	14	.....	.....	....	2 78	.....	.....	.....	.....	....	160 15	78 03	....
3	2	.....	.....	20	.....	.....	....	1 80	.....	.....	.....	.....	....	150 16	113 67	....
.....	.....	.....	.....	.....	.....	.....	....	15	.....	.....	.....	.....	....	26 65	47 09	....
5	.....	.....	.....	19	.....	.....	....	3 08	.....	.....	.....	1	....	142 70	63 15	....
8	2	.....	.....	46	.....	.....	....	5 24	.....	.....	.....	1	....	388 20	254 74	....
2	.....	.....	.....	5	.....	.....	....	86	.....	.....	.....	.....	....	40 25	.....	....
1	.....	.....	.....	14	.....	.....	....	1 39	.....	.....	.....	.....	....	108 67	.....	....
7	.....	.....	.....	17	.....	16 20	....	2 38	.....	.....	.....	.....	....	91 60	59 87	....
5	.....	.....	.....	28	.....	.....	....	2 27	.....	.....	.....	.....	....	196 90	.....	....
174	3	.....	5	416	....	.....	....	92 04	653 71	5	30 00	198	18	5,268 55	{ 1,773 43 { 1,757 40	2 00
1	.....	.....	.....	1	.....	.....	....	91	.....	.....	.....	.....	....	69 50	77 38	....
5	1	.....	.....	4	.....	.....	....	2 13	.....	.....	.....	.....	....	88 18	71 75	....
1	.....	.....	.....	.....	.....	.....	....	67	.....	.....	.....	.....	....	41 05	53 60	....
6	.....	.....	.....	2	.....	.....	....	2 10	.....	.....	.....	.....	....	64 50	75 66	....
5	.....	.....	.....	10	.....	.....	....	2 42	.....	.....	.....	.....	....	128 70	106 99	....
.....	.....	.....	.....	51	.....	.....	....	1 53	.....	.....	.....	.....	....	249 81	.....	....
6	.....	.....	.....	18	2	37 40	....	3 27	.....	.....	.....	6	....	213 75	93 22	....
4	.....	.....	.....	29	.....	4 00	....	2 68	.....	.....	.....	.....	....	153 95	.....	....
1	.....	.....	.....	.....	.....	.....	....	88	.....	.....	.....	.....	....	37 11	33 59	....
3	.....	.....	.....	.....	.....	.....	....	87	.....	.....	.....	.....	....	21 25	28 24	....
8	.....	.....	.....	14	.....	.....	....	2 53	.....	1	10 00	1	....	128 00	51 42	....
14	4	.....	.....	67	.....	.....	....	8 64	.....	.....	.....	11	....	748 55	424 80	....
3	1	.....	3	5	.....	.....	....	1 20	.....	.....	.....	.....	....	64 30	64 80	....
49	2	3	2	244	.....	.....	....	26 65	.....	3	15 00	11	4	1,772 85	1,025 24	....
6	2	.....	2	17	.....	.....	....	3 70	.....	.....	.....	.....	....	197 61	228 67	....
10	.....	.....	5	11	.....	.....	....	70	.....	.....	.....	1	....	67 30	79 40	....
3	3	.....	1	33	.....	.....	....	2 71	.....	.....	.....	.....	....	263 65	88 68	....
5	.....	.....	.....	16	.....	.....	....	2 91	.....	.....	.....	.....	....	170 31	98 89	....
2	1	.....	.....	27	1	10 00	....	1 70	.....	.....	.....	4	....	199 70	116 38	....
7	.....	.....	.....	36	1	12 00	....	4 52	.....	.....	.....	5	....	306 20	156 70	....
1	7	.....	2	10	1	12 10	....	70	.....	2	18 00	1	....	66 50	.....	....
10	.....	.....	5	266	2	21 00	2	10 66	.....	6	35 00	72	1	1,805 16	{ 456 07 { 511 00	....
13	3	.....	.....	20	1	9 00	....	7 21	.....	.....	.....	6	....	492 35	277 15	....
7	3	.....	.....	13	.....	.....	....	2 18	.....	.....	.....	1	....	145 90	118 03	....
.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	....	.....	.....	....

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Frontenac	1	866	24,088 66	22	1,067 95	150	34 26	9,666 92	9,624 20	42 72	829
	2	28	946 55	2	178 74	2	46 06	395 00	357 50	83 56	27
	3	66	1,139 13	3	149 26	3	.....	1,038 37	1,038 37	.....	58
	4	94	3,682 76	6	187 27	12	.....	2,019 47	1,979 67	39 80	93
	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	6	55	2,331 85	7	342 47	2	.....	913 05	913 05	.....	43
	7	41	2,173 06	4	210 26	7	67 36	733 39	800 75	.....	37
Grey	1	559	17,474 81	20	690 00	50	.....	4,453 92	4,265 01	189 01	529
	2	129	4,853 51	15	1,177 19	6	14 00	2,028 50	2,042 50	.....	118
	3	177	3,054 82	3	529 52	21	.....	1,524 58	1,524 58	.....	195
	4	56	2,704 27	14	892 90	4	31 25	1,520 92	1,504 88	16 04	48
	5	112	3,224 13	9	782 34	8	79 02	2,946 58	2,820 02	126 56	103
	6	46	1,585 18	8	410 44	2	.....	484 27	484 27	.....	45
	7	93	2,851 86	15	549 38	3	.....	1,317 18	1,309 88	7 30	88
	8	92	3,658 52	3	168 53	7	75 24	1,269 93	1,262 14	83 03	84
Haldimand	1	51	2,260 06	1	81 65	11	430 46	885 51	1,265 46	50 51	56
	2	33	1,279 43	2	78 50	8	89 16	1,047 52	1,102 99	24 69	16
	3	224	6,885 12	11	418 34	62	256 19	2,289 17	2,158 92	386 64	213
	4	65	2,665 00	9	257 00	8	56 19	1,078 52	828 77	305 94	65
	5	7	373 74	12	621 73	.....	.....	313 74	313 74	.....	5
Haliburton	1	28	1 730 49	8	280 23	2	14 00	780 04	790 04	4 00	21
	2	74	3,245 80	3	79 01	2	.....	1,285 67	1,257 97	27 70	71
	3	54	2,177 70	7	651 84	.....	.....	1,011 79	1,011 79	.....	50
	4	5	144 40	.....	.....	.....	.....	94 80	44 80	50 00	.....
Halton	1	95	2,954 98	15	1,379 34	17	148 32	1,204 21	1,303 09	49 44	91
	2	66	1,909 60	3	189 75	8	17 07	796 75	750 99	45 76	64
	3	124	6,381 09	14	1,246 98	5	190 12	1,710 89	1,605 07	105 82	124
	4	58	2,834 81	6	291 01	8	.....	767 13	767 13	.....	47
	5	10	296 82	2	48 24	.....	.....	146 82	146 82	.....	10
	6	31	948 98	8	304 33	2	.....	575 74	575 74	30 61	30
Hastings	1	695	19,156 75	22	1,302 99	32	427 70	8,611 50	8,475 15	564 05	440
	2	54	2,247 08	7	225 13	4	115 02	830 94	797 63	168 33	49
	3	11	306 52	1	72 42	.....	.....	112 25	112 25	.....	.....
	4	122	3,453 60	8	492 30	16	232 48	2,552 90	2,726 52	58 86	116
	5	61	2,226 40	3	99 81	5	2 00	1,196 80	1,159 35	39 45	60
	6	133	4,673 48	12	650 62	10	.....	3,386 21	3,386 21	.....	148
	7	40	776 29	.....	.....	.....	116 45	370 74	455 44	31 75	39
	9	367	11,057 52	15	725 29	20	49 59	5,637 41	5,581 50	55 91	182
	10	79	2,958 07	10	748 12	2	45 00	2,263 36	2,208 36	54 00	78
	11	118	2,318 48	6	279 48	3	194 19	1,422 04	1,439 04	177 09	121
	12	82	2,985 84	3	59 81	5	175 73	1,179 22	1,089 88	89 34	79
Huron	1	170	5,597 42	14	982 25	2	95 46	2,503 90	2,508 54	91 02	163
	2	130	3,928 42	4	162 82	10	225 32	1,589 46	1,587 68	227 10	122
	3	99	3,944 58	7	325 72	7	76 90	1,995 30	2,072 20	.....	97
	4	57	2,907 28	6	104 73	2	.....	1,105 68	1,105 18	50	55
	5	46	1,523 91	8	323 14	3	.....	626 16	624 16	2 00	42
	6	20	796 41	5	610 60	.....	1 00	578 35	579 35	.....	20
	7	4	318 63	.....	.....	.....	.....	30 00	30 00	.....	.....
	8	137	4,149 11	7	445 69	13	153 42	1,918 24	1,985 28	86 38	149
	9	41	2,016 57	2	74 22	.....	.....	1,010 13	963 47	46 66	34
	10	20	684 54	9	424 82	4	.....	416 69	416 69	.....	17
	11	10	316 16	.....	.....	.....	12 00	237 33	238 48	10 85	10
	12	17	1,183 15	1	35 82	1	.....	217 65	217 65	.....	13

*Part of year only. ** Estimated.

A.—Continued.

to the 31st day of December, A.D. 1911, inclusive, etc.—Continued.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of jury trials by jurors called in pursuance of section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of section 43, D.C.A.
						$ c.		$ c.	$ c.		$ c.			$ c.	$ c.	$ c.
27	.....	.....	.....	297	.....	.....	....	18 90	.....	.....	.....	38	2	1,669 15	{ 45 50 { 824 83	....
2	.....	.....	.....	8	.....	.....	....	95	.....	.....	.....	.....	....	66 35	.....	....
5	.....	.....	.....	12	.....	.....	....	2 60	.....	.....	.....	.....	....	136 85	113 00	....
3	.....	.....	.....	15	.....	.....	....	3 09	.....	.....	.....	1	1	197 27	160 61	....
5	.....	.....	.....	15	.....	.....	....	3 09	.....	.....	.....	1	....	197 27	17 60	....
5	.....	.....	.....	3	.....	.....	....	2 54	.....	.....	.....	.....	....	110 05	73 13	....
5	.....	.....	1	8	.....	.....	....	2 27	.....	1	10 00	1	....	192 68	67 35	....
30	4	.....	4	163	.....	.....	....	.....	.....	.....	.....	.....	....	1.350 00	* 750 69	....
11	.....	.....	.....	7	.....	.....	....	6 00	.....	.....	.....	.....	....	404 65	219 68	....
6	6	.....	.....	92	.....	.....	....	3 16	.....	.....	.....	2	3	451 45	155 36	....
8	.....	.....	.....	8	1	12 00	....	3 02	.....	.....	.....	1	....	150 17	232 13	....
6	1	1	.....	21	2	24 00	....	3 92	.....	.....	.....	.....	....	263 45	253 69	....
1	3	.....	.....	13	.....	.....	....	1 81	.....	.....	.....	.....	....	116 25	115 60	....
4	.....	.....	.....	28	.....	.....	....	2 60	.....	.....	.....	1	....	178 50	93 38	....
8	2	.....	.....	19	.....	.....	....	3 65	.....	.....	.....	.....	....	221 20	129 09	....
6	1	.....	.....	6	1	12 00	....	1 95	.....	.....	.....	1	....	122 25	60 20	....
2	.....	.....	.....	15	.....	.....	....	1 07	.....	.....	.....	.....	....	71 52	38 50	....
9	3	.....	.....	83	.....	.....	....	4 86	.....	.....	.....	41	....	484 56	236 64	....
4	.....	.....	.....	11	.....	.....	....	2 23	.....	.....	.....	.....	....	148 85	93 18	....
2	1	.....	.....	62	.....	.....	....	.....	.....	.....	.....	.....	....	22 81	22 88	....
4	.....	.....	.....	3	.....	.....	....	2 10	.....	.....	.....	.....	....	63 48	79 05	....
4	3	.....	.....	8	.....	.....	....	2 92	.....	.....	.....	.....	....	182 56	51 65	....
4	2	.....	.....	12	.....	.....	....	2 08	.....	.....	.....	1	....	119 60	148 98	....
.....	.....	.....	.....	1	.....	.....	....	12	.....	.....	.....	.....	....	9 68	.....	....
3	3	.....	.....	27	.....	.....	....	2 44	.....	.....	.....	4	....	263 10	.....	....
2	.....	.....	.....	23	.....	.....	....	1 67	.....	.....	.....	2	1	119 20	64 98	....
18	.....	.....	.....	36	.....	.....	....	7 12	.....	.....	.....	.....	....	298 60	121 28	....
6	.....	.....	.....	16	.....	.....	....	3 21	.....	.....	.....	1	....	191 05	58 09	....
.....	1	.....	.....	2	.....	.....	....	18	.....	.....	.....	.....	....	27 60	.....	....
1	.....	.....	.....	5	.....	.....	....	76	.....	.....	.....	.....	....	80 58	91 19	....
28	5	.....	2	227	2	36 00	....	16 99	.....	.....	.....	2	1	1.601 55	811 23	....
5	.....	.....	.....	11	.....	.....	....	2 48	.....	.....	.....	.....	....	147 21	152 34	....
.....	.....	.....	.....	3	.....	.....	....	.....	.....	.....	.....	.....	....	18 38	17 13	....
6	2	.....	.....	41	.....	.....	....	3 12	.....	2	10 00	1	....	259 40	178 56	....
4	.....	.....	.....	16	.....	.....	....	2 02	.....	.....	.....	.....	....	130 10	64 28	....
5	1	.....	1	22	.....	.....	....	3 53	.....	.....	.....	1	....	253 20	326 36	....
1	.....	.....	.....	19	.....	.....	....	52	.....	.....	.....	.....	....	81 10	10 75	....
22	2	.....	2	163	1	11 00	....	9 82	.....	2	10 00	1	1	718 10	500 58	....
10	.....	.....	.....	15	.....	.....	....	4 06	.....	.....	.....	.....	....	134 90	122 87	....
.....	.....	.....	.....	42	.....	.....	....	1 68	.....	.....	.....	1	....	217 51	285 14	....
3	.....	.....	.....	15	.....	.....	....	2 31	.....	.....	.....	.....	....	182 85	.....	....
11	2	.....	1	52	.....	.....	....	4 91	.....	3	15 00	.....	....	397 21	132 72	....
7	.....	.....	.....	54	.....	.....	....	3 53	.....	1	6 00	5	....	235 00	77 12	....
9	.....	.....	.....	22	.....	.....	....	3 81	.....	.....	.....	1	....	186 75	99 59	....
7	.....	.....	1	10	.....	.....	....	3 21	.....	2	10 00	.....	....	172 76	18 50	....
4	.....	.....	.....	12	.....	.....	....	1 51	.....	.....	.....	2	....	111 55	49 89	....
1	.....	.....	.....	4	.....	.....	....	73	.....	.....	.....	.....	....	38 00	44 91	....
2	.....	.....	.....	2	.....	.....	....	56	.....	.....	.....	.....	....	13 65	9 95	....
5	4	.....	.....	53	1	12 00	....	3 74	.....	.....	.....	.....	....	309 20	203 73	....
7	.....	.....	.....	7	.....	.....	....	2 32	.....	.....	.....	1	....	55 80	59 17	....
3	.....	.....	.....	4	.....	.....	....	87	.....	.....	.....	2	....	51 81	41 98	....
.....	.....	.....	.....	2	.....	.....	....	30	.....	.....	.....	.....	....	17 68	20 89	....
3	.....	.....	.....	3	.....	.....	....	1 24	.....	.....	.....	.....	....	47 42	30 46	....

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Kenora	1	275	12,713 98	6	523 31	1	1,093 44	6,502 73	6,759 45	836 72	258
	2	19	1,220 40	.....	.....	.....	20 11	465 53	451 13	11 40	18
	3	45	2,060 53	4	291 80	2	.....	1,688 90	1,688 90	.....	43
	4	26	1,184 70	2	147 35	.....	.....	79 91	15 95	63 96	23
Kent	1	651	25,383 00	28	1,202 95	123	789 14	9,893 98	9,002 59	1,680 53	617
	2	169	5,815 81	19	956 29	35	71 41	2,787 74	2,805 96	50 19	159
	3	65	2,154 78	8	273 21	5	13 35	749 20	750 52	12 17	6
	4	153	3,701 90	6	164 59	31	15 77	1,770 70	1,784 86	1 61	95
	5	254	7,247 51	14	558 35	23	186 71	5,068 33	5,122 52	133 52	246
	6	61	2,816 10	6	351 12	6	.....	796 33	796 33	.....	57
	7	193	8,415 88	13	606 38	5	31 52	4,451 11	4,355 85	126 78	179
Lambton	1	656	18,995 95	13	411 84	61	744 54	9,902 49	10,156 88	490 15	46
	2	64	2,707 15	3	42 81	.....	.....	704 54	683 59	20 95	63
	3	59	2,157 62	16	1,029 85	7	.....	1,790 93	1,790 93	.....	55
	4	27	1,011 00	3	450 00	13	196 75	438 65	635 40	.....	27
	5	68	1,755 26	.....	.....	3	.....	708 33	663 33	45 00	70
	6	9	328 82	4	29 11	2	.....	359 76	359 76	.....	13
	7	24	773 95	2	119 29	2	.....	238 45	238 45	.....	25
	8	139	3,595 13	14	1,310 32	10	47 78	3,156 68	3,127 52	29 16	125
	9	31	1,305 68	4	76 77	5	.....	1,077 16	1,065 16	12 00	25
Lanark	1	219	8,691 71	16	1,152 97	18	103 15	5,391 33	5,378 70	115 78	198
	2	27	965 97	5	415 69	.....	35 00	379 87	399 87	15 00	26
	3	141	5,010 35	6	294 31	23	.....	1,985 13	1,985 31	.....	141
	4	385	14,140 33	7	328 71	14	176 52	3,993 28	3,937 20	257 20	368
	5	77	2,033 31	2	43 73	3	.....	950 22	950 22	.....	74
Leeds and Grenville	1	661	12,782 93	7	905 75	24	46 76	7,679 60	7,669 16	57 20	672
	2	159	3,687 32	4	146 04	4	254 42	1,611 83	1,686 35	179 90	159
	3	190	6,668 07	17	853 51	5	147 12	3,909 23	4,015 06	41 29	179
	4	81	2,518 35	3	61 37	6	87 33	1,282 15	1,369 48	21 03	83
	5	77	2,012 39	.....	.....	3	39 28	951 55	951 55	.....	76
	6	100	3,276 81	6	369 71	13	28 49	1,700 35	1,646 07	54 28	109
	7	13	372 59	1	44 30	2	.....	306 87	303 72	3 15	12
	8	110	3,970 72	4	214 66	14	4 00	910 96	906 96	4 00	80
	9	48	2,004 35	3	142 83	1	1 00	1,318 47	1,106 04	213 43	42
	10	21	290 85	3	234 18	.....	175 25	194 06	367 41	.....	21
	11	15	562 85	.....	.....	2	.....	145 71	145 71	.....	14
	12	23	897 74	.....	.....	1	.....	427 51	427 51	.....	22
Lennox and Addington	1	141	3,887 35	3	.....	23	63 16	1,255 17	1,167 39	150 94	164
	2	17	688 23	.....	.....	1	30 00	130 95	130 95	30 00	16
	3	4	136 15	.....	.....	.....	.....	10 35	5 50	4 85	4
	4	25	1,005 27	2	28 09	6	7 40	335 05	338 43	4 02	24
	5	64	4,991 92	.....	.....	7	.....	948 89	948 89	.....	43
	6	32	1,390 21	4	108 25	2	31 92	535 35	454 20	113 07	30
	7	42	1,729 41	2	116 25	2	6 00	467 42	439 02	34 40	38
	8	28	1,026 40	4	176 08	2	98 28	586 64	540 12	46 52	27
	9	7	293 16	.....	.....	.....	.....	56 35	56 35	.....	7

A.—Continued.

to the 31st day of December, A.D. 1912, inclusive, etc.—Continued.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of jury trials by jurors called in pursuance of section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of section 43, D.C.A.
						$ c.		$ c.	$ c.		$ c.			$ c.	$ c.	$ c.
14	.....	.....	.....	28	.....	.....	....	.....	.....	.....	.....	.....	....	736 00	311 82	40 00
1	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	....	39 00	.....	.....
6	.....	.....	1	4	.....	.....	....	.....	.....	.....	.....	.....	....	68 90	.....	.....
3	.....	.....	.....	5	.....	.....	....	.....	.....	.....	.....	.....	....	34 13	.....	.....
44	.....	.....	1	160	.....	.....	1	24 46	.....	1	10 00	81	1	1,549 40	492 87 423 35	.....
10	1	.....	.....	43	1	12 00	1	5 54	.....	1	10 00	9	....	393 30	228 69	.....
5	.....	.....	.....	27	.....	.....	....	2 15	.....	.....	.....	.....	....	118 70	63 67	.....
2	.....	.....	.....	76	.....	.....	....	2 45	.....	.....	.....	9	1	378 55	208 46	.....
8	.....	.....	2	82	.....	.....	....	5 87	.....	1	7 00	4	....	566 15	304 17	.....
10	.....	.....	.....	19	.....	.....	....	3 46	.....	.....	.....	.....	....	130 75	119 10	.....
19	6	.....	.....	36	.....	.....	....	8 77	.....	.....	.....	.....	....	354 50	418 87	.....
22	6	.....	2	249	2	12 00	....	13 87	.....	2	10 00	20	1	1,121 05	577 51	.....
2	.....	.....	.....	20	.....	.....	....	1 76	.....	.....	.....	.....	....	115 70	94 10	.....
4	.....	.....	.....	14	.....	.....	....	2 05	.....	.....	.....	.....	....	139 95	176 69	.....
.....	.....	.....	.....	2	.....	.....	....	84	.....	.....	.....	3	....	64 70	93 34	.....
1	.....	.....	.....	26	.....	.....	....	1 24	.....	.....	.....	.....	....	97 80	66 93	.....
2	.....	.....	.....	3	.....	.....	....	77	.....	.....	.....	.....	....	23 27	19 89	.....
.....	.....	.....	.....	4	.....	.....	....	54	.....	.....	.....	.....	....	33 20	46 72	.....
1	1	.....	.....	35	1	11 00	....	2 56	.....	.....	.....	1	....	255 15	112 50	.....
3	.....	.....	.....	8	.....	.....	....	1 30	.....	.....	.....	.....	....	58 00	84 03	.....
18	3	.....	.....	55	.....	.....	....	8 39	.....	3	22 50	5	....	603 60	153 04 335 06	.....
2	.....	.....	.....	2	.....	.....	....	76	.....	.....	.....	.....	....	95 56	57 48	.....
10	.....	.....	.....	39	.....	.....	....	4 93	.....	.....	.....	3	....	306 40	168 51	.....
17	.....	.....	.....	96	.....	.....	....	9 91	.....	.....	.....	.....	....	717 20	372 78 25 75	.....
3	1	.....	1	28	.....	.....	....	1 83	.....	1	7 50	1	....	135 00	149 48	.....
14	.....	.....	.....	315	.....	.....	....	10 29	.....	.....	.....	.....	....	1,173 60	170 00 286 81	.....
1	3	.....	1	55	.....	.....	....	2 20	.....	.....	.....	.....	....	230 11	112 88	.....
13	4	.....	.....	77	.....	.....	1	6 10	.....	1	8 00	.....	....	417 77	294 82	.....
4	.....	.....	.....	29	.....	.....	....	2 71	.....	.....	.....	.....	....	178 55	140 38	.....
1	.....	.....	.....	28	.....	.....	....	1 39	.....	1	10 00	1	....	143 90	72 10	.....
5	.....	.....	.....	22	.....	.....	....	2 93	.....	.....	.....	.....	....	275 15	252 12	.....
1	.....	.....	1	5	.....	.....	....	40	.....	.....	.....	.....	....	22 56	31 48	.....
8	.....	.....	1	17	.....	.....	....	3 83	.....	.....	.....	1	....	261 28	212 75	.....
7	.....	.....	.....	12	.....	.....	....	2 47	.....	.....	.....	1	....	108 70	91 49	.....
.....	.....	.....	.....	3	.....	.....	....	54	.....	.....	.....	.....	....	43 05	.....	.....
1	.....	.....	.....	5	.....	.....	....	46	.....	.....	.....	.....	....	33 99	28 50	.....
2	.....	.....	.....	5	.....	.....	....	76	.....	.....	.....	.....	....	48 93	44 10	.....
4	3	.....	2	40	.....	.....	....	3 31	.....	.....	.....	3	....	311 55	189 30	.....
.....	.....	.....	.....	5	.....	.....	....	55	.....	.....	.....	.....	....	30 80	.....	.....
.....	.....	.....	.....	1	.....	.....	....	09	.....	.....	.....	.....	....	9 75	9 02	.....
1	1	.....	.....	3	.....	.....	....	85	.....	.....	.....	.....	....	74 58	32 78	.....
10	.....	.....	.....	11	.....	.....	....	3 90	.....	.....	.....	.....	....	172 25	.....	.....
2	.....	.....	.....	10	.....	.....	....	1 28	.....	.....	.....	.....	....	64 95	45 06	.....
3	2	.....	.....	12	.....	.....	....	1 59	.....	.....	.....	.....	....	100 45	51 50	.....
1	.....	.....	.....	5	.....	.....	....	73	.....	.....	.....	.....	....	73 96	76 96	.....
.....	.....	.....	.....	2	.....	.....	....	.....	.....	.....	.....	.....	....	14 60	8 97	.....

TABLE

Return of Division Court business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Lincoln	1	43	1,673 29	13	1,027 13	3	.....	935 65	935 65	.....	37
	2	578	17,315 56	28	1,694 62	46	283 42	9,014 17	9,051 80	245 79	552
	3	49	1,528 12	13	804 02	6	25 97	951 11	974 11	2 97	4
	4	30	1,125 30	2	77 82	5	10 00	632 52	642 52	.....	27
	5	135	4 952 70	13	723 01	13	74 34	11,527 78	11,602 15	.....	125
Manitoulin	1	49	1,939 99	5	377 64	2	133 37	698 81	660 87	191 31	43
	2	34	1,668 79	2	72 91	5	.....	742 23	716 68	26 55	36
	3	23	840 17	4	85 43	.....	.....	327 54	211 12	116 42	23
Middlesex	1	1,744	64,738 32	44	1,806 59	76	436 65	23,777 72	23,648 20	586 17	1,099
	2	89	3,540 00	3	253 72	6	.....	1,644 57	1,644 57	.....	83
	3	56	2,620 45	30	2,543 88	4	54 32	2,535 69	2,521 93	68 08	50
	4	27	986 69	8	245 10	5	.....	467 63	467 63	.....	25
	5	50	2,467 75	12	674 41	8	48 99	959 03	978 03	30 49	43
	6	81	2,919 77	17	1,049 51	3	16 17	2,386 04	2,348 45	54 00	80
	7	44	1,203 67	.....	.....	1	.....	420 56	407 56	13 18	42
	8	9	345 76	3	140 58	1	5 00	293 46	273 46	25 00	9
	9	443	8,699 98	14	687 13	75	24 55	3,248 97	3,030 61	218 36	435
Muskoka.....	1	142	6,197 20	10	527 48	27	75 03	2,339 17	2,257 35	157 85	124
	2	123	4,750 27	11	654 49	16	11 98	2,730 06	2,644 40	97 64	123
	3	130	4,453 93	17	1,206 86	31	19 60	1,647 43	1,574 68	92 35	94
	4	29	957 79	5	326 52	8	.....	780 08	780 08	.....	24
Nipissing.....	1	162	5,063 58	9	639 21	3	42 89	1,827 17	1,823 47	46 59	126
	2	79	2,850 40	7	660 65	3	.....	1,432 50	1,417 20	15 30	60
	3	609	22,015 06	30	1,951 98	42	.....	11,419 96	11,205 36	214 60	578
	4	123	6,815 16	9	712 07	.....	298 36	1,783 93	1,982 84	99 45	113
	5	30	1,171 15	2	125 83	2	.....	1,138 10	1,138 10	.....	30
	6	123	6,089 75	20	1,012 38	6	.....	1,841 24	1,834 88	6 36	111
	7	905	45,150 97	53	3,229 42	82	444 97	16,890 51	16,361 79	861 40	818
	8	486	30,647 44	35	2,545 42	10	633 40	10,340 13	10,156 11	817 42	359
	9	400	15,075 49	12	1,458 65	55	37 42	4,798 22	4,724 95	110 69	327
Norfolk.....	1	232	6,412 83	8	376 60	78	67 15	2,106 35	1,842 87	263 48	227
	2	38	2,171 28	6	381 93	3	55 30	550 16	565 46	40 00	33
	3	11	237 54	4	154 60	4	.....	354 51	354 51	.....	14
	4	44	1,426 42	9	497 94	12	127 34	824 87	895 61	56 60	40
	5	16	696 58	4	245 61	1	.....	453 91	453 91	.....	16
	6	134	5,412 89	8	323 08	20	.....	3,643 12	3,643 12	.....	131
	7	31	950 86	7	218 42	5	.....	486 81	443 16	43 65	31
	8	24	848 85	3	107 07	3	.....	267 67	267 67	.....	22
Northumberland and Durham ..	1	89	2,900 14	12	716 70	2	65 65	1,729 72	1,701 03	94 34	84
	2	39	1,692 09	5	276 52	.....	37 31	872 94	854 83	55 42	34
	3	178	4,759 73	6	472 76	4	31 30	2,256 24	2,216 24	40 50	174
	4	51	1,855 88	8	413 79	2	72 90	730 14	720 19	82 13	49
	5	320	9,798 99	4	226 94	23	6 00	2,952 70	2,853 68	99 01	299
	6	29	709 35	6	362 75	5	.....	245 81	245 84	.....	27
	7	130	3,606 07	5	168 16	31	176 88	917 68	1,024 96	69 60	125
	8	140	4,766 00	2	17 00	14	62 06	635 00	578 27	123 77	92
	9	113	4,104 04	10	631 55	6	.....	2,088 86	2,088 86	.....	105
	10	53	1,449 36	6	184 79	5	.....	781 52	763 52	18 00	52
	11	366	8,368 29	6	234 05	36	114 96	5,133 60	5,088 84	159 72	398

A.—Continued.

to the 31st day of December, A.D. 1912, inclusive, etc.—Continued.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 142 D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's Returns of Emoluments.	Bailiff's Returns of Emoluments.	Unclaimed moneys in pursuance of section 43 D.C.A.
						$ c.		$ c.	c.		$ c.			$ c.	$ c.	
2	2	.....	.....	4	.....	.....	....	1 34	.....	.....	.....	.....	....	109 35	.....	.....
26	3	.....	1	200	.....	.....	....	16 13	.....	1	6 00	.....	....	1,126 65	666 00	.....
3	3	.....	.....	14	.....	.....	....	1 47	.....	.....	.....	.....	....	137 20	89 68	.....
3	.....	.....	.....	6	.....	.....	....	1 23	.....	1	8 00	.....	....	88 70	89 88	.....
10	.....	.....	.....	29	.....	.....	....	4 68	.....	1	10 00	.....	....	261 12	115 27	.....
6	.....	.....	.....	9	.....	.....	....	.....	.....	.....	.....	1	....	105 20	148 59	.....
2	.....	.....	.....	8	.....	.....	....	.....	.....	.....	.....	.....	....	57 35	56 77	.....
.....	.....	.....	.....	2	.....	.....	....	.....	.....	.....	.....	.....	....	51·60	.....	.....
151	23	.....	1	481	5	53 00	....	65 70	316 56	7	35 00	5	....	3,582 80	1,176 67	.....
9	.....	.....	.....	18	.....	.....	....	3 60	.....	1	10 00	1	....	145 75	94 36	.....
9	.....	.....	.....	9	.....	.....	....	3 45	.....	.....	.....	.....	....	146 18	147 42	.....
2	.....	.....	.....	4	1	12 00	....	95	.....	.....	.....	2	....	80 21	92 92	.....
6	.....	.....	.....	3	.....	.....	....	2 80	.....	.....	.....	.....	....	120 70	131 28	.....
3	.....	.....	.....	12	.....	.....	....	2 28	.....	.....	.....	1	....	197 20	120 00	.....
2	.....	.....	.....	13	.....	.....	....	1 16	.....	.....	.....	.....	....	71 80	53 83	.....
.....	1	.....	.....	10	.....	.....	....	30	.....	.....	.....	.....	....	26 11	32 21	.....
8	.....	.....	2	203	.....	.....	....	5 42	.....	.....	.....	3	....	846 08	327 51	.....
15	.....	.....	1	28	.....	.....	....	.....	.....	.....	.....	1	....	372 07	.....	.....
4	2	.....	2	17	.....	.....	....	.....	.....	.....	.....	1	....	306 05	327 66	.....
11	.....	.....	.....	25	.....	.....	....	.....	.....	.....	.....	2	1	312 45	145 75	.....
.....	.....	.....	.....	5	.....	.....	....	.....	.....	.....	.....	2	1	79 55	.....	.....
7	.....	.....	.....	29	.....	.....	....	.....	.....	.....	.....	1	....	311 55	199 39	.....
1	2	.....	.....	16	.....	.....	....	.....	.....	.....	.....	.....	....	168 75	{ 93 37	.....
															{ 13 05	.....
31	2	.....	.....	91	.....	.....	....	.....	.....	7	21 00	10	....	1,772 30	739 37	.....
10	.....	.....	.....	.....	.....	.....	....	.....	.....	9	32 00	.....	....	268 06	143 70	.....
.....	.....	.....	.....	6	.....	.....	....	.....	.....	.....	.....	.....	....	78 07	.....	.....
12	.....	.....	.....	9	.....	.....	....	.....	.....	.....	.....	1	....	312 60	.....	.....
87	17	.....	.....	85	.....	.....	....	.....	100 98	2	8 00	9	2	2,504 95	1,419 15	.....
85	5	.....	1	36	.....	.....	....	.....	.....	.....	.....	.....	....	1,297 15	843 95	.....
23	.....	.....	.....	38	.....	.....	....	.....	.....	.....	.....	7	....	1,005 60	475 87	.....
5	.....	.....	.....	72	6	85 00	....	5 09	.....	.....	.....	14	1	444 35	326 90	.....
3	1	.....	.....	9	.....	.....	....	1 91	.....	.....	.....	.....	....	93 65	83 11	.....
1	.....	.....	.....	3	.....	.....	....	40	.....	.....	.....	1	....	27 94	.....	.....
1	.....	.....	.....	5	.....	.....	....	1 09	.....	.....	.....	1	....	102 10	.....	.....
.....	.....	.....	.....	1	1	11 00	....	51	.....	.....	.....	.....	....	44 10	40 08	.....
3	.....	.....	.....	48	.....	.....	....	3 00	.....	.....	.....	.....	....	268 59	299 11	.....
.....	.....	.....	.....	8	.....	.....	....	72	.....	.....	.....	.....	....	81 65	57 11	.....
2	.....	.....	.....	6	.....	.....	....	80	.....	.....	.....	.....	....	51 50	34 81	.....
5	1	.....	.....	26	1	12 00	....	3 25	.....	.....	.....	.....	....	213 12	149 90	.....
4	.....	.....	.....	4	.....	.....	....	1 97	.....	.....	.....	.....	....	89 15	100 50	.....
4	2	.....	.....	71	.....	.....	....	3 00	.....	.....	.....	.....	....	358 90	161 49	.....
4	.....	.....	1	10	.....	.....	....	2 05	.....	.....	.....	2	....	108 05	120 00	.....
19	.....	.....	.....	91	.....	.....	....	9 44	.....	.....	.....	2	....	558 60	280 52	.....
1	.....	.....	.....	9	.....	.....	....	1 10	.....	.....	.....	.....	....	54 30	78 62	.....
4	.....	.....	.....	51	1	16 00	....	3 08	.....	.....	.....	17	....	283 35	167 14	.....
12	.....	.....	.....	36	.....	.....	....	6 69	.....	3	20 00	.....	....	264 70	124 81	.....
8	2	3	.....	46	.....	.....	....	4 34	.....	.....	.....	.....	....	272 22	146 13	.....
1	1	.....	.....	14	.....	.....	....	1 03	.....	.....	.....	.....	....	116 61	80 24	.....
7	.....	.....	.....	153	.....	.....	....	6 39	.....	.....	.....	.....	....	762 96	.....	.....

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Ontario	1	274	10,613 06	18	801 68	18	96 58	3,276 60	3,226 73	49 87	250
	2	77	2,387 65	3	276 34	10	.....	1,634 67	1,634 67	.....	74
	3	45	1,953 65	1	30 52	.....	.....	864 27	864 27	.....	41
	4	95	2,793 45	16	1,330 12	3	146 29	1,180 84	1,084 49	242 64	92
	5	30	859 32	7	239 29	.....	.....	588 12	588 12	.....	28
	6	25	1,127 73	2	76 40	.....	.....	409 99	409 99	.....	17
	7	20	628 84	5	229 94	1	128 31	395 68	406 58	117 41	20
Oxford.....	1	963	33,244 17	28	1,330 15	175	49 00	23,298 47	23,310 19	39 28	71
	2	58	2,439 43	4	218 68	4	.....	1,597 46	1,597 46	.....	52
	3	49	1,582 00	9	240 93	3	.....	1,042 67	1,042 67	.....	46
	4	115	4,684 45	3	42 17	10	244 33	2,894 83	2,949 05	190 11	112
	5	300	9,864 78	20	1,028 04	41	40 90	4,918 72	4,694 60	373 71	280
	6	232	8,007 38	16	1,028 58	27	43 90	2,890 43	2,905 33	29 00	220
	7	51	2,745 14	.....	.....	.....	15 50	1,673 18	1,679 68	9 00	41
Parry Sound ...	1	196	6,760 09	4	260 91	1	180 61	2,615 94	2,390 17	225 77	165
	2	19	922 86	2	100 01	3	.....	439 20	419 20	20 00	17
	3	19	810 02	.....	.....	.....	.....	268 03	.....	.....	17
	4	119	4,301 56	13	587 19	4	55 35	1,593 09	1,532 83	60 26	114
	5	28	1,709 17	7	137 03	1	44 09	628 91	673 00	.....	22
	6	80	3,730 20	17	729 21	9	2 37	1,851 32	1,832 25	17 04	86
	7	95	3,531 66	11	384 04	18	.....	1,149 57	1,149 57	.....	91
Peel	1	114	4,447 55	12	598 71	12	.....	1,565 04	1,565 04	.....	114
	2	55	2,818 22	8	822 32	4	36 99	1,169 33	1,131 66	37 67	47
	3	28	991 25	7	137 90	.....	25 00	643 36	668 36	.....	28
	4	40	1,904 79	4	214 66	2	.....	690 10	690 10	.....	36
Perth	1	449	15,290 12	34	1,897 66	88	23 67	6,922 31	6,640 01	305 07	509
	2	103	3,961 27	10	436 13	19	.....	1,669 20	1,604 00	64 00	98
	3	171	6,616 85	19	886 64	25	.....	2,442 15	2,442 15	.....	160
	4	12	477 75	5	117 31	.....	.....	362 11	288 17	73 94	12
	5	75	3,175 27	8	544 51	8	26 75	1,579 74	1,535 99	43 75	82
	6	225	6,261 58	.....	642 98	31	.....	4,408 38	4,408 38	.....	207
Peterborough....	1	590	20,681 43	25	1,323 47	125	185 74	8,945 20	8,700 53	244 67	681
	2	35	1,260 94	.....	.....	8	61 37	484 87	484 87	61 37	41
	3	88	3,498 83	5	296 42	2	33 68	1,209 55	1,212 98	30 25	83
	4	14	463 17	.....	.....	.....	.....	446 84	446 84	.....	12
	5	137	3,601 59	7	254 21	3	30 00	1,934 12	1,851 48	52 64	83
	6	14	316 65	.....	.....	.....	.....	169 50	169 50	.....	14
Prescott and Russell	1	28	1,849 16	1	207 33	5	.....	253 73	253 73	.....	20
	2	44	2,058 06	1	5 63	2	.....	832 28	832 28	.....	41
	3	32	1,271 80	.....	.....	1	.....	391 93	384 28	7 65	28
	4	96	3,768 68	4	217 71	3	.....	2,018 25	2,018 25	.....	83
	5	30	1,541 44	2	.....	.....	37 23	1,041 42	1,004 19	37 23	26
	6	93	3,760 06	16	940 00	5	.....	1,919 00	1,919 00	.....	56
	7	196	4,439 76	1	62 32	43	.....	1,844 60	1,824 78	19 86	235
	8	32	1,074 50	1	75 75	1	.....	478 96	478 96	.....	31
	9	58	2,342 51	.....	.....	3	21 00	687 05	693 05	15 00	53
	10	138	5,056 18	3	93 63	24	12 00	2,476 88	2,488 88	.....	130
	11	114	4,392 59	6	433 21	1	.....	2,545 42	2,545 42	.....	108

A.—Continued.

to the 31st day of December, A.D. 1912, inclusive, etc.—Continued.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of Section 43, D.C.A.
						$ c.		$ c.	$ c.		$ c.			$ c.	$ c.	
22	.....	.....	1	72	.....	.....	....	10 53	.....	3	20 00	3	....	534 00	495 82	.....
6	.....	.....	.....	11	.....	.....	....	3 12	.....	.....	.....	4	....	207 65	178 74	.....
4	.....	.....	.....	5	.....	.....	....	1 72	.....	1	10 00	.....	....	98 98	145 00	.....
3	.....	.....	.....	28	.....	.....	....	1 98	.....	.....	.....	1	1	194 22	96 98	.....
3	.....	.....	.....	5	.....	.....	....	1 20	.....	.....	.....	.....	....	106 35	126 43	.....
2	.....	.....	.....	13	.....	.....	....	1 36	.....	2	10 00	.....	....	47 44	25 49	.....
.....	.....	.....	.....	2	.....	.....	....	36	.....	.....	.....	.....	....	54 85	51 42	.....
82	2	.....	1	369	5	69 10	....	34 25	.....	3	15 00	11	....	1,863 40	1,360 61	.....
6	.....	.....	.....	17	.....	.....	....	2 52	.....	.....	.....	1	....	92 85	81 62	.....
2	17	.....	.....	27	.....	.....	....	1 04	.....	.....	.....	.....	....	80 06	.....	.....
13	3	.....	.....	21	1	13 80	....	5 17	.....	.....	.....	2	....	264 08	201 55	.....
15	.....	.....	.....	102	4	38 00	....	8 62	.....	1	5 00	14	....	678 95	357 91	.....
12	.....	.....	.....	54	.....	.....	....	7 26	.....	.....	.....	11	....	466 50	377 21	.....
10	.....	.....	.....	17	.....	.....	....	3 03	.....	.....	.....	2	....	108 07	41 72	.....
10	1	.....	.....	38	.....	.....	....	.....	.....	.....	.....	3	....	310 10	105 05	.....
2	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	1	1	60 75	.....	.....
1	.....	.....	.....	1	.....	.....	....	.....	.....	.....	.....	.....	....	.....	45 15	.....
4	.....	.....	1	13	.....	.....	....	.....	.....	1	5 00	.....	....	260 35	.....	.....
6	.....	.....	.....	1	.....	.....	....	.....	.....	.....	.....	.....	....	66 62	68 62	.....
7	.....	.....	.....	8	.....	.....	....	.....	.....	.....	.....	.....	....	193 95	185 48	.....
4	.....	.....	.....	16	.....	.....	....	.....	.....	.....	.....	.....	....	235 45	119 96	.....
11	.....	.....	.....	24	1	12 00	....	4 52	.....	.....	.....	4	....	265 45	146 46	.....
8	.....	.....	.....	14	.....	.....	....	3 11	.....	2	13 00	.....	....	133 43	72 95	.....
2	.....	.....	1	8	.....	.....	....	1 07	.....	.....	.....	.....	....	43 39	77 54	.....
4	.....	.....	.....	5	.....	.....	....	1 96	.....	.....	.....	.....	....	75 60	61 49	.....
25	.....	.....	.....	137	.....	.....	....	14 11	.....	2	15 00	20	4	1,121 90	590 48	.....
4	.....	.....	1	19	.....	.....	....	3 23	.....	.....	.....	4	....	297 28	203 91	.....
9	1	.....	.....	40	.....	.....	1	6 14	.....	.....	.....	7	....	391 95	217 31	.....
.....	.....	.....	.....	2	.....	.....	....	.....	.....	.....	.....	.....	....	22 40	10 00	.....
6	.....	.....	.....	17	.....	.....	....	3 21	.....	.....	.....	.....	....	173 80	167 26	.....
18	1	.....	.....	67	.....	.....	....	7 95	.....	.....	.....	12	....	470 10	269 11	.....
32	4	.....	.....	138	2	22 00	....	18 82	.....	4	20 00	23	....	1,181 85	635 61	.....
1	.....	.....	.....	.....	.....	.....	....	1 10	.....	.....	.....	.....	....	77 70	.....	.....
5	.....	.....	.....	20	.....	.....	....	2 73	.....	.....	.....	.....	....	189 70	78 96	.....
1	.....	.....	.....	6	.....	.....	....	46	.....	.....	.....	.....	....	39 64	.....	.....
5	.....	.....	.....	49	.....	.....	....	3 27	.....	.....	.....	1	....	220 19	151 19	.....
.....	.....	.....	.....	4	.....	.....	....	18	.....	.....	.....	.....	....	16 73	8 14	.....
6	.....	.....	.....	1	.....	.....	....	2 16	.....	.....	.....	2	....	65 00	44 08	.....
5	.....	.....	.....	8	.....	.....	....	2 18	.....	.....	.....	.....	....	94 12	50 03	.....
4	2	.....	.....	9	.....	.....	....	1 45	.....	1	10 00	1	....	61 70	35 31	.....
13	3	.....	3	21	.....	.....	....	4 78	.....	.....	.....	2	....	264 09	153 18	.....
4	.....	.....	.....	4	.....	.....	....	1 81	.....	.....	.....	.....	....	62 31	.....	.....
10	1	.....	.....	4	.....	.....	....	4 12	.....	2	7 00	.....	....	188 77	108 89	.....
4	.....	.....	.....	75	.....	.....	....	3 49	.....	.....	.....	11	....	423 50	149 91	.....
1	.....	.....	.....	6	1	19 00	....	91	.....	.....	.....	.....	....	57 75	68 53	.....
5	1	.....	.....	17	.....	.....	....	2 42	.....	.....	.....	1	....	138 80	97 76	.....
8	.....	.....	.....	26	.....	.....	....	4 58	.....	.....	.....	11	....	292 88	175 12	.....
6	.....	.....	.....	22	.....	.....	....	4 08	.....	.....	.....	.....	....	253 21	237 16	.....

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Prince Edward..	1	553	11,981 38	3	316 22	205	563 49	3,685 70	3,987 70	261 49	750
	2	8	169 57	.....	.....	1	.....	8 60	2 00	6 60	8
	3	No	suits entered	in the	Court	dur	ing the	year.			
	4	4	65 22	3	75 95	.....	.....	223 68	223 68	.....	4
	5	34	1.033 03	.....	.....	2	17 43	653 13	650 13	20 43	3
	6	11	344 86	.....	.....	3	4 00	119 90	113 90	2 00	11
	7	7	215 17	1	18 85	1	.....	118 77	118 77	.....	7
	8	3	116 00	1	.....	.....	.....	71 00	71 00	.....	3
Rainy River ...	1	196	11,160 59	2	43 17	7	.....	3,602 13	3,085 51	516 62	151
	2	46	1,487 33	23	.....	6	.....	794 17	794 17	.....	51
	3	85	4,031 44	.....	.....	.....	171 97	1,196 99	1,111 56	257 40	74
Renfrew	1	194	6,777 74	3	78 46	17	191 17	1,941 72	1,974 43	158 46	185
	2	17	827 64	.....	.....	.....	.....	327 17	327 17	.....	15
	3	182	5,373 63	13	790 82	9	52 90	1,882 62	1,842 02	214 60	175
	4	166	5,685 55	1	139 89	10	175 36	2,476 43	2,453 18	198 61	155
	5	123	3,390 57	2	16 87	6	.....	2,177 47	2,177 47	.....	78
	6	82	3.316 91	8	354 99	4	6 49	2,113 91	2,029 13	91 22	83
	7	116	4,126 17	4	109 74	3	173 45	1,870 91	1,954 38	89 98	101
Simcoe.....	1	581	19,095 00	12	727 05	40	66 71	7,189 41	7,170 55	85 57	553
	2	101	3,894 38	8	516 73	25	57 50	2,321 39	2,278 23	100 46	115
	3	72	3,376 09	6	710 52	6	41 02	876 78	910 80	7 00	63
	4	195	7,195 83	10	549 11	6	130 52	3,726 12	3,517 23	339 41	98
	5	46	1,659 89	4	414 81	12	66 25	942 30	962 55	46 00	43
	6	274	10.716 43	22	1,788 48	40	269 61	3,182 32	2,975 14	207 18	289
	7	50	2,076 37	5	264 66	1	5 27	706 08	700 67	10 68	43
	8	114	5,452 83	10	536 78	11	122 31	2,036 94	2,036 86	122 39	110
	9	504	14,386 16	9	672 43	56	.....	6.820 24	6.753 13	67 11	479
	10	81	3,622 40	9	341 14	12	114 27	1,250 13	1,262 07	102 33	59
Stormont, Dundas and Glengarry	1	61	2,765 13	4	.....	7	95 35	1,927 26	1,927 26	.....	57
	2	208	8,150 11	.....	40 00	33	99 34	2,007 67	1,793 09	254 58	193
	3	437	13,770 60	9	765 83	110	127 97	5,120 65	4,992 68	189 47	409
	4	55	1,653 58	3	247 00	10	.....	578 77	554 25	24 52	51
	5	84	2,882 30	4	158 69	19	197 49	886 86	1,004 58	79 77	81
	6	43	1,182 93	9	594 15	7	16 15	1,142 93	1.122 90	20 00	52
	7	37	1,039 46	4	352 13	3	43 29	871 75	880 49	34 55	2
	8	115	4,044 86	2	44 23	8	.....	2,923 22	2,830 12	93 10	107
	9	124	3,012 17	.....	.....	1	.....	589 62	565 62	24 00	120
	10	111	6.616 08	5	40 50	11	177 27	3,386 03	3.491 96	71 34	92
	11	77	2,300 71	1	85 41	7	11 30	781 36	787 05	5 61	76
	12	79	2,419 82	1	6 11	7	23 43	1,678 57	1,663 21	38 79	85
Sudbury	1	929	35,102 00	44	2,882 00	34	1,653 07	15,009 23	13,965 00	2,697 30	898
	2	92	4,132 12	7	340 18	4	105 75	1,700 65	1,551 70	274 70	91
	3	158	6,357 81	16	763 97	2	645 65	2,718 53	3,110 42	353 77	143
	4	96	4,404 99	2	155 84	8	.....	1,838 01	1,838 01	.....	86
	5	312	15,715 70	46	3,849 01	7	.....	4,139 89	3,962 34	277 58	290
Thunder Bay....	1	924	39,884 89	32	1,532 34	52	382 26	19.704 74	19,373 07	331 87	942
	3	894	42,215 62	27	1,719 39	40	1,083 97	17,495 76	16,504 33	2,075 40	818

A.—Continued.

to the 31st day of December, A.D. 1912, inclusive, etc.—Continued.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of jury trials by jurors called in pursuance of section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of section 143, D.C.A.
						$ c.		$ c.	$ c.		$ c.			$ c.	$ c.	$ c.
4	4	.....	.....	385	.....	.....	....	3 47	.....	.....	.....	5	....	1,232 20	499 63	.....
.....	.....	1	.....	3	.....	.....	....	12	.....	.....	.....	.....	....	16 32	.....	.....
.....	.....	.....	.....	1	.....	.....	....	.....	.....	.....	.....	.....	....	13 48	.....	.....
1	21	.....	.....	11	.....	.....	....	1 06	.....	.....	.....	.....	....	86 50	40 26	.....
.....	.....	.....	.....	1	.....	.....	....	18	.....	.....	.....	.....	....	27 66	17 87	.....
.....	.....	.....	.....	2	.....	.....	....	15	.....	.....	.....	.....	....	10 78	15 99	.....
.....	.....	.....	.....	.....	.....	.....	....	9	.....	.....	.....	.....	....	8 70	5 25	.....
16	.....	.....	2	22	.....	.....	....	.....	.....	.....	.....	1	....	445 75	119 58	.....
2	.....	.....	.....	10	.....	.....	....	.....	.....	.....	.....	.....	....	84 04	71 74	.....
11	.....	.....	.....	15	.....	.....	....	.....	.....	.....	.....	.....	....	151 50	99 86	.....
8	1	.....	.....	36	.....	.....	....	4 67	.....	.....	.....	2	....	397 01	142 42	.....
2	.....	.....	.....	3	.....	.....	....	92	.....	.....	.....	.....	....	34 10	17 65	.....
8	.....	.....	.....	41	.....	10 00	....	4 80	.....	.....	.....	.....	2	.....	240 94	.....
11	1	.....	.....	42	.....	.....	....	5 24	.....	.....	.....	.....	....	379 40	125 56	.....
9	.....	.....	.....	80	.....	.....	....	3 88	.....	.....	.....	.....	....	219 44	229 28	.....
3	.....	.....	.....	.....	.....	.....	....	2 55	.....	.....	.....	.....	....	193 82	120 30	.....
5	.....	.....	.....	26	.....	.....	....	3 95	.....	.....	.....	.....	....	243 07	340 00	.....
26	1	.....	1	157	2	16 90	....	16 51	.....	1	5 00	16	....	1,340 25	239 74	.....
8	.....	.....	.....	33	1	16 70	....	4 10	.....	1	5 00	8	....	277 05	167 87	.....
8	1	.....	.....	18	.....	.....	....	3 29	.....	.....	.....	6	....	159 15	.....	.....
12	.....	.....	2	40	1	12 00	....	6 66	.....	1	5 00	.....	....	390 79	297 05	.....
3	.....	.....	.....	.....	.....	.....	....	1 47	.....	.....	.....	1	....	105 50	147 18	.....
25	.....	.....	.....	79	2	20 00	....	10 96	.....	2	10 00	7	....	642 05	234 77	9 21
3	.....	.....	.....	3	2	12 60	....	1 87	.....	1	5 00	.....	....	92 68	108 11	.....
15	.....	.....	.....	28	1	12 00	....	5 91	.....	1	5 00	2	....	264 20	201 33	.....
25	1	.....	.....	168	2	22 00	....	13 54	.....	.....	.....	29	....	1,006 00	815 65	.....
6	.....	.....	.....	16	.....	.....	....	3 30	.....	.....	.....	2	....	178 25	131 98	.....
4	.....	.....	.....	7	.....	.....	....	2 80	.....	.....	.....	.....	....	116 75	163 84	.....
15	.....	2	.....	47	.....	.....	....	6 99	.....	.....	.....	4	....	482 16	117 25	.....
23	.....	.....	.....	168	.....	.....	....	12 76	.....	5	30 00	39	2	1,059 34	531 93	.....
4	.....	.....	.....	15	.....	.....	....	1 69	.....	.....	.....	1	....	137 19	121 75	.....
4	2	.....	.....	25	.....	.....	....	2 44	.....	.....	.....	.....	....	213 29	120 56	.....
1	30	.....	.....	6	.....	.....	....	94	.....	.....	.....	1	....	125 01	.....	.....
2	.....	.....	2	9	.....	.....	....	1 01	.....	.....	.....	.....	....	97 05	.....	.....
8	.....	.....	.....	19	.....	.....	....	4 13	.....	1	7 00	2	1	252 60	.....	.....
4	.....	.....	.....	50	.....	.....	....	2 77	.....	.....	.....	1	....	164 02	154 67	.....
18	7	.....	.....	15	.....	.....	....	5 93	.....	2	15 00	.....	....	242 65	211 20	.....
1	.....	.....	.....	24	.....	.....	....	1 66	.....	.....	.....	.....	....	149 35	183 78	.....
1	1	.....	.....	2	.....	.....	....	1 75	.....	.....	.....	3	....	166 00	148 91	.....
36	1	.....	.....	161	.....	.....	....	.....	.....	.....	.....	.....	....	1,630 00	1,864 09	16 19
8	.....	.....	.....	14	.....	.....	....	.....	.....	.....	.....	3	....	240 35	54 16	.....
15	3	.....	.....	24	.....	.....	....	.....	.....	.....	.....	.....	....	353 29	217 39	.....
7	.....	.....	.....	3	.....	.....	....	.....	.....	.....	.....	1	1	268 36	291 57	.....
22	.....	.....	1	34	.....	.....	....	.....	.....	.....	.....	.....	....	693 50	**410 42	.....
57	.....	.....	.....	84	.....	.....	....	.....	.....	.....	.....	4	1	2,017 77	1,015 69	.....
116	12	.....	4	88	.....	.....	....	.....	.....	4	31 50	5	....	1,537 95	1,176 87	.....

**Part of year only.

TABLE

Return of Division Court Business from the 1st day of January

Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered exclusive of transcripts of judgments and judgment summonses.	Amount of claims entered exclusive of transcripts of judgments and judgment summonses.	Number of transcripts of judgments received from other Courts.	Amount of claims received by transcripts of judgments from other Courts.	Number of judgment summonses issued.	Balance of cash in Court from the previous year.	Total amount of suitors' money paid into Court.	Total amount of suitors' money paid out of Court.	Balance of cash in Court.	Number of suits entered where the amount claimed does not exceed $100, exclusive of transcripts of judgments from other Courts.
			$ c.		$ c.		$ c.	$ c.	$ c.	$ c.	
Victoria	1	37	1,323 91	4	112 75	1	.....	456 47	456 47	.....	32
	2	40	1,396 40	2	47 74	.....	.....	812 60	812 60	.....	38
	3	35	1,259 81	1	69 92	7	4 00	699 63	700 63	3 00	39
	4	18	839 69	2	193 90	1	.....	419 32	417 32	2 00	16
	5	298	9,819 50	13	968 99	33	40 00	4,507 21	4,521 57	25 70	285
	6	36	926 22	1	28 61	6	10 31	400 88	407 44	3 75	35
	7	49	1,871 62	6	257 89	1	15 46	975 16	951 07	24 09	47
Waterloo	1	657	17,920 30	40	2,179 94	84	75 15	9,793 58	9,688 73	104 85	700
	2	115	3,917 68	5	161 84	14	68 50	1,786 36	1,767 50	18 86	149
	3	397	10,516 04	19	1,002 90	50	100 00	5,029 78	5,009 35	21 43	358
	4	108	3,667 24	17	1,609 98	9	145 54	1,749 76	1,623 40	271 90	101
	5	30	1,468 71	4	188 23	4	11 00	834 41	842 91	2 50	28
	6	48	1,264 50	5	327 08	3	104 11	805 25	805 25	.....	30
	7	17	199 04	1	105 49	.....	4 25	318 12	322 37	.....	.....
Welland	1	442	15,199 32	26	1,384 39	72	344 73	6,184 41	6,033 25	495 88	423
	2	214	1,107 33	2	105 04	3	14 00	521 15	517 15	4 00	20
	3	167	6,507 59	6	215 21	17	2 50	2,953 25	2,937 04	18 71	157
	4	318	11,078 24	18	1,081 85	33	909 94	5,016 34	4,765 20	251 14	48
	5	83	2,739 97	8	557 08	7	39 80	1,078 21	1,058 91	59 10	80
	6	53	1,195 53	9	413 90	1	3 22	612 77	612 77	3 22	.....
Wellington.....	1	622	19,370 25	37	1,706 96	78	111 65	8,594 24	8,687 68	18 21	576
	2	7	313 53	.....	.....	.....	.....	45 65	45 65	.....	7
	3	9	487 93	2	142 73	1	.....	85 90	85 90	.....	8
	4	83	2,791 03	9	734 78	6	16 00	940 36	940 36	16 00	81
	5	38	1,517 37	6	423 97	3	.....	797 52	797 52	.....	43
	6	58	2,175 00	8	531 69	4	.....	859 32	744 42	114 90	56
	7	62	1,974 48	11	645 31	11	17 50	1,173 99	1,128 38	45 61	56
	8	39	1,381 46	5	168 01	4	196 87	574 22	663 26	107 83	37
	10	80	3,359 43	12	566 81	7	125 72	1,136 95	1,136 95	124 72	93
	11	60	1,951 52	10	709 61	12	136 43	953 74	863 74	226 83	55
Wentworth	1	1,220	47,564 55	34	1,840 90	61	391 36	13,066 74	13,116 89	341 21	943
	2	108	3,713 71	15	917 34	3	.....	1,949 69	1,949 69	.....	99
	3	29	1,230 87	2	101 56	.....	.....	520 04	520 04	.....	27
	4	47	2,567 08	11	427 71	3	.....	1,753 01	1,753 41	.....	40
	5	72	2,820 07	8	339 07	2	.....	947 79	947 79	.....	67
	7	2	63 20	.....	.....	.....	.....	21 30	21 30	.....	.....
	8	7	218 43	.....	.....	.....	.....	105 37	105 37	.....	16
	9	1,370	43,816 89	36	1,884 58	80	175 71	18,812 37	18,499 40	488 68	1,269
York.....	1	4,368	200,771 93	78	3,365 66	470	2,108 92	41,123 36	40,903 01	2,289 27	4,667
	2	102	3,726 99	14	1,048 15	4	4 19	2,006 27	1,973 42	37 04	88
	3	56	1,308 49	3	140 15	2	52 31	1,377 34	1,344 98	34 67	50
	4	186	7,065 03	26	1,298 94	14	117 41	2,513 19	2,572 83	57 77	175
	5	76	2,426 25	9	706 98	2	9 49	920 10	806 57	123 02	64
	6	112	5,284 63	15	1,149 59	3	.....	2,389 00	2,387 00	2 00	114
	7	55	2,513 69	3	68 47	4	9 00	1,575 18	1,584 18	.....	50
	8	538	18,419 03	31	2,045 32	74	76 40	8,544 07	8,414 21	129 86	581
	9	44	2,795 93	4	262 64	7	.....	877 96	820 44	57 52	36
	10	3,650	173,228 23	83	3,879 64	507	2,226 96	41,810 27	42,852 37	1,184 86	3,267
Totals	....	60,914	2,230,017 61	2,961	166,436 82	6,192	34,439 05	891,207 48	881,890 96	37,713 56	52,810

A.—Concluded.

to the 31st day of December, A.D. 1912, inclusive, etc.—Concluded.

Number of suits entered where claim does not exceed $200.	Number of actions for tort, where the amount claimed does not exceed $60.	Number of personal actions, where the parties consent thereto in writing and the amount claimed does not exceed $100.	Number of actions of replevin, where the value of the goods or other property or effects distrained, taken or detained, does not exceed the sum of $60.	Number of suits entered for claims not exceeding $10.	Number of jury trials by juries summoned.	Amount paid to jurors summoned.	Number of jury trials by jurors called in pursuance of section 142, D.C.A.	Amount payable to County Treasurer for "Division Court Jury Fee Fund."	Amount of fees and emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' fees.	The amount of costs so taxed.	Return of judgment debtors ordered to be committed.	The number of such debtors actually committed.	Clerk's returns of emoluments.	Bailiff's returns of emoluments.	Unclaimed moneys in pursuance of Section 43, D.C.A.
						$ c.		$ c.			$ c.			$ c.	$ c.	
5	.....	.....	.....	10	.....	.....	....	1 67	.....	.....	.....	.....	....	87 81	46 50	.....
2	1	.....	.....	4	.....	.....	....	1 52	.....	1	5 00	.....	....	85 00	48 78	.....
4	.....	.....	.....	12	.....	.....	....	1 45	.....	1	5 00	1	....	81 65	68 02	.....
2	.....	.....	.....	4	.....	.....	....	1 07	.....	.....	.....	.....	....	46 10	18 90	.....
12	6	.....	.....	68	.....	.....	....	8 47	.....	3	17 00	11	....	667 75	347 69	.....
.....	1	.....	.....	10	.....	.....	....	54	.....	.....	.....	1	....	69 10	55 57	3 75
2	1	.....	.....	7	.....	.....	....	1 52	.....	.....	.....	.....	....	77 63	.....	.....
38	1	.....	2	202	1	12 00	....	20 00	.....	.....	.....	17	....	1,462 07	646 09	.....
6	.....	.....	.....	69	.....	.....	....	3 15	.....	1	10 00	1	1	279 40	158 42	.....
20	.....	.....	.....	170	.....	.....	....	9 41	.....	3	13 00	10	....	816 45	255 33	.....
5	.....	.....	.....	32	.....	.....	....	3 37	.....	.....	.....	1	....	236 65	125 16	.....
2	1	.....	.....	5	.....	.....	....	1 19	.....	.....	.....	.....	....	81 75	104 26	.....
1	.....	.....	.....	11	1	12 00	1	1 06	.....	.....	.....	.....	....	85 10	104 68	.....
.....	.....	.....	.....	12	.....	.....	....	9	.....	.....	.....	.....	....	23 60	11 99	.....
19	.....	.....	.....	138	.....	.....	....	11 79	.....	2	10 00	12	4	1,057 70	548 42	.....
4	.....	1	.....	6	.....	.....	....	1 36	.....	.....	.....	3	....	71 40	47 89	.....
9	.....	.....	.....	31	.....	.....	....	5 44	.....	1	5 00	2	....	341 40	402 48	.....
13	2	.....	1	72	.....	.....	....	9 52	.....	.....	.....	3	....	726 30	395 39	17 49
2	.....	.....	.....	30	.....	.....	....	2 10	.....	.....	.....	4	....	188 05	110 86	.....
.....	.....	.....	.....	13	.....	.....	....	72	.....	.....	.....	.....	....	105 90	23 00	.....
38	7	1	.....	194	.....	.....	....	18 23	.....	3	18 00	.....	....	1,510 80	{ 243 31 { 538 42	.....
.....	.....	.....	.....	1	1	12 00	....	18 00	.....	3	.....	.....	....	15 00	6 35	.....
1	.....	.....	.....	.....	.....	.....	....	40	.....	.....	.....	.....	....	21 30	.....	.....
4	.....	.....	.....	23	1	11 00	....	2 44	.....	.....	.....	1	....	186 80	102 44	.....
3	.....	.....	.....	13	.....	.....	....	1 38	.....	.....	.....	.....	....	58 98	67 12	.....
2	1	.....	.....	12	.....	.....	....	1 92	.....	.....	.....	.....	....	113 75	48 32	.....
5	.....	.....	.....	10	1	12 00	....	2 15	.....	1	5 00	.....	....	172 85	117 78	.....
2	.....	.....	.....	9	1	12 60	....	1 19	.....	1	5 00	2	....	126 53	77 30	5 50
3	.....	.....	.....	5	.....	.....	....	3 33	.....	.....	.....	1	....	193 05	.....	.....
5	.....	.....	.....	18	.....	.....	....	2 00	.....	.....	.....	.....	....	163 90	107 62	.....
76	20	.....	2	269	2	21 00	....	41 86	174 05	16	122 80	14	....	2,870 28	785 56	.....
8	2	.....	.....	27	.....	.....	....	3 84	.....	.....	.....	1	....	260 40	192 56	.....
2	.....	.....	.....	.....	.....	.....	....	37	.....	.....	.....	.....	....	49 60	.....	.....
5	.....	.....	.....	12	2	24 00	....	12 43	.....	2	15 00	2	....	135 95	171 92	.....
5	57	.....	.....	10	.....	.....	....	2 96	.....	.....	.....	.....	....	149 90	.....	.....
.....	.....	.....	.....	.....	.....	.....	....	6	.....	.....	.....	.....	....	3 54	22 77	.....
.....	.....	.....	.....	1	.....	.....	....	18	.....	.....	.....	.....	....	11 85	4 09	.....
56	5	.....	2	355	.....	.....	....	38 80	121 66	3	18 00	19	....	2,608 30	1,313 00	.....
301	79	.....	9	694	.....	.....	....	164 92	1,022 56	49	210 00	192	....	7,114 80	4,883 13	.....
14	1	.....	.....	15	.....	.....	....	5 57	.....	.....	.....	2	....	265 30	209 26	.....
7	.....	.....	.....	8	.....	.....	....	2 92	.....	.....	.....	2	....	116 60	70 76	.....
8	1	.....	.....	45	.....	.....	....	6 41	.....	.....	.....	1	....	419 55	318 65	.....
.....	5	.....	.....	12	.....	.....	....	1 63	.....	.....	.....	1	....	182 10	86 00	.....
8	.....	.....	.....	18	.....	.....	....	.....	.....	.....	.....	.....	....	*260 00	.....	.....
5	1	.....	1	6	.....	.....	....	2 30	.....	.....	.....	2	....	149 05	.....	.....
39	10	.....	2	98	.....	.....	....	17 88	.....	.....	.....	17	....	1,075 30	729 10	.....
6	1	.....	.....	8	.....	.....	....	2 96	.....	.....	.....	2	....	80 35	73 72	.....
358	21	.....	10	616	4	12 00	....	174 59	857 19	36	185 00	190	1	6,285 69	4,703 20	2 00
3,803	843	16	109	14,589	91	958 00	10	1,657 80	3,250 27	240	1,326 00	1,481	35	.....	.....	.....

* Part of year only.

TABLE B.

LIST of Division Court clerks, their post office address, their county or district and number of division in which their Courts are situated, for the Province of Ontario, up to the 31st December, 1912, inclusive. (Lists corrected up to date of printing.)

County and District.	No. of Division.	Clerk.	Post office address.
Algoma	1	F. A. King	Sault Ste. Marie
	2	T. Sullivan	Bruce Mines
	3	Thos. Dodds	Thessalon
	6	W. F. Adams	Richard's Landing
	7	J. A. Hawkins	Blind River
Brant	1	James C. Spence	Brantford
	2	Jas. Smiley	Paris
	3	S. B. Laurason	St. George
	4	W. F. Miles	Burford
	5	Walter E. Hooker	Scotland
Bruce	1	N. Crawford	Walkerton
	2	John K. McLean	Teeswater
	3	Joseph Barker	Kincardine
	4	J. C. Gibson	Paisley
	5	J. A. Chapman	Port Elgin
	6	A. Nelson	Tiverton
	7	J. R. Vandusen	Tara
	8	J. H. Fielding	Wiarton
	9	Angus Martyn	Ripley
	10	John Pettigrew	Lion's Head
	11	W. J. Little	Lucknow
	12	C. E. Biehn	Chesley
Carleton	1	J. R. Armstrong	Ottawa
	2	Wm. McElroy	Richmond
	3	Jas. H. Wilson, Jr.	Carp
	4	Matthew Riddell	Galetta
	5	John Kerr	North Gower
	6	W. C. Cameron	Metcalf
	7	W. A. Mason	Ottawa
Dufferin	1	Joseph Pattulo	Orangeville
	2	W. H. Lamon	Shelburne
	3	A. Ferris	Stanton
	4	Robt. Orr	Mono Mills
	5	M. G. Varcoe	Grand Valley
Elgin	1	E. C. Monteith	Aylmer
	2	John McIntyre	St. Thomas
	3	John McIntyre	St. Thomas
	4	Samuel Maccoll	Dutton
Essex	1	C. F. Pequegnot	Sandwich
	2	G. E. Pulford	Amherstburg
	3	Geo. Pearce	Kingsville
	4	C. Bell	Oxley
	5	W. G. Gidley	Leamington
	6	H. Taylor	Belle River
	7	Joseph D. A. Deziel	Windsor
	8	Wm. Laing	Essex
	9	A. J. Brown	Comber
	10		Scudder

List of Division Court Clerks.—Continued.

County and District.	No. of Division.	Clerk.	Post office address.
Frontenac	1	W. H. Carson	Kingston
	2	J. F. Latherland	Cataraqui
	3	J. W. Davis	Sydenham
	4	H. McMullen	Verona
	5	H. Kieler	Battersea
	6	E. B. Buell	Sharbot Lake
	7	W. McGregor	Arden
Grey	1	A. C. Maitland	Owen Sound
	2	Archibald Davidson	Durham
	3	H. P. Heming	Meaford
	4	W. L. Tyson	Clarksburg
	5	W. J. Bellamy	Flesherton
	6	Wm. J. Winter	Chatsworth
	7	John Taylor	Hanover
	8	Richard L. Stephen	Markdale
Haldimand	1	James McGregor	Caledonia
	2	B. Humphrey	Cayuga
	3	T. Armour	Dunnville
	4	C. E. Bourne	Jarvis
	5	Robert E. Johnson	Canboro'.
Haliburton	1	Geo. A. Rogers	Minden
	2	G. Bemister	Haliburton
	3	Stephen Kettle	Ursa
	4	Ed. B. Speers	Dorset
Halton	1	Wm. Panton	Milton
	2	A. Hillmer	Oakville
	3	C. C. Roe	Georgetown
	4	R. J. McNabb	Acton
	5	Wm. Fraser	Campbellville
	6	J. A. McArthur	Burlington
Hastings	1	F. M. Clark	Belleville
	2	W. Greer	St. Ola
	3	L. E. Mills	Shannonville
	4	F. A. Bartlett	Tweed
	5	Thomas G. Clute	Stirling
	6	Dennis Gillen	Madoc
	7	Thos. Donnelly	Deseronto
	9	G. J. Chadd	Trenton
	10	J. C. Bowen	Marmora
	11	James Haryatt	Maynooth
	12	W. N. Simmons	Bancroft
Huron	1	James Yates	Goderich
	2	J. C. Greig	Seaforth
	3	H. T. Rance	Clinton
	4	S. Wilson	Brussels
	5	R. N. Creech	Exeter
	6	James Whyard	Dungannon
	7	Jno. Tippett	Bayfield
	8	Alex. Ross	Wingham
	9	Thomas Brown	Wroxeter
	10	H. H. Neeb	Zurich
	11	Wm. Lewis	Crediton
	12	Thos. Code	Blyth

List of Division Court Clerks.—Continued.

County and District.	No. of Division.	Clerk.	Post office address.
Kenora	1	O. Partington	Kenora
	2	Fred Deacon	Wabigoon
	3	A. L. Orvis	Dryden
	4	P. B. Discher	Sioux Lookout
Kent	1	W. B. Wells	Chatham
	2	Arthur McKinlay	Ridgetown
	3	F. A. Hicks	Dresden
	4	J. W. Gibson	Blenheim
	5	Charles B. Jackson	Wallaceburg
	6	Jos. Dillon	Bothwell
	7	Arthur A. Wilson	Tilbury
Lambton	1	A. F. Wade	Sarnia
	2	Wm. McLeay	Watford
	3	Jas. McIntyre	Florence
	4	Wm. W. Stover	Sombra
	5	Thomas L. Jones	Forest
	6	W. C. Tudor	Thedford
	7	John McCrea	Mooretown
	8	W. G. Fraser	Petrolea
	9	Richard Code	Alviston
Lanark	1	R. Jamieson	Perth
	2	T. L. Simpson	Lanark
	3	A. R. G. Peden	Carleton Place
	4	James H. Ross	Smith's Falls
	5	P. C. Dowdall	Almonte
Leeds and Grenville	1	I. J. Mansell	Brockville
	2	Jno. F. Graham	Prescott
	3	S. McCammon	Gananoque
	4	S. J. Law	Kemptville
	5	W. H. McCrea	Merrickville
	6	N. L. Phelps	Delta
	7	Jas. Edgar	Toledo
	8	Ed. Wright	Newboro'
	9	E. J. Purcell	Athens
	10	M. Maguire	Spencerville
	11	John Haley	North Augusta
	12	Charles Tennant	Mallorytown
Lennox and Addington	1	A. Knight	Napanee
	2	Fred W. Armstrong	Bath
	3	Joseph B. Allison	Adolphustown
	4	Jno. H. Patterson	Newburgh
	5	Robert Cox	Enterprise
	6	J. A. Timmerman	Odessa
	7	James Aylesworth	Tamworth
	8	J. M. Dafoe	Flinton
	9	W. J. Slater	Denbigh
Lincoln	1	Samuel Shearer	Niagara-on-the-Lake
	2	A. H. Trapnell	St. Catharines
	3	Thos. Pearson	Smithsville
	4	W. D. Fairbrother	Beamsville
	5	R. T. Johnson	Grimsby
Manitoulin	1	A. Hall	Gore Bay
	2	David McGilvery	Little Current
	3	F. P. Denison	Manitowaning

List of Division Court Clerks.—Continued.

County or District.	No. of Division.	Clerk.	Post office address.
Middlesex	1	J. W. McIntosh	London
	2	Wm. J. McRoberts	Parkhill
	3	R. H. Collins	Lucan
	4	J. H. Matthews	Delaware
	5	G. Wilson	Glencoe
	6	John H. McIntosh	Strathroy
	7	Edward Thomas Shaw	Dorchester Station
	8	Walter R. Westlake	Arva
	9	F. H. Whetter	London
Muskoka	1	Charles Bard	Bracebridge
	2	W. N. Moody	Gravenhurst
	3	A. R. Corbett	Huntsville
	4	F. D. Stubbs	Port Carling
Nipissing	1	A. W. Smith	Sturgeon Falls
	2	John McMeekin	Mattawa
	3	M. W. Flannery	North Bay
	4	A. M. Daniels	Elk Lake
	5	J. A. Levesque	Bonfield
	6	Saml. Errett	Englehart
	7	Paul A. Cobbald	Haileybury
	8	S. L. Bradley	Cochrane
	9	F. W. Ferguson	Liskeard
Norfolk	1	E. E. Collins	Simcoe
	2	Abraham A. Tobin	Waterford
	3	Hy. McKnight	Teeterville
	4	Arthur Gerhard	Delhi
	5	M. J. McColl	Vittoria
	6	Arthur P. Barrett	Port Rowan
	7	Watson Park	Fairground
	8	W. Francis Tibbetts	Port Dover
Northumberland and Durham	1	John Moorecraft	Bowmanville
	2	L. B. Davidson	Newcastle
	3	Thos. A. Thompson	Port Hope
	4	W. S. Givens	Millbrook
	5	J. C. Rosevear	Cobourg
	6	E. H. Pratt	Grafton
	7	H. S. Keyes	Colborne
	8	B. C. H. Becker	Brighton
	9	P. S. Ewing	Warkworth
	10	Wm. Little	Wooler
	11	S. J. Fisher	Campbellford
Ontario	1	E. L. McDonell, pro tem.	Whitby
	2	M. Gleeson	Greenwood
	3	J. W. Burnham	Port Perry
	4	R. J. Moore	Uxbridge
	5	Thos. Foster	Cannington
	6	James Gordon	Beaverton
	7	D. Leonard	Atherly
Oxford	1	V. L. Francis	Woodstock
	2	Chas. K. Curry	Drumbo
	3	A. S. Herd	Embro
	4	M. L. Bushell	Norwich
	5	Neil G. Gunn	Ingersoll
	6	John C. Ross	Tillsonburg
	7	W. S. Russell	Tavistock

List of Division Court Clerks.—Continued.

County or District.	No. of Division.	Clerk.	Post office address.
Parry Sound	1	W. J. Jones	Parry Sound
	2	John Fletcher	McKellar
	3	J. A. Hall	Rosseau
	4	Fred Metcalf	Burk's Falls
	5	Harry Snuggs	Magnetawan
	6	T. J. Williams	Powassan
	7	John Harper	Sundridge
Peel	1	John Clarke	Brampton
	2	H. H. Shaver	Cooksville
	3	M. C. Hillock	Caledon
	4	John McDonald	Bolton
Perth	1	D. B. Burritt	Stratford
	2	J. Dougherty	Mitchell
	3	Richard Shepherd	St, Mary's
	4	Jos. Thompson	Shakespeare
	5	Wm. Zimmerman	Milverton
	6	Wm. Bright	Listowel
Peterborough	1	J. W. Miller	Peterborough
	2	J. L. Squires	Norwood
	3	W. Sherin	Lakefield
	4	Chas. Booth	Apsley
	5	W. A. McMaster	Havelock
	6	W. D. Edwards	Keene
Prescott and Russell	1	E. A. Johnson	L'Orignal
	2	P. S. Paquet	Vankleek Hill
	3	Napoleon Labrosse	St. Eugene
	4	D. Viau	Plantagenet
	5	J. S. Cameron	Cumberland
	6	A. Carson	Russell
	7	J. A. D. Landriault	Hawkesbury
	8	R. L. Downing	Routhier
	9	F. W. Langrell	Alfred
	10	Moise Rochon	Clarence Creek
	11	Peter Stewart	South Indian
Prince Edward	1	Fred Slavin	Picton
	2	J. McQuoid	Milford
	3	Charles H. Wright	Demorestville
	4	William H. C. Robin	Ameliasburg
	5	H. A. Jolley	Wellington
	6	C. H. Saylor	Bloomfield
	7	A. S. Burr	Consecon
	8	B. E. Harrison	Waupoos
Rainy River	1	W. H. Elliott	Fort Frances
	2	Robert Gill	Emo
	3	D. K. McGregor	Rainy River
Renfrew	1	J. H. Leach	Pembroke
	2	Hugh S. Miller	Beachburg
	3	M. Devine	Renfrew
	4	John R. Tierney	Arnprior
	5	C. Blackburn	Eganville
	6	J. R. Warren	Cobden
	7	P. J. Harrington	Killaloe Station

List of Division Court Clerks.—Continued.

County or District.	No. of Division	Clerk.	Post office address.
Simcoe	1	W. C. McLean	Barrie
	2	R. E. Stevenson	Bradford
	3	Jos. Wright	Beeton
	4	D. C. Barr	Collingwood
	5	T. C. Craig	Craighurst
	6	F. Webber	Orillia
	7	Angus Bell	New Lowell
	8	D. A. Lee	Alliston
	9	W. J. Martin	Penetanguishene
	10	J. R. Russell	Coldwater
Stormont, Dundas and Glengarry	1	J. A. B. McLennan	Williamstown
	2	Hugh R. Macdonald	Alexandria
	3	G. A. Milden	Cornwall
	4	Geo. Sampson	Aultsville
	5	Jas. N. Eastman	Morrisburg
	6	Jas. Collison	Iroquois
	7	M. J. Cleland	South Mountain
	8	D. G. McMillan	Finch
	9	A. A. McLennan	Lancaster
	10	W. G. Bolster	Chesterville
	11	D. McIntosh	Strathmore
	12	John D. McIntosh	Dominionville
Sudbury	1	J. K. McLennan	Sudbury
	2	J. A. Bastien	Chelmsford
	3	J. C. McMillan	Webbwood
	4	S. Soufrine	Warren
	5	G. A. D. Murray	South Porcupine
Thunder Bay	1	R. E. Mitchell	Port Arthur
	3	G. H. Coo	Fort William
Victoria	1	Arch. Campbell	Woodville
	2	Edward D. Hand	Fenelon Falls
	3	G. W. Taylor	Bobcaygeon
	4	W. H. Kennedy	Omemee
	5	Elias Bowes	Lindsay
	6	J. F. Cunnings	Oakwood
	7	A. C. Graham	Victoria Road
Waterloo	1	Fred. Rohleder	Berlin
	2	James D. Webster	Preston
	3	Edward D. Wilkins	Galt
	4	F. H. McCallum	New Hamburg
	5	C. W. Parsill	Linwood
	6	Wm. H. Winkler	St. Jacob's
	7	A. E. Watson	Ayr
Welland	1	John M. Livingston	Welland
	2	Joseph Henderson	Marshville
	3	Jos. Clark	Ridgeway
	4	Jos. G. Cadham	Niagara Falls Sth.
	5	D. J. C. Munro	Thorold
	6	Jas. E. Neff	Port Colborne

List of Division Court Clerks.—Concluded.

County or District.	No. of Division.	Clerk.	Post office address.
Wellington	1	Thos. J. Day	Guelph
	2	Wm. Nicoll	Morriston
	3	Robt. Scott	Eramosa
	4	John Brownridge	Fergus
	5	A. J. Lindsay	Ballinafad
	6	Henry Clark	Elora
	7	John Lunz	Drayton
	8	R. T. Smith	Arthur
	10	C. L. Eady	Harriston
	11	J. C. Wilkes	Mount Forest
Wentworth	1	T. C. J. Jones	Hamilton
	2	F. D. Suter	Dundas
	3	J. C. Medlar	Waterdown
	4	H. M. McPherson	Orkney
	5	J. C. Moore	Stoney Creek
	7		Glanford
	8	Thomas Murphy	Binbrook
	9	C. H. Peebles	Hamilton
York	1	A. McL. Howard	Toronto
	2	Robert J. Corson	Markham
	3	Thos. F. McMahon	Richmond Hill
	4	K. N. Robertson	Newmarket
	5	F. G. Tremayne	Sutton West
	6	W. H. Taylor	Aurora
	7	E. W. Brown	Woodbridge
	8	John Hamshaw	West Toronto
	9	J. H. Richardson	West Hill
	10	E. H. Duggan	Toronto

TABLE C.

List of Division Court Bailiffs, their Post Office Address, the County or District and Number of Division in which their Courts are situated, for the Province of Ontario, up to 31st December, 1912, inclusive. (Lists corrected up to date of printing.)

County or District.	No. of Division.	Bailiff.	Post office address.
Algoma	1	T. J. Bowers	Sault Ste. Marie
	2	.....	Bruce Mines.
	3	Isaac Leach	Thessalon
	6	A. Kitchen	Carterton, St. Jos. Is.
	7	Robt. George	Blind River
Brant	1	Jno. M. Dyckman	Brantford
	2	Horace Huston	Paris
	3	J. H. Cornell	St. George
	4	Robt. Balkwill	Burford
	5	J. R. Smith	Scotland
Bruce	1	Ezra Briggs	Walkerton
	2	Jas. Donaghy	Teeswater
	3	George G. Collins	Kincardine
	4	Alex. Fraser	Paisley
	5	Wm. McFadden	Port Elgin
	6	Gore Leggett	Tiverton
	7	L. G. Briggs	Tara
	8	H. G. Trout	Wiarton
	9	.....	Bervie
	10	A. C. Bridge	Lion's Head
	11	R. J. Cameron	Lucknow
	12	Jno. Beatty	Chesley
Carleton	1	E. Lavoie	Ottawa
		E. T. Van Nierop	Ottawa
	2	Jos. Binnington	Stapleton
	3	Wm. Falls	Carp
	4	George Owens	Antrim
	5	Wesley Hicks	Kars
	6	Ed. J. Murphy	Metcalfe
	7	A. Wilson	Ottawa
Dufferin	1	.....	Orangeville
	2	John Reburn	Whitfield
	3	Jno. Armstrong	Earnscliffe
	4	Wm. Irwin	Mono Mills
	5	J. I. Buchanan	Grand Valley
Elgin	1	W. W. White	Aylmer
	2	Geo. Smiley	St. Thomas
	3	Geo. Smiley	St. Thomas
	4	H. J. Hales	Dutton

List of Division Court Bailiffs, etc.—Continued.

County or District.	No. of Division.	Bailiff.	Post office address.
Essex	1	Alois Master	Sandwich
	2	John Pettypiece	Amherstburg
	3	Horace Wigle	Kingsville
	4	R. J. Snider	Harrow
	5	Wm. Roach	Leamington
	6		Belle River
	7	F. St. Louis	Windsor
		Clement Reaume	Windsor
	8	James Johnston	Essex
	9	Leon Souchereau	Stoney Point
	10	H. S. Barnes	Pelee
Frontenac	1	Hiram Davis	Wolfe Island
		Chas. G. Clarke	Kingston
	2		Cataraqui
	3	P. Trousdale	Sydenham
	4	E. A. Tallen	Verona
	5	E. F. Dennee	Inverary
	6	D. McDonald	Ardoch
		W. Thomlison	Sharbot Lake
	7	John E. Hays	Arden
Grey	1	Robt. Taylor	Owen Sound
	2	Wm. Sharp	Durham
	3	W. H. Arthur	Meaford
	4	Geo. Mitchell	Clarksburg
	5	John Wright, Jr.	Flesherton
	6	James Dudgeon	Chatsworth
	7	F. Heimbecker	Hanover
	8	W. J. Pickell	Markdale
Haldimand	1	James Thorburn	Caledonia
	2	Robert Walker	Cayuga
	3	Wm. McIndoe	Dunnville
	4	Geo. A. Irwin	Jarvis
	5	Harvey Ricker	Canboro
Haliburton	1	R. C. Garrett	Minden
	2		Haliburton
	3	J. M. Pickens	Ursa
	4	Angus McKay	Dorset
Halton	1	J. A. Fraser.	Milton
	2	Alex. McCleary	Oakville
	3	W. R. Brown	Georgetown
	4	John Lawson	Acton
	5		Campbellville
	6	Hiram Laud	Burlington
Hastings	1	Joshua Duffin	Belleville
	2	Jno. Schryver	St. Ola
	3	W. E. Pearsall	Shannonville
	4	W. H. Davis	Tweed
	5	A. McCutcheon	Stirling
	6	C. St. Charles	Madoc
	7	A. P. Brown	Deseronto
	9	H. Mumford	Trenton
	10	O. R. Jones	Marmora
	11	Jno. Perry	Maynooth
	12	Frank Walker	Bancroft

List of Division Court Bailiffs, etc,—Continued.

County or District.	No. of Division.	Bailiff.	Post office address.
Huron	1	.....	Goderich.
	2	Fred Welsh	Seaforth.
	3	Robt. Welsh	Clinton.
	4	Thos Newsome	Brussels.
	5	Alex. Davitt	Exeter.
	6	James Mallough	Dungannon.
	7	Thomas W. Cameron	Bayfield.
	8	G. A. Phippen	Wingham.
	9	John Brethauer	Wroxeter.
	10	C. Eilber	Zurich.
	11	J. Beanes	Crediton.
	12	Richard Somers	Blyth.
Kenora	1	R. B. Donkin	Kenora.
	2	H. Wright	Wabigoon.
	3	D. Wright	Dryden.
	4	G. H. Fanning	Sioux Lookout
Kent	1	Charles J. Moore	Chatham.
		A. Wells	Chatham.
	2	J. N. Wilson	Ridgetown.
	3	Alex. Cuthbert	Dresden.
	4	H. B. Marshall	Blenheim.
	5	Nelson Seed	Wallaceburg.
	6	John Eachran	Thamesville.
	7	M. Dillon	Tilbury
Lambton	1	Rich. Macdonald	Sarnia.
	2	J. F. Elliott	Watford
	3	T. J. Elliott	Florence.
	4	N. Cornwall	Sombra.
	5	Joseph Burney	Forest.
	6	Jno. Patching	Thedford.
	7	Ed. Harkness	Mooretown.
	8	.....	Petrolea.
	9	Jno. A. Cummings	Alvinston.
Lanark	1	P. J. Lee	Perth.
		Robt. Burns	Perth.
	2	Jas. Doran	Lanark.
	3	H. Wilson	Carleton Place.
	4	J. E. Burus	Smith's Falls.
		J. R. Polk	Smith's Falls.
	5	John Slattery	Almonte.
Leeds and Grenville	1	Ed. Young	Brockville.
		Matthew White	Brockville.
	2	I. W. Bradley	Prescott.
	3	Thos. Baker	Gananoque.
	4	Michael Sweeney	Kemptville.
	5	Jno. Wilson	Merrickville.
	6	J. W. Russell	Delta.
	7	W. G. Richards	Frankville.
	8	E. J. Leech	Newboro.
		Jno. Whitmarsh	Westport.
	9	H. C. Phillips	Athens.
	10	Jas. P. Lawrence	Spencerville
	11	W. H. Love	North Augusta
	12	W. J. Mallory	Mallorytown.

List of Division Court Bailiffs, etc.—Continued.

County or District.	No. of Division.	Bailiff.	Post office address.
Lennox and Addington	1	Z. Ham	Napanee
	1	Geo. Greer	Napanee
	2	S. M. Rose	Bath
	3	R. H. Hawley	Dorland
	4	S. E. Sagar	Newburgh
	5		Enterprise
	6	Geo. Watts	Odessa
	7	P. F. Carscallen	Tamworth
	8	Jas. Banford	Flinton
	9	Chas. P. Stein	Denbigh
Lincoln	1	Robert Chapman	Niagara-on-the-Lake
	2	Richard E. Boyle	St. Catharines
	3	A. D. Lacey	Smithville
	4	Jos. Grobb	Beamsville
	5	H. C. Kelson	Grimsby
Manitoulin	1	Thos. Griffith	Gore Bay
	2	John Ramesbottom	Little Current
	3	Robert Russell	Tehkummah.
Middlesex	1	Jas. W. Hevey	London
	2	J. Hall	Parkill
	3	N. Ryan	Lucan
	4	Henry Eldidge	Delaware
	5	James Poole	Glencoe
	6	T. F. Hawkin	Strathroy
	7	W. H. Shaw	Dorchester Station
	8	Thos. A. Shoebotham	Arva
	9	A. H. Yerex	London
Muskoka	1	Thos. Little	Bracebridge
	2	Chas. Richardson	Gravenhurst
	3	H. G. Harper	Huntsville
	4		Port Carling
Nipissing	1	H. Kinch	Sturgeon Falls
	2	Aime Jodouin	Mattawa
	2	Jas. Ruddy	Whitney
	3	D. McIntyre	North Bay
	4	C. M. McCarthy	Elk Lake
	5		Bonfield
	6		Englehart
	7	F. K. Ebbitt	Haileybury
	8	E. A. Cottsell	Cochrane
	9	W. G. Armstrong	Liskeard
Norfolk	1	John Allgeo	Simcoe
	2	Orlando H. Duncombe	Waterford
	3	J. H. Boyce	Windham
	4	W. J. Herron	Courtland
	5	Chas. A. Dunkin	Vittoria
	6	Plewis Pierce	Port Rowan
	7	R. Scruton	Hemlock.
	8	G. F. Holden	Port Dover
Northumberland and Durham	1	M. Munday	Bowmanville
	2	Jas. Coleman	Newcastle
	3	H. Merrifield	Port Hope
	4	Jas. Francey	Millbrook
	5	S. B. Miniffe	Coldsprings
	6	T. B. Finley	Grafton
	7	Wm. Usher	Colborne
	8	Jno. A. Marshall	Brighton
	9	William Love	Warkworth
	10	F. Ellis	Wooler
	11	Jas. Shillinglaw	Campbellford

List of Division Court Bailiffs, etc.—Continued.

County or District.	No. of Division.	Bailiff.	Post office address.
Ontario	1	B. F. Campbell	Brooklyn
	2	S. H. Stevenson	Brougham
	3	Jos. Baird	Manchester
	4	J. Steiner	Uxbridge
	5	Lachlin McBain	Cannington
	6	W. S. Glassford	Beaverton
	7	Geo. Elliott	Brechin
Oxford	1	Benj. Hobson	Woodstock
	2	A. W. Burgess	Drumbo
	3	J. A. McKay	Embro
	4	Arthur Catton	Norwich
	5	S. H. Nagle	Ingersoll
	6	E. A. Ellis	Tillsonburg
	7	C. Strahm	Tavistock
Parry Sound	1	Jas. Manson	Parry Sound
	2	R. S. Jackson	McKellar
	3	Wm. Atkinson	Rosseau
	4	H. Stewart	Burk's Falls
	5	S. Walton	Magnetawan
	6	Jno. Lang	Powassan
	7	Jno. Willoughby	Sundridge
Peel	1	Robt. Taylor	Brampton
	2	Wm. Henry Rutledge	Cooksville
	3	D. McArthur	Caledon
	4	Thos. Barons	Bolton
Perth	1	D. W. Forbes	Stratford
	2	John Coppin	Mitchell
	3	Wm. Box	St. Mary's
	4	Jno. S. Gabel	Shakespeare
	5	F. W. Guenther	Milverton
	6	R. Woods	Listowel
Peterborough	1	Thomas Laplante	Peterborough
	2	F. J. Stewart	Norwood
	3	Robt. Webster	Lakefield
	4	.....	Lasswade
	5	A. Waller	Havelock
	6	Thos. McIntyre	Keene
Prescott and Russell	1	S. W. Wright	L'Orignal
	2	I. Labrosse	Vankleek
	3	Michael Kelly	St. Eugene
	4	John A. Peltier	Plantagenet
	5	.....	Navan
	6	Thos. Yonge	Russell
	7	D. Millette	Hawkesbury.
	8	Ira Gates	Routhier
	9	H. Larocque	Alfred
	10	John A. Dent	Rockland
		Moise Laviolette	Clarence Creek
	11	A. L. Macdonald	South Indian

List of Division Court Bailiffs, etc.—Continued.

County or District.	No. of Division.	Bailiff.	Post office address.
Prince Edward	1	S. A. Ruttan	Picton
	2	G. N. Ostrander	Milford
	3	George Farrell.	Demorestville
	4	A. Harvey	Ameliasburg
	5	R. L. Smith	Wellington
	6	J. W. Branscombe	Bloomfield
	7	Herman W. Weeks	Consecon
	8	E. A. Williams	Waupoos
Rainy River	1	J. B. Masher	Fort Frances
	2	T. A. Boucher	Emo
	3	George Simpson	Rainy River
Renfrew	1	Geo. McDonald	Pembroke
	2	John Beaupre	Beachburg
		Jas. Thrasher	Beachburg
	3	C. Miller	Renfrew
	4	John Warnock, jr.	Arnprior
	5	Wm. Luloff	Eganville
	6	Jno. Jardine.	Cobden
	7	Jno. Roche..	Killaloe Sta.
Simcoe	1	John Weymouth	Barrie
	2	W. Simpkin	Bradford
	3	D. W. Watson	Beaton
	4	A. W. S. Cunningham	Collingwood
	5	Ed. Corlett	Hillsdale
	6	George Reeve	Orillia
	7	Wm. Switzer	New Lowell
	8	John R. Arnold	Alliston
	9	Ed. E. J. Hewson	Penetanguishene
	10	G. A. Abbott	Coldwater
Stormont, Dundas and Glengarry	1	John Burgess	Williamstown
	2	J. J. Kennedy	Alexandria
	3	W. S. Smith	Cornwall
	4	J. P. Ferguson	Osnabruck Centre
	5	Jacob Hopper	Morrisburg
	6	C. Larabee	Iroquois
	7	J. Anderson	South Mountain
	8		Finch
	9	J. J. Duemo	North Lancaster
	10	E. Merkley	Chesterville
	11	Chas. W. Kahala	Avonmore
	12	Donald J. Robertson	Maxville
Sudbury	1	C. Gravelle	Sudbury
	2	H. Gratton	Chelmsford
		W. Lyness	Chapleau
	3	H. Hodgins	Webbwood
	4	J H. Boyd	Warren
	5	Herbert Warren	South Porcupine
Thunder Bay	1	A. Clavet	Port Arthur
		Jno. Plummer	Schrieber
		Geo. L. Gordon	Nipigon
	3	A. Inman	Fort William

List of Division Court Bailiffs, etc.—Concluded.

County and District.	No. of Division.	Bailiff.	Post office address.
Victoria	1	S. Dumond	Woodville
	2	E. Mark	Fenelon Falls
	3	W. Mitchell	Bobcaygeon
	4	W. R. McQuade	Omemee
	5	Peter Mitchell	Lindsay
	6	Wm. J. McCullough	Oakwood
	7		Kirkfield
Waterloo	1	S. E. Moyer	Berlin
	2	W. A. Bolduc	Preston
	3	Levi Bawtinheimer	Galt
	4	David Ritz	New Hamburg
	5	Benj. J. Ballard	Hawkesville
	6	Benj. J. Ballard	Hawkesville
	7	Jas. G. Watson	Ayr
Welland	1	J. C. Nixon	Welland
	2	Jno. Haymes	Marshville
	3	Jno. R. Huffman	Ridgeway
	4	Thos. Fawell	Niagara Falls South
	5	R. C. Higgins	Thorold
	6	J. A. Crysler	Port Colborne
Wellington	1	Jno. Ogg	Guelph
		Wm. Young	Guelph
	2	Jno. Ogg	Guelph
	3		Rockwood
	4	Wm. M. Frank	Fergus
	5	Peter McGill	Erin
	6	J. W. Love	Elora
	7	Wm. Richards	Drayton
	8	O. D. White	Arthur
	10	Henry Torrance	Clifford
	11	Thos. Ryan	Mount Forest
Wentworth	1	Jas. Bryers	Hamilton
	2	Alex. Misener	Dundas
	3	C. Teeple	Waterdown
	4	Alex. Misener	Troy
	5	J. F. Felker	Stoney Creek
	7	Jas. Thompson	Binbrook
	8	Jas. Thompson	Binbrook
	9	J. A. Atkinson	Hamilton
York	1	Chas. Synge	Toronto
	2	M. C. Selby	Locust Hill
	3	Geo. Thompson	Richmond Hill
	4	A. E. Widdifield	Newmarket
	5	Peter Grant	Sutton
	6	A. M. Graham	Aurora
	7	Thos. Rowntree	Woodbridge
	8	A. Kaake	Weston
	9	Jos. Skelton	Scarboro
	10	Frank Woods	Toronto

TABLE D.

DIVISION COURTS, LIMITS OF THE RESPECTIVE DIVISIONS IN THE PROVINCE OF ONTARIO, AND JUDICIAL OFFICERS.

ALGOMA.

F. Stone, Judge, Sault Ste. Marie.
Edward O'Connor, J. J., Sault Ste. Marie.
M. McFadden, Crown Attorney and Clerk P., Sault Ste. Marie.

1.—Bounded west by Thunder Bay District, 85th parallel of west longitude and east by Bar River, including all the islands in front.

2.—Bounded west by Bar River and east by the westerly boundary of the Townships of Thessalon, Kirkwood, Bridgeland, Houghton and Otter, and by said boundary line of the last five named townships produced northerly.

3.—Bounded west by the westerly boundary of the Townships of Thessalon, Kirkwood, Bridgeland, Houghton and Otter, and the boundary line of the last named five townships produced northerly to the northern boundary of the District, and on the east by a line produced northerly between the Townships of Bright and Thompson to the northern boundary of the District of Algoma.

6.—Consisting of St. Joseph's Island.

7.—All the Territory of the District of Algoma lying east of the eastern boundary of the Third Division including the Village of Cutler and Johns Island.

BRANT.

A. D. Hardy, Judge, Brantford.
A. J. Wilkes, C.C.A. and C.P., Brantford.

1.—The City of Brantford and that part of the Township of Brantford not included in the other divisions hereinafter described. The Townships of Onondaga and Tuscarora and that part of the Township of Brantford lying south of the main road from Brantford to Hamilton and east of Fairchild's Creek.

2.—The Town of Paris and that part of South Dumfries west of the line between lots 18 and 19, and that part of the first concession of the Township of Brantford lying west of a continuation of the last-mentioned line.

3.—The remainder of the Township of South Dumfries and of the first concession of the Township of Brantford.

4.—The ten northern concessions of the Township of Burford, and all that part of the 2nd, 3rd, 4th and 5th concessions of the Township of Brantford, west of the line between lots numbers 10 and 11, and that portion of the Kerr tract west of the continuation of the last-mentioned line.

5.—The Township of Oakland, the four southern concessions of the Township of Burford and lots numbers 1 to 5, inclusive, in the ranges east and west of the Mount Pleasant Road, in the Townships of Brantford, adjoining the Township of Oakland.

BRUCE.

Wm. Barrett, Judge, Walkerton.
A. B. Klien, J.J., Walkerton.
Thomas Dixon, C.C.A. and C.P., Walkerton.

1.—The Town of Walkerton and the Township of Carrick and the Township of Brant, south of the 12th concession, in the lots up to No. 26, and south of the 10th concession, in lots 26 to 34, inclusive.

2.—The Village of Teeswater, the Townships of Culross and Greenock south of the 12th concession.

3.—The Town of Kincardine, the Township of Kincardine, lying south of the 10th concession.

4.—The Village of Paisley, and that part of the Township of Brant lying north of 11th concession and west of lot 26. That part of Greenock lying north of concession 11; lots 26 to 35, inclusive, in the 8th, 9th, 10th, 11th, 12th, 13th and 14th concessions of the Township of Bruce; and Saugeen, east of a line between lots 28 and 29, and south of the proportion of the town line between Arran and Elderslie to the Saugeen River. All Elderslie lying west of the 25th side line and south of the 12th concession. And also that part lying north of concession 11 and west of lot 17.

5.—All of the Township of Amabel lying north of the 10th concession, Port Elgin and Southampton, and all Saugeen not in No. 4, Arran, west of the line between lots 10 and 11, north of Arran Lake and its outlet, and Amabel, south of concession 11, and west of concession C, and concessions 8, 9 and 10.

6.—The Village of Tiverton and all the Township of Bruce, except that part included in No. 4, and all Kincardine north of the 9th concession.

7.—Tara and all Arran, not in No. 5, and all Elderslie, not in Nos. 4 and 12, and Amabel, south of the 8th concession and east of concession lettered C.

8.—The Town of Wiarton, the Township of Albemarle and that part of Amabel not in Nos. 5 and 7.

9—The Township of Huron.

10.—The Townships of Eastnor, Lindsay, and St. Edmunds.

11.—Lucknow and the Township of Kinloss.

12.—Chesley and those parts of Brant and Elderslie not included in Nos. 1, 4 and 7.

CARLETON.

D. B. McTavish, Judge, Ottawa.

R. D. Gunn, J.J., Ottawa.

J. A. Ritchie, C.C.A. and C.P., Ottawa.

1.—Comprising all the City of Ottawa and the Township of Gloucester, to lot 15, inclusive, Rideau Front, and concessions 1 and 6, inclusive, Ottawa Front and the islands in the Ottawa River opposite thereto.

2.—The Township of Goulbourne, the 8th, 9th and 10th concessions of the Township of Marlborough, all the Township of Nepean south of the River Goodwood, and the 4th, 5th and 6th concessions thereof north of the same river to the boundary line between lots 20 and 21 in the last-mentioned concession.

3.—The Township of Huntley and the Township of March, except lots 1 to 5, inclusive, in concessions 1, 2, 3 and 4 thereof.

4.—The Townships of Fitzroy and Torbolton.

5.—The Township of North Gower, Long Island in the Rideau River, and 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions of Marlborough.

6.—The Township of Osgoode, the 6th, 7th and 8th concessions Ottawa Front, and from lots 16 to 30, inclusive, of Rideau Front of the Township of Gloucester.

7.—The Township of Nepean, except the City of Ottawa, and part of the said Township lying south of the River Goodwood and concessions 4, 5 and 6, north of

the River Goodwood to the boundary between lots 20 and 21 in the said last-mentioned concessions, and, including also lots 1 to 5, inclusive, in concession 1, 2, 3 and 4, in the Township of March.

DUFFERIN.

T. A. M. McCarthy, Judge, Orangeville.
W. J. L. McKay, C.C.A. and C.P., Orangeville.

1.—The Town of Orangeville, the Township of East Garafraxa and all that portion of the Township of Amaranth lying south of the southern boundary of lot No. 26, in each concession in the Township of Amaranth.

2.—The Village of Shelburne, the Township of Melancthon, and all that portion of the Township of Amaranth lying north of the southern boundary of lot number 26, in each concession of the Township of Amaranth.

3.—The Township of Mulmur.

4.—The Township of Mono.

5.—The Township of East Luther.

ELGIN.

C. W. Colter, Judge, St. Thomas.
C. O. Z. Ermatinger, J.J., St. Thomas.
A. McCrimmon, C.C.A. and C.P., St. Thomas.

1.—The Townships of Bayham, Malahide and South Dorchester.

2.—The Townships of Southwold and Yarmouth (except the City of St. Thomas).

3.—The City of St. Thomas.

4.—The Townships of Aldborough and Dunwich.

ESSEX.

M. A. McHugh, Judge, Sandwich.
G. Smith, J.J., Sandwich.
J. H. Rodd, C.C.A. and C.P., Windsor.

1.—Town of Sandwich and Township of West Sandwich.

2.—Town of Amherstburg and the Townships of Alden and Anderdon.

3.—The Village of Kingsville, and all that part of the Township of Gosfield not included in Division No. 8.

4.—The Township of Colchester South, and all Colchester North south of the 9th concession, exclusive of the said concession, and the lots on both sides of Maiden Street.

5.—Township of Mersea and Village of Leamington.

6.—The Township of Rochester, the Village of Belle River, the first concession of the Township of Maidstone, and all north of the Middle Road in the said Township of Maidstone.

7.—Town of Windsor, the Town of Walkerville, and all of Sandwich East north of the Talbot Street range.

8.—The Town of Essex, and all of the Township of Maidstone lying west of the first concession and south of the Middle Road; so much of Sandwich East as is south of Talbot Street, including the lots on both sides of said street to Nos. 306 and 307; all of Colchester north of the 9th concession, including said concession

and lots on both sides of Maiden Street, and all that part of Gosfield lying north of concession 6, and extending as far east from the limits between Gosfield and Colchester as lots No. 12, including such lot in each concession north of concession 6, inclusive.

9.—The Townships of Tilbury West and Tilbury North.

10.—The Township of Pelee.

FRONTENAC.

C. V. Price, Judge, Kingston.

J. L. Whiting, C.C.A. and C.P., Kingston.

1.—City of Kingston, Township of Garden Island, Wolfe Island, Howe Island, and part of the Township of Pittsburg.

2.—Cataraqui, the Township of Kingston and the Village of Portsmouth.

3.—Loughboro', the Townships of Loughboro' and Bedford.

4.—Verona, Townships of Portland and Hinchinbrooke.

5.—Sudbury, the Township of Storrington and part of the Township of Pittsburg.

6.—The Townships of Olden, Oso, Barrie, Clarendon, Palmerston, Miller, Canonto, and South Canonto.

7.—The Township of Kennebec.

GREY.

————————, Judge, Owen Sound.

C. H. Widdifield, J. J., Owen Sound.

J. Armstrong, C.C.A. and C.P., Owen Sound.

1.—The Town of Owen Sound, the Village of Brooke and the Townships of Derby, Keppel, Sarawak and Sydenham.

2.—The Town of Durham, the Township of Egremont, and those portions of the Townships of Bentinck, Normanby and Glenelg as follows:—That part of the Township of Bentinck lying east of the line between lots 30 and 31 in the 1st, 2nd and 3rd concessions south of the Durham Road, and in concessions 1, 2 and 3 north of the Durham Road, and east of the line between lots 15 and 16 in concessions 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 thereof. That part of the Township of Normanby lying east of the line between lots 20 and 21, in the 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th and 18th concessions, and all of the Township of Glenelg, excepting that portion lying east of the line between lots 10 and 11 in the 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th and 15th concessions thereof.

3.—The Town of Meaford, the Township of St. Vincent, and that part of the Township of Euphrasia, lying west of the line between the 6th and 7th concessions and north of the line between lots 15 and 16.

4.—The Township of Collingwood and the east half of the Township of Euphrasia, excepting that part thereof lying between the 4th and 5th concessions and south of the lots between 12 and 13, and east half of the Township of Osprey.

5.—The Township of Proton, the west half of the Township of Osprey, and those parts of the Township of Artemesia consisting of the ranges of lots lying parallel to the Toronto and Sydenham Road, and south of the line between lots 130 and 131, and concessions 1, 2 and 3, south of the Durham Road, and 1, 2, 3, 4, 5 and 6 north of the said Durham Road, and those portions of concessions 7,

8 and 9 lying east of the ranges of lots parallel with the Toronto and Sydenham Road, and those portions of concessions 10, 11, 12, 13 and 14 lying east of the line between lots 30 and 31.

6.—The Township of Sullivan and the Township of Holland, excepting those portions of concessions 9, 10, 11 and 12 lying south of the line between lots 15 and 16, and those portions of concessions 7 and 8 west of the ranges of lots lying parallel with the Toronto and Sydenham Road, and the ranges of lots lying parallel with the Toronto and Sydenham Road and south of the line between lots 50 and 51.

7.—All the lots from 1 to 30, inclusive, in the three concessions south and the three concessions north of the Durham Road in the said Township of Bentinck, and all the lots from 1 to 15, inclusive, in the 12th concession, from the 4th to the 15th concessions, inclusive, of the said Township of Bentinck, and all the lots from 1 to 20, inclusive, in all the concessions from 4 to 18, inclusive, in the Township of Normanby aforesaid.

8.—All the lots from 51 to 130, inclusive, in all the concessions parallel to and being northeast and southwest of the Toronto and Sydenham Road, in the Townships of Artemesia, Glenelg and Holland aforesaid; all lots to the westward of the dividing line between lots 30 and 31, in all the concessions from 10 to 14, inclusive, and all the lots from 1 to 5 in the 7th, 8th and 9th concessions, inclusive, which lie to the southwest of the third concession, southwest of the said Toronto and Sydenham Road, in the said Township of Artemesia; all the lots from 1 to 15, inclusive, in concessions 5 and 6, and all the lots from 1 to 15, inclusive, in the concessions from 7 to 12, inclusive, in the Township of Euphrasia; all lots south of the allowance for road between lots 15 and 16, in the 9th, 10th, 11th, and 12th concessions, and from lots 25 to 30, inclusive, on the 7th concession, and lots 28, 29 and 30 in the 8th concession of the said Township of Holland; and all the lots lying east of allowance for road between lots 10 and 11 in all the concessions from 7 to 15, inclusive, in the Township of Glenelg.

HALDIMAND.

G. B. Douglas, Judge, Cayuga.

J. A. Murphy, C.C.A. and C.P., Cayuga.

1.—Comprising the Township of Seneca except the first and second concessions, the Young Tract, and the property of the late Richard Martin and the late Robert Weir; all of the Township of Oneida, except the first range north of the Cayuga line, the Dennis Tract, and the lots southerly of the said tract, and the Village of Caledonia.

2.—Comprising the Township of North Cayuga, except that portion thereof lying northeast of the side line between lots 12 and 13, and 1st and 2nd concessions of the Township of Seneca, except that portion thereof lying northeast of the side line between lots 12 and 13, the Young Tract, and the lands of the late Robert Weir and Richard Martin, Esquires, in the said Township of Seneca, the first range of Oneida north of the Cayuga line, also the Dennis Tract and river lots lying south, and the Townships of Rainham and South Cayuga.

3.—Comprising the Townships of Moulton, Sherbrooke and Dunn, and the Town of Dunnville.

4.—Comprising the Township of Walpole, and the Village of Hagersville.

5.—Comprising the Township of Canboro', that portion of North Cayuga lying east of the side line between lots 12 and 13, and those parts of the 1st and 2nd concessions of the Township of Seneca lying northeast of the side line between lots 12 and 13.

COUNTY OF HALIBURTON.

(Annexed to Victoria for Judicial Purposes.)

J. E. Harding, Judge, Lindsay.
H. McMillan, J.J.
A. P. Devlin, C.P. and C.C.A., Lindsay.

1.—The Townships of Glamorgan and Snowden, except that portion of both included in the third division, and all of the Townships of Snowden, Lutterworth, Minden, Anson, Stanhope, Hindon.

2.—The Townships of Dysart, Guilford, Harburn, Dudley, Harcourt and Bruton, and that portion of Monmouth not included in the third division.

3.—All the rest of the territory comprising Township of Monmouth (except lots 1 and 19, inclusive) in 13th, 14th, 15th, 16th and 17th concessions; the south 12 concessions of the Township of Glamorgan, and from lot 21, inclusive, to the eastern boundary in the south six concessions of Snowden.

4.—The Townships of Shelbourne, McClintock, Livingstone, Lawrence, Nightingale, Havelock, Eyre and Clyde.

HALTON.

T. A. Gorham, Judge, Milton.
W. I. Dick, C.C.A. and C.P., Milton.

1.—All the territory comprised in the new survey of the Township of Trafalgar, and the first ten lots in concessions 1, 2, 3, 4, 5 and 6 in the Township of Esquesing, and the first five lots in concessions 7, 8, 9, 10 and 11 in the said township.

2.—That part of the Township of Trafalgar known as the Old Survey.

3.—All the rest of the territory comprised in concessions 8, 9, 10 and 11 in the Township of Esquesing not comprised in the first division.

4.—All the rest of the territory comprised in concessions 1, 2, 3, 4, 5 and 6, Township of Esquesing.

5.—The Township of Nassegaweya.

6.—The Township of Nelson.

HASTINGS.

G. E. Deroche, Judge, Belleville.
E. B. Fralick, J.J., Belleville.
P. J. M. Anderson, C.C.A. and C.P., Belleville.

1.—To comprise the City of Belleville and the Township of Thurlow; also all that portion of the Township of Sidney lying south of the 8th concession and east of the line between lots 18 and 19.

2.—Comprising the Townships of Wollaston, Limerick and Cashel, and the six northerly concessions of the Townships of Tudor and Grimsthorpe, and all those parts of the Township of Lake, in all the concessions thereof lying north of lots 21 in said concessions, all in the County of Hastings.

3.—The Township of Tyendinaga, except that part called Deseronto.

4.—The Township of Hungerford.

5.—All that part of the Township of Sidney which lies to the north of the 8th concession, and to the east of lot No. 6, in each concession north of the 8th concession, and all that part of the Township of Rawdon which lies to the south of the 9th concession, and that part of the Township of Huntingdon south of the 5th con-

cession; also Block A and lots 1, 2, 3, 4, 5 and 6, in the 8th and 9th concessions of the Township of Sydney heretofore forming part of the 2nd division, together with all that portion of the Township of Sidney lying north of the 7th concession, and east of the line between lots 6 and 7.

6.—The Township and Village of Madoc, all that part of the Township of Huntingdon north of the 6th concession of said township, and all of the Townships of Tudor and Grimsthorpe, except the northerly six concessions of each of the said townships.

7.—The Village of Deseronto.

9.—The Town of Trenton, and all that part of the Township of Sidney which lies to the west of lot 7 in each of the concessions of the township, including Mill Island. Also, all of said Township of Sidney lying south of the 8th concession and west of the line between 18 and 19, and east of the line between lots 6 and 7.

10.—The Township of Marmora, that part of the Township of Lake lying south of lots 22 in all the concessions thereof, and all that part of the Township of Rawdon which lies north of the 8th concession thereof.

11.—The Townships of Herschell, Monteagle, Carlow, Bangor, Wicklow and McClure.

12.—The Townships of Faraday, Dungannon and Mayo, and the Village of Bancroft.

HURON.

B. L. Boyle, Judge, Goderich.
Philip Holt, J.J., Goderich.
Chas. Seager, C.C.A. and C.P., Goderich.

1.—Comprising the Town of Goderich, that part of the Township of Goderich to the north of the Cut Line and the Huron Road until the same meets the road allowance between the 13th and 14th concessions, then back along the Huron Road to its junction with the Cut Line, then west by the road allowance between concessions 11 and 12 to the River Maitland, then along the River Maitland to Goderich, together with the Township of Colborne.

2.—Comprising the Township of McKillop, the Town of Seaforth, and all that portion of the Township of Tuckersmith not included in the third division.

3.—Comprising all that portion of the Township of Hullett south of the blind line between the 7th and 8th concessions, of the Township of Hullett, that part of the Township of Goderich not included in Nos. 1 and 7, 1st, 2nd, 3rd and 4th concessions, Township of Stanley 1st and 2nd concessions, Township of Tuckersmith, L.R.S., north of lot 15, and that portion west of side road between lots 25 and 26, H.R.S., and Town of Clinton.

4.—Comprising the Township of Grey, all of the Township of Morris east of side road between lots Nos. 10 and 11 (which is not included in No. 12), and the Village of Brussels.

5.—Comprising the Townships of Usborne and the Village of Exeter.

6.—Comprising the Townships of Ashfield and all West Wawanosh, except that portion east of Maitland River.

7.—Comprising the Township of Goderich, south of Cut Line and Huron Road until the same joins the road between the 12th and 14th concessions of the Township of Goderich; thence along the said concessions until the same joins the River Bayfield, all Stanley not included in No. 3 and the Village of Bayfield.

8.—Comprising the Village of Wingham, the Township of Turnbury, all that part of East Wawanosh not included in No. 12, and all of the Township of Morris not included in Nos. 4 and 12.

9.—Comprising the Township of Howick and the Village of Wroxeter.

10.—Comprising the Township of Hay.

11.—Comprising the Township of Stephen.

12.—Commencing at the northeast angle of the Township of Hullett, thence southerly along the easterly boundary of the said Township of Hullett to the blind line between the 7th and 8th concessions of said township, thence westerly along said line to the western boundary of the township, thence northerly along the westerly boundary of the township to the Maitland River at the southeastern corner of the Maitland Block, thence along the said river northerly till the western boundary of East Wawanosh is reached, thence northerly along said westerly boundary to the road running between the 6th and 7th concessions of said Township of East Wawanosh, thence easterly along said road to the easterly limit of said township, thence northerly along the gravel road to the road running between the 5th and 6th concessions of the Township of Morris, thence easterly along said road to the line between lots 10 and 11, thence southerly along said line between the 6th and 7th concessions. thence easterly along said line to the line between lots 15 and 19, thence southerly to the boundary line between the Townships of Morris and Hullett, thence easterly to the place of beginning, including the Village of Blyth.

DISTRICT OF KENORA.

T. W. Chapple, Judge, Kenora.

J. F. MacGillivary, C. Atty. and C.P., Kenora.

1.—Comprising all the portion of the said District of Kenora lying west of the Seventh Meridian Line, including the Towns of Kenora and Keewatin.

2.—Comprising all that portion of the said District lying east of the eastern boundary of the Third Division, south of the northern boundaries of the Townships of Zealand and Hartman to the eastern boundary of the said District, including the Municipality of Ignace.

3.—Comprising all that portion of the said District lying between the Seventh Meridian Line and a line drawn parallel with the western boundary of lot 10 in the Township of Zealand, and extending northward to the northern boundary of the said District and southward to the southern boundary thereof, including the Town of Dryden.

4.—Comprising all that portion of the said Second Division, lying north of a line drawn eastward along the northern boundaries of the Townships of Zealand and Hartman, to the eastern boundary of the said District of Kenora.

KENT.

Archibald Bell, Judge, Chatham.

John L. Dowlin, J.J., Chatham.

H. D. Smith, C.C.A. and C.P., Chatham.

1.—The First Division to consist of the Town of Chatham and that part of the Townships of Dover East and West to the south of the 12th and 13th concession line of the Township of Dover East, and that part of the Township of Chatham south of the 12th and 13th concession line, and west of the side roads between lots 12 and 13, from the first mentioned 12th and 13th concession line to the 5th and 6th concession line, and all south of the said 5th and 6th concession line of said township; that part of the Township of Harwich north of 5th and 6th concession line, by the easterly boundary; that part of the Township of Raleigh north of the 16th concession to the west side road between lots 12 and 13 north to the 6th and 7th concession line, and all of the said township north of the said last-mentioned line, and that part of the Township of Tilbury East north of the 4th concession.

2.—The Second Division to consist of that portion of Township of Howard south of the 2nd and 3rd concession line by the eastern boundary (known as the Botany Road), and that part of the Township of Orford south of the 10th and 11th concession line of said township.

3.—The Third Division to consist of all that part of the Gore of Camden lying west of the 10th and 11th concession line, and that part of the Township of Camden lying west of the side line between lots 6 and 1; the Village of Dresden, and that part of the Township of Chatham north of the 5th and 6th concession line and east of the side roads between lots 12 and 13.

4.—The Fourth Division to consist of that part of the Township of Harwich south of the 5th concession of the eastern boundary, and south of the 3rd concession by the western boundary, and that part of Raleigh south of the 15th concession and east of the side road between lots 12 and 13 and the road to the shore through lot 146 on the Talbot Road.

5.—The Fifth Division to consist of the Village of Wallaceburg, the Gore of Chatham and that part of the Township of Chatham northwest of the 12th and 13th concession line, and west of the said roads between lots 12 and 13, and that part of Dover East lying north of the 12th and 13th concession side road.

6.—The Sixth Division to consist of that part of the Township of Howard north of the Botany Road aforesaid, and that part of the Township of Oxford north of the 10th and 11th concession line, the Township of Rone, the Township of Bothwell, the Village of Thamesville, and that part of the Gore of Camden east of the 10th and 11th concession line, and that part of the Township of Camden east of the side line between lots 6 and 7.

7.—The Seventh Division to consist of that part of Tilbury East south of the 3rd concession, the Township of Romney, and that part of the Township of Raleigh south of the 6th and 7th concession line, and west of the side road between lots 12 and 13, in the said township, and the road through lot 147 on Talbot Road.

LAMBTON.

D. F. McWatt, Judge, Sarnia.

A. E. Taylor, J.J., Sarnia.

J. P. Bucke, C.C.A. and C.P., Sarnia.

1.—The external boundaries of the Township of Sarnia and the Town of Sarnia.

2.—The external boundaries of the Township of Warwick, including that portion of the Village of Arkona south of the township line.

3.—The external boundaries of the Townships of Euphemia and Dawn.

4.—The external boundaries of the Township of Sombra.

5.—The external boundaires of the Township of Plympton.

6.—The external boundaries of the Township of Bosanquet, including that portion of the Village of Arkona north of the township line.

7.—The external boundaries of the Township of Moore.

8.—The external boundaries of the Township of Enniskillen.

9.—The external boundaries of the Township of Brock.

LANARK.

W. S. Senkler, Judge, Perth.

E. G. Malloch, C.C.A. and C.P., Perth.

1.—The Town of Perth, and the Townships of Drummond, Bathurst, South Sherbrooke, Burgess North, and that part of the Township of Elmsley North, north of the Rideau River, within the County of Lanark, and west of lot No. 12 in each concession. The sittings of said court to be held in the Town of Perth.

2.—The Second Division to consist of the Village of Lanark, and the Townships of Lanark, Dalhousie, Darling, Lavant and North Sherbrooke. The sittings of said court to be held at the Village of Lanark.

3.—The Third Division to consist of the Town of Carleton Place and the Township of Beckwith, and the first six lots in the first seven concessions of Township of Ramsay. The sittings of said court to be held in the Town of Carleton Place.

4.—The Township of Montague, the Town of Smith's Falls, and that part of the Township of North Elmsley, from lot No. 1 to lot No. 12, in each concession, both inclusive, not within the limits of the Town of Smith's Falls. Sittings at Smith's Falls.

5.—The Township of Pakenham, the Town of Almonte, and the Township of Ramsay, with the exception of the first six lots in the first seven concessions of the said township. Sittings at Almonte.

LEEDS AND GRENVILLE.

H. S. McDonald, Judge, Brockville.
E. J. Reynolds, J.J., Brockville.
M. M. Brown, C.C.A. and C.P., Brockville.

1.—To consist of the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions and broken front of the Township of Elizabethtown, and the concession roads between them.

2.—To consist of the 1st, 2nd, 3rd, 4th and 5th concession, and broken front and that part of the 6th, 7th and 8th concessions from the town line of Edwardsburg to lot No. 18, inclusive, of the Township of Augusta, and the concession roads between them.

3.—To consist of the 1st, 2nd, 3rd, 4th and 5th concessions and broken front of the Townships of Leeds and Lansdowne, respectively, and the concession roads between them.

4.—To consist of the Township of South Gower, the Township of Oxford from the west side line of lots No. 11 in all the concessions of the eastern boundary of the township, and the gore of land between South Gower, Oxford and Edwardsburg.

5.—To consist of the Township of Wolford (except the 7th and 8th concessions and the allowances of roads within and between them); lots Nos. 1 to 10, inclusive, in the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions of the Township of Oxford, and allowances of roads within and between them.

6.—To consist of the Townships of Bastard and Burgess, and those parts of the Townships of Leeds and Lansdowne, on the north side of the rear of the 5th concession in each respectively.

7.—To consist of the Townships of Kitley and Elmsley.

8.—To consist of the Townships of North Crosby and South Crosby.

9.—To consist of that part of the Townships of Escott and Yonge, in rear of the 4th concession of Yonge, and in rear of the 6th concession of Escott; that part of the Township of Elizabethtown, in rear of the 7th concession of and west of lot No. 18 in the 8th, 9th, 10th and 11th concessions, and the allowances for roads embraced therein.

10.—To consist of the Township of Edwardsburg.

11.—To consist of that part of the Township of Augusta in rear of the 5th concession and west of lot No. 18 in the 6th, 7th and 8th concessions; the whole of the 9th and 10th concessions of the Township of Augusta; the Gore between the

Townships of Oxford, Wolford and Augusta; that part of the Township of Elizabethtown in rear of the 7th concession, and east of the commons, between lots No. 18 and 19 in the 8th, 9th and 10th concession; the 7th and 8th concessions of the Township of Wolford; lots No. 1 to 10, inclusive, in the 9th and 10th concessions of the Township of Oxford; and the allowance for roads embraced therein.

12.—To consist of the 1st, 2nd, 3rd and 4th concessions and broken front of the Township of Yonge; the 1st, 2nd, 3rd, 4th, 5th and 6th concessions and broken front of the Township of Escott, and the allowances for roads embraced therein.

The said 1st, 2nd and 12th divisions shall respectively embrace and comprehend within their lines those portions of the River St. Lawrence and islands therein, within the exterior lines of which such portions of said river and islands would lie and be, if such exterior side lines were produced and extended in that direction to the utmost limits of the Province.

LENNOX AND ADDINGTON.

Jas. H. Madden, Judge, Napanee.

H. M. Deroche, C.C.A. and C.P., Napanee.

1.—The Town of Napanee, Township of Richmond, all that part of North Fredericksburg and Adolphustown lying north of Hay Bay, and all that part of North Fredericksburg lying north of Big Creek.

2.—Comprises 1st concession of Ernestown, the Village of Bath, the Township of Amherst Island, and the 2nd, 3rd and 4th concessions of the said Township of Ernestown, from the west limits thereof to the west limit of lot No. 21 in each concession.

3.—Township of South Fredericksburg and all that part of North Fredericksburg and Adolphustown not included in Division No. 1.

4.—1st, 2nd and 3rd concessions of the Township of Camden and the Village of Newburg.

5.—All that part of the Township of Camden not included in Division No. 4.

6.—All that portion of the Township of Ernestown not included in the limits of Division No. 2.

7.—Township of Sheffield.

8.—Townships of Kaladar, Anglesea and Effingham.

9.—Townships of Abinger, Ashby and Denbigh.

LINCOLN.

R. B. Carman, Judge, St. Catharines.

M. Brennan, C.C.A. and C.P., St. Catharines.

1.—The Town and Township of Niagara.

2.—The Township of Grantham (including the City of St. Catharines), the Villages of Merritton and Port Dalhousie and the Township of Louth.

3.—The Townships of Caistor and Gainsborough and the 9th concession of the Township of Grimsby, including the 1st and 2nd ranges as part of the said concession.

4.—The Village of Beamsville and the Township of Clinton.

5.—The Village of Grimsby, the Township of North Grimsby, and the Township of South Grimsby, except that portion included in the Third Division.

DISTRICT OF MANITOULIN.

C. E. Hewson, Judge, Gore Bay.
W. F. McRae, C.A., and C.P., Gore Bay.

1.—The Town of Gore Bay, the Townships of Gordon, Allan, Campbell, Mills, Burpee, Robinson, Dawson, The Islands, Barrie, Clapperton and the Duck Islands, and that part of the Township of Billings lying west of the road allowance between lots 15 and 16 in the several concessions thereof, and so much of the Township of Carnarvon as lies west of Lake Mindemoya and north of the line between the 6th and 7th concessions thereof, and Cockburn Island.

2.—The Town of Little Current, the Township of Howland and those parts of the Townships of Sheguindah and Bidwell lying north of the line between the 6th and 7th concessions of Sheguindah and the 4th and 7th concessions of the Township of Bidwell, and the 6th and 7th concessions of the line between lots 17 and 18 in the Township of Billings, and the adjacent islands lying north and east of the said Townships, except the Clapperton Island.

3.—Manitowaning, the Townships of Assiginack, Tehkummah and Sandfield, and those parts of the Township of Sheguindah lying south of the line between the 4th and 5th concessions of the Township of Bidwell and the 6th and 7th concessions of the Township of Billings to the line between lots 17 and 18 of said township, and the Township of Carnarvon, except so much of the same as lies west of Mindemoya Lake, and all the part of Manitoulin lying east of the Township of Assiginack, Manitowaning and South Bays and the islands adjacent thereto.

MIDDLESEX.

Talbot Macbeth, Judge, London.
Edward Elliott, J.J., London.
J. B. McKillop, C.C.A., and C.P., London.

1.—That part of the City of London lying to the west of Maitland street with that portion of the Township of London lying south of the line between the 4th and 5th concessions and west of the said street, produced northerly on a line in the same direction to the line between the said 4th and 5th concessions, and with that portion of the Township of Westminster lying west of the main road leading south from Clark's Bridge, across the Thames, south to the line between the 1st and 2nd concessions, and westerly to the line between lots 42 and 43, and extending northerly to the River Thames, and also including the Village of London West.

2.—The Villages of Parkhill and Ailsa Craig, the Townships of East Williams and West Williams, and that portion of the Township of Lobo lying north of the line between the 11th and 12th concessions, and east of the lines between lots Nos 12 and 13.

3.—The Townships of McGillivray and Biddulph and the Village of Lucan.

4.—The Township of Delaware, with that portion of the Township of Westminster west of the line between lots 30 and 31 in the 2nd concession, then southerly on the line between lots 20 and 21 to the southerly limit of the township, including all west of said line, and also including all that portion of the front of said Township of Westminster lying west of the line between lots Nos. 42 and 43, not included in the first division, with that portion of the Township of Caradoc lying south of the line between the 5th and 6th concessions to the River Thames, and with that portion of the Township of Lobo lying south of the line between the 6th and 7th concessions, to the River Thames.

5.—The Township of Ekfrid and Mosa, including the Villages of Wardsville, Newbury and Glencoe.

6.—Townships of Adelaide and Metcalfe, the Town of Strathroy, with that portion of the Township of Caradoc lying north of the line between the 3rd and 4th concessions, with that portion of the Township of Lobo which lies north of the 6th concession and west of the line between lots 12 and 13 of the said township.

7.—The Township of North Dorchester, north and south of the River Thames, that portion of the Township of West Nissouri which lies south of the line between lots 14 and 15, and with that portion of the Township of Westminster lying south of the line between the 1st and 2nd concessions and east of the line between lots 30 and 31 in the 2nd concession and thence east of the line between lots 20 and 21, continued south to the southerly limit of the said Township of Westminster.

8.—All that portion of the Township of London which lies north of the line between the 4th and 5th concessions, that portion of the Township of Lobo which lies north of the line between the 6th and 7th concessions, and east of the line between lots 12 and 13 to the line between the 11th and 12th concessions and with all that portion of the Township of West Nissouri which lies north of the line between lots 14 and 15.

9.—All that part of the City of London lying east of Maitland Street; that part of the Township of London, lying north of the line between the 4th and 5th concessions and east to the said street, produced northerly or in a line in the same direction to the line between the said 4th and 5th concessions and that part of the Township of Westminster lying north of the line between the 1st and 2nd concessions, and east of the main road leading south from Clarke's Bridge across the Thames.

DISTRICT OF MUSKOKA.

A. A. Mahaffy, Judge, Bracebridge.

Thomas Johnson, C.A., and C.P., Bracebridge.

1.—The Town of Bracebridge and the Townships of Macauley, McLean, Ridout, Monck and Cardwell, concessions 1, 2, 3, 4, 5, 6, 7, 8 and 9 in the Townships of Stephenson, Brunel and Franklin and that part of the Township of Watt situated east of lot 21, in the several concessions thereof and concessions 7, 8, 9, 10, 11, 12 and 13 in the Townships of Muskoka and Draper.

2.—The Town of Gravenhurst, the Townships of Morrison, Ryde, Wood, Oakley and Baxter, and concessions 1, 2, 3, 4, 5 and 6 of the Townships of Muskoka and Draper.

3.—The Town of Huntsville, the Townships of Stisted, Chaffey and Sinclair, and concessions 10, 11, 12, 13 and 14 in the Townships of Stephenson, Brunel and Franklin.

4.—The Village of Port Carling and the Townships of Freeman, Gibson and Medora and that part of the Township of Watt situated on the west of lot 21 in in the several concessions thereof.

DISTRICT OF NIPISSING.

Jos. A. Valin, Judge, North Bay.

H. D. Leask, J.J., North Bay.

T. E. McKee, C.A., and C.P., North Bay.

1.—To be composed of the Townships of Springer, Field, Badgerow, Caldwell, and all that part of the District of Nipissing which is situated west of the line between the Indian Reserve and the Township of Widdifield, produced south to the

boundary of the said District, and north to the north-east boundary of the Township of Gooderham, and south of the said line marking the northern boundary of the said Township of Gooderham and its production to the North-western boundary of the Township of Pardo.

Sittings of the Court, Sturgeon Falls.

2.—To be composed of the Townships of Mattawan, Olrig, Calvin, Papineau, Lauder, Pentland, Boyd, Osler, McLaughlin, Canisby, Sabine, Lyell, Airy, Murchison, and Robinson, and all that part of the District of Nipissing situated east of the line between the Townships of Bonfield and Calvin, produced south to the provisional County of Haliburton and east of the line between the Townships of Phelps and Olrig, produced north to the Ottawa River.

Sittings of the Court, Mattawa.

3.—To be composed of the Townships of Widdifield, Merrick, Mulock, Phelps, Ferris, Chisholm, Ballantyne, Wilkes, Biggar, Paxton, Butt, Devine, Hunter, McCraney, Finlayson, Peck, and all that part of the District of Nipissing situated west of the line between the Townships of Phelps and Olrig, produced north to the Ottawa River, thence along the Ottawa River to the north-east angle of the Township of Wyse, thence along the line marking the northern boundary of the said Township of Wyse, produced westerly to the eastern boundary of the First Division, thence south along the eastern boundary of the First Division to the southern boundary of the District.

Sittings of the Court, North Bay.

4.—To be composed of so much of the District as lies south of the southern boundary of the Townships of Langmuir, Blackstock, and Timmins, produced easterly to a point which shall meet the line between the Townships of Eby and Otto, produced northerly and west of the line between the Townships of Eby and Otto, produced north to a point where the line of production of the south boundary of the Townships of Langmuir, Blackstock and Timmins, and produced southerly to the northern boundary of the Township of Hobbs.

Sittings of the Court, Elk Lake City.

5.—To be composed of the Townships of Bonfield and Boulter.

Sittings of the Court, Town of Bonfield.

6.—To be composed of that part of the District that lies north of the northern boundary of the Townships of Cane, Henwood, Kerns, Harley. and Casey, and east of the boundary line between the Townships of Tudhope and Bryce, produced northerly to the production easterly of the southerly boundary of the Township of Timmins.

Sittings of Court, Englehart.

7.—To be composed of that portion of the District lying south of the northerly boundary of the Townships of Klock, Barr, Firstbrook, and Bucke, and east of the line between the Townships of Van Nostrand and Klock, produced southerly to the northern boundary of the Township of Hobbs.

Sittings of the Court, Haileybury and Cobalt, alternately.

8.—To be composed of that portion of the District lying north of the southerly boundary of the Townships of Langmuir, Blackstock, and Timmins and produced easterly to the eastern boundary of the District.

Sittings of the Court, Cochrane.

9.—To be composed of the Townships of Cane, Henwood, Kerns, Harley, Casey, Auld, Lundy, Hudson, Dymond, Harris and the Town of New Liskeard.

Sittings of the Court, New Liskeard.

NORFOLK.

James Robb, Judge, Simcoe.

T. R. Slaght, C.C.A. and C.P., Simcoe.

1.—The Town of Simcoe, the Gore of the Township of Woodhouse and all that part of said Township lying west of the side line between lots 5 and 6, together with that part of the 4th, 5th and 6th concessions lying west of the said line between lots 12 and 13.

2.—The Township of Townsend and the Village of Waterford.

3.—The Township of Windham.

4.—The Township of Middleton and the Village of Delhi.

5.—The Township of Charlotteville.

6.—The Townships of North Walsingham, South Walsingham and the Village of Port Rowan.

7.—The Township of Houghton.

8.—The Village of Port Dover, and that part of the Township of Woodhouse not included in Division 1, viz.: all that part of the 1st, 2nd and 3rd concession lying east of the side line between lots 5 and 6, and that part of the 4th, 5th and 6th concessions lying east of the said line, between lots 12 and 13 in said township.

NORTHUMBERLAND AND DURHAM.

T. M. Benson, Judge, Cobourg.

G. M. Roger, J.J., Cobourg.

W. F. Kerr, C.C.A. and C.P., Cobourg.

1.—Townships of Cartwright and Darlington and the Town of Bowmanville.

2.—Township of Clarke and Village of Newcastle.

3.—Township of Hope and Town of Port Hope.

4.—Townships of Cavan, Manvers, South Monaghan and Village of Millbrook.

5.—Township of Hamilton and Town of Cobourg.

6.—Townships of Haldimand and Alnwick.

7.—Township of Cramahe and Village of Colborne.

8.—Township of Brighton and Village of Brighton.

9.—Township of Percy and Village of Hastings.

10.—Township of Murray.

11.—Township of Seymour and Village of Campbellford.

ONTARIO.

T. MacGillivray, Judge, Whitby.

D. J. McIntyre, J.J., Whitby.

J. E. Farewell, C.C.A. and C.P., Whitby.

1.—Including the Townships of Whitby and East Whitby and the Towns of Whitby and Oshawa.

2.—The Township of Pickering.

3.—The Townships of Reach and Scugog and the Village of Port Perry.

4.—The Townships of Uxbridge and Scott and the Town of Uxbridge.

5.—The Township of Brock and the Village of Cannington.

6.—The Township of Thorah and all that part of the Township of Mara lying south of the line between the 4th and 5th concessions.

7.—All that part of the Township of Mara lying north of the line between the 4th and 5th concessions thereof, and the Township of Rama.

OXFORD.

Alex. Finkle, Judge, Woodstock.

R. N. Ball, C.C.A., Woodstock.

1.—Comprising the City of Woodstock, the Township of East Oxford, and that part of the Township of East Zorra, lying south of the line between lots number twenty-five and twenty-six of the Township of Blandford, and that part of the Township of North Oxford lying east and north of the road between lots 16 and 17 to the boundary of the Township line between North and West Oxford, and that part of the Township of West Oxford lying east of the road between lots 6 and 7 to the boundary of the Township of East Oxford, and that part of the Township of Blandford lying south of the 10th concession.

2.—Comprises the Township of Blenheim.

3.—Comprises the Township of East Nissouri and West Zorra and the Village of Embro.

4.—Comprises the Townships of North Norwich and South Norwich and the Village of Norwich.

5.—Comprises the Town of Ingersoll and that part of the Township of North Oxford lying west and south of the road between lots No. 16 and 17 of the Township of West Oxford, and that part of the Township of West Oxford lying south of the road between lots 6 and 7 to the line between West Oxford and East Oxford, and those portions of the Township of Dereham being part of the 1st concession of the said Township of Dereham, west of the Middle Town Line.

6.—Comprises the Town of Tillsonburg and that part of the Township of Dereham not included in the Fifth Division.

7.—Comprising the Village of Tavistock and that part of the Township of East Zorra, north of the road between lots 25 and 26, and that part of the Township of Blandford lying north of the 10th concession of the said township.

DISTRICT OF PARRY SOUND.

P. McCurry, Judge, Parry Sound.

W. L. Haight, C.A. and C.P., Parry Sound.

1.—The Town of Parry Sound and the Townships of Foley, McDougall, Cowper and Carling, and all that portion of the district lying to the west of the east boundary of Carling, produced to the French River.

2.—The Townships of McKellar, Ferguson, Hagerman, Croft, and all that portion of the district lying between the east boundary of Ferrie and the west boundary of Ferguson, produced to the French River.

3.—The Townships of Humphrey, Christie, Monteith and Conger.

4.—Townships of McMurrich, Perry, Armour, Proudfoot and Bethune.

5.—Townships of Spence, Chapman, Ryerson and Lount.

6.—That territory bounded on the west by the western boundaries of the Townships of Pringle and Patterson, and the western boundary of the Township of Patterson, produced to the French River and Lake Nipissing; on the east by the boundary of the District of Parry Sound, and on the south by the southern boundaries of the Townships of Himsworth, Gurd and Pringle.

7.—The Townships of Machar, Laurier, Strong and Joly.

PEEL.

D. McGibbon, Judge, Brampton.

W. H. McFadden, C.C.A., and C.P., Brampton.

1.—Township of Brampton, Township of Chinguacousy and northern division of the Township of Toronto Gore.

2.—Village of Streetsville, Township of Toronto and southern division of the Township of Toronto Gore.

3.—Township of Caledon.

4.—Village of Bolton, Township of Albion.

PERTH.

J. A. Barron, Judge, Stratford.

G. G. McPherson, C.C.A., and C.P., Stratford.

1.—To consist of all that part of the Township of North Easthope west of the line between lots 25 and 26, and south of the road between the 8th and 9th concessions, and all that part of the Township of South Easthope west of the side line between lots 25 and 26; all that part of the Townships of Downie and Gore north and east of the concession line between the 10th and 11th concessions and the Oxford Road; and all the Township of Ellice from the 1st to 13th concession, inclusive.

2.—To consist of all that part of the Township of Fullarton not included in Division No. 3, and the Townships of Hibbert and Logan.

3.—To consist of that portion of the Township of Downie west of the Oxford Road, and south of the concession line between the 10th and 11th concessions; the Township of Blanshard; all that part of the Township of Fullarton comprising the 13th and 14th concessions, and south of a road leading from Mitchell Road, between lots 24 and 25, east of lot 3 in the 10th concession; thence east along the line between the 10th and 11th concessions to the town line.

4.—To consist of that part of the Township of North Easthope east of the line between lots 25 and 26, and the north of the 8th concession, inclusive, with the 9th and 10th concessions; all that part of the Township of South Easthope not included in Division 1.

5.—To consist of the Township of Mornington, and all that part of the Township of Elma from lots 13 to 72, both numbers inclusive, of the 1st concession, and from lots 27 to 16, both numbers inclusive, in and from the 2nd to the 18th concession, both concessions inclusive, of the said Township of Elma; and concessions 14, 15 and 16 of the Township of Ellice; and concessions 11, 12, 13 and 14 of the Township of North Easthope.

6.—To consist of the Township of Wallace and all that part of the Township of Elma from the 1st concession to the 18th concession, both concessions inclusive, and comprising lots Nos. 1 to 52, both inclusive, of the 1st concession, and lots Nos. 1 to 26 inclusive from the 2nd to the 18th concession, both concessions inclusive.

PETERBOROUGH.

E. C. S. Huycke, Judge, Peterborough.

R. E. Wood, C.C.A., and C.P., Peterborough.

1.—Shall comprise the City of Peterborough, the Townships of North Monaghan and Ennismore, all the Township of Smith lying south of the 7th concession,

all that part of the Township of Otonabee lying west of the 8th concession and north of lots Nos. 21 and all that part of the Township of Douro lying south of lots numbered 11.

Court to be held at the Court House in the City of Peterborough.

2.—Shall comprise the Village of Norwood, the Township of Asphodel, and all that part of the Township of Dummer lying east of the 5th concession and that part of the said Township of Dummer lying west of the 6th concession and south of lots numbered 11. Court to be held in the Town Hall in the Village of Norwood.

3.—Shall comprise that part of the Township of Smith lying north of the 6th concession, all that part of the Township of Douro lying north of lots numbered 10, that part of the Township of Dummer lying west of the 6th concession and north of lots numbered 10, the Township of Galway, the Township of Harvey and the Village of Lakefield. Court to be held in the Town Hall in the Village of Lakefield.

4.—Shall comprise the Townships of Anstruther, Burleigh, Cavendish and Chandos. Court to be held in the Town Hall at Apsley.

5.—Shall comprise the Townships of Belmont and Methuen and the Village of Havelock. Court to be held in the Town Hall in the Village of Havelock.

6.—Shall comprise the Township of Otonabee, except that part thereof lying west of the 8th concession and north of lots numbered 21. Court to be held in the Town Hall, at Keene, in said township.

PRESCOTT AND RUSSELL.

A. Constantineau, Judge, L'Orignal.

A. Johnston, J.J., L'Orignal.

J. Maxwell, C.C.A., and C.P., L'Orignal.

1.—Comprises the whole of the Township of Longeuil, the municipality of the Village of L'Orignal, and the 1st concession of the Township of Caledonia.

2.—Comprising all that part of the Township of West Hawkesbury, extending from front of 3rd concession to the rear of the said township.

3.—Comprises the whole of the Township of East Hawkesbury.

4.—Comprising the Township of North Plantagenet, and that part of the Township of South Plantagenet lying north of the Nation River.

5.—Comprising the whole of the Township of Cumberland.

6.—Comprising the whole of the Township of Russell.

7.—Comprising the two front concessions of the Township of West Hawkesbury, and the Municipality of Hawkesbury Village, within the same.

8.—Comprising the Township of Caledonia (excepting the 1st concession of the said township), and also that portion of the Township of South Plantagenet lying south and east of the Nation River.

9.—Comprising the whole of the Township of Alfred.

10.—Comprising the whole of the Township of Clarence.

11.—Comprising the whole of the Township of Cambridge.

PRINCE EDWARD.

D. Morrison, Judge, Picton.

Jas. R. Brown, C.C.A., and C.P., Picton.

1.—The Town of Picton, the 2nd and 3rd concessions of "Military Tract" from the west line of No. 13 eastward; Gore "G"; 1st and 2nd concessions north of

the Carrying Place, 1st concession southeast of the Carrying Place, and 2nd concession north of Black River, including Gores "K" and "L" and McCan Gores, all in the Township of Hallowell; Block "I" in the concession north and east of East Lake, and Gore "B" in the Township of Athol, and 1st and 2nd concessions south of the Bay of Quinte, and Gore "A" in the Township of North Marysburg, and 1st concession southwest of Green Point to the end of Carman's Point in Sophiasburg.

2.—The Township of South Marysburg, and the Southern part of Athol, commencing at the outlet of East Lake, thence down to the head of the Lake, thence down to the base line between the 1st concession south and the 1st concession north of East Lake, till it strikes the township line of Hallowell, thence down said township line till it strikes South Marysburg.

3.—The Township of Sophiasburg, together with Big Island, excepting the 1st concession southwest of Green Point to the end of Carman's Point.

4.—All that part of the Township of Ameliasburg lying east of the line between lots 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said township, including Huff's Island.

5.—That part of the Township of Hillier not included in the 7th division, also the first and 2nd concessions north of West Lake, and west of lot No. 7 in the said concession, and that part of Irwin Gore lying north and west of lot No. 7 in the 2nd concession and the west part of the 2nd concession produced west of lot No. 74 in that concession in the Township of Hallowell.

6.—Block (IV.) four, concession south side of West Lake, 1st concession "Military Tract," 2nd and 3rd concessions of said tract west of Lots No. 13, in those concessions, "Gore E," 1st and 2nd concessions north of West Lake, and east of lot No. 6 in those concessions; the Gerrow Gore and that part of Irwin Gore not included in Division No. 8, and all that part of the 2nd concession produced east of lot No. 75 in the Township of Hallowell.

7.—All that part of the Township of Ameliasburg lying west of the line between lots No. 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said township; all that part of the 4th and 5th concessions of the Township of Hillier west of the line between lots 86 and 87 and the 3rd concession west of the line between lots No. 22 and 23, with that part of the 2nd concession lying North of Pleasant Bay in the said Township of Hillier.

8.—All the point lying east of the west line of Marshland's Gore, the concession lying North of Smith's Bay and Waupoos Island in the Township of North Marysburg.

DISTRICT OF RAINY RIVER.

C. R. Fitch, Judge, Fort Frances.

A. D. George, C.A., and C.P., Fort Frances.

1.—To comprise all that part of the said District lying east of the east boundaries of the Townships of Aylesworth, Lash, Carpenter, Kingsford and Fleming, and east of the east boundary of the said Township of Fleming produced north to the north boundary of the said District, to be styled "The First Division Court in the District of Rainy River."

2.—To comprise all that part of the said District lying west of Division No. 1 and east of the east boundaries of the Townships of Morley, Morley Additional, Pattullo, Sifton and Dewart, and east of a line drawn north astronomically from the northeast angle of the said Township of Dewart to the north boundary of the said District, to be styled "The Second Division Court in the District of Rainy River."

3.—To comprise all that part of the said District lying west of Division No. 2, to be styled "The Third Division Court in the District of Rainy River."

RENFREW.

A. A. Fisher, J.J., Pembroke.

J. H. Barritt, C.C.A., and C.P., Pembroke.

1.—Comprising the Town of Pembroke, the Townships of Pembroke, Stafford, Alice, Petawawa, Buchan, Rolph, Wylie, McKay, Fraser, Herd, Clara and Maria, and all that part of the Township of Wilberforce from the 18th to the 25th concessions, both inclusive, and also those parts of the 14th, 15th, 16th and 17th concessions of the same Township of Wilberforce lying north of Snake River and east of Lake Dore.

2.—Comprising all that part of the Township of Westmeath lying east and north of the Muskrat Lake and River, and all those parts of the Township of Ross, from the 5th to the 9th concessions, both inclusive, east of Muskrat Lake, and from the 7th to the 13th (of the other) concessions, both inclusive, of the said Township of Ross.

3.—Comprising the Town of Renfrew and the Townships of Horton, Admaston, Bagot, Blythfield, Brougham and Matawachan, in the said County of Renfrew.

4.—Comprising the Village of Arnprior and the Township of McNab.

5.—Comprising the Townships of Grattan, Sebastopol, South Algoma, North Algoma, and all that part of the Township of Wilberforce, from the 1st to the 17th concessions, both inclusive, excepting those parts of the 14th, 15th, 16th and 17th concessions of said Township of Wilberforce lying north of Snake River and east of Lake Dore.

6.—Comprising the Township of Bromley, and all that part of the Township of Westmeath west of Muskrat Lake, and all those parts of the Township of Ross, from the 1st to the 14th concessions, both inclusive, of the said Township of Ross.

7.—Comprising the Townships of Brudenell, Radcliffe, Raglan, Lynedoch, Griffith, Hagarty, Sherwood, Jones, Richards and Burns.

SIMCOE.

J. A. Ardagh, Judge, Barrie.

E. A. Wismer, J.J., Barrie.

J. R. Cotter, C.C.A., and C.P., Barrie.

1.—Comprising the Town of Barrie, the Township of Vespra, except that portion lying west of the Nottawasaga River, and excepting also lots Nos. 38, 39 and 40, in the 1st and 2nd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions respectively. That portion of the Township of Oro lying south of lots Nos. 21 in the 1st and 2nd concessions (including the ranges), and south of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions respectively; that portion of the Township of Innisfil lying east of lots Nos. 5 in the 6th, 7th and 8th concessions, and that portion lying north of the 8th concession; that portion of the Township of Essa lying north of lots Nos. 19 in the 7th, 8th, 9th, 10th and 11th concessions.

2.—The Village of Bradford, the Township of West Gwillimbury, excepting thereout lots Nos. 1, 2, 3, 4 and 5 in the 14th and 15th concessions; the Township of Innisfil, excepting that portion lying north of the 5th concession, and excepting also lots Nos. 1, 2, 3, 4, and 5 in the 1st, 2nd, 3rd, 4th and 5th concessions thereof.

3.—The Township of Tecumseh, excepting concessions 12, 13, 14 and 15; the Township of Adjala, excepting that portion lying north of lot No. 25 in the 8th concession thereof.

4.—The Town of Collingwood, the Village of Stayner, that portion of the Township of Nottawasaga lying north of lot No. 18 in the 12th concession thereof; that portion of the Township of Sunnidale lying north of the 8th concession; that portion of the Township of Floss lying west of the Nottawasaga River; the islands in Lake Huron contiguous to the Township of Nottawasaga.

5.—The Township of Floss, except that portion lying west of the Nottawasaga River; the Township of Medonte, except that portion lying east of the 10th concession and north of lots Nos. 10 in the 9th and 10th concessions respectively; that portion of the Township of Oro lying north of the southern boundaries of lots Nos. 21 in the 1st and 2nd concessions, and north of the southern boundaries of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions respectively; lots 38, 39 and 40 in the 1st and 3rd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions of the Township of Vespra.

6.—The Town of Orillia, the Township of Orillia, southern division, the Township of Orillia, northern division, except that portion lying north of lots Nos. 15 in the first seven concessions thereof; that portion of the Township of Oro lying east of the 8th concession; that portion of the Township of Medonte, being composed of lots Nos. 1 to 6 (both inclusive) in the 11th, 12th, 13th, and 14th concessions; the islands in Lake Simcoe contiguous to the townships and portions of townships above described lying wholly or for the most part opposite thereto.

7.—The Township of Nottawasaga, except that portion lying north of lot No. 18 in the 12th concession thereof; the Township of Sunnidale, except that portion lying north of the 8th concession; that portion of the Township of Vespra lying west of the Nottawasaga River; that portion of the Township of Essa lying north of lots 19 in the 1st, 2nd, 3rd, 4th, 5th and 6th concessions; that portion of the Township of Tossorontio lying north of lots Nos. 20 in each of the seven concessions thereof.

8.—The Township of Essa, except that portion lying north of lots Nos. 19 in each of the eleven concessions thereof; the Township of Tossorontio, except that portion lying north of lots No. 20 in each of the seven concessions thereof; that portion of the ownship of Innisfil, being composed of lots Nos. 1, 2, 3, 4 and 5 in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions; the 12th, 13th, 14th and 15th concessions of the Township of Tecumseh; lots Nos. 1, 2, 3, 4 and 5 in the 14th and 15th concessions of the Township of West Gwillimbury; that portion of the Township of Adjala lying north of lots Nos. 25 in the eight concessions thereof.

9.—The Town of Penetanguishene and the Village of Midland, the Township of Tiny; that portion of the Township of Tay lying west of the 8th concession; the islands in Lake Huron contiguous to the Township of Tiny, and to that part of the Township of Tay, forming part of the 9th division, and lying wholly and for the most part opposite thereto.

10.—The Township of Matchedash, that portion of the Township of Orillia, northern division, lying north of lots Nos. 15, in the first seven concessions thereof; that portion of the Township of Medonte lying north of lots Nos. 6, in the 11th, 12th, 13th and 14th concessions, and that portion lying north of lots Nos. 10, in the 9th and 10th concessions thereof; the Township of Tay, except that portion lying west of the 8th concession; the island in Lake Huron, contiguous to that portion of the Township of Tay, forming part of the 10th division, and lying wholly or for the most part opposite thereto.

NOTE.—Each of the said several divisions shall include all allowances for roads embraced within its external limits, and shall also extend to the centre of every allowance for road lying external and adjacent to every such division, excepting

always where any such last-mentioned allowance is hereinbefore declared to belong to or form part of any particular division.

STORMONT, DUNDAS AND GLENGARRY.

J. R. O'Reilly, Judge, Cornwall.
J. W. Liddell, J.J., Cornwall.
Jas. Dingwall, C.C.A., and C.P. Cornwall.
1.—Township of Charlottenburg, in the County of Glengarry.
2.—Township of Lochiel, in the County of Glengarry.
3.—Township of Cornwall, in the County of Stormont.
4.—Township of Osnabruck, in the County of Stormont.
5.—Township of Williamsburg, in the County of Dundas.
6.—Township of Matilda, in the County of Dundas.
7.—Township of Mountain, in the County of Dundas.
8.—Township of Finch, in the County of Stormont.
9.—Township of Lancaster, in the County of Glengarry.
10.—Township of Winchester, in the County of Dundas.
11.—Township of Roxborough, in the County of Stormont.
12.—Township of Kenyon, in the County of Glengarry.

SUDBURY.

J. J. Kehoe, Judge, Sudbury.
J. H. Clary, C.A., and C.P., Sudbury

First Division Court.—That part of the District of Sudbury as follows: Commencing at the southwest angle of the township No. 82; thence on a line produced north to the northwest angle of the Township of Fairbank; thence east to the southeast angle of the Township of Rayside; thence north to the northwest angle of the Township of Creelman; thence east to the northeast angle of the same township; thence south to the southeast angle of the township, thence east to the line between the Townships of Aylmer and Mackelcan, thence south on that line to the southern boundary.

Second Division Court.—So much of the district as lies north of a line produced westerly from the southeast angle of the Township of Rayside to the west boundary of the said district, and south of the limits of the Fifth Division and including all the territory westerly to the line known as O.L.S. Speight's Meridian line.

Third Division Court.—So much of the District as lies west of a line produced north from the southwest angle of the Township Number 82, to the northwest angle of the Township of Fairbank. thence west to the boundary of the said District.

Fourth Division Court.—So much of the district as lies east of the line between the Townships of Aylmer and Mackelcan produced to the southern boundary of the said district.

Fifth Division Court.—Commencing at the southeast corner of the Township of Geikie, thence westerly to the southwest corner of the Township of Pharand, thence northerly to the southwest corner of the Township of Massey, thence westerly along P.L.S. Niven's base line to the western boundary of the District of Sudbury and comprising all the territory in the District of Sudbury north of the lines hereinbefore mentioned.

THUNDER BAY DISTRICT.

H. H. O'Leary, Judge, Port Arthur.

Jno. McKay, J.J.

W. F. Langworthy, C.A., and C.P., Port Arthur.

1.—All that part of the district lying west of the meridian of 87 degrees of west longitude, to the meridian of the most easterly part of Hunter's Island, excepting therefrom the Municipality of Neebing.

3.—Comprising the Municipality of Neebing.

VICTORIA

J. E. Harding, Judge, Lindsay.

H. McMillan, J.J., Lindsay.

A. P. Devlin, C.C.A., and C.P., Lindsay.

1.—The first consists of the following townships and parts of townships, viz.: Of the 15th concession of the Township of Mariposa, and the Township of Eldon, except the ranges north and south of the Portage Road.

2.—All the Township of Fenelon, except that portion lying east of the Scugog River, and south of Sturgeon Lake, and the Township of Somerville.

3.—The Township of Verulam.

4.—The Township of Emily.

5.—The Town of Lindsay, Township of Ops, and that portion of the Township of Fenelon, lying east of the Scugog River, and south of Sturgeon Lake.

6.—The Township of Mariposa, except the 15th concession.

7.—The Townships of Carden and Dalton, Laxton, Digby and Longford, and the Township of Bexley, and that portion of the Township of Eldon north of Portage Road, and the range south of Portage Road.

WATERLOO.

D. Chisholm, Judge, Berlin.

W. H. Bowlby, C.C.A., and C.P., Berlin

1—All that portion of the Township of Waterloo lying north of Blockline on the west side of the Grand River and that part of the upper block of said township lying north of said township lying on the east side of the Grand River, north of lots Nos. 115, 109, 104, 86 and 95, to the Guelph Township line, including the Towns of Berlin and Waterloo.

2.—All that part of the Township of Waterloo lying south of the Blockline on the west side of the Grand River, and that part lying on the east side of the Grand River, south of the northern boundary of lots Nos. 115, 109, 104, 85 and 95, to the Guelph Township line, including the Villages of Preston and Hespeler.

3.—All that portion of the Township of North Dumfries lying east of lot No. 19 in the 7th concession, and running a course with the eastern boundary of the said lot in a northerly direction up to the 12th concession; thence along the eastern boundary of lot No. 23, in the said 12th concession, to the township line, including the Town of Galt.

4.—The Township of Wilmot, including the Village of New Hamburg.

5.—The Township of Wellesley.

6.—The Township of Woolwich.

7.—All that part of the Township of North Dumfries lying west of the eastern boundary of said lot No. 19, in the 7th concession; thence along the eastern limits of the said lot No. 19, the same course thereof, in a northerly direction to the 15th concession; thence along the westerly limit of lot No. 23, in the said 12th concession to the township line, including the Village of Ayr.

WELLAND.

George W. Wells, Judge, Welland.

T. D. Cowper, C.C.A., and C. P., Welland.

1.—The Township of Crowland; that part of the Township of Thorold lying south of the lines between lots 178 and 195, running through to Pelham; that part of Pelham lying south of the 4th concession, and that part of Humberstone lying north of the concession line, between the 4th and 5th concessions, being the whole of the 15th concession and the Town of Welland.

2.—The Township of Wainfleet.

3.—The Township of Bertie, and those parts of the Township of Humberstone not included in Nos. 1 and 6, and the Village of Fort Erie.

4.—The Township of Willoughby, the Village of Chippawa, and that part of the Township of Stamford south of the line between lots 136 and 137; easterly from the westerly limit of the township to the southeast angle of lot No. 133; thence north on the line between lots Nos. 132 and 133, to the northern boundary of the township, including the towns of Clifton and Navy Island.

5.—Those parts of the Township of Stamford, Thorold and Pelham not included in any other division, and the Town of Thorold.

6.—All the Township of Humberstone lying south of the 5th concession, and west of the side lines between lots Nos. 9 and 10, in the several other concessions thereof, and the Village of Port Colborne.

WELLINGTON.

A. C. Chadwick, Judge, Guelph.

Joseph Jamieson, J.J., Guelph.

H. W. Peterson, C.C.A., and C.P., Guelph.

1.—The Town and Township of Guelph.

2.—The Township of Puslinch.

3.—The Township of Eramosa.

4.—The Township of Nichol, excepting the 11th and 12th concessions; the Municipality of Fergus; the first eight concessions of the Township of Garafraxa; and lots 1 to 18, both inclusive, in concessions A and B of the Township of Peel, lots 13, 14, 15, 16, 17 and 18, in concessions 18 and 19, and lots 19, 20 and 21 in the 17th concession of the Township of Peel.

5.—The Township of Erin.

6.—The Township of Pilkington, and the 11th and 12th concessions of the Township of Nichol; the Municipality of the Village of Elora, and lots Nos. 19 and upwards belonging to the 9th, 10th, 11th, 12th, 13th, 14th, 15th and 16th concessions of Peel.

7.—Concessions 1 to 16, inclusive, of the Township of Maryboro' and concessions 1 to 16, inclusive, of the Township of Peel, except lots 19, 20, 21, 22 and 23 of those concessions in that township.

8.—That part of the Township of Arthur south and southeast of lot 15, on the west side of the Owen Sound Road, in the Township of Arthur; that part of the Township of Luther from 1 to 16, both inclusive; and lots 1 to 12, both inclusive, of the 17th and 18th concessions of the Township of Peel; lots 5 to 11, both inclusive, of the 19th concession of said Township of Peel; and lots 19 to 23, both inclusive, of concessions A and B of said Township of Peel.

9.—The territory formerly comprised in this division is now in the County of Dufferin.

10.—The Township of Minto.

11.—The Town of Mount Forest, and that part of the Township of Arthur north of lot 16, west of the Owen Sound Road; lot 17, on the Owen Sound Road, and lot 13, east of the Owen Sound Road.

WENTWORTH.

C. G. Snider, Judge, Hamilton.

J. F. Monck, J.J., Hamilton.

S. F. Washington, C.C.A., and C.P., Hamilton.

1.—All that part of the Township of Barton lying east of the lines between lots 14 and 15, and all that part of Hamilton City east of Hughson street.

2.—The whole of the Township of Flamboro' West, the Town of Dundas, and the east half of the Township of Ancaster.

3.—The whole of the Township of Flamboro' East.

4.—The whole of the Township of Beverly and the west half of the Township of Ancaster.

5.—The whole of the Township of Saltfleet.

7.—The whole of the Township of Glanford.

8.—The whole of the Township of Binbrook.

9.—All that part of the Township of Barton lying west of the lines between lots 14 and 15, and that part of Hamilton City west of Hughson street.

YORK.

John Winchester, Judge, Toronto.

Edward Morgan, J.J., Toronto.

F. M. Morson, J.J., Toronto.

J. H. Denton, J.J.

R. H. Greer, C.C.A., Toronto.

H. E. Irwin, C.P., Toronto.

Toronto City.—Crown Attorney, J. W. Seymour Corley.

1.—The City of Toronto east of Yonge street, at date 14th September, 1875 (*i.e.*, Bloor, Sherbourne and Howard streets on the north, the Don on the east, down to Queen street, and south of Queen street as far as Lee avenue).

2.—Concessions 5 to 11, inclusive, of the Township of Markham, and concessions 5 to 10, inclusive, of the Township of Whitchurch, from 1 to 10, inclusive, together with the Villages of Markham and Stouffville.

3.—Concessions 1 to 4, inclusive, of the Township of Markham, and concessions 1 to 4, inclusive, of the Township of Whitchurch, from lots 1 to 10, inclusive, and concessions 1 to 3, inclusive, of the Township of Vaughan.

4.—The Township of Whitchurch, from the line between lots 10 and 11 northward; and the Township of East Gwillimbury.

5.—The Townships of Georgina and North Gwillimbury.

6.—The Townships of King and the incorporated Village of Aurora.

7.—Concessions 4 to 11, inclusive, of the Township of Vaughan.

8.—All that portion of the Township of York lying west of Yonge street, and the Township of Etobicoke.

9.—Township of Scarboro' and all that portion of the Township of York which lies east of Yonge street and the Village of Leslieville.

10.—The City of Toronto, west of Yonge street, at date of 10th September, 1875 (*i.e.*, Bloor street on the north and Dufferin street on the west).

DIVISION COURT TARIFF.

Fees to be received by the several Clerks and Bailiffs of Division Courts from and after 1st of September, 1910.

Form I.

Clerk's Fees.

1.	Receiving claim, numbering and entering in procedure book	$0 15
	(This item to apply to entering in the procedure book a transcript of judgment from another Court, but not an entry made for the issue of a judgment summons.)	
2.	Issuing summons, with necessary notices and warnings thereon, or judgment summons (as provided in forms) in all	
	Where claim exceeds $10 and does not exceed $20.....	$0 40
	Where claim exceeds $20 and does not exceed $60.....	50
	Where claim exceeds $60 and does not exceed $100.....	60
	Where claim exceeds $100.....	1 00
	(N.B.—In replevin and interpleader suits the value of goods to regulate the fee.)	
3.	Copy of summons, including all notices and warnings thereon.....	25
4.	Copy of claim (including particulars), when not furnished by plaintiff	25
5.	Copy of set-off or counterclaim (including particulars), when not furnished by defendant	25
	(Note.—In either of the last two preceding items the fee may be taxed against the party ordered to pay costs.)	
6.	Receiving and entering bailiff's return to any summons, writ or warrant issued under the seal of the Court (except summons to witness and return to summons or paper from another division).....	15
7.	Taking confession of judgment	10
	(This does not include affidavit and oath, chargeable under item 8.)	
8.	Every necessary affidavit if actually prepared by the Clerk, and administering oath to the deponent	25
9.	Furnishing duly certified copies of the summons and notices and papers with all proceedings, for purposes of appeal (under section 127), as required by either party, per folio of 100 words.....	05
10.	Certificate therewith	25
11.	Certifying under seal of the Court and delivering to a judgment creditor a memorandum of the amount of judgment and costs against a judgment debtor, under The Creditor's Relief Act, or for any other purpose	25
12.	Copies of papers, for which no fee is otherwise provided, necessarily required for service or transmission to the Judge, each.....	10
	If exceeding two folios, per folio	05
13.	Every notice of defence or admission entered, or other notice required to be given by the Clerk to any party to a cause or proceeding, including mailing, but not postages	15
14.	Entering final judgment by Clerk, on special summons, where claim not disputed	50

15. Entering every judgment rendered at the hearing, or final order made by the Judge 50
(Note.—This fee does not apply to any proceeding on judgment summons.)
(This one fee of 50 cents will include the service of recording at the trial and afterwards entering in the procedure book the judgment, decree and order in its entirety, rendered or made at the trial. If a garnishee proceeding before a judgment, the fee of 50 cents will be allowed for the judgment in respect to the primary debtor, and a like fee of 50 cents for the adjudication, whenever made, in respect to the garnishee.)
16. Subpœna to witness 25
(The subpœna may include any number of names therein, and only one original subpœna shall be taxed, unless the Judge otherwise orders.)
17. For every copy of subpœna required for service..... 05
18. Summons for jury (including copy for each juryman), when required by parties 1 25
19. Calling and returning jury ordered by the Judge 25
20. Every order of reference, or order for adjournment, made at hearing, and every order requiring the signature of the Judge, and entering the same, including final order of judgment debtor's examination.. 25
(Any warning necessary with order, *e.g.*, the warning in Form 73, forms part of the order.)
21. Transcript of judgment to another Division Court 25
23. Every writ of execution, warrant of attachment or warrant of commitment and delivering same to bailiff 50
24. Renewal of every writ of execution, when ordered by the judgment creditor, or of warrant of commitment, when ordered by the Judge.. 15
25. Every bond, when necessary, and prepared by the clerk (including affidavits of justification and of execution) 1 00
26. For necessary entries in the debt attachment book, in each case (in all) 20
27. Transmitting transcript of judgment; or transmitting papers for service to another division; or to the Judge, on application to him, including necessary entries and mailing, but not including postage.... 25
28. Receiving papers from another division for service, entering the same, handing to the bailiff, receiving and entering his return and transmitting the same (if return made promptly, not otherwise)..... 30
29. Search by person not party to the suit or proceeding, to be paid by the applicant 10
Search by party to the suit or proceeding, where the suit or proceeding is over one year old 10
(No fee is chargeable for search to a party to the suit or proceeding, if the same is not over one year old.)
30. Taxing costs, in defended suits, after judgment pronounced..... 25
31. Making out statement of costs in detail (including bailiff's fees) at the request of any party, or for the purpose of settlement, or upon entering judgment by default 10
(Neither item 30 nor 31 applies to statement of costs endorsed on summons or copy to be served.)

32. Taxing bailiff's costs, under section 188 of the Division Courts Act (R.S.O.), 1897 25
33. Copying and transmitting to municipal clerk, Judge's decision to appeal 50

2.—BAILIFF'S FEES.

1. Service of summons issued under the seal of the Court, or Judge's summons or order on each person, except summons to witness and summons to juryman:—
   Where claim exceeds $10 and does not exceed $20 ..... $0 30
   Where claim exceeds $20 and does not exceed $60 40
   Where claim exceeds $60 and does not exceed $100 50
   Where claim exceeds $100 75
   (In interpleader suits the value of the goods to regulate the fee.)
2. For every return as to service under item 1; attending at the clerk's office and making the necessary affidavit (as provided by Rule 183) 15
3. Service of summons on witness or juryman, or service of notice 15
4. Taking confession of judgment and attending to prove 10
5. For calling parties and their witnesses at the sitting of the court, in every defended case, and at the hearing of every judgment summons 15
6. Enforcing every writ of execution or summons of replevin, or warrant of attachment or warrant against the body, each:
   Where claim does not exceed $20 50
   Where claim exceeds $20 and does not exceed $60 75
   Where claim exceeds $60 ..... 1 00
   (Where goods replevied, the value of the goods to regulate the amount of the fee. This fee does not include service of summons in replevin on defendant.)
   Fees under Creditor's Relief Act (see section 188 of 10 Edw., cap. 32; and section 26 of R.S.O., cap. 48, 9 Edward VII.) shall be taxed according to the tariff.
7. Every mile necessarily travelled to serve summons, or process, or other necessary papers, or in going to replevy goods, or to seize on attachment, or in going to seize on a writ of execution, where money, paid on demand, or made on execution, or case settled after seizure 12
8. Mileage going to arrest under warrant, when arrest made, per mile 12
9. Mileage carrying delinquent to prison, including all expenses and assistance, per mile 20
10. Every schedule of property seized, attached, or replevied, including affidavit of appraisal, when necessary:
    Exceeding $10 and not exceeding $20 30
    Exceeding $20 and not exceeding $60 50
    Exceeding $60 75
11. Every bond, when necessary, when prepared by the bailiff, including affidavit of justification and execution 50
12. Every notice of sale, not exceeding three, under execution, or under attachment, each 15
13. Reasonable allowances and disbursements, necessarily incurred in the care and removal of property:
    (*a*) If a bailiff removes property seized, he is entitled to the necessary disbursements, in addition to the fees for seizure and mileage.

(*b*) If he takes a bond, then to 50 cents, instead of disbursements for removal of property.

(*c*) If assistance is necessary in the seizure, or securing, or retaining of property, the bailiff is entitled to the disbursements for such assistance.

(*d*) All charges for disbursements are to be submitted to the clerk for taxation, subject to appeal to the Judge.

(*e*) The bailiff must in all cases endorse a memorandum of all his charges on the back of the execution, or state them on a separate slip of paper, so that the clerk may conveniently tax the bailiff's charges for fees and disbursements.

(*f*) The Clerk is in all cases to sign the memorandum of his taxation and preserve it among the papers in the cause, together with the execution, for future reference, and thereby enable the clerk to certify the bailiff's returns properly.

14. If execution or process in attachment in the nature of execution be satisfied in whole or in part, after seizure and before sale, whether by action of the parties or otherwise, the bailiff shall be entitled to charge and receive 3 per cent. on the amount directed to be levied; or on the amount of the value of the property seized, whichever shall be the lesser amount.

15. Poundage on executions, and on attachments in the nature of executions, 5 per cent., exclusive of mileage for going to seize and sell, upon the amount realized from property necessarily sold.

3.—FEES TO WITNESSES AND APPRAISERS.

Allowances to Witnesses.

Attendance, per diem, to witnesses within three miles of the place where the Court is held, if within the county	$0 75
And if without the county	1 00
Attendance, if witness resides over three miles from the place of sittings and within the county, per diem	1 00
Attendance, if witness resides without the county and more than three miles from the place of sittings, per diem	1 25
Barristers and solicitors, physicians and surgeons, engineers and veterinary surgeons, other than parties to the cause, when called upon to give evidence of any professional service rendered by them, or to give professional opinions, per diem	4 00

(Note.—Disbursements to surveyors, architects and professional witnesses, such as are entitled to specific fees, by statute, are to be taxed, as authorized by such statute.

If witnesses attend in one case only, they will be entitled to the full allowance.

If they attend in more than one case, they will be entitled to a proportional part in each cause only.)

The travelling expenses of witnesses, over three miles, shall be allowed according to the sums reasonably and actually paid, but in no case shall exceed 20 cents per mile, one way.

FEES OF APPRAISERS.

Fees to Appraisers of Goods, etc., Seized under Warrant of Attachment.

To each appraiser, $1.00 per day, during the time actually employed in appraising goods—to be paid in the first instance by plaintiff and allowed as costs in the cause.

FEES IN SUITS NOT EXCEEDING $10.

(Section 48 D.C. Act.)

Clerk.

For all services, from entering action, or suing out a judgment or interpleader summons, up to and including the entering of final judgment, or final order on any such judgment or interpleader summons, in case the action proceeds to judgment or final order	$1 25
In case the action does not proceed to judgment or final order, the fees heretofore, or that may hereafter be payable, but not exceeding in the whole the sum.	
For issuing writ of execution, warrant of attachment, or warrant for arrest of delinquent and entering the return thereto	50

Bailiff.

For all services rendered in serving summons and making return, and any other service that may be necessary before the judgment is entered by the clerk or pronounced by the Judge, mileage excepted	50
For enforcing execution, schedule of property seized, or attached bond, where necessary, and all other necessary acts done by him, after seizure, mileage excepted, if money made or case settled, after levy...	1 00
(Necessary disbursements incurred in the care and removal of property shall be allowed to be first taxed by the clerk, subject to the approval of the Judge.)	

REPORT

OF THE

Inspector of Legal Offices

ONTARIO

1912

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty

1913

Printed by
WILLIAM BRIGGS
29-37 Richmond Street West
TORONTO

To His Honour Sir John Morison Gibson, K.C.M.G., etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

The undersigned begs repectfully to present to Your Honour the thirtieth annual report of the Inspector of Legal Offices for the year ending 31st day of December, 1912.

J. J. FOY,

Attorney-General.

Toronto, March 25th, 1913.

REPORT

OF THE

Inspector of Legal Offices, 1912

To His Honour Sir John Morison Gibson, K.C.M.G., etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

Sir,—I have the honour of presenting the thirtieth annual Report of the Inspector of Legal Offices upon the affairs of the Judicial Offices of the Province for the year ending December 31st, 1912.

A list of the officers appointed during the year, with a reference to the issue of the Ontario Gazette in which each appointment was published, will be found in Appendix "I" to this Report.

Sheriffs.

The annual sworn returns sent to this office by twenty-one of the Sheriffs showed incomes for the year 1912 less than $1,500. Examination of their books, however, revealed that of these only nineteen were entitled to payments from the Province, under sec. 39 of The Sheriff's Act, to bring their incomes up to $1,500. (9 Ed. VII, chap. 6, as amended by 2 Geo. V, chap. 17, sec. 3.)

Their duties were generally well performed and their books accurately kept. In some instances, however, I found fees omitted, items of disbursements entered twice, and stationery and other items which the Counties are obliged to furnish, erroneously entered.

The Statute 2 Geo. V. chap. 17, sec. 2, provides that every Sheriff shall be entitled to retain to his own use in each year his net income up to $6,500, but shall pay to the Provincial Treasurer 90 per cent. of the excess over that sum. During 1912, one Sheriff only came within the provisions of this Statute.

In view of the above mentioned Statutes it is all the more important that Sheriffs be accurate, especially in the preparation of their sworn returns, and also that they use every effort to collect within the year as much as possible of the fees earned by them during the year.

Appendix "A" sets out in tabulated form the Statistical returns of the Sheriffs for the year 1912.

Local Masters.

The volume of business in the Masters' offices during the year was not large. The gradual reduction of business, due chiefly to legislation and to a tendency to avoid references, has greatly reduced the incomes of those Masters whose fees have not been commuted. In the offices of those whose fees have been commuted for a fixed sum law stamps should be collected as the fees are earned, at the close of each days sittings, and affixed to stamp vouchers.

During the year law stamps amounting to $131.60 were missing; these I caused to be affixed to the papers and cancelled.

In Appendix "B" is set out in tabulated form the Statistical returns of the Local Masters for the year 1912.

Local Registrars, Deputy Registrars, Deputy Clerks of the Crown, County and District Court Clerks.

A want of care is still noticeable on the part of some of these officers.

Jury fees amounting to $67.50 had not been paid over to the County Treasurer.

$68.00 in law stamps, representing fees for the Shorthand Reporters' Fund, were missing from the "praecipe" for entry of High Court Actions; and law stamps aggregating $17.00 from Records. There were also stamps amounting to $18.00 missing from various High Court papers.

In four offices moneys paid into Court under Rules 1,221 to 1,223 had not been entered until my visits of inspection.

The copying of Orders and Judgments in the High and County Courts, were in several cases in arrears.

I found 37 chattel Mortgages and lien notes not entered, and some failed to note in their chattel Mortgage books, or to properly endorse upon the instrument discharged, the certificate required by the Bills of Sale and chattel Mortgage Act. The requirement of such certificate renders it imperative upon the officer to whom a discharge is presented, to first satisfy himself that the document tendered for registration, is in fact a discharge of the mortgage; for the public usually rely upon the correctness of the officer's certificate in such matters.

Complaints have been frequent during the year that Local Registrars, when forwarding papers to the Central Office, neglect to enclose a list of exhibits. This list should set out the exhibits in the order of the numbers that were endorsed on each at the time of the trial.

Appendix "C" is a return of the business of the High Court of Justice in the offices of the Local Registrars, Deputy Registrars, and Deputy Clerks of the Crown, while Appendix "D" is a return of the business in the offices of the Clerks of the County and District Courts for the year 1912.

Surrogate Registrars.

In ten offices the papers were not sufficiently stamped; the amount due the Crown as represented by such law stamps was $189.35. These I caused to be affixed and cancelled.

Some failed to insert in the proper column of the Non-Contentious Business Book a minute of the passing of Accounts.

In four offices the copying of the letters, wills, and bonds were considerably in arrears.

During my inspections I found instances where fees had been computed on the value of the realty as well as of the personal property; such fees I caused to be refunded, and had new law stamps aggregating $840.00, issued in lieu of those erroneously cancelled. In this connection the following extract from my report for the year 1903 may be of interest:—

"When inspecting I found that in one office fees were charged for the Registrar and the Crown, and in another for the Registrar only, upon the value of the real as well as the personal property: and complaints having been made to me that in one county fees were being charged upon the value of property

situate outside Ontario, and that in another the Judge treated as personality, for the purpose of computing fees, lands which by the terms of the will the executors were directed to sell, or given a discretionary power to sell; and my ruling being requested, I addressed the following circular letter to all of the Surrogate Registrars of the Province:

"Osgoode Hall, Toronto, 6th October, 1903.

"Dear Sir,—The Surrogate Courts Act, R.S.O. 1897, Chap. 59, purports to deal only with property within Ontario: and the words of Section 74, 'whole estate and effects,' and of Section 77, 'whole estate,' refer to the whole of the deceased's property in this Province, and over which Probate or Letters of Administration have effect. The fees upon grants must therefore be computed on the value of the property within Ontario solely; so that, in cases where the value of the property within Ontario is under $400, or being over $400 is under $1,000, Sections 74 and 77 respectively apply; and this though the deceased died possessed of valuable property situate outside the Province.

"Another question has arisen, namely, whether or not probate fees may properly be charged upon the value of the land directed to be sold by the testator in his Will. Prior to the passing of The Devolution of Estates Act in 1886, the jurisdiction of the Surrogate Courts was, as that of the Probate Division of the High Court of Justice in England now is, confined to the Probate of Wills relating to personal property solely; and the equitable doctrine of conversion could not confer upon these Courts jurisdiction over a Will limited to Realty and directing its conversion into Personalty (Re Jane Barden, 1 P. & D. 325), and thus the fees payable on the Letters were limited to the value of the Personal estate alone. The passing of the Devolution of Estates Act did not, however, effect a change in the matter of the fees: for, while it abolished the distinction between real and personal property for the purposes of Administration and to devolve the realty as well as the personalty upon the legal personal representatives, it expressly enacted by sub-section 6, of Section 4 of the Act of 1886 that the fees were to be based 'as hitherto' on what before that Act was *personal property*. Hence the value of the land must not be considered in the computation of fees whether directed to be sold or not.

I beg to remain, dear Sir,

Yours very truly,

Jas. W. Mallon,

Inspector.

"Upon the receipt of this letter a few of the Registrars wrote to me asking what fees they should charge where the estate within Ontario consists of valuable realty, and of personalty of the value of $400 or under. I replied that they should charge fees for the Judge on an estate under $1,200, and for the Crown and Registrar on an estate under $1,000; that such cases do not come within secs., 74 or 77 of the Surrogate Courts Act (the whole estate exceeding in value $1,000): but that they are estates the personal property of which is valued at a sum less than the lowest sums mentioned in Schedules 'A' and 'B' and Tariff 'I' of the Surrogate Court Act and Rules; that in so doing they were not computing fees on the real, but on the personal property only."

Appendix "E" gives in tabulated form the business of the Surrogate Registrars for the year 1912.

County and District Crown Attorneys and Clerks of the Peace.

The Sessions Books, and the District or County Court Judge's Criminal Court Dockets, in some instances did not contain complete minutes of the business of these Courts.

The returns of convictions made quarterly to these officers should be entered in their Sessions books, or in a book kept specially for that purpose. Since the Statute 4 Ed. VII, ch. 10, sec. 24, there are no means of checking the fines imposed by Police Magistrates and Justices of the Peace except by a perusal of the entries in these books, or the copies that are required to be posted up.

The Order-in-Council of October 9th, 1885, having been Amended by Order-in-Council dated Nov. 12, 1912, I sent to the County Attorney of each county a copy of the following extract therefrom.

"Re Fines, etc."

"Extract from Order-in-Council of October 9th, A.D. 1885, as amended by Order-in-Council dated November 12th, 1912.

"The undersigned, therefore, respectfully recommends that it be the *duty* of the County Attorney of each County *to supervise the collection of* fines, penalties, and forfeited recognizances to which the Province is entitled, and that he be authorized to receive on behalf of the Treasurer of Ontario from Sheriffs, Justices of the Peace, and others, all moneys to which the Province is entitled for fines, penalties and forfeited recognizances, and in case the sum received amounts to fifty dollars, that he be required to pay over to the Treasurer of Ontario, every such sum forthwith on the receipt thereof, whether or not any additional sum is to be received in the same matter; and in case the sum received is under fifty dollars, then that he be required to pay the same over, as aforesaid, as soon as he has received sums amounting to fifty dollars, and at any rate on the *last* day of January, April, July, or October next succeeding the receipt of any sum. Proper particulars to be given with each sum paid or remitted.

"That each County Attorney be further required to report annually, on or before the 15th day of January, particulars of all moneys received by him during the year ending on the preceding *31st day of October,* or in case no such money has been received during such year, then to report such fact to the Provincial Treasurer, a duplicate report to be sent in each case to the Inspector of Legal Offices.

"When under this Order a County Attorney receives money *from a Sheriff,* he shall be entitled to an allowance of *two per cent.* thereon, but in other cases he shall be entitled to four per cent., such percentage to be deducted by the County Attorney on the transmission of the moneys to the Provincial Treasurer. Unless where legal proceedings are instituted under the direction of the Attorney-General, the said allowances are to cover all charges by the County Attorney against the Province for services under this Order.

"The undersigned further recommends that on the receipt from any Coroner, Sheriff, or other Officer or party, by the Treasurer of Ontario of any moneys,

proceeds of fines, penalties, or of forfeited recognizances, that the Inspector of Legal Offices be notified of the particulars thereof.

"The undersigned further recommends that each Sheriff be required to give to the County Attorney of his County, from time to time, without charge, full information of all process in his hands in respect to any fine, penalty, or estreated recognizance, to which the Province is entitled."

General Remarks.

Sec. 17 of the Statute Law Amendment Act, 1912, provides the form in which Magistrates shall make quarterly returns of their Convictions. In the form are separate columns for (*a*) Magistrate's fees, (*b*) Constable's fees and (*c*) Witness' fees. Their neglect to comply with the provisions of this Section necessitated considerable unnecessary correspondence.

Little, if any, improvement has taken place during the year in the matter of furnishing adequate vault accommodation for the offices.

The correspondence of this office continues to increase. While always willing to help when difficulties present themselves, still much unnecessary letter writing would be avoided if officers would make returns promptly and in proper form.

The sums payable to the Province under the Statute 10 Edward VII, chapter 5, amounted to $11,259.32, as follows:

Local Registrars and Deputy Clerks of the Crown	$9,038.32
Crown Attorneys and Clerks of the Peace	2,221.00

The sum payable under Section (4 a) of the Public Officers Fees Act (2 Geo. V, chapter 17, sec. 2) was $6,234.04.

Appendix "F" is a statement of the fees and emoluments of the officers for the year 1912 and of the sources from which they derive their incomes.

In Appendix "G" is set out the more important business of the High Court of Justice at Toronto, during 1912, compiled from statements received from the officers in Osgoode Hall.

Appendix "H" shows the number of actions tried, or otherwise disposed of by the Justices of the High Court, and of the Court of Appeal, and the disposition thereof, during the year 1912.

Appendix "I" is a statement of the business transacted in the Office of the Surrogate Clerk at Osgoode Hall, for the year 1912.

Appendix "J" shows the Criminal business of the High Court of Justice at its Sitting throughout the Province during the year, while Appendix "K" gives in tabulated form the business of the Courts of General Sessions of the Peace, and of the County and District Court Judge's Criminal Courts of the Province for the same period.

I have the honour to be,

Sir,

Your obedient Servant,

J. W. Mallon,
Inspector.

Osgoode Hall, March 25th, 1913.

APPENDIX A.—Containing in tabulated form Statistics as returned

Counties or Districts.	Number of writs of summons received for service		Number of subpœnas received for service in—				Number of orders for arrest.		Number of other process.		Total process received.	
			Criminal Cases.		Civil Cases.							
	H.C.	C.C.	H.C.	C.C.	H C.	C.C.	H.C.	C.C.	H C.	C.C.	H.C.	C.C
Algoma	24	64	6	34	5	5	.....	1	24	55	59	159
Brant	20	24	2	.....	.....	.....	1	.....	.....	2	22	26
Bruce	9	15	1	17	1	2	.....	.....	.....	4	11	38
Carleton	137	234	11	9	25	12	1	.....	42	21	216	276
Dufferin	7	8	.....	15	.....	.....	.....	.....	.....	.....	7	23
Elgin	17	12	.....	11	1	2	.....	.....	6	2	24	27
Essex	22	31	6	30	6	.....	.....	.....	5	10	39	71
Frontenac	17	37	.....	2	2	.....	.....	.....	6	2	25	41
Grey	7	20	1	21	3	1	.....	.....	3	.....	14	42
Haldimand	6	12	14	38	7	1	.....	2	11	5	38	56
Halton	8	15	.....	61	.....	7	.....	.....	4	1	12	84
Hastings	31	50	2	25	5	2	.....	1	2	6	40	84
Huron	14	24	2	21	.....	.....	.....	1	5	1	21	47
Kenora	5	16	1	10	1	1	.....	.....	2	19	9	36
Kent	30	39	1	26	2	3	.....	.....	24	3	57	71
Lambton	3	11	4	12	1	3	1	1	4	5	13	32
Lanark	11	19	1	4	.....	2	.....	.....	4	5	16	30
Leeds and Grenville	12	30	2	20	1	4	.....	1	14	6	29	61
Lennox and Addington	2	6	1	4	.....	.....	.....	.....	3	3	6	13
Lincoln	14	30	1	23	2	1	.....	1	6	2	23	57
Manitoulin	1	3	.....	1	.....	.....	.....	.....	.....	.....	1	4
Middlesex	26	48	6	36	10	4	.....	.....	9	4	51	92
Muskoka	.....	8	7	20	.....	.....	.....	.....	.....	.....	7	28
Nipissing	13	26	11	14	1	1	.....	.....	2	3	27	44
Norfolk	7	12	.....	14	.....	1	.....	.....	.....	1	7	28
Northumberland and Durham	13	18	2	17	.....	.....	.....	.....	4	2	19	37
Ontario	11	26	5	20	1	1	.....	.....	5	1	22	48
Oxford	16	22	74	52	5	7	1	.....	22	7	119	88
Parry Sound	4	12	6	6	3	.....	.....	.....	4	.....	17	18
Peel	6	8	.....	5	3	1	.....	1	3	3	12	18
Perth	12	43	.....	9	1	5	.....	.....	4	9	17	62
Peterborough	32	38	.....	18	7	4	.....	.....	9	8	48	68
Prescott and Russell	3	16	.....	3	.....	.....	.....	.....	1	1	4	20
Prince Edward	.....	.....	1	.....	.....	7	.....	.....	6	.....	7	7
Rainy River	13	22	4	8	4	7	.....	.....	4	7	25	49
Renfrew	11	21	14	6	3	2	.....	.....	.....	7	28	36
Simcoe	13	27	4	18	.....	1	.....	.....	3	8	20	54
Stormont, Dundas and Glengarry	19	43	1	3	2	3	.....	1	11	1	33	51
Sudbury	32	100	55	78	9	2	.....	.....	8	1	104	181
Thunder Bay	32	73	15	31	5	.....	1	.....	24	40	77	144
Victoria	5	11	2	2	.....	.....	.....	.....	2	7	9	20
Waterloo	18	45	.....	4	.....	.....	.....	1	5	6	23	58
Welland	12	25	2	19	7	2	.....	.....	6	4	27	50
Wellington	12	23	.....	7	.....	2	.....	.....	.....	5	13	37
Wentworth	61	124	5	99	19	2	.....	.....	21	15	106	240
York	18	52	.....	359	5	4	.....	13	11	16	34	444
Toronto	387	736	67	.....	54	35	.....	2	107	63	615	836
Totals	1,173	2,279	337	1,232	201	137	5	26	436	371	2,153	4,036

by the different Sheriffs for the year ending 31st December, 1912.

Number of persons served.		Estreats received.		Number of jurors summoned.		Number of writs of execution received.			Number of renewals of writs of execution issued against— Goods and Lands.		
H.C.	C.C.	H.C.	C.C.	H.C.	C.C.	H.C.	C.C.	D.C.	H.C.	C.C.	D.C.
72	200	.....	.....	114	80	8	45	19	6	18	.....
36	126	.....	.....	122	122	7	17	25	1	3	2
12	45	.....	.....	122	122	4	18	5	8	3	.....
323	322	.....	1	219	122	29	124	36	13	8	.....
7	21	.....	.....	122	122	10	4	4	.....	1	.....
24	69	.....	.....	122	122	7	14	6	1	1	.....
99	152	.....	.....	122	122	9	26	16	1	2	.....
29	53	.....	.....	122	98	8	28	7	5	.....	.....
27	90	.....	1	122	127	11	26	15	3	.....	.....
44	63	.....	.....	122	218	1	10	.....	.....	.....	.....
14	89	.....	.....	61	49	13	6	3	.....	4	1
47	175	.....	.....	122	122	6	29	9	5	10	.....
59	94	.....	.....	122	122	32	22	12	2	.....	.....
19	75	.....	.....	113	113	6	12	5	3	2	.....
110	172	.....	.....	122	122	9	19	16	3	1	.....
71	48	.....	.....	122	122	5	11	11	6	6	.....
42	55	.....	.....	120	120	3	26	6	.....	.....	.....
43	120	.....	.....	122	218	5	15	7	1	.....	.....
4	21	.....	.....	122	98	2	3	1	.....	1	.....
14	79	.....	.....	122	98	13	22	13	.....	1	.....
2	8	.....	.....	62	98	.....	1	.....	.....	2	.....
124	205	.....	.....	183	122	27	29	21	2	1	.....
7	28	.....	.....	122	122	4	7	8	1	2	.....
139	89	.....	.....	127	117	45	112	27	1	1	.....
9	134	.....	.....	122	122	1	8	24	.....	.....	.....
47	98	.....	.....	122	122	9	13	9	2	4	.....
59	117	.....	.....	122	122	5	17	3	4	5	.....
111	89	.....	.....	122	122	10	14	5	.....	.....	.....
33	42	.....	.....	128	228	6	13	6	6	2	.....
10	37	.....	.....	122	122	9	2	4	1	1	.....
26	83	.....	.....	122	122	28	29	10	1	.....	.....
68	197	.....	.....	122	122	11	17	12	.....	1	.....
7	39	.....	.....	122	122	3	11	6	.....	.....	.....
23	7	.....	.....	118	121	.....	8	6	.....	1	.....
50	90	.....	.....	122	137	1	10	.....	.....	.....	.....
29	44	.....	.....	122	122	12	20	6	1	.....	.....
74	92	.....	.....	106	106	.....	.....	.....	8	4	1
63	95	.....	.....	183	98	8	26	17	.....	.....	.....
90	166	.....	.....	120	95	18	60	5	.....	.....	.....
175	352	.....	.....	129	128	35	103	35	9	19	.....
35	28	.....	.....	100	88	5	10	9	1	2	.....
30	66	.....	.....	118	116	8	26	10	1	7	.....
55	90	.....	.....	122	122	21	25	34	1	.....	.....
13	69	.....	.....	122	122	7	26	8	.....	1	.....
207	526	.....	.....	183	242	16	53	23	10	15	.....
54	1,733	.....	6	.....	292	30	47	18	9	13	.....
1,285	855	.....	.....	339	.....	153	420	95	108	80	.....
3,921	7,448	.....	8	5,939	5,891	660	1,584	617	224	222	4

APPENDIX A.—Containing in tabulated form Statistics as returned by the

Counties or Districts.	Number of renewals of writs of execution against—					Number of writs of possession received		Number of writs Ca. Sa.	
	Lands only.			Goods only.					
	H.C.	C.C.	D.C.	H.C.	C.C.	H.C.	C.C.	H.C.	C.C.
Algoma		1	13						
Brant									
Bruce			10			1	1		
Carleton			4			1	1		
Dufferin		2							
Elgin	1				1		1		
Essex			5				2		
Frontenac			1			1			
Grey			2			2			
Haldimand					1		2		
Halton			1			1			
Hastings	1						1		
Huron			1			1			
Kenora									
Kent	1		2				2		
Lambton			7			3			
Lanark			1						
Leeds			1			1	2		
Lennox and Addington							1		
Lincoln			1				1		
Manitoulin									
Middlesex			3						
Muskoka	1				1				
Nipissing						1	1		
Norfolk			1				1		
Northumberland and Durham			6						
Ontario			6					1	
Oxford			1			3			
Parry Sound			3						
Peel									
Perth						1	1		
Peterborough			1						
Prescott and Russell									
Prince Edward			6						
Rainy River									
Renfrew									
Simcoe						1			
Stormont, Dundas and Glengarry			2			2			
Sudbury						2			
Thunder Bay			5						
Victoria			2						
Waterloo			3			1	2		
Welland						1			
Wellington			7				1		
Wentworth			9				2		
York			8		1	1			1
Toronto	12	15	10			6	8	1	
Totals	16	18	122		4	30	30	2	1

different Sheriffs for the year ending 31st December, 1912.—*Continued.*

Number of sales under writs of execution of					Seizures under writs of execution where no subsequent sale.			Number of Attendances to seize where no goods found.		Writs of execution on which money realized.		
Goods.		Lands.										
H.C	C.C.	H.C.	C.C.	D.C	H.C.	C.C.	D.C.	H.C.	C.C.	H.C.	C C.	D.C.
1	1	.....	1	.....	1	1	.....	.....	6	3	9	.....
2	.....	.....	.....	.....	.....	2	.....	1	1	6	4	1
1	1	.....	.....	.....	.....	8	.....	2	.....	.....	5	2
2	2	.....	.....	.....	4	45	.....	2	5	1	49	3
.....	.....	.....	.....	.....	.....	.....	.....	7	.....	1	.....	.....
.....	2	.....	.....	.....	3	2	.....	.....	2	2	3	.....
.....	.....	.....	.....	.....	1	16	.....	.....	4	1	12	.....
2	3	.....	.....	.....	1	12	.....	1	.....	1	10	.....
.....	.....	.....	.....	.....	4	9	.....	9	9	3	11	3
.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	3	.....
.....	3	1	1	.....	1	7	3	.....	3	2	19	2
.....	.....	.....	.....	.....	15	1	.....	6	.....	15	1	.....
1	.....	.....	1	.....	.....	1	.....	1	1	.....	4	.....
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	3	.....	.....	1	.....	1	.....	.....	.....	1	5	5
.....	1	.....	.....	1	.....	8	.....	2	.....	.....	8	.....
2	1	2	.....	.....	.....	12	1	.....	1	4	13	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
1	1	.....	.....	.....	.....	.....	.....	1	.....	10	6	1
.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	2	.....
2	1	.....	.....	1	5	9	.....	2	4	4	8	4
.....	.....	.....	.....	.....	2	1	.....	.....	1	1	.....	.....
2	6	2	.....	1	9	6	.....	2	9	10	26	3
.....	1	.....	.....	.....	1	1	.....	.....	.....	1	5	4
2	.....	.....	.....	1	.....	1	.....	.....	1	2	4	.....
.....	1	.....	.....	.....	2	9	.....	1	5	.....	6	.....
.....	1	.....	.....	.....	2	8	.....	.....	.....	3	8	.....
.....	1	.....	.....	.....	.....	1	.....	1	2	6	5	3
.....	.....	.....	.....	.....	2	1	.....	6	.....	1	.....	.....
.....	1	.....	.....	.....	7	9	.....	6	1	12	7	.....
.....	1	.....	.....	.....	3	3	.....	.....	.....	3	4	2
.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	8	.....
.....	.....	.....	1	.....	.....	1	.....	.....	1	.....	1	.....
.....	.....	.....	.....	.....	1	15	.....	.....	2	1	15	.....
.....	.....	.....	.....	.....	2	6	.....	.....	.....	.....	7	2
.....	.....	.....	.....	.....	5	14	.....	7	8	2	10	.....
1	1	1	.....	1	1	5	.....	.....	.....	3	7	4
1	1	.....	.....	.....	2	6	.....	1	1	2	8	.....
.....	2	.....	.....	1	7	38	.....	5	9	7	40	4
1	2	.....	1	1	.....	.....	.....	.....	.....	1	7	2
.....	3	.....	.....	.....	2	5	.....	2	8	3	5	.....
1	1	.....	.....	1	2	1	.....	1	2	6	9	3
.....	.....	.....	.....	.....	2	11	.....	1	.....	2	8	.....
.....	3	.....	.....	.....	5	11	.....	2	5	3	9	7
.....	.....	.....	.....	.....	3	5	.....	18	15	7	10	.....
5	5	.....	.....	.....	.....	.....	.....	.....	.....	27	47	10
27	53	6	5	9	95	299	4	87	106	162	430	66

APPENDIX A.—Containing in tabulated form Statistics as returned by the

Counties or Districts.	Cases under Creditors' Relief Act.	Certificates received under Creditors' Relief Act.	Assignments made to Sheriff under 10 Edw. VII., cap. 64.	Returns received under 9 Edw. VII., cap 89, sec. 37.	Sales of Lands under 9 Edw. VII., cap. 89, sec. 37.	Amount endorsed on Writs of Execution (not renewals). For debt or damages H C.	C.C.	Div. Co.	For costs taxed. H.C.	C.C.
						$ c.	$ c	$ c.	$ c.	$ c.
Algoma	....	....	....	3	....	7,685 35	13,999 35	1,450 37	760 10	1,242 43
Brant	1	16	....	....	....	4,908 37	5,227 91	1,600 77	202 09	440 33
Bruce	2	....	....	....	....	6,456 91	5,242 02	404 95	87 61	688 54
Carleton	5	9	....	....	....	43,801 83	38,724 68	3,094 59	1,570 57	2,990 93
Dufferin	....	....	....	....	....	2,345 80	1,314 37	398 38	64 27	48 81
Elgin	....	....	....	....	....	4,692 46	4,732 35	624 45	558 84	392 07
Essex	....	....	....	....	....	2,494 61	7,470 18	1,477 88	1,330 79	676 74
Frontenac	3	2	....	....	....	18,357 04	7,800 20	402 32	333 18	751 85
Grey	8	....	....	....	....	11,318 17	7,960 37	1,890 49	1,085 29	850 58
Haldimand	....	....	....	....	....	20 00	1,814 09	.....	9 00	115 99
Halton	....	....	....	....	....	156 00	1,606 84	376 90	39 00	299 88
Hastings	2	....	3	....	....	8,713 50	9,633 68	1,104 72	172 42	920 67
Huron	....	....	1	....	....	22,621 65	7,110 17	1,206 20	1,413 48	856 88
Kenora	2	9	....	1	1	25,522 11	4,143 08	514 79	305 18	307 86
Kent	....	....	....	....	....	16,178 26	4,892 05	1,712 44	2,398 82	386 20
Lambton	2	....	....	....	....	11,163 60	3,267 62	1,250 55	594 85	512 09
Lanark	....	15	....	....	....	3,763 71	3,321 53	633 61	74 81	432 03
Leeds	5	9	1	....	....	12,794 67	4,658 11	774 43	168 12	429 84
Lennox & Addington	1	....	....	....	....	2,382 70	850 49	106 95	105 47	67 72
Lincoln	2	....	....	....	....	8,269 29	6,861 70	1,414 63	248 24	750 80
Manitoulin	....	....	....	....	....	.....	169 70	.....	.....	30 24
Middlesex	4	....	....	....	....	39,375 57	11,481 49	1,818 01	2,136 99	585 05
Muskoka	....	....	....	....	....	1,148 51	1,708 96	1,056 86	55 78	127 10
Nipissing	....	....	....	....	....	213,519 81	35,871 18	2,526 10	12,149 35	2,194 67
Norfolk	....	....	....	....	....	5,242 28	2,026 28	2,719 28	25 34	120 89
Northumberland and Durham	....	....	....	....	....	8,351 84	4,765 56	894 56	160 92	211 59
Ontario	1	7	3	....	....	16,559 61	5,417 43	360 61	145 48	448 66
Oxford	....	1	....	....	....	8,723 47	3,938 86	413 17	152 18	361 99
Parry Sound	1	....	....	15	....	1,920 59	2,658 95	486 64	85 88	256 82
Peel	....	....	....	....	....	8,706 74	370 25	403 34	72 05	24 86
Perth	1	....	2	....	....	8,444 68	9,179 95	1,395 22	541 63	572 77
Peterborough	....	....	....	....	....	4,162 08	5,125 17	1,093 15	95 35	401 37
Prescott & Russell	....	....	....	....	....	4,340 71	2,443 08	757 52	282 50	141 89
Prince Edward	....	....	....	....	....	.....	1,356 49	117 47	.....	.....
Rainy River	....	....	....	....	1	958 80	2,579 58	.....	30 94	310 08
Renfrew	1	....	....	....	....	14,748 81	5,795 06	620 58	1,146 84	697 51
Simcoe	....	....	....	....	....	16,112 46	10,114 10	1,260 72	1,065 07	1,622 41
Stormont, Dundas and Glengarry	2	2	....	....	....	8,257 51	7,143 89	1,667 01	1,137 11	488 57
Sudbury	....	....	3	....	....	57,598 04	17,597 64	347 98	641 58	1,483 04
Thunder Bay	4	4	4	....	....	41,877 06	28,407 39	3,231 77	1,258 98	3,385 34
Victoria	1	2	....	....	....	1,579 84	2,657 40	760 51	526 23	242 57
Waterloo	....	....	....	....	....	37,973 61	8,821 29	1,408 60	221 41	595 80
Welland	3	1	....	....	....	20,003 72	8,882 85	3,385 46	571 04	462 06
Wellington	....	....	1	....	....	7,569 69	7,932 66	840 82	274 38	580 17
Wentworth	1	....	1	....	....	29,316 57	15,029 01	2,217 84	1,088 04	1,571 38
York	....	....	....	....	....	26,056 64	14,749 95	1,523 02	424 93	1,342 86
Toronto	12	....	....	....	....	465,085 80	119,706 76	9,481 06	14,908 43	11,729 85
Totals	64	75	19	19	2	1,261,280 47	476,561 72	60,246 09	50,660 56	43,151 78

different Sheriffs for the year ending 31st December, 1912.—*Concluded.*

	Amounts realized under writs of execution from sales of					Amount received for fines, penalties, etc.	Amount received (not fees) under Fi. Fas. without sale, goods and lands.		
	Goods.		Lands.						
Div. C.	H.C.	C.C.	H.C.	C.C.	Div. C.		H.C.	C.C.	Div. C.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
98 88	17 50	125 00	.....	30 00	.....	.....	2,211 60	1,606 36	.....
148 07	713 69	.....	.....	.....	.....	20 00	594 09	1,160 46	67 76
21 42	500 00	25 00	.....	.....	.....	.....	.....	455 12	69 21
144 56	1,669 68	822 40	.....	.....	.....	550 00	440 00	9,841 62	417 75
20 22	.....	.....	.....	.....	.....	.....	19 65	.....	.....
13 68	.....	342 00	.....	.....	.....	.....	1,941 02	628 74	352 37
87 57	.....	.....	.....	.....	.....	.....	237 58	2,786 08	618 80
33 93	1,049 75	.....	.....	.....	.....	.....	.....	2,468 98	.....
88 01	.....	.....	.....	.....	.....	.....	333 67	1,835 34	268 35
.....	.....	.....	.....	.....	.....	150 00	.....	353 62	.....
31 52	.....	.....	.....	.....	.....	.....	112 88	186 88	.....
60 48	.....	1,083 04	1,428 20	20 00	.....	.....	100 00	2,307 45	308 78
43 91	.....	.....	.....	.....	.....	.....	796 89	809 64	230 14
20 13	453 00	.....	.....	975 00	.....	.....	.....	415 00	.....
41 27	.....	250 00	.....	.....	85 00	50 00	1,000 00	427 02	246 02
84 09	.....	279 63	.....	.....	105 69	.....	1,824 22	293 14	483 23
55 26	.....	20 00	.....	.....	40 00	.....	.....	2,277 84	.....
48 32	972 50	558 50	1,675 00	.....	.....	.....	52 13	3,420 87	303 14
.....	.....	.....	.....	.....	.....	.....	.....	153 08	.....
121 06	262 19	361 38	.....	.....	.....	.....	287 95	1,050 41	337 88
.....	.....	160 00	.....	.....	.....	.....	.....	333 33	.....
322 65	1,484 54	615 00	.....	.....	112 96	.....	650 72	1,543 36	417 38
79 08	.....	.....	.....	.....	.....	.....	106 00	.....	.....
17 31	1,310 00	965 70	750 00	365 56	.....	2,122 15	1,521 59	2,929 86	60 52
.....	.....	114 56	.....	.....	.....	.....	.....	58 51	41 46
57 15	1,069 05	.....	.....	.....	227 00	.....	1,233 00	531 39	.....
14 39	.....	400 00	.....	.....	.....	260 25	.....	994 50	.....
33 98	.....	129 18	.....	.....	.....	.....	237 85	1,306 96	.....
28 22	.....	800 00	.....	.....	.....	.....	344 73	738 45	232 04
15 61	.....	.....	.....	.....	.....	.....	79 63	.....	.....
46 17	.....	117 50	.....	.....	.....	20 00	1,938 92	1,402 96	.....
114 59	.....	65 00	.....	.....	.....	.....	64 02	283 28	121 18
25 87	.....	.....	.....	.....	.....	.....	.....	1,478 64	.....
.....	.....	.....	.....	.....	.....	.....	.....	12 57	.....
.....	.....	296 31	.....	325 00	.....	308 11	1,002 30	3,927 45	.....
18 88	.....	.....	.....	.....	.....	.....	.....	860 90	385 80
197 69	.....	.....	.....	.....	.....	5 00	2,577 68	3,032 40	.....
95 47	104 00	200 00	405 00	.....	75 27	.....	655 55	973 50	271 48
39 61	210 00	107 20	.....	.....	.....	.....	1,217 04	1,047 43	.....
292 46	.....	1,588 00	.....	.....	150 00	.....	4,782 42	8,248 65	695 43
95 45	73 06	.....	.....	101 51	37 00	.....	.....	804 32	.....
48 98	.....	556 55	.....	.....	.....	.....	1,123 16	1,061 27	.....
.....	25 00	136 25	.....	.....	500 00	.....	149 60	1,738 75	439 31
23 11	.....	.....	.....	.....	.....	.....	2,373 65	2,709 83	.....
164 11	.....	761 17	.....	.....	.....	.....	1,990 98	1,841 59	893 61
113 94	.....	.....	.....	.....	.....	600 00	1,804 74	2,635 14	.....
569 27	604 65	1,735 35	.....	.....	.....	.....	9,101 65	7,647 63	1,247 78
3,576 28	10,518 61	12,614 62	4,258 20	1,817 07	1,332 92	4,085 51	42,906 91	78,220 32	8,509 42

APPENDIX B.—Being a return of business transacted by Local Masters through

County or District.	Number of Orders made for the following purposes:					Examinations taken as special examiner or otherwise before trial.
	For administration of estates.	For partition or sale of property.	Respecting Infants under 1 Geo. V., c. 35, s. 5. (Examination only).	Under Winding-up Acts.	Other Orders made in chambers.	
Algoma				2		1
Brant		1				
Bruce						
Carleton		1			70	72
Dufferin					14	
Elgin						18
Essex						1
Frontenac						2
Grey		1			18	
Haldimand		1				
Halton		1				
Hastings	1			3	28	20
Huron						
Kenora						5
Kent						
Lambton					4	1
Lanark						
Leeds and Grenville	1				23	
Lennox and Addington						
Lincoln		3				
Manitoulin						
Middlesex		2				
Muskoka						
Nipissing				2	2	
Norfolk						
Northumberland and Durham						
Ontario		1			3	
Oxford						9
Parry Sound						
Peel		2			23	
Perth	2	1		2	2	
Peterborough					18	
Prescott and Russell						
Prince Edward	1				7	
Rainy River						2
Renfrew						
Simcoe						
Stormont, Dundas and Glengarry					20	
Sudbury						
Thunder Bay		1		1		2
Victoria		1				
Waterloo						
Welland	1				1	
Wellington				2	24	2
Wentworth		2		1	2	
Totals	6	18		13	259	135

out the Province of Ontario during the year ending 31st December, 1912.

Number of Judgments or Orders brought into the Master's Office for taking the following accounts, etc.

Administration of estates.	Executors, trustees or committees' accounts and compensation.	Foreclosure of mortgage or bond.	Redemption of mortgage or bond.	Sale under mortgage or agreement.	Account on any charge or liens on lands other than mechanics' liens.	Account under Mechanics' Lien Act.	Specific performance.	Partnership accounts.	Alimony.	Partition or sale.	Damages for breach of contract or covenant.
										1	
						2					
		6		3		8				1	
						1					
1											
1	1					3		2		2	
										1	
				2	1			1		1	
										1	
1	1					1					
1						1					
1										2	
1										2	
1		1									
1		3							1		
										2	
	1						1	1			
		1				1					
1	1	3									
										1	
	2										
					1						
				1						2	
2						1		1			
		4							2		
1		2									
		1									
						1					1
				1							1
		1				1					
1						7					
2		1		1						1	
1		3				6			1		
16	6	26		8	2	33	1	5	4	17	2

APPENDIX B.—Being a return of business transacted by Local Masters through

County or District.	Number of Judgments or Orders.—*Con*						
	Work and labor done.	Money received, paid, advanced, or lent.	Goods sold and delivered.	Promissory notes and bills of exchange.	Bonds, life and fire insurance.	Infants' estates.	Quieting Title matters.
Algoma							
Brant							
Bruce							
Carleton	1	1					
Dufferin							
Elgin							
Essex							1
Frontenac							
Grey							
Haldimand							
Halton							
Hastings							
Huron							
Kenora		1					
Kent							1
Lambton							
Lanark							
Leeds and Grenville							
Lennox and Addington							
Lincoln							
Manitoulin							1
Middlesex							3
Muskoka							
Nipissing			2				
Norfolk							
Northumberland and Durham							
Ontario							
Oxford							
Parry Sound							
Peel							
Perth							
Peterborough							
Prescott and Russell							
Prince Edward							
Rainy River							
Renfrew							
Simcoe							1
Stormont, Dundas & Glengarry	2						
Sudbury							
Thunder Bay						1	
Victoria							
Waterloo							
Welland							
Wellington							
Wentworth			1				1
Totals	3	2	3			1	8

out the Province of Ontario during the year ending 31st December, 1912.

tinued.									
Lunacy.	Miscellaneous.	Number of advertisements of sale issued.	Number of reports issued.	Number of references pending at date of return.	Number of bills of cost taxed by Master.	Amount realized by sales held under direction of Master.	Amount of costs of reference, etc., taxed by Master or under his direction.	Amount of commission allowed in administration and partition matters.	Amount of fees earned by Local Masters during the year.
						$ c.	$ c.	$ c.	$ c.
.....	1	1	.....	2	.....	2,000 00	.....	.....	185 50
.....	.....	1	1	.....	1	4,000 00	134 90	148 00	29 40
.....	.....	.....	2	2	.....	.....	.....	.....	27 00
2	2	6	11	10	10	21,355 00	1,123 34	156 75	1,807 13
3	.....	2	6	1	.....	1,906 73	.....	.....	82 20
1	.....	.....	2	.....	.....	.....	.....	.....	272 77
1	.....	5	11	6	3	9,400 00	337 34	349 00	214 00
.....	.....	.....	3	.....	1	.....	.....	.....	118 20
.....	.....	3	8	1	3	6,700 00	264 57	559 25	176 50
.....	.....	.....	.....	1	.....	.....	.....	.....	5 80
.....	.....	.....	1	1	.....	.....	.....	.....	15 00
1	2	.....	7	4	6	3,500 00	716 73	341 65	741 90
2	.....	.....	5	1	4	44,693 00	12,252 54	332 22	198 07
.....	.....	.....	1	1	.....	.....	.....	.....	20 00
.....	1	.....	.....	.....	.....	.....	.....	.....	84 15
.....	.....	.....	2	1	2	4,535 00	179 22	438 50	48 84
.....	.....	1	.....	2	.....	.....	.....	.....	18 60
.....	1	1	9	8	4	2,000 00	304 34	132 50	149 12
.....	.....	.....	3	.....	4	4,200 00	242 20	247 90	39 30
1	.....	1	2	.....	1	1,025 00	86 64	104 15	73 50
.....	.....	.....	.....	1	.....	.....	.....	.....	6 90
1	4	1	12	6	1	6,570 00	251 00	502 02	271 38
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	4	2	.....	.....	.....	.....	76 40
.....	.....	.....	.....	.....	1	.....	73 56	.....	25 80
.....	.....	.....	.....	3	.....	.....	.....	.....	24 40
4	.....	.....	9	1	.....	.....	.....	.....	122 78
2	.....	1	4	4	1	3,000 00	306 22	.....	338 65
.....	.....	.....	.....	.....	.....	.....	.....	.....	7 40
1	.....	2	2	3	2	.....	214 64	.....	43 40
.....	.....	3	6	6	6	.....	725 63	1,052 20	159 72
1	.....	3	5	5	5	.....	.....	.....	276 02
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	1	2	3	5	.....	168 88	116 25	78 33
.....	.....	.....	.....	.....	3	.....	.....	.....	28 20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	2	.....	.....	.....	.....	20 10
.....	2	1	10	4	11	4,700 00	1,286 14	674 15	216 45
.....	.....	1	1	1	.....	.....	.....	.....	24 80
.....	1	.....	4	5	.....	12,000 00	.....	357 50	265 00
.....	.....	1	3	1	3	.....	156 14	.....	69 15
1	1	2	2	3	5	.....	1,249 68	.....	94 45
.....	.....	.....	1	3	.....	.....	.....	.....	169 80
.....	.....	1	2	4	4	4,836 00	.....	.....	131 20
.....	.....	.....	9	.....	.....	.....	.....	.....	300 70
21	16	38	112	98	86	136,420 73	20,073 71	5,512 04	7,048 01

APPENDIX C.—A return of all business transacted by Local Registrars, 31st Dec

County or District.	Writs of summons issued.	Orders for arrest issued.	Actions entered in Procedure Book.			*Præcipe* orders issued.	Orders issued and signed by Local Judge.	Examination of parties returned.	Records passed.	Actions entered for Trial.		Actions tried.		Remanets standing for Trial	
			Writs issued during year.	Writs issued during previous years.	Otherwise than by Writ.					With Jury.	Without Jury.	With Jury.	Without Jury.	With Jury.	Without Jury.
Algoma	44	....	35	6	5	26	66	17	14	2	15	2	2	....	....
Brant	40	....	29	2	2	21	9	7	10	2	11	1	7	....	1
Bruce	20	....	16	2	....	14	6	11	6	3	1	3	1	....	....
Carleton	270	....	214	8	52	106	36	42	55	23	49	18	36	5	12
Dufferin	9	....	8	1	4	2	1	6	1	1	....	1	....	....	....
Elgin	43	....	39	3	9	17	17	11	10	5	6	2	5	....	....
Essex	68	....	53	9	10	35	35	41	26	10	17	7	15	1	1
Frontenac	33	....	23	4	6	9	11	4	7	1	6	1	5	....	1
Grey	55	....	42	2	2	22	7	15	19	7	10	11	10	....	3
Haldimand	14	....	11	....	3	10	11	12	6	1	5	....	2	....	....
Halton	5	....	5	....	2	6	....	....	1	5	1	4	2	....	3
Hastings	65	....	54	....	1	43	4	23	23	....	28	....	17	....	4
Huron	41	....	39	5	1	19	24	7	14	2	9	....	6	2	3
Kenora	22	....	17	1	4	8	17	2	4	....	4	....	4	....	....
Kent	45	....	33	2	1	28	30	15	13	5	7	2	7	....	....
Lambton	35	....	29	2	3	10	9	7	7	3	6	2	5	1	1
Lanark	35	....	19	1	1	4	10	4	8	2	5	2	5	....	....
Leeds and Grenville	40	....	31	6	2	13	5	19	11	3	8	1	10	....	....
Lennox and Addington	5	....	5	....	....	4	5	4	5	2	3	2	3	....	....
Lincoln	26	....	25	3	1	16	9	....	10	2	6	1	5	1	1
Manitoulin	2	....	2	....	....	....	....	....	1	....	1	....	1	....	1
Middlesex	118	....	81	4	21	84	70	71	44	23	27	13	13	4	10
Muskoka	17	....	10	....	....	3	4	2	1	1	1	....	1	....	....
Nipissing	128	....	98	7	31	63	81	32	46	20	30	5	18	1	4
Norfolk	14	....	13	....	....	7	1	4	2	2	....	1	....	....	....
Northumberland and Durham	46	....	31	1	....	19	11	6	13	7	6	6	5	....	....
Ontario	32	....	28	3	....	15	9	2	1	1	1	1	1	....	....
Oxford	32	1	22	2	1	6	3	9	8	2	7	....	8	....	....
Parry Sound	10	....	8	....	4	3	1	3	5	3	2	3	2	....	....
Peel	23	....	16	3	5	13	8	9	7	3	9	2	7	1	2
Perth	36	....	24	5	8	23	20	36	11	4	6	4	7	....	....
Peterborough	59	....	47	2	5	21	....	29	8	2	8	1	5	....	....
Prescott and Russell	14	....	9	1	3	10	7	3	3	....	3	1	3	....	....
Prince Edward	4	....	2	....	....	3	3	5	2	....	2	....	2	....	....
Rainy River	16	....	13	1	1	4	10	....	2	1	1	1	1	....	....
Renfrew	27	....	15	2	....	....	....	....	8	5	3	3	1	....	3
Simcoe	61	....	49	8	1	37	9	12	14	2	12	1	3	....	4
Stormont, Dundas and Glengarry	59	....	49	2	12	24	10	2	7	2	6	1	6	....	....
Sudbury	51	....	44	26	22	18	29	....	15	12	10	5	6	....	2
Thunder Bay	145	....	144	2	24	49	166	27	45	17	27	8	15	....	....
Victoria	18	....	14	....	3	8	7	7	6	5	2	4	3	....	....
Waterloo	59	....	38	....	14	30	17	17	10	3	8	1	3	....	....
Welland	49	....	38	2	6	15	17	12	13	2	19	1	19	....	1
Wellington	35	1	24	3	2	12	3	2	7	2	8	2	8	....	....
Wentworth	208	....	182	5	64	138	83	40	89	55	51	17	42	5	5
Totals	2178	2	1728	136	336	1018	881	577	618	253	347	141	327	21	62

Deputy Registrars and Deputy Clerks of the Crown for the year ending ember, 1912.

Judgments entered without trial.	Amount of such judgments, without costs.	Amount of costs taxed thereunder (exclusive of Disbursements).	Amount of disbursements allowed.	Judgments entered after trial.	Amount of such judgments, without costs.	Amount of costs taxed thereunder (exclusive of Disbursements).	Amount of disbursements allowed.	Number of Judgments for over $10,000.	Number of Judgments for $10,000 and above $5,000.	Number of Judgments for $5,000 and above $2,000.	Number of Judgments for $2,000 and above $1,000.
	$ c.	$ c.	$ c.		$ c.	$ c.	$ c.				
4	2,663 33	109 00	48 12	8	12,025 04	190 70	119 07	....	1	1	2
6	5,808 02	70 70	35 21	2	10,000 00	194 85	80 70	1	....	1	1
2	3,454 11	39 20	13 82	5	8,897 12	169 95	429 98	....	1	1	1
55	98,777 61	1,254 18	367 48	37	14,953 82	2,487 65	258 31	1	3	13	22
1	253 50	60 00	.....	....	.....	.....	.....	....	....	....	....
3	2,923 69	62 90	23 37	9	7,958 66	565 88	192 94	....	....	1	5
15	22,854 63	392 09	57 85	20	10,464 74	1,938 71	1,182 50	....	2	4	4
6	7,254 50	30 95	19 63	5	3,527 60	219 06	591 18	....	2	4	2
5	7,587 18	247 88	8 40	6	1,520 19	269 27	1,560 54	....	....	2	1
....	.....	.....	.....	....	.....	.....	.....	....	....	....	....
....	.....	.....	.....	1	.....	.....	.....	....	....	....	....
7	8,079 58	111 87	41 55	11	2,341 96	786 69	674 29	....	....	1	2
10	27,782 28	230 96	88 14	6	4,117 11	440 11	676 55	....	2	3	7
6	14,940 13	219 61	46 06	4	3,595 00	68 60	100 79	....	....	5	2
7	11,934 32	128 35	65 30	3	1,375 00	355 23	468 00	....	....	2	4
5	1,495 65	86 30	30 72	7	7,536 96	142 15	92 40	....	....	1	4
6	5,487 11	92 00	35 56	3	7,927 50	.....	.....	....	....	3	1
7	15,836 87	216 32	68 12	4	3,300 00	146 60	278 91	....	....	3	4
2	.....	93 52	18 42	2	.....	436 42	137 01	....	....	....	....
3	7,790 17	105 73	23 28	5	1,850 00	751 22	349 92	....	1	....	2
....	.....	.....	.....	....	.....	.....	.....	....	....	....	....
27	27,014 55	309 60	160 78	19	19,320 00	1,067 30	409 48	....	1	6	14
6	11,282 67	111 12	14 93	....	.....	.....	.....	....	....	2	3
27	115,279 41	468 25	164 84	24	25,395 12	885 20	584 80	1	1	6	17
3	.....	.....	.....	1	3,500 00	.....	.....	....	....	1	....
2	2,422 78	40 00	12 58	3	279 00	79 25	75 35	....	....	....	2
2	4,023 96	64 88	18 38	3	.....	90 50	77 67	....	....	....	3
6	2,728 23	151 80	50 48	7	5,714 11	417 70	627 94	....	....	1	1
1	604 00	21 38	.....	3	4,910 45	49 74	.....	....	....	1	1
5	6,016 50	22 41	5 21	2	.....	.....	.....	....	1	....	....
7	1,824 60	458 60	110 19	5	4,137 02	587 93	676 88	....	....	....	3
16	22,693 82	172 76	80 19	1	1,800 00	.....	.....	1	....	1	5
3	875 58	21 10	4 30	2	4,224 33	80 20	149 39	....	....	2	....
1	.....	.....	.....	1	.....	131 76	113 60	....	....	....	....
3	13,634 24	63 13	17 94	1	1,200 00	.....	.....	....	....	....	3
4	6,064 42	73 78	29 66	3	3,000 00	.....	.....	....	....	....	4
7	7,112 23	251 90	37 67	9	8,307 00	36 60	20 94	....	2	....	5
19	23,441 31	388 20	192 46	13	12,980 50	835 35	80 74	....	....	8	8
7	10,601 79	191 80	36 44	15	12,863 78	1,047 92	504 95	....	....	1	4
15	34,391 39	297 80	131 41	29	47,050 45	1,340 48	739 23	3	....	9	11
4	4,624 19	375 81	.....	2	800 00	.....	.....	....	....	1	....
10	38,823 48	223 80	71 92	9	225 00	815 66	1,247 22	1	....	3	3
5	5,202 79	119 50	42 95	10	11,942 95	803 99	445 71	....	....	3	4
2	1,815 35	45 71	.....	7	14,263 10	774 84	.....	....	....	1	2
29	53,784 88	932 65	214 76	37	39,329 30	2,854 22	1,424 29	1	5	4	21
361	639,184 85	8,357 54	2,388 12	344	322,632 81	21,061 73	14,371 28	9	22	85	178

APPENDIX C.—A return of all business transacted by Local Registrars. 31st Dec

County or District.	Number of Judgments for $1,000 and above $400.	Number of Judgments for $400 and under.	Number of Judgments dismissing actions.	Number of Judgments in default of appearance or pleading.	Number of Judgments under Con. Rule 603.	Number of Judgments for reference to Master.	Number of Writs of Execution issued.	Number of Writs of Execution renewed.	No. of Writs of *Ca. Sa.* issued.	Number of Certificates issued under Creditors' Relief Act.	Amount for which issued, without costs.	Amount of Costs allowed thereunder (including Disbursements).
											$ c.	$ c.
Algoma	4	4	....	5	1	3	2	1	....	....	.....	.....
Brant	2	....	1	4	1	2	5	4	....	....	.....	.....
Bruce	3	1	....	1	....	....	2	1	....	....	.....	.....
Carleton	18	3	20	36	3	10	27	17	....	11	2,057 79	63 43
Dufferin	....	1	....	....	....	....	....	1	....	....	.....	.....
Elgin	....	6	1	3	....	....	5	....	....	....	.....	.....
Essex	8	1	4	7	1	3	9	....	....	....	.....	.....
Frontenac	1	2	1	6	....	....	2	1	....	....	.....	.....
Grey	1	1	2	2	3	3	6	3	....	....	.....	.....
Haldimand	....	....	....	....	....	....	....	....	....	....	.....	.....
Halton	....	....	....	....	....	....	....	....	....	....	.....	.....
Hastings	4	5	....	4	....	2	4	5	....	....	.....	.....
Huron	....	4	2	8	2	....	9	3	....	....	.....	.....
Kenora	1	....	1	6	....	1	3	....	....	....	.....	.....
Kent	3	1	....	6	1	....	5	3	....	....	.....	.....
Lambton	1	6	2	5	1	....	5	4	....	....	.....	.....
Lanark	3	....	....	1	....	2	3	....	....	....	.....	.....
Leeds and Grenville	2	2	1	10	2	6	6	....	....	....	.....	.....
Lennox and Addington	....	4	1	1	....	....	....	2	....	....	.....	.....
Lincoln	3	1	....	2	1	1	5	1	....	....	.....	.....
Manitoulin	....	....	....	....	....	....	....	....	....	....	.....	.....
Middlesex	8	1	7	15	3	5	16	4	....	....	.....	.....
Muskoka	....	....	....	....	....	....	3	....	....	....	.....	.....
Nipissing	7	2	5	18	3	1	17	1	....	....	.....	.....
Norfolk	....	....	....	....	....	3	....	....	....	....	.....	.....
Northumberland and Durham	....	3	....	2	....	....	1	1	....	....	.....	.....
Ontario	1	1	....	3	....	....	....	....	1	7	353 39	27 84
Oxford	2	....	....	3	1	....	....	....	....	....	.....	.....
Parry Sound	....	1	....	1	....	....	2	4	....	....	.....	.....
Peel	....	....	2	1	....	....	1	....	....	....	.....	.....
Perth	2	1	2	2	1	1	7	2	....	....	.....	.....
Peterborough	1	....	1	15	1	5	5	1	....	....	.....	.....
Prescott and Russell	1	2	....	2	....	1	3	....	....	....	.....	.....
Prince Edward	....	....	1	1	....	1	....	....	....	....	.....	.....
Rainy River	1	....	....	3	....	....	....	....	....	....	.....	.....
Renfrew	....	....	....	4	....	....	2	1	....	....	.....	.....
Simcoe	4	5	1	7	1	....	5	2	....	....	.....	.....
Stormont, Dundas and Glengarry	3	5	1	19	....	7	6	1	....	....	.....	.....
Sudbury	8	2	....	....	....	....	8	....	....	....	.....	.....
Thunder Bay	7	2	4	15	1	1	28	5	....	2	.....	.....
Victoria	3	....	1	....	....	1	3	1	....	....	.....	.....
Waterloo	3	3	2	7	....	3	7	....	....	....	.....	.....
Welland	1	6	1	3	....	1	5	....	....	1	971 77	121 00
Wellington	....	....	....	2	....	5	2	2	....	....	.....	.....
Wentworth	6	29	10	12	16	4	35	10	....	....	.....	.....
Totals	112	105	74	142	43	72	244	81	1	21	3,382 95	212 27

Deputy Registrars and Deputy Clerks of the Crown for the year ending ember, 1912.—Continued.

Number of days of sitting of Judge with Jury, H.C.J.	Number of days of sitting of Judge without Jury, H.C.J.	Number of Estreats ordered to be issued.	Number of Estreats issued.	Amount of Jury fees paid County or Provincial Treasurer.	Amount of money paid into Court with defence.	Amount of money paid out of Court.	Amount of fees collected in law stamps for the Short-hand Reporters' Fund.	Fees collected in law stamps by Deputy Clerks and Local Registrars.	Fees collected in law stamps by Deputy Registrars.
				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
2	7	.....	....	6 00	1,490 00	200 00	32 00	254 15	.....
2	9	.....	....	6 00	250 00	.....	26 00	169 50	.....
4	2	.....	....	9 00	.....	.....	8 00	108 50	.....
10	10	.....	....	69 00	2,788 78	.....	144 00	497 20	280 80
2	.....	.....	....	3 00	143 10	.....	2 00	45 00	.....
4	6	.....	....	15 00	.....	.....	22 00	212 50	.....
13	12	.....	....	30 00	.....	.....	54 00	511 70	.....
4	9	.....	....	3 00	.....	.....	.....	132 20	.....
13	7	.....	....	21 00	.....	.....	34 00	233 50	.....
4	3	.....	....	3 00	50 00	.....	12 00	83 80	.....
6	.....	.....	....	12 00	.....	.....	12 00	35 10	.....
.....	10	.....	....	.....	.....	.....	38 00	30 40	329 40
4	3	.....	....	6 00	.....	.....	22 00	169 20	.....
.....	4	3	....	.....	.....	.....	8 00	119 15	.....
3	4	.....	....	15 00	.....	.....	24 00	336 70	.....
12	2	.....	....	6 00	.....	.....	14 00	152 40	.....
5	2	.....	....	6 00	45 35	.....	14 00	159 30	.....
3	7	.....	....	9 00	.....	.....	22 00	257 90	.....
3	3	.....	....	6 00	.....	.....	8 00	57 30	.....
6	2	.....	....	6 00	200 00	.....	16 00	128 30	.....
.....	1	.....	....	.....	.....	.....	2 00	8 80	.....
10	11	.....	....	69 00	75 00	.....	92 00	129 90	139 60
3	3	.....	....	3 00	.....	.....	2 00	57 35	.....
8	4	1	....	60 00	270 00	.....	100 00	738 00	.....
2	2	.....	....	6 00	.....	.....	4 00	54 10	.....
13	5	.....	....	18 00	.....	.....	26 00	186 05	.....
4	1	.....	....	3 00	.....	.....	4 00	251 50	.....
5	6	.....	....	6 00	.....	.....	18 00	104 70	25 00
2	3	.....	....	9 00	.....	.....	10 00	67 70	.....
6	2	.....	....	9 00	.....	.....	20 00	118 75	.....
2	6	.....	....	12 00	5,816 62	.....	22 00	181 70	.....
6	10	.....	....	6 00	.....	.....	20 00	264 70	.....
2	2	.....	....	3 00	.....	.....	8 00	76 80	.....
.....	5	.....	....	.....	.....	.....	4 00	275 80	.....
2	2	.....	....	3 00	.....	.....	4 00	70 00	.....
3	2	.....	....	15 00	380 79	380 79	16 00	104 20	.....
2	4	.....	....	6 00	69 00	.....	28 00	236 40	.....
5	4	.....	....	6 00	.....	.....	16 00	348 70	.....
6	5	.....	....	36 00	.....	.....	44 00	323 50	.....
13	4	1	1	42 00	1,395 79	841 26	82 00	888 55	.....
7	2	.....	....	15 00	.....	.....	14 00	79 60	.....
2	4	.....	....	9 00	950 00	.....	20 00	289 70	.....
2	9	.....	....	6 00	626 90	.....	40 00	254 70	.....
3	4	.....	....	9 00	.....	.....	8 00	150 90	.....
42	8	.....	....	165 00	1,340 70	.....	212 00	1,011 95	20 20
250	211	5	1	738 00	15,892 03	1,422 05	1,328 00	9,907 85	795 00

APPENDIX D.—Being a return of business transacted by County Court Clerks

County or District.	Writs of summons issued.	Orders for arrest issued.	Actions entered in Procedure Book. (a) Writs issued during the year.	(b) Do. previous year.	(c) Otherwisethan by Writ.	*Precipe* orders issued.	Orders issued and signed by Local Judge.	Examination of Parties returned.	Records passed.	Actions entered for Trial with Jury.	Actions entered for Trial without Jury.	Number of actions tried with Jury.	Number of actions tried without Jury.	Number of Remanets standing for Trial with Jury.
Algoma	87	1	69	6	9	34	95	10	20	....	15	....	11	....
Brant	83	..	63	....	1	17	20	21	17	7	10	4	8	....
Bruce	49	..	39	4	4	18	20	7	7	3	4	2	4	1
Carleton	375	1	271	2	6	43	34	61	56	8	48	6	36	2
Dufferin	12	..	12	1	2	4	4	6	2	1	1	1	....	....
Elgin	55	..	45	1	....	8	21	3	5	3	8	1	6	....
Essex	65	..	52	3	6	27	.....	17	23	10	13	....	13	....
Frontenac	47	..	32	7	8	6	9	3	3	1	2	1	2	....
Grey	49	..	38	3	1	19	.....	12	17	4	13	4	12	....
Haldimand	35	..	13	....	....	7	12	5	6	3	3	2	2	....
Halton	21	..	17	....	....	14	4	5	....	3	12	1	9	3
Hastings	79	..	68	2	4	34	33	14	19	11	8	6	7	....
Huron	64	1	49	1	1	24	18	9	24	9	15	3	7	....
Kenora	29	..	27	....	2	5	33	....	3	....	5	....	5	....
Kent	65	..	64	1	....	29	23	17	14	5	9	3	8	1
Lambton	49	..	39	1	10	16	11	20	12	3	11	2	11	....
Lanark	40	..	27	2	2	19	18	15	9	1	11	1	8	....
Leeds & Grenville	66	..	55	1	....	10	.....	11	11	....	11	....	11	....
Lennox & Addington	24	..	18	....	....	7	8	5	6	2	4	....	6	....
Lincoln	43	..	33	....	2	12	12	....	3	1	2	....	3	....
Manitoulin	21	..	19	....	....	....	3	9	....	....	....	....	....	....
Middlesex	171	1	133	6	13	30	54	37	25	12	13	8	8	1
Muskoka	16	1	13	....	....	2	5	....	4	2	4	1	2	....
Nipissing	251	..	177	40	6	62	171	15	49	5	45	2	27	1
Norfolk	18	..	15	....	....	5	5	3	1	1	....	....	1	....
Northumberland and Durham	51	..	26	3	1	10	37	13	....	4	4	3	5	....
Ontario	29	..	21	1	12	4	10	2	5	4	1	2	1	....
Oxford	48	..	31	1	2	....	.....	....	3	1	2	1	2	....
Parry Sound	21	..	20	....	1	10	2	3	4	1	3	1	3	....
Peel	23	1	20	1	2	9	10	7	6	2	4	2	3	....
Perth	71	..	55	4	3	25	26	43	20	8	12	9	11	1
Peterborough	60	..	48	4	6	11	.....	6	5	4	1	2	1	....
Prescott and Russell	14	..	9	....	1	4	4	6	3	2	....	2	....	....
Prince Edward	15	..	10	1	....	7	5	6	4	1	3	....	4	....
Rainy River	47	..	38	4	4	1	31	....	4	....	8	....	8	....
Renfrew	40	..	28	2	....	....	.....	....	8	....	9	....	4	....
Simcoe	95	..	68	13	....	32	25	9	18	13	5	3	4	....
Stormont, Dundas and Glengarry	62	..	49	10	....	18	17	....	12	1	16	1	10	....
Sudbury	169	..	132	76	....	7	48	....	33	2	31	2	20	....
Thunder Bay	175	..	165	3	....	8	175	8	17	4	15	2	10	1
Victoria	39	..	31	....	4	10	16	11	2	1	2	1	2	....
Waterloo	97	1	80	3	1	29	27	20	13	5	8	3	4	....
Welland	39	..	32	....	11	12	11	6	12	1	12	....	12	....
Wellington	53	..	40	....	....	15	11	4	4	....	4	....	4	....
Wentworth	280	..	220	6	9	72	57	40	66	37	29	12	20	2
York	2,002	2	1,465	59	3	676	884	171	361	113	248	104	258	16
Totals	5,244	9	3,997	272	137	2412	2,009	660	936	299	684	198	593	29

throughout the Province of Ontario for the year ending 31st December, 1912.

Number of Remanets standing for Trial without Jury.	Number of Judgments entered without Trial.	Total amount of such Judgments without costs.	Total amount of Costs taxed thereunder (exclusive of Disbursements).	Total amount of Disbursements allowed.	Number of Judgments entered after Trial.	Total amount of such Judgments without costs.	Total amount of Costs taxed thereunder (exclusive of Disbursements).	Total amount of Disbursements allowed.	Number of Judgments $400 and under.	Number of Judgments dismissing actions.	Number of Judgments in default of appearance or pleading.	Number of Judgments under Con. Rule 603.
		$ c.	$ c.	$ c.		$ c.	$ c.	$ c.				
2	26	8,687 47	427 14	170 88	17	4,382 04	870 16	475 86	43	3	24	7
1	18	5,694 64	243 80	86 00	6	1,698 27	379 84	212 20	23	1	16	1
....	11	3,351 08	126 00	46 27	5	281 47	213 80	422 67	14	2	10	1
12	126	40,635 90	1,466 13	484 61	14	2,490 20	686 23	170 81	136	2	98	17
....	5	2,152 64	81 00	18 88	2	.....	70 10	27 21	5	2	3	2
1	12	4,002 11	135 91	44 83	11	1,607 07	329 52	181 22	23	3	14	....
6	18	5,803 48	291 47	69 08	8	1,373 38	1,081 61	547 45	24	3	16	2
....	25	6,404 41	327 00	51 06	3	880 00	94 10	101 32	26	....	23	2
2	14	3,707 03	148 40	38 89	3	1,274 74	74 68	190 16	15	....	14	....
....	2	440 00	10 00	.....	2	354 99	.....	.....	4	....	1	....
....	5	2,312 63	88 65	37 20	1	.....	99 00	45 00	5	1	1	....
6	13	4,966 86	175 60	61 50	3	588 78	339 25	67 66	15	1	12	1
5	12	3,530 46	160 70	76 99	3	1,323 67	99 68	140 60	15	....	10	2
....	12	3,590 03	202 00	72 70	1	72 00	.....	.....	12	1	12	....
1	13	3,035 94	163 31	43 65	2	417 00	105 70	140 00	15	1	9	4
....	12	4,278 90	203 40	78 41	8	1,254 72	365 54	308 73	20	....	12	....
....	16	4,828 21	219 50	124 46	10	1,201 88	406 20	771 80	26	4	14	1
....	24	5,516 77	327 25	164 63	7	1,507 13	1,241 60	835 01	32	....	20	2
....	4	1,012 77	112 18	41 17	....	.....	.....	.....	4	....	3	1
....	12	4,576 06	252 03	72 87	1	150 00	133 64	98 11	13	....	9	3
....	2	241 25	20 58	7 68	....	.....	.....	.....	....	....	2	....
3	52	15,919 74	872 71	266 78	12	2,510 69	192 74	109 61	60	4	41	11
....	6	2,102 49	66 80	25 97	3	816 14	24 45	70 57	6	....	....	....
5	123	44,280 97	1,606 10	412 04	39	9,325 36	1,228 85	1,112 61	154	3	95	27
....	3	797 00	29 60	16 26	....	.....	.....	.....	3	....	3	....
4	14	4,699 70	228 68	69 80	....	.....	.....	.....	13	1	12	1
....	9	2,934 69	154 70	51 78	7	750 00	220 88	169 96	11	6	9	....
....	16	5,664 29	248 63	104 67	5	793 69	153 68	249 42	21	2	13	3
....	6	1,701 86	90 37	16 44	2	1,428 85	220 65	19 80	8	....	6	....
1	3	1,736 37	90 05	42 25	1	.....	.....	.....	1	....	3	....
2	20	7,439 66	234 32	88 46	5	61 65	322 90	287 41	20	4	18	2
....	19	6,671 98	257 39	102 87	7	1,548 72	333 51	223 39	23	....	15	3
....	4	1,158 73	51 28	18 92	1	100 00	74 05	79 91	5	....	4	....
....	8	2,614 64	192 58	71 02	1	127 77	64 55	84 04	9	....	6	2
....	12	3,794 56	264 19	67 31	5	1,132 89	95 13	162 24	15	2	12	....
4	....	.....	.....	.....	3	574 50	37 90	92 82	3	....	10	1
....	31	9,295 00	436 67	140 15	4	414 15	191 00	94 47	35	....	31	....
3	27	7,726 99	342 15	124 87	4	441 14	297 84	202 49	31	....	25	2
7	39	14,546 53	454 15	195 83	13	2,816 87	440 87	397 84	52	....	....	....
....	77	25,171 24	1,060 62	354 88	14	3,586 62	247 49	116 16	77	2	77	....
1	11	3,997 76	184 99	80 67	2	80 00	98 20	138 63	13	....	10	....
4	28	9,065 32	576 85	159 19	5	1,938 94	410 30	210 51	32	1	28	2
1	9	2,365 87	117 25	37 84	2	157 21	79 85	69 02	11	....	8	1
1	23	7,617 17	524 69	163 55	2	371 60	.....	.....	25	1	17	6
3	61	18,860 97	1,069 13	328 16	21	2,625 61	476 24	145 69	82	6	48	10
14	703	211,022 85	10,406 35	2,912 07	196	33,498 27	12,349 74	3,664 33	899	56	540	163
89	1686	529,955 02	24,742 30	7,643 54	461	85,958 01	23,251 47	22,436 73	2079	112	1354	280

APPENDIX D.—Being a return of business transacted by County Court Clerks

County or District.	Number of Judgments for reference to Master.	Writs of Execution issued.	Number of Writs of Execution renewed.	Number of Writs of *Ca. Sa.* issued.	Number of Certificates issued under Creditors' Relief Act.	Amount for which issued without Costs.	Amount of Costs allowed thereunder (including Disbursements).	Number of days of sittings of County Court.	Amount of Jury Fees paid County or Provincial Treasurers.	Amount of money paid into Court with defence.
						$ c.	$ c.		$ c.	$ c.
Algoma	....	29	16	....	....	.....	.....	8	.....	273 20
Brant	....	11	3	....	....	.....	.....	12	10 50	317 50
Bruce	....	16	2	....	1	162 14	3 00	8	4 50	354 39
Carleton	....	107	11	....	....	.....	.....	38	12 00	255 61
Dufferin	....	7	3	....	....	.....	.....	2	1 50	158 00
Elgin	....	13	....	....	....	.....	.....	13	4 50	.....
Essex	....	23	6	....	....	.....	.....	13	12 00	200 00
Frontenac	....	11	1	....	2	491 10	20 55	6	1 50	85 00
Grey	1	13	1	....	....	.....	.....	30	6 00	659 96
Haldimand	....	2	....	....	....	.....	.....	7	4 50	45 00
Halton	....	6	....	....	....	.....	.....	22	1 50	97 11
Hastings	....	19	7	....	....	.....	.....	29	15 00	537 19
Huron	....	11	2	....	....	.....	.....	12	13 50	181 75
Kenora	....	9	....	....	9	3,728 59	132 02	8	.....	182 56
Kent	....	11	2	....	....	.....	.....	12	7 50	798 05
Lambton	....	11	4	....	....	.....	.....	12	3 00	123 47
Lanark	....	14	1	....	13	576 72	64 85	6	1 50	266 95
Leeds and Grenville	....	21	1	....	8	2,747 67	39 30	20	.....	100 00
Lennox and Addington	....	4	2	....	....	.....	.....	8	3 00	250 00
Lincoln	....	15	3	....	....	.....	.....	10	1 50	50 00
Manitoulin	....	....	1	....	....	.....	.....	....	.....	.....
Middlesex	....	44	4	....	....	.....	.....	17	18 00	90 00
Muskoka	....	4	2	....	....	.....	.....	4	1 50	321 30
Nipissing	...	86	....	....	....	.....	.....	13	7 50	355 00
Norfolk	4	....	....	....	....	.....	.....	7	.....	.....
Northumberland and Durham	....	7	4	....	....	.....	.....	18	6 00	21,026 87
Ontario	....	....	....	....	....	.....	.....	4	6 00	.....
Oxford	....	....	....	....	....	.....	.....	7	1 50	45 00
Parry Sound	....	8	....	....	....	.....	.....	4	1 50	.....
Peel	....	....	....	....	....	.....	.....	14	3 00	.....
Perth	....	17	2	....	....	.....	.....	21	12 00	.....
Peterborough	....	14	2	....	....	.....	.....	8	4 50	297 40
Prescott and Russell	....	4	1	....	....	.....	.....	5	3 00	253 36
Prince Edward	....	4	2	....	....	.....	.....	7	1 50	.....
Rainy River	....	5	....	....	....	.....	.....	9	.....	.....
Renfrew	....	8	1	....	....	.....	.....	6	.....	100 00
Simcoe	....	26	3	1	....	.....	.....	26	19 50	146 50
Stormont, Dundas and Glengarry	1	21	1	...	1	326 20	6 70	18	1 50	253 77
Sudbury	....	30	....	....	....	.....	.....	12	3 00	18,412 00
Thunder Bay	...	73	22	....	....	.....	.....	18	1 50	.....
Victoria	1	7	2	....	1	23 77	4 05	7	.....	425 32
Waterloo	....	31	....	....	....	.....	.....	13	7 50	754 75
Welland	...	8	....	....	....	.....	.....	7	1 50	.....
Wellington	....	19	....	....	....	.....	.....	13	.....	275 00
Wentworth	1	62	17	....	....	.....	.....	22	55 50	793 08
York	6	676	130	1	....	.....	.....	243	169 50	4,058 82
Totals	14	1507	259	2	35	8,056 19	270 47	799	429 00	32,543 91

in the Province of Ontario for the year ending 31st December, 1912.—Concluded.

Amount of money paid out of Court.	Number of Partition Matters.	Amount of money paid thereunder.	Amounts paid out.	Amount of moneys in Court in County Court matters, including interest (under Con. Rule 1221).	Number of Chattel Mortgages and Bills of Sale filed.	Total amount secured by such mortgages.	Number of mortgages renewed.	Number of discharges filed.	Number of assignments for benefit of creditors.	Number of Hire Receipts, etc., filed under 1 Geo. V., c. 30.	Total amount secured by such Receipts, etc.	Amount of fees collected in law stamps under Section 42 of the Creditors' Relief Act.
$ c.		$ c.	$ c.	$ c.		$ c.					$ c.	$ c.
378 20	..	...	.....	.....	152	41,102,730 62	65	15	6	212	110,829 88	.....
905 09	..	...	.....	693 88	145	96,294 55	83	16	4	278	38,829 12	.....
354 39	..	...	426 80	84 56	187	71,288 00	119	8	21	111	28,125 20	.....
102 70	..	...	.....	8,717 41	163	119,283 90	116	24	30	1,140	140,911 93	3 20
25 00	..	...	.....	158 00	32	49,695 20	49	....	3	35	4,877 15	.....
275 00	..	...	.....	432 78	307	260,000 33	133	3	6	116	21,342 07	.....
1,613 90	..	...	.....	437 32	209	95,205 28	105	10	3	156	38,915 84	.....
85 00	..	...	.....	.....	257	134,645 17	112	12	6	369	47,211 88	1 50
691 76	..	...	.....	50 00	477	242,600 61	200	3	6	268	63,246 64	.....
45 41	..	...	.....	.....	77	109,404 03	46	5	2	47	17,936 73	.....
.....	..	...	.....	.....	36	85,163 88	27	3	....	25	12,000 80	.....
8,981 16	..	...	.....	2,489 05	552	207,193 16	201	10	7	164	36,537 19	.....
142 65	..	...	.....	204 21	110	104,908 50	102	8	3	65	17,653 98	.....
182 56	..	...	.....	123 79	58	129,522 49	15	8	1	70	19,280 72	10 90
726 73	..	...	.....	78 23	287	105,765 10	229	21	4	561	70,305 65	.....
420 24	..	...	.....	25 00	203	74,363 09	201	5	3	62	28,267 06	.....
100 00	..	...	.....	566 45	48	25,857 10	61	2	2	38	30,628 84	.....
100 00	..	...	.....	603 94	181	135,050 91	91	5	6	112	17,749 27	4 00
.....	..	...	.....	250 00	82	66,954 72	90	6	....	70	5,765 33	.....
50 00	..	...	.....	34 78	84	151,700 47	46	7	3	166	36,180 81	.....
.....	..	...	.....	.....	72	23,093 43	48	2	....	.....	.....	.....
324 93	..	...	.....	90 00	136	254,541 30	136	8	13	297	54,876 00	.....
244 44	..	...	.....	.....	167	63,598 98	56	4	3	69	22,547 33	.....
3,988 86	..	...	.....	3,037 49	351	388,120 02	93	18	25	146	86,106 44	.....
.....	..	...	.....	370 57	134	64,683 32	112	16	2	158	27,505 31	.....
18,916 05	..	...	.....	27,577 20	189	74,143 88	180	5	6	103	96,322 97	.....
.....	..	...	.....	15,687 50	175	129,331 52	90	7	8	72	34,800 95	.....
.....	..	...	.....	1,812 68	149	101,960 95	98	16	13	116	17,746 08	.....
.....	..	...	.....	.....	195	202,487 48	35	4	8	49	16,920 00	.....
.....	..	...	.....	125 00	65	37,169 36	24	2	3	42	29,153 89	4 00
.....	..	...	.....	.....	157	662,650 35	58	4	6	100	47,787 25	.....
297 40	..	...	.....	25 50	127	50,398 94	90	10	8	76	19,431 64	.....
253 36	..	...	.....	.....	167	109,162 52	57	11	6	17	5,216 15	.....
.....	..	...	.....	.....	67	36,719 12	41	6	1	30	17,438 03	.....
.....	..	...	.....	.....	80	97,481 59	9	5	....	86	21,959 77	.....
139 00	..	...	.....	.....	109	48,045 98	217	6	1	52	7,993 90	.....
.....	..	...	.....	2,633 55	497	691,138 38	233	8	12	133	44,432 30	.....
788 15	..	...	.....	105 62	273	244,835 34	99	17	10	358	18,566 48	80
3,967 50	..	...	.....	14,595 75	246	432,169 87	31	11	19	99	117,081 69	.....
131 65	..	...	.....	22 84	157	186,698 06	17	9	16	1,457	196,559 04	.....
115 30	..	...	.....	310 02	124	238,802 19	54	4	6	237	35,922 96	.....
681 44	..	...	.....	165 01	144	109,309 75	64	8	12	289	70,690 89	.....
.....	..	...	.....	.....	239	377,323 36	70	16	4	100	199,938 82	3 00
283 59	..	...	.....	2,349 23	215	169,346 71	89	3	9	93	19,262 97	.....
682 93	..	...	.....	695 30	261	487,665 05	262	20	23	253	204,224 23	.....
6,642 87	..	...	.....	79,670 69	906	2,319,911 00	457	79	89	2,275	988,288 00	.....
52,637 26	..	...	426 80	164,223 35	9,049	49,968,415 56	4811	470	419	10,772	3,187,369 68	27 40

APPENDIX E.—Being a return of business transacted by Surrogate Registrars

County or District.	Total number of Probates issued.	Total number of Letters of Administration issued.	Total number of Letters of Guardianship issued.	Total number of Probates and Letters of Administration issued under 10 Edw. VII., C. 31, s. 73, ss. 1.	Total number of Probates and Letters issued under 10 Edw. VII., C. 31, s. 73, ss. 4.	Number of Wills proved istration or Guardianship alty valued as			
						$100,000, or over.	From $50,000 to $100,000.	From $25,000 to $50,000.	From $10,000 to $25,000.
Algoma	23	49	3	14	16	.....	.....	.....	2
Brant	106	47	2	21	14	.....	.....	.....	5
Bruce	158	59	3	24	25	.....	1	2	7
Carleton	190	90	2	13	27	2	3	7	18
Dufferin	38	20	.....	4	6	.....	.....	.....	.....
Elgin	110	57	2	14	21	.....	1	1	14
Essex	115	99	7	33	31	2	.....	1	5
Frontenac	84	35	2	6	13	.....	1	3	6
Grey	153	60	2	21	18	.....	.....	2	5
Haldimand	57	27	.....	6	.....	.....	1	3	3
Halton	59	30	1	6	6	.....	1	3	3
Hastings	21	71	2	25	21	.....	1	.....	7
Huron	173	71	3	26	23	.....	.....	3	11
Kenora	85	5	.....	3	3	.....	.....	.....	1
Kent	121	65	4	23	21	.....	.....	2	6
Lambton	135	87	3	16	21	.....	1	4	6
Lanark	51	35	1	3	12	.....	.....	2	4
Leeds and Grenville	144	64	1	12	28	.....	2	5	8
Lennox and Addington	32	15	1	2	2	.....	1	.....	1
Lincoln	85	52	.....	12	20	.....	1	4	8
Manitoulin	5	5	.....	4	1	.....	.....	1	.....
Middlesex	289	109	5	100	85	1	5	.....	14
Muskoka	25	12	1	2	2	.....	.....	1	1
Nipissing	28	29	1	.....	9	.....	.....	2	2
Norfolk	65	37	2	15	11	.....	1	.....	4
Northumberland and Durham	159	81	3	26	41	2	2	4	10
Ontario	103	41	3	9	16	1	1	5	10
Oxford	124	62	2	15	20	.....	1	4	9
Parry Sound	22	14	1	6	7	.....	1	.....	1
Peel	50	25	1	12	8	.....	.....	3	3
Perth	113	49	.....	13	13	.....	.....	1	4
Peterborough	92	40	3	14	15	.....	1	4	3
Prescott and Russell	65	24	1	4	9	.....	.....	1	5
Prince Edward	55	12	.....	4	9	.....	1	1	2
Rainy River	6	12	2	7	1	.....	.....	.....	2
Renfrew	57	29	1	7	9	.....	.....	1	5
Simcoe	179	78	8	32	29	.....	.....	2	7
Stormont, Dundas and Glengarry	112	54	6	17	18	1	.....	3	11
Sudbury	13	32	.....	.....	.....	.....	.....	.....	1
Thunder Bay	26	41	1	7	17	1	1	2	3
Victoria	49	39	2	15	16	.....	.....	2	2
Waterloo	163	46	.....	209	30	1	1	3	9
Welland	92	68	1	13	26	.....	1	.....	7
Wellington	157	82	2	26	23	.....	.....	2	10
Wentworth	210	113	6	33	40	2	5	6	16
York	760	573	19	256	145	30	22	38	86
Totals	4,959	2,745	110	1,130	928	43	57	128	247

throughout the Province of Ontario during the year ending 31st December, 1912.

and Letters of Administration issued where person follows:				Total amount of personalty devolving.	Total amount of realty to be administered under 10 Edw. VII., C, 56, s. 3.	Amount of moneys in Court in Surrogate matters, including interest, Con. Rule 1,221.	Amount earned for.		
From $5,000 to $10,000.	From $1,000 to $5 000.	From $400 to $1,000.	$400 and under.				Registrar's fees.	Judge's fees.	Fee fund.
				$ c.	$ c.	$ c.	$ c.	$ c	$ c
1	15	20	37	83,849 16	32,272 19	.....	620 51	303 50	133 60
17	52	25	56	348,758 41	319,828 85	.....	1,600 89	762 50	412 10
21	90	38	61	602,384 00	487,769 71	.....	2,113 51	1,192 50	670 50
20	116	41	75	1,620,971 60	119,856 16	.....	2,783 27	2,469 70	1,327 34
4	32	8	14	96,981 65	126,599 73	.....	652 80	256 50	145 90
15	58	32	48	518,242 96	390,091 71	.....	1,796 75	1,025 50	550 80
11	67	32	103	711,920 90	808,417 71	413 49	2,125 50	1,402 25	729 40
16	49	18	28	511,261 18	275,479 50	.....	1,328 00	883 80	482 30
13	88	52	55	492,500 13	443,557 00	.....	2,170 37	1,157 00	594 20
10	34	16	17	358,927 80	183,337 50	172 38	1,036 05	760 25	321 30
8	41	13	21	390,121 08	209,615 00	1,318 05	942 25	643 65	346 10
10	74	32	70	446,135 00	85,960 00	.....	2,355 11	1,130 80	529 10
19	119	30	65	701,232 40	34,690 00	.....	2,655 45	1,250 25	736 40
.....	8	1	3	22,839 24	18,436 69	.....	129 22	70 50	41 90
8	76	52	46	309,751 00	41,165 00	.....	1,392 40	846 75	511 50
26	98	37	53	639,060 01	537,486 00	235 00	2,273 01	1,407 30	749 90
8	45	16	12	309,012 48	176,403 00	.....	1,169 89	614 75	309 20
15	92	45	42	736,430 09	115,055 00	.....	3,141 95	1,523 75	802 20
3	28	7	8	175,754 63	108,680 00	.....	650 25	507 50	177 00
14	47	30	33	569,539 98	546,110 66	.....	1,475 14	1,032 00	512 48
.....	4	1	4	50,333 41	910 00	.....	103 99	64 75	43 40
40	140	81	122	1,286,474 71	1,251,082 81	.....	3,981 94	2,400 25	1,359 00
6	8	9	13	114,271 35	134,728 00	.....	410 23	194 00	128 70
2	17	14	21	162,362 78	18,700 00	.....	505 20	302 00	164 50
7	44	19	29	366,753 87	269,926 71	451 15	1,293 85	625 50	323 70
15	88	61	61	1,351,022 26	523,982 66	.....	2,589 65	2,061 25	1,123 70
10	62	21	37	649,236 64	425,652 18	.....	1,967 93	1,269 50	618 70
19	79	29	47	689,814 32	644,573 66	9,802 21	2,480 10	1,445 30	658 20
1	9	12	13	115,455 00	33,278 00	.....	274 72	175 50	114 75
8	23	13	26	228,986 00	470,080 00	.....	1,093 26	715 50	265 40
17	76	28	36	314,370 90	309,687 91	.....	1,766 20	803 50	468 75
14	56	25	32	524,017 43	312,242 65	.....	1,582 72	998 25	488 50
10	41	10	23	255,226 12	262,576 00	.....	922 55	405 50	292 20
8	29	9	17	262,905 45	157,969 22	.....	859 05	564 00	275 80
2	8	1	7	53,471 72	25,440 61	.....	171 57	90 00	149 30
12	34	18	17	276,605 55	257,256 66	.....	975 09	540 50	294 40
19	176	32	29	634,945 18	644,868 93	.....	2,528 65	1,254 75	740 55
14	88	26	29	753,853 82	404,206 31	.....	2,302 62	1,272 75	678 30
.....	8	16	20	52,011 29	46,045 71	.....	288 96	124 75	85 70
4	33	17	7	426,047 69	379,354 18	.....	722 86	808 00	442 40
4	51	15	15	259,761 49	165,649 58	.....	1,076 15	512 75	269 00
25	81	33	56	934,645 89	554,820 36	.....	2,298 74	1,309 25	847 80
12	62	28	51	477,134 03	320,378 20	.....	1,616 20	1,030 50	509 40
21	114	31	63	652,357 00	486,323 00	.....	2,320 41	1,305 25	724 60
27	114	54	105	1,723,406 89	1,125,635 70	602 70	3,281 97	2,852 75	1,464 80
99	369	225	483	15,068,787 00	9,172,417 00	.....	13,572 71	19,001 35	9,749 40
635	3,343	1,373	2,210	37,329,931 49	23,458,597 45	12,994 98	83,399 64	61,368 15	32,364 17

APPENDIX F.—Return of fees and emoluments of County Judicial Officers throughout the officers payable by the Province, the County and the

County and Town.	Office.	Officer	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
ALGOMA:						
Sault Ste. Marie ..	Sheriff	W. H. Carney ...	2,925 70	1,000 00	3,925 70	3,247 89
	Surrogate Judge ..	Judge Stone.....	.....	* 500 00	685 50	500 00
	Local Master	" ..	185 50	.....	.....	165 30
	Crown Attorney...	M.McFadden K.C.	1,433 97	400 00	2,452 05	1,590 97
	Clerk of the Peace.	" ..	618 08	.....	.....	404 75
	Local Registrar...	C. V. Plummer..	162 52	150 00	2,079 88	287 52
	District Court Cl'k	" ..	546 85	600 00	.....	1,046 85
	SurrogateRegistrar	" ..	620 51	.....	.....	620 51
BRANT:						
Brantford.	Sheriff	W. W. Ross	2,328 72	.....	2,328 72	1,733 18
	Surrogate Judge...	Judge Hardy...	Commuted	875 00	904 40	875 00
	Local Master.....	" ...	29 40	.....	.....	29 40
	Crown Attorney .	A. J. Wilkes, K.C.	1,365 80	.....	2,382 81	1,056 80
	Clerk of the Peace	"	1,017 01	.....	.....	627 14
	Local Registrar...	J. T. Hewitt.....	163 62	675 00	3,160 49	838 62
	County Court Clerk	"	720 98	.....	.....	720 98
	SurrogateRegistrar	"	1,600 89	.....	.....	1,600 89
BRUCE:						
Walkerton	Sheriff	D. M. Jermyn ..	2,066 83	.....	2,066 83	1,662 19
	Surrogate Judge...	Judge Barrett...	1,000 00	.....	1,000 00	.....
	Local Master	Judge Klein.....	Commuted	400 00	.....	.....
	Crown Attorney...	Thomas Dixon ..	496 30	.....	2,034 27	403 80
	Clerk of the Peace	" ..	1,537 97	.....	.....	991 67
	Local Registrar. .	Matthew Goetz..	188 34	675 00	3,559 24	863 34
	County Court Clerk	" ..	582 39	.....	.....	309 10
	SurrogateRegistrar	" ..	2,113 51	.....	.....	1,703 57
CARLETON:						
Ottawa ..	Sheriff	G. C. Richardson.	8,436 67	.....	8,436 67	7,205 48
	Surrogate Judge...	Judge McTavish.	1,300 00	.....	1,300 00	.....
	" ...	Judge Gunn.....	1,000 00	.....	1,000 00	.....
	Local Master	John Bishop, K.C.	1,807 13	.....	2,485 08	1,807 13
	Deputy Registrar..	"	677 95	.....	.....	677 95
	Crown Attorney...	J. A. Ritchie	664 56	.....	1,310 81	540 56
	Clerk of the Peace.	"	646 25	.....	.....	271 41
	Deputy Clerk of the Crown.....	Horace Pratt ...	351 73	450 00	5,277 25	801 73
	County Court Clerk	"	1,692 25	.....	.....	1,692 25
	SurrogateRegistrar	"	2,783 27	.....	.....	2,783 27
DUFFERIN:						
Orangeville	Sheriff	Thomas Bowles.	969 97	.....	969 97	584 57
	Surrogate Judge ..	Judge McCarthy.	256 50	.....	339 70	256 50
	Local Master	"	83 20	.....	.....	37 90
	Crown Attorney...	W. J. L. McKay..	116 35	.....	595 10	77 00
	Clerk of the Peace.	"	478 75	.....	.....	255 55
	Local Registrar...	J. A. V. Preston.	86 30	675 00	1,643 80	754 60
	County Court Clerk	"	229 70	.....	.....	203 95
	SurrogateRegistrar	"	652 80	.....	.....	610 90
ELGIN:						
St. Thomas	Sheriff	Dugald McColl .	2,112 92	.....	2,112 92	1,628 34
	Surrogate Judge..	Judge Colter....	1,000 00	.....	1,000 00	.....
	Local Master	C. F. Maxwell. .	272 77	.....	272 77	272 77
	Crown Attorney...	A. McCrimmon..	1,354 65	.....	2,333 41	743 10
	Clerk of the Peace.	" ..	978 76	.....	.....	544 60
	Local Registrar...	David McLaws..	198 30	675 00	3,201 55	758 50
	County Court Clerk	"	531 50	.....	.....	480 80
	SurrogateRegistrar	"	1,796 75	.....	.....	1,715 30

*By 10 Edw. VII., Cap. 26, S. 13.

Province of Ontario for the year ending 31st December, 1912, and of total earnings of such General Public, respectively, for the same period.

Total received for past year's services	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
529 99	3,777 88	2,371 77	1,406 11	.....	1,406 11	3,064 73	.....	860 97	Algoma.
.....	686 30	.....	686 30	.....	686 30	500 00	.....	.....	
21 00	.....	.....	.....	.....	.....	.....	.....	185 50	
323 00	2,540 44	300 00	2,240 44	.....	2,240 44	400 00	.....	1,433 97	
221 72	.....	.....	.....	.....	.....	.....	.....	618 08	
25 00	2,079 88	305 70	1,774 18	.....	1,774 18	150 00	.....	162 52	
100 00	.....	.....	.....	.....	.....	600 00	.....	546 85	
.....	.....	.....	.....	.....	.....	.....	.....	620 51	
749 43	2,482 61	266 70	2,215 91	.....	2,215 91	1,100 01	675 81	552 90	Brant.
.....	904 40	.....	904 40	.....	904 40	875 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	29 40	
335 50	2,478 56	550 06	1,928 50	.....	1,928 50	999 00	.....	366 80	
459 12	.....	.....	.....	.....	.....	168 25	728 38	120 38	
.....	3,160 49	618 00	2,542 49	4 24	2,538 25	675 00	.....	163 62	
.....	.....	.....	.....	.....	.....	.....	.....	720 98	
.....	.....	.....	.....	.....	.....	.....	.....	1,600 89	
266 70	1,928 89	1,058 79	870 10	.....	870 10	875 25	717 37	474 21	Bruce.
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
.....	400 00	.....	400 00	.....	400 00	400 00	.....	.....	
80 05	1,992 46	12 48	1,979 98	.....	1,979 98	492 30	4 00	.....	
516 94	.....	.....	.....	.....	.....	250 45	1,263 63	23 89	
.....	3,575 23	529 20	3,046 03	59 21	2,986 82	675 00	.....	188 34	
279 69	.....	.....	.....	.....	.....	.....	.....	582 39	
419 53	.....	.....	.....	.....	.....	.....	.....	2,113 51	
1,082 62	8,288 10	2,521 53	5,766 57	.....	5,766 57	2,444 94	830 74	5,158 99	Carleton.
.....	1,300 00	.....	1,300 00	.....	1,300 00	.....	.....	1,300 00	
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
.....	2,485 08	646 00	1,839 08	.....	1,839 08	.....	.....	1,807 13	
.....	.....	.....	.....	.....	.....	.....	.....	677 95	
228 60	1,753 26	219 55	1,533 71	.....	1,533 71	664 56	.....	.....	
712 69	.....	.....	.....	.....	.....	109 60	490 20	46 45	
.....	5,277 25	1,596 40	3,680 85	240 43	3,440 82	450 00	.....	351 73	
.....	.....	.....	.....	.....	.....	.....	.....	1,692 25	
.....	.....	.....	.....	.....	.....	.....	.....	2,783 27	
384 25	968 82	702 49	266 33	.....	266 33	434 59	343 77	191 61	Dufferin.
.....	294 40	.....	294 40	.....	294 40	.....	.....	256 50	
.....	.....	.....	.....	.....	.....	.....	.....	83 20	
28 00	580 10	40 00	540 10	.....	540 10	91 35	.....	25 00	
219 55	.....	.....	.....	.....	.....	386 00	70 75	22 00	
.....	1,623 25	97 60	1,525 65	.....	1,525 65	675 00	.....	86 30	
45 35	.....	.....	.....	.....	.....	.....	.....	229 70	
8 45	.....	.....	.....	.....	.....	.....	.....	652 80	
774 32	2,402 66	906 54	1,496 12	.....	1,496 12	895 30	651 13	566 49	Elgin.
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
25 12	297 89	.....	297 89	.....	297 89	.....	.....	272 77	
203 85	2,043 16	446 34	1,596 82	.....	1,596 82	1,238 65	41 00	75 00	
551 61	.....	.....	.....	.....	.....	208 00	672 98	97 78	
118 40	3,331 10	505 80	2,825 30	32 53	2,792 77	675 00	.....	198 30	
127 30	.....	.....	.....	.....	.....	.....	.....	531 50	
130 80	.....	.....	.....	.....	.....	.....	.....	1,796 75	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
ESSEX: Sandwich.	Sheriff	J. E. D'Avignon	2,429 23	.....	2,429 23	1,965 43
	Surrogate Judge	Judge McHugh	1,000 00	.....	1,000 00	.....
	Local Master	Henry Clay	214 00	.....	214 00	208 00
	Crown Attorney	J. H. Rodd	1,451 60	.....	2,551 40	997 35
	Clerk of the Peace.	"	1,099 80	.....	.....	756 47
	Local Registrar	Francis Cleary	281 51	675 00	3,710 55	956 51
	County Court Clerk	"	628 54	.....	.....	628 54
	SurrogateRegistrar	"	2,125 50	.....	.....	2,121 10
FRONTENAC Kingston	Sheriff	Thomas Dawson	2,667 41	.....	2,667 41	2,320 91
	Surrogate Judge	Judge Price	Commuted	752 00	.....	.....
	Local Master	J. B. Walkem, KC	118 20	.....	118 20	.....
	Crown Attorney	J. L. Whiting, K.C.	338 50	.....	1,365 82	305 00
	Clerk of the Peace.	"	1,027 32	.....	.....	642 52
	Local Registrar	T. M. Asselstine	85 40	675 00	1,229 00	760 40
	County Court Clerk	"	468 60	.....	.....	468 60
	SurrogateRegistrar	Miss H. Fraser	1,328 00	.....	1,328 00	1,264 55
GREY: Owen Sound	Sheriff	C. H. Moore	2,603 09	.....	2,603 09	1,984 00
	Surrogate Judge	Judge Widdifield	1,000 00	.....	1,176 50	1,000 00
	Local Master	"	176 50	.....	.....	144 45
	Crown Attorney	J. Armstrong	621 00	.....	1,947 75	538 00
	Clerk of the Peace.	"	1,326 75	.....	.....	810 42
	Local Registrar	W. A. Bishop	185 20	750 00	3,922 72	810 20
	County Court Clerk	"	817 15	.....	.....	817 15
	SurrogateRegistrar	"	2,170 37	.....	.....	2,170 37
HALDIMAND Cayuga	Sheriff	M. McConnell	1,655 64	.....	1,655 64	1,383 73
	Surrogate Judge	Judge Douglas	760 25	.....	766 05	760 25
	Local Master	"	5 80	.....	.....	.....
	Crown Attorney	J. A. Murphy	540 75	.....	1,869 89	394 55
	Clerk of the Peace.	"	1,329 14	.....	.....	1,010 47
	Local Registrar	J. C. Eccles	292 80	600 00	2,199 20	876 80
	County Court Clerk	"	270 35	.....	.....	241 80
	SurrogateRegistrar	"	1,036 05	.....	.....	1,032 85
HALTON: Milton	Sheriff	S. Webster	1,764 06	.....	1,764 06	1,143 53
	Surrogate Judge	Judge Gorham	643 65	.....	658 65	643 65
	Local Master	"	15 00	.....	.....	14 80
	Crown Attorney	W. I. Dick	830 55	.....	2,373 87	660 90
	Clerk of the Peace.	"	1,543 32	.....	.....	1,097 06
	Local Registrar	*W. J. McClenahan	60 80	600 00	1,832 00	60 80
	County Court Clerk	"	228 95	.....	.....	228 95
	SurrogateRegistrar	"	942 25	.....	.....	942 25
HASTINGS: Belleville	Sheriff	M. B. Morrison	3,369 53	.....	3,369 53	2,390 23
	Surrogate Judge	Judge Fraleck	Commuted	985 00	.....	.....
	Local Master	S. S. Lazier	Commuted	3,000 00	.....	.....
	Deputy Registrar	"	.....	.....	.....	.....
	Crown Attorney	P. J. M. Anderson	1,496 56	.....	2,791 06	939 73
	Clerk of the Peace.	"	1,294 50	.....	.....	1,194 85
	Deputy Cl'k of the Crown	John Williams	100 46	450 00	3,854 89	550 46
	County Court Cl'k.	"	949 32	.....	.....	949 32
	SurrogateRegistrar	"	2,355 11	.....	.....	2,355 11

* Appointed by O. in C. 8th November, 1912,

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net Income.	Earnings of each officer payable by the Province, the County, and the General Public, respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
820 56	2,785 99	441 20	2,344 79	.....	2,344 79	1,038 36	563 20	827 67	Essex.
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
18 04	226 04	.....	226 04	.....	226 04	.....	.....	214 00	
408 20	2,473 76	628 97	1,844 79	.....	1,844 79	1,426 60	.....	25 00	
311 74	.....	.....	.....	.....	.....	134 10	867 47	98 23	
.....	3,710 55	579 09	3,131 46	76 29	3,055 17	675 00	.....	281 51	
.....	.....	.....	.....	.....	.....	.....	.....	628 54	
4 40	.....	.....	.....	.....	.....	.....	.....	2,125 50	
374 77	2,695 68	505 50	2,190 18	.....	2,190 18	812 72	603 00	1,251 69	Frontenac.
.....	752 00	.....	.....	.....	752 00	752 00	.....	.....	
237 54	237 54	10 00	227 54	.....	227 54	.....	.....	118 20	
52 00	1,355 12	100 00	1,255 12	.....	1,255 12	338 50	.....	.....	
355 60	.....	.....	.....	.....	.....	111 65	841 17	75 00	
.....	1,229 00	13 70	1,215 30	.....	1,215 30	675 00	.....	85 40	
.....	.....	.....	.....	.....	.....	.....	.....	468 60	
78 75	1,343 30	15 00	1,328 30	.....	1,328 30	.....	.....	1,328 00	
637 82	2,621 82	1,194 56	1,427 26	.....	1,427 26	1,100 00	820 29	682 80	Grey.
.....	1,180 20	.....	1,180 20	.....	1,180 20	.....	.....	1,000 00	
35 75	.....	.....	.....	.....	.....	.....	.....	176 50	
325 60	2,196 48	384 00	1,812 48	.....	1,812 48	511 00	95 00	15 00	
522 46	.....	.....	.....	.....	.....	202 15	1,036 60	88 00	
125 00	3,922 72	330 20	3,592 52	196 26	3,396 26	750 00	.....	185 20	
.....	.....	.....	.....	.....	.....	.....	.....	817 15	
.....	.....	.....	.....	.....	.....	.....	.....	2,170 37	
388 83	1,772 56	259 73	1,512 83	.....	1,512 83	.....	.....	.....	Haldimand.
.....	760 95	.....	760 95	.....	760 95	.....	.....	760 25	
0 70	.....	.....	.....	.....	.....	.....	.....	5 80	
53 50	1,776 56	360 00	1,416 56	.....	1,416 56	509 10	12 65	19 00	
318 04	.....	.....	.....	.....	.....	142 95	1,131 78	54 41	
.....	2,167 30	260 75	1,906 55	.....	1,906 55	600 00	.....	292 80	
13 90	.....	.....	.....	.....	.....	.....	.....	270 35	
1 95	.....	.....	.....	.....	.....	.....	.....	1,036 05	
413 63	1,557 16	774 52	782 64	.....	782 64	835 16	520 73	408 17	Halton.
.....	658 45	.....	658 45	.....	658 45	.....	.....	643 65	
.....	.....	.....	.....	.....	.....	.....	.....	15 00	
47 95	2,217 69	581 45	1,636 24	.....	1,636 24	724 50	.....	106 05	
411 78	.....	.....	.....	.....	.....	116 85	1,416 83	9 64	
.....	1,832 00	558 70	1,273 30	.....	1,273 30	600 00	.....	60 80	
.....	.....	.....	.....	.....	.....	.....	.....	228 95	
.....	.....	.....	.....	.....	.....	.....	.....	942 25	
728 07	3,118 30	1,264 19	1,854 11	.....	1,854 11	1,478 56	923 14	967 83	Hastings.
.....	985 00	.....	985 00	.....	985 00	985 00	.....	.....	
.....	3,000 00	550 00	2,450 00	.....	2,450 00	3,000 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
236 30	2,484 99	337 45	2,147 54	14 75	2,132 79	1,371 56	.....	125 00	
114 11	.....	.....	.....	.....	.....	244 50	1,050 00	.....	
.....	3,854 89	676 11	3,178 78	85 76	3,093 02	450 00	.....	100 46	
.....	.....	.....	.....	.....	.....	.....	.....	949 32	
.....	.....	.....	.....	.....	.....	.....	.....	2,355 11	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c	$ c.
HURON:	Sheriff	R. G. Reynolds .	2,458 34	.....	2,458 34	2,385 29
Goderich.	Surrogate Judge ..	Judge Doyle	Commuted	1,000 00	1,198 07	1,148 61
	Local Master	"	198 07	.....	.....	.....
	Crown Attorney ..	C. Seager.....	1,017 41	.....	2,354 52	836 73
	Clerk of the Peace..	"	1,337 11	.....	.....	1,239 23
	Local Registrar...	D. McDonald....	28 00	750 00	3,644 75	778 00
	County Court Clerk.	"	211 30	.....	.....	211 30
	SurrogateRegistrar	"	2,655 45	.....	.....	2,655 45
KENORA:						
Kenora.	Sheriff	John W. Humble.	1,567 25	1,000 00	2,567 25	2,056 30
	Surrogate Judge ..	Judge Chapple ..	.....	*500 00	520 00	500 00
	Local Master	" ..	20 00	.....	.....	20 00
	Crown Attorney...	J.F.MacGillivray	650 73	.....	1,221 59	504 73
	Clerk of the Peace.	K.C."	320 86	250 00	.....	424 79
	Local Registrar...	C. W. Chadwick.	47 20	700 00	1,131 31	747 20
	District Court Cl'k.	" .	254 89	.....	.....	254 89
	SurrogateRegistrar	" .	129 22	.....	.....	129 22
KENT:						
Chatham.	Sheriff	J. R. Gemmill..	2,538 96	.....	2,538 96	1,542 83
	Surrogate Judge...	Judge Bell.....	846 75	.....	.....	846 75
	Local Master.....	Thos. Scullard..	84 15	.....	84 15	25 55
	Crown Attorney...	H. D. Smith	1,127 27	.....	2,380 72	907 67
	Clerk of the Peace.	"	1,253 45	.....	.....	906 85
	Local Registrar ..	James Holmes ..	126 80	675 00	2,784 80	801 80
	County Court Clerk.	" .	590 60	.....	.....	590 60
	Surrogate Regist'r.	" ..	1,392 40	.....	.....	1,392 40
LAMBTON:						
Sarnia.	Sheriff	James Flintoft..	2,184 34	.....	2,184 34	1,650 39
	Surrogate Judge...	Judge Macwatt..	Commuted	1,000 00	1,048 84	1,000 00
	Local Master	" ..	48 84	.....	.....	48 84
	Crown Attorney...	J. P. Bucke.....	681 03	.....	1,804 08	458 03
	Clerk of the Peace.	"	1,123 05	.....	.....	1,079 15
	Local Registrar...	Alex Saunders..	154 63	675 00	3,519 71	717 13
	County Court Clerk.	" ..	517 07	.....	.....	517 07
	Surrogate Regist'r.	" ..	2,273 01	.....	.....	2,273 01
LANARK:	Sheriff	D. G. MacMartin.	1,845 32	.....	1,845 32	1,429 33
Perth.	Surrogate Judge...	Judge Senkler...	614 75	.....	633 35	614 75
	Local Master.....	" ..	18 60	.....	.....	.....
	Crown Attorney...	E.G.Malloch,K.C.	496 55	.....	1,163 35	290 60
	Clerk of the Peace	"	666 80	.....	.....	389 55
	Local Registrar . .	W. P. McEwen..	136 70	675 00	2,480 19	749 35
	County Court Clerk.	" ..	498 60	.....	.....	402 25
	Surrogate Regist'r.	" ..	1,169 89	.....	.....	784 29
LEEDS AND						
GRENVILLE:	Sheriff	J. A. McCammon	2,929 20	.....	2,929 20	2,386 56
Brockville.	Surrogate Judge...	Judge McDonald,	Commuted	960 00	1,026 60	960 00
	Local Masters...	" .	66 60	.....	.....	.....
		Judge Reynolds.	82 52	.....	.....	40 36
	Crown Attorney...	M. M. Brown....	829 30	.....	2,004 14	704 24
	Clerk of the Peace.	"	1,174 84	.....	.....	846 25
	Local Registrar ...	O. K. Fraser	300 90	750 00	5,292 75	1,000 20
	County Court Clerk.	"	1,099 90	.....	.....	1,005 65
	Surrogate Regist'r.	"	3,141 95	.....	.....	2,890 10

* By 10 Edw. VII., Cap. 26, Sec. 13.

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public, respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
49 28	2,434 57	550 44	1,884 13	.....	1,884 13	1,096 70	658 87	702 77	Huron.
.....	1,200 51	13 46	1,187 05	.....	1,187 05	1,000 00	.....	.....	
51 90	.....	.....	.....	.....	.....	.....	.....	198 07	
327 02	2,517 21	107 83	2,409 38	40 93	2,368 45	897 41	.....	120 00	
114 23	.....	.....	.....	.....	.....	142 35	1,100 00	94 76	
.....	3,644 75	869 80	2,774 95	27 49	2,747 46	750 00	.....	28 00	
.....	.....	.....	.....	.....	.....	.....	.....	211 30	
.....	.....	.....	.....	.....	.....	.....	.....	2,655 45	
594 33	2,650 63	709 31	1,941 32	.....	1,941 32	2,102 24	.....	465 01	Kenora.
.....	520 00	.....	520 00	.....	520 00	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	20 00	
83 40	1,186 22	21 45	1,164 77	.....	1,164 77	600 73	.....	50 00	
173 30	.....	.....	.....	.....	.....	552 49	.....	18 37	
.....	1,131 31	300 00	831 31	.....	831 31	700 00	.....	47 20	
.....	.....	.....	.....	.....	.....	.....	.....	254 89	
.....	.....	.....	.....	.....	.....	.....	.....	129 22	
869 29	2,412 12	695 63	1,716 49	.....	1,716 49	807 41	739 45	992 10	Kent.
.....	846 75	.....	846 75	.....	846 75	.....	.....	846 75	
25 55	51 10	.....	51 10	.....	51 10	.....	.....	84 15	
357 82	2,518 94	700 00	1,818 94	.....	1,818 94	626 27	.....	501 00	
346 60	.....	.....	.....	.....	.....	185 75	1,000 00	67 70	
.....	2,784 80	674 00	2,110 80	.....	2,110 80	675 00	.....	126 80	
.....	.....	.....	.....	.....	.....	.....	.....	590 60	
.....	.....	.....	.....	.....	.....	.....	.....	1,392 40	
779 10	2,429 49	669 08	1,760 41	.....	1,760 41	1,100 73	492 34	591 27	Lambton.
.....	1,060 64	.....	1,059 43	.....	1,059 43	1,000 00	.....	.....	
11 80	.....	1 21	.....	.....	.....	.....	.....	48 84	
43 90	1,624 98	18 68	1,606 30	.....	1,606 30	644 88	36 65	.....	
43 90	.....	.....	.....	.....	.....	103 05	1,020 00	.....	
112 50	3,619 71	745 00	2,874 71	37 47	2,837 24	675 00	.....	154 63	
.....	.....	.....	.....	.....	.....	.....	.....	517 07	
.....	.....	.....	.....	.....	.....	.....	.....	2,273 01	
417 34	1,846 67	744 82	1,101 85	.....	1,101 85	656 92	583 50	604 90	Lanark
.....	634 44	.....	634 44	.....	634 44	.....	.....	614 75	
19 69	.....	.....	.....	.....	.....	.....	.....	18 60	
138 00	1,140 24	209 62	930 62	.....	930 62	355 33	141 22	.....	
322 09	.....	.....	.....	.....	.....	140 11	472 19	54 50	
.....	2,464 49	280 70	2,183 79	.....	2,183 79	675 00	.....	136 70	
115 30	.....	.....	.....	.....	.....	.....	.....	498 60	
413 30	.....	.....	.....	.....	.....	.....	.....	1,169 89	
627 71	3,014 27	879 15	2,135 12	.....	2,135 12	1,096 92	709 74	1,122 54	Leeds and Grenville.
.....	960 00	.....	960 00	.....	.....	960 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	66 60	
38 38	78 74	.....	78 74	.....	78 74	.....	.....	82 52	
326 66	2,329 61	357 40	1,972 21	.....	1,972 21	780 30	.....	49 00	
452 46	.....	.....	.....	.....	.....	202 94	812 03	159 87	
48 33	5,229 35	501 70	4,727 65	763 83	3,963 82	750 00	.....	300 90	
110 00	.....	.....	.....	.....	.....	.....	.....	1,099 90	
175 07	.....	.....	.....	.....	.....	.....	.....	3,141 95	

APPENDIX F—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
LENNOX & ADDINGTON: Napanee.	Sheriff	G. D. Hawley	1,279 57	.....	1,279 57	890 70
	Surrogate Judge	Judge Madden	507 50	.....	507 50	507 50
	Local Master	S. S. Lazier	39 30	.....	39 30	39 30
	Crown Attorney	H.M.Deroche,K.C.	60 00	.....	724 55	53 00
	Clerk of the Peace.	"	664 55	.....	.....	407 53
	Local Registrar	W. P. Deroche	75 80	600 00	1,646 90	675 80
	County Court Clerk.	"	320 85	.....	.....	320 85
	Surrogate Regist'r.	"	650 25	.....	.....	650 25
LINCOLN: St. Catharines.	Sheriff	T. C. Dawson	2,249 85	.....	2,249 85	1,812 80
	Surrogate Judge	Judge Carmen	Commuted	900 00	973 50	900 00
	Local Master	"	73 50	.....	.....	46 80
	Crown Attorney	M. Brennan	761 40	.....	2,272 21	516 40
	Clerk of the Peace.	"	1,510 81	.....	.....	926 28
	Local Registrar	Johnson Clench	92 68	675 00	2,618 84	738 28
	County Court Clerk	"	376 02	.....	.....	352 32
MANITOULIN: Gore Bay.	Surrogate Regist'r.	"	1,475 14	.....	.....	1,475 14
	Sheriff	J. Haddow Fell	683 95	950 00	1,633 95	1,510 44
	Surrogate Judge	Judge Hewson	.....	*500 00	506 90	500 00
	Local Master	"	6 90	.....	.....	.....
	Crown Attorney	†W. F. McRae	53 65	.....	737 83	39 00
	Clerk of the Peace.	"	434 18	250 00	.....	314 92
	Local Registrar	C. C. Platt	4 00	.....	1,061 54	4 00
	District Court Cl'k.	"	103 55	850 00	.....	953 55
	Surrogate Regist'r.	"	103 99	.....	.....	103 99
MIDDLESEX: London.	Sheriff	D. M. Cameron	4,675 94	.....	4,675 94	3,292 74
	Surrogate Judges	Judge Macbeth	1,300 00	.....	1,300 00	.....
		Judge Elliott	1,000 00	.....	1,000 00	.....
	Local Master	R. K. Cowan	271 38	.....	1,586 07	48 38
	Deputy Registrar.	"	1,314 69	.....	.....	709 09
	Crown Attorney	J. B. McKillop	1,605 64	.....	3,211 39	1,120 79
	Clerk of the Peace.	"	1,605 75	.....	.....	969 44
	Deputy Clerk of the Crown	Edmund Weld	88 57	500 00	5,317 91	588 57
	County Court Clerk.	"	747 40	.....	.....	747 40
	SurrogateRegistrar	"	3,981 94	.....	.....	3,908 61
MUSKOKA: Bracebridge.	Sheriff	D. E. Bastedo	1,219 91	750 00	1,969 91	1,724 05
	Surrogate Judge	‡Judge Mahaffy	.....	*500 00	500 00	.....
	Local Master	§ "	.....	.....	.....	.....
	Crown Attorney	Thomas Johnson	298 20	250 00	982 77	445 20
	Clerk of the Peace.	"	434 57	.....	.....	170 85
	Local Registrar	Isaac Huber	60 94	600 00	1,253 66	660 94
	District Court Cl'k.	"	182 49	.....	.....	182 49
	SurrogateRegistrar	"	410 23	.....	.....	410 23
NIPISSING: North Bay	Sheriff	H. C. Varin	5,213 83	1,000 00	6,213 83	5,264 23
	Surrogate Judge	Judge Valin	.....	*500 00	576 40	500 00
	Local Master	"	76 40	.....	.....	76 40
	Crown Attorney	T. E. McKee	675 00	.....	1,812 18	433 50
	Clerk of the Peace.	"	887 18	250 00	.....	906 53
	Local Registrar	T. J. Bourke	421 10	150 00	2,772 00	571 10
	District Court Cl'k	"	1,245 70	450 00	.....	1,695 70
	SurrogateRegistrar	"	505 20	.....	.....	505 20

*By 9 Edw. VII., Cap. 26, Sec. 13.
‡ O. in C., 31st October, 1912.
† From 1 May, O. in C., 27th April, 1912.
§ O. in C., 21st January, 1913.

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public, respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
359 43	1,250 13	262 82	987 31	.....	987 31	534 93	572 71	171 93	Lennox and
.....	.....	.....	507 50	.....	507 50	.....	.....	507 50	Addington.
28 90	68 20	6 00	62 20	.....	62 20	.....	.....	39 30	
51 50	735 14	8 45	726 69	.....	726 69	60 00	.....	.....	
223 11	.....	.....	.....	.....	.....	62 50	602 05	.....	
.....	1,646 90	124 40	1,522 50	.....	1,522 50	600 00	.....	75 80	
.....	.....	.....	.....	.....	.....	.....	.....	320 85	
.....	.....	.....	.....	.....	.....	.....	.....	650 25	
567 35	2,380 15	427 35	1,952 80	.....	1,952 80	754 49	706 85	788 51	Lincoln.
.....	946 80	.....	946 80	.....	946 80	900 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	73 50	
128 00	2,114 08	220 00	1,894 08	.....	1,894 08	656 40	105 00	.....	
543 40	.....	.....	.....	.....	.....	173 65	1,202 16	135 00	
8 82	2,597 86	452 25	2,145 61	.....	2,145 61	675 00	.....	92 68	
23 30	.....	.....	.....	.....	.....	.....	.....	376 02	
.....	.....	.....	.....	.....	.....	.....	.....	1,475 14	
190 58	1,701 02	135 19	1,565 83	.....	1,565 83	1,562 67	71 28	.....	Manitoulin.
.....	500 00	.....	500 00	.....	500 00	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	6 90	
.....	353 92	85 69	268 23	.....	268 23	53 65	.....	.....	
.....	.....	.....	.....	.....	.....	684 83	.....	.....	
.....	1,061 54	.....	1,061 54	.....	1,061 54	.....	.....	4 00	
.....	.....	.....	.....	.....	.....	850 00	.....	103 55	
.....	.....	.....	.....	.....	.....	.....	.....	103 99	
681 70	3,974 44	1,592 10	2,382 34	.....	2,382 34	1,198 19	1,901 79	1,575 96	Middlesex.
.....	1,300 00	.....	1,300 00	.....	1,300 00	.....	.....	1,300 00	
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
46 38	1,072 37	357 00	715 37	.....	715 37	.....	.....	271 38	
268 52	.....	.....	.....	.....	.....	.....	.....	1,314 69	
453 28	3,314 60	1,000 00	2,314 60	31 46	2,283 14	1,510 74	52 00	42 90	
771 09	.....	.....	.....	.....	.....	283 12	1,199 43	123 20	
20 00	5,354 92	1,987 00	3,367 92	123 58	3,244 34	500 00	.....	88 57	
10 60	.....	.....	.....	.....	.....	.....	.....	747 40	
79 74	.....	.....	.....	.....	.....	.....	.....	3,981 94	
332 22	2,056 27	1,116 00	940 27	.....	940 27	1,829 25	.....	140 66	Muskoka.
.....	500 00	.....	500 00	.....	500 00	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
111 00	911 26	24 20	887 06	.....	887 06	548 20	.....	.....	
184 21	.....	.....	.....	.....	.....	426 57	.....	8 00	
.....	1,253 66	18 25	1,235 41	.....	1,235 41	600 00	.....	60 94	
.....	.....	.....	.....	.....	.....	.....	.....	182 49	
.....	.....	.....	.....	.....	.....	.....	.....	410 23	
239 40	5,503 63	3,459 58	2,044 05	.....	2,044 05	3,550 87	.....	2,662 96	Nipissing
.....	576 40	.....	576 40	.....	576 40	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	76 40	
141 15	1,735 22	100 00	1,635 22	.....	1,635 22	675 00	.....	.....	
254 04	.....	.....	.....	.....	.....	1,095 18	.....	42 00	
.....	2,772 00	319 25	2,452 75	.....	2,452 75	150 00	.....	421 10	
.....	.....	.....	.....	.....	.....	450 00	.....	1,245 70	
.....	.....	.....	.....	.....	.....	.....	.....	505 20	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
NORFOLK:						
Simcoe ...	Sheriff	F. S. Snider	1,865 59	.....	1.865 59	1,408 62
	Surrogate Judge ..	Judge Robb	625 50	.....	651 30	625 50
	Local Master.....	"	25 80	.....	.....	10 30
	Crown Attorney...	T. R. Slaght,K.C.	892 00	.....	3,077 84	513 60
	Clerk of the Peace.	"	2,185 84	.....	.....	1,564 32
NORTHUM-	Local Registrar ..	C. C. Rapelje....	161 30	675 00	2,478 90	785 60
BERLAND	County Court Cl'k.	"	348 75	.....	.....	259 02
AND	SurrogateRegistrar	"	1,293 85	.....	.....	1,033 33
DURHAM:						
Cobourg ..	Sheriff	*D. J. Nesbitt ...	2,532 33	.....	2,532 33	1,518 01
	Surrogate Judge...	Judge Benson ...	commuted	1,000 00	.....	.....
	Local Master	Judge Roger	24 40	.....	24 40	6 00
	Crown Attorney...	W. F. Kerr.....	980 57	.....	2,035 78	666 35
	Clerk of the Peace.	"	1,055 21	.....	.....	622 52
	Local Registrar...	John T. Field ...	194 30	750 00	4.027 30	944 30
	County Court Clerk	"	493 35	.....	.....	493 35
	SurrogateRegistrar	"	2,589 65	.....	.....	2,589 65
ONTARIO:						
Whitby ..	Sheriff	J. F. Paxton	2,322 85	.....	2.322 85	1,671 18
	Surrogate Judge...	G. Y. Smith.....	1,000 00	.....	1,122 78	1,000 00
	Local Master .. .	"	122 78	.....	.....	27 50
	Crown Attorney...	J.E.Farewell, KC	1,163 99	.....	2,611 72	974 46
	Clerk of the Peace.	"	1,447 73	.....	.....	999 17
	Local Registrar...	†Horace Bascom.	61 79	675 00	3.080 59	736 79
	County Court Cl'k.	"	375 87	.....	.....	375 87
	SurrogateRegistrar	"	1,967 93	.....	.....	1,967 93
OXFORD:						
Woodstock	Sheriff	‡Wm. McGhee...	2,202 56	.....	2,202 56	1,690 40
	Surrogate Judge ..	Judge Finkle....	commuted	1,000 00	.....	.....
	Local Master	W. T. McMullen.	338 65	.....	418 39	235 25
	Deputy Registrar..	"	79 74	.....	.....	57 09
	Crown Attorney...	R. N. Ball	615 10	.....	615 10	531 65
	Clerk of the Peace.	F. R. Ball, K.C..	797 91	.....	797 91	483 89
	Deputy Clerk of the Crown.....	James Canfield..	175 10	450 00	3.706 25	498 00
	County Court Clerk	"	601 05	.....	.....	496 50
PARRY	SurrogateRegistrar	"	2,480 10	.....	.....	1,910 00
SOUND:						
Parry Sound	Sheriff	Sam'l Armstrong	1,808 65	750 00	2,558 65	1,997 41
	Surrogate Judge ..	Judge McCurry..	.....	§500 00	507 40	500 00
	Local Master.....	"	7 40	.....	.....	7 40
	Crown Attorney...	W. L. Haight....	616 81	250 00	1,339 32	568 31
	Clerk of the Peace.	"	472 51	.....	.....	236 92
	Local Registrar...	E. Jordan.....	28 60	600 00	1,138 87	628 60
	District Court Cl'k.	"	235 55	.....	.....	235 55
	SurrogateRegistrar	"	274 72	.....	.....	274 72
PEEL:		[son				
Brampton.	Sheriff	Nathan Hender-	1,426 90	.....	1,426 90	1,095 80
	Surrogate Judge...	Judge McGibbon.	715 50	.....	758 90	715 50
	Local Master	"	43 40	.....	.....	43 40
	Crown Attorney...	W. H. McFadden, K.C.	382 83	.....	1,183 12	264 28
	Clerk of the Peace.	"	800 29	.....	.....	579 58
	Local Registrar...	J. B. Dixon.....	165 62	600 00	2.182 95	765 62
	County Court Cl'k.	"	324 07	.....	.....	324 07
	SurrogateRegistrar	"	1,093 26	.....	.....	1,093 26

* Appointed 1st August. † Appointed 11th October.
‡ O. in C., 10th Jan., assumed office, Feb. 17th. § By 10 Edw. VII., Cap. 26, Sec. 13.

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
461 66	1,870 28	647 75	1,222 53	.....	1,222 53	826 86	720 09	318 64	Norfolk.
.....	682 80	.....	682 80	.....	682 80	.....	.....	625 50	
47 00	.....	.....	.....	.....	.....	.....	.....	25 80	
100 00	2,868 53	614 00	2,254 53	25 45	2,229 08	878 00	8 00	6 00	
690 61	.....	.....	.....	.....	.....	182 40	1,978 28	25 16	
144 10	2,561 54	57 00	2,504 54	45	2,504 09	675 00	.....	161 30	
107 00	.....	.....	.....	.....	.....	.....	.....	348 75	
232 49	.....	.....	.....	.....	.....	.....	.....	1,293 85	
880 68	2,398 69	614 79	1,783 90	.....	1,783 90	988 32	678 00	866 01	Northumberland and Durham.
.....	1,000 00	.....	1,000 00	.....	1,000 00	1,000 00	.....	.....	
25 92	31 92	.....	31 92	.....	31 92	.....	.....	24 40	
395 16	2,156 79	410 08	1,746 71	.....	1,746 71	866 26	5 00	109 31	
472 76	.....	.....	.....	.....	.....	153 20	786 05	115 96	
.....	4,027 30	386 07	3,641 23	220 62	3,420 61	750 00	.....	194 30	
.....	.....	.....	.....	.....	.....	.....	.....	493 35	
.....	.....	.....	.....	.....	.....	.....	.....	2,589 65	
418 66	2,089 84	790 85	1,298 99	.....	1,298 99	1,101 47	529 20	692 18	Ontario.
.....	1,027 50	10 00	1,017 50	.....	1,017 50	.....	.....	1,000 00	
.....	.....	.....	.....	.....	.....	.....	.....	122 78	
86 72	2,645 78	558 55	2,087 23	8 72	2,078 51	966 40	.....	197 59	
585 43	.....	.....	.....	.....	.....	185 79	1,195 29	66 65	
.....	3,080 59	540 00	2,540 59	4 05	2,536 54	675 00	.....	61 79	
.....	.....	.....	.....	.....	.....	.....	.....	375 87	
.....	.....	.....	.....	.....	.....	.....	.....	1,967 93	
35 37	1,725 77	1,204 38	521 39	.....	521 39	987 92	651 96	562 68	Oxford.
.....	1,000 00	.....	1,000 00	.....	1,000 00	1,000 00	.....	.....	
76 80	392 10	100 00	292 19	.....	292 10	.....	.....	338 65	
22 96	.....	.....	.....	.....	.....	.....	.....	79 74	
76 71	608 36	.....	608 36	.....	608 36	298 00	.....	317 10	
350 94	834 83	8 00	826 83	.....	826 83	73 70	669 15	55 06	
118 40	3,734 00	251 30	3,482 70	146 54	3,336 16	450 00	.....	175 10	
96 00	.....	.....	.....	.....	.....	.....	.....	601 05	
615 10	.....	.....	.....	.....	.....	.....	.....	2,480 10	
517 14	2,514 55	1,397 24	1,117 31	.....	1,117 31	2,075 15	.....	483 50	Parry Sound.
.....	507 40	.....	507 40	.....	507 40	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	7 40	
152 86	1,134 25	258 07	876 18	.....	876 18	535 81	.....	81 00	
176 16	.....	.....	.....	.....	.....	424 29	.....	48 22	
.....	1,138 87	12 50	1,126 37	.....	1,126 37	600 00	.....	28 60	
.....	.....	.....	.....	.....	.....	.....	.....	235 55	
.....	.....	.....	.....	.....	.....	.....	.....	274 72	
366 71	1,462 51	645 26	817 25	.....	817 25	648 80	466 38	311 72	Peel.
.....	758 90	.....	758 90	.....	758 90	.....	.....	715 50	
.....	.....	.....	.....	.....	.....	.....	.....	43 40	
97 15	1,111 47	260 36	851 11	.....	851 11	369 50	.....	13 33	
170 46	.....	.....	.....	.....	.....	90 40	665 25	44 64	
141 60	2,324 55	177 25	2,147 30	.....	2,147 30	600 00	.....	165 62	
.....	.....	.....	.....	.....	.....	.....	.....	324 07	
.....	.....	.....	.....	.....	.....	.....	.....	1,093 26	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
PERTH: Stratford.	Sheriff	Thomas Magwood	2,560 80	.....	2,560 80	2,038 34
	Surrogate Judge	Judge Barron	Commuted	873 00	1,723 00	873 00
	Local Master	"	Commuted	850 00	.....	850 00
	Crown Attorney	G. G. McPherson K.C.	703 50	.....	1,951 57	596 50
	Clerk of the Peace.	"	1,248 07	.....	.....	797 19
	Local Registrar	E. Sydney Smith	430 54	675 00	3,847 93	1,046 80
	County Court Clerk	" K.C.	976 19	.....	.....	976 19
	Surrogate Registrar	"	1,766 20	.....	.....	1,766 20
PETERBOROUGH: Peterboro'	Sheriff	J. A. Hall	1,974 84	.....	1,974 84	1,538 37
	Surrogate Judge	Judge Huycke	998 25	.....	1,274 27	998 25
	Local Master	"	276 02	.....	.....	115 52
	Crown Attorney	R. E. Wood	559 80	.....	1,461 29	435 10
	Clerk of the Peace.	"	901 49	.....	.....	391 04
	Local Registrar	G. J. Sherry	630 59	675 00	3,458 86	1,119 93
	County Court Clerk	"	570 55	.....	.....	541 30
	Surrogate Registrar	"	1,582 72	.....	.....	1,582 72
PRESCOTT & RUSSELL: L'Orignal	Sheriff	Albert Hagar	1,322 90	.....	1,322 90	851 92
	Surrogate Judge	Judge Constantineau.	405 50	.....	405 50	405 50
	Local Master	"	.....	.....	.....	.....
	Crown Attorney	John Maxwell	291 82	.....	1,124 99	239 05
	Clerk of the Peace.	"	833 17	.....	.....	671 41
	Local Registrar	Joseph Bélanger.	35 09	675 00	1,876 59	710 09
	County Court Clerk	"	243 95	.....	.....	238 03
	Surrogate Registrar	"	922 55	.....	.....	819 23
PRINCE EDWARD: Picton	Sheriff	James Gibson	1,034 59	.....	1,034 59	899 77
	Surrogate Judge	Judge Morrison	564 00	.....	642 33	564 00
	Local Master	"	78 33	.....	.....	72 18
	Crown Attorney	J. Roland Brown	80 90	.....	548 81	65 90
	Clerk of the Peace	"	467 91	.....	.....	257 25
	Local Registrar	Nehemiah Gilbert	98 30	600 00	1,895 10	698 30
	County Court Clerk	"	337 75	.....	.....	337 75
	Surrogate Registrar	"	859 05	.....	.....	859 05
RAINY RIVER: Fort Frances	Sheriff	W. A. Baker	1,834 20	750 00	2,584 20	2,134 45
	Surrogate Judge	Judge Fitch	.....	*500 00	528 20	500 00
	Local Master	"	28 20	.....	.....	28 20
	Crown Attorney	A. D. George,	598 50	.....	1,451 35	335 60
	Clerk of the Peace.	"	602 85	250 00	.....	775 40
	Local Registrar	Wm. H. Elliott	70 00	450 00	901 82	408 00
	District Court Cl'k.	"	210 25	.....	.....	210 25
	Surrogate Regist'r	"	171 57	.....	.....	171 57
RENFREW: Pembroke	Sheriff	Alex. Morris	2,292 39	.....	2,292 39	2,144 24
	Surrogate Judge	†Judge Fisher	540 50	.....	540 50	540 50
	Local Master	‡ "	.....	.....	.....	.....
	Crown Attorney	J.H.Burritt,K.C.	106 11	.....	809 71	106 11
	Clerk of the Peace.	"	703 60	.....	.....	435 97
	Local Registrar	H. W. Perrett	36 99	600 00	1,962 03	636 99
	County Court Clerk	"	349 95	.....	.....	349 95
	Surrogate Registrar	"	975 09	.....	.....	975 09

* By 10 Edw. VII., Cap. 26, Sec. 13. † Acting, 10 Edw. VII., Cap. 31, Secs. 2 and 3.
‡ Appointed 14th September.

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
582 10	2,620 44	930 01	1,690 43	.....	1,690 43	1,073 78	541 18	945 84	Perth.
.....	1,723 00	.....	1,723 00	.....	1,723 00	873 00	.....	.....	
.....	.....	.....	.....	.....	.....	850 00	.....	.....	
272 50	2,435 56	288 00	2,147 56	14 75	2,132 71	547 00	.....	156 50	
769 37	.....	.....	.....	.....	.....	120 50	1,100 12	27 45	
.....	3,789 19	1,019 94	2,769 25	26 93	2,742 32	675 00	.....	430 54	
.....	.....	.....	.....	.....	.....	.....	.....	976 19	
.....	.....	.....	.....	.....	.....	.....	.....	1,766 20	
408 06	1,946 63	839 45	1,107 18	.....	1,107 18	914 92	477 14	582 78	Peterborough
.....	1,263 77	.....	1,263 77	.....	1,263 77	.....	.....	998 25	
150 00	.....	.....	.....	.....	.....	.....	.....	276 02	
150 89	1,528 90	24 02	1,504 88	.....	1,504 88	499 80	40 00	20 00	
551 87	.....	.....	.....	.....	.....	148 60	660 20	126 19	
177 13	3,449 73	580 35	2,869 38	36 93	2,832 45	675 00	.....	630 59	
20 00	.....	.....	.....	.....	.....	.....	.....	570 55	
8 65	.....	.....	.....	.....	.....	.....	.....	1,582 72	
292 74	1,144 66	857 55	287 11	.....	287 11	461 85	421 22	439 83	Prescott and Russell.
.....	405 00	.....	405 50	.....	405 50	.....	.....	405 50	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	1,041 18	35 00	1,006 18	.....	1,006 18	112 07	94 75	85 00	
130 72	.....	.....	.....	.....	.....	76 30	700 11	56 76	
1 10	1,805 30	304 20	1,501 10	.....	1,501 10	675 00	.....	35 09	
19 55	.....	.....	.....	.....	.....	.....	.....	243 95	
17 30	.....	.....	.....	.....	.....	.....	.....	922 55	
180 95	1,080 72	854 15	226 57	.....	226 57	497 00	440 67	96 92	Prince Edward
.....	648 86	5 00	643 86	.....	643 86	.....	.....	564 00	
12 68	.....	.....	.....	.....	.....	.....	.....	78 33	
13 00	526 29	106 45	419 84	.....	419 84	49 50	.....	31 40	
190 14	.....	.....	.....	.....	.....	54 00	383 91	10 00	
.....	1,895 10	63 90	1,831 20	.....	1,831 20	600 00	.....	98 30	
.....	.....	.....	.....	.....	.....	.....	.....	337 75	
.....	.....	.....	.....	.....	.....	.....	.....	859 05	
626 63	2,761 08	969 01	1,792 07	.....	1,792 07	2,033 19	.....	551 01	Rainy River
.....	528 20	.....	528 20	.....	528 20	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	28 20	
126 25	1,378 10	43 10	1,335 00	.....	1,335 00	598 50	.....	.....	
140 85	.....	.....	.....	.....	.....	852 85	.....	.....	
112 00	901 82	.....	901 82	.....	901 82	450 00	.....	70 00	
.....	.....	.....	.....	.....	.....	.....	.....	210 25	
.....	.....	.....	.....	.....	.....	.....	.....	171 57	
181 97	2,326 21	1,058 29	1,267 92	.....	1,267 92	632 00	930 97	729 42	Renfrew.
.....	540 50	.....	540 50	.....	540 50	.....	.....	540 50	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	809 71	248 00	561 71	.....	561 71	106 11	.....	.....	
267 63	.....	.....	.....	.....	.....	103 41	544 09	56 10	
.....	1,962 03	127 00	1,835 03	.....	1,835 03	600 00	.....	36 99	
.....	.....	.....	.....	.....	.....	.....	.....	349 95	
.....	.....	.....	.....	.....	.....	.....	.....	975 09	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present years' services.
SIMCOE:			$ c.	$ c.	$ c.	$ c.
Barrie....	Sheriff	W. McL. Harvey	2,886 90	.....	2,886 90	2,591 10
	Surrogate Judge...	Judge Ardagh...	Commuted	585 00	.....	.....
	Local Master.....	J. R. Cotter.....	20 10	.....	2,981 48	20 10
	Crown Attorney...	"	1,299 93	.....	.....	804 43
STORMONT,	Clerk of the Peace,	"	1,661 45	.....	.....	1,060 09
DUNDAS	Local Registrar...	John McCosh....	238 40	750 00	1,957 70	988 40
AND	County Court Clerk	"	969 30	.....	.....	969 30
GLEN-	Surrogate Regist'r.	E. A. Little.....	2,528 65	.....	2,528 65	2,528 65
GARRY:						
Cornwall .	Sheriff	W. R. Mack.....	2,375 98	.....	2,375 98	1,946 45
	Surrogate Judge...	Judge O'Reilly..	1,000 00	.....	1,397 36	1,000 00
	Local Master.....	" *	Commuted	440 00	.....	397 36
	Crown Attorney...	James Dingwall.	184 24	.....	924 19	178 09
	Clerk of the Peace.	"	739 95	.....	.....	480 73
	Local Registrar...	J. A. McDougald	56 61	750 00	3,775 18	681 61
	County Court Clerk	"	665 95	.....	.....	665 95
	Surrogate Regist'r.	"	2,302 62	.....	.....	2,302 62
SUDBURY:						
Sudbury..	Sheriff	Alex. Irving	4,382 51	†950 00	5,332 51	4,281 91
	Surrogate Judge...	Judge Kehoe	.....	§500 00	524 80	500 00
	Local Master	"	24 80	.....	.....	20 60
	Crown Attorney...	‡R.R. McKessock, K.C.	1,786 30	.....	2,152 08	785 15
	Clerk of the Peace.	"	240 78	125 00	.....	216 23
	Local Registrar...	John D. Shipley .	109 10	150 00	1,701 02	259 10
THUNDER	Dist. Court Clerk..	"	703 16	450 00	.....	1,153 16
BAY:	Surrogate Regist'r.	"	288 76	.....	.....	288 76
Port Ar-						
thur	Sheriff	A. W. Thompson.	7,373 79	1,000 00	8,373 79	6,328 40
	Surrogate Judge...	Judge O'Leary ..	.....	§500 00	765 00	500 00
	Local Master.....	"	265 00	.....	.....	75 00
	Crown Attorney...	W.F. Langworthy	1,801 70	250 00	2,499 05	1,549 55
	Clerk of the Peace.	" [K.C.	447 35	.....	.....	223 50
	Local Registrar...	T. S. T. Smellie.	666 48	150 00	2,997 29	816 48
	Dist. Court Clerk..	"	1,007 95	450 00	.....	1,457 95
	Surrogate Regist'r.	"	722 86	.....	.....	722 86
VICTORIA:						
Lindsay ..	Sheriff	John McLennan .	1,419 11	.....	1,419 11	1,081 99
	Surrogate Judge...	Judge McMillan.	512 75	.....	512 75	.....
	Local Masters...	"	.....	.....	.....	.....
		Judge Harding ..	69 15	.....	69 15	69 15
	Crown Attorney ...	A. P. Devlin	85 00	.....	617 25	65 00
	Clerk of the Peace.	"	532 25	.....	.....	336 00
	Local Registrar ...	J. H. Sootheran..	102 30	675 00	2,264 95	777 30
	County Court Clerk	"	411 50	.....	.....	411 50
	Surrogate Regist'r.	"	1,076 15	.....	.....	1,076 15
WATERLOO:						
Berlin....	Sheriff ..... ||	Henry G. Lackner	2,518 01	.....	2,518 01	2,090 01
	Surrogate Judge...	Judge Chisholm .	1,000 00	.....	1,000 00	.....
	Local Master.....	J. J. A. Weir	94 45	.....	94 45	49 56
	Crown Attorney ...	W.H.Bowlby,K.C.	345 50	.....	1,422 50	231 00
	Clerk of the Peace.	"	1,077 00	.....	.....	1,050 00
	Local Registrar ...	E. J. Beaumont..	215 57	675 00	1,548 48	890 57
	County Court Clerk	"	657 91	.....	.....	588 56
	Surrogate Regist'r.	John M. Scully..	2,298 74	.....	2,298 74	2,066 99

*From 1st May. †$200.00 salary as District Treasurer. ‡Appointed from 1st August, 1912.
§By 9 Edw. VII., Cap. 26 Sec. 13. || O. in C., 5th Oct., assumed office 13th October.

Officers throughout the Province of Ontario, etc.—Continued.

Total received for past year's services.	Total receipts by officers from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public, respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
626 39	3,217 49	1,754 58	1,462 91	.....	1,462 91	1,032 81	856 56	997 53	Simcoe.
.....	585 00	.....	585 00	.....	585 00	585 00	.....	.....	
.....	2,586 82	402 29	2,184 53	16 44	2,168 09	.....	.....	26 10	
184 55	.....	.....	.....	.....	.....	1,253 43	.....	46 50	
517 65	.....	.....	.....	.....	.....	228 40	1,330 32	102 73	
.....	1,957 70	120 00	1,837 70	.....	1,837 70	750 00	.....	238 40	
.....	.....	.....	.....	.....	.....	.....	.....	969 30	
.....	2,528 65	240 00	2,288 65	.....	2,288 65	.....	.....	2,528 65	
1,138 27	3,084 72	1,145 43	1,939 29	.....	1,939 29	781 83	671 77	922 38	Stormont,
.....	1,411 56	.....	1,411 31	.....	1,411 31	.....	.....	1,000 00	Dundas
14 20	.....	25	.....	.....	.....	301 61	.....	95 75	and Glen-
120 50	1,132 72	627 71	505 01	.....	505 01	149 02	2 68	32 54	garry.
353 40	.....	.....	.....	.....	.....	91 90	547 86	100 19	
125 00	3,775 18	948 90	2,826 28	32 63	2,793 65	750 00	.....	56 61	
.....	.....	.....	.....	.....	.....	.....	.....	665 95	
.....	.....	.....	.....	.....	.....	.....	.....	2,302 62	
538 68	4,820 59	1,842 95	2,977 64	.....	2,977 64	4,371 04	.....	961 47	Sudbury.
.....	520 60	.....	520 60	.....	520 60	500 00	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	24 80	
.....	1,001 38	575 60	425 78	.....	425 78	1,416 30	.....	370 00	
.....	.....	.....	.....	.....	.....	331 28	.....	34 50	
.....	1,701 02	.....	1,701 02	.....	1,701 02	150 00	.....	169 10	
.....	.....	.....	.....	.....	.....	450 00	.....	703 16	
.....	.....	.....	.....	.....	.....	.....	.....	288 76	
1,103 96	7,432 36	3,406 55	4,025 81	.....	4,025 81	5,275 30	.....	3,098 49	Thunder
.....	693 70	.....	693 70	.....	693 70	500 00	.....	.....	Bay.
118 70	.....	.....	.....	.....	.....	.....	.....	265 00	
344 20	2,370 55	108 00	2,262 55	.....	2,262 55	2,051 70	.....	.....	
253 30	.....	.....	.....	.....	.....	447 35	.....	.....	
.....	2,997 29	505 05	2,492 24	.....	2,492 24	600 00	.....	666 48	
.....	.....	.....	.....	.....	.....	.....	.....	1,007 95	
.....	.....	.....	.....	.....	.....	.....	.....	722 86	
409 10	1,491 09	344 25	1,146 84	.....	1,146 84	621 78	460 20	337 13	Victoria.
.....	512 75	.....	512 75	.....	512 75	.....	.....	512 75	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	69 15	.....	69 15	.....	69 15	.....	.....	69 15	
22 00	650 85	.....	650 85	.....	650 85	45 00	40 00	.....	
227 85	.....	.....	.....	.....	.....	46 40	485 85	.....	
.....	2,264 95	556 94	1,708 01	.....	1,708 01	675 00	.....	102 30	
.....	.....	.....	.....	.....	.....	.....	.....	411 50	
.....	.....	.....	.....	.....	.....	.....	.....	1,076 15	
523 26	2,613 27	1,392 19	1,221 08	.....	1,221 08	980 47	461 36	1,076 18	Waterloo.
.....	1,000 00	.....	1,000 00	.....	1,000 00	.....	.....	1,000 00	
167 08	216 64	.....	216 64	.....	216 64	.....	.....	94 45	
107 00	1,499 20	200 00	1,299 20	.....	1,299 20	345 50	.....	.....	
11 20	.....	.....	.....	.....	.....	77 00	1,000 00	.....	
.....	1,537 30	97 40	1,439 90	.....	1,439 90	675 00	.....	215 57	
58 17	.....	.....	.....	.....	.....	.....	.....	657 91	
56 70	2,123 69	461 58	1,662 11	.....	1,662 11	.....	.....	2,298 74	

APPENDIX F.—Return of fees and emoluments of County Judicial

County and Town.	Office.	Officer.	Amount earned.	Salary paid by Province.	Total earnings and salary in all offices.	Total received for present year's services.
			$ c.	$ c.	$ c.	$ c.
WELLAND:						
Welland..	Sheriff	James Smith....	2,144 77	.....	2,144 77	1,709 46
	Surrogate Judge...	Judge Wells.....	1,000 00	.....	1,169 80	1,000 00
	Local Master.....	"	169 80	.....	.....	78 70
	Crown Attorney ...	T. D. Cowper....	766 85	.....	3,122 40	535 35
	Clerk of the Peace.	"	2,355 55	.....	.....	1,642 57
	Local Registrar ...	J. E. Cohoe.....	198 75	800 00	2,996 40	998 75
	County Court Clerk	"	381 45	.....	.....	381 45
WELLINGTON:	Surrogate Regist'r.	"	1,616 20	.....	.....	1,616 20
Guelph ...	Sheriff	A. S. Allan	2,267 42	.....	2,267 42	1,932 66
	Surrogate Judge...	Judge Chadwick.	Commuted	1,000 00	.....	.....
	Local Master....	*W.H. Kingston, K.C.	Commuted	2,000 00	.....	.....
	Local Registrar..					
	Crown Attorney...	H. W. Peterson..	239 05	.....	2,290 61	132 00
	Clerk of the Peace.	"	2,051 56	.....	.....	1,817 38
	County Court Clerk	Wm. Carroll	363 95	.....	2,684 36	347 75
WENTWORTH:	Surrogate Regist'r.	"	2,320 41	.....	.....	2,220 56
Hamilton	Sheriff	J. T. Middleton..	7,598 65	.....	7,598 65	6,278 31
	Surrogate Judge...	Judge Snider.. .	1,500 00	.....	1,500 00	.....
	"	Judge Monck....	1,000 00	.....	1,300 70	1,000 00
	Local Master.....	"	300 70	.....	.....	300 70
	Deputy Registrar .	†T. H. A. Begue. K.C.....	32 00	250 00	282 00	240 34
	Crown Attorney ...	S. F. Washington, K.C.....	4,246 30	.....	6,183 21	3,101 30
	Clerk of the Peace.	"	1,936 91	.....	.....	1,300 63
	Deputy Clerk of the Crown	T.H.A.Begue,K.C.	234 32	500 00	5,339 25	650 99
	County Court Clerk	"	1,322 96	.....	.....	1,322 96
	Surrogate Regist'r.	"	3,281 97	.....	.....	3,281 97
YORK:						
Toronto .	Sheriff	F. T. Daville....	10,266 70	.....	10,266 70	8,511 65
	Surrogate Judges	Judge Winchester	2,600 00	.....	2,600 00	.....
		Judge Morgan...	1,600 00	.....	1,600 00	.....
		Judge Morson ...	1,600 00	.....	1,600 00	.....
		Judge Denton ...	1,600 00	.....	1,600 00	.....
	Crown Attorney...	R. H. Greer	5,065 10	.....	5,065 10	3,731 70
	Clerk of the Peace	H. E. Irwin, K.C.	7,681 69	.....	7,681 69	5,286 28
	County Court Clerk	John Richardson.	8,738 15	.....	8,738 15	8,737 45
	Surrogate Regist'r .	Arthur F.Wallis.	13,572 71	.....	13,572 71	13,572 71
TORONTO:	Sheriff	Fred'k Mowat...	25,702 97	.....	25,702 97	22,445 63
	Crown Attorney...	J.W.S.Corley,K.C.	Commuted	5,500 00	.....	.....

* Appointed 5th October. † Acting.

Officers throughout the Province of Ontario, etc.—Concluded.

Total received for past year's services.	Total receipts by officer from all his offices.	Total disbursements.	Net receipts.	Amount paid to Province under 10 Edw. VII., cap. 5.	Net income.	Earnings of each officer payable by the Province, the County, and the General Public, respectively.			County.
						From Province.	From County.	From General Public.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
439 83	2,149 29	971 45	1,177 84	.....	1,177 84	750 04	783 59	611 14	Welland.
.....	1,078 70	.....	1,078 70	.....	1,078 70	.....	.....	1,000 00	
.....	.....	.....	.....	.....	.....	.....	.....	169 80	
100 00	3,212 77	714 00	2,498 77	49 87	2,448 90	658 70	29 00	88 15	
934 85	.....	.....	.....	.....	.....	2,169 95	185 60	.....	
.....	2,996 40	427 05	2,569 35	6 93	2,562 42	800 00	.....	198 75	
.....	.....	.....	.....	.....	.....	.....	.....	381 45	
.....	.....	.....	.....	.....	.....	.....	.....	1,316 20	
455 84	2,388 50	747 37	1,641 13	.....	1,641 13	728 92	687 03	851 47	Welling-
.....	1,000 00	.....	1,000 00	.....	1,000 00	1,000 00	.....	.....	ton.
.....	2,000 00	9 00	1,991 00	.....	1,991 00	2,000 00	.....	.....	
128 75	2,256 89	364 00	1,892 89	.....	1,892 89	170 30	.....	68 75	
178 76	.....	.....	.....	.....	.....	150 30	1,700 00	201 26	
13 25	2,670 56	320 66	2,349 90	.....	2,349 90	.....	.....	363 95	
89 00	.....	.....	.....	.....	.....	.....	.....	2,320 41	
1,155 00	7,433 31	2,402 80	5,030 51	.....	5,030 51	3,592 14	785 99	3,220 52	Went-
.....	1,500 00	.....	1,500 00	.....	1,500 00	.....	.....	1,500 00	worth
.....	1,370 00	.....	1,370 00	.....	1,370 00	.....	.....	1,000 00	
.....	.....	.....	.....	.....	.....	.....	.....	300 70	
41 66	282 00	125 00	157 00	.....	157 00	250 00	.....	32 00	
947 27	6,178 00	1,726 67	4,451 33	775 66	3,635 67	4,206 30	.....	40 00	
828 80	.....	.....	.....	.....	.....	665 40	1,265 41	6 10	
83 33	5,339 25	1,546 62	3,792 63	296 32	3,496 31	500 00	.....	234 32	
.....	.....	.....	.....	.....	.....	.....	.....	1,322 96	
.....	.....	.....	.....	.....	.....	.....	.....	3,281 97	
1,019 20	10,030 85	3,818 68	6,212 17	.....	6,212 17	6,543 67	680 00	3,043 03	York.
.....	.....	.....	2,600 00	.....	.....	2,600 00	.....	.....	
.....	.....	.....	1,600 00	.....	.....	1,600 00	.....	.....	
.....	.....	.....	1,600 00	.....	.....	1,600 00	.....	.....	
.....	.....	.....	1,600 00	.....	.....	1,600 00	.....	.....	
1,333 40	5,065 10	1,902 00	3,163 10	198 93	2,964 17	4,299 50	765 60	.....	
3,301 19	8,587 47	3,599 00	4,988 47	1,044 24	3,944 23	2,273 80	5,249 15	158 74	
80	8,738 25	3,089 30	5,648 95	1,484 06	4,164 89	.....	.....	8,738 15	
.....	13,572 71	3,866 53	9,706 18	5,135 57	4,570 61	.....	.....	13,572 71	
1,631 12	24,076 75	10,650 04	13,426 71	6,234 04	7,192 67	*4,893 31	866 28	19,382 88	Toronto.
.....	5,500 00	.....	5,500 00	.....	5,500 00	5,500 00	.....	.....	

* $551.00 payable by City, $9.00 payable by Dominion Government.

APPENDIX G.—Table showing the business of the High Court of Justice in York County during 1912, compiled from statements furnished by the officers at Osgoode Hall.

Writs of summons issued		1488
Actions entered in Procedure Book commenced by writs issued during the year 1912		1124
" " " " previous years		57
" " otherwise than by writ		297
Præcipe Orders issued		882
Court " "		641
Chamber " "		2,732
Records passed		388
Actions entered for trial with Jury		104
" " without a Jury		284
Actions tried with a Jury		95
" without a Jury		182
Judgments entered in default of appearance or pleading		104
" " without trial		88
" " after trial		117
Interlocutory judgments		4
Judgments dismissing actions		41
" for administration		14
" of the Master in Chambers under Con. Rule 603, etc		78
" under Con. Rule 938		27
" " " " 596		25
" in mechanics' lien actions		49
" of reference		27
" " official referees		192
" entered in respect of Writs issued in the year 1904		1
" " " " " 1907		3
" " " " " 1908		5
" " " " " 1909		14
" " " " " 1910		15
" " " " " 1911		186
" " " " " 1912		542
Total judgments entered		766
Amount recovered on Judgments (exclusive of costs)	$2,482,164 84	
Amount of Taxed costs (including disbursements) on judgments of all kinds	$17,173 96	
Writs of Execution Fi. Fa. issued		245
" renewed, and Alias and Pluries Writs issued		162
Special writs (Habeas Corpus, etc.) issued		19
Amount of Jury fees paid City Treasurer	$294 00	
Petitions under The Quieting Titles Act		25
Certificates of Title under The Quieting Titles Act		18

Accountant's office:

Amount of moneys paid into Court	$3,162,413 05	
" " " out of Court	2,549,329 75	
Number of directions issued for payments of moneys into Court		1,585
" cheques issued		4,688
" certificates issued		128
" new accounts opened		1,100
" individual accounts		825

Orders issued by the Master in Ordinary, in Winding-up Matters	57

References brought into the office of the Master in Ordinary:

Trustees accounts	1
Partition or sale	1
Foreclosure	10
Administration	8
Title	1
Partnership accounts	2
Alimony	0
Winding up	10
Lunacy	2
Executors' accounts	1
Mechanics' liens	0

APPENDIX G.—Table showing the business of the High Court of Justice in York County, etc.—Continued.

Sale	2
Damages	1
Redemption or sale	1
Receivership	1
Settling conveyances	0
Specific performance	0
Account	11
	52

References before Official Referees —

Specific Performance	0
Trial or assessment	0
Trustees and Executors' accounts	0
Winding up	21
Lunacy	1
Accounts	0
Mechanics' liens	181
Title	0
Partition or sale	0
Administration	0
Receivership	0
Foreclosure	1
Under Arbitration Act	0
Vendor and Purchaser	2
	206

Fees paid in law stamps (Stamps cancelled by Taxing officers not included):

Central office	Records and Writs Branch	$6,755 60	$8,856 55
	Judgment Branch	2,100 95	
Registrars' office	For Fee Fund	1,195 50	1,941 50
	For Shorthand Reporters' Fund	746 00	
Accountant's office			973 10
Official Referee Cameron's office			118 20
Office of the Inspector and Referee (Quieting Titles)			309 90
" Master in Ordinary			1,451 60
" Clerk in Chambers			1,925 10
" Registrar of the Court of Appeal			938 90
			$16,514 85

APPENDIX H.—Table showing the number of actions tried or otherwise disposed of by the Judges of the High Court of Justice and the Court of Appeal and the disposition thereof during the year ending Dec. 31st, 1912.

Trial Judges.	With a Jury.	Without a Jury.	Total.
Actions disposed of by the Judges of the King's Bench.	73	136	209
" " " " Chancery.....	55	140	195
" " " " Common Pleas	59	106	165
" " " " Exchequer ...	65	100	165
" " " Unattached...	.....	9	9
Totals	252	491	743

Judges in Chambers.	Allowed or varied.	Dismissed.	Standing for Judgment.	Total
Toronto:				
Appeals from the Masters in Chambers	9	25	.....	34
" Local Masters and other officers acting in Chambers.....	9	12	.....	21
Appeals from Official Referees.....	.....	.....	.....	.....
" Local Taxing Officers	1	1	... .	2
" Taxing Officers at Toronto	.....	.....	.....	.....
Motions, other than appeals	.....	.....	.....	1,241
Ottawa:—				
Appeals from Local Masters and other officers acting in Chambers	.....	.....	.....	.....
Appeals from Taxing Officers	.....	.....	.....	.....
Motions, other than appeals	13	1	....	14
London;—				
Appeals from Local Masters or other officers acting in Chambers.....	.....	.....	.....	.....
Motions, other than appeals	43	5	.....	48
Totals.....	75	44	.....	1,360

Weekly Courts.	Allowed.	Dismissed.	Standing for Judgment or Abandoned.	Total.
Toronto:—				
Appeals from reports of Local Masters and Official Referees.....	12	15	.....	27
Appeals from awards and motions to set aside awards	1	.....	.....	1
Motions, other than appeals	590	72	11	673
Number struck off the list, no one appearing	.....	.....	.....	23
" of motions enlarged	.....	.....	.....	243
Ottawa:—				
Appeals from Local Judges.....	.....	.....	.....	.....
Appeals from reports of Local Masters and Official Referees.....	2	2	.....	4
Motions, other than appeals.....	13	2	3	18
London:—				
Motions, other than appeals	30	5	2	37
Appeals from reports of Local Masters and Official Referees	.....	.....	.....	.....
Totals.....	648	96	16	1,026

*Master in Chambers:—	
Motions in respect of pleadings, for particulars, for discovery and for commissions to take evidence.....	384
Motions in respect of venue, to set aside jury notices and notices of trial and proceedings under quo warranto	68
Motions for judgments and orders.....	479
Motions setting aside judgments or orders, staying trials, and dismissing actions ...	473
Miscellaneous motions	320
Ex parte motions	198
Total...	1,922

* In 138 cases judgment was reserved and given in writing by the Master. They appear in the Ontario Weekly Notes and Ontario Weekly Reporter.

APPENDIX H.—Table showing number of actions tried, etc.—Continued.

Divisional Court.	Allowed.	Dismissed.	Varied.	Standing for Judgment.	Total.
Appeals from Trial Judges	39	96	9	2	146
Appeals from Weekly Courts and Chambers	11	20	2	2	35
Appeals from County and District Courts	47	95	8	5	155
Appeals from Surrogate Courts	1	3	.....	1	5
Appeals from Division Courts	2	3	.....	.....	5
Appeals under special statutes	3	5	.....	.....	8
Motions to quash convictions	.....	.....	.....	.....	.....
Motions, other than above	10	3	.....	.....	13
Totals	113	225	19	10	367

Court of Appeal.	Allowed.	Dismissed.	Varied.	Standing for		Withdrawn.	Total.
				Argument.	Judgment.		
Appeals from Single or Trial Judges	19	33	3	.....	6	.....	61
Appeals from Divisional Courts	12	17	2	.....	12	.....	43
Appeals from Board of County Judges	.....	.....	.....	.....	.....	.....	.....
Appeals from Arbitrators	1	.....	.....	.....	2	.....	3
Appeals from Drainage Referee	.....	2	1	.....	.....	.....	3
Appeals from the Ontario Railway and Municipal Board	3	.....	1	.....	3	.....	7
Election Trial appeals	.....	.....	.....	.....	.....	.....	.....
Habeas Corpus appeals	.....	.....	.....	.....	1	.....	1
Reserved cases under criminal code	6	5	.....	.....	3	.....	14
Stated cases	.....	.....	.....	.....	.....	.....	
Appeals from County and District Judges	.....	.....	.....	.....	.....	.....	.....
Appeals from Surrogate Courts	.....	.....	.....	.....	.....	.....	.....
Appeals from Mining Commissioner	.....	.....	.....	.....	.....	.....	.....
Motions to full Court	.....	.....	.....	.....	.....	.....	.....
Submitted under Con. Questions Act	.....	.....	.....	.....	.....	.....	.....
Referred under Orders in Council	1	2	.....	.....	1	.....	4
Orders and certificates issued, 227.							
Totals	42	59	7	.....	28	.....	136

APPENDIX "I."

TABLE showing the business in the office of the Surrogate Clerk, Osgoode Hall, Toronto, for the year ending December 31st, 1912.

	No.
Probate Certificates issued	4,995
Administration Certificates issued	2,748
Guardianship Certificates issued	111
Caveats fyled	85

Fees paid in law stamps, $4,198.70.

APPENDIX J.—Table showing the Criminal business of the High Court of Justice at its sittings throughout the Province during the year 1912.

County or District.	Bills.		Nolle prosequi.	Indictments quashed.	Traversed to the Sessions.	Number of persons pleading guilty.	Number of persons tried by the Judges of the								Verdicts after trial.				Number of days of sittings.
							King's Bench.		Chancery.		Common Pleas.		Exchequer.						
	True.	No.					With a Jury.	Without a Jury.	With a Jury.	Without a Jury.	With a Jury.	Without a Jury.	With a Jury.	Without a Jury.	Guilty.	Not guilty.	Disagreed.	Reserved.	
Algoma	6	1	..	..	..	1	1	....	....	....	....	....	4	....	3	1	..	..	4
Brant	....	....	2	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	2
Bruce	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Carleton	4	....	..	..	..	..	1	....	....	....	....	....	....	....	..	1	..	..	3
Dufferin	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Elgin	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Essex	6	....	..	..	..	..	4	....	....	....	1	....	....	....	3	2	..	..	5
Frontenac	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Grey	1	....	..	..	..	..	....	....	1	....	....	....	....	....	..	1	..	..	8
Haldimand	6	....	..	..	..	..	....	....	....	....	....	....	....	....	†	6	..	..	7
Halton	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Hastings	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	2
Huron	1	....	..	..	..	1	....	1	....	....	....	....	....	....	1	..	..	..	4
Kenora	4	....	..	..	..	3	....	....	4	....	....	....	....	....	..	1	..	3	4
Kent	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Lambton	8	....	2	..	..	..	....	....	2	....	....	....	2	....	2	2	..	..	7
Lanark	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Leeds and Grenville	1	1	..	..	..	..	....	....	1	....	....	....	....	....	..	..	1	..	5
Lennox and Addington	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Lincoln	....	....	..	..	1	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Manitoulin	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Middlesex	8	1	..	..	2	6	1	....	....	....	....	....	....	....	..	..	..	..	3
Muskoka	1	....	..	..	..	..	....	....	....	....	1	....	....	....	1	..	..	..	...
Nipissing	9	....	1	..	4	..	....	....	....	....	....	....	....	....	1	2	..	..	6
Norfolk	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Northumberland & D'm	2	....	..	..	..	..	1	....	....	....	....	....	....	....	2	..	..	..	5
Ontario	2	....	..	..	..	..	2	....	....	....	....	....	....	....	..	1	..	..	2
Oxford	4	....	..	..	..	..	....	....	3	....	....	....	1	....	1	3	..	..	5
Parry Sound	3	....	..	..	..	..	....	2	....	....	....	....	....	....	..	1	..	1	3
Peel	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Perth	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Peterborough	1	....	..	..	..	..	....	....	1	....	....	....	1	....	2	..	..	..	4
Prescott and Russell	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Prince Edward	4	....	..	2	..	2	....	2	....	....	....	....	....	....	..	..	..	..	...
Rainy River	3	1	..	..	..	..	....	....	2	....	....	....	1	....	2	1	1	..	4
Renfrew	1	....	..	..	..	..	....	....	1	....	....	....	....	....	..	1	..	..	1
Simcoe	1	....	..	..	..	..	....	....	....	....	....	....	1	....	1	..	..	..	1
Stormont, D's and G'y.	2	....	..	..	..	..	....	....	....	....	2	....	3	....	2	..	..	..	6
Sudbury	7	1	..	..	..	..	7	....	....	....	....	....	....	....	5	1	1	..	6
Thunder Bay	13	....	..	..	..	2	....	....	7	....	....	....	6	....	12	1	..	..	8
Victoria	1	....	..	..	..	..	....	....	....	....	....	....	1	....	1	..	..	..	2
Waterloo	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Welland	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	...
Wellington	....	....	..	..	..	..	....	....	....	....	....	....	....	....	..	..	..	..	2
Wentworth	13	....	..	..	..	1	1	....	....	....	11	....	....	....	11	1	..	..	11
York	29	6	*1	..	..	1	....	....	8	....	2	....	12	....	8	8	1	4	34
Totals	141	11	6	2	7	14	18	5	30	....	17	....	32	....	58	34	4	8	154

* Insane, could not plead.

† Tried by Mr. Justice Leach (unattached).

APPENDIX K.—Table showing the business of the Courts of General Sessions of the Peace and of the District and County Court Judge's Criminal Courts of the Province for the year 1912.

County or District.	Bills in Sessions.		Cases C. C. J. C. C.	Number of Persons Pleading Guilty.		Number of Persons Tried.		Verdicts after Trial.					Persons Accused.				Days of Sittings.	
						With Jury.	Without Jury.	Guilty.		Not Guilty.		Disagreed.	Sessions.		C. C. J. C. C.		Sessions.	C. C. J. C. C.
	True.	No.		Sessions.	C. C. J. C. C.	Sessions.	C. C. J. C. C.	Sessions.	C. C. J C. C.	Sessions.	C. C. J. C. C.		Male.	Female.	Male	Female		
Algoma		1	72		12		72		28		44				71	1	5	37
Brant	3		18		4	3	18		7	3	11		3		12	6	2	14
Bruce			27		19		8		19		8	8			25	2		22
Carleton			14		3		12		2		7				12	2	4	27
Dufferin			3				3		2		1				3		2	2
Elgin	7	1	7	2	1	3	6	2	3	2	4	6	5		7		7	6
Essex	3		23	2		1	27	2	18	1	9		2		26	1	5	15
Frontenac	7		8	1	7	6	8	6	7	1	1		7		8		6	8
Grey	2		20		1	3	18		14	3	6		3		18		4	37
Haldimand	1		19		8	1	19		10	1	1		1		18	1	3	20
Halton	5		14		10	5	14	2	13		1	1	5		14		7	14
Hastings	3		53		17	2	37	2	32	1	5		2		34	3	7	43
Huron	1				12	1	18	1	2		4	10	1		18		5	18
Kenora	4		9		1	5	9	1	3	4	6		5		9		3	10
Kent	12	1	10	1	2	11	11	7	5	5	3		12		10		9	9
Lambton			6		3		6		4		2				4	2	1	12
Lanark			12		9		3		2		1				12		2	10
Leeds and Grenville	1		48		37	1	48		4	1	7		1		47	1	2	64
Lennox and Addington	2		2			2	2		1	2	1		1		2		2	2
Lincoln	9	1	12	1	2	8	12	6	10	2	2		10		12		8	22
Manitoulin																	2	
Middlesex	5	1	31		9	7	16	2	9	4	7		6		24	1	12	43

Muskoka	2		10			1	10	2	10				2		9	1	2	10
Nipissing	5		23		7	5	23	2	13	3	10		5		22	1	6	18
Norfolk	8		11	1	2	5	9	2	5	6	6		6		7	2	4	5
Northumberland and Durham			22		5		21		12		4				20	1	7	42
Ontario			35		9		35		33		2				35			39
Oxford	4	1	7			5	7		3		3		5		7		3	7
Parry Sound			7		2		8		4		4				6	2		7
Peel	1		5		4	2	6		1	2	1	3	3		6		4	9
Perth			14		5		11		10		1	1			15	1	4	27
Peterborough	1		17			1	17		8	1	9		1		17		3	14
Prescott and Russell			3		1		3		2		1				3		2	4
Prince Edward	1				1				1						1			1
Rainy River	11	2	4	2		11	4	10	3	3	1		13		4		8	4
Renfrew							4		2		2				4			5
Simcoe	5		13		10	5	33		28	5	5		5		32	2	9	28
Stormont, Dundas and Glengarry	2		4			2	4		3	2	1		2		4		2	8
Sudbury	2	1	10			2	10		6	2	4		1		8	1	2	8
Thunder Bay	5	2	26		10	3	26	2	8	1	8		7		25	1	6	28
Victoria	2		1			1	1	1	1				1		1		1	3
Waterloo			9		3		6				5				9			9
Welland	1		11	1	2	2	13	1	4	1	9	10	2		12		7	15
Wellington			10		4		12		10		2	2			11	1		10
Wentworth	8	1	119	2	39	5	98	4	48	3	50		5	2	129	8	4	45
York	193	22	129	78	56	57	79	26	32	29	45	42	224	24	71	11	110	89
Totals	316	33	898	91	317	166	807	81	442	88	304	83	345	26	844	52	282	870

APPENDIX "L."

Sheriffs.

William McGhee, of the Village of Beachville, in the County of Oxford, Esquire, to be Sheriff of the said County of Oxford, in the room and stead of James Brady, Esquire, deceased.—*Gazette, 24th February.*

David John Nesbitt, of the Village of Brighton, in the County of Northumberland, to be Sheriff of the United Counties of Northumberland and Durham, in the room and stead of I. O. Proctor, Esquire, resigned.—*Gazette, 3rd August.*

Henry George Lackner, of the City of Berlin, in the County of Waterloo, Esquire, M.D., to be Sheriff of the said County of Waterloo, in the room and stead of John Motz, Esquire, deceased.—*Gazette, 12th October.*

Surrogate Judges.

Arthur Arnold Mahaffy, of the Town of Bracebridge, Judge of the District Court of the Provisional Judicial District of Muskoka, to be Judge of the Surrogate Court of the said Provisional Judicial District.—*Gazette, 9th November.*

Local Masters.

William H. Kingston, Esquire, K.C., of the Town of Mount Forest, in the County of Wellington, to be appointed Local Master of the Supreme Court of Judicature for Ontario and Local Registrar for the High Court in and for the County of Wellington, in the room and stead of A. M. McKinnon, Esquire, deceased. —*Gazette, 12th October.*

County Crown Attorneys: Clerks of the Peace.

William F. McRae, of the Town of Gore Bay, in the Provisional Judicial District of Manitoulin, Esquire, Barrister-at-Law, to be Crown Attorney and Clerk of the Peace in and for the said Provisional Judicial District of Manitoulin, in the room and stead of A. G. Murray, Esquire, removed from office.—*Gazette, 8th June.*

Robert Russell McKessock of the Town of Sudbury, in the Provincial District of Sudbury, Esquire, Barrister-at-Law, to be District Crown Attorney and Clerk of the Peace in and for the said District, in the room and stead of John Haig Clarry, Esquire, resigned.—*Gazette, 12th August.*

Local Registrars, Deputy Clerks of the Crown, etc.

Miss Helen Beatrice Palen, of the City of Belleville, in the County of Hastings, to be Registrar of the Surrogate Court *pro tempore* in and for the said County of Hastings.

Miss Helen Beatrice Palen, of the City of Belleville, in the County of Hastings, to be Deputy Clerk of the Crown and Deputy Clerk of the County Court (*pro tempore*) in and for the said County of Hastings.—*Gazette, 3rd August.*

Robert Jamieson, of the Town of Perth, in the County of Lanark, to be Registrar of the Surrogate Court of the said County of Lanark, *pro tempore*, during the absence on leave of Mr. Wm. P. McEwen.

Robert Jamieson, of the Town of Perth, in the County of Lanark, Esquire, to be Local Registrar of the High Court of Justice, Deputy Clerk of the Crown, and Clerk of the County Court of the County of Lanark, *pro tempore,* during the absence on leave of the Registrar.—*Gazette, 12th August.*

Horace Bascom, of the Town of Uxbridge, in the County of Ontario, Esquire, M.D., to be Local Registrar of the High Court of Justice, Clerk of the County Court and Registrar of the Surrogate Court in and for the said County of Ontario, in the room and stead of Theodore A. McGillivray, Esquire, resigned.—*Gazette, 19th October.*

William J. McClenahan, of the Township of Nelson, in the County of Halton (Appleby P.O.), Esquire, to be Local Registrar of the High Court, Clerk of the County Court and Registrar of the Surrogate Court in and for the County of Halton, in the room and stead of W. A. Lawrence, Esquire, deceased.—*Gazette, 23rd November.*

Miss Olivia Goetz, of the Town of Walkerton, in the County of Bruce, to be Local Registrar of the High Court, Clerk of the County Court, and Registrar of the Surrogate Court, *pro tempore,* in and for the said County of Bruce.—*Gazette, 21st December.*

Police Magistrates.

Wilbur Henry Whitside, of the Village of Delhi, in the County of Norfolk, Esquire, to be Police Magistrate in and for the said Village of Delhi.—*Gazette, 27th January.*

Peter McGregor, of the Village of Waterdown, in the County of Wentworth, Esquire, to be Police Magistrate in and for the said Village of Waterdown.—*Gazette, 27th January.*

A. A. Mactavish, of the Town of Parkhill, in the County of Middlesex, Esquire, to be Police Magistrate in and for the Township of West Williams.—*Gazette, 12th February.*

Thomas H. Brunton, of the City of Toronto, in the County of York, Esquire, to be Police Magistrate in and for the County of York, saving and excepting the Township of Scarborough and all that portion of the Township of York, lying and being east of Yonge Street, including the Town of North Toronto, in the room and stead of John A. Ramsden, deceased.—*Gazette, 18th March.*

William L. Redman, of the Village of Iroquois, in the County of Dundas, Esquire, to be Police Magistrate in and for the said Village of Iroquois.—*Gazette, 18th March.*

John Edward Starr, of the Town of Allandale, in the County of Simcoe, to be a Commissioner with the power of a Police Magistrate, under Section 28 of The Children's Protection Act of Ontario (8 Edw. VII., Cap. 59), and further, that pursuant to The Juvenile Delinquent Act, 1908, Section 2 (6), the said John Edward Starr be a Juvenile Court specially authorized to deal with Juvenile Delinquents for the City of Toronto.—*Gazette, 18th March.*

William Henry Clay, of the City of Toronto, in the County of York, Esquire, to be Police Magistrate in and for the Township of Scarborough, and all that part of the Township of York lying and being East of Yonge Street, including the Town of North Toronto.—*Gazette, 30th March.*

Bertram Smith, of the Township of Oso (Sharbot Lake P.O.), in the County of Frontenac, Esquire, to be Police Magistrate in and for the Village of Sharbot Lake, and in and for all that part of the County of Frontenac composed of the

Townships of Oso, Olden and Clarendon, in the room and stead of William Lawson, Police Magistrate for the County of Frontenac; Esquire, who has resigned as far as relates to the territory above described.—*Gazette, 30th March.*

Gordon H. Gauthier, of Porcupine, in the District of Sudbury, Esquire, Barrister-at-Law, to be Police Magistrate in and for Golden City and the territory in the vicinity thereof, saving and excepting the Township of Tisdale, composed of the Porcupine Mining Division as established by Order-in-Council of 27th January, 1910, without salary, in the room and stead of Thomas Godson, Esquire, resigned. *Gazette, 16th April.*

Seigfried Atkinson, of the Town of Haileybury, in the District of Temiskaming, Esquire, to be Police Magistrate in and for the Districts of Nipissing, Temiskaming and Sudbury.—*Gazette, 18th May.*

George Bawden, of the Village of Newboro, in the County of Leeds, Esquire, to be Police Magistrate in and for the said Village of Newboro, in the room and stead of L. G. Lewis, Esquire, deceased.—*Gazette, 8th June.*

Henry Farnsworth, of the Town of Huntsville, in the District of Muskoka, Esquire, to be Police Magistrate in and for the said Town of Huntsville, in the room and stead of J. R. Reece, Esquire, deceased.—*Gazette, 15th June.*

Edward G. Adams, of the Village of Westport, in the County of Leeds, to be Police Magistrate in and for the said Village of Westport, and in and for the Township of North Crosby, in the room and stead of F. W. Scott, Esquire, resigned. —*Gazette, 15th June.*

Frank M. Bond, of the Village of Port Dover, in the County of Norfolk, to be Police Magistrate in and for the said Village.—*Gazette, 22nd June.*

Seigfried Atkinson, of the Town of Haileybury, in the District of Nipissing, Esquire, to be a Police Magistrate in and for the District of Algoma.—*Gazette, 29th June.*

Allan McMillan, of the Village of Byng Inlet, in the District of Parry Sound, Esquire, to be Police Magistrate in and for the said Village of Byng Inlet and in and for the Villages of French River and Key Harbour.—*Gazette, 6th July.*

George D. Laurie, of the Town of St. Mary's, in the County of Perth, to be Police Magistrate in and for the said Town of St. Mary's, in the room and stead of Thomas D. Stanley, Esquire, deceased.—*Gazette, 20th July.*

Philip Quackenbush, of Whitney P. O., in the District of Nipissing, Esquire, to be Police Magistrate in and for the said District, in the room and stead of James A. Devenny, Esquire, resigned.—*Gazette, 10th August.*

Thomas Wholehan, of the Village of Chesterville, in the County of Dundas, to be Police Magistrate in and for the said Village of Chesterville.—*Gazette, 10th August.*

E. Byron Brown, of the Village of Victoria Harbour, in the County of Simcoe, Esquire, to be Police Magistrate in and for the said Village.—*Gazette, 17th August.*

Matthew Devine, of the Town of Renfrew, in the County of Renfrew, to be Police Magistrate in and for the said Town of Renfrew, in the room and stead of George Eady, Esquire, deceased.—*Gazette, 14th September.*

John Henry Delamere, of the Village of Minden, in the Provisional County of Haliburton, Esquire, to be Police Magistrate for the said Provisional County of Haliburton, in the room and stead of William Fielding, Esquire, removed—*Gazette, 14th September.*

ASSOCIATE CORONERS.

G. R. CRANN, of the Village of Gowganda, in the District of Nipissing, Esquire, M.B., to be an Associate Coroner in and for the said District of Nipissing.—*Gazette, 20th January.*

PAUL POISSON, of the Township of Sandwich East, in the County of Essex, Esquire, M.D. (Tecumseh P.O.), to be an Associate Coroner in and for the said County of Essex.—*Gazette, 3rd February.*

JOHN SILVERTHORN, of the Township of Windham, in the County of Norfolk (Teeterville P.O.), Esquire, to be an Associate Coroner in and for the said County of Norfolk.—*Gazette, 3rd February.*

THOMAS M. GALBRAITH, of the Township of Camden East (Yarker P.O.), in the County of Lennox and Addington, to be an Associate Coroner in and for the said County of Lennox and Addington.—*Gazette, 9th March.*

JOHN GRAHAM, of the Town of Pembroke, in the County of Renfrew, Esquire, M.D., to be an Associate Coroner in and for the County of Renfrew.—*Gazette, 30th March.*

JOHN VINCENT BRANDON, of the Town of Sioux Lookout, in the District of Kenora, to be an Associate Coroner in and for the said District of Kenora—*Gazette, 30th March.*

CHARLES GOLDIE SUTHERLAND, of South Porcupine, in the District of Sudbury, Esquire, M.D., to be an Associate Coroner in and for the said District of Sudbury.—*Gazette 30th March.*

HERBERT EDWIN GAGE, of the Village of Paisley, in the County of Bruce, to be an Associate Coroner in and for the said County of Bruce—*Gazette, 30th March.*

GEORGE WESLEY HALL, of the Village of Little Britain, in the County of Victoria, to be an Associate Coroner in and for the said County of Victoria.—*Gazette, 20th April.*

MALCOLM A. V. ARMSTRONG, of the Village of Tara, in the County of Bruce, Esquire, M.D., to be an Associate Coroner in and for the said County of Bruce.—*Gazette, 20th April.*

MILTON HENRY LIMBERT, of the Town of Parry Sound, in the District of Parry Sound, Esquire, M.B., to be an Associate Coroner in and for the said District of Parry Sound.—*Gazette, 11th May.*

NORMAN WILLIAM MELDRUM, of the Village of Ayr, in the County of Waterloo, Esquire, M.D., to be an Associate Coroner in and for the County of Waterloo—*Gazette, 11th May.*

JAMES HUGH LAIDLAW, of the Village of Cainsville, in the County of Brant, Esquire, M.D., to be an Associate Coroner in and for the said County of Brant.—*Gazette, 11th May.*

ROBERT MERRITT CHARLTON, of Rainy River, in the District of Rainy River, Esquire, M.D., to be an Associate Coroner in and for the said District of Rainy River.—*Gazette, 11th May.*

HENRY BLACKBURN JOHNSTONE, of the Village of Fenelon Falls, in the County of Victoria, Esquire, M.D, to be an Associate Coroner in and for the County of Victoria.—*Gazette, 11th May.*

JOSEPH EASSON DEPEW, of White River, in the District of Algoma, Esquire, to be an Associate Coroner in and for the Districts of Thunder Bay, Sudbury and Algoma.—*Gazette, 25th May.*

PATRICK J. SCOTT, of the Town of Southampton, in the County of Bruce, Esquire, M.D., to be an Associate Coroner in and for the County of Bruce.—*Gazette, 22nd June.*

WILLIAM REID, of the Village of Wyoming, in the County of Lambton, M.B., to be an Associate Coroner in and for the said County of Lambton.—*Gazette, 22nd June.*

FREDERIELL WILLIAM MANNING, of the City of Windsor, in the County of Essex, Esquire, M.B., to be an Associate Coroner in and for the said County of Essex.—*Gazette, 6th July.*

JOHN WESLEY RUSSELL, of the City of Toronto, in the County of York, Esquire, M.D., to be an Associate Coroner in and for the said City of Toronto.—*Gazette, 13th July.*

HIRAM HORTON KIRBY, of the Town of Hawkesbury, in the County of Prescott, Esquire, M.D., to be an Associate Coroner in and for the United Counties of Prescott and Russell.—*Gazette, 20th July.*

JAMES NELSON RICHARD, of the Village of Warkworth, in the County of Northumberland, Esquire, M.D., to be an Associate Coroner in and for the United Counties of Northumberland and Durham.—*Gazette, 20th July.*

JAMES F. VANDERBURGH, of the Village of Merritton, in the County of Lincoln, Esquire, M.B., to be an Associate Coroner in and for the said County of Lincoln.—*Gazette, 3rd August.*

ROBERT GEORGE CAMPBELL KELLY, of the Village of Watford, in the County of Lambton, Esquire, M.D., to be an Associate Coroner in and for the said County of Lambton.—*Gazette, 10th August.*

FREDERICK CHARLES DELAHEY, of the Town of Pembroke, in the County of Renfrew, Esquire, M.D., to be an Associate Coroner in and for the said County of Renfrew.—*Gazette, 21st September.*

CLAUDE ALLISON PATTERSON, of the Township of Plympton (Forest P.O.), in the County of Lambton, Esquire, M.D., to be an Associate Coroner in and for the said County of Lambton.—*Gazette, 21st September.*

HENRY MANSFIELD TORRINGTON, of the Town of Sudbury, in the District of Sudbury, Esquire, M.D., to be an Associate Coroner in and for the said District of Sudbury.—*Gazette, 5th October.*

HUGH KENNEDY HYNDMAN, of the Village of Exeter, in the County of Huron, Esquire, M.D., to be an Associate Coroner in and for the said County of Huron.—*Gazette, 5th October.*

JOSEPH WILLIAM HUNT, of the Town of Steelton, in the District of Algoma, Esquire, M.D., to be an Associate Coroner in and for the District of Algoma.—*Gazette, 19th October.*

W. W. BOYCE, of the City of Belleville, in the County of Hastings, Esquire, M.D., to be an Associate Coroner in and for the said County of Hastings.—*Gazette, 19th October.*

DUNCAN ALEXANDER CAMPBELL, of the Town of North Bay, in the District of Nipissing, Esquire, M.D., to be an Associate Coroner in and for the said District of Nipissing.—*Gazette, 26th October.*

JAMES HERBERT TANDY, of the City of Toronto, in the County of York, Esquire, B.A., M.D., to be an Associate Coroner in and for the said County of York.—*Gazette, 9th November.*

EBENEZER ASA DOAN, of the Town of Copper Cliff, in the District of Sudbury, Esquire, to be an Associate Coroner, in and for the said District of Sudbury.—*Gazette, 30th November.*

WILLIAM HENRY BUTT, of the Town of Timmins, in the District of Sudbury, Esquire, M.D., to be an Associate Coroner in and for the said District of Sudbury. *14th December.*


Nabinina
Lake
Rap. F. 10' Por. 330 yds
Pol. 730 yds
Bare rocky shore & islands
Burnt timber
Pinestone R.

ONTARIO
DEPARTMENT OF LANDS, FORESTS AND MINES
BUREAU OF MINES

MAP

(Actinolite - Cloyne Sheet)

SHOWING GEOLOGY ON A BELT OF COUNTRY THIRTY MILES LONG, IN THE COUNTIES OF

HASTINGS, ADDINGTON AND FRONT

PROVINCE OF ONTARIO

To accompany Part II, Volume 22, Report of Bureau of Mines, 1913

Hon. W. H. Hearst, *Minister* — Willet G. Miller, *Provincial Geologist*

Scale — 4 Miles or ½ Mile = 1 Inch

Chains 100 — Miles

Metres 500 — Kilometres

LEGEND

PALEOZOIC

Ordovician

- Black River limestone, and basal sandstone and conglomerate.

UNCONFORMITY

PRE-CAMBRIAN

Post-Hastings intrusives.

- Diabase.
- Fine-grained grey felsite.
- Monzo granite and coarse-grained granite pegmatite.

INTRUSIVE CONTACT

Hastings (Temiskaming Series?)

- Conglomerate and quartzite. (These rocks are in part altered to mica-schist and gneiss.)

UNCONFORMITY

Laurentian.

- Felsite, partly altered to sericite-schist or gneiss.
- Gneissoid granite and syenite, quartz-porphyry, feldspar-porphyry.

INTRUSIVE CONTACT

Grenville

- Non-magnesian and magnesian crystalline limestone.
- Iron formation, (banded chert, jasper, or granular quartz).
- Grey gneiss, quartz-mica schists, greywacke, quartzite, rusty schist.

Keewatin.

- Hornblende schist, diffusoidal basalt and other rocks.

SIGNS

- House.
- Hill.
- Swamp.
- 551 Elevation above sea level.
- Road.
- Railway.
- County boundaries.
- Township boundaries.
- o P P Prospect pit.
- Actinolite pits (actinolite and serpentinous or talcose minerals.)
- Actinolite bands.

NOTE

The Keewatin schists, originally essentially volcanic rocks, are considered to form the basement. On the ropy, fulgaceous and uneven surface of the Keewatin were deposited the sediments now represented by quartzite, greywacke, schist, iron formation and crystalline limestone. No erosion unconformity preceding that immediately below the Hastings series has been observed. The deposition of the older sediments, including the quartzite, greywacke and limestone, probably closely followed the submarine lava flows of the Keewatin.

SOURCES OF INFORMATION

Geology by Willet G. Miller and Cyril W. Knight.

Topography by W. R. Rogers.

ECONOMIC NOTES

The area contains a variety of mineral deposits and rocks of economic importance, viz.—iron pyrites, gold, nickel, talc, crystalline limestone, actinolite and trap.

IRON PYRITES

Southwest of Queensboro, in Madoc township, the Canadian Sulphur Ore Company is mining a body of iron pyrites which occurs near the contact of a band of mica schist and an intrusion of grey felsite. The Company has recently built a spur line from the Bay of Quinte railway to the property. Two other deposits of iron pyrites, the Blakley and the Palmer, occur short distances from here; they have been worked from time to time.

GOLD

A property, commonly known as the Golden Fleece, which is located about a mile and a half northeast of Flinton in Kaladar township, has been operated in the past for gold. The deposit occurs at the contact of conglomerate and greenstone schist. The Ore Chimney, which lies six miles northeast of the Golden Fleece, near the southwest corner of Harrie township, also occurs at the contact of these two rocks.

MISPICKEL

This mineral is found on the property of Mr. Joseph James, at the village of Actinolite (formerly known as Bridgewater).

TALC

A large body of talc is being worked on the outskirts of the village of Madoc. It occurs in a dolomitic crystalline limestone. The greater part of the product goes to the talc mill at Madoc where it is ground and shipped. Developments work has also been done by another company on an adjoining property where a body of talc has recently been discovered.

CRYSTALLINE LIMESTONE

Immense bodies of crystalline limestone are found in the area. A quarry is being worked about a mile south of Actinolite on the Bay of Quinte railway. The crushed rock is used for making artificial stone.

ACTINOLITE

There are extensive deposits of actinolite in the townships of Elzevir and Kaladar which are at present lying idle. In past years this mineral has been ground and used for roofing purposes. Certain varieties appear to be suitable for decorative purposes. The mineral is often associated with calcite, talc and serpentine. The locations of these occurrences are shown on the map.

TRAP

The greenstone northwest of Actinolite has in a few instances escaped metamorphism. Thus there are certain restricted areas which appear to contain rock suitable for road material. Schistose varieties of this rock are not desirable for road-making purposes.

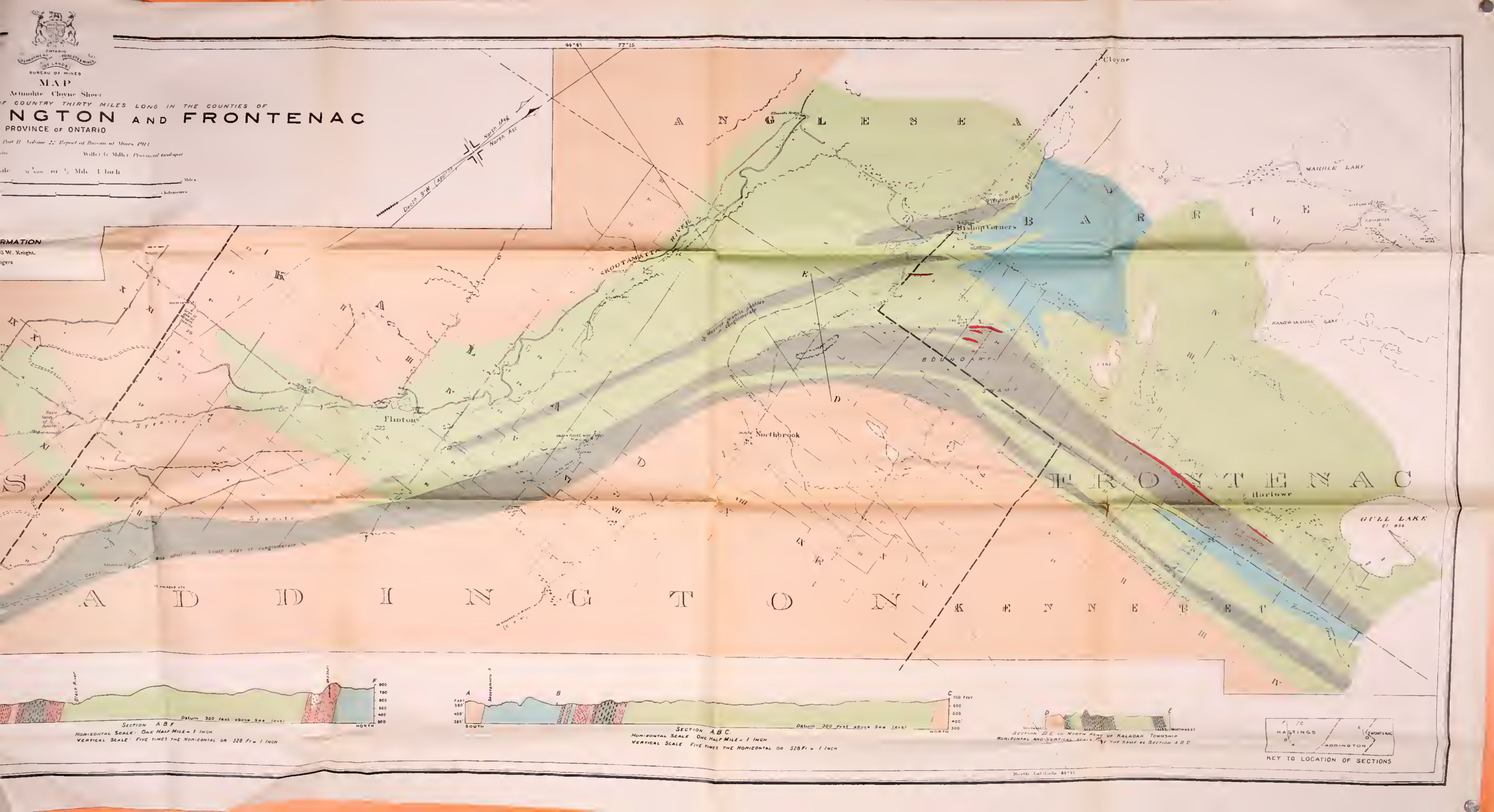
Toronto, 132 miles

77° 15' Longitude West From Greenwich

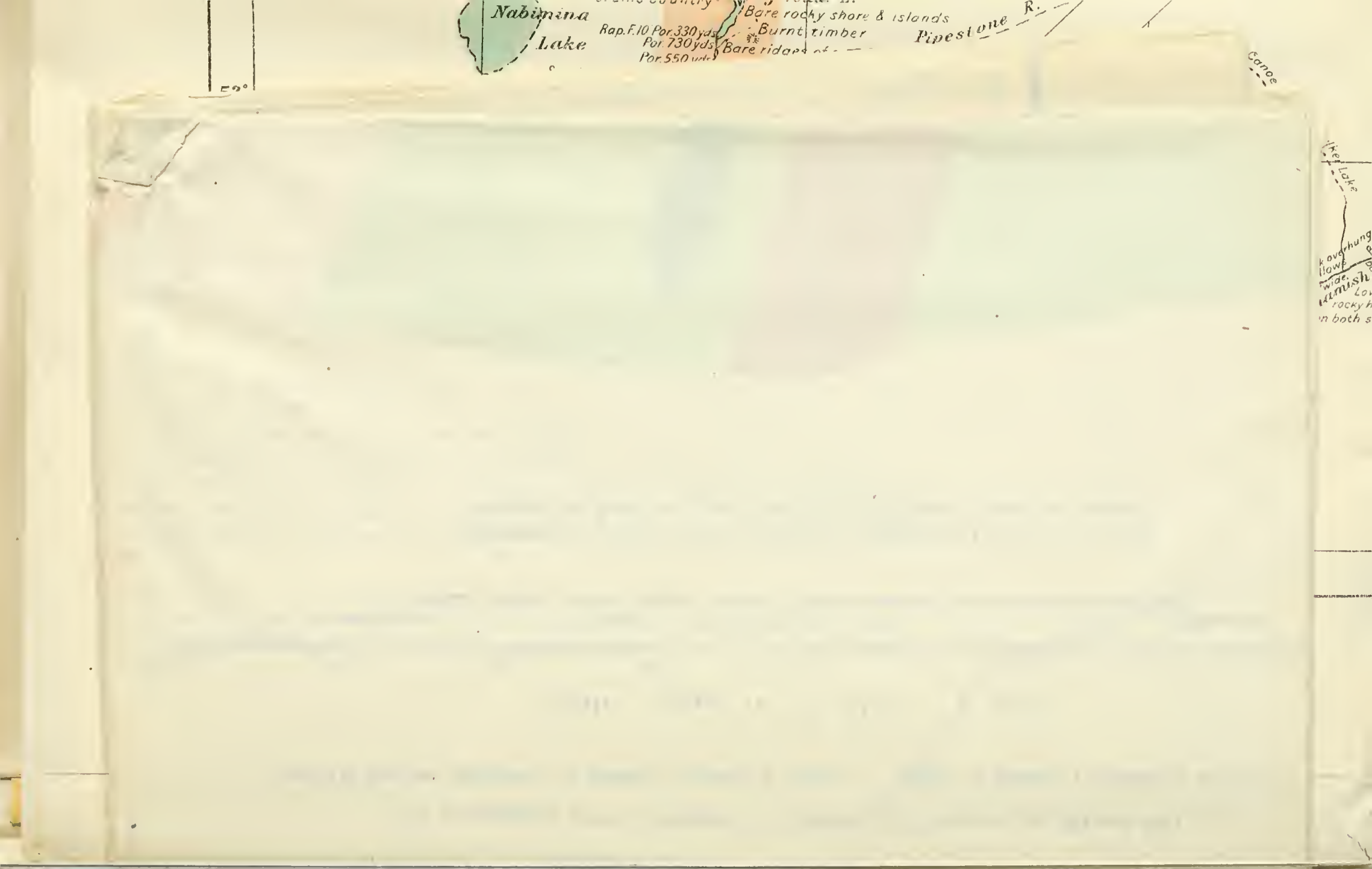
SECTION A.B.F.

HORIZONTAL SCALE: ONE HALF MILE = 1 INCH

VERTICAL SCALE: FIVE TIMES THE HORIZONTAL OR 528 FT. = 1 INCH



ONTARIO
DEPARTMENT OF LANDS FORESTS & MINES
BUREAU OF MINES
MAP
NGTON AND FRONTENAC
PROVINCE OF ONTARIO
North Mag
North Ast
RMATION
W. Knight.
gers
Cloyne
ANGLESEA
BARRIE
MARBLE LAKE
Bishop Corners
SKOOTAMATTA RIVER
Flinton
Northbrook
FRONTENAC
Harlowe
GULL LAKE
ADDINGTON
KENNEBEC
BOUNDARY SWAMP
Syenite
South edge of conglomerate
Section A B F
Horizontal Scale: One Half Mile = 1 Inch
Vertical Scale: Five times the Horizontal or 528 Ft = 1 Inch
Datum 300 feet above Sea level
Section A.B.C.
Horizontal Scale One Half Mile = 1 Inch
Vertical Scale Five times the Horizontal or 528 Ft = 1 Inch
Section D.E. in North Part of Kaladar Township
HASTINGS
ADDINGTON
FRONTENAC
KEY TO LOCATION OF SECTIONS


Nabinina
Lake
Rap. F. 10 Por. 330 yds
Por. 730 yds
Por. 550 yds
Bare rocky shore & islands
Burnt timber
Pipestone R.
Canoe

MAP
OF THE
SUDBURY COBALT PORCUPINE REGION
PROVINCE OF ONTARIO

NOTES

TABLE No. 1
Nickel Production Sudbury Nickel Mines, 1890 to 1913

Calendar Year	Pounds	Value
1890	18,100	$
1891	90,394	
1892	Nil	
1893	201,676	
1894	316,228	
1895	520,256	
1896	524,536	
1897	364,464	
1898	407,854	
1899	167,114	
1900	341,586	
1901	721,023	
1902	1,067,580	
1903		
1904		
1905		
1906		
1907		
1908		
1909		
1910		
1911		
1912		
1913		

TABLE No. 4
Copper Production in Ontario, 1886 to 1913

Calendar Year	Lbs.	Value
1886	168,400	$
1887	222,824	18,193
1888	Nil	90,394
1889	Nil	Nil
1890	1,499,736	201,676
1891	1,703,193	316,228
1892	3,172,196	520,256
1893	2,503,793	524,536
1894	641,364	364,464
1895	3,501,670	407,854
1896	1,870,597	167,114
1897	3,181,250	341,586
1898	5,144,052	721,023
1899	9,372,225	1,067,580
1900	6,523,224	1,307,377
1901	6,740,058	1,401,316
1902	6,806,161	1,401,667
1903	7,446,208	965,276
1904	6,913,504	940,295
1905	8,779,250	630,179
1906	11,016,781	1,706,991
1907	14,104,187	2,560,156
1908	15,106,171	2,923,836
1909	18,150,684	4,181,402
1910	18,487,680	3,944,427
1911	16,250,000	3,402,213
1912	17,665,000	3,410,307
1913	22,200,181	5,810,971

*Mainly from the nickel copper ores of the Sudbury area.

TABLE No. 5
Silver Production, Cobalt Mines, 1904 to 1913

Year	Ounces	Value
1904	158,000	$
1905	1,255,000	1,000,000
1906	3,000,000	2,500,000
1907	5,000,000	4,000,000
1908	5,000,000	4,000,000
1909	7,000,000	5,000,000
1910	8,000,000	6,000,000
1911	9,000,000	7,000,000
1912	10,000,000	8,000,000
1913	30,000,000	24,000,000

TABLE No. 6
Gold Production, Porcupine Mines, 1911 and 1912

Year	Quantity	Value
1911	6,454	$
1912	169,705	3,510,000
		3,510,000

Sudbury Area.—It will be noted that there are extensive areas to be mapped before the above table is complete. Much work must also be accomplished before the age relationships of certain rocks can be definitely understood. For instance, it is uncertain whether or not the Sudbury series, consisting of quartzite, greywacke and slate, is of the same age as the Temiskaming series which is composed of similar sediments. Judging, however, from the facts that both series are much metamorphosed and have been tilted up into vertical attitudes by great masses of intrusive granite, it is possible that they are of the same age. The Sudbury series as mapped may also include sediments of the older Grenville series.

The Cobalt series, which is extensively developed at Cobalt, Gowganda, Temagami and other localities consists of conglomerate, slate like greywacke and quartzite. The rocks, mapped as Huronian in the Sudbury basin consist of conglomerate, tuff, slate and sandstone. These two series of sediments appear to have suffered about the same degree of metamorphism, and are probably of the same age. The Ramsay Lake conglomerate, exposed to the east of the town of Sudbury, may also be of the same age.

A word may be added in regard to the Grenville series. These sediments, which are exposed in numerous areas lie all to the south of Sudbury beyond the confines of this map, are believed to be represented by what has formerly been known as the Keewatin "green stone" formation. The latter consists of banded ferruginous chert and jaspilyte, together with basic beds of schistose greenstone as may be seen near the railway station at Temagami. Small areas of crystalline limestone south of the Sudbury area and north of Rutherglen on the C. P. Ry., probably also should be classed with the Grenville series.

The age relations of the sediments on the north shore of lake Huron (the original Huronian area of sir William Logan) to the Temiskaming, Sudbury and Cobalt series are not fully understood. Hence on account of this incomplete knowledge, it has been considered prudent to use three legends, the first of which refers to the original Huronian area on the north shore of Lake Huron, the second to the Sudbury area, and the third to all the remaining parts shown on the map.

While the age relations of the sediments mentioned above are still uncertain, it seems probable that the difference in age of the Nipissing diabase, which is exposed in the Cobalt area, and the Nickel eruptive, which is exposed at Sudbury, is established. These intrusives intersect all of the pre-Laurentian sediments of the area, are very similar in chemical and lithological composition, and show similar magmatic differentiation. Both occur in the form of sills, the Nipissing diabase having a thickness of 600 feet or more, and the Nickel eruptive ascending to 4 or 5 thousand feet and a quarter.

Ore Deposits.—The ore deposits at Sudbury, Cobalt and Porcupine are classified as of pre-Cambrian age and believed to be due directly or indirectly to igneous intrusions. At Sudbury the intrusive rock is quartz norite (the Nickel eruptive) at Cobalt quartz diabase (the Nipissing diabase), and at Porcupine granite.

SOURCES OF INFORMATION

Maps of the Ontario Bureau of Mines. Willet G. Miller, *Provincial Geologist*
Maps of the Canadian Geological Survey. R. W. Brock, *Director.*
E. and N. T. Ry. Commission Geological Survey between Porcupine and Gowganda, by L. O. McMillan.
Topography compiled under the direction of W. K. Rogers, *Topographer, Bureau of Mines*
Geology compiled by A. G. Burrows and Cyril W. Knight

LEGEND FOR NORTH SHORE OF LAKE HURON.
(After A. P. Low.)

PALEOZOIC
Ordovician and Silurian
Fossiliferous limestones and shales.

GREAT UNCONFORMITY
PRE-CAMBRIAN
Huronian Series
Quartzite, conglomerate, greywacke, etc.

GREAT UNCONFORMITY
Laurentian
Gneiss and gneissoid granite.

INTRUSIVE ROCKS
Diabase (Nipissing).

LEGEND FOR AREAS EXCLUSIVE OF SUDBURY AND NORTH SHORE OF LAKE HURON.
(After Willet G. Miller.)

PALEOZOIC
Silurian
Limestone, sandstone, basal conglomerate (Niagaran).

GREAT UNCONFORMITY
PRE-CAMBRIAN
Keweenawan Series
Nipissing diabase.

INTRUSIVE CONTACT
Cobalt Series
Lorrain arkose and quartzite.
Conglomerate, quartzite greywacke.

UNCONFORMITY
Lorrain granite and gneiss.

INTRUSIVE CONTACT
Temiskaming Series
Conglomerate, quartzite greywacke, slate.

UNCONFORMITY
Laurentian
Fine-grained granite, banded gneiss. Probably also in places intrusions of Lorrain granite.

INTRUSIVE CONTACT
Grenville Series
Crystalline limestone.
Jaspilyte, schistose grey wacke.

Keewatin
Green schists, amygdaloidal basalt, diabase, diorite, acid porphyries, etc.

INTRUSIVE ROCKS
Granite, syenite and gneissic intrusives, Porcupine, etc.†
Syenite and porphyries (Murray Creek, Kirkland Lake).†

† These rocks are older than the Cobalt series, but their relation to the Temiskaming series is not known.

LEGEND FOR SUDBURY AREA
(After A. P. Low.)

PRE-CAMBRIAN

INTRUSIVE CONTACT

INTRUSIVE CONTACT
Keweenawan Series
Nickel eruptive norite and micropegmatite.

INTRUSIVE CONTACT
Upper Huronian
Chelmsford sandstone.
Onaping tuff.

Lower Huronian
Basalt, greenstone.

Laurentian
Granite and gneiss, to be referred by Coleman to be younger than Sudbury series.

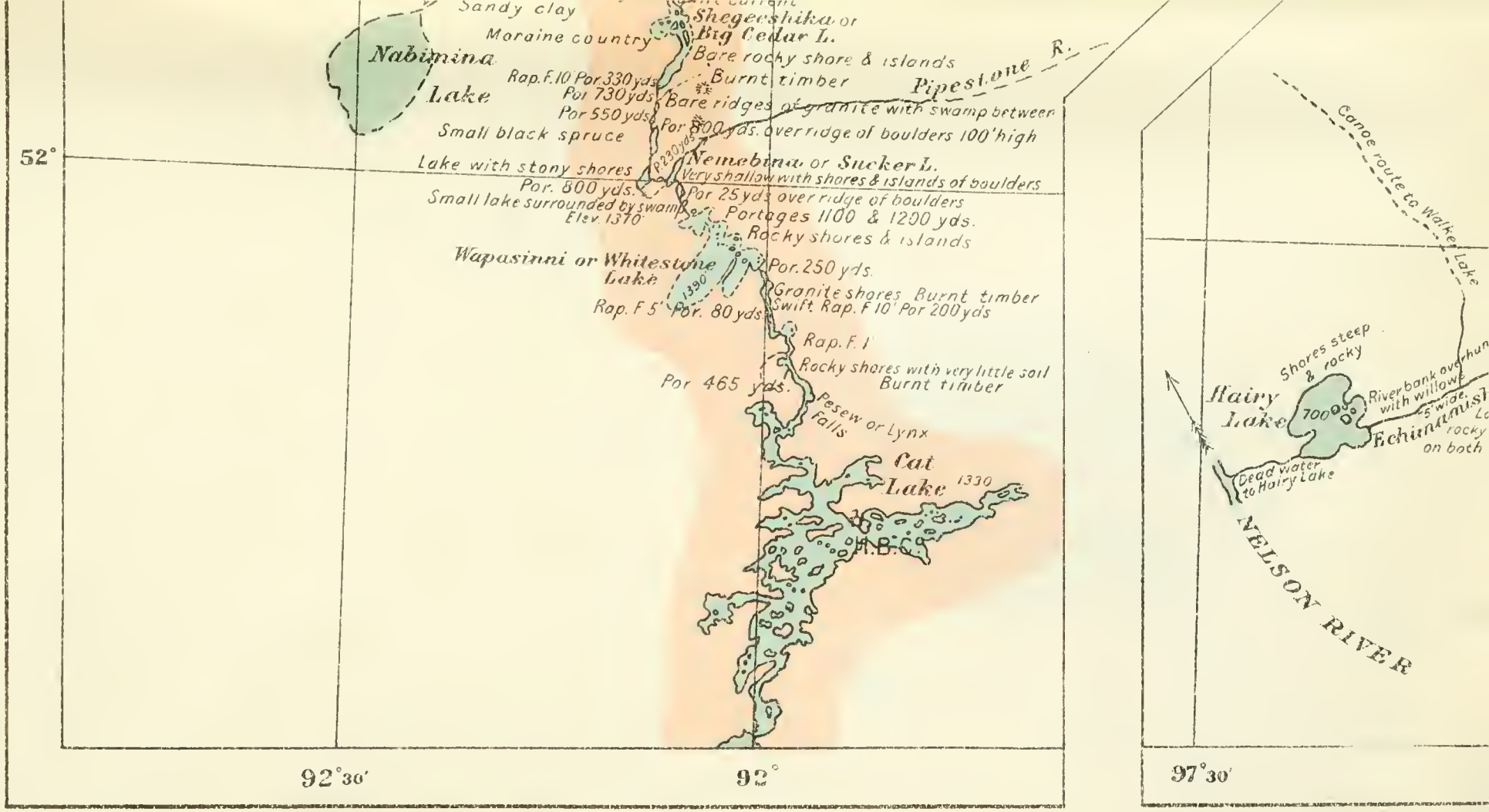
INTRUSIVE CONTACT
Sudbury Series
Greywacke, slate.
Quartzite, schist and ferruginous gneiss.

Grenville Series
Crystalline limestone and quartzite.

INTRUSIVE ROCKS
Diabase, norite and gneissoid Sudbury intrusives into above Nickel eruptive.

Scale 8 miles 1 inch.

Preliminary Edition, subject to revision


Sandy clay
Moraine country
Nabinina Lake
Shegeeshika or Big Cedar L.
Bare rocky shore & islands
Rap. F. 10 Por. 330 yds.
Pol 730 yds.
Por 550 yds.
Burnt timber
Pipestone R.
Bare ridges of granite with swamp between
Por 500 yds. over ridge of boulders 100' high
Small black spruce
Lake with stony shores
Por. 800 yds.
Small lake surrounded by swamp
Elev. 1370'
Nemebina or Sucker L.
Very shallow with shores & islands of boulders
Por 25 yds over ridge of boulders
Portages 1100 & 1200 yds.
Rocky shores & islands
Wapasinni or Whitestone Lake
1390
Por. 250 yds.
Granite shores Burnt timber
Swift Rap. F 10' Por 200 yds
Rap. F 5'
Por. 80 yds.
Rap. F. 1
Rocky shores with very little soil
Burnt timber
Por 465 yds.
Pesew or Lynx Falls
Cat Lake 1330
H.B.C.
52°
92°30'
92°
Canoe route to Wakey Lake
Shores steep & rocky
Hairy Lake
700
River bank overhun with willows
5' wide
Echimamish
rocky on both
Dead water to Hairy Lake
NELSON RIVER
97°30'

ONTARIO
DEPARTMENT OF LANDS, FORESTS AND MINES
BUREAU OF MINES

MAP
OF PART OF THE
TOWNSHIP OF BELMONT
PETERBOROUGH COUNTY — PROVINCE OF ONTARIO
(BELMONT LAKE SHEET)

To accompany Part II, Volume 22, Report of Bureau of Mines, 1913

Hon. W. H. Hearst, *Minister of Lands, Forests & Mines* — Willet G. Miller, *Provincial Geologist*

Scale: 12,540 or ¼ Mile = 1 Inch

Miles 1 ¾ ½ ¼ 0 1 Mile
Metres 1000 500 0 1 Kilometre

Elevations noted on the map are referred to mean sea level. Islands in Belmont Lake are numbered from south to north.

ECONOMIC NOTES

In November, 1913, the mineral industries in operation in the area covered by this map were the gold mine at Canborra, the Belmont Iron mine on an adjacent property, and the quarry of the Ontario Rock Company, on a spur of the Canadian Pacific Railway about three miles east of Havelock.

It will be seen from the map that all the mining and quarrying operations are being carried on in connection with the intrusive rocks, which have been classified provisionally as of Keewatinian age. The gold at Canborra occurs in quartz deposits in the gabbro-diabase, while the Belmont iron deposit has been produced by the alteration of this rock into crystalline limestone and associated material. The Ontario Rock Company is quarrying a basaltic phase of the rock commonly known as "trap." This rock is manufactured as road material. It may be added that the quarry industry here has been developed directly as a result of the mapping of the area. The good roads movement, especially in the vicinity of Toronto, caused enquiries to be made as to the location of likely quarry sites. Several enquiries were directed to the Havelock locality, and work was finally begun by the company mentioned. From the map it will be seen that rock similar to that now being quarried underlies a large area. Inexhaustible supplies of road material are thus available. If the mapping of the area had not been undertaken, diabase-trap rock outcrops would long have remained unknown and undeveloped.

It is to be hoped that the publication of this map will lead to the development of other industries in the area, and it is believed that it will be found of value to the residents, and especially to tourists who will come in increasing numbers to Belmont and Round Lakes when their attractions are better known. The area is so accessible to the centres of population of the Province, that it is likely to attract many visitors in the future.

SIGNS

- *Road*
- *Hill*
- P.O. *Post Office*
- 650 *Elevation above sea level in feet*
- *Strike and Dip*
- *Railway*
- *Swamp*
- *Town*

SOURCES OF INFORMATION

Geology mainly surveyed by W. G. Miller and Cecil W. Knight, in 1906-08.

Compiled by W. R. Rogers.

Soundings in and to the north part of Belmont lake were taken survey by Engineering Field Class of the School of Mining, Kingston, Ont., May, 1913.

MARMORA TOWNSHIP AND COUNTY
BELMONT
PETERBOROUGH HASTINGS

BELMONT IRON MINE
LEDYARD GOLD MINE
CANBORRA GOLD MINES Co.
BELMONT
LAKE
ROUND LAKE
BIG ISLAND
CON 1
CON 2
CON 3
CON 4
CON 5
CON 6
CON 7


ROUND LAKE
LAKE
HAVELOCK
LEGEND
GLACIAL and RECENT
PALEOZOIC
Ordovician
UNCONFORMITY
PRE-CAMBRIAN
Keweenawan?
IGNEOUS CONTACT
Hastings
GREAT UNCONFORMITY
Grenville
Keewatin
NOTE
Section A B
BELMONT
CANADIAN PACIFIC RAILWAY
77°50
77°55

MAP

SHEWING ROUTE OF THE

NELSON RIVER EXPLORING EXPEDITION

THROUGH THE

PROVINCES OF MANITOBA AND ONTARIO

To accompany report by J.B. TYRRELL

Part I, Vol. 22, Report of Bureau of Mines, 1913

Hon. W.H. Hearst, *Minister*

Scale: as shown or 10 Miles = 1 Inch

10 0 10 20 30 Miles

10 0 10 20 30 40 Kilometres

ONTARIO DEPARTMENT OF LANDS, FORESTS & MINES

BUREAU OF MINES

AUTHORITIES

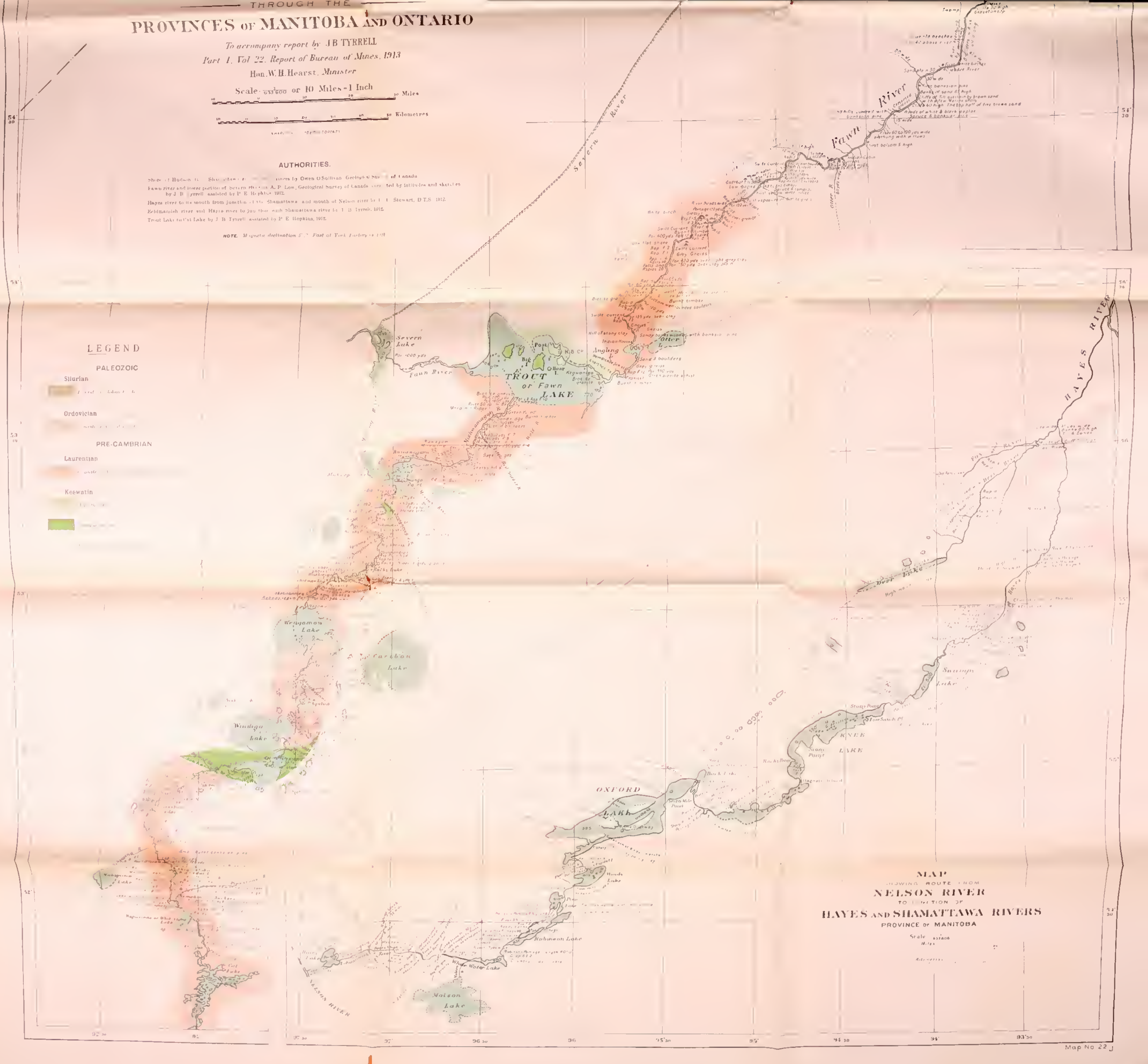
Nelson or Hayes River, Shamattawa and Gods Lake rivers by Owen O'Sullivan, Dominion Survey of Canada.

Fawn river and lower portion of Severn river by A.P. Low, Geological Survey of Canada, surveyed by latitudes and variation by J.B. Tyrrell, assisted by F.E. Hopkins, 1912.

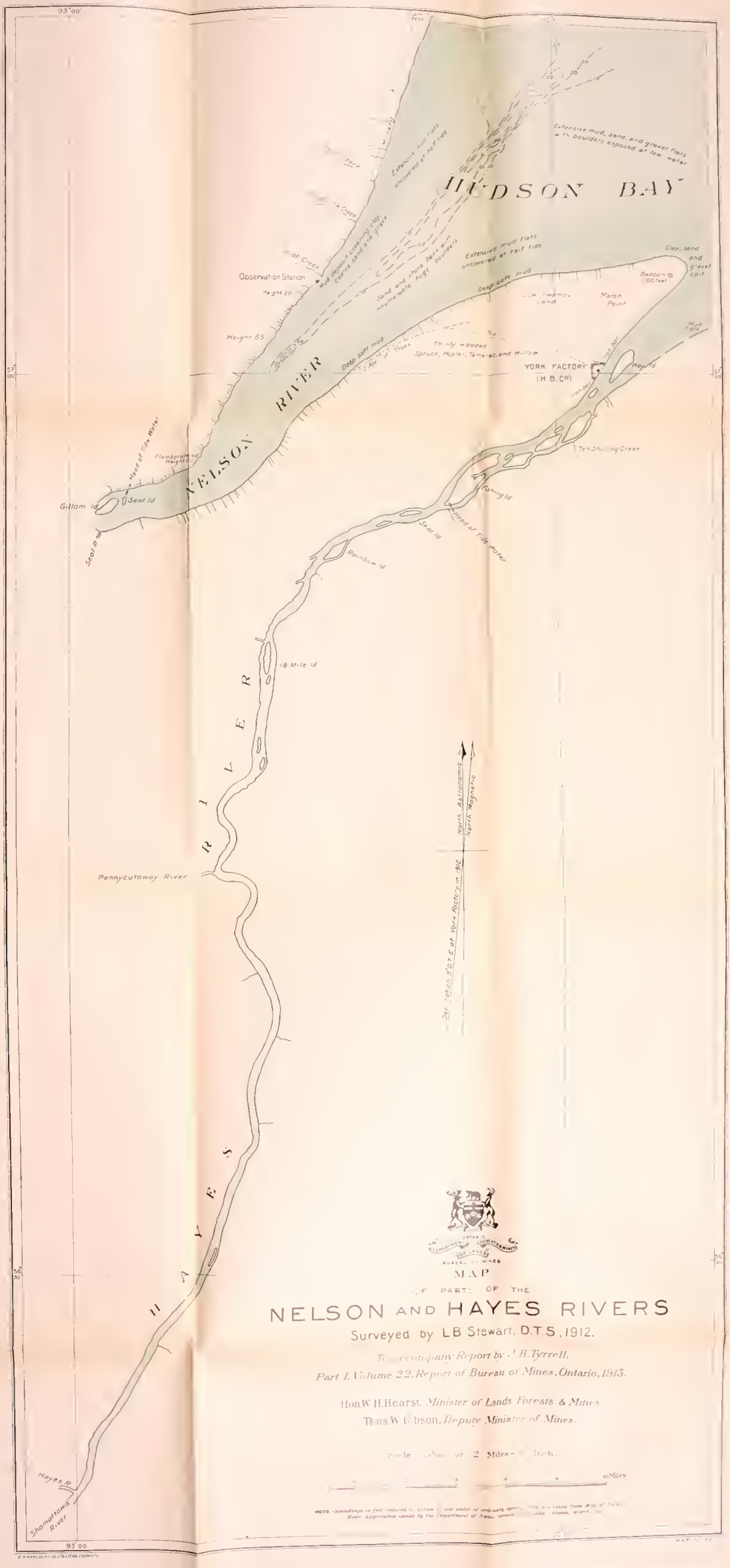
Hayes river to the mouth from junction of the Shamattawa, and mouth of Nelson river by L.B. Stewart, D.T.S., 1912.

Shamattawa river and Hayes river to junction with Shamattawa river by J.B. Tyrrell, 1912.

Trout Lake to Cat Lake, by J.B. Tyrrell, assisted by F.E. Hopkins, 1912.



THROUGH THE
PROVINCES OF MANITOBA AND ONTARIO
To accompany report by J B TYRRELL
Part 1, Vol 22, Report of Bureau of Mines, 1913
Hon. W. H. Hearst, Minister
Scale or 10 Miles = 1 Inch
Miles
Kilometres
AUTHORITIES.
Trout Lake to Cat Lake by J. B. Tyrrell assisted by P. E. Hopkins, 1912.
NOTE.
LEGEND
PALEOZOIC
Silurian
Ordovician
PRE-CAMBRIAN
Laurentian
Keewatin
Severn River
Fawn River
Severn Lake
TROUT or Fawn LAKE
Otter L.
Angling L.
Weagamow Lake
Caribou Lake
Windigo Lake
Deer Lake
Swampy Lake
KNEE LAKE
OXFORD LAKE
Robinson Lake
White Water Lake
Molson Lake
NELSON RIVER
HAYES RIVER
Cat Lake
MAP
SHOWING ROUTE FROM
NELSON RIVER
HAYES AND SHAMATTAWA RIVERS
PROVINCE OF MANITOBA
Scale
Miles
Map No 22


HUDSON BAY
NELSON RIVER
HAYES RIVER
YORK FACTORY
(H.B.Co)
Observation Station
Height 20
Height 65
Extensive mud flats uncovered at half tide
Extensive mud, sand, and gravel flats with boulders exposed at low water
Mud deposit covering clay, coarse sand and gravel
Sand and stone bank with innumerable huge boulders
Deep soft mud
Extensive mud flats uncovered at half tide
Clay, sand and gravel spit
Beacon 60 feet
Marsh Point
Mud flats
Thinly wooded
Spruce, Poplar, Tamarack and Willow
Hay Rd
Tan Shanning Creek
Head of Tide Water
Flamborough Head
Gillam Id
Seal Id
Seal R
Rainbow Id
18 Mile Id
Pennycutaway River
Hayes R
Shamattawa River
North Astronomic
North Magnetic
Dec. taken 59° E. at York Factory in 1912
MAP
OF PARTS OF THE
NELSON AND HAYES RIVERS
Surveyed by L.B. Stewart, D.T.S., 1912.
To accompany Report by J.B. Tyrrell.
Part I, Volume 22, Report of Bureau of Mines, Ontario, 1913.
Hon. W.H. Hearst, Minister of Lands Forests & Mines
Thos. W. Gibson, Deputy Minister of Mines.
Scale 4 Miles or 2 Miles = 1 Inch.
0
10 Miles
93° 00'
56° 30'

ONTARIO
DEPARTMENT OF LANDS FORESTS AND MINES

BUREAU OF MINES

MAP OF TORONTO AND VICINITY

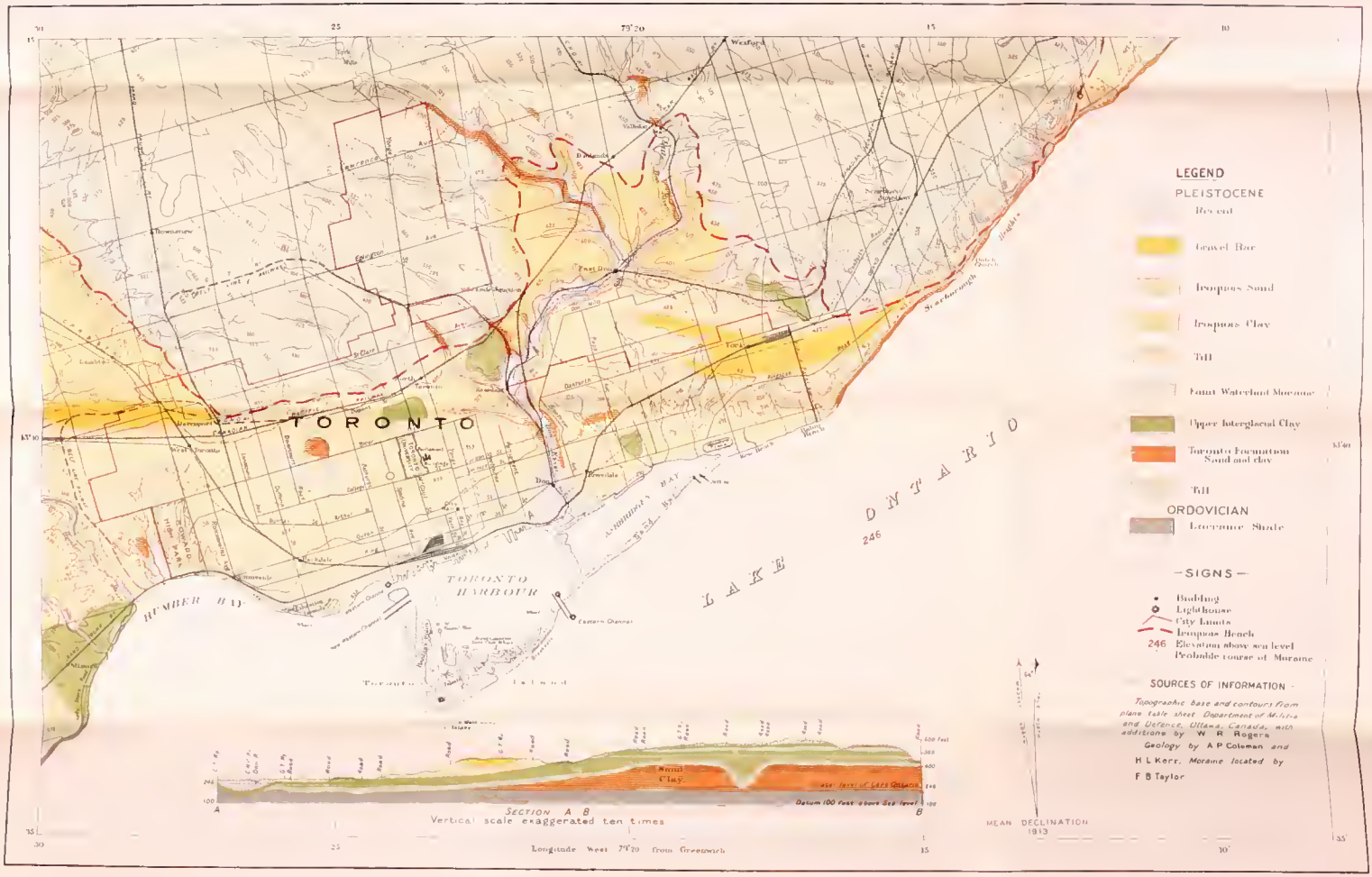
To accompany Part I Volume 22 Report of Bureau of Mines 1913

Hon W H Hearst, *Minister* Willet G. Miller, *Provincial Geologist*

Scale 63360 or 1 Mile = 1 inch

1 ½ 0 1 2 3 4 Miles

Metres 1000 500 0 1 2 3 4 5 Kilometres



LEGEND

PLEISTOCENE

Recent

- Gravel Bar
- Iroquois Sand
- Iroquois Clay
- Till
- Peant Waterlind Moraine
- Upper Interglacial Clay
- Toronto Formation Sand and clay
- Till

ORDOVICIAN

- Lorraine Shale

—SIGNS—

- Building
- Lighthouse
- City Limits
- Iroquois Beach
- 246 Elevation above sea level
- Probable course of Moraine

SOURCES OF INFORMATION

Topographic base and contours from plane table sheet Department of Militia and Defence, Ottawa, Canada, with additions by W R Rogers

Geology by A P Coleman and H L Kerr. Moraine located by F B Taylor

Map N° 22 g