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Ontario Legislative Assembly

SESSIONAL PAPERS

—
VOL. LV—PART II
—

FOURTH SESSION

OF THE

FIFTEENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO

—
SESSION 1923
—

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TORONTO

Printed and Published by Clarkson W. James, Printer to the King's Most Excellent Majesty
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- No. 2 Estimates—Supplementary for the service of the Province for the year ending 31st October, 1923. Presented to the Legislature, February 22nd, 1923. *Printed.* Estimates for the year ending 31st October, 1924. Presented to the Legislature, May 1st, 1923. *Printed.* Supplementary Estimates, grant to Dr. Banting. Presented to the Legislature, May 4th, 1923. *Not Printed.*

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- No. 7 Report of the Inspector of Registry Offices for the year 1922. Presented to the Legislature, April 9th, 1923. *Printed.*
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- No. 9 Report of the Commissioners for the Queen Victoria Niagara Falls Park for the year 1922. Presented to the Legislature, April 30th, 1923. *Printed.*
- No. 10 Report of the Superintendent of Insurance for the year 1922. Presented to the Legislature, May 1st, 1922. *Printed.*
- No. 11 Report of the Registrar of Friendly Societies for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

- No. 12 Report of the Registrar of Loan Corporations for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

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- No. 14 Report of the Department of Game and Fisheries for the year 1922. Presented to the Legislature, May 2nd, 1923. *Printed.*
- No. 15 Report upon Highway Improvement for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*
- No. 16 Report of the Department of Labour for the year 1922. Presented to the Legislature, May 4th, 1923. *Printed.*
- No. 17 Report of the Department of Education for the year 1922. Presented to the Legislature, May 3rd, 1923. *Printed.*
- No. 18 Report of the Board of Governors of the University of Toronto for the year ending 30th June, 1922. Presented to the Legislature March 5th, 1923. *Printed.*
- No. 19 Report of the Secretary and Registrar of the Province for the year 1922. Presented to the Legislature, March 26th, 1923. *Printed.*

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- No. 20 Report of the Registrar-General upon the Births, Marriages and Deaths, in the Province for the year 1922. Presented to the Legislature, May 4th, 1923. *Printed.*
- No. 21 Report of the Provincial Board of Health for the year 1922. Presented to the Legislature, April 30th, 1923. *Printed.*
- No. 22 Report of the Inspector upon the Hospitals for Insane, Feeble-minded and Epileptic, for the year 1922. Presented to the Legislature, May 4th, 1923. *Printed.*
- No. 23 See No. 22.
- No. 24 Report of the Ontario Parole Board for the year ending October 31st, 1922. Presented to the Legislature, February 14th, 1923. *Printed.*
- No. 25 Report of the Inspector upon Hospitals and Charitable Institutions for the year 1922. Presented to the Legislature, May 4th, 1922. *Printed.*
- No. 26 Report of the Inspector upon Prisons and Reformatories. Presented to the Legislature, May 4th, 1923. *Printed.*

No. 27 Report of the Superintendent upon Neglected and Dependent Children for the year 1922. Presented to the Legislature, May 4th, 1922. *Not Printed.*

No. 28 Report of the Board of License Commissioners on the operation of the Ontario Temperance Act for the year 1922. Presented to the Legislature, May 3rd, 1923. *Printed.*

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No. 29 Report of the Minister of Agriculture for the year ending October 31st, 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 30 Report of the Ontario Agricultural College and Experimental Farm for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 31 Report of the Veterinary College for the year 1922. *Not Presented.*

No. 32 Report of the Agricultural and Experimental Union for the year 1922. Presented to the Legislature, May 4th, 1923. *Printed.*

No. 33 Report of the Stallion Enrolment Board for the year 1922. *Not Presented.*

No. 34 Report of the Vegetable Growers' Association for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 35 Report of the Corn Growers' Association for the year 1922. *Not Presented.*

No. 36 Report of the Entomological Society for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 37 Report of the Beekeepers' Association for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 38 Report of the Dairymen's Association for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 39 Report of the Live Stock Branch of Department of Agriculture for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

No. 40 Report of the Bureau of Municipal Affairs upon Housing for the year 1922. Presented to the Legislature, March 5th, 1923. *Printed.*

No. 41 Report upon Women's Institutes for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*

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- No. 43 Report of the Horticultural Societies for the year 1922. Presented to the Legislature, May 1st, 1922. *Printed.*
- No. 44 Report of the Fruit Growers' Association for the year 1922. Presented to the Legislature, May 1st, 1923. *Printed.*
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- No. 49 Report of the Hydro-Electric Power Commission for the year 1922. Presented to the Legislature, May 4th, 1923. *Printed.*
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- No. 52 Report of the Bureau of Archives for the year 1922. Presented to the Legislature, May 1st, 1923. *Not Printed.*
- No. 53 Report of the Librarian of the Legislative Assembly for the year 1922. Presented to the Legislature, February 9th, 1923. *Not Printed.*
- No. 54 Auditors' Report 1921-22, pursuant to provision of Order-in-Council dated October 28th, 1909. Presented to the Legislature, February 26th, 1923. *Printed.*
- No. 55 Report of Workmen's Compensation Board for the year 1922. Presented to the Legislature, May 4th, 1922. *Printed.*
- No. 56 Report of the Commission to conduct inquiry into the truth or falsity of certain charges, etc., reflecting on the Administration of the Attorney-General's Department in respect of the investigation into the death of Captain Orville Huston, at Fort Frances, December 16th, 1921, etc., etc., etc. Presented to the Legislature, January 25th, 1923. *Not Printed.*

- No. 57 Report on Osgoode Hall of the Commission to Inquire, Consider and Report upon the best mode of selecting, appointing and remunerating Sheriffs, etc., etc., etc. Presented to the Legislature, January 24th, 1923. *Not Printed.*
- No. 58 Copy of agreement and contract with the United Press, Limited, in connection with printing for the Legislative Assembly. Presented to the Legislature, February 7th, 1923. *Printed.*
- No. 59 Copy of agreement and contract with the United Press, Limited, in connection with binding for the Legislative Assembly. Presented to the Legislature, February 7th, 1923. *Printed.*
- No. 60 Report of Commissioner under The Extramural Employment of Sentenced Persons Act, 1921, for the year ending October 31st, 1922. Presented to the Legislature, January 24th, 1923. *Printed.*
- No. 61 Final Report of the Representative of the Province of Ontario, respecting the Lake Disaster Fund of Canada. Presented to the Legislature, January 24th, 1923. *Not Printed.*
- No. 62 Return to an Order of the House, dated 9th February, 1923, That there be laid before this House, a Return of all correspondence between any Minister of the Government, the Civil Service Commissioner or any Officer of the Government and any other person or persons regarding the appointment of Allan MacDonald, formerly Assistant Crown Timber Agent at Fort Frances, in the Rainy River District. Presented to the Legislature, March 5th, 1923. Mr. McCrea. *Not Printed.*
- No. 63 Report of Commission to investigate and report upon the accuracy or otherwise of all returns made pursuant to the Crown Timber Act, etc., etc., etc. Presented to the Legislature, January 24th, 1923. *Not Printed.*
- No. 64 Return to an Order of the House of June 8th, 1922, That there be laid before this House, a Return of copies of all papers, documents, correspondence, cablegrams, reports and memoranda between any person or persons, companies or corporations, and any member of the Government in reference to the re-purchase or refunding of the loan or loans in connection with which A. H. Pepall was sent to England by the Government in 1920. Presented to the Legislature, January 24th, 1923. Mr. Ferguson. *Not Printed.*
- No. 65 Return to an Order of the House of the 6th June, 1922, That there be laid before the House, a Return of copies of all documents, agreements, memoranda, correspondence and papers relating to the Rockefeller Foundation Gift to Toronto University, between the Minister of Education or any other Minister of the Government, or the President, or any other of the University

- authorities, and any person or persons whomsoever, with reference to the said gift. Presented to the Legislature, January 24th, 1923. Mr. Marshall. *Not Printed.*
- No. 66 Regulations and Orders-in-Council passed since the last Session of the Legislature under the authority of The Department of Education Act or of the Acts respecting Public Schools, Separate Schools or High Schools. Presented to the Legislature, January 25th; February 7th; February 23rd; March 7th; April 6th and May 4th, 1923. *Not Printed.*
- No. 67 Return to an Order of the House, dated 16th February, 1923, That there be laid before this House, a Return of copies of all letters, telegrams, papers and documents, evidence and reports in connection with the alleged accident of W. W. Calhoun of Sault Ste. Marie, together with the reports, recommendations, findings, rulings and decision of the Workmen's Compensation Board or any officials under their control or in their employ, and the same be laid upon the table of the House. Presented to the Legislature, March 19th, 1923. Mr. Dewart. *Not Printed.*
- No. 68 Return to an Order of the House of the 10th March, 1922, That there be laid before the House, a Return of all correspondence, telegrams or communications between the Attorney-General, the Prime Minister or any member of the Government, N. W. Rowell or R. T. Harding, representing the Attorney-General, and E. W. Backus or any official of the International Lumber Company of Minnesota in connection with the action against the Shevlin-Clarke Company, relative to Berths 45, 49 and 51. Presented to the Legislature, January 26th, 1923. Mr. Ferguson. *Not Printed.*
- No. 69 Report of the Agricultural Development Board for the year ending October 31st, 1922. Presented to the Legislature, January 26th, 1923. *Not Printed.*
- No. 70 Supplementary Return to an Order of the House of the 25th May, 1922, That there be laid before this House, a Return of the Legislative grants for the year 1922 paid to the Rural, Public and Separate Schools, in the Counties and Districts and to the Urban, Public and Separate Schools in the Counties and Districts which, in accordance with the Provisions of the Amendment to the Schools Act, passed in 1922, were classed as Rural Schools, and received grants as such. Presented to the Legislature, February 1st, 1923. Mr. Cooke. *Not Printed.*
- No. 71 Return to an Order of the House, dated 31st January, 1923, That there be laid before this House, a Return showing copies of all correspondence between George Bell, K.C., and the Honourable the Attorney-General in reference to the moving of the Ontario Government Dispensaries to premises adjoining the property of St. Andrew's Church, in the City of Toronto. Presented to the House, February 5th, 1923. Mr. Dewart. *Not Printed.*

- No. 72 Report relative to the situation in the Thunder Bay District of Commission to inquire into and report on estimates submitted from time to time to the Hydro-Electric Power Commission of Ontario for the Queenston-Chippawa Power Development and also all estimates for the said work submitted by the said Commission to the Government of Ontario, etc., etc., etc. Presented to the Legislature, February 7th, 1923. *Not Printed.*
- No. 73 Return to an Order of the House of the 26th April, 1922, That there be laid before the House a Return showing: (a) the total amount received by the Honourable the Provincial Treasurer or his Department, or any department or sub-department of the Government, during the months of August, September and October during each of the years 1919, 1920 and 1921, under the heading of Ordinary Revenue in regard to items mentioned. Presented to the Legislature, February 7th, 1923. Mr. Sinclair. *Not Printed.*
- No. 74 Statement showing all sums credited to the Highway Improvement Fund and all payments chargeable thereto for the fiscal year ending 31st October, 1922. Presented to the Legislature, February 8th, 1923. *Not Printed.*
- No. 75 Reports of Clarkson, Gordon and Dilworth upon the accounts of the Hydro-Electric Power Commission of Ontario for the year ending 31st October, 1920 and 1921. Presented to the Legislature, April 13th, 1923. *Printed.*
- No. 76 Statement and Report of the Ontario Athletic Commission and of the Auditor thereof, for the year ending October 31st, 1922. Presented to the Legislature, February 23rd, 1923. *Not Printed.*
- No. 77 Return to an Order of the House of the 7th February, 1923, for a Return of copies of all letters, telegrams, and all other evidence of investigation in connection with the alleged accident to one Mansford H. Clement, deceased, formerly of Orillia, Ont., and that a copy of the discussion of the Workmen's Compensation Board on same be also returned and laid on the table of the Legislature for inspection by the House. Presented to the Legislature, February 26th, 1923. Mr. Johnston (Simcoe). *Not Printed.*
- No. 78 Report of the Board of Visitors, respecting the Homewood Sanatorium, Guelph. Presented to the Legislature, February 26th, 1923. *Not Printed.*
- No. 79 Report on the Central Ontario System of the Commission to enquire into and report upon (1) all estimates submitted from time to time for the Queenston-Chippawa Power Development, etc., etc., etc. Presented to the Legislature, March 5th, 1923. *Not Printed.*

- No. 80 Return to an Order of the House, dated 9th of February, 1923, That there be laid before this House, a Return showing the names of members of the permanent staff of the Hydro-Electric Commission of Ontario, who have been granted an increase in salary since January 1st, 1923, also showing the amount of increase in each case. Presented to the Legislature, March 21st, 1923. Mr. McLeod. *Not Printed.*
- No. 81 Return to an Order of the House, dated 12th of March, 1923, That there be laid before this House, a Return (a) of all evidence and proceedings, including all exhibits and documents, as taken in the Northern Ontario Fire Investigation before the Fire Marshal of Ontario. (b) Copies of all correspondence carried on by the Fire Marshal of Ontario, counsel employed in investigation, and officials of Fire Marshal's Department with all persons, including the Government and the members of the Fire Relief Committee. (c) Copies of all correspondence carried on by the Premier, or any member of his Government, or his Department, relating to the said fire, and regarding the appointment of a Fire Relief Committee, including the appointment of said Committee. Presented to the Legislature, March 21st, 1923. Mr. Ferguson. *Not Printed.*
- No. 82 Return to an Order of the House, dated 14th of March, 1923, That there be laid before this House, a Return showing in detail the estates from which succession duties came in 1921 and 1922, similar to the particulars published theretofore in the Public Accounts, and that hereafter such particulars be published yearly in the Public Accounts as has been customary. Presented to the Legislature, March 21st, 1923. Mr. J. W. Curry. *Not Printed.*
- No. 83 Return to an Order of the House dated 14th March, 1923, That there be laid before this House, a Return of a copy of the report made by Harbinger & Allen, chartered accountants, of their investigation into the Department of Lands and Forests, and same to be laid upon the Table of the House. Presented to the Legislature, March 27th, 1923. Mr. Marceau. *Not Printed.*
- No. 84 Report of the Ontario Provincial Police for the year 1922. Presented to the Legislature, April 6th, 1923. *Printed.*
- No. 85 Return to an Order of the House dated 16th March, 1923, That there be laid before this House, a Return of copies of all estimates, cruises, explorations, maps and reports of every description in connection with the area north of Cochrane, received by the Government prior to and since the commencement of construction work on the T. & N. O. Railway. Presented to the Legislature, April 6th, 1923. Mr. MacBride. *Not Printed.*

- No. 86 Return to an Order of the House dated 14th March, 1923, That there be laid before this House, a Return of dates of meetings held by the Board of Governors, Toronto University, since 1915, with the names of those attending such meetings. Presented to the Legislature, April 6th, 1923. Mr. Watson. *Not Printed.*
- No. 87 Return to an Order of the House dated 16th March, 1923, That there be laid before this House, a Return of all applications for licenses to spear or net fish in Hamilton Bay for the years 1920, 1921, 1922. 2. List of names of those who secured licenses to spear or net fish in Hamilton Bay for the years 1920, 1921 and 1922. 3. List of names of those who applied for, and the names of those who secured special permission or licenses to spear or net fish in the spring in Hamilton Bay, during each of the above mentioned years, and the authority under which such special permission was given. Presented to the Legislature, April 6th, 1923. Mr. Halcrow. *Not Printed.*
- No. 88 Report of the Public Service Superannuation Board for the year 1922. Presented to the Legislature, April 9th, 1923. *Printed.*
- No. 89 Report of the Minimum Wage Board for the year 1922. Presented to the Legislature, April 12th, 1923. *Printed.*
- No. 90 Report on Sandwich, Windsor and Amherstburg Railway and Windsor and Tecumseh Electric Railway of the Commission to enquire into and report upon: 1. All estimates submitted from time to time to the Hydro-Electric Power Commission of Ontario for the Queenston-Chippawa power development, and also all estimates for the said work submitted by the said Commission to the Government of Ontario. 2. The reason for increases from time to time in the estimates for the Queenston-Chippawa power development, etc. Presented to the Legislature, April 16th, 1923. *Not Printed.*
- No. 91 Report of the Civil Service Commissioner of Ontario for the year ending 31st October, 1922. Presented to the Legislature, April 26th, 1923. *Printed.*
- No. 92 Return to an Order of the House of the Nineteenth day of April, for a Return of copies of all letters, telegrams, papers, documents and reports in connection with the accident of James F. Devine, Cochrane, Ontario, together with reports, recommendations, findings, rulings, and decisions of the Workmen's Compensation Board or any officials under their control or in their employ and the same be laid upon the table of the House. Presented to the Legislature, April 20th, 1923. Mr. Marceau. *Not Printed.*
- No. 93 Return to an Order of the House of the Nineteenth day of April, for a Return of all letters, telegrams, papers, documents, and reports in connection with an accident to Eugene Seguin, North Bay, working with his father for Michael Dweyer, who is a sub-con-

tractor of Mr. Satchell, contractor for the Spanish River Pulp and Paper Company, together with reports, recommendations, findings, rulings, and decisions of the Workmen's Compensation Board, or any officials under their control or in their employ. Presented to the Legislature, April 20th, 1923. Mr. Marceau. *Not Printed.*

- No. 94 Return to an Order of the House of the Nineteenth day of April, for a Return of (1) all copies of documents, papers, letters and correspondence in connection with the proposal of the Government that Spadina House should be used as the offices for the Workmen's Compensation Board; (2) of all documents, papers, letters, correspondence and minutes concerning the refusal of the Chairman of the Workmen's Compensation Board or the Board to have the staff under the Workmen's Compensation Board placed under the Civil Service Act; (3) of a report setting out the number of pay roll auditors in 1915 and 1916, and of the number of contributing firms in each of these years respectively; and also of the number of auditors in 1922 and the number of firms contributing in that year. Presented to the Legislature, April 20th, 1923. Mr. Dewart. *Not Printed.*
- No. 95 Return to an Order of the House of the Nineteenth day of April, for a Return showing all the different tables used by the Workmen's Compensation Board for computing Pension Reserves, with the dates during which each table was in force and copy of the minute or resolution adopting new tables at any time with the date of such minute. Presented to the Legislature, April 20th, 1923. Mr. Dewart. *Not Printed.*
- No. 96 Return to an Order of the House of the Nineteenth day of April, for a Return showing copies of all correspondence, telegrams, reports of investigation relating to the claim 264,504, made to the Workmen's Compensation Board for injuries received by C. J. Halliday whilst employed as foreman carpenter by W. J. Fletcher, as well as all correspondence, reports, etc., dealing with the subsequent demand by the said Board for fees from the said Halliday as an employer of labour. Presented to the Legislature, April 20th, 1923. Mr. Tolmie. *Not Printed.*
- No. 97 Return to an Order of the House, showing copies of all correspondence, telegrams, reports or recommendations relating to the removal from office of Fortunat Cadieux, Bailiff of the First Divisional Court, County of Prescott (county town of L'Original), and the appointment of Albert Rochau in his place. Presented to the Legislature, April 20th, 1923. Mr. Evanturel. *Not Printed.*
- No. 98 Report of Mothers' Allowances Commission for the year 1922. Presented to the Legislature, April 30th, 1923. *Printed.*

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- No. 99 Return to an Order of April 19th, 1923, for a Return of copies of all correspondence, reports, documents and papers between the Workmen's Compensation Board and the Public Works Department, or any other Department of the Government or persons, and between any Department of the Government and the Workmen's Compensation Board or any person or persons, in connection with the death of Harry S. Scott, and payment of any moneys to the widow of the said Harry S. Scott of Orillia, and any ruling of the Treasury Department. Presented to the Legislature, April 30th, 1923. Mr. John A. Currie. *Not Printed.*
- No. 100 Statement on distribution of Statutes. Presented to the Legislature, May 1st, 1923. *Not Printed.*
- No. 101 Return to an Order of the House of 16th March, 1923, That there be laid before this House, a Return of all applications, recommendations, letters, telegrams, papers and other correspondence having reference to the appointment to positions in the Algonquin Park, of the following:—E. C. Brewer, G. A. Holmberg, F. Lovesey, M. Newell, C. Ryan, T. Saraza, D. Stringer, A. Grant, W. A. Mooney, J. P. Foran, P. J. Gervais. Presented to the Legislature, May 2nd, 1923. Mr. Marceau. *Not Printed.*
- No. 102 Return to an Order of the House of the 14th March, 1923, for a Return of copies of all letters, telegrams, recommendations and other correspondence having reference to the appointment of Mark Robinson as temporary park superintendent of Algonquin Park, and to the proposed appointment of the same person as permanent superintendent of Algonquin Park. Presented to the Legislature, May 3rd, 1923. Mr. Marceau. *Not Printed.*
- No. 103 Report of the Soldiers' Aid Commission for the year ending 31st October, 1923. Presented to the Legislature, May 4th, 1923. *Not Printed.*
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REPORT

OF THE

Minister of Lands and Forests

OF THE

PROVINCE OF ONTARIO

For the Year Ending 31st October

1922

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



TORONTO:

Printed and Published by Clarkson W. James, Printer to the King's Most Excellent Majesty

1923



Load of waney-board white pine timber cut on Sturgeon River watershed, season 1921.

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

For the Year Ending 31st October, 1922.

To His Honour the Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

In pursuance of the provisions of the Public Lands Act I have the honour to submit for the information of Your Honour and the Legislative Assembly a report for the fiscal year ending the 31st day of October, 1922, with respect to the proceedings and transactions of the Department of Lands and Forests.

It affords me pleasure to announce as a preface to the detailed data following that the revenue in timber operations and land transactions during the year has been the largest in the history of the Province, exceeding that of the preceding year by over \$400,000.

An outline of the scope of the undertakings of the Department and the functions of each Branch disclose the variety and importance of the services rendered.

As the name implies, there are two outstanding and somewhat distinct units of the Department, viz, "Lands" and "Forests", but these embrace in the application of the Acts and Regulations the rendering of services not directly expressed in either term, such as extensive building of roads and generous assistance to settlers.

Under the heading of "Lands" come:

(A) *Surveys, Sales, Leases, Locations and Grants of Agricultural lands, the placing of settlers and the general disposition of all Crown areas for Ranching, Summer Resorts, Fur Farming, Transmission Lines, Mill Sites, Water Lots and numerous other purposes.*

(B) *Water Powers:* The leasing of same for commercial and industrial purposes at annual rentals based upon h.p. developed and sold.

(C) Public Parks such as Algonquin, Quetico and Rondeau—great Provincial natural recreation grounds and protectors and propagators of wild game and bird life, also conservers of timber and possessors of great opportunities for the study of technical forest problems.

(D) *Loans and Advances* to settlers covering seed grain, feed and stock; Experimental Farms; Creameries; Dairy Co-operative Societies.

(E) Building of Colonization and Northern Ontario Trunk and side roads to meet needs of settlers.

Under the heading of "Forests" come:

(A) Cruising, surveying and estimating timber and pulpwood areas.

(B) Selling and disposing of timber limits.

(C) Measurement of timber and the collection of all charges resulting from the issue of timber licenses and from bush operations.

(D) Forest Fire Protection.

(E) Reforestation.

LAND TRANSACTIONS.

Notwithstanding the more or less general tendency of the individual in Old Ontario to trek from the rural to urban fields, the newer and northern part of the Province holds its own reasonably well in its attractiveness to the pioneer settler. The Great Clay Belt traversed by the Transcontinental is being acquired by the man who is prepared to break the way for the future users of that productive section.

A considerable number of colonists have purchased farm holdings on the line between Cochrane and Hearst. The prospective opening in the near future of the pulp mill at Kapuskasing, with its attendant town population, has given an additional impetus to the settlement movement and substantial development on bush lots in the way of cutting and clearing has resulted.

A determined effort has been made towards concerted settlement rather than indiscriminate allocation of land. Certain tiers in townships contiguous to the line of railway have been opened rather than the whole townships, and settlers have been required to limit their selections within more circumscribed areas.

This system, besides conducing towards more effective community life, proves more economic in the building of roads and caring for the needs of settlers in the way of checking up the work done and assisting them in more speedily getting clearance for timber cut or approval of improvements made.

Each section in Northern Ontario succeeded in getting a fair share of those who located or purchased land. The sum of \$189,549.68 was received from the sale of agricultural lands and townsites with Crown Leases.

Regular inspections of holdings have been made with a view to eliminating the spurious holder or speculator in timber or pulpwood.

Important assistance has been rendered to settlers because of fire loss or crop failures and it is most satisfactory to indicate that the returns payable on loans to cover advances are being splendidly made and reflect credit on the patience and industry of the well-intentioned producer in the newer parts.

Details as to land sales and collections are as follows:

CLERGY LANDS.

But a small area of these lands still exist in the Crown and during the year 100 acres was sold for \$50.00, while the sum of \$613.87 was collected on account of former sales.

COMMON SCHOOL LANDS.

Practically all such lands have been long since alienated, although isolated cases still arise where parties are clearing title, and from this source \$1,013.60 was collected.

GRAMMAR SCHOOL LANDS.

Some 99.38 acres of these lands were sold for \$178.88 and the sum of \$538.40 was collected.

UNIVERSITY LANDS.

These lands, as the heading implies, are set apart for the support of the University, and the area sold was 2,155 acres, for \$1,077.50, while the total revenue from such sources was \$2,080.37.

CROWN LANDS.

For agricultural and townsite purposes 132,188.12 acres were sold and the total collections on these and former sales were \$114,975.11.

The total area leased amounted to 15,409.05 acres and rentals collected from leaseholders to \$57,175.06.

FREE GRANTS.

There has been a marked increase during the year in the area of land located as free grants; a total number of 1,013 persons selected land as compared with 858 last year. The tendency to more intensive farming on smaller areas has reduced the individual farm area from 136 acres to 130 acres. The privilege of purchasing additional land adjacent to their farms has been taken by a larger number of settlers, but the areas are somewhat less as stated above. The previous year only 136 settlers increased their holdings by this means, but during the present year 177 parties purchased a total area of 5,954 acres.

There were 135,656 acres located and 460 patents were issued covering 64,813 acres to settlers who have cleared and put under actual cultivation the required area on their homesteads.

SETTLERS ON PURCHASED LANDS.

The demand for land by bona-fide settlers shows a marked increase, with the result that it has been necessary to open new areas for sale and an increase in the area sold. Lands in the vicinity of Kapuskasing in the Townships of O'Brien, Owens, Williamson and Nansen, along the Transcontinental Railway, have been opened during the year, and in this particular area 12,131 acres have been sold, and the demand still continues. The extension of the T. & N. O. Railway line has caused an increase in the already great demand for land in the Cochrane agency, but the adjacent agencies of Matheson and Hearst still lead in the number of actual settlers.

During the year 894 persons purchased land, an increase of over one hundred and fifty. It was found that a number of parties were holding land, apparently for speculative purposes, and they were required to either continue settlement or dispose of their interests to actual settlers, with the result that 549 persons were granted permission to assign their interests, covering an area of 75,102 acres, as compared with 314 persons the previous year. This land was sought by those expressing the intention of becoming actual farmers and the balance of the purchase price paid in full in each case.

Naturally as time goes on the demand for free grants of land by returned soldiers decreases, as they are rapidly becoming established in other lines of business. This year, however, there were 219 locations of 160 acres each granted to returned men, or a total of 35,040 acres.

Patents were granted covering 43,119 acres to 328 settlers who had met the required building and clearing conditions.

RANCHING LANDS.

There is a constantly growing request for land for ranching and pasture purposes as a result of the policy adopted by the Department of leasing these lands at five cents per acre per annum with easy conditions as to stocking. Farmers who have their farms practically all under grain crops are acquiring additional areas and enlarging their activities to that of sheep and cattle raising.

Rough land more adapted for ranching or pasture has been largely taken up for this purpose, and during the year Leases and Licenses of Occupation have issued, covering 8,200 acres.

Numerous inquiries have been received for marsh or low-lying lands for the purpose of raising muskrats and other fur-bearing animals. This promises to be an industry which may make valuable lands that at the present time have practically no market value.

Licenses of Occupation were issued for fur farming in the townships of Eric and Genoa, District of Sudbury, and for a parcel of land west of the Township of Strange in the District of Thunder Bay, containing 2,520 acres.

MILITARY GRANTS

Under Act 1 Edward VII, Cap. 6, and amendments thereto, there have been issued 13,998 Military Certificates. Notwithstanding the fact that the date for receiving applications for these grants expired in September, 1908, a large number of inquiries regarding certificates have been received.

As a result of legislation this year, limiting the time in which to locate to the 30th April next, a larger percentage of the outstanding certificates are being located or surrendered to the Crown.

During the year 22 of these certificates have been located on 3,473 acres, making a total of 8,413 certificates actually located on land.

Few certificates are being surrendered for the \$50.00 commutation money, as the land which may be located is worth more than the commutation value of the certificates. There were, however, six surrendered in this manner.

There were 240 acres purchased by three certificates being applied in payment thereof, making a total of 803 certificates which have been thus applied on land.

Of the locations already made under certificates 42 patents were issued during the year, making a total of 7,530 certificates which have been thus disposed of by the Department.

A large area, 4,334 acres, which had been located to 30 veterans who neglected to perform settlement duties within the time required by the Act, was cancelled and the land redeemed by the Crown.

There are still 1,510 certificates outstanding.

During the last session of the Legislature an amendment to the Veterans' Act was passed providing that no locations of land will be made after the 30th day of April, 1923. After a lapse of twenty years it was deemed advisable to place a time limit upon the selection and allocation of land for the purposes of the Act. Any certificate thereafter may, however, be surrendered to the Crown for a cash consideration of \$50.00, or accepted as payment for Crown land at its face value of \$80.00.

It is confidently predicted that the amendment will conduce towards the return of several hundred certificates by the end of the time limit for locating.

COLLECTIONS.

The total revenue of the Department from all sources, which was the largest ever received, amounted to \$4,439,340.03, being over \$400,000.00 more than that of the preceding year. The sale of Agricultural Lands and Townsites, with Crown Leases, including Provincial Parks, etc., amounted to \$189,549.68; Casual Fees \$2,118.95; Refund Items \$66,239.43. From Woods and Forests

the Revenue was \$4,181,431.97, made up of the following items: Bonus \$1,446,351.31; Timber Dues \$2,315,668.17; Ground Rent \$103,179.09; Transfer Fees \$6,295.00; Fire Protection \$309,938.40. (See Appendix No. 4, page 26.)

DISBURSEMENTS.

The total Expenditure, less Civil Government, of the Department for all services (exclusive of those rendered under the Northern and North-Western Ontario Development Acts, for which see Appendices Nos. 47, 48 and 49), was \$2,399,175.22. Some of the more important items were: Crown Lands Agents' Salaries and Disbursements \$22,803.85; Homestead Inspectors \$28,423.00; Crown Timber Agents \$41,452.56; Fire Ranging \$684,585.62; Forest Ranging and Measurement of Timber \$299,616.18; Reforestation \$151,216.63; Algonquin Provincial Park \$42,450.97; Quetico Provincial Park \$13,401.05; Rondeau Provincial Park \$12,975.12; Surveys \$154,856.61; Colonization Roads \$671,184.48; Commissions re Sundry Investigations \$33,556.07; Litigation of Constitutional and Other Questions \$34,895.57; Aerial Surveys \$15,000.00; Special Warrants \$71,221.88; Clearing Townsites and Removing Fire Hazards \$11,070.42. (Additional details are found in Appendix No. 6.)

TIMBER REVENUE.

From all sources in connection with the administration of the Timber Resources the sum of \$4,181,431.97 was collected, the largest amount ever collected in the history of the country. This sum is in excess of the unprecedented record of last year by over \$400,000.00.

It should be noted that while the accruals for the past year approximated only \$3,000,000, collections were greater by over \$1,000,000, the difference being accounted for by a payment of some \$400,000, resulting from the Court action of the Crown against the Shevlin-Clarke Company and by a close check upon outstanding accounts and a follow-up system of collection.

Notwithstanding the somewhat trying and uncertain market conditions obtaining during the earlier part of the fiscal year, the dealers and operators, prompted by a desire to co-operate with the Crown in its desire to maintain a regular revenue, responded splendidly. In certain cases, rather than force a company to the wall because of an inability to finance its operations, the Crown, without impairing its security, made provision to meet the situation.

LOG OPERATIONS.

As pointed out in last year's report a number of the smaller operators, because of the depression in the lumber market, considered the financial outlay for heavy bush operations too hazardous, and in consequence their output was limited, while certain larger operators in some instances, apprehending a continuation of the precarious market, restricted their cutting. Such narrowing operations, naturally justified, are reflected in the following figures.

Throughout the year only 247,554,350 feet B.M. pine for sawlogs, boom and dimension timber, was cut, or approximately 90,000,000 feet less than the previous year. Sawlog timber, other than pine, was taken out to the extent of 57,311,922 feet B.M., or nearly 10,000,000 feet less than during the year 1921. Boom and dimension timber other than pine accounted for 2,266,461 feet B.M. For piling 102,162 lineal feet and 73,339 feet B.M. were cut.

Tie production was much lower than for the two years immediately preceding, only 1,755,419 having been taken, as against 4,001,471 for 1922 and over 6,000,000 for 1920. The decreased figures are due to lack of new railway construction, uncertainty in connection with tie contracts and the requirement in new sales that ties shall be sawn and not hewn, the latter for the most part being taken out, measured on a B.M. basis and included in the log returns. (See Appendix No. 7, page 34.)

The more or less pessimistic lumber outlook that prevailed in the latter part of 1921 and continued for a considerable part of 1922 has given way to an optimistic one, which I consider will be amply reflected in the returns of the coming year, the indications pointing in the direction of a much heavier logging operation this coming winter.

Pulpwood: The quantity of pulpwood cut subject to Crown dues totalled some 289,113 cords, scarcely one-third of that covered in 1921, but this reduction in cordage was not unexpected. In addition to this quantity 415,304 cords were cut free of Crown Dues, this having been taken from patented lands or those held by settlers with proper improvements. The peak market price of pulpwood during the war and continuing some time thereafter gave an impetus to large contracts extending over several seasons and abnormal cuts by individuals in the expectation that the market price would stand. A lowering of the price with a large unsold stock on hand from 1920 and 1921 lessened activities in pulpwood regions.

There has been an improved tone in the pulp and paper industry and the tendency is towards a steadier and upward market.

By the end of the present year, or in the early weeks of the year 1923, two new mills are expected to be in operation, one at Kenora, resulting from the English River sale in 1920 and the other at Kapuskasing as a result of the arrangement consummated with the Spruce Falls Company in 1920.

The Provincial Paper Mills, Limited, by virtue of an agreement entered into with the Government in pursuance of the sale of the Nipigon Timber Limit in 1920, are operating their mill at Port Arthur.

For ready reference and future use in comparisons I am furnishing in this report, as promised in my last year's summary, a tabulated statement of all the timber sales made throughout the year, giving such details as to area, price, purchaser and other features that may be useful. (See Appendix No. 51.) A compilation of timber sales or transactions is being prepared to cover a reasonable period of the past, which shall serve as a permanent record of the Department.

Lands under License: The area covered by License at the end of the fiscal year, 31st October, 1922, was 17,289½ square miles, subject to a ground rent of \$5.00 per square mile. This was less by 2,500 square miles than the year 1921.

SUMMARY OF TIMBER REVENUE.

Bonus.....	\$1,446,351 31
Timber Dues.....	2,315,668 17
Ground Rent.....	103,179 09
Transfer Fees.....	6,295 00
Fire Protection.....	309,938 40
	<hr/>
	\$4,181,431 97

CULLERS' EXAMINATION.

Two examinations were held during the year, one at Callander and one at Fort Frances, on the 3rd day of October, 1922.

Six candidates successfully passed the examination and were duly granted licenses authorizing them to act as Cullers.

(For names of Cullers who passed at this examination, see Appendix No. 10, page 38.)

(For complete list of Licensed Cullers see Minister's Reports for 1917, 1918, 1919, 1920 and 1921).

TIMBER COMMISSION.

The Timber Commission appointed in March, 1920, to report on the administration of the timber resources of the Province, published three interim reports, as stated in last year's Departmental report and submitted its main or final report in June 1922.

The report has been regularly printed and speaks for itself.

As a result of or during the Timber Investigation a sum approximating \$122,000 was collected as trespass and over-run charges.

From a monetary point of view the fact should not be overlooked that in addition to this amount the Crown succeeded in its court action against the Shevlin-Clarke Company, which action was instituted following an interim report of the Commissioners on the Timber Investigation.

The decision of the Court declared that the Agreement made by the Ontario Government with Shevlin-Clarke in respect of berths 45 and 49 Quetico Reserve was illegal and held that the company should pay, instead of \$7 per M ft. B.M. for the pine, \$17.60 per M ft. B.M. Doyle Rule, in addition to Crown Dues.

This difference in the rate meant a payment to the Crown of approximately \$170,000, to cover the increased rate on the timber cut, and approximately \$900,000 on the timber still remaining to be cut under the estimates made, so that the decision of the Court in respect of these berths will ultimately add to the Crown's revenue more than \$1,000,000 above that which would have come had the investigation not proceeded and the case not been instituted.

Two other court actions were contemplated against the Shevlin-Clarke Company, one to recover certain monies alleged by the Crown to have been due it from the Company because of too great an over-run, and a second action was instituted with a view to having the Court declare invalid the sale of berth 51 to the Company.

A settlement was reached whereby the Company agreed that in consideration of the withdrawal of the action against it, the sum of \$250,000 cash would be paid. The agreement closed out all the actions including that of the Company which proposed to proceed with its appeal against the Crown in the case of berths 45 and 49. Under an Act of the Legislature, being Cap. 20, 12—13 George V, the agreement and licenses of the Company were duly confirmed.

CROWN SURVEYS.

Survey of Crown lands in the northern part of the Province, consisting of base and meridian lines, township boundaries, lake and river traverse, have been carried on in compliance with the several instructions issued.

The survey of the Ontario-Manitoba boundary line was also continued to the twelfth base line of Dominion surveys in Manitoba.

Certain large islands have been subdivided for summer resort purposes and additional park lots were laid out at Rondeau Park and Presqu'île Park. The town plot subdivisions of lands patented since 1910 have been approved pursuant to R.S.O. 1910, chapter 34, as follows:

Timmins Addition. South-east quarter of south half of lot 12, concession 3, Township of Tisdale, District of Cochrane.

Timmins Addition. Part of broken lot 2, concession 2, Township of Mountjoy, District of Cochrane.

Hornepayne. Township of Wicksteed, District of Algoma.

Kirkland Lake Addition. (Wright and Hargreaves subdivision) Township of Teck, District of Timiskaming.

MUNICIPAL SURVEYS.

Pursuant to sections 15, 16 and 17 of the Surveys Act, petitions for the re-survey of lines laid out under competent authority have been received from the Corporations of the Municipalities of:

Township of Beckwith,

Township of Clinton,

County of Lincoln (Townships of Niagara and Grantham).

Surveys performed and confirmed were:

Durie Street, City of Toronto,

First Concession road allowance Township of Clinton.

Detailed reports of the several surveys will be found in Appendices 20 to 42 inclusive.

PROVINCIAL PARKS.

More and more each year is emphasized the wisdom and foresight in segregating wild natural areas as forest preserves, playgrounds and sanctuaries for the preservation of our forests, our game and fur-bearing animals.

The Department in its effort to give the people a faint idea of the value of Ontario's natural resources, installed the second annual display at the Canadian National Exhibition, a photograph of which is reproduced and shown on page 132.

The public showed its approval of the display by a record-breaking attendance, the spaces surrounding the exhibit being packed with a dense throng of interested spectators from early morning until closing time at night.

A picturesque log cabin, typical of the forest ranger's home, snugly set against a background of Ontario's natural forest trees, pine, spruce, balsam and birch trees, mingled together into one harmonious picture. It was a section of the great Northland's out-of-doors, rocks, trees and water, and wild animals, grouped together in its quaint effect; in other words the out-of-doors from the primeval Northland was brought down and installed indoors, affording the multitude an opportunity to view and inhale the aroma of the wildwood and greenwood.

The public school teachers of the city embraced the opportunity to bring the children to view these object lessons, many times more impressive and more interesting than those derived from cold print. The beaver pond proved a never-ending source of interest, the family of seven live beaver from Algonquin Park, playing and chasing each other through and under the water, and at meal time sitting up and holding a small birch stick between their fore-paws, contentedly gnawing at their favourite food, the bark of poplar and birch.

Part of the exhibit consisted of live deer, silver foxes, wild turkeys and pheasants from the Rondeau Park preserve, and sections of trees cut down by

the industrious beaver. A live wild timber wolf, captured in Algonquin Park, was shown for the first time in captivity. A part of the exhibit which proved very interesting was the display of the various kinds of pulpwood used in paper manufacture. Indian guides were also there making birch-bark canoes and snowshoes.

The whole exhibit proved most interesting and educative, and won favourable commendation from visitors from all parts of the world, and from the Board of Directors of the Canadian National Exhibition.

COLONIZATION ROADS.

The sum of \$671,184.48 was spent upon Colonization Roads, or \$165,000 more than the previous year. Those outlying sections of the Province that do not benefit from the Provincial Highway system, that are yet for the most part unsold and unpatented, must of necessity be accorded treatment justly due to the pioneers, and consequently both organized and unorganized municipalities received the advantage of this expenditure. New roads were built, old ones repaired, bridges constructed and maps prepared and plans devised for proposed improvements.

For detailed expenditure see Appendix No. 46.

NORTHERN DEVELOPMENT BRANCH.

A sum of \$2,010,153.23 was expended for development purposes in Northern and North-western Ontario. Of this amount \$1,603,148.53 was expended upon the construction, maintenance and repair of roads and bridges, or slightly under eighty per cent of the total amount expended. The balance, \$407,004.76 was used to advance settlement and colonization, included in which was the making of loans to settlers through the Settlers' Loan Commissioner.

The report of the Branch will be found on pages 159 to 202 inclusive, Appendices 47 and 48 and that in connection with Settlers' Loans, on pages 207 and 208, Appendix 49.

FORESTRY BRANCH

FOREST SURVEY.

With a view to ascertaining the types of timber upon certain of our hitherto uncruised and unestimated stretches of country, the Forestry Branch conducted careful, systematic and expert cruises, using standard machines and collaborating with experienced ground parties.

Two most important surveys and estimates that will have far reaching results are, first—one covering a portion of the James Bay watershed, lying between Cochrane and Moose Factory, and the other an extensive block comprising over 5,000 square miles in the Sudbury and Algoma Districts.

An excellent example of quickly, accurately and economically segregating and mapping different types is found in the James Bay Report (see Appendix No. 50).

FOREST FIRE PROTECTION.

During the past season a change was made in the field organization of the region south of the French River. This territory, known as the Ottawa-Huron region and comprising 10,000,000 acres, was divided into three districts and placed under technical forest engineers.

Improvement Work: The Forestry Branch is rapidly installing an over-head system of lookout towers and telephone communication, in order to secure quick detection of fires. 175 miles of telephone lines and 28 lookout towers were constructed this last season. Several hundred miles of roads and trails were opened and cleaned out; landing docks made for boats and canoes; camping grounds made in several places; and signs put up directing travellers as to good camping sites.

During the past season the following new structures were put up—38 rangers' cabins, three store houses, one car house, one boat house and two oil houses for the storage of gasoline and oil.

Mechanical Equipment: Until a few years ago fire fighting in the woods was done by rangers with shovels and mattocks, carrying water to the fires with ordinary buckets. To-day our organization has a large number of portable gasoline engines and pumps which carry from 500 to 1,000 feet of hose. These small portable pumps have proven of great value; in many cases saving the entire cost of all pumps purchased up to date. During the last season 16 of these portable pumps with fire-fighting hose were secured.

For supervision of forest fire protection along railways and territory adjacent thereto, gasoline power motor cars have been of great assistance. During the past season seven of these power motor cars were purchased.

On many of the larger waters, power motor boats are being installed for better protection. During the past season three power motor boats were purchased.

I wish to point out that organized, modern forest fire protection requires an over-head quick method of detecting fires at their inception, and then improved mechanical equipment for reaching and successfully fighting them. A considerable proportion of our expenditure for several years must be in the nature of permanent improvements and should be classed as CAPITAL EXPENDITURE.

Air Patrol: During the past season, through an arrangement with the Air Board, about ten million acres were patrolled by seaplanes. It is the opinion of the Forestry Branch staff that air patrol must be used as a factor in reaching a solution of forest protection.

The fact of the air-craft working over a district has a very salutary effect on the people using the woods; secures quick and accurate detection of fires and often permits of landing and actually extinguishing them.

Daily flights of two machines were made, one flying out of Parry Sound, and one out of Whitney.

Slash Disposal: Some reasonable solution of the slash disposal problem is one of the most pressing needs in connection with fire protection.

During the last season our field officers have been able to secure considerable burning of slash at hazardous points in timber operations through the cooperation of the operators. I believe that the timber operators on the whole are prepared to co-operate with the Department in any reasonable slash disposal regulations. This question of regulations can only be carried out in a satisfactory manner through the direction of the district officers, as slash disposal is a local problem.

Forest Fires: During the past season two very bad weather periods developed, namely, during May and September.

1021 fires occurred and of these 539 did not exceed five acres in size, and 799 did not exceed 100 acres in size. In other words we feel that the organization is locating fires early and doing good work in extinguishing them quickly. While exaggerated newspaper reports might indicate a very bad forest fire season in Ontario, such is not the case. The total acreage burned was 346,000, which is the smallest since 1918.

When we consider a forest region of 100,000,000 acres under protection, our total acreage loss will compare very favourably with that of any similar area in America.

Southern Clay Belt Fire: Reference should be made to the fire which swept over a portion of the Southern Clay Belt on October 4th, 1922.

This fire passed over an area, over 90 per cent. of which has left the Crown. The area has developed into a fine farming region, and this fire could scarcely be designated as a forest fire, although numerous small bush and clearing operations aided in carrying the fire. Throughout the region numerous clearing fires were burning during late September. A terrific wind arose on October 4th, after several days of very dry weather, and within a few hours hundreds of fires had swept everything before them. This fire passed over areas which have been cleared and partly under cultivation for over twenty years.

The details of this fire are contained in a special report, following an investigation by the Provincial Fire Marshal. This report was published by The King's Printer in December, 1922.

REFORESTATION.

The older more settled portions of Ontario present two outstanding problems in relation to reforestation.

1. The protection and improvement of the present privately owned woodlands and the reforesting of the small privately owned waste lands unsuited for agriculture.

2. The reforesting, through provincial and municipal effort, of the larger waste land areas scattered throughout older Ontario.

Many districts in older Ontario have less than five per cent. of woodland left and the solution of this problem is of vital importance to agricultural Ontario. Throughout Western Europe, where the demand for land to produce food crops is most pressing, from 15 to 20 per cent. of forest cover is maintained.

Provincial Forest Stations: The policy of establishing demonstration forest stations in the larger waste land areas was adopted in 1908, when the Norfolk Station was started. We believe that with the development of several of these stations in the larger waste land areas as demonstrations and sources of planting material, a great incentive will be given to both private and municipal reforestation projects.

Nurseries: The Norfolk Station has in the past produced the nursery stock for distribution throughout the Province, as well as that for local use.

At this nursery we now have the following plants one and two years old:

Coniferous or Evergreens:

(Chiefly Red, White and Scotch Pine, White Cedar and Spruce).....14,900,000

Hardwoods:

(Ash, Elm, Maple and Walnut)..... 596,000

Total.....15,496,000

This nursery has developed from an output of 500,000 plants to a capacity of several millions.

Plantations: A little over 500 acres of demonstration plantations have been made at this station. The oldest plantations (13 years old) are now from 24 to 25 feet high. The educational effect of these on the locality is shown by the increasing demand for planting material from private owners who visit this station.

Prince Edward County Station: Two years ago a forest station was opened at the Sand Banks in the above County. This is a sand formation of about 600 acres which was owned by the Crown. Owing to the formation of dunes this sand area was becoming a menace to adjacent farm lands.

During the past season some 500,000 willow and poplar cuttings were planted in order to check the moving sand.

Orono Forest Station: During the past season this forest station was opened. One hundred and fifty acres of light land was acquired adjacent to the village of Orono, in the County of Durham. Throughout this district there is considerable land adapted to reforestation, and this station will eventually take care of the requirements of the district for nursery stock in addition to providing demonstration plantations. Seed bed ground has been prepared and 200,000 seedlings from Norfolk have been planted.

Midhurst Forest Station: One thousand acres of sand land have been secured at Midhurst, Simcoe County, where a Provincial forest station is being established.

This land was at one time covered with a pinery and much of it is still covered with stumps.

Clearing up land for nursery purposes was carried out last autumn and 375,000 one-year-old seedlings were put out in nursery lines.

Municipal Reforestation Projects: Through legislation passed in 1921 the Province is enabled to co-operate with county and township municipalities in establishing municipal forests. The municipalities secure the land and the Province carries out the planting.

In the case of *County projects*, where large areas are involved, the Province undertakes the management and care during the earlier years.

In the case of *Township projects*, which are of a smaller size and in the form of demonstration plantations, the Province bears the cost of planting, and the local authorities look after maintenance. Twelve demonstration township plantations were started last season.

The following County project has been started:

Simcoe County: 1,000 acres of cut-over pine land was purchased by the County. Last season 60 acres was reforested. Local nursery was opened and 1-year-old material supplied from the Norfolk Nurseries.

Distribution of Planting Material: The Department supplies free of cost forest planting material to land-owners throughout the Province. Forest plantations have been started in all of the older counties during the past few years.

Last season's distribution of trees was as follows:

Private land owners.....	327,732
Municipal and Provincial projects.....	731,500
Total.....	1,059,232

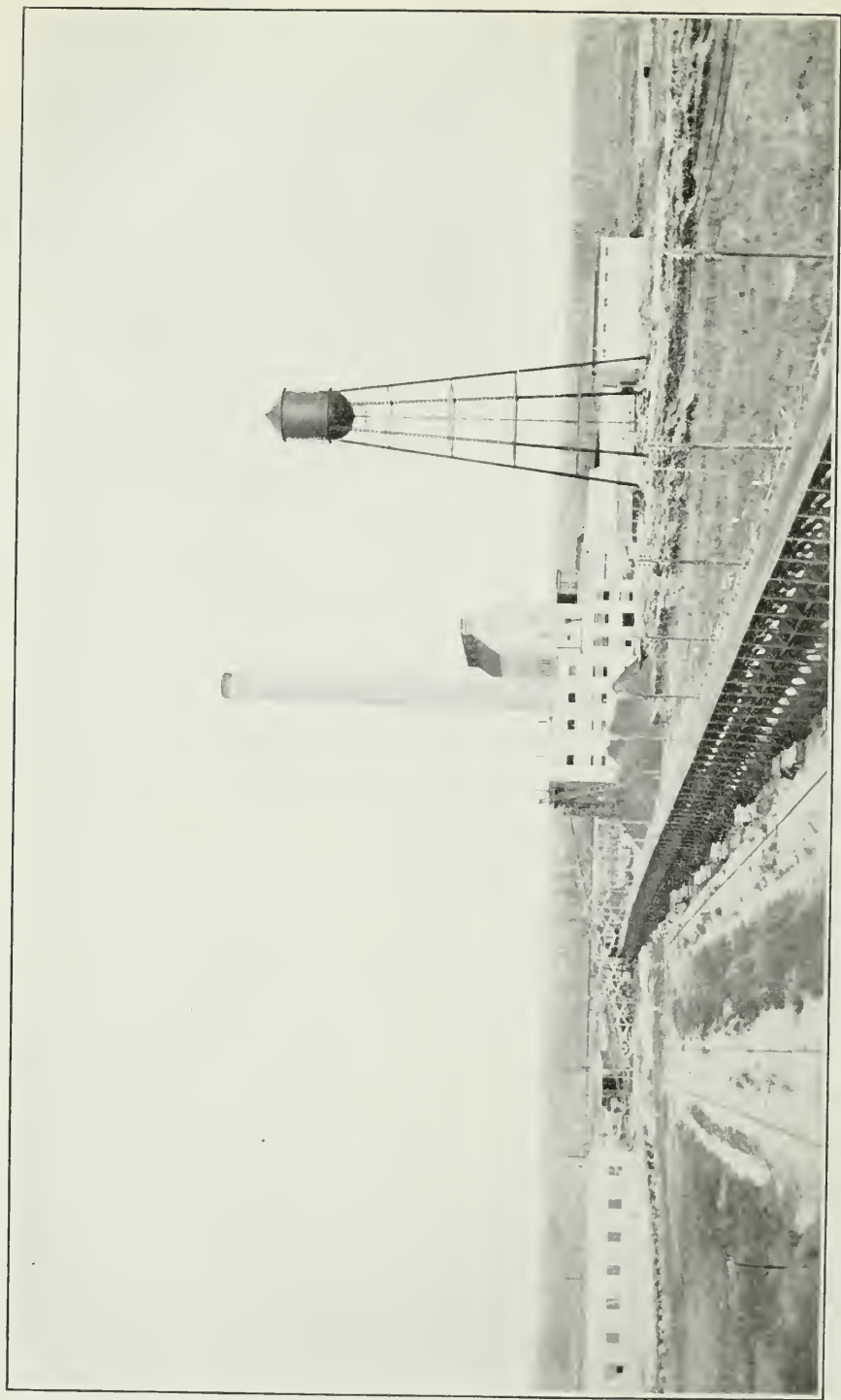
The annual distribution *previous* to last season averaged about 500,000 plants. Our present output has been doubled, and I expect that by the spring of 1924 the output will reach several million plants per year. During the past season an inspection was made of 448 plantations. About 84 per cent. of these plantations are reported as having been successful.

Seed Collection: An effort has been made to secure our forest seed supply from local sources. A seed collecting centre was established at Angus, in Simcoe County, where the Department secured a building at Camp Borden for seed extraction purposes.

Seeds of the native Pines, Spruces and Cedar, collected.....	1,334 lbs.
Seeds of hardwood as Walnut, Ash, Maple and Elm, collected.....	1,065 bushels.

BENIAH BOWMAN,
Minister.

Department of Lands and Forests,
Toronto, October 31st, 1922.



Sulphite pulp mill, Kapuskasing, Spruce Falls Co., to be running by end of calendar year.

APPENDICES

Appendix No. 1

Return of Officers and Clerks of the Department of Lands and Forests, for the year ending October 31st, 1922.

Branch.	Name.	Designation.	When Appointed.	Salary per annum.	Remarks.	
	Hon. B. Bowman.....	Minister.....	1919, Nov. 14	\$6,000 00		
	W. C. Cain.....	Deputy Minister.....	1903, Mar. 1	5,100 00		
	F. J. Niven.....	Minister's Secretary and Secretary to the Department.....	1897, May 27	3,000 00		
	F. E. Titus.....	Solicitor to Department.....	1920, Mar. 2	3,500 00		
	M. E. Bliss.....	Senior Clerk Stenographer.....	1909, Aug. 16	1,300 00		
	E. Harrison.....	"	1920, May 14	1,100 00		
	R. P. Ferguson.....	"	1918, April 2	1,200 00		
	A. J. Allan.....	Clerk Stenographer.....	1921, May 2	975 00		
	B. Lankin.....	Office Boy.....	1921, Jan. 14	775 00		
	Lands Branch.....	S. Draper.....	Chief Clerk.....	1900, May 1	2,850 00	
		W. R. Ledger.....	Principal Clerk.....	1894, Feb. 15	2,300 00	
		C. E. Burns.....	"	1897, July 29	2,300 00	
		W. S. Sutherland.....	Senior Clerk.....	1900, Mar. 18	1,900 00	
		J. B. Proctor.....	"	1897, Jan. 15	1,900 00	
		J. E. Drinkwater.....	"	1915, Oct. 19	1,800 00	
		A. E. Roe.....	"	1906, Oct. 16	1,800 00	
		F. W. Bindon.....	"	1915, Jan. 26	1,600 00	
F. A. Lucas.....		Clerk.....	1906, Dec. 18	1,700 00		
S. A. Platt.....		"	1905, June 12	1,700 00		
S. Mulholland.....		"	1918, May 6	850 00		
M. Bengough.....		Senior Clerk Typist.....	1896, Oct. 23	1,300 00		
E. F. O'Neil.....		"	1902, July 7	1,200 00		
E. Ross.....		Senior Clerk Stenographer.....	1917, July 9	1,200 00		
E. G. Halliday.....		"	1907, Feb. 21	1,200 00		
B. M. Benson.....		"	1909, May 25	1,200 00		
E. Hills.....		"	1912, July 2	1,200 00		
E. Singleton.....	Clerk Stenographer.....	1917, April 16	1,050 00			
A. E. Robillard.....	Engrossing Clerk.....	1894, May 4	1,600 00			
B. Chambers.....	Clerk Stenographer.....	1917, April 24	900 00			

Died July 8th, 1922.

Transferred from Department of
Mines, Jan. 1, 1922.

Surveys Branch...	L. V. Rorke.....	Director of Surveys.....	1909, May	1	4,400 00	
	J. Hutcheon.....	Inspector of Surveys.....	1913, April	1	3,300 00	
	H. C. Smith.....	Cartographer.....	1919, Dec.	12	2,400 00	
	D. G. Boyd.....	Senior Map Draughtsman.....	1896, Oct.	16	2,400 00	
	J. Work.....	Principal Clerk.....	1909, May	18	2,000 00	
	H. Treby.....	Map Draughtsman.....	1896, June	25	1,900 00	
	B. Rushford.....	"	1910, Jan.	24	1,800 00	
	F. E. Blanchet.....	"	1906, May	15	1,800 00	
	A. Leaman.....	"	1907, Sept.	12	1,800 00	
	E. M. Jarvis.....	Senior Clerk.....	1897, April	25	1,800 00	
	W. A. Hewitt.....	"	1921, May	2	1,500 00	
	M. H. Kirkland.....	Senior Clerk Stenographer.....	1902, July	21	1,200 00	
Forestry Branch...	E. C. Arner.....	"	1909, Aug.	6	1,100 00	
	C. O'Connor.....	Clerk Typist.....	1907, Oct.	16	900 00	
	E. J. Zavitz.....	Provincial Forester.....	1912, Nov.	7	4,600 00	
	C. K. Mills.....	Assistant Provincial Forester.....	1921, Mar.	28	3,150 00	
	F. S. Newman.....	Forester.....	1913, Oct.	1	2,300 00	
	J. Houser.....	Head Clerk.....	1905, July	17	2,550 00	
	H. D. Gillard.....	"	1897, Dec.	6	2,100 00	
	W. F. Trivett.....	Principal Account Clerk.....	1900, June	25	2,100 00	
	N. L. Rogers.....	Senior Account Clerk.....	1911, Aug.	1	1,800 00	
	A. H. O'Neil.....	Senior Clerk.....	1906, July	19	1,700 00	
	G. W. Harris.....	"	1906, Sept.	1	1,500 00	
	E. H. Telfer.....	"	1915, Sept.	27	1,600 00	
S. D. Meeking.....	"	1910, Feb.	8	1,600 00		
E. H. Squire.....	"	1916, Jan.	4	1,400 00		
M. C. Rowland.....	Senior Clerk Stenographer.....	1912, May	1	1,200 00		
S. O. Dennis.....	"	1910, Mar.	2	1,100 00		
J. Bald.....	"	1913, June	12	1,200 00		
J. McCort.....	Clerk Stenographer.....	1918, Feb.	28	1,050 00		
V. M. Bassford.....	"	1920, June	1	900 00		
J. Ferguson.....	Junior Clerk Stenographer.....	1919, Aug.	4	900 00		
A. S. McKyes.....	Clerk Stenographer.....	1921, May	9	975 00		
D. M. Hastings.....	"	1920, April	28	1,050 00		
Accounts Branch...	H. M. Lount.....	Accountant.....	1903, Oct.	1	2,700 00	
	C. J. Clarke.....	Senior Clerk.....	1905, Aug.	9	1,900 00	
	W. A. Burritt.....	"	1907, Sept.	24	1,700 00	
	R. Gordon.....	Clerk.....	1912, July	30	1,500 00	
	C. Bowland.....	Senior Clerk Typist.....	1908, July	9	1,200 00	
	M. A. Whyte.....	Clerk Typist.....	1921, June	1	975 00	
	C. C. Johnson.....	Clerk.....	1921, May	16	1,300 00	
	Resigned Aug. 31, 1922.					
	Resigned May 15, 1922.					

Appendix No. 1.—Concluded.

Return of Officers and Clerks of the Department of Lands and Forests, for the year ending October 31st, 1922.

Branch.	Name.	Designation.	When Appointed.	Salary per annum.	Remarks.
Records Branch....	S. K. Burdin.....	Head Clerk.....	1916, April 6	2,500 00	
	A. Ferguson.....	Senior Clerk.....	1915, Dec. 15	1,700 00	
	C. Dies.....	Clerk.....	1905, Oct. 2	1,500 00	
	F. Samuels.....	"	1903, Dec. 5	1,500 00	
	C. W. St. John.....	"	1906, July 9	1,400 00	
	W. B. Baines.....	"	1912, April 9	1,500 00	
	J. T. Lee.....	"	1917, June 25	1,500 00	
	N. B. Mathewson.....	"	1915, May 7	1,400 00	
	H. Brophy.....	Senior Clerk Messenger.....	1898, Oct. 1	1,300 00	
	Colonization Roads Branch.....	C. H. Fullerton.....	Superintendent.....	1915, Oct. 15	4,400 00
C. H. Meader.....		Road Engineer.....	1912, June 14	2,700 00	
M. P. Doherty.....		Principal Clerk.....	1898, May 1	2,100 00	
A. Gamey.....		Account Clerk.....	1915, July 19	1,300 00	
W. T. Axford.....		Junior Clerk.....	1910, July 11	1,000 00	

H. M. LOUNT,
Accountant.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 2.

List of Agents for the year ending October 31st, 1922.

Name	Post Office Address	District or County	Date of Appointment	Salary per annum	Remarks
<i>Land Agents.</i>					
Arthurs, E.	Espanola Mills.	Part District of Sudbury.	1915, June 1	\$500 00	
Baker, R. H.	Minden.	Part District of Sudbury.	1907, Oct. 1	350 00	
Bolger, J. W.	New Liskard.	Part District of Temiskaming.	1913, Aug. 1	1,200 00	
Both, C.	Denbigh.	Part of Frontenac and Addington.	1905, Oct. 20	200 00	
Blank, Frank.	Wino.	Part District of Renfrew.	1921, Apr. 1	500 00	
Brown, John.	Markstay.	" Nipissing and Sudbury.	1916, July 3	600 00	
Brown, J. B.	Bracebridge.	Muskoka District.	1905, July 28	.....	For salary see Homestead Inspectors.
Cameron, W.	Stratton Station.	Part District of Rainy River.	1911, May 8	500 00	
Campbell, I. M.	Parry Sound.	" Parry Sound.	1914, Nov. 15	500 00	
Dean, Thos.	Sault Ste. Marie.	" Algoma.	1920, Nov. 18	300 00	
Dempsey, S. J.	Cochrane.	" Cochrane.	1911, Feb. 1	1,100 00	
Dodds, T.	Thessalon.	" Algoma.	1915, May 1	500 00	
Douglas, W. J.	Maynooth.	Part Hastings.	1912, June 1	500 00	
Ellis, H. J.	Powassan.	Part District of Parry Sound.	1909, May 20	500 00	
Freeborn, Dr. J. S.	Magnetawan.	" "	1905, Nov. 10	500 00	
Gibson, J. E.	Dryden.	" Kenora.	1914, Dec. 5	1,000 00	
Hales, W.	Apsley.	Part County of Peterborough.	1911, July 17	250 00	
Hollands, C. J.	Fort Frances.	Part Township of Alberta and District of Rainy River.	1892, Oct. 12	300 00	
Holland, H. E.	Kenora.	Part District of Kenora.	1921, Jan. 1	600 00	
Lockhart, J.	Pembroke.	Part Renfrew.	1922, Feb. 16	300 00	
McFayden, A.	Emo.	Part District of Rainy River.	1905, Sept. 8	600 00	
MacLennan, J. K.	Sudbury.	" Sudbury.	1905, July 3	700 00	
Mills, J. E.	Matheson.	" Cochrane.	1921, Aug. 1	1,200 00	
O'Donnell, J. L.	Hearst.	" "	1921, May 3	800 00	
Parsons, W. J.	North Bay.	" Nipissing.	1908, Apr. 8	1,000 00	
Phillon, J. A.	Sturgeon Falls.	" "	1907, Sept. 13	500 00	
Small, R.	Mattawa.	" "	1910, July 1	500 00	
Teasdale, R. A.	Massey.	" Sudbury.	1917, July 1	600 00	
Thaw, D.	Emsdale.	" Parry Sound.	1919, July 2	500 00	
Watt, F.	Pembroke.	Part Renfrew.	1913, May 28	300 00	Retired from office February 16, 1922.
Whybourne, W. E.	Marksville.	Part St. Joseph Island.	1905, Apr. 7	300 00	

Appendix No. 2.—Concluded.

List of Agents for the year ending October 31st, 1922.

Name	Post Office Address	District or County	Date of Appointment	Salary per annum	Remarks.
Wilson, A. N.	Kinnmount.	Part District of Peterborough.	1915, May 6	175 00	
Wilson, S. H.	Port Arthur.	" Thunder Bay.	1921, Nov. 26	1,200 00	
Woollings, J.	Englehart.	" Temiskaming.	1908, July 13	800 00	
McArthur, T. A.	North Bay.	Inspector of Crown Lands Offices.	1912, May 1	900 00	Also Inspector of Mining Recorders' Offices.
<i>Homestead Inspectors.</i>					
Barr, J. C.	Fort Frances.	District of Rainy River.	1906, Dec. 1	1,500 00	
Bastien, J. A.	Chelmsford.	W. part of Sudbury District.	1913, May 12	1,200 00	
Brown, J. B.	Bracebridge.	Muskoka District.	1905, July 28	1,100 00	Also Crown Lands Agent.
Cragg, W. V.	New Liskeard.	S. part of Temiskaming District.	1913, Apr. 1	1,500 00	
Dean, Thos.	Sault Ste. Marie.	Algoma District.	1908, Aug. 3	900 00	Also Crown Lands Agent.
Hughes, T.	Murillo.	Thunder Bay District.	1908, July 29	1,400 00	
Jervis, H. F. J. W.	Callander.	District of Parry Sound.	1920, June 10	1,500 00	
Owens, H. B.	Cache Bay.	E. part Sudbury and W. part Algoma Districts.	1918, July 1	1,000 00	
Smith, D.	Cochrane.	N. Part of Temiskaming District.	1912, Apr. 24	1,800 00	
Van Horn, I. E.	Monteith.	Part Temiskaming and Algoma Districts.	1920, Jan. 27	1,600 00	
Watson, T. P.	Englehart.	Centre part of Temiskaming District.	1905, May 10	1,500 00	
Wigle, R. G.	Dryden.	Kenora District.	1914, June 1	1,500 00	
<i>Timber Agents.</i>					
Christie, W. P.	Parry Sound.	Part Parry Sound and Muskoka Districts.	1903, Dec. 4	1,700 00	
Hawkins, S. J.	Webbwood.	Part Algoma and Sudbury Districts.	1905, Aug. 16	1,900 00	
Huckson, A. H.	Sault Ste. Marie.	Part District of Algoma.	1914, Apr. 1	2,300 00	
Larose, S. C.	Ottawa.	Part Ottawa District.	1890, May 8	1,800 00	
MacDonald, S. C.	New Liskeard.	Part Temiskaming District.	1907, Jan. 1	2,200 00	
McDonald, A.	Fort Frances.	Rainy River District.	1916, Aug. 7	1,600 00	Retired from office April 7, 1922.
McDougall, J. T.	North Bay.	Nipissing and part Sudbury Districts.	1908, July 1	2,300 00	
Spence, D. J.	Cochrane.	Part Temiskaming and Algoma Districts.	1920, Dec. 1	2,300 00	
Stevenson, A.	Peterborough.	Belleville District.	1905, Oct. 4	1,900 00	
Wood, W. G. A.	South Porcupine.	Porcupine District.	1917, Mar. 1	1,600 00	

H. M. LOUNT,
Accountant.W. C. CAIN,
Deputy Minister of 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, 1922.

Service.	Acres sold and leased.	Amount of sales and leases.	Collections on sales and leases.
<i>Lands Sold:</i>		\$ c	\$ c
Agricultural and Townsites.....	132,188.12	102,422 57	114,975 11
Clergy Lands.....	100.00	50 00	663 87
Common School Lands.....	270.00	378 00	1,013 60
Grammar School Lands.....	99.38	178 88	538 40
University Lands.....	2,155.00	1,077 50	2,080 37
<i>Lands Leased:</i>			
Crown.....	15,392.15	8,876 88	55,618 06
Temagami.....	16.90	190 00	1,557 00
	150,221.55	113,173 83	176,446 41

H. M. LOUNT,
Accountant.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 4.

Statement of Revenue of the Department of Lands and Forests for the year ending October 31st, 1922.

Service.	\$	c	\$	c	\$	c
LAND COLLECTIONS.						
<i>Crown Lands:</i>						
Agricultural.....	97,416	44				
Townsites.....	17,558	67				
			114,975	11		
Clergy Lands.....	663	87				
Common School Lands.....	1,013	60				
Grammar School Lands.....	538	40				
University Lands.....	2,080	37				
			4,296	24		
					119,271	35
<i>Rent:</i>						
Crown Leases.....			53,763	99		
Algonquin Provincial Park.....			1,562	67		
Temagami Leases.....			1,557	00		
Sand and Gravel.....			291	40		
					57,175	06
WOODS AND FORESTS.						
Bonus.....			1,446,351	31		
Timber Dues.....			2,315,668	17		
Ground Rent.....			103,179	09		
Transfer Fees.....			6,295	00		
Fire Protection.....			309,938	40		
					4,181,431	97
<i>Parks:</i>						
Algonquin Provincial Park.....			6,683	25		
Rondeau Provincial Park.....			5,174	02		
Quetico Provincial Park.....			1,246	00		
					13,103	27
Casual Fees.....			1,676	95		
Cullers' Fees.....			256	00		
Forest Reserves Guides' Fees.....			186	00		
					2,118	95
REFUNDS.						
Fire Ranging.....			9,726	06		
Forest Ranging.....			52,146	92		
Special Survey of Ontario and Manitoba Boundary Line.....			3,200	00		
Reforestation.....			544	85		
Contingencies, Lands.....			303	80		
Surveys.....			186	00		
Agents' Salaries.....			131	80		
					66,239	43
					4,439,340	03

H. M. LOUNT,
Accountant.W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 5.

Statement of Receipts of the Department of Lands and Forests for the year ending October 31st, 1922, which are considered as Special Funds.

Service.	\$ c.	\$ c.
<i>Clergy Lands.</i>		
Principal.....	395 40	
Interest.....	268 47	
		663 87
<i>Common School Lands.</i>		
Principal.....	731 07	
Interest.....	282 53	
		1,013 60
<i>Grammar School Lands.</i>		
Principal.....	337 18	
Interest.....	201 22	
		538 40
<i>University Lands.</i>		
Principal.....	1,404 16	
Interest.....	676 21	
		2,080 37
		\$4,296 24

H. M. LOUNT,
Accountant.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 6.

Statement of Disbursements of the Department of Lands and Forests for the year ending
October 31st, 1922.

Service.	\$ c.	\$ c.	\$ c.
AGENTS' SALARIES AND DISBURSEMENTS.			
<i>Land, \$22,803.85</i>			
Arthurs, E		500 00	
Baker, R. H.	350 00		
Disbursements	7 30		
		357 30	
Blank, F.	500 00		
Disbursements	201 50		
		701 50	
Both, C.		200 00	
Bolger, J. W.	1,200 00		
Disbursements	334 00		
		1,534 00	
Brown, John.	600 00		
Disbursements	35 99		
		635 99	
Cameron, W.	500 00		
Disbursements	50 00		
		550 00	
Campbell, Miss I. M.	500 00		
Disbursements	150 00		
		650 00	
Dean, T.	300 00		
Disbursements	155 70		
		455 70	
Dempsey, S. J.	1,100 00		
Disbursements	129 90		
		1,229 90	
Dodds, T.	500 00		
Disbursements	17 25		
		517 25	
Douglas, W. J.	500 00		
Disbursements	21 25		
		521 25	
Ellis, H. J.		500 00	
Freeborn, J. S.	500 00		
Disbursements	26 50		
		526 50	
Gibson, J. E.	1,000 00		
Disbursements	183 90		
		1,183 90	
Hales, W.	250 00		
Disbursements	19 75		
		269 75	
Holland, H. E.	600 00		
Disbursements	606 50		
		1,206 50	
Hollands, C. J.	300 00		
Disbursements	140 00		
		440 00	
McFayden, A.	600 00		
Disbursements	46 85		
		646 85	
<i>Carried forward.</i>		12,626 39	

Appendix No. 6—Continued.

Service.	\$ c.	\$ c.	\$ c.
<i>Brought forward</i>		12,626 39	
<i>AGENTS' SALARIES AND DISBURSEMENTS—Continued.</i>			
<i>Land—Concluded.</i>			
MacLennan, J. K.....	700 00		
Disbursements.....	119 00	819 00	
Mills, J. E.....	1,200 00		
Disbursements.....	144 60	1,344 60	
O'Donnell, J. L.....	800 00		
Disbursements.....	242 50	1,042 50	
Parsons, W. J.....	1,000 00		
Disbursements.....	223 00	1,223 00	
Phillion, J. A.....	500 00		
Disbursements.....	38 49	538 49	
Small, R.....	500 00		
Disbursements.....	36 75	536 75	
Teasdale, R. A.....	600 00		
Disbursements.....	17 96	617 96	
Thaw, D.....		500 00	
Watt, F.....	88 15		
Lockhart, J.....	210 68		
Disbursements.....	9 50	308 33	
Whybourne, W. E.....	300 00		
Disbursements.....	9 25	309 25	
Wilson, A. N.....	175 00		
Disbursements.....	6 00	181 00	
Wilson, S. H.....	1,116 44		
Kurki, Miss A.....	182 69		
Disbursements.....	471 05	1,770 18	
Woollings, J.....	800 00		
Disbursements.....	186 40	986 40	
<i>Homestead Inspectors, \$28,423.00.</i>			
Barr, J. C.....	1,500 00		
Disbursements.....	1,202 05	2,702 05	
Bastien, J. A.....	1,200 00		
Disbursements.....	1,198 30	2,398 30	
Brown, J. B.....	1,100 00		
Disbursements.....	639 28	1,739 28	
Cragg, W. V.....	1,500 00		
Disbursements.....	543 60	2,043 60	
<i>Carried forward</i>		31,687 08	

Appendix No. 6—Continued.

Service.	\$ c.	\$ c.	\$ c.
<i>Brought forward</i>		31,687 08	
<i>AGENTS' SALARIES AND DISBURSEMENTS—Continued.</i>			
<i>Homestead Inspectors.—Concluded.</i>			
Dean, T.....	900 00		
Disbursements.....	510 10	1,410 10	
Hughes, T.....	1,400 00		
Disbursements.....	1,065 90	2,465 90	
Jervis, H. F. J. W.....	1,500 00		
Disbursements.....	818 65	2,318 65	
Owens, H. B.....	1,000 00		
Disbursements.....	1,883 45	2,883 45	
Smith, D.....	1,800 00		
VanHorn, L. E.....	1,600 00		
Corke, A.....	385 00		
Disbursements.....	1,889 98	5,674 98	
Watson, T. P.....	1,500 00		
Disbursements.....	869 75	2,369 75	
Wigle, R. G.....	1,500 00		
Disbursements.....	916 94	2,416 94	
<i>Timber, \$41,452.56.</i>			
Alexander, J. A.....	2,920 00		
McDonald, A.....	697 38		
McLeod, Miss R.....	438 46		
Disbursements.....	805 22	4,861 06	
Christie, W. P.....	1,700 00		
Disbursements.....	449 81	2,149 81	
Hawkins, S. J.....		1,900 00	
Huckson, A. H.....	2,300 00		
McDougall, Miss M.....	782 31		
Disbursements.....	1,049 28	4,131 59	
McCaw, J. G.....	2,712 00		
MacCrindle, Miss I.....	1,043 06		
Hurdman, G. C.....	23 00		
Disbursements.....	498 69	4,276 75	
McDougall, J. T.....	2,300 00		
Disbursements.....	848 79	3,148 79	
MacDonald, S. C.....	2,200 00		
Disbursements.....	352 53	2,552 53	
Milway, J. H.....	2,504 00		
Godfrey, Miss S.....	960 00		
Disbursements.....	1,068 46	4,532 46	
<i>Carried forward</i>		78,779 84	

Appendix No. 6—Continued.

Service.	\$ c.	\$ c.	\$ c.
<i>Brought forward</i>		78,779 84	
<i>AGENTS' SALARIES AND DISBURSEMENTS—Continued.</i>			
<i>Timber—Concluded.</i>			
Smith, J. D. C.....	2,504 00		
Brunsel, Miss E. L.....	977 91		
Disbursements.....	1,534 22		
		5,016 13	
Spence, D. J.....	2,300 00		
Disbursements.....	1,030 84		
		3,330 84	
Stevenson, A.....	1,900 00		
Disbursements.....	689 78		
		2,589 78	
Whelan, P. J., disbursements.....		513 31	
Wood, W. G. A.....	1,600 00		
Disbursements.....	849 51		
		2,449 51	
<i>Miscellaneous, \$2,279.72.</i>			
Green, H. P., Caretaker of Islands in Charleston Lake.	50 00		
Disbursements.....	2 65		
		52 65	
Jamieson, W. H., Caretaker of Islands in Dog and Laboria Lakes.....		50 00	
McDonald, H., disbursements.....		56 00	
McNichol, T. E., inspecting Township of Nansen.....		102 00	
Nash, Jas., inspecting Township of Nansen.....		102 00	
Sheppard, H. E., disbursements.....		14 65	
Stuart, Joseph, services as Supervisor of Wellington Beach.....		50 00	
McArthur, T. A., Inspector of Agencies.....	900 00		
Disbursements.....	952 42		
		1,852 42	
			94,959 13
<i>OTTAWA AGENCY.</i>			
Larose, S. C., Acting Agent.....		1,800 00	
Rent.....	700 00		
Disbursements.....	190 47		
		890 47	
			2,690 47
<i>CULLERS' ACT.</i>			
Legris, J. P., disbursements.....		46 25	
McDougall, J. T., disbursements.....		23 00	
Milway, J. H., disbursements.....		39 42	
			108 67
<i>Carried forward</i>			97,758 27

Appendix No. 6—Continued.

Service.	\$	c.	\$	c.	\$	c.
<i>Brought forward</i>					97,758	27
FIRE RANGING.....					684,585	62
FOREST RANGING.....					299,616	18
FOREST RESERVES.....					6,340	36
REFORESTATION.....					151,216	63
ALGONQUIN PROVINCIAL PARK.....					42,450	97
QUETICO PROVINCIAL PARK.....					13,401	05
RONDEAU PROVINCIAL PARK.....					12,975	12
SURVEYS.....					154,856	61
COLONIZATION ROADS.....					671,184	48
BOARD OF SURVEYORS.....					200	00
GRANT TO CANADIAN FORESTRY ASSOCIATION.....					3,000	00
ANNUAL MEMBERSHIP FEES.....					39	97
INSURANCE.....					1,497	67
COMMISSIONS RE SUNDRY INVESTIGATIONS.....					33,556	07
LITIGATION OF CONSTITUTIONAL AND OTHER QUESTIONS.....					34,895	57
AERIAL SURVEYS.....					15,000	00
ALLOWANCE SCHOOL SECTION, S. WALSINGHAM.....					150	00
WORKMEN'S COMPENSATION.....					2,406	46
UNFORSEEN AND UNPROVIDED.....					302	50
SPECIAL WARRANTS.						
Clearing Lands at Kapuskasing.....			15,409	11		
Clark, Dr. Judson F.....			1,019	05		
Legal Fees and Expenses.....			54,793	72		
					71,221	88
MISCELLANEOUS.						
Law Society of Upper Canada, fees.....					20	00
REFUNDS—Miscellaneous.....					24,037	52
CLEARING TOWNSITES AND REMOVING FIRE HAZARDS.....					11,070	42
BEACH AND SHORE PROTECTION.....					5,000	00
DISPLAY AT TORONTO EXHIBITION.....					985	44
MOVING EXPENSES OF OFFICIALS.....					170	38
VETERANS' COMMUTATION.....					300	00
<i>Carried forward</i>					2,338,239	17

Appendix No. 6—Concluded.

Service.	\$ c.	\$ c.	\$ c.
<i>Brought forward</i>			2,338,239 17
CONTINGENCIES, ETC.			
<i>Departmental.</i>			
Printing and Binding.....	2,845 22		
Stationery.....	12,091 77	14,936 99	
Express and Cartage.....	695 42		
Postage.....	2,902 32	3,597 74	
Telegraphing.....	1,254 02		
Car Fare.....	72 00		
Livery.....	142 75	1,468 77	
Subscriptions.....	230 14		
Advertising.....	7,302 52	7,532 66	
Typewriters, repairs and inspections.....		1,272 05	
Bowman, Hon. Beniah, travelling expenses.....	750 00		
Cain, W. C., " ".....	66 20		
Niven, F. J., " ".....	104 10		
Titus, F. E., " ".....	81 50		
Rorke, L. V., " ".....	419 15		
Hutcheon, J., " ".....	581 51		
Work, J., " ".....	94 53		
O'Neil, A. H., " ".....	73 40		
Zavitz, E. J., " ".....	179 90		
Tilley, Johnston Co., legal fees.....	350 00	2,700 29	
Extra Clerks.....	9,645 19		
Maps.....	13,013 31		
Sundries.....	378 85	23,037 35	
COLONIZATION ROADS CONTINGENCIES.			
Printing and Binding.....	524 18		
Stationery.....	1,216 19	1,740 37	
Postage.....	192 38		
Express.....	12 65	205 03	
Telegraphing.....	24 56		
Subscriptions.....	18 79		
Typewriter, repairs and inspections.....	60 00	103 35	
Fullerton, C. H., travelling expenses.....	721 95		
Meador, C. H., " ".....	877 17		
Niven, F. J., " ".....	56 70	1,655 82	
Extra Clerks.....	2,565 18		
Sundries.....	120 45	2,685 63	
			6,390 20
			2,399,175 22

For particulars of expenditure of the Northern Development Branch see Appendix No. 48.

H. M. LOUNT,
Accountant.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix

FORESTRY

Statement of Timber and Amounts accrued from Timber Dues, Ground

QUANTITY AND

Agencies.	Area covered by timber licenses.	Saw logs.					Pieces.
		Pine.		Other.			
	Square Miles.	Pieces.	Feet B.M.	Pieces.	Feet B.M.	Pieces.	
Western Timber District.....	11,979	6,618,556	218,869,821	1,310,516	43,562,743	34,149	
Belleville Timber District.....	465½	43,105	786,991	77,471	2,992,380	138	
Ottawa Timber District.....	4,845	378,819	23,175,872	361,865	10,756,799	1,656	
	17,289½	7,040,480	242,832,684	1,749,852	57,311,922	35,943	

General Statement

Agencies.	Shingle Bolts.	Cedar Lincal feet.	Cedar Posts	Telegraph Poles.	Pulpwood.	Railway Ties.		
	Cords.		Pieces.	Pieces.	Cords.	Pieces.	Transfer Fees.	Interest.
Western Timber District.....	207	.....	45,865	12,440	267,132	1,738,958	\$ 5,615 00	\$ 55,961 46
Belleville Timber District..	.....	2,178	6,448	3,465	26	9,880	185 00	453 60
Ottawa Timber District.....	.....	.....	4,212	5,222	21,955	6,581	495 00	1,088 30
	207	2,178	56,525	21,127	289,113	1,755,419	6,295 00	57,503 36

JOHN HOUSER,
Chief Clerk in Charge.

No. 7.

BRANCH

Rent and Bonus during the year ending 31st October, 1922.

DESCRIPTION OF TIMBER.

Boom and Dimension.		Piling.					Cordwood.		Tan Bark.
Pine.	Other.								
Feet B.M.	Pieces.	Feet B.M.	Pieces.	Lineal Feet.	Pieces.	Feet B.M.	Cords.	Cords.	Cords.
4,481,462	14,803	1,637,610	2,831	102,162	867	73,339	1,897	25,127	205
24,392	793	189,386	.....	.....	.....	.....	20	.....	37
215,812	2,972	439,465	.....	.....	.....	.....	.....	5,285	29
4,721,666	18,568	2,266,461	2,831	102,162	867	73,339	1,917	30,412	271

of Timber.—Concluded.

Amounts accrued.

Trespass.	Timber Dues.	Bonus.	Deposit Timber Sales.	Ground Rent.	Fire Protection.	Total.
\$ 48,302 c 71	\$ 1,080,512 c 35	\$ 1,147,950 c 27	\$ 130,650 c 00	\$ 75,348 c 76	\$ 275,541 c 53	\$ 2,819,882 c 08
3,279 82	8,152 24	209 27	25 00	4,175 00	5,263 00	21,742 93
793 58	95,085 99	.....	.....	22,925 00	29,133 87	149,521 74
52,376 11	1,183,750 58	1,148,159 54	130,675 00	102,448 76	309,938 40	2,991,146 75

W. C. CAIN,
Deputy Minister.

Appendix No. 8.

PATENTS OFFICE (Lands Branch).

Statement of Patents, etc., issued from 1st November, 1921, to October 31st, 1922.

Public Lands (late Crown).....	472
" " (late School).....	10
" " (late Clergy Reserves).....	3
" " (University).....	17
Free Grant Lands (Act of 1913).....	350
" " (Act of 1901) Veterans.....	42
Mining Lands (Patents).....	313
Mining Leases.....	263
Water Power Leases.....	4
Crown Leases.....	130
Licenses of Occupation.....	117
Timagami Islands Leases.....	9
Sand and Gravel Licenses.....	29
Pine Patents.....	3
Quarry Claims.....	9
	<hr/>
Total.....	1,771

CHAS. E. BURNS,
Clerk of Patents.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 9.

WOODS AND FORESTS BRANCH.

Statement of Revenue collected during the year ending October 31st, 1922.

Amount of Western Collections at Department.....	\$3,960,896	23
" Belleville " " " 	19,256	61
" Ottawa " " " 	201,279	13
	<u>\$4,181,431</u>	<u>97</u>

WOODS AND FORESTS.

Bonus.....	\$1,446,351	31
Timber Dues.....	2,315,668	17
Ground Rent.....	103,179	09
Transfer Fees.....	6,295	00
Fire Protection.....	309,938	40
	<u>\$4,181,431</u>	<u>97</u>

WOODS AND FORESTS REVENUE.

October 31st, 1922.

WESTERN DISTRICT—

Timber dues.....	\$2,102,199	89
Bonus.....	1,315,579	59
Ground rent.....	75,348	76
Interest, timber dues.....	55,489	34
Interest, ground rent.....	472	12
Transfer fees.....	5,615	00
Timber sale deposit.....	130,650	00
Fire protection.....	275,541	53
	<u>\$3,960,896</u>	<u>23</u>

OTTAWA DISTRICT—

Timber dues.....	\$147,636	96
Ground rent.....	22,925	00
Interest, timber dues.....	914	43
Interest, ground rent.....	173	87
Fire protection.....	29,133	87
Transfer fees.....	495	00
	<u>201,279</u>	<u>13</u>

BELLEVILLE DISTRICT—

Timber dues.....	\$9,058	29
Bonus.....	96	72
Ground rent.....	4,175	00
Interest, timber dues.....	369	26
Interest, ground rent.....	84	34
Fire protection.....	5,263	00
Transfer fees.....	185	00
Timber sale deposit.....	25	00
	<u>19,256</u>	<u>61</u>

\$4,181,431 97

H. M. LOUNT,

Accountant,
JOHN HOUSER,
Chief Clerk in Charge.

W. C. CAIN,
Deputy Minister.

Appendix No. 10.

Memorandum of parties who passed the Cullers' Examination in 1922.

Cox, G. B., Fort Frances, examined at Fort Frances on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

Dingwall, Alex., Fort Frances, examined at Fort Frances on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

Kirton, William, Pakesley, examined at Callander on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

Lester, Hiram L., Kippewa, Quebec, examined at Callander on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

Mullin, L. J., Fort Frances, examined at Fort Frances on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

Smith, Cecil S., McDougall's Mills, examined at Fort Frances on the 3rd day of October, 1922, license granted on the 9th day of October, 1922.

JOHN HOUSER,
Chief Clerk.

W. C. CAIN,
Deputy Minister.

Appendix No. 11.

Statement of the Work done in Military Office, Lands Branch of the Department of Lands and Forests, during the year ending October 31st, 1922.

Veteran Patents issue.....	42
Locations under Military Certificates.....	22
Certificates applied in payment of lands.....	3
Certificates surrendered for commutation money.....	6

J. B. PROCTOR,
Clerk in Charge.

SELBY DRAPER,
Chief Clerk.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 12.

RECORDS BRANCH, 1921-1922.

Communications received:

From Crown Lands Agents.....	9,598
" Crown Timber Agents.....	4,877
" Mining Recorders.....	2,703
" Homestead Inspectors.....	4,073
" Superintendent Algonquin Park.....	318
" Superintendent Quetico Park.....	136
" Superintendent Rondeau Park.....	135
Orders-in-Council.....	224
Telegrams.....	143
Northern Development Branch (figures supplied by them).....	9,742
Loan Commissioner (figures supplied by them).....	8,007
Forestry Branch (figures supplied by them).....	20,494
Colonization Roads (figures supplied by them).....	3,949
All other sources.....	33,597
	<hr/>
Total incoming (Minister's Office not included).....	97,996

Communications sent out:

To Crown Lands Agents, Inspectors and Park Superintendents.....	28,567
" General public.....	23,891
Circular letters <i>re</i> timber sales.....	7,563
Maps and blue prints.....	5,500
Northern Development Branch (figures supplied by them).....	11,002
" " " Seed Grain, (figures supplied by them).....	404
Loan Commissioner Letters (figures supplied by them).....	12,635
Forestry Branch, Letters (figures supplied by them).....	9,344
" " Parcels by post (figures supplied by them).....	484
" " Calendars (figures supplied by them).....	10,000
Colonization Roads, Letters (figures supplied by them).....	3,410
	<hr/>
Total outgoing (Minister's Office not included).....	112,800

Postage:

Postage for the year, Records Branch.....	2,194 33
" " Loan Commissioner.....	410 00
" " Forestry Branch.....	350 00
" " Colonization Roads.....	250 00

Files:

New Files issued, General.....	5,351
" " Accounts chargeable.....	647
" " Accounts free.....	282

S. K. BURDIN,
Chief Clerk, Records Branch.

W. C. CAIN,
Deputy Minister of Lands and Forests.

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, 1922.

Township	District or County	Agent	No. of persons located	No. of acres located	No. of purchasers	No. of acres sold	No. of persons cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Baxter	Muskoka	J. B. Brown,			1	$\frac{87}{116}$	1	100	4	332
Brunel	"	Bracebridge	2	146 $\frac{1}{2}$			1	100	1	100
Cardwell	"	"	1	62			1	62	1	200
Chaffey	"	"							2	151
Draper	"	"								
Franklin	"	"	3	902	2	45	4	402	2	492
Freeman	"	"	1	25					1	137
Macaulay	"	"	1	100			1	100		
Medora	"	"	1	100			1	100	1	195
Monck	"	"								
Morrison	"	"					1	285	3	287
Muskoka	"	"	2	110	2	12 $\frac{1}{2}$	2	76	1	12
McLean	"	"	1	100			1	100		
Oakley	"	"	3	326			3	239		
Ridout	"	"							1	200
Ryde	"	"	3	471			1	100		
Sherbourne	Haliburton	"	2	251			1	205		
Sinclair	Muskoka	"	2	174			3	374	3	593
Stephenson	"	"								
Stisted	"	"			1	4			1	104
Watt	"	"							2	197
Wood	"	"	1	100	9	38	3	399	2	234
Blair	Parry Sound	Miss I. M. Campbell, Parry Sound	1	100	2	99			1	96
Burpee	"	"	1	102					1	193 $\frac{3}{4}$
Carling	"	"	5	610	4	119 $\frac{1}{4}$	5	610	5	496
Christie	"	"	3	281			2	271	4	677
Conger	"	"	6	683	1	103	2	244	3	282
Cowper	"	"								
Foley	"	"	1	100						
Ferguson	"	"							1	200
Hagerman	"	"	2	359			1	91		
Harrison	"	"							2	26
Henvey	"	"	3	264	1	7	1	103	3	541 $\frac{1}{2}$
Humphrey	"	"			1	73	1	99	2	186 $\frac{1}{2}$
McConkey	"	"	3	287					3	377
McDougall	"	"	3	292					1	192 $\frac{3}{4}$
McKellar	"	"	1	100			1	200		
McKenzie	"	"	2	190			1	100	4	437
Monteith	"	"							1	200
Shawanaga	"	"								
Wilson	"	"	12	2,030	1	10	1	81	1	145
Chapman	Parry Sound	Dr. J. S. Freeborn, Maganetawan	2	400	1	2	1	200	3	358
Croft	"	"								
Ferrie	"	"					1	100		
Gurd	"	"	3	293			2	300	6	1,016
Lount	"	"	3	477	1	4			2	99
Machar	"	"	6	698	1	35	3	299	3	340
Mills	"	"	19	2,368	5	244	1	100	4	478
Pringle	"	"	7	710	3	122			4	498
Ryerson	"	"	2	246			2	245	1	200
Spence	"	"	3	202	3	151 $\frac{1}{2}$	5	850	1	201
Strong	"	"			1	84			3	596 $\frac{3}{4}$

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 persons cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Armour.....	Parry Sound..	David Thaw,								
Bethune.....	"	Emsdale..	2	194			2	194		
Joly.....	"	"	8	913	3	323	3	324	3	399
McMurrich....	"	"			1	1			3	265
Perry.....	"	"								
Proudfoot....	"	"	1	91	1	5	1	91	1	91
Hardy.....	"	H. J. Ellis,	1	201	4	104	1	200	1	202
Himsworth....	"	Powassan..	6	797	1	100	8	1,011	10	1,599
Laurier.....	"	"	2	200			1	100	1	100
Nipissing.....	"	"	3	500	3	88	4	485	4	783
Patterson....	"	"	3	500	2	48			2	236
Bonfield.....	Nipissing.....	W. J. Parsons,	4	347			2	197	3	345
Boulter.....	"	North Bay..	1	100	1	4			1	204
Chisholm....	"	"	5	567	1	12	5	722	9	1,142
Ferris.....	"	"	4	500			5	500	11	1,190 $\frac{1}{2}$
Anson.....	Haliburton...	R. H. Baker,								
Glamorgan....	"	Minden..					2	198		
Hindon.....	"	"								
Lutterworth..	"	"					1	156		
Minden.....	"	"	4	338			2	250	1	172
Snowdon.....	"	"	1	100			1	100		
Stanhope....	"	"	1	66			1	66		
Anstruther..	Peterborough.	William Hales,	2	400	1	3	3	500		
Burleigh, N.D.	"	Apsley..					1	175 $\frac{1}{2}$		
" S.D.	"	"	1	100						
Chandos.....	"	"	1	100						
Methuen.....	"	"	1	134						
Cardiff.....	Haliburton...	A. N. Wilson,	5	520			4	402	2	124
Cavendish....	Peterborough.	Kinmount..	1	55	1	50			1	74
Galway.....	"	"	4	616	1	21	7	793	3	321
Monmouth....	Haliburton...	"	7	841	1	11	1	100	6	804
Bangor.....	Hastings.....	W. J. Douglas,	2	435	5	60	1	135		
Carlow.....	"	Maynooth..	3	400					3	280
Cashel.....	"	"					1	100		
Dungannon...	"	"	3	497			1	155	2	248 $\frac{1}{2}$
Faraday.....	"	"	4	561			5	683	2	136 $\frac{1}{2}$
Herschel....	"	"	2	200	1	$\frac{1}{4}$	2	200	3	319 $\frac{3}{4}$
Limerick....	"	"	4	400	1	100	2	200		
Mayo.....	"	"	2	142 $\frac{1}{2}$	2	71	2	197 $\frac{1}{2}$	1	254
Monteagle...	"	"	1	100			1	100	2	261
McClure.....	"	"	4	301			1	100	1	85
Wicklow....	"	"	1	99			1	99	2	205
Wollaston...	"	"			1	100			1	196
Algona, S....	Renfrew.....	Frank Blank,	1	100						
Brougham....	"	Wilno..					1	200	1	161 $\frac{1}{2}$
Brudenell....	"	"	7	427			2	191	5	657
Burns.....	"	"					1	101		
Grattan.....	"	"								
Griffith....	"	"	1	37 $\frac{1}{2}$						
Hagarty.....	"	"	3	399	1	8	2	179	1	112
Jones.....	"	"	11	1,032 $\frac{1}{2}$	2	200	2	242		
Lyell.....	"	"	6	715 $\frac{1}{2}$			3	310	1	200
Lyndoch....	"	"	6	756	1	2	2	200	3	257

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 persons cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Pardee.....	Thunder Bay..	S. H. Wilson,	2	320	1	67½	.....	.....	2	320
Pearson.....	"	Port Arthur..	8	1,224	1	1	4	652½	5	820
Scoble.....	"	"	14	1,954	1	1½	5	704	1	161
Stirling.....	"	"	19	2,468	1	80¼	8	1,052¼	3	342¾
Strange.....	"	"	6	947½	4	6½	4	625½	1	161
Ware.....	"	"	7	776	.....	.....	5	780½	9	1,506½
Atwood.....	Rainy River..	Wm. Cameron,	.....	.....	4	218¾	.....	.....	.....	.....
Blue.....	"	Stratton..	9	1,167½	.....	.....	1	164	.....	.....
Curran.....	"	"	4	644	.....	.....	9	1,184½	2	324
Dewart.....	"	"	15	2,262	1	4	14	2,018¾	3	401
Dilke.....	"	"	.....	.....	.....	.....	.....	.....	.....	.....
Morley.....	"	"	5	569	.....	.....	.....	569	1	162
Morson.....	"	"	28	4,087	1	141⅛	26	3,391	1	258
McCrosson.....	"	"	9	1,484	.....	.....	11	1,723	3	543¼
Nelles.....	"	"	4	564	3	5	4	484	4	485
Patullo.....	"	"	12	1,360	4	208½	12	1,595	3	320
Pratt.....	"	"	8	1,299½	1	20	.....	501½	1	160
Roseberry.....	"	"	.....	.....	.....	.....	.....	.....	.....	.....
Shenston.....	"	"	1	160	1	4	.....	.....	3	384
Sifton.....	"	"	19	2,766	1	2	12	1,939½	4	783½
Spohn.....	"	"	9	1,211	1	81	7	1,042½	2	178
Sutherland.....	"	"	12	1,935¼	2	40½	9	1,480	5	657½
Tait.....	"	"	9	980	3	46½	4	333½	2	314
Tovell.....	"	"	8	1,092½	2	23	11	1,209	2	159
Worthington.....	"	"	.....	.....	.....	.....	.....	.....	3	574
Aylesworth.....	Rainy River..	Alex. McFayden,	2	160	.....	.....	.....	.....	.....	.....
Barwick.....	"	Emo..	.....	.....	.....	.....	.....	.....	.....	.....
Burriss.....	"	"	.....	.....	.....	.....	.....	.....	2	335½
Carpenter.....	"	"	4	649	.....	.....	1	163	4	566
Crozier.....	"	"	1	41	.....	.....	.....	.....	.....	.....
Dance.....	"	"	7	1,126½	.....	.....	7	1,126	1	159½
Devlin.....	"	"	1	164	.....	.....	.....	.....	.....	.....
Dobie.....	"	"	4	546¾	1	168	4	554½	.....	745½
Fleming.....	"	"	1	160½	.....	.....	3	481	.....	.....
Kingsford.....	"	"	11	1,478	1	80½	11	1,442	2	342½
Lash.....	"	"	2	324	.....	.....	2	241	1	40½
Mather.....	"	"	4	694	2	1½	4	694	1	161
Miscampbell.....	"	"	1	159½	1	1½	.....	.....	3	480½
Potts.....	"	"	4	56½	1	2	3	481¾	2	322
Richardson.....	"	"	7	1,215	.....	.....	6	1,054	2	368
Roddick.....	"	"	.....	.....	1	70	.....	.....	1	230
Woodyatt.....	"	"	.....	.....	.....	.....	.....	.....	3	396
Aubrey.....	Kenora.....	J. E. Gibson.....	7	1,212½	2	12½	6	903½	6	729
Britton.....	"	Dryden..	14	2,304	.....	.....	11	1,606	.....	.....
Eton.....	"	"	20	3,147	2	155¼	20	3,159¼	4	795
Langton.....	"	"	.....	.....	.....	.....	.....	308½	.....	.....
Melgund.....	"	"	7	1,008	1	27	6	878	.....	.....
Mutrie.....	"	"	4	532½	1	1½	2	265	1	161½
Redvers.....	"	"	12	2,090	5	137½	5	672½	2	329
Rowell.....	"	"	1	153	.....	.....	1	153	.....	.....
Rugby.....	"	"	11	1,623	.....	.....	6	960	.....	.....
Sanford.....	"	"	13	2,004½	.....	.....	8	1,361½	4	476½
Southworth.....	"	"	12	1,740½	1	4	11	1,538½	1	137
Temple.....	"	"	8	1,109	.....	.....	8	1,182½	1	160
Van Horne.....	"	"	.....	.....	.....	.....	3	465½	2	169½
Wabigoon.....	"	"	6	661	1	80	6	741¼	6	1,010
Wainwright.....	"	"	9	1,182½	.....	.....	6	953	9	1,300
Zealand.....	"	"	32	4,686	3	130	13	1,1793	3	538

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 persons cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Melick	Kenora	H. E. Holland,	8	886	2	81	11	1,701		
Pellatt	"	Kenora	6	642	1	42	6	653½	4	373½
Balfour	Sudbury	J. K. MacLennan,	1	71½	1	71½	3	479½		
Bleazard	"	Sudbury	2	303½			1	160	2	223
Broder	"	"	1	171					2	219
Capreol	"	"	4	506			4	4,931¼		
Chapleau	"	"	6	991½			1	209		
Dill	"	"	1	159½			2	333	1	117¾
Garson	"	"								
Hanmer	"	"	9	1,364½	1	6	7	1,078½	2	241¾
Lumsden	"	"	2	353½	1	1½	4	644		
Morgan	"	"	2	235	1	1½			2	235¼
Melon	"	"								
Rayside	"	"	2	226			1	124½	1	101
Appleby	Sudbury	John Brown,	18	2,946¾	2	9	8	1,286		490½
Casimir	"	Markstay	10	1,502			6	842½		
Dunnet	"	"	6	805	1	1½	1	161	4	480
Hagar	"	"	11	1,743½			14	1,970	1	160
Jennings	"	"	4	626½			1	160½	2	264½
Kirkpatrick	"	"	4	630					1	160
Ratter	"	"	16	2,562	1	15	10	1,561	4	640
Caldwell	Nipissing	J. A. Phillon,	3	307	1	15½	1	75½	5	597
Cosby	"	Sturgeon Falls	6	957½	1	1				
Grant	"	"	11	1,540	2	4	5	800	2	159
Macpherson	"	"	11	160			1	134	3	386¼
Martland	"	"	6	871			2	323	1	161
Springer	"	"	3	216	1	86			5	630
Abinger	Lennox and Addington	Chas. Both,	2	248	1	19	1	149		
Canonto, S.	Frontenac	Denbigh							1	73
" N.	"	"					1	99		
Clarendon	"	"	2	203						
Denbigh	Lennox and Addington	"	1	90			1	90		
Miller (pt.)	"	"								
Palmerston	"	"					1	140		
McClintock	Haliburton	Unattached							1	100
Airy	Nipissing	"	1	101	1	10	1	100	2	304
Finlayson	"	"								
Murchison	"	"							1	267
Sabine	"	"	4	341			1	76	3	599
Burton	Parry Sound	"							1	25
Total			1,013	135,656	177	5,954¼	629	85,988½	460	64,813¾

No. of lots assigned. 255

No of acres assigned. 36,786

SELBY DRAPER,
Chief Clerk.W. C. CAIN,
Deputy Minister of Lands and Forests.W. R. LEDGER,
Clerk of Free Grants.

Appendix No. 13—Continued

ISLANDS SOLD.

Part or Parcel.	Township.	District or County.	Agent.	No. of Acres Sold.
Island D.	Harrison	Parry Sound.	Miss I. M. Campbell.	.33
“ 356.	Carling	“	“	1.36
“ B 408.	Cowper	“	“	2.1
“ 842 A.	Harrison .....	“ .....	“ .....	.4
“ B 358.	Conger	“	“	4.
Pt. Palestine Is'd	Carling	“	“	9.50
Island B 430.	Cowper	“	“	4.50
“ C 309.	Carling	“	“	3.64
“ W. S. 89.	Mowat	“	“	4.5
“ Owakwa- shkesh Lake.	McKenzie	“	“	2.
Island B 207.	Conger	“	“	142.
“ 30 A.	Harrison	“	“	5.
“ B 300.	Conger	“	“	2.
Pt. McLaren Is'd	Cowper	“	“	3.
Island B 716.	“	“	“	2.7
“ B 281.	Conger	“	“	1.1
“ 110 A.	Harrison	“	“	4.50
“ A.	“	“	“	6.3
“ T P 3434	“	“	“	“
Low. French R.	“ .....	“ .....	“ .....	.09
Island E.	Shawanaga	“	“	1.3
“ T P 3513	“	“	“	“
Pickerel River	“	“	“	5.
Crescent Island	“	“	“	“
Three Mile Lk.	Armour	“	David Thaw.	2.6
Island A.	Hardy	“	H. J. Ellis.	5.
W. D. 2523.	“	Sudbury .....	“ .....	.8
and F., Maskin- onge Lake.	Kelly	“	“	5.
Island T P 3142	“	“	“	“
Bear Lake.	“	“	“	12.
Island T P 3272	“	“	“	“
Lake Penage. ..	“	“	“	1.
Island T P 3271	“	“	“	“
Lake Penage. ..	“	“	“	3.
Island T P 3149	“	“	“	“
Lake Penage. ..	“ .....	“ .....	“ .....	.22
Island T P 3237	“	“	“	“
Lake Penage. ..	“	“	“	1.2
Island T P 3169.	“	“	“	6.
Island H Wes- lemkoon Lake. ..	Ashby	Lennox and Add- ington	“	6.
Island B Wes- lemkoon Lake. ..	“	“	“	2.
Island A, Otter Lake.	“	“	“	2.
Lyman Island, Weslemkoon Lk	Effingham.	“	“	1.
Island in Otter Lake.	S. Elmsley	Leeds .....	“ .....	.80
Part Deer Island	Leeds and Lansdowne	“	“	10.
Joe's Island, Charleston Lake	Lansdowne.	“	“	12.
Part of Buck Island.	Leeds and Lansdowne	“	“	5.
Rabbit Island, Charleston Lake	Lansdowne	“	“	120.

Appendix No. 13—Continued

ISLANDS SOLD—Continued

Part or Parcel.	Township.	District or County.	Agent.	No. of Acres Sold.
Sheep Island in Charleston Lake	Lansdowne.....	Leeds.....		60.
Paudash Island, Loon Lake....	Chandos.....	Peterborough....	Wm. Hales.....	2.75
Island in Clear Lake.....	Cavendish.....	".....	A. N. Wilson.....	4.
Island L.....	Cardiff.....	Haliburton.....	".....	7.
Island A, West Lake.....	".....	".....	".....	5.
Indian Island, Calabogie Lake	Blithefield.....	Renfrew.....		3.
Island S F 40, Canyon Lake..		Kenora.....		3.7
Island T P 1939, Macgregor Bay		Manitoulin.....	W. E. Whybourne...	.64
Island T P 1388, Macgregor Bay		".....	".....	1.3
Island 43, St. Josephs Chan'el		Algoma.....	".....	1.
Edith Island, St. Josephs Chan'el		".....	".....	2.
Island 29, St. Josephs Chan'el		".....	".....	2.
Island E.....	Aweres.....	".....	Thos. Dean.....	2.
Part of Island B Sharbot Lake..	Olden.....	Frontenac.....		1.94
Cranberry or Island A, Kashe-shobogamog Lake.....	Morrison.....	Muskoka.....	J. B. Brown.....	.37
Part Island A 3 in Sesequinika Lake.....	Grenfell.....	Timiskaming.....		6.6
Buck Island....	S. Crosby.....	Leeds.....	Unattached.....	10.
H 54 in Night Hawk Lake....	Cody.....	Cochrane.....	".....	.30
H 51 in Night Hawk Lake....	".....	".....	".....	.50
				526.16

Appendix No. 13—Continued

ISLANDS PATENTED.

Part or Parcel.	Township.	District or County.	Agent and P. O. Address.	No. of Acres Patented.
Island B 346....	Cowper.....	Parry Sound...	Miss I. M. Campbell, Parry Sound..	4. 1-10
Island B 408....	".....	".....	" " "	2. 1-10
W.D. 2523.....	".....	Sudbury.....	" " "	8.
T.P. 3172.....	".....	".....	" " "	8.
T.P. 3142.....	Berth 90.....	".....	" " "	12.
Island E.....	Carling.....	Parry Sound...	" " "	4. 4
Island 34.....	Harrison.....	".....	" " "	½
Island 30a.....	".....	".....	" " "	5.
Island 347a.....	".....	".....	" " "	. 1-5
Pt. Deer Island.	Leeds and Lansdowne	Leeds.....	.....	4. 5
Pt. Deer Island.	".....	".....	.....	10.
Joe's Island....	".....	".....	.....	12.
				69 9

Appendix No. 13—(Concluded)

List showing number and locations by Returned Soldiers in Sale and Free Grant Territory, respectively.

District.	Agency.	Number Locations.
IN SALE TERRITORY		
Algoma	Hearst	22
"	Kapuskasing	21
"	Thessalon	1
"	Sault Ste. Marie	3
Temiskaming	Englehart	15
"	Cochrane	73
"	Elk Lake	3
"	Haileybury	1
"	Matheson	51
"	New Liskeard	4
Sudbury	Massey	3
"	Sudbury	5
"	Unattached	1
"	Markstay	2
Nipissing	North Bay	10
Thunder Bay	Port Arthur	4
		219

Statement showing number of lots resumed for non-performance of settlement duties by, or on behalf of returned soldiers.

		No. of lots.
IN SALE TERRITORY.		
Temiskaming	Cochrane	67
"	Englehart	5
"	Matheson	14
"	Hearst	19
"	Elk Lake	1
Algoma	Massey	1
		107

IN FREE GRANT TERRITORY.

Nipissing	North Bay	2
Algoma	Sault Ste. Marie	1
		3

SELBY DRAPER,
Chief Clerk.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 14.

Statement showing the number of purchasers, acres sold, sales cancelled, acres resumed, patents issued, and acres patented in Townships other than Free Grant during the year ending 31st October, 1922.

Township	District or County.	Agent.	No. of acres sold.	No. of purchasers.	No. of sales cancelled.	No. of acres resumed.	No. of patents issued.	No. of acres patented.
Machin.....	Cochrane.....	S. J. Dempsay, Cochrane...	3,707	27	27	3,938	.....	.....
Blount.....	".....	".....	2,468	19	17	2,136	1	61 $\frac{1}{2}$
Shackleton.....	".....	".....	1,635	12	25	3,713	.....	.....
Brower.....	".....	".....	1,417 $\frac{1}{2}$	10	16	2,502 $\frac{1}{2}$	1	1
Pyne.....	".....	".....	1,124	7	11	1,769 $\frac{1}{2}$	.....	.....
Newmarket.....	".....	".....	3,215 $\frac{1}{2}$	20	23	3,667	.....	.....
Fauquier.....	".....	".....	1,202	9	24	3,451	2	300
Fox.....	".....	".....	2,214 $\frac{1}{2}$	14	25	3,957	.....	.....
Clute.....	".....	".....	1,425	10	22	3,238	9	1,291
Kennedy.....	".....	".....	1,974	13	15	2,826	.....	.....
Calder.....	".....	".....	3,755	25	63	9,401	1	145 $\frac{1}{2}$
Glackmeyer.....	".....	".....	1,873	13	26	3,754	11	1,640
Fournier.....	".....	".....	1,684	11	17	2,611 $\frac{1}{2}$	.....	.....
Leitch.....	".....	".....	1,342	10	33	4,461	.....	.....
Colquhoun.....	".....	".....	150	1	1	150	.....	.....
Lamarche.....	".....	".....	637	4	.....	.....	.....	.....
Casgrain.....	Cochrane.....	J. L. O'Donnell, Hearst...	3,450	24	29	4,335	2	293 $\frac{1}{2}$
Devitt.....	".....	".....	7,473	50	1	150	.....	.....
Eilber.....	".....	".....	5,103	34	24	3,665	.....	.....
Hanlan.....	".....	".....	6,253	42	40	6,296	1	149
Kendall.....	".....	".....	5,294	36	39	5,786	4	534
Lowther.....	".....	".....	3,610	24	41	6,185	.....	.....
O'Brien.....	".....	H. E. Sheppard, Acting Agent, Kapuskasing...	8,241	87	2	175	3	188
Owens.....	".....	".....	3,021	31	1	100	.....	.....
Williamson.....	".....	".....	869	10	.....	.....	.....	.....
Bayley.....	Temiskaming..	Jos. Woollings, Englehart...	.....	.....	.....	.....	1	158 $\frac{1}{2}$
Blain.....	".....	".....	.....	.....	1	160 $\frac{1}{2}$	.....	.....
Catharine.....	".....	".....	.....	5	.....	801	3	479 $\frac{1}{2}$
Chamberlain.....	".....	".....	.....	2	.....	317	2	356 $\frac{1}{2}$
Dack.....	".....	".....	275 $\frac{1}{2}$	2	1	158	4	501 $\frac{1}{2}$
Davidson.....	".....	".....	.....	.....	.....	.....	.....	.....
Eby.....	".....	".....	163	2	.....	.....	1	140
Evanturel.....	".....	".....	143	1	.....	.....	7	952 $\frac{3}{4}$
Gross.....	".....	".....	480	3	.....	.....	.....	.....
Ingram.....	".....	".....	319 $\frac{1}{2}$	2	10	1,574 $\frac{1}{2}$	2	319
Marter.....	".....	".....	160	1	4	640 $\frac{1}{2}$	3	481 $\frac{1}{2}$
Marquis.....	".....	".....	160	1	11	1,734	4	478 $\frac{1}{2}$
Otto.....	".....	".....	480	3	6	955 $\frac{1}{2}$	.....	.....
Pacaud.....	".....	".....	160	1	8	1,273 $\frac{1}{2}$	5	597 $\frac{1}{2}$
Pense.....	".....	".....	.....	.....	4	650 $\frac{1}{2}$	.....	.....
Robillard.....	".....	".....	406	3	1	135	3	486 $\frac{1}{2}$
Savard.....	".....	".....	319 $\frac{1}{2}$	2	7	1,118 $\frac{1}{2}$	6	942 $\frac{1}{2}$
Sharpe.....	".....	".....	.....	.....	1	159 $\frac{1}{2}$	.....	.....
Truax.....	".....	".....	155 $\frac{1}{2}$	1	7	1,108 $\frac{1}{2}$	.....	.....
Benoit.....	Temiskaming..	J. E. Mills, Matheson...	2,146	16	2	324	6	240 $\frac{1}{2}$
Beatty.....	Cochrane.....	".....	873	7	6	887	6	760 $\frac{1}{2}$
Bond.....	".....	".....	1,723	14	19	2,849	3	468
Bowman.....	".....	".....	949	6	11	1,566	3	323

Appendix No. 14—Continued

Township.	District or County.	Agent.	No. of acres sold.	No. of purchasers.	No. of sales cancelled.	No. of acres resumed.	No. of patents issued.	No. of acres patented.
Calvert.....	Cochrane.....	J. E. Mills, Matheson...	792	5	7	1,108	3	476
Carr.....	"	"	160	1			6	824 $\frac{1}{2}$
Clergue.....	"	"	652	4	8	1,282	6	590
Currie.....	"	"	1,197	8	9	1,362	1	160
Dundonald.....	"	"	1,183	9	14	1,927		
Evelyn.....	"	"			1	160		
German.....	"	"	1,218	9	21	2,963	2	289 $\frac{1}{2}$
Hislop.....	"	"	801	6	6	964	8	1,185
Matheson.....	"	"	1,499	11	40	6,006	3	389 $\frac{1}{2}$
Mountjoy.....	"	"	1,394	10	15	2,460	1	162
McCart.....	"	"	949	7	16	2,492	2	318
Playfair.....	"	"	798	5	2	325	6	1,078
Stock.....	"	"	1,260	9	12	1,801	1	161 $\frac{1}{2}$
Taylor.....	"	"	791	5	8	1,234	11	1,715
Walker.....	"	"	320	2	12	1,870	3	475
Armstrong.....	Temiskaming..	J. W. Bolger, New Liskeard...	240	2			5	758 $\frac{1}{2}$
Auld.....	"	"	196	2	1	160	1	120
Beauchamp.....	"	"	158	1	3	482	2	320
Brethour.....	"	"	1,064	7	5	799	6	880
Bryce.....	"	"	479	3	9	1,371	1	160
Bucke.....	"	"	138	1	1	160	1	158 $\frac{1}{2}$
Cane.....	"	"	319	2	3	361	5	736
Casey.....	"	"	78	1			7	905 $\frac{3}{4}$
Dymond.....	"	"					1	76 $\frac{3}{4}$
Firstbrook.....	"	"			3	438	1	82
Harley.....	"	"					4	560
Henwood.....	"	"	162 $\frac{1}{2}$	1	5	808	2	320 $\frac{1}{2}$
Harris.....	"	"					2	201 $\frac{1}{2}$
Hilliard.....	"	"	321	2	4	641	5	561 $\frac{1}{2}$
Hudson.....	"	"			5	781	3	482
Kerns.....	"	"					3	398
Lundy.....	"	"	162	1	2	325		
Tudhope.....	"	"	83	1	1	153	3	318 $\frac{1}{2}$
Smyth.....	Temiskaming..	Mark Morgan, Elk Lake...	158 $\frac{1}{2}$	1				
Lorrain.....	Temiskaming..	Neil J. McAuley, Haileybury...	600	7	6	960	5	663
Mason.....	Nipissing.....	J. A. Phillion, Sturgeon Falls..	320	2			3	257 $\frac{1}{2}$
Scollard.....	"	"	407	3	1	164	2	323 $\frac{1}{2}$
Hugel.....	Nipissing.....	John Brown, Markstay..	319	2	2	320	1	159
Loudon.....	"	"	164	1			1	161 $\frac{1}{2}$
Widdifield.....	Nipissing.....	W. J. Parsons, North Bay..	641	4	32	5,349	7	1,038 $\frac{1}{2}$
Phelps.....	"	"	2,081	14	3	480		
Awrey.....	Sudbury.....	R. A. Tesdale, Massey..	79 $\frac{1}{2}$	1			1	160
Hallam.....	"	"					2	316 $\frac{1}{2}$
Harrow.....	"	"	140	1			1	140
May.....	"	"	616	4	1	163	3	479 $\frac{1}{2}$
Salter.....	"	"	259	2	1	80	4	580
Shedden.....	"	"			1	150	1	30
Victoria.....	"	"	283	2	2	214	2	240

Appendix No. 14—Continued

Township	District or County	Agent	No. of acres sold	No. of purchasers	No. of sales cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Dowling	Sudbury	J. K. McLennan, Sudbury			1	158	2	326
McKim	"	"						
Loughrin	"	"	161	1			2	311
Delamere	"	"	478	3			1	34
Drayton	Kenora	H. E. Holland, Kenora	151	3			3	298
Bright	Algoma	Thos. Dodds, Thessalon	160	1	2	352	2	236
Bright ad.	"	"			1	151		
Day	"	"						
Gladstone	"	"						
Gould	"	"	123	1	1	160		
Houghton	"	"					1	157
Johnson	"	"			1	133	2	293 $\frac{1}{2}$
Kirkwood	"	"						
Parkinson	"	"	161 $\frac{1}{2}$	1	1	161	2	318 $\frac{3}{4}$
Patton	"	"	157	1	2	327	4	552 $\frac{1}{2}$
Rose	"	"			1	167		
Striker	"	"	221	2	4	397	1	151 $\frac{1}{2}$
Thompson	"	"	159	1			1	160
Wells	"	"						
Aweres	Algoma	Thos. Dean, Sault Ste. Marie	98	1	2	308	2	100
Tarentorus	"	"	80	1	1	90	1	80
Vankoughnet	"	"			2	294	3	451
Forbes	Thunder Bay	S. H. Wilson, Port Arthur	2,078	15	4	582	3	471 $\frac{1}{2}$
Lyon	"	"	223	2	4	613	1	158
Nipigon	"	"	453	3	2	315	6	1,099
Upsala	"	"	3,694	25				
Nairn	Sudbury	E. Arthurs, Espanola	185	1			2	330
Admaston	Renfrew	Unattached	100	1			3	275
Barrie	Frontenac	"	192	2	2	192	1	154
Badgerow	Nipissing	"	420	3	2	242	2	365
Bagot	Renfrew	"	685	5	1	100	4	600
Bigwood	Sudbury	"	1,198	9			6	115
Bastedo	Nipissing	"	320	2				
Crerar	"	"	1,268	9	1	160	5	795
Creighton	Sudbury	"	323	2	1	80 $\frac{1}{2}$	1	162
Drury	"	"			2	240		
Dummer	Peterboro	"	100	1				
Fairbank	Sudbury	"	238	2			2	238
Field	Nipissing	"	667	6	1	204	6	587
Gibbons	"	"	198	2			2	198
Harvey	Peterboro	"	97	1	2	202	4	717
James	Temiskaming	"	42	1			4	157 $\frac{1}{2}$
Kennebec	Frontenac	"	180	1			1	180
Kaladar	Lennox and Addington	"	128	1			2	322 $\frac{1}{2}$
Laxton	Victoria	"	100	1	1	100	1	100
Lorne	Sudbury	"	856	6			4	387
Louise	"	"	223	2			2	273
Medonte	Simcoe	"	180	1	1	190		
Proton	Grey	"	199	2			2	199 $\frac{3}{8}$

Appendix No. 14—Concluded

Township.	District or County.	Agent.	No. of acres sold	No. of purchasers	No. of sales cancelled	No. of acres resumed	No. of patents issued	No. of acres patented
Rutherford.....	Manitoulin.....	Unattached.....			1	164		
Sherbrooke, S...	Lanark.....	".....	50	1			1	50
Shakespeare....	Sudbury.....	".....	85	2			2	89½
Somerville.....	Victoria.....	".....	159	1			2	251
Tudor.....	Hastings.....	".....	99	1	1	99	2	199
			121,222	894	935	140,775	328	43,119½

Number of Lots assigned.....549 Number of Acres assigned.....75.102

J. E. DRINKWATER,
Clerk in charge.
SELBY DRAPER,
Chief Clerk.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Statement showing the number of purchasers, acres sold and of patents issued in Townsites during the year ending 31st October, 1922.

Townsite.	District or County.	Agent.	No. of acres sold.	No. of purchasers.	No. of patents issued.	No. of acres patented.
Adolphstown.....	Lennox and Addington	Unattached.....	77.41	1	1	77.41
Alexandra.....	Cochrane.....	".....	.24	1		
Belleville.....	Hastings.....	".....	.12	1	1	.25
Capreol.....	Sudbury.....	".....	1.02	9	9	1.14
Foleyet.....	".....	".....	.17	2		
Frederickhouse....	Cochrane.....	".....	.20	2		
Gogama.....	Sudbury.....	".....	.44	4	3	.44
Grant.....	Thunder Bay.....	".....	.94	6	4	.80
Hornepayne.....	Algoma.....	".....	.36	1		
Kirkland Lake.....	Temiskaming.....	".....	1.21	13	8	.55
" extension..	".....	".....	.60	8		
Lowbush River.....	".....	".....	.54	2		
Macfarlane.....	Kenora.....	".....	.90	2	6	2.14
Minden.....	Haliburton.....	".....	1.50	2	1	.75
Missinabie.....	Algoma.....	".....	2.92	16	4	1.05
Moonbeam.....	Cochrane.....	".....	1.57	2	1	1.40
North Capreol.....	Sudbury.....	".....	.13	1	3	.39
Sioux Lookout.....	Kenora.....	".....	.88	4	7	2.86
Swastika.....	Temiskaming.....	".....	1.09	6		
Waldhof.....	Kenora.....	".....	.65	1	1	.65
Winnipeg River Crossing.....	".....	".....	.69	2	1	.23
Wood.....	Muskoka.....	".....	.65	1		
			94.23	88	50	90.06

SELBY DRAPER,
Chief Clerk.
J. B. PROCTOR,
Clerk in charge.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 15.

HONOURABLE BENIAH BOWMAN
Minister of Lands and Forests.

REPORT OF CROWN SURVEYS.

Sir,—During the past year surveys have been carried out on Crown Lands under instructions from this Department to the extent of 1,000 miles of Provincial boundary, base and meridian and township boundary lines, also covering 2,000 miles of lake, river and is and traverse.

INTERPROVINCIAL BOUNDARY BETWEEN ONTARIO AND MANITOBA.

This boundary survey commenced in 1921 was continued in charge of J. W. Pierce, Ontario and Dominion Land Surveyor, of Ottawa, and pushed forward to the twelfth base line on the system of Dominion Land Survey, this being the deflecting point in the boundary as described by the Act of Parliament of Canada of 1st April, 1912. The Commissioners appointed by the respective Governments will make a special report on this boundary survey when the final returns are completed.

INTERPROVINCIAL BOUNDARY BETWEEN ONTARIO AND QUEBEC.

In order to preserve and perpetuate the existing line it was found expedient to retrace and remonument the Ontario-Quebec Boundary from a point on the northerly bank of Lake St. Francis, near Baudette, to a point on the Ottawa River near Pointe Fortune. In compliance with an Order-in-Council dated 20th day of March, 1922, instructions issued to E. T. Wilkie, Ontario Land Surveyor, on behalf of this Province, and similar instructions issued to Paul E. Mercier, Quebec Land Surveyor, on behalf of the Province of Quebec, to carry on this joint survey. I am glad to report that this retracing of the line was carried on harmoniously and to the satisfaction of both representatives and the report on this work will be found herein.

BASE AND MERIDIAN LINES.

Phillips and Benner, Ontario Land Surveyors, and K. G. Ross, Ontario Land Surveyor, were engaged on base and meridian line work west of the Nipigon Forest Reserve, in the district of Thunder Bay.

TOWNSHIP BOUNDARIES.

The following surveyors were in charge of township boundary work:—

- District of Sudbury, six-mile townships,—
 J. W. Fitzgerald.
 Chas. V. Gallagher.
 McAuslan, Anderson & Moore.
- District of Cochrane, nine-mile townships,—
 Sutcliffe & Neelands.
 Speight & Van Nostrand.
- District of Algoma,—
 H. J. Beatty.

LAKE AND RIVER TRAVERSE.

- (1) Traverse of English River from Lac Seul westward, districts of Kenora and Patricia, J. S. Dobie.
- (2) Traverse of shore and islands Lake Wabigoon, district of Kenora, R. S. Kirkup.
- (3) Traverse of shore and islands Lake of the Woods, district of Rainy River, D. J. Gillon.
- (4) Traverse of Abitibi River north from the township of Leitch, district of Cochrane, C. R. Kenny.
- (5) Traverse of part of Severn River, County of Simcoe and district of Muskoka, J. T. Coltham.
- (6) Traverse of Mississaga River, district of Algoma, T. J. Patten.
- (7) Traverse of Reuben Lake, district of Nipissing, T. G. Code.
- (8) Traverse of lakes and islands in township of Methuen, County of Peterborough, C. H. Wilkins.

TIMBER LIMIT SURVEYS.

- (1) Burnt area near Jellicoe, district of Thunder Bay, Phillips & Beener.
- (2) Timber lines in the townships of Afton, MacBeth and Sheppard, district of Sudbury, Mooney and Gill.
- (3) Timber lines in Township 9, Z, district of Sudbury, Lincoln Mooney.
- (4) Berth No. 25, district of Rainy River, D. J. Gillon.

MISCELLANEOUS SURVEYS.

- (1) Subdivision of park lots in Rondeau Park, county of Kent, C. E. Fitton.
- (2) Survey of Pine Island, in St. Mary's River, into summer resort parcels, K. G. Ross.
- (3) Additional town lots laid out at Alexandra, in the district of Cochrane, G. F. Summers.
- (4) Survey of park lots in Presqu'île Park, county of Haliburton, M. M. Gibson.
- (5) Resurvey of certain township lots along the Timiskaming and Northern Ontario Railway extension in the township of Blount, district of Cochrane, G. P. Angus.

INSPECTION.

Inspection of work in the field was carried on during the year by Charles E. Fitton, and I am glad to be able to report that the work as a whole has been well performed. Detailed reports of the several surveys for which returns have been made during the year will be found in appendices 20 to 24, inclusive.

L. V. RORKE,
Director of Surveys.

Appendix No. 16.

Statement of Municipal Surveys confirmed during the twelve months ending October 31st, 1922.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.	Date when confirmed under Ont. Statutes 1920, chap. 48, sec. 11-18, inclusive.
1	Speight & VanNstrand.....	726	Aug. 18, 1921	To survey the limits of Durie Street in the City of Toronto, in the County of York, and to plant stone or other durable monuments to define the limits of said street....	Dec. 27, 1921.
1	James J. MacKay.	730	May 8, 1922.	To survey the original road allowance between the broken front and first concession of the township of Clinton, across lot 23, in said township.....	Aug. 31, 1922.

L. V. RORKE,
Director of Surveys.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 17

Statement of Municipal Surveys for which instructions issued during the twelve months ending October 31st, 1922.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.
1	J. H. Moore	729	Dec. 2, 1921	To survey the side road line between lots 20 and 21 in the 1st concession of the Township of Beckwith, and also the line between the 8th and 9th concessions in said township in front of lots 1 to 5 inclusive, and that iron monuments be placed to mark the said road allowance as set out herein.
2	James J. MacKay	730	May 8, 1922	To survey the original road allowance between the broken front and first concession of the Township of Clinton, across lot 23, in said township.
3	Frank N. Rutherford	731	Aug. 24, 1922	To survey the road allowance between the Townships of Niagara and Grantiam in the County of Lincoln, extending from the Queenston and Grimsby Provincial Road to the lake shore road, and to plant durable monuments to mark the said road allowance as set out herein.

L. V. RORKE,
Director of Surveys.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 18.

Statement of Crown Surveys in progress during the twelve months ending October 31st, 1922.

No.	Date of Instructions.	Name of Surveyor.	Description of Surveys.	Amount paid.
1	April 12, 1922	H. J. Beatty.....	Survey certain township outlines, district of Algoma.....	\$7,237.50
2	Sept. 26, 1922	G. P. Angus.....	Resurvey of certain lots in the Township of Blount, district of Cochrane.....	1,000 00
3	April 27, 1922	Jas. T. Coltham....	Traverse of Severn River between the Townships of Matchedash, Baxter, Morrison, Wood.....	1,818 80
4	April 18, 1922	J. S. Dobie.....	Traverse the shores of the English River and the islands therein, district of Kenora and Patricia.....	8,600 00
5	April 12, 1922	J. W. Fitzgerald....	Certain township outlines south of the Canadian Pacific Railway, district of Sudbury.....	6,120 00
6	May 8, 1922	C. E. Fitton.....	Inspection of surveys, 1922.....	3,496 00
7	April 12, 1922	Chas. V. Gallagher	Certain township outlines along the Canadian Pacific Railway, district of Sudbury.....	4,016 00
8	April 17, 1922	D. J. Gillon.....	Traverse of islands and part of shore lines Lake of Woods, district of Rainy River.....	4,800 00
9	April 18, 1922	C. R. Kenny.....	Traverse of portion of Abitibi River, district of Cochrane.....	2,950 00
10	April 18, 1922	Roy S. Kirkup.....	Traverse shores of Wabigoon Lake, etc., district of Kenora.....	2,700 00
11	April 12, 1922	McAuslan, Anderson and Moore.....	Certain township outlines along Canadian Pacific Railway, district of Sudbury...	5,790 00
12	April 1, 1922	Mooney & Gill....	Certain lines in unsurveyed territory, district of Sudbury.....	3,000 00
13	April 21, 1922	Phillips & Benner...	Base and meridian lines, district of Thunder Bay.....	6,207 50
14	April 26, 1922	T. J. Patten.....	Traverse part of Mississaga River, district of Algoma.....	3,099 00
15	April 22, 1922	K. G. Ross.....	Base and meridian lines, district of Thunder Bay.....	7,973 50
16	April 12, 1922	Sutcliffe & Neelands	Certain township outlines on Abitibi River, district of Cochrane.....	3,700 00
17	April 12, 1922	Speight & VonNosstrand.....	Certain township outlines on Abitibi River, district of Cochrane.....	7,492 50
18	April 5, 1922	E. T. Wilkie.....	Renewal portion boundary between Ontario and Quebec.....	1,400 00
19	April 27, 1922	C. H. Wilkins.....	Traverse certain lakes and rivers, Township Methuen.....	1,900 00

Appendix No. 18—Concluded

Statement of Crown Surveys in progress during the twelve months ending October 31st, 1922.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.
20	March 7, 1921	J. W. Pierce.....	Survey boundary between Ontario and Manitoba.....	12,900 00
21	June 5, 1922	M. M. Gibson.....	Certain survey work, Presqu'île Park, County of Northumberland.....	600 00
22	July 25, 1922	T. G. Code.....	Traverse Reuben Lake, etc., district of Nipissing.....	800 00
23	Aug. 21, 1922	L. Mooney.....	Survey timber berth line, Township 9 Z, district of Sudbury.....	1,000 00
				\$10,100 80

L. V. RORKE,
Director of Surveys.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 19.

Statement of Crown Surveys completed and closed during the twelve months ending
October 31st, 1922.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.
1	Oct. 3, 1921	R. M. Anderson....	Retracing and establishing the boundaries of land lying between Long Point and Walsingham Townships.....	\$569 94
2	April 15, 1922	H. J. Beatty.....	Survey certain township outlines in district of Algoma.....	1,761 48
3	May 16, 1921	Jas. T. Coltham....	To traverse certain lakes and rivers in Townships of Wallbridge and Harrison	1,684 55
4	May 2, 1921	T. G. Code.....	Traverse certain lakes and streams in the Timagami Forest Reserve, district of Timiskaming and Nipissing.....	2,504 87
5	April 5, 1921	Jas. S. Dobie.....	Traverse the islands and shores of Lake St. Joseph and run certain base and meridian lines in Thunder Bay district	3,106 08
6	May 17, 1921	C. E. Fitton.....	Inspection of surveys, 1921.....	1,609 71
7	April 15, 1921	J. W. Fitzgerald....	Survey certain township outlines north of Canadian Pacific Railway in district of Sudbury and Algoma.....	2,513 14
8	May 18, 1921	D. J. Gillon.....	Survey islands and shore lines in part of Lake of the Woods in the district of Rainy River and Kenora.....	2,430 40
9	May 5, 1921	Chas. V. Gallagher	Survey certain township outlines north of Canadian Pacific Railway in the district of Sudbury.....	1,803 30
10	May 2, 1921	R. S. Kirkup.....	Traverse Kenogami River and its expansions in the districts of Thunder Bay and Algoma.....	2,253 96
11	April 22, 1921	Carmen R. Kenny..	To continue traverse of Missinaibi River in districts of Algoma and Timiskaming	1,943 88
12	Oct. 3, 1921	L. Mooney.....	Survey a meridian Township 44, along Canadian Pacific Railway, district of Sudbury.....	434 70
13	May 16, 1921	McAuslan & Anderson.....	Survey certain township outlines north of Canadian Pacific Railway, district of Sudbury.....	2,075 55
14	May 16, 1921	T. J. Patten.....	Survey traverse islands in French River districts of Parry Sound and Sudbury..	2,610 75
15	April 15, 1921	Phillips & Benner..	Survey certain base and meridian lines in district of Thunder Bay.....	2,556 37
16	Aug. 22, 1921	Phillips & Benner..	Survey outlines timber berth south of Ignace, district of Kenora.....	5,228 69
17	March 7, 1921	J. W. Pierce.....	Survey of portion of Interprovincial Boundary between Ontario and Manitoba.....	5,406 77
18	April 15, 1921	K. G. Ross.....	Survey base and meridian line, district of Thunder Bay.....	2,358 80

Appendix No. 19—Concluded

Statement of Crown Surveys completed and closed during the twelve months ending
October 31st, 1922.

No.	Date of Instructions.	Name of Surveyor.	Description of Surveys.	Amount paid.
19	April 15, 1921	Speight & VanNstrand.....	Survey certain township outlines at head waters of Missinaibi River, districts of Sudbury and Algoma.....	2,763 34
20	Nov. 4, 1920	Bingham & Kirkup.	Resurvey certain lines in Township of Pardee, district of Thunder Bay.....	808 17
21	May 27, 1920	G. F. Summers.....	To survey a town plot and other lands in the vicinity of Kapuskasing, Township of O'Brien, district of Timiskaming.....	2,948 60
22	Dec. 3, 1921	D. J. Gillon.....	Survey of timber berth 25, district of Rainy River.....	372 00
23	March 2, 1922	C. E. Fitton.....	Survey in Rondeau Park.....	591 05
24	Aug. 18, 1921	McAuslan, Anderson & Moore.....	Survey of lots in town plot of Grant....	249 45
25	Dec. 20, 1921	G. F. Summers.....	Survey additional lots in town plot of Alexandra.....	362 38
26	.....	Baines & David....	Survey iron posts.....	170 00
27	Aug. 16, 1922	Phillips & Benner...	Timber berths near Jellicoe Station....	772 40
28	July 4, 1922	Thornton & Co.....	Supplies.....	20 00
29	July 4, 1922	Surveyor-General...	Supplies, Boundary Survey, Ontario and Quebec.....	96 24
30	Nov. 23, 1921	K. G. Ross.....	Salary, etc.....	48 00
31	May 12, 1920	N. B. MacRostie...	Township outlines in Timiskaming.....	1,949 54
32	June 30, 1919	H. K. Wicksteed, executor A. L. Russell.....	Survey Shebandowan and Greenwater Lakes.....	725 80
	April 25, 1922	Pritchard, Andrews & Co.....	Brass plates.....	26 00
			Total.....	\$54,755 81

L. V. RORKE,
Director of Surveys.

W. C. CAIN,
Deputy Minister of Lands and Forests.

Appendix No. 20.

COBALT, ONT., February 1st, 1922.

SURVEY OF SMALL LAKES NORTH AND EAST OF LAKE TIMAGAMI, DISTRICTS OF
TIMISKAMING AND NIPISSING.

Sir,—In obedience to your instructions dated May 2nd, 1921, to traverse certain lakes and canoe routes in the Timagami Forest Reserve, I have surveyed as much of my contract as was possible in a season, and beg to report as follows:—

1.—ROUTINE OF WORK.

On May 7th I left Cobalt with my party. We packed in supplies to Anima, Nipissing Lake and commenced survey thereof the following Tuesday, May 10th, carrying on through McLean, Carrying and Red Squirrel Lakes down to Sandy Inlet on Lake Timagami, surveying the small lakes Pickerel, Gull Rock, Breeches, Mountain and Clearwater from camps on Anima, Nipissing, finishing this section of the work on June 9th.

On June 10th we moved down through Lake Timagami, Snake Island, White Bear and into Rabbit Lake, reprovisioning the outfit and commencing the survey of Rabbit Lake on June 15th. The survey was carried on from here through White Bear, Snake Island, Obaskong, Net, Cedar and Thieving Bear Lakes, completing Thieving Bear Lake on the morning of July 28th, and moving a light camp the same day to Mountain Lake. As the route from Thieving Bear to Mountain Lake is through a very small winding creek, barely more than fifteen feet wide in low water, I did not feel that the time necessary to survey this would be well spent and, therefore, sketched the route and chained the portages, which are in fair condition. For driving logs, dams will be necessary to raise the water above the low flat banks of the present creek.

The survey of Mountain Lake was completed on July 29th and camp moved to mileage 76, T. & N. O. Ry., at Net Lake, on July 30th. A few days were spent making arrangements to have camp outfit picked up by the way freight and moved to Doherty Station, and in getting a new supply of provisions. However, with as little delay as possible the survey of Twin Lakes was commenced on August 4th. After surveying Upper and Lower Twin Lakes and Lowell Lake, we moved camp on August 12th to a small lake two and one-half miles south of Doherty. The water was very low and the canoe route through the northeast corner of Law township had not been in use for ten or twelve years, so we cut a new portage three-quarters of a mile south into Angus Lake. This we found to benefit others as well, probably more than twenty tourists passing through this way in the short time we were surveying Angus and Caribou Lakes. From here we continued survey through Angus, Jumping Caribou, Ingall, Brophy, Green, Wasaksinagama, Island, Herridge, Wilson and Christy Lakes, finishing this portion of the work on October 12th. On October 13th, I moved camp to Timagami Lake, arriving back in Cobalt and paying off the men on October 14th.

All the work allotted to me was not completed but I have tried to survey as many lakes as possible along the routes to save going over the same ground a second time.

The following is the mileage of traverse, calculated by wheeled scale, which though close, can only be approximate,—

	Miles.
Anima Nipissing and Pickere' Lakes.....	57.50
Islands.....	7.00
Gull Rock Lake.....	6.00
Breeches Lake.....	4.50
Clearwater Lake.....	11.75
McLean Lake.....	6.25
Mountain Lake.....	15.50
Carrying Lake.....	3.00
Red Squirrel Lake.....	14.00
Rabbit Lake.....	46.50
White Bear Lake.....	17.75
Snake Island Lake.....	6.50
Obaskong Lake.....	3.50
Net Lake.....	36.00
Cedar Lake.....	13.00
Thieving Bear Lake.....	8.50
Upper and Lower Twin Lakes.....	14.50
Lowell Lake.....	4.00
Angus Lake.....	6.00
Jumping Caribou Lake.....	20.00
Ingall Lake.....	19.50
Brophy Lake.....	6.75
Green Lake.....	1.00
Wasaksinagama Lake.....	35.00
Island Lake.....	7.50
Herridge Lake.....	13.00
Wilson Lake.....	8.00
Christy Lake.....	4.50
Wilson to Christy Lake route.....	3.00
	400.00

2.—METHOD OF SURVEY.

(a) Instruments used.—Throughout the whole survey, traverse was made by stadia readings. Azimuth angles were carried through with the transit A. C. L. Berger instrument was used and gave perfect satisfaction, both for stadia distances and for azimuth. The only adjustment necessary at any time was for level bubbles.

Stadia rods used were made by myself and read direct to tenths of links. The accuracy of readings being checked from time to time by reading on measured lines.

(b) Field Notes.—One form of field notes were kept throughout the course of the work. The notes were transcribed in ink and carefully checked. They show station, azimuth, angle right, bearing and under remarks, the point on which the reading was taken.

(c) Observations were taken frequently on Polaris for azimuth. The results are shown in the field notes.

(d) Posts and blazed trees.

Posts were planted and bearing trees marked at one chain back from the intersections of the several township boundaries with the shores of the different lakes.

Around the shores of the lakes at intervals of about a mile, trees were blazed and marked with a number. In almost every case the number given was the number of the station of the traverse, but where this was not found convenient, other numbers were used and are shown on the plans and in the field notes.

3.—DESCRIPTION OF LAKES AND RIVERS.

In dealing with this heading, on account of the smallness of the lakes and the general features being the same, I am grouping the surveys similar to 1, Routine of Work.

(a) *Anima Nipissing Lake to Red Squirrel Lake Section.*

All these lakes have fairly high rocky shores. The land close to the shores is not suitable for agriculture, with the exception of a very few isolated spots where the overburden is sufficient to permit farming.

Timber.—The timber throughout this section consists of 8''-16'' red pine, 12''-18'' scattered white pine, 4''-8'' birch, 4''-8'' spruce, together with some cedar and balsam, in the low places. The timber at the northwest end of Anima Nipissing Lake is not quite as good as the rest of the area described.

Islands.—The islands are, with the exception of one or two small ones on which the timber has been destroyed by careless campers, well timbered.

(b) *Rabbit and White Bear Lake Section.*

Considerable timber has been destroyed on Rabbit, White Bear, Snake Island, and Obaskong Lakes. The standing dead trees do not contribute to the beauty of the place and give the impression that considerably more timber has been destroyed than is actually the case. The high shores taking up the rise in the water level. A fair estimate would be about one chain in width along the shores of the several lakes, say from six to seven hundred acres.

The timber along the shores of Rabbit Lake consists of jack pine, average 10'', red pine 12''-18'', birch and poplar, with cedar and balsam. Farther north, around White Bear Lake, the timber consists of 4''-15'' red and white pine. Small poplar and birch, spruce and balsam.

(c) *Net Lake Section, including Cedar and Thieving Bear Lakes.*

The general physical features of this system are very similar to the previous lakes described. The shores, however, are not quite so precipitous.

The timber consists of 4''-16'' red pine, 4''-10'' white pine, 4''-18'' poplar, with cedar along the shores together with spruce.

(d) *Lake Section through Law and Strathcona Townships.*

The shores of these lakes are even more rugged than the lakes previously described. The country back of the lakes being very rough and rocky.

Considering the amount of rock exposed the timber is very good consisting of 8''-16'' red and white pine, balsam, birch and poplar, increasing to 6''-20'' red and white pine at Island Lake and carrying through with the same class of timber to Wilson and Christy Lakes. Very little of this has been destroyed by fire. The section around Angus, Caribou and Ingall Lakes being very old brule. The islands, however, are well timbered.

(e) Remarks.

Throughout the course of the survey it has been very noticeable that the brule area is confined to the T. & N. O. Railway. Apart from portions close to the railway, due probably to sparks from locomotives and possibly due to carelessness of the men in the employ of the different construction companies building the line, there is practically no timber destroyed by fire. This is probably due to the efficient staff of fire rangers at Timagami.

The section of the Timagami Reserve surveyed last summer is an ideal spot for tourists. The scenery is beautiful. The canoe routes are not hard. The lakes are excellent for fishing. At present a great number of people from points farther north spend their holidays there, as well as pleasure seekers from the south. There are several dangerous shoals in Timagami Lake even for canoes in bad weather. These, I feel, should be shown on future maps of the lake.

Accompanying this report are:

Plans—

Sheet No. 1—

Anima Nipissing, Pickerel, Gull, Rock, Breeches, Mountain, Clear-water, McLean, Carrying and Red Squirrel Lakes.

Sheet No. 2—

Rabbit, White Bear, Snake Island and Obaskong Lakes.

Sheet No. 3—

Net, Cedar and Thieving Bear Lakes.

Sheet No. 4—

Upper and Lower Twin Lakes, Lowell, Angus, Jumping Caribou, Ingall, Brophy, Wasaksinagama, Island, Herridge, Wilson and Christy Lakes.

Field Notes—

Three field books containing notes of all the above plans.

Diary of progress of survey.

Time Book.

The above is respectfully submitted,

I have the honour to be, Sir,

Your obedient servant,

T. G. CODE,
Ontario Land Surveyor.

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

Appendix No. 21.

SURVEY OF MISSINAIBI RIVER, DISTRICTS OF ALGOMA AND TIMISKAMING.

SAULT STE. MARIE, ONT., January 16th, 1922.

SIR,—Under instructions from you dated April 22nd, 1921, to survey the Missinaibi River from the north boundary of the Township of Sankey to the Mattagami River, and to complete the survey of Opazatika River from the north boundary of the Township of Idington to its mouth, I commenced organizing for this survey May 13th, 1921, leaving Sault Ste. Marie with my outfit and four men and arriving at Mattice on May 18th. At this point I overhauled supplies and outfit, and proceeded down Missinaibi River on the twentieth, arriving below point of commencement the following day.

The problem of transportation on this portion of Missinaibi River is one of extreme difficulty, particularly at low water. From north boundary to Township of Sankey the river can be run all the way to Conquering Rapids by experienced canoemen using poles almost constantly as flow is rapid and boulders frequent.

Between head of Conquering Rapids and foot of the Long Rapids a distance of four and a half miles, is sixty per cent. portage. The old portages were re-cut out by my party as this was absolutely necessary. The approaches to the portages are hazardous and require careful use of pole and paddle.

At the north side of the Township of Sankey the river is divided into two channels by Skunk Island reuniting thirty chains north of the line. The elevation of surface of river here is 645 feet. Half a mile north of Township of Sankey, Isabell and Alice Islands commence. The river here from Skunk Island to Isabell Island is almost ten chains wide with easy flow. On either side of Alice Island the river runs through clay country, but the shores are marked by stones and occasional large boulders. From the north boundary of Sankey for about fourteen and one-half miles the river flows moderately swift, and with easy curves to the head of Conquering Rapids. Surface at head of rapids is 620 feet and at foot 609 feet with a length of about thirty chains. At the head of the rapids are four rocky islands, and rock is plainly visible on the shore.

Thunder House Falls is one-half mile below Conquering Rapids, and is comprised of three separate falls within twenty chains, elevations at head of first fall 604 feet, and elevation at foot of third fall being 565 feet. Below this is a gorge three to four chains wide falling four feet in a length of twenty chains. At the head of first fall is a solid rock island which seems a favourable dam site. I consider that a dam twenty feet high, elevation of crest 624 feet, would be 700 feet long, of which 300 feet would be of moderate height, and would drown out Conquering Rapids. The difficulty here is the existence of Coal River running eastward from near foot of Conquering Rapids to a point about ten miles farther down the Missinaibi River, being a sort of high water by-pass or channel; whether this could be easily blocked or regulated I cannot say. Photographs accompanying this report will indicate clearly the nature of possible dam site.

One mile and three-quarters below lower end of Thunder House Gorge is the head of Stone Rapids which consists of a series of rapids, chutes and falls with a total drop of thirty-one feet within a distance of thirty chains. The sides of the valley of Stone Rapids are clay banks perhaps seventy-five feet high. There was apparently no chance of favourable power development near

head of rapids, but possibly a dam could be constructed at or about position of Post No. 10 as shown on plan, though no natural dam site was noted.

Three-quarters of a mile below Stone Rapids is the head of the Long Rapids, surface elevation 494 feet. A fair natural dam site exists just below island "P." Total length of dam with crest at 520 feet would be about 700 feet. Another natural dam site exists half way down the rapids, marked surface elevation 451.5 and where there is a drop to elevation 408.3 in about five chains. This is perhaps the best way to develop power at this rapids as a dam thirty feet or more above elevation 451.5 feet would only be 400 feet long. Possibly a two stage development would be more economic.

The total drop in the four rapids, Conquering Rapids, Thunder House Falls, Stone Portage Rapids and the Long Rapids is 255 feet. The distance from head of Conquering Rapids to foot of the Long Rapids is four and one-half miles by river, so that the total development by low impounding dam at head of Conquering Rapids and penstock lines would be a very expensive undertaking. The water shed area determination is an important factor. Whether it is possible to utilize Coal River as a power canal in whole, or in part, or to make development by canal in lieu of penstock or open flume cannot be stated now, but it appears doubtful. This water power location requires considerable survey and study to ascertain economic development. The water shed area common to Conquering Rapids, Thunder House Falls, Stone Portage Rapids and the Long Rapids is about four thousand square miles (noted as 6,500 square miles in 1911 Commission of Conservation Report).

(Note—Datum of elevations is base of rail at centre of bridge at Mattice as 750 feet.)

Below the Long Rapids there is no possibility of water power development on the Missinaibi River. The banks are fifty to one hundred feet high in clay as far as the Opazatika River, eighty miles from the north boundary of the Township of Sankey. Below this the banks of the river are fifteen to forty feet high in clay which is the same formation as throughout the clay belt.

From the foot of the Long Rapids to the mouth of the Mattagami River there are numerous rapids and gravel bars, work being arduous, both ascending and descending at all stages, except at high water period. This position is safe only for men expert with the pole and canoes cannot be loaded to full capacity.

Indications show that the greater part of the Missinaibi River region has been visited years ago by fire, destroying what was at one time a wonderful forest. Great areas of timber have since grown up, such as poplar to fourteen inches, spruce to twenty inches and balsam and birch, but there still remains many places of almost barren land covered only by heavy growths of small poplar.

OPAZATIKA RIVER.

The Opazatika River has throughout this survey an average width of five chains. From the north boundary of the Township of Idington the river runs almost direct north to Allan Lake about fourteen miles between clay banks. Allan Lake is about two miles long, east and west, and its area is about two square miles. A short stretch of about one mile east and west is the connection to Zadi Lake which is two miles long, east and west, and averages about one mile in width. All this distance is easy navigation for canoes or motor boats. Zadi Lake is partly in the Township of Neeley, District of Algoma, and partly in Township of Nixon, District of Timiskaming. From the foot of Zadi Lake for five miles down stream the river flows, east and north, to Eleanor Lake, and the water is swift with one portage.

Eleanor Lake is about three miles long varying in width from ten chains to one-half mile and lies east and west. About a mile easterly down stream is Neshin Lake about one and a half miles long, and lies northeast and southwest; from foot of Neshin Lake the river runs direct north three miles to the head of Opazatika Canyon with easy navigation for canoes. There is a fall twenty-eight feet in about thirty chains, a sort of chute. About two miles north is Indian Signs Falls, a drop of nineteen feet. From here the river runs westerly for about four miles, then turns sharply to the north and runs almost direct north from the point of the Missinaibi River. All this distance the water is swift, consisting of numerous rapids and chutes. About seventeen miles down stream from Indian Signs Falls is Mareva Falls a drop of 27.2 feet. Breakneck Falls as shown on plan has fifty-three feet of a drop, and is the best falls in the river, but does not appear to be a feasible water power proposition in the near future. Below this point the water is swift, with no marked falls to the Missinaibi River. The last thirty miles of the river are high clay banks from fifty to one hundred feet high.

There are some very good areas of timber along this river such as poplar to fourteen inches, spruce to twenty-four inches, balsam, birch and cedar. Similar to the Missinaibi River region the country has been fire swept years ago, destroying large tracks of virgin forests which have since grown up to a size to be of merchantable value. Great areas of almost barren land still remain covered only with small poplar.

I have the honour to be, Sir,

Your obedient servant,

C. R. KENNY,

Ontario Land Surveyor.

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

Appendix No. 22.

SURVEY OF TOWNSHIP OUTLINES, DISTRICT OF SUDBURY.

SOUTH PORCUPINE, ONT., January 23rd, 1922.

SIR,—I have the honour to submit the following report on the survey of certain township outlines in the District of Sudbury, north of the Canadian Pacific Railway, made by me under instructions from your Department, dated May 5th, 1921.

The survey was commenced at the northwest angle of Township No. 3, as directed in your instructions, and from this point the first meridian was run north astronomically to the southerly limit of the Township of Vrooman, and the second meridian was run north astronomically from the northeast angle of the said Township No. 3, which is also the northwest angle of the Township of Muldrew, to the southerly limit of the Township of Westbrook.

From the six, twelve and eighteen mile points on this second meridian, base lines were run eastward, as chords of parallels of latitude, to the west limits of the Township of Shelley, Blewett and Hennessy. Between the first and second meridians the base line at the six mile point was run eastward from the first

meridian; at the twelve mile point the base line was run westward from the second meridian, and at the eighteen mile point the base line was run eastward from the first meridian, always as chords of parallels of latitude.

The survey was carried out in strict accordance with your instructions, the lines being well opened out and blazed, and carefully chained, a clinometer being used on all grades and the horizontal distance calculated. The iron and the wooden posts were properly placed at the designated points, and the required mounds constructed, the wooden posts being of the most durable wood obtainable, six inches square and properly carved.

The entire country enclosed by these outlines is rough and broken with high hills, there being many lakes, streams, swamps and muskegs, except in the northerly part of Inverness and Edinburgh, where the country is undulating.

SOIL.

The soil throughout almost the entire area is a sandy loam, and not well adapted for agriculture.

TIMBER.

The southern part of Battersby Township has been recently burned, but there is a small stand of good red and white pine along the Spanish River. A dense growth of small jack pine, spruce and poplar covers the westerly part, and there is valuable spruce and poplar and jack pine in the northerly and south-easterly parts of this township.

There is a thick growth of small jack pine, spruce and poplar in the greater part of Dublin Township, apparently with some large scattered white pine in the northeast.

The Townships of Marquette, Baynes, Paudash, Brebeuf, Edinburgh and Inverness appear to be covered with a fair growth of spruce, jack pine, birch and poplar of valuable size, and scattered white pine up to twenty-four inches, except on the west side of Paudash where there is an old burn which is now covered with a dense growth of small timber of the same varieties, and in the north-westerly part of Inverness where there is a recent small burn.

MINERALS.

Granite was encountered throughout the survey and no indications of economic minerals were observed.

FISH AND GAME.

Indications and works of fur-bearing animals were common, and the animals, bear, beaver, mink and muskrat were frequently seen.

Moose were very plentiful, and occasionally a red deer could be seen.

The lakes and streams seemed to abound with pike which were easily taken at any time.

I have the honour to be, Sir,

Your obedient servant,

CHAS. V. GALLAGHER,

Ontario Land Surveyor.

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

Appendix No. 23.

SURVEY OF TOWNSHIP OUTLINES, DISTRICT OF SUDBURY.

NORTH BAY, January 7th, 1922.

SIR,—We have the honour to submit the following report on the survey of certain township outlines in the District of Sudbury, made by us in accordance with instructions from your Department, dated May 6th, 1921.

Leaving North Bay on the 9th of June, with our party, we proceeded to Ramsay Station on the Canadian Pacific Railway, where we had previously sent out supplies and equipment. From this point we portaged along the east boundary of the Townships of Cavell and Edith to the northeast angle of the Township of Edith, which point had been established in our survey of 1920, as the adjacent angle of four townships, i.e., Edith, Fingal, Osway and Esther. This point is in a spruce swamp and is marked by a spruce post bearing the township names, referenced by two bearing trees and witnessed by an iron post and witness monument, thirty-six chains west astronomically therefrom. From this point we commenced the survey.

The first procedure was to get an astronomical observation on Polaris for azimuth. Having made certain of the bearing we ran west astronomically one mile and twenty-five chains between the Townships of Edith and Esther. From the same point of commencement, we then ran north astronomically between the Townships of Esther and Osway, six miles and nine links to the line run in 1920 forming the south boundary of the Township of Fenton. Returning to the line between the Townships of Esther and Edith, where we had left off, we continued this line west astronomically to the Woman River. Leaving this line we proceeded by way of the Woman River to the southwest angle to the Township of Edith. From this point we ran north astronomically between the Townships Number 18 and Edith, and intersecting our first base line at six miles two chains and ninety-nine and a half links, which point of intersection established the adjacent angle of the four Townships, 18 Edith, Esther and Fawn. We then continued the line north astronomically between the Townships of Esther and Fawn, six miles and forty-six links, where we intersected the south boundary of the Township of Garnet. Returning to our first base line, where we had discontinued it at the Woman River, we produced it west astronomically between the Townships of Fawn and 18, to the Meridian run by O. L. S. Speight in 1909. This completed this portion of the work, which had proceeded very slowly owing to the excessive heat and the difficulty of getting and keeping men at this time of the year.

We then travelled by way of the Woman River to the Woman River Station on the C. P. R. thence to Biscotasing Station and from there proceeded with a reinforced party by canoe via Biscotasing Lake and Flying Post Creek to the southeast angle of the Township of Arbutus, which was also established in our survey of 1920, and marked by an iron post, jack pine post, pits and mounds. From this point we ran a second base line east astronomically between the Townships of Yeo and Smuts a distance of six miles. At this six mile post we established the adjacent angle of the four Townships, i.e., Yeo, Smuts, Invergarry and Chester, from which we then ran south astronomically between the Townships of Smuts and Invergarry one mile. Returning to the southeast angle of Arbutus Township we ran south astronomically between the Townships of Alcona and Smuts six miles, and at this six mile post we established the southwest angle of

the Township of Smuts, from which we ran a third base line east astronomically along the south boundary of the Township of Smuts and continued east astronomically along the south boundary of the Township of Invergarry to the west boundary of the township of Vrooman. We then returned to where we left off on the line between the Townships of Smuts and Invergarry and continued running this line south astronomically six miles and eight links, where we intersected our third base line forming the south boundary of the Township of Smuts and Invergarry. We then returned to the northeast angle of the Township of Smuts and continued our second base line east astronomically between the Townships of Chester and Invergarry to the west boundary of the Township of Benneweis. Again returning to the northeast angle of the Township of Smuts, we ran north astronomically between the Townships of Yeo and Chester. We then travelled across country to the northeast angle of the Township of Arbutus, from which point we ran east astronomically between the Townships of Yeo and Potier six miles and twenty-eight links, where we intersected our meridian between Yeo and Chester, and continuing thence east astronomically between the Townships of Chester and Neville to the west boundary of the Township of St. Louis. We then returned to our last mentioned meridian and continued running it north between the Townships of Potier and Neville. We then travelled across country to the southeast angle of the Township of Frater, from which point we ran a base line east astronomically between the Townships of Somme and Potier, and Somme and Neville to the southerly production of the west boundary of the Township of Jack, where we terminated our survey.

All lines were well opened out and blazed in the regulation manner. Iron posts were planted where shown on our plan of the survey and at each of these, pits and mounds were constructed, except where such iron posts were planted as witness posts, then circular trenches and mounds were constructed in the prescribed manner. Wooden posts of a good material, bearing the number of the mile carved thereon on the side of the post nearest the initial point of the line, were planted at each mile and when such mile point came in a lake they were planted in the line on the nearest shore and marked so as to show their position. The mileage, however, was not marked on the wooden posts at township corners, but the township names were inscribed. Where an iron post was planted a wooden post as also planted near the iron post, but in all cases the iron post was planted to mark the true point.

Frequent astronomical observations were taken, the records of a number of which are appended, for the purpose of verifying the course of our lines. All north and south lines were run as true meridians, while the east and west lines were run as chords of latitude passing through the township corners. The magnetic declination was frequently observed, the average being about seven degrees west.

The country embraced by both the east and west portions of the survey is, generally speaking, rolling or hilly with some hills reaching the height of two hundred feet.

RIVERS.

No rivers of any size were met with, the Woman River, being the largest, which is very crooked and for the most part shallow and sluggish with many rapids and log jams. This river is shown on our plan running northerly through the Townships of 18, Edith, Fawn and Esther, and our line crosses it no less than ten times.

LAKES.

The lakes were very numerous in the country covered by the east portion of the survey. The principal ones being Biscotasing, in the southerly part of Smuts Township, Schist lying both in Potier and Yeo Townships, and Mesomekenda extending south across the Township of Neville and into the Township of Chester. Schist Lake is very shallow in most places and contains a great number of islands. Biscotasing Lake also contains a great number of islands and is apparently deep with rocky shores. Mesomekenda Lake is a beautiful body of deep water with high banks and has few islands. The water in this lake has been raised several feet by a dam, which accounts for some drowned timber along the shores.

SOIL.

There is very little, if any, agricultural land in the whole of the territory covered by the survey. The soil is generally of a light sandy or gravelly nature and is in many places filled with boulders. Many rock outcrops are also in evidence.

TIMBER.

The only timber of commercial value met with was in the Township of Neville and along the north part of the Township of Chester, also in the north-east corner of the Township of Potier and along the south boundary of the Township of Somme. The timber in this area consists chiefly of jack pine up to eighteen inches in diameter with spruce, birch, balsam and poplar from five to fourteen inches in diameter, while along the Mesomekenda Lake some red pine of good quality was observed. The balance of the country, with the exception of occasional swamps, which are timbered with spruce and cedar up to fourteen inches in diameter, has been run over by a very destructive fire, some twenty five or thirty years ago, and is now covered with a dense growth of small jack pine, birch, spruce and poplar.

MINERALS.

No precious minerals were observed, but considerable work of prospectors, now abandoned, was seen along the south shore of Schist Lake, where the formation is a schist rock with numerous veins of white quartz. The rock formation met with throughout the survey was generally of a granite gneiss.

WATER POWERS.

No water power capable of being developed was met with.

GAME.

Moose were very numerous and an occasional red deer was seen. Bears were also plentiful. Considerable indications were seen of beaver and the smaller game also abounds. Fish were very plentiful in all the lakes we had the opportunity to try, but the only kind caught were pike and pickerel.

Accompanying this report, we submit a general plan on mounted paper, a timber plan on linen, field notes and our account in triplicate.

We have the honour to be, Sir,

Your obedient servants,

MCAUSLAN, ANDERSON & MOORE.

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

Appendix No. 24.

SURVEY OF TOWNSHIP OUTLINES IN DISTRICT OF SUDBURY.

TORONTO, December 27th, 1921.

SIR,—We have the honour to submit the following report on the survey of certain township outlines at the head waters of the Missinaibi River in the District of Sudbury, performed under instructions from your Department, dated 15th April, 1921, and supplementary instructions dated 14th July, 1921.

Upon receipt of the instructions, we proceeded with the purchase of supplies and the organization of the necessary party, and on the 4th June, two canoe loads of supplies were sent from Missinaibi Station on the Canadian Pacific Railway to Little Missinaibi Lake, which lay in the centre of the projected work. These supplies were sent in via Dog Lake, Crooked Lake, Missinaibi Lake and the Little Missinaibi River. On the ninth of the month the main party left Missinaibi by way freight for mileage $141\frac{1}{2}$ on the C. P. R. From that point Bolkow Lake was reached over a half mile of waggon road, and through the courtesy of Messrs. Austin and Nicholson, the party and supplies were towed eight miles to the head of the lake, by one of the launches used by them on the lake. The southwest corner of the Township of Lang, where our work commenced, is about three miles east of the head of the lake, and by the night of the tenth the party was camped on the banks of Rock Creek, within reach of the corner.

The next day a commencement was made on the season's work, and the line between Townships Forty-one and Addison was carried south to the shores of Rock Lake, from the corner of the Township of Lang, defined by us the previous summer. The meridian between Townships Forty-one and Addison was continued south to intersect the north boundary of the Township of Buckland, run in 1920 by O.L.S. Fitzgerald. The intersection is eleven chains and thirteen and a half links (11.135 chs.) east of the northwest corner of that township.

Posts of the most durable wood obtainable were planted at the end of each mile and marked with the mileage from the north end of the line. At the end of the third mile, and at the north boundary of the Township of Buckland, the iron posts, supplied by your Department, were planted, and referenced with pits and mounds according to your instructions.

The boundary between the Townships of Missinaibi and Abbey was then run eastward a distance of six miles, from the northeast angle of the Township of Lang. The six mile point fell in the Little Missinaibi River, just where it leaves the lake of that name. Wooden witness posts were planted on the banks of the river, where they are intersected by this boundary and by the other boundaries run from the corner. The iron post was planted on the meridian between the Townships of Missinaibi and Admiral, six chains north of the corner. The boundary between the Townships of Abbey and Clifton was next run south from the six mile point to the intersection of the boundary between the Townships of Abbey and Addison, which was run eastward from the southeast angle of the Township of Lang. This corner also lay in water, there being at the point of intersection, a pond about five chains across. The iron post was planted south of the pond and wooden posts on the other three sides. The meridian was then continued south between the Townships of Addison and Chaplin to the north boundary of the Township of Ramsden. Returning to the southeast corner of the Township of Abbey, the line between the Townships of Clifton and Chaplin was run eastward as far as the three mile post.

The party then proceeded north across Little Missinaibi Lake to the northwest corner of the Township of Clifton, and ran the line between the Townships of Admiral and Clifton. From the eastern extremity of this line, the line between the Townships of Admiral and Busby was run north four and a half miles, and the line between the Townships of Busby and Brutus run eastward as far as O.L.S. Fitzgerald's meridian, a distance of somewhat more than three and one-quarter miles. Returning to the northwest corner of the Township of Brutus, the meridian between the Townships of Brutus and Clifton, and Chaplin and Manning, was carried south to the north boundary of the Township of Mageau. The line between the Townships of Clifton and Chaplin was completed, and the line carried eastward between the Townships of Brutus and Manning, to O.L.S. Fitzgerald's meridian.

The party then proceeded again to the northeast corner of the Township of Abbey and from there ran north between the Townships of Missinaibi and Admiral, to Missinaibi Lake. The base line between the Townships of Leeson and Brackin, run by us in 1920, was then picked up and carried east across Lake Missinaibi to begin the base line between the Townships of Baltic and Missinaibi. This line was run eastward to intersect the meridian between the Townships of Missinaibi and Admiral and that meridian was carried north between the Townships of Baltic and Barclay to Niven's base line of 1899 and 1900, from that intersection.

From the east end of the base line between the Townships of Baltic and Missinaibi, the line between the Townships of Barclay and Admiral was run eastward to the meridian between the Townships of Admiral and Busby. This meridian was continued north between the Townships of Barclay and Calais, to Niven's base line. From the northeast angle of the Township of Admiral, the boundary between the Townships of Calais and Busby was run eastward six miles. From the six mile post, the east boundary of the Township of Calais was run north to Niven's base line, and the meridian was then produced south to the north boundary of the Township of Racine, along the east limits of the Townships of Busby, Brutus and Manning, while the base lines between these townships were completed easterly to the meridian. This work was finished on 9th September.

All lines were well opened out and carefully blazed. Where possible, cairns of stones were built around the posts planted, and except in a few instances where suitable trees were not available, each post was referenced to two bearing trees. Wooden posts were selected from the most durable material available in the vicinity of the point to be marked, and the posts themselves were firmly planted. The iron posts were carefully placed and the trench or mounds witnessing each post were constructed, as far as possible, to conform with the letter and spirit of the instructions.

All the east and west lines were run as chords of the parallel of latitude passing through the corners of the respective townships. Frequent observations were taken on Polaris throughout the survey and the notes of a number of these are embodied in the field notes.

GENERAL FEATURES.

The townships outlined during the summer's work are almost entirely in the territory drained by the head waters of the Missinaibi River. Arms of Missinaibi Lake fill the bottoms of two parallel valleys running northeasterly through the Townships of Baltic, Missinaibi and Barclay. The drainage basin

of the Little Missinaibi River occupies the central, southerly and westerly portions of the area surveyed, while Hay Creek and its tributaries drain the water from the northeasterly townships directly into the Missinaibi River, a few miles below the foot of Missinaibi Lake. Little Missinaibi Lake, a straggling sheet of water with numerous long winding bays, lies in the southwesterly portion of a broad depression running in a general northeasterly direction across the Townships of Addison, Clifton, Busby and Calais. A low divide separates the waters of this depression near the northeast corner of the Township of Clifton, and the waters to the southwest flow in a general northwesterly direction, through a gap in the ridges, to Missinaibi Lake. This stream is the Little Missinaibi River. The waters of the northeasterly part are the source of Hay Creek.

The terrain of the townships is of the character common to most of the lands along the height of land between the waters of the St. Lawrence and Moose Rivers. Ridges of Laurentian rock rise from two hundred to three hundred feet above the lakes, and the lower lands, where not exposing similar rock, are covered with coarse glacial deposits of sand and gravel.

The country abounds in lakes. Of these, the largest, exclusive of Missinaibi Lake, is Little Missinaibi Lake, mentioned above, which has an extreme length of about ten miles. There are several others, however, from three to four miles long.

TIMBER.

Fire swept through the Townships of Abbey, Missinaibi, the north half of Admiral, the south part of Busby, and part of Calais, about twenty years ago. In consequence, a large part of the timber in these townships has been destroyed, and there is now growing up a dense second growth. Much of this new growth is jack pine, and in time, provided the district is not again visited by fire, there will be much valuable tie timber produced. The three southerly townships, Addison, Chaplin and Manning, contain to-day the most valuable timber. Good stands of jack pine and spruce were found on each of the meridians bounding these townships, while scattered specimens of white pine were seen on the west boundary of the Township of Manning.

In general the quality of the timber over the rest of the area surveyed is not quite so good, but numerous more or less extensive groves of good spruce and jack pine were interspersed between areas sometimes heavily wooded with balsam, poplar and birch, but more often covered with somewhat scattered timber rising above a heavy growth of alder, maple and hazel underbrush.

ROCK.

The rock formation is of Laurentian origin and is mainly granite, though occasional outcroppings of diabase, gneiss and feldspar were seen. The area did not seem quite so promising from a mining standpoint as that surveyed in the previous year, but the rock is of the same general character, and it is possible that thorough prospecting will disclose mineral bearing formations worthy of attention by the miner.

SOIL.

These townships are entirely unsuitable for agriculture. Where the rock is not exposed, the surface is covered with sand, gravel and boulders. There are, however, extensive marsh lands on either side of Hay Creek, in Calais Township, which might possibly be utilized some day for the production of hay.

WATER POWER.

Little Missinaibi River is the only stream in these townships capable of power development. This stream drains about one hundred and fifty square miles of territory. It has a potential storage basin of considerable size in Little Missinaibi Lake, and in the five miles from that lake to its outlet in Missinaibi Lake, there are two falls and a long series of rapids to produce adequate head for power purposes.

FISH AND GAME.

Moose seem to be extremely plentiful, and in June were seen in all the lakes and streams. Sixteen of them were counted at one time feeding in one of the small lakes. The lakes and streams were well stocked with pike and pickerel but so far as we were able to discover, no trout or bass are in the waters. The central and westerly townships have been apparently thoroughly trapped during the past few years, but in the Townships of Calais, Busby and Brutus, many signs of beaver activities were seen and each creek and pond apparently had its colony.

CANOE ROUTES.

Missinaibi Lake, mentioned above, forms part of the historic route between Moose Factory and Lake Superior, and was, in the early days of this country, one of the main thoroughfares for the transports of the Hudson's Bay Company. Little Missinaibi Lake may be reached by the Little Missinaibi River, from either Peterbell on the Canadian National Railways, or Missinaibi on the Canadian Pacific Railway, in about a day and a half, or during high water, it may be reached with equal or greater facility via Bolkow and Angigaming Lakes from mileage 141½ on the Canadian Pacific Railway. There is a somewhat indifferent canoe route up Hay Creek, and by a chain of lakes south to Lake Seseginika, through the easterly tier of townships.

We have the honour to be, Sir,

Your obedient servants,

SPEIGHT & VAN NOSTRAND,
Ontario Land Surveyors.

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

Appendix No. 25.

SURVEY OF BASE AND MERIDIAN LINES, DISTRICT OF THUNDER BAY.

PORT ARTHUR, ONT., December 31st, 1921.

SIR,—I beg to report that in accordance with your instructions dated April 15th, 1921, we have completed the survey of certain base and meridian lines in the District of Thunder Bay.

This survey was commenced on the easterly shore of Muskeg Lake at a birch post planted by O.L.S. Fawcett at a distance of twenty-nine chains east from the southeast angle of Grand Trunk Pacific Block No. 4. From this point

the first base line was run east to intersect the southerly production of the westerly boundary of the Black Sturgeon River Pulp and Timber Limit, surveyed by our firm in 1918. This line was run in six mile chords of a parallel of latitude.

From the sixth to eighteenth mile posts on the first base line the first and second meridians, respectively, were run north astronomically. From the twelve mile post on the second meridian the second base line was run east to intersect the westerly boundary of the Black Sturgeon River Pulp and Timber Limit, and from the same point was also run west to intersect the first meridian and continued west to intersect the easterly limit of Grand Trunk Pacific Block No. 5. This base line was also run in six mile chords of a parallel of latitude.

A standard iron post was planted at the point of commencement. The first mile post was planted at a distance of 51.00 chains east from this point. The numbering of the mile posts on the first base line is from one to six to the first meridian, from one to twelve between the first and second meridians and from 1 to 17M+78c.81 east of the second meridian. The meridians were numbered from south to north from one to twelve. The second base line was numbered from 1 to 17M+75c.50 east of the second meridian, from 1 to 11M+76c.86 between the second and first meridian, from 1 to 14M+68c.25 west of the first meridian. Iron posts were planted at the points indicated in your instructions. It was found necessary to erect seven witness monuments, and the unfortunate part of this is that four of these were for intersections.

SURVEY LINES.

The lines established by an Ontario Land Surveyor were the boundaries of Grand Trunk Pacific Blocks 4 and 5, and the west boundary of the Black Sturgeon River Pulp and Timber Limits. The former were surveyed by O.L.S. Fawcett in 1907, and the latter by ourselves in 1918. The south easterly corner of Grand Trunk Pacific Block 5 has been burned over since the lines were run, and we had some difficulty in locating it. The other lines are all in good condition.

We also found the trial lines of the survey of the Nipigon Savanne route of the Canadian Pacific Railway. These were crossed in the fifth and sixth miles of the first meridian. From here the general course of these lines is easterly to a point about three miles north from the easterly end of the first base line.

TOPOGRAPHY.

The country generally is not rough, the hills seldom being over one hundred feet in height. From the heights of the hills shown in the field notes a fairly accurate profile of the lines could be plotted as these heights were obtained by calculation from the clinometer readings.

The westerly eleven miles of the second base line is nearly all level country, there being numerous shallow lakes and long stretches of muskeg and swamp. The roughest country is towards the easterly end of the second base line.

SOIL.

The agricultural possibilities of the area covered are rather poor. The soil for the most part ranges from sand to sandy loam. The best soil is in the valleys of the Dog and Des Iles Rivers. The quality of the soil improves gradually towards the east. On the second base line west of the second meridian the soil is nearly all sandy loam and the subsoil in the swamps is of a sandy

nature. This belt extends through to the railway and should make good grazing land judging by the growth of grasses.

There are no outcrops of rock over extensive areas but the soil is shallow over the greater part of the ground covered and boulders are to be found in nearly all of it.

ROCK FORMATION.

Granite and granite gneiss are the principal rocks. The only mineral found was magnetite. This was first indicated by the marked variation of the needle near the eleventh mile east of the first meridian on the first base line. Samples examined appeared to contain a good percentage of iron. We understand that several mining claims have been staked on iron formation in the region west of Little Pine Lake and that a favourable report has been made on the same.

TIMBER.

The timber plan accompanying this report shows the areas of burned country and the areas of green timber. The area shown as brule had been burned over at least twice and there now remains a very small amount of green timber. This area is now covered with a healthy growth of poplar and jack pine with a dense growth of underbrush. The area shown green comprises two distinct forest areas. One of these is covered with a stand about twenty-five to thirty years old. In this poplar and jack pine are the main species and there is about an equal amount of each. Birch and spruce are the other species. There are also considerable areas of swamps containing valuable spruce within the area above mentioned. The remaining portion of the area coloured green contains timber of sufficient size to be marketable. Of this the best timber is within a short haul of the Dog River and the west branch of the same. On the high ground jack pine is the predominant species and this is of sufficient size for the manufacture of ties. On the low ground is found good stands of spruce of sufficient size for pulpwood. This timber could all be brought down the Dog River, but it would mean a drive of two seasons to land it at the railroad as the lower stretch of the Dog River is flooded for several miles back from Dog Lake and there are several small lakes to be crossed.

The timber near and along the west boundary of the Black Sturgeon River Limit is larger than that along the Dog River, but at present is not very accessible to any good waterway. Spruce is the main species found here, and it ranges up to twenty-four inches in diameter, but there is a great amount of it that is decayed and much has been brought down by storms. In this section there was a considerable area burned over during this year. The fire that destroyed it was first noticed about July 4th, and from bearings taken would appear to have started up about midway between the two base lines. The fire continued to burn for about two weeks, but as there was very little wind during the time it is not likely that a larger area than that shown was burned. It has not worked as far south as the last base line by the time that we had completed this, but there is a chance that it may have crossed it later. The cause is unknown.

ROUTES, WATERWAYS, ETC.

Our supplies were all taken in via Kelly on the G. T. P. division of the Canadian National Railways. From the railway a good portage of about one mile leaves at near the seventy-fifth mile board. This leads to Lower Kaogomok Lake (known locally as Canoe Lake). The route then is via Muskeg River to

Muskeg Lake and then to Dog River. There are no rapids on the Muskeg River between Kaogomok and Muskeg Lakes though there is a portage that saves considerable time when travelling light. From Muskeg Lake to Dog River there are numerous portages and this portion of the river would be very difficult to travel in the late summer.

Our main cache was established near the mouth of the Muskeg River, and from here supplies were carried to the main party via Des Iles River. The portages on the Dog and Des Iles Rivers are fairly well mapped, though on the latter it is necessary to make more portages during the dry months. Both the east and west branches of the Dog River were travelled and improved. There is a much greater volume of water coming down the west branch.

We did not use the canoe routes on the easterly eighteen miles of the two base lines. The routes on the first base line are in a north and south direction, and so of no use to us. The Muskrat River is about seven feet deep at high water, but at the time that we crossed it there was scarcely a foot of water, and the river is filled with driftwood. On the second base line the portage route to the east was found but was not used. The route from Lac Des Iles to the east branch of the Dog River was found and used. It is mapped fairly well though our men reported that there were new ones now used in some places.

Lac Des Iles is one of the finest lakes that we have seen in this district. There are over one hundred islands and the water is clear, though not of great depth.

The route we used in coming out was via Grassy Narrows, Ricetalk, Upper and Lower Kaogomok Lakes, Ricetalk Lake is very shallow and is completely filled with wild rice and forms a good feeding ground for wild fowl.

Moose, deer and bears are quite numerous as are also the smaller fur-bearing animals. Most of the country is trapped. The only fish caught were pike, though it is likely there are trout in Lac Des Iles. Partridge were particularly numerous.

The magnetic variation ranges from zero and one degree east. The only marked difference was as mentioned previously under "rock formation."

No falls of any size were found on the rivers, and it is unlikely that there are any water powers of any consequence within this work.

The heat during the months of June and July was excessive, especially as we were for a considerable part of this time in fairly open country. There was no frost during the months that we were in the field.

We have the honour to be, Sir,

Your obedient servants,

PHILLIPS AND BENNER.

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

Appendix No. 26.

SURVEY OF LOWER FRENCH RIVER, IN THE DISTRICTS OF PARRY SOUND AND SUDBURY.

LITTLE CURRENT, ONT., January 24th, 1922.

SIR,—I have the honour to submit to you the following report on the survey of the Lower French River, in the Districts of Sudbury and Parry Sound, which survey includes the western outlet, known as the Bad River, the Middle Outlet, or Main French River; the outlet known as Bass Creek; and the Eastern Outlet. The survey also includes the Pickerel River, and the large island 3382 T.P. which is bounded on the north and west by the Wahnapiatae River. The survey extends from the Georgian Bay up to near the east boundary of the Township of Mowat. I also retraced the boundaries of the town plot of Copananing, as instructed.

Instructions for the above were issued from your Department, dated Toronto, May 16th, 1921.

Proceeding from here with my party on the 18th of June by motor boat, I arrived at Point au Girondine the same evening, and on the following Monday, 20th June, we arrived at our first camp, a short way up the Bad River. The work at the mouth of this outlet was commenced the following day.

The survey was made by means of a stadia. The rodman also used a stadia and checked the readings on all the main stations which eliminated almost entirely the chance of error in the main traverse.

Frequent observations of Polaris for azimuth were also made, and the bearings deduced for the purpose of checking the bearings as we proceeded. On the railroads we made several tests of the stadia readings on carefully measured distances with a steel tape, the results of which are shown in the returns of survey. The necessary correction has been applied in plotting the traverse.

Cedar posts, mostly about five or six inches square, were planted at prominent points, from about forty to eighty chains apart. Cedar posts were also planted on all islands where stones were convenient to mound them. The numbers were cut on them in Arabic numerals. These posts are shewn in the field notes and plan. On the large islands at several of the numbered posts, a post was also planted with the number of the island cut thereon, and shewn in the notes. Beside numbers posts on islands are marked T.P.

With only one or two exceptions, all posts were well mounded up with large stones, the mounds being from four to six feet at the base, and at least two feet high. The posts were planted well above the high water.

On account of the scarcity of cedar in several localities, it often required the services of an extra man to keep us supplied with posts.

Iron bars, one inch square, were also planted at the places indicated in the field notes and plan.

A peculiarity observed in the retracing of the boundaries of the town plot of Copananing, and several of the interior streets which we also retraced, was that no original posts or traces of them whatever could be found in the low lying places between the rocks.

The measurements shewn on the boundaries of the Indian Reserve in the Township of Mowat were made by me in a re-survey of the Reserve for the Department of Indian Affairs in 1912.

In the plotting of the Canadian Pacific Railway location from records furnished me across Island 3464 T.P., it will be observed that it closes fairly well

with my traverse when the bearings of the tangents have been adjusted to agree with what I found the actual bearings to be at the crossings of the French and Pickerel Rivers. The short spirals I have included with the tangents. The plotting of the Canadian National Railway location from records also furnished me closes fairly well also.

In one of the larger outlets of the Bad River, Stations 52 to 53, I have made a rough estimate of the horse-power at a fall. The other outlets of the Bad River are very broken and irregular, and until the water is much higher an attempt at an estimate would be a very rough approximation. I might say too that while working in that vicinity the water suddenly lowered considerably, caused no doubt by the holding up of the water on the Wahnapiatae in driving saw-logs. An estimate was also made at the falls at Station 400, on the main French River. At Station 334, at the east end of the big island 3464 T.P., where there is some fall and volume in high water, there was a mere trickle of water. At Station 343 at Horseshoe Rapids, there was a small volume going through, but probably a much more accurate estimate could be made in high water. The estimate at this latter point was overlooked, however. At Station 203 on the fall near Copananing an estimate was also made. The above estimates accompany the field notes.

The whole country is Laurentian rock. In the lower levels adjoining Georgian Bay, it is a succession of parallel rocky ridges in a southwesterly course, and from about six to thirty feet high. In some of the Copananing vicinity the ridges are very tedious to travel through. Farther up it changes into a rolling country with a few precipitous hills.

Through the whole country there are small patches of tillable soil mostly sand of all grades of fineness and fertility, with occasionally gravel and boulders. In the clearings it was observed that fairly good crops were growing. In the valleys of the Wahnapiatae River and Beef Tea Creek there is apparently good clay land, and mostly devoid of much rock. There are apparently no considerable tracts of tillable land. The settlers at the C.N.R. crossing on the Pickerel River mentioned that there are in that vicinity some large patches of good land on Island 3464 T.P.

The timber consists principally of jack pine ranging in size from a scrubby, two inches in diameter, adjoining Georgian Bay, and in other small tracts, to a general distribution through the region traversed of a diameter of from four to ten inches. Poplar and white birch, balsam, spruce, and an occasional thicket of cedar, all up to a diameter of about ten inches, are found generally throughout. In many places a new growth of white and red pine of from three to six inches diameter was observed. There will probably be in a few years a considerable amount of merchantable pine. There are groves of very good large white and red pine in several places. In the valleys of the Wahnapiatae River and Beef Tea Creek, in addition to the timber mentioned, except jack pine, there is considerable soft maple, ash, Balm o' Gilead, elm and some red oak. There are a few patches of old brule, here and there, in the whole country traversed.

Accompanying the returns I have prepared a timber map on which I have shewn in colours the distribution of the various timbers. All the timber is of good quality, except that probably a great deal of the scattered large white and red pines are faulty.

Some hard maple bush was observed at Location D.B. 3 on Island 3464 T.P. This is a very fine location.

The country generally is very attractive to the tourist. With the exception of the immediate vicinity of Georgian Bay, and probably one-half at the most of

the north shore of the big island 3464 T.P. which is too precipitous, the shores of the whole country nearly are very suitable for cottage sites, a great proportion of them which would be especially attractive. On the French River between Stations 400 to 414 on the north side of the big island 3464 T.P. referred to on account of the rapids at those stations, that part of the river is inaccessible to motor craft.

Sand beaches so essential to summer cottages are very numerous, and in fact are to be found almost everywhere. For the greater part the Pickerel River and its expansions at Islands 3512 T.P. and 3520 T.P. is particularly desirable for cottages.

There are also a considerable number of nicely wooded islands very suitable for cottages. I have mentioned these specially in the index. There are a good many islands too, not so well favoured, that would be considered fairly desirable.

Black bass, pickerel and pike are very abundant.

A few rattlesnakes, apparently the *Crotalus Horridus*, were met with near the shores of Georgian Bay. They are perhaps the most numerous on the west side of the main outlet of French River at the mouth. On the east side at French River village they are very seldom found, it is said. A short distance up the several branches of the river there are apparently none at all.

I have the honour to be, Sir,

Your obedient servant,

T. J. PATTEN,
Ontario Land Surveyor.

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

Appendix No. 27.

SURVEY OF TIMBER BERTHS NEAR IGNACE, DISTRICT OF KENORA.

PORT ARTHUR, ONT., February 4th, 1922.

SIR,—In accordance with instructions dated August 22nd, 1921, and received September 9th, we beg to report that we left for Ignace on September 15th to survey certain timber berths.

The survey was started at the post planted by O.L.S. Stewart to mark the south limit of the right of way of the Canadian Pacific Railway on the west boundary of Township 22. An observation was taken here and the line run south, a traverse of the railway having first been made to connect this point with the four mile post on the Canadian Pacific Railway in order that the northeast angle of timber berth D could be fixed.

At a point on the west limit of Township 22, two miles and seventy chains south of the northwest angle thereof, a trial line was run east to connect with the southwest angle of location L.K. 84, the offset was measured and the true line run to form this portion of the north limit of the Walsh Tie Company's Limit.

At a point on the west limit of Township 22, five miles and twenty-six chains, fifteen and four-tenths links south of the northwest angle thereof, a line was run east thirty-two chains three and five-tenths links to the northeast

angle of timber berth D, this line was also run west two miles and forty-seven chains ninety-six and five-tenths links to the northwest angle of timber berth D, making a total distance of three miles. From the angles thus established lines were run south, the easterly limit being run south three miles and then west to intersect the west limit run south from the northwest angle as established above.

From a point on the west boundary of Township 22, five miles and thirty chains south of the northwest angle thereof, a line was run east to Ignace Lake forming the south limit of the Walsh Tie Company's Berth.

From a point on the west boundary of Township 22, six miles south of the northwest angle thereof, a line was run west six miles and seventy-four links to intersect the production south of the west boundary of Township 24.

The east limit of Township 22 was run by producing the line joining the iron bar planted on the north limit of the right of way of the Canadian Pacific Railway with the bar planted at the nine mile post by O.L.S. Stewart, it being impossible to get an observation at this point on account of cloudy weather.

At a point one mile and a half south of the nine mile post an observation was obtained and the line corrected.

At a point on the east limit of Township 22, three miles south of nine mile post, the southeast angle of the township was established and a line was run west to intersect the west limit of the township as run. From this latter intersection, being the southwest angle of Township 22, the west limit of the township was produced south two miles, thence a line was run west one and one-half miles, thence south four miles; thence east seven miles and forty-one chains and seventy-seven and seven-tenths links to intersect the production south of the east limit of Township 22.

From the southeast angle of Township 22 the east limit thereof was produced south six miles, two chains and fifty-eight links to the southeast angle of the Walsh Tie Company's limit.

From points on the production south of the east limit of Township 22, distant one and one-half miles and three miles, respectively, from the southeast angle of the said township, lines were run east; that run from the three mile point was run east two miles and forty chains and from this point a line was run north to intersect that run from the one and one-half mile point. Subsequently lines were run similarly from the half-mile and two mile points on the said production of the said limit, for the north and south limits of the W. J. Smiley Timber Berth and the line first run was used for that portion of the east limit covered by it, and this line was produced north to intersect the north limit of this berth.

From the northwest angle of Township 22 and the southeast angle of Township 24, a line was run west to intersect the west limit of Township 24, as established by O.L.S. Stewart and produced south. From this intersection a line was run south to intersect the line run west from a point in the production of the west limit of Township 22, distant six miles measured south thereon from the northwest angle of the said township.

Along the east limit of Township 22 and its production six miles south a line was found to have been run presumably by O.L.S. McMeekin, of Kenora; this is shown in the field notes, also a similar line along the south limit of Township 22 was found which is also shown in the field notes.

The lines were well cut out and blazed, those lines which formed part of the six-mile system being blazed on three sides and the others on two. The lines were posted every mile and at the corners of berths and the name of the

berth marked on the posts. Iron posts were planted as shown on the plan and field notes.

A timber plan is included in the returns which shows the nature of the timber as seen from the lines. Nearly all the area shown as having green timber on it has been cut over at some time, the country east and south of Ignace Lake particularly being full of old logging roads and lumber camps. Practically the only large area of timber which appears to be untouched is that portion lying south of Poplar Lake and an approximate line joining the east end of Poplar Lake to the two mile post on the east limit of Timber Berth D. These lumbering operations appear to have extended over a period dating from about twenty years ago up to the present time.

This area appears to be unsuitable for farming to any large extent, the soil being either swamp or sand and a large part is rocky. The portions shown as burnt on the timber plan are in general covered with a young growth of jack pine, poplar and spruce, and reforest themselves if not prevented by fires. The country is full of lakes of varying sizes and should be ideal from the point of view of the hunter and trapper, as it appears to be well stocked with game and fur-bearing animals.

We have the honour to be, Sir,

Your obedient servants,

PHILLIPS & BENNER,
Ontario Land Surveyors.

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

Appendix No. 28.

SURVEY KENOGAMI RIVER, DISTRICTS OF THUNDER BAY AND ALGOMA.

FORT WILLIAM, ONT., February 17th, 1922.

Sir,—I have the honour to report that in accordance with your instructions of date May 2nd, 1921, to traverse the Kenogami River and its expansions, in the Districts of Thunder Bay and Algoma, I started out from Fort William on the morning of July 19th, with three men, via Canadian Northern Railway, having secured the necessary supplies and shipped them in advance to Long Lac. I wish to say, in explanation of the late start, that I was held here in connection with the straightening up of my late father's estate, and so was unable to start out at an earlier date.

I had made arrangements to secure the services of three Indians through the courtesy of one of the fur companies at that point, but when I arrived they were waiting to be paid their treaty money. This necessitated a further delay of two days, which we spent in getting supplies and outfit in shape to the pack, and in testing out the stadia.

On the morning of July 22nd we started downstream, and after we had covered the first mile from the outlet (which is very swampy, flooded in places and hard to get solid ground for stations), we found the traversing very good.

We ran across a Canadian Northern Railway location party during this first day's work, who were running trial lines across to the C. G. Ry.

The country tributary to the Kenogami, between Long Lac and Pine Lake, is low, fairly level and swampy back from the river. The soil is clay and clay loam covered with, on an average, a foot of moss and spruce of small diameter. Along the banks, the timber grows heavier, but this is noted on the plan, so I will not refer further to it here.

As we neared Pine Lake the country became rather undulating and fairly rocky along the banks of the river. We reached Pine Lake on the 3rd of August. This lake is divided into two,—the upper half is about nine miles long and runs, in a general way, in a northerly direction; the lower half is about five miles long and runs, in a general way, northeasterly. They are both fairly deep, with rocky bays and beaches, being most noticeable in its southerly portion of the upper half, where we ran across an old mining location, in fact there are indications of iron in all this formation.

The country surrounding Pine Lake is very hilly and rocky for about half a mile, and then level, swampy country, being densely covered with spruce of 6 inches to 12 inches diameter; near Pine Lake and Lower Kenogami,—balm of gilead, poplar, B. pine, spruce, W. birch and scrubby cedar are mostly noticeable. The soil is mostly clay and clay loam with sandy loam on the ridges, mixed with gravel in many cases and rocky for the most part. Back from the lake the clay is covered with one foot of moss.

The country in the vicinity of Arm Lake is much the same as around Pine Lake, only not quite so rocky. Proceeding downstream it is fairly swampy and open and on the north side is a brule which possibly extends to the C. G. Ry.

The country around the next lake expansion, in the vicinity of Fernow River, is very low and swampy. Spruce of three to twelve inches diameter growing rather densely around the lake.

As we approached the C. G. Ry., it became airly rocky and we ran across several falls, the details of which I have set out in Schedule "A," attached hereto. We brought the traverse to the C. G. Ry. track on the 23rd August. Here my three Indians decided to quit. However, we carried the traverse on to the north boundary of Barlow Township. I was unfortunate enough to injure my only transit in a rapid above the track, so took the opportunity to run into Winnipeg and have it fixed, as my supplies for northern part of trip had not yet turned up, and I had, in addition, to replace three men.

On September 1st, we continued the traverse downstream, arriving at the Pagwachuan River on the 16th of September. The country tributary is, generally speaking, low and level and swampy, back from the river, clay soil covered with one foot of moss and spruce one to five inches diameter. After we leave the C. G. Ry., the banks become higher, forty to fifty feet in some instances, and are composed of clay and gravel. The river is very much wider, swift and shallow, although we had more water than in the Pagwachuan last season. There is some spruce of good diameter along the banks, and in places a very old brule with second growth timber, poplar and dense growth of willows. We ran into the big brule about Mile 110.

We started back upstream on the 18th September, arriving at the Flint River on the evening of 19th. The next day we started up the Flint River. This river has been well named by the Indians, "Pewahasibi" (Crooked River), it certainly is crooked and narrow, necessitating short stations, which slowed up the work considerably. Between the Moose River and the C. G. Ry. we had to fairly cut our way through the overhanging and intertwining cedar.

There is some very good spruce on this river, mostly in a small belt extending back about ten chains on an average from the river bank, then the spruce swamp with spruce one to five inches diameter.

On arrival at the C. G. Ry. my two transport men quit, and I continued on with the remainder of the party and two canoes.

The country from here to Flint Lake is level and swampy for the most part, and the great portion of it has been burnt over. We reached Flint Lake on Saturday, the 15th of October, after quite a strenuous trip, there being nineteen portages between the C. G. Ry. and the lake, the majority of which we had to open up. I do not believe this river is used even by the Indians as a canoe route. As we neared the lake we ran into a big marsh and it was exceedingly difficult to get solid ground for stations.

We had also run short of provisions, so I decided, in view of this fact and that ice had been forced in the marsh for several days, to return to the railroad, which we did, and entrained for Fort William on the 18th of October, arriving here the following day.

The notes of soil and timber, I have put on the plans in detail. I have not made a summary of the bearings and distances of courses as I had already put them on the plans using azimuth angles only for intermediate readings. I have summarized the report on water power and islands, with their descriptions and acreages, in Schedules "A" and "B," respectively, attached hereto. In my preliminary report on water power in the Townships of Goodwin and Barlow, I used my local cross sections for calculating the run off and the discharge was found to be excessive. The revised list, which I calculated on the basis of 4-10 c.f.s. average minimum discharge per square mile, I hope will be found satisfactory.

GAME.

The country between the C. N. Ry. and the C. G. Ry. abounds with game of every description, moose, bears and muskrats were plentiful; a few beaver, otter and mink were also encountered.

North of the C. G. Ry. although moose and caribou were numerous, we met with very few of the other fur-bearing animals. I, however, had the pleasure of seeing a white fox while making a trip up Caribou Creek. Speckled trout and pike also abound south of the C. G. Ry.

It will be noticed that on the plan there are a few islands without any designating letter. These are really only sand and gravel bars covered with a dense growth of long grass.

We suffered no severe mishap throughout the trip, although the canoes always suffer a good deal when readings are being given on the shores of the various lakes, which are invariably rocky. This is more especially realized when the lake is at all rough. We had quite a lot of rain during the season, but lost very little through it.

The plots of traverse of the Kenogami and Flint Rivers are now complete and are being forwarded to you with observations, accounts and vouchers in triplicate, all of which I hope will be satisfactory.

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

ROY S. KIRKUP,
Ontario Land Surveyor.

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

Appendix No. 29.

CERTAIN BASE AND MERIDIAN LINES, DISTRICT OF THUNDER BAY.

SAULT STE. MARIE, ONT., September 30th, 1922.

SIR,—I beg to submit the following report on certain base and meridian lines in the District of Thunder Bay surveyed during the summer of 1921, in accordance with instructions from the Department of Lands and Forests, dated April 22nd, 1922.



Base Line, Thunder Bay District.

I left Sault Ste. Marie by boat, on May 17th, with an assistant, two chainmen and four Indians, and was joined at Fort William by four Indians from Chapleau. We took the C. N. R. train to Tannin on May 19th. I had arranged to have eight local Indians join me at this point but not one was there. I hired

a Russian and Swede and commenced work on the 22nd May with this small party. A week later I returned to Tannin and endeavoured, without success, to get men in that district, and was forced to telegraph to the Sault for six Indians. These men joined us on the 12th of June.

Our place of beginning was a point in the east boundary of the Grand Trunk Pacific Railway Block No. 7, at a distance of six miles north from the southeast angle of that block. This point was established by running east astronomically from a witness post on a point in Palette Lake and offsetting eleven chains and forty links south. I ran my base line east astronomically on six mile chords from the end of the third mile. The first three miles being considered as the easterly half of a chord passing through the 96 mile post on O.L.S. Niven's meridian. I intersected my meridian of 1921 at 32 miles 46 chains 16 links on the base line. I continued my base line east astronomically 41 miles 64 chains 16 links, to the west boundary of the Nepigon Forest Reserve, run by Phillips & Benner in 1920. My posting from the west to east ran, respectively, zero to 32 miles 46 chains 16 links, 0 to 24 miles, 0 to 17 miles 64 chains 16 links, in accordance with the marked plan accompanying my instructions. From the point 24 miles east of my meridian of 1920, I ran north astronomically 37 miles 43 chains and 26 links to the Canadian Government Railway and arrived back in Sault Ste. Marie on the 5th of August.

A bush fire from the southwest was burning the territory traversed by the first eighteen miles of my base line during the progress of the work, and had it not been for the proximity of large lakes all along this section, it would have been much too dangerous to carry on. Heavy rains extinguished the fire at the time when it threatened to block me completely.

The party consisted of twenty-one in all, made up as follows:—

- 1 Surveyor.
- 1 Assistant,
- 2 Chainmen,
- 1 Cook,
- 1 Cookee,
- 5 Axemen,
- 5 Packers on line,
- 4 Packers with freighting canoes,
- 1 Geologist attached to party.

This distribution was maintained throughout the whole course of the survey except for the last twenty-five miles of the meridian, when I put on two extra choppers and sent two men out to the railway with the canoe.

SOIL.

There are no areas in the country traversed by these lines suitable for agriculture. The covering is ninety-five per cent. gravel and boulders and five per cent. solid rock.

MINERALS.

I found no trace of valuable minerals. The formation along the base line and the southerly twenty miles of the meridian is Laurentian, and the northerly seventeen miles of the meridian is Kewatin and schists.

TIMBER.

From our starting point to the 25th mile of our base line a bush fire was raging through the second growth timber of this area. This fire was reported to have started somewhere in the neighbourhood of the C. P. R. west of Fort William and travelled through to the Canadian Government Railways east of Allenwater. Heavy rains extinguished it about the 12th June. The timber in this section is of no great commercial value, at present being about fifteen years old. From the 25th mile on my base line to the western boundary of the Nepigon Forest Reserve and through the southerly twenty-five miles of my meridian there is a uniformly good stand of spruce, poplar, birch and banksian pine, ranging from four inches to sixteen inches in diameter. The northerly twelve miles of my meridian runs through mixed second growth small timber.

WATER POWERS.

The Gull River is the only waterway which presents any possibilities in the way of commercial water power. There is a falls on the river about twenty miles north of my base line, with a drop of one hundred feet in a quarter of a mile. The flow in this river in July, 1922, was about three hundred and fifty cubic feet per second. The drainage area is approximately 1,000 square miles and storage possibilities are excellent.

GAME.

Moose are plentiful over this entire area. There are also red deer and caribou. All fur-bearing animals seem to be plentiful, more particularly beaver and martin. There are a great number of partridge.

FISH.

Pickereel, pike, whitefish, perch and suckers are to be found in abundance in all lakes.

This is my report.

I have the honour to be, Sir,

Your obedient servant,

K. G. Ross,
Ontario Land Surveyor.

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

Appendix No. 30.

CERTAIN LINES IN THE UNSURVEYED TOWNSHIPS OF MACBETH, AFTON, ARMAGH,
CLARY AND SHEPPARD.

SUDBURY, ONT., September 11th, 1922.

SIR,—In accordance with your instructions dated April 12th, 1922, to survey certain lines in the unsurveyed Townships of MacBeth, Afton, Armagh, Clary and Sheppard, this we have done and respectfully submit the following:—

We left Sudbury on May 4th, 1922, and arrived at Washagaming Lake same day; next day we proceeded up Washagaming and Maskinonge Lake, and thence by portage to Sturgeon River to the south limit of the Township of MacBeth.

The country in general is extremely rough and rocky, the soil on the whole is sand and gravel; we found a few places suitable for agriculture.

The timber in the Townships of MacBeth, Afton and Armagh is composed chiefly of large white and red pine and the stand is very heavy.

The timber in the Township of Clary is mostly jack pine with light stands of red and white pine.

In the Township of Sheppard, on the south half the pine is young and vigorous, while on the north part the pine is large and over-matured, with patches of jack pine. The spruce within a radius of about two miles from the Sturgeon River has been cut many years ago.

As to the minerals, we saw no economic minerals, excepting in the Township of Afton. We ran across the Golden Rose properties, the formation here is an "iron formation."

The only water powers encountered were on the Sturgeon River, Upper and Lower Goose Falls, which may each develop about 700 h.p.

Your obedient servants,

MOONEY & GILL,
Ontario Land Surveyors.

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

Appendix No. 31.

BOUNDARY LINE BETWEEN ONTARIO AND QUEBEC.

TORONTO, November 13th, 1922.

SIR,—On receipt of your instructions No. 2610, dated April 5th, 1922, to renew the line of boundary between the Provinces of Ontario and Quebec, from Point Beaudette on Lake St. Francis to Pointe Fortune on the Ottawa River, I got in communication with Mr. Paul E. Mercier, of Montreal, who was appointed by the Province of Quebec, to work with me in the interests of that province, and we went on the ground and commenced work on May 8th and finished the field work on June 24th, and I beg to submit the following report.

We commenced at Lake St. Francis and worked northerly and with the aid of copies of Fletcher's plan and a copy of his field notes furnished Mr. Mercier we had no difficulty in following the line and finding all the monuments Fletcher planted in 1860, except three. We found that Fletcher had divided the line into three parts, which he called *Novelle Longueuil*, *Newton* and *Rigaud*, and gave separate chainages for each part, and we followed the same plan so as to be able, if necessary, to locate missing monuments or other features the more easily from his chainage. We found that he had marked the divisions between these parts or sections as well as each end of the line by a larger monument than generally used along the line, they being 9" x 13" dressed 27" at top. The league or mile monuments were 6" x 9" dressed 24" and the deflection or angle monuments were triangular about eight inches on each side dressed 24", all cut stones and set about three or four feet in the ground. A detailed description of each monument is given later.



Monument No. 38A
Ontario-Quebec Boundary.

We found the country through which the line runs generally cleared and cultivated, there being only a few patches of bush, mostly second growth, and that the line was mostly fenced, generally barbed wire, or had a ditch on it in accordance with French practice.

We ran the line through from the south to north, chaining and taking notes as we went, all being shown in the foregoing field notes.

The deflection monument at chainage 674+30 from Lake St. Francis No. 19, being in Concession VII Lancaster Township, was found lying on the side of a ditch in a field used for pasturage this season, we decided to move it to the southerly side of the Canadian Pacific Railway right of way, main line from Smith's Falls to Montreal, a distance of 5.93 chains, and so be out of the way for cultivation of the field, and not be liable to damage or destruction. By doing this we moved the actual line where the monument is built into Ontario less than

seven links, but as the boundary line is not a property line at this place, we felt the change was of no consequence. Again at the south branch of the La Grassie River, the deflection monument, No. 34, being in Concession VI West Hawkesbury Township, at about chainage 221 on the third or Rigaud section, had been on the north bank of the river where a considerable slide had recently taken place, was found lying on the southerly bank of the river, we carried it up on the north bank and set it on the forward line about 1.75 chains from the top of the bank, and made it a deflection point, then we went back to monument No. 33, at chainage 206+78 and made that a deflection point also, with a very small angle, this made no appreciable difference to the line except that there is one more angle in it than Fletcher had.

Two monuments Nos. 42 and 44 could not be found. We were not able to find any person who had seen them that could find them again, nor could we find them from chainage, but built new ones at places so located.



Monument No. 2
Ontario-Quebec Boundary.

At Pointe Fortune we found buildings on the line as shown on the enlargement on the plan.

On the return we check chained with a 200 foot chain, by different men, my assistant and I doing it, straightened up, moved and mounded up the stone monuments and built new concrete monuments at points shown. The check chainage showed a difference of 2.4 feet in 53,447 feet in the north or Rigaud section and a slightly greater difference in the other two sections. Four stone monuments, which had the tops broken off and were in cultivated fields, were not touched, as they would be in the way for cultivation.

At certain places as shown on the plan and field notes, new concrete monuments were built, these being a two feet square shaft about four feet long and being pyramided to eight inches at top in a height of two feet, as shown on detail attached. Generally a two-foot hole was dug in the ground as deep as re-

quired, where boulders did not interfere, then filled with concrete, using "plums"; small boulders were available, and carried up eight or nine inches above ground with a form and then the pyramidal top built on, after the form was removed this was mounded up to within eighteen inches of the top. Eight pairs of brass plates were supplied having "Ontario" and "Quebec" on them, these were set in the forms with the bolts supplied and built in the concrete. Five monuments each having a pair of plates were built, one at each of the five railways crossed, and the others at the three principal roads crossed. The plates had a space number on them, but no numbers were put on for the reason that they were sandwiched in among the stone monuments and we could not see how we could put numbers on them only and have the line symmetrical; consequently we did not put any numbers on at all, but they can be numbered at any time if it is considered advisable to do so.

No blazing of trees was done, because there were very few trees close enough to the line to be within the regulation distance, the exception being shade trees in fences.

The following is a list of the several monuments found and as left together with the new concrete monuments built, the numbers being the same as numbers in report of Messrs. Hutcheon and Mills in September, 1921, with the letters A and B added for new ones built or ones omitted in said report.

(List of monuments follow.)

Underneath is a drawing of the concrete monuments that were built, in places as described, all being the same size and built with the same forms.

All of which is respectfully submitted,

Your obedient servants,

E. T. WILKIE,
Ontario Land Surveyor.

PAUL E. MERCIER,
Quebec Land Surveyor.

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

Appendix No. 32.

OUTLINES OF TOWNSHIPS, DISTRICT OF TIMISKAMING.

TORONTO, ONT., October 18th, 1922.

SIR,—We have the honour to submit the following report of the survey of certain township outlines in the District of Timiskaming, lying along and adjacent to the Abitibi and Mattagami Rivers, north of the Canadian Government Railways. This work was done under instructions from your Department dated April 12th, 1922.

Upon receipt of the instructions we proceeded with the purchase of supplies and the organization of the necessary party. On the 15th June the party

assembled at Clute, twelve miles northwest of Cochrane, and that afternoon reached, by a waggon road recently opened, the foot of the rapids on the Frederick House River. This point is about a mile north of the south boundary of the Township of Leitch.

A descent of ten miles down the Frederick House River brought us to its junction with the Abitibi River. We found the line between the Townships of Colquhoun and Leitch without difficulty and about thirty chains north of the Abitibi River located the iron and wooden posts planted to mark the north-west corner of the Township of Leitch, at which point the season's work commenced.

From this corner of the Township of Leitch we ran a meridian north eighteen miles and fifty-two links, to O.L.S. Niven's base line in 1899, which we intersected six chains and thirty-three and a half links east of his nine mile post.

From the nine mile post on our meridian we ran eastward eight miles, seventy-six chains and thirty-six links to the meridian run in 1898 by O.L.S. Niven, and from the same post we ran westward across the Abitibi River. Meanwhile a sub-party ascended Driftwood Creek to the north boundary of the Township of Colquhoun, and travelling westward along that boundary, reached the northeast angle of the Township of Kendry. There they commenced a second meridian which was also carried north to O.L.S. Niven's base line of 1899. Our base line run westward across the Abitibi River, intersected this meridian at eight miles seventy-nine chains and thirty-nine links north of the Township of Kendry. The base line was then carried westward to intersect a third meridian which we ran north from the northeast angle of the part of the Township of Alexandra lying south of O.L.S. Speight's base line of 1905. This meridian was run north to O.L.S. Niven's base line. Our base line was then carried westward to the west boundary of the Township of Beardmore, intersecting that boundary at one chain and fifty-seven links north of the southeast corner of the township.

The remainder of the work lay north of O.L.S. Niven's base line and commenced at the northeast angle of the Township of Beardmore. This point was reached from the Poplar Rapids River by means of a canoe route, leaving that river about a mile above its mouth. From the township corner we ran north slightly more than eighteen miles, to the base line run last year by O.L.S. Sutcliffe and Neelands. We picked up the line for the north boundary of the Township of Tucker, run by ourselves in 1911, and continued it eastward twenty-six chains and sixty-six links to intersect our meridian, and then continued eastward eight miles, forty-nine chains and seventy links, to a meridian run last year by O.L.S. Sutcliffe and Neelands. This completed the season's work. The party then ascended the Mattagami River and reached rail head at Smooth Rock Falls on 11th August.

All lines were well opened out and carefully blazed. Wooden posts were planted at the end of each mile and iron posts were planted at the end of each third mile and at the township corners, or as witness posts for those points.

On each line carried across more than one township the chainage was recommenced at the intersecting township outlines.

Wooden posts were selected from the most durable material available in the vicinity of the point to be marked, and the posts themselves were firmly planted. We found it impossible in any instance to build a cairn of stones, as we encountered very little rock and none of it was reasonably close to a point where it could be used in this way. Owing to the flat nature of the country and the presence of considerable areas of swamp, a number of the iron posts

had to be planted as witness posts at some distance from the points they were intended to mark. The iron posts were in all cases carefully planted and the trench or pits, dug to reference each, were made of full width and depth. Except in a few instances where suitable trees were not available, each mile post and witness post was referenced to two bearing trees.

We intersected in several places lines run by O.L.S. Speight in 1905, and noted our chainage to those lines as well as to the distance to his nearest post.

TIMBER.

Fire swept through the country east of the Abitibi River, apparently about twenty years ago, and destroyed about eighty-five per cent. of the timber in the area covered by it. What timber remains is in the swamps or protected by stretches of muskeg. The burnt area seems to include most of the townships of Menapia and Ireland east of the river and the northern part of the Township of Marvin. A second growth of spruce and poplar is now springing up, but is not yet of any considerable size. West of the Abitibi River we found that the timber on the boundary between the Townships of Beniah and Webster was quite young, not more than forty to fifty years old, except in isolated spots. The country had been evidently burnt over probably fifty years ago. The growth, however, seems to be vigorous. The timber encountered on other lines run, south of O.L.S. Niven's base line, was of a good average quality, being, of course, mainly spruce, with some balsam, poplar, balm of gilead and birch, on the higher lands. Much of the land is swampy, but most of it is capable of being drained and cleared. North of O.L.S. Niven's base line the country was inclined to be flat and wet, muskegs were more extensive and the timber, on the whole, smaller.

MINERALS.

Practically no rock was seen during the course of the survey, and none at all on the lines of survey.

SOIL.

The soil is mainly the white clay common to this part of Ontario, with occasional ridges of sandy loam or coarse sand, and the townships south of O.L.S. Niven's base line seem suitable for agricultural development. The large areas of muskeg encountered on the lines north of O.L.S. Niven's base line suggest that these townships are not so largely composed of good agricultural land.

WATER POWERS.

The Abitibi and Mattagami Rivers are both fast flowing streams. Plans are now under way for the development of water power on the Abitibi River at Three Carrying Places Rapids and also at a point lower down. Though there are numerous small rapids on the Mattagami River, within the townships outlined, there is no point within their boundaries suitable for power development on any considerable scale. At Cypress Falls, with a drop of about thirteen feet, just below our last crossing, there is a possible site.

FISH AND GAME.

Moose were comparatively scarce and few signs of them were seen. Beaver, too, were not plentiful. Of the other game and fur-bearing animals, it is diffi-

cult to speak from observation in the summer, though this area is said to be a good martin country. The lakes and smaller streams contained considerable numbers of pike and pickerel. The Mattagami and Abitibi Rivers apparently are not particularly well supplied with fish.

CANOE ROUTES.

The Abitibi River is for the most part broad and deep through these townships and is at present much travelled in connection with surveys and construction work for the Timiskaming and Northern Ontario extension. From our observation, the Mattagami River is, generally speaking, swifter and shallower than the Abitibi River. From the railway at Smooth Rock Falls to Cypress Rapids there are three short portages. There are, however, numerous flat rapids. The Poplar Rapids River, from our crossing on the north boundary of the Township of Alexandra to its mouth, is readily navigable by canoes, except at extreme low water. Driftwood Creek, which we ascended from its mouth to the north boundary of the Township of Colquhoun, is also easily travelled in normal stages, with one or two short portages.

All the east and west lines were run as chords of the parallels of latitude passing through the corners of the respective townships. Frequent observations were taken on Polaris throughout the survey and the notes of a number of these are embodied in the field notes.

GENERAL FEATURES.

The townships outlined during the summer's work are part of the northern clay belt and conform in general to the characteristics associated with that area. The surface is for the most part flat, or gently undulating, except in the immediate neighbourhood of the rivers and larger creeks, where it is broken by the ravines cut by these streams. These ravines and the river valleys are seldom wide, the banks as a rule rising almost to the level of the interior country within a few chains of the water. The Abitibi and Mattagami Rivers drain the area surveyed. Tributary to these rivers are the Driftwood and Red Sucker Creeks and the Poplar Rapids River. The latter empties into the Mattagami River at O. L. S. Niven's base line, where there is a small clearing and some buildings have been erected by John Shabatese, an Indian Chief. The Driftwood and Red Sucker Creeks flow into the Abitibi River.

No large lakes were seen. The lakes crossed by our lines were shallow and the shores were, in most cases, swampy.

We have the honour to be, Sir,

Your obedient servants,

SPEIGHT & VAN NOSTRAND,
Ontario Land Surveyors.

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

Appendix No. 33.

RESURVEY OF SEVERN RIVER AND LAKE EXPANSIONS.

PARRY SOUND, ONT., October 21st, 1922.

I have the honour to report that in compliance with instructions dated April 27th, 1922, I proceeded to make a resurvey of the Severn River and its lake expansions, from the south boundary of the Township of Matchedash, near the head of Sparrow Lake, down stream to the Government dam at Port Severn.

I left Parry Sound on May 31st with three men and assistant, by way of the Canadian National Railways, arriving at Sparrow Lake the same evening, where we were joined by another rodman. Loading our canoes, we proceeded down Sparrow Lake about four miles to the scene of our operations, where we pitched camp. The following day, after making the usual tests of our instruments, I commenced the traverse of Sparrow Lake at the south boundary of Matchedash Township.

Severn River and its lake expansions form the boundary between the District of Muskoka and the County of Simcoe as it wends its way to Port Severn on the Georgian Bay, and has been greatly improved as a water route by the construction of the Trent Canal. Sparrow Lake, owing to its location on the Canadian National Railway, lies in easy access of approach by those who love the great outdoors. The shores are mostly rocky, but not exceedingly high, thus permitting of better building sites. Numerous large hotels have been erected along the shores of this lake, and appear to be doing a lucrative business.

Wending our way down the river, we came to the dam, about two miles below the Canadian National Railway crossing. A large power plant has been erected below this dam, supplying the town of Orillia with light and power. Before we reach Gloucester Pool on our way to the Georgian Bay, we come to the Big Chute, where another large dam has been erected. A power plant has also been erected here, supplying a great deal of light and power to different towns. Besides the dam at Port Severn, at the Severn River entrance to the Georgian Bay, there are several concrete and earth dams blocking the different by-passes from the river. The shores all along the river are generally rocky, with occasionally a level stretch of land. At several places near Ragged Rapids, the banks are high and precipitous. Owing to the dam construction and the height the water has been raised, several of the older islands have been partially submerged, and a great deal of the mainland flooded, causing many new islands. These islands range in size from a mere rock to thirty or forty acres. Apparently, in some places the timber was felled before the land was flooded, as all trace of the original shore is obliterated, while in many of the bays the dead timber still stands, thus making it very difficult for traversing the shores.

TIMBER.

As these townships have been timbered over many years ago, very little of the original forest remains. Fire has also done its deadly work, leaving in its wake the charred remains.

Clinging by their roots to the shallow soil among the rocks, scrub oak four inches to twelve inches, pine six inches to thirteen inches, and scattered small poplar, birch, maple and hemlock have sprung up, while in the low land there is scattered, ash, elm and cedar. No timber in quantities large enough for commercial purposes to any extent was met with, although if the timber was protected for a few years, the pine would grow.

SOIL.

The country around the Severn waters in this locality is mostly high and rocky, thus making farming out of the question. However, a few settlers have braved the hardships of pioneer life, following the pursuit of farming, both in the Townships of Morrison in the district of Muskoka, and Matchedash, in the County of Simcoe. When land exists, the soil is a clay loam, sandy in places. Not much farm land was met with until we reached Gloucester Pool. Several settlers in the Township of Baxter, on the west shore of Gloucester Pool, appeared to be making a good living. Some had settled along Go-Home Bay, White's Bay and up near Six-Mile Lake. Excepting the land occupied by these sparsely-settled agriculturists, a considerable portion of the remainder lying along the water front is in the hands of the tourists.

MINERALS.

As the rock here is granite of the Huronic era, no minerals at all were seen. There were a few small outcrops of feldspar, but not of any commercial value.

FISH AND GAME.

No deer or bear were seen at all. A few otter, beaver and mink were seen, and scattered broods of partridge were met with. While no doubt the grassy, weedy bottom of Sparrow Lake has been for years the mecca for maskinonge, they appear to be getting scarcer. Several fine specimens of the pike and small-mouth black bass were caught, but generally speaking the fishing was only fair.

In reference to the water powers, it will be unnecessary for me to dwell upon them in detail, as they have been all developed to a great extent, and any information can be obtained much more accurately.

While the townships through which our work extended have been surveyed many years ago, most of the different monuments were found. Many of the different concession lines in Matchedash and Baxter have been resurveyed under instructions from the Crown, and in the Townships of Morrison and Wood the old monuments have been perpetuated through the local surveys.

In reference to the tourist sites, the same does not hold. True it is, in a few cases, posts were planted on the ground, but in the majority of cases no posts were planted. I have shown on the plans all posts, or nearly so, that were found planted.

Owing to the presence of the dams on this river, it covers a wider area than formerly. Our plan of traverse will show this, and the different matters that I have mentioned in detail.

I am enclosing with the report, observations, descriptions of islands met with and area of same, along with the bearing of the courses, and distances from station to station.

All of which is respectfully submitted.

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

JAS. T. COLTHAM,
Ontario Land Surveyor.

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

Appendix No. 34.

BASE AND MERIDIAN LINES AND ISLANDS IN THE EAST END OF ST. JOSEPH LAKE, DISTRICT OF THUNDER BAY.

THESSALON, ONT., March 29th, 1922.

SIR,—In accordance with your instructions dated April 15th, 1921, I have made a survey of certain base and meridian lines in the Districts of Patricia and Thunder Bay, and have made a traverse of the eastern part of the Lake St. Joseph and beg to submit the following report:—

The base line was started from the 66th mile post on the meridian line run by myself in 1919, was run east astronomically on a series of six-mile chords of a parallel of latitudes for a distance of twenty-eight miles and twenty-nine chains. At this point it was intersected by a production of the westerly boundary of the Indian Reserve on the south side of Lake St. Joseph, near the Hudson's Bay Company's post at Osnaburgh. The west boundary of this Indian Reserve was produced south a distance of seventy-three chains, sixty-four links.

From the end of each six-mile chord, a meridian line was run north astronomically to the shore of Lake St. Joseph.

The base and meridian lines were well cut out and blazed. A substantial wooden post of the best timber available was placed at the end of each mile, excepting where this point occurred in a lake or stream, and was surrounded wherever possible by a substantial mound of stones. Bearing trees were marked with the letters "B. T." after being blazed in a prominent manner, at every post where possible and the distances and bearings of these trees from the various posts, were recorded in the field notes.

The number of the mile was marked with a scribing iron on the side of the post facing the point from which the line was started. When the end of a mile came in a lake or stream, the post was planted on the nearest shore, and the chainage from the nearest mile was marked on the post with a scribing iron.

At the end of every third mile, wherever possible, a standard iron post of the type recently adopted by your department was planted. At these iron posts two pits were dug, and the earth from the pits was formed into two square pyramidal mounds, in the manner described in the general instructions relating thereto. In some cases it was impossible to plant an iron post and dig the pits and erect mounds, on account of the end of the mile coming in water or on unsuitable ground. In each of such cases, a standard iron post surrounded by a witness trench and accompanied by a conical mound was planted at the nearest even chain where suitable ground could be found; from the correct position of the point to be established.

These witness posts, trenches and mounds were placed at the following points:—

At 14 M.	76.00	chains	to indicate	the	15th	mile.
" 17 M.	73.00	"	"	"	18th	mile.
" 21 M.	8.00	"	"	"	21st	mile.
" 26 M.	62.00	"	"	"	27th	mile.

On the third meridian no iron post was planted at the third mile, on account of the ground being unsuitable, but a witness post was planted at 3 M., 60.00 chains, near the shore of Lake St. Joseph.

Astronomic observations were taken whenever possible to determine the bearings of the lines run, and the results of these observations are recorded in the field notes on the proper pages.

The traverse of the eastern part of lake St. Joseph was started at a point on the south side of the narrows on Lake St. Joseph, 59.00 chains north of the sixty-first mile post on the meridian line run by myself in 1919. This is the same point from which I started the traverse of the western part of Lake St. Joseph surveyed in 1920, only this year the traverse was made towards the east.

The whole of the south side of Lake St. Joseph lying east of this meridian was traversed as far east as a point about six miles in a direct line east from the meridian of 1919. The traverse of the north shore was also conducted westerly from the east end of the lake, to a point about two miles west of where it would be intersected by a northerly production of the third meridian. This leaves an unfinished portion on the north shore of the lake, about ten and a half miles across in a direct line. This unfinished portion includes a large bay with numerous islands, some of them quite large. It was not possible to traverse this portion of the lake owing to lack of time. The prevailing rock formation in this section appears to be Laurentian and the opportunities for successful prospecting do not appear to be so great as in other sections, so it was decided that it was more important to complete the traverse of the other portions of the lake.

The traverse was tied to the base line wherever possible and to each of the meridian lines run north from the base line. It was continued on the south side of the lake as far east as the Indian Reserve south of Osnaburgh. On the north side of the lake at the eastern end, the traverse was carried sufficiently far to tie in the Hudson's Bay Co.'s property at Osnaburgh, and also the Indian Reserve north of this point. At the east end of Lake St. Joseph the only portion not traversed is the large island between the northerly and the southerly outlets of the lake, and a number of small islands adjacent to this large island and to the northerly Indian Reserve.

In the traverse all angles were measured with a transit, and the distances were obtained by stadia or micrometer. The bearings of the traverse courses were checked by astronomical observations at frequent intervals and also by ties to the base and meridian lines.

Every night the traverse work of the day was plotted on cross section paper to a scale of twenty chains to an inch. By this means any error in the traverse was at once located and corrected. The closing errors in the traverse were never more than twenty-five links to the mile, and were usually much less than that.

As in the previous season, at intervals of about a mile on the shore, prominent trees were placed on four sides, and marked on the side next the water with the letter "P," followed by the number of the tree, thus, P. No. —. Similarly the islands were marked by having the letter "I" following by the number of the island. In cases where no suitable tree was available, a substantial post was planted in a mound of stones and marked as indicated above. These trees and posts were all tied to the nearest transit station, and the bearing and distance to the tree or post from the transit station recorded in the field notes.

The details on the traverse showing all measurements, all posts and trees marked as monuments, and all information necessary for the proper interpretation of plans, have been plotted on a scale of ten chains to an inch, and tracings of these detail sheets have already been sent to your department. A plan on a scale of one mile to an inch has also been prepared on mounted drawing paper. This plan shows the base and meridian lines and their relations to the sur-

rounding country. The shore line of Lake St. Joseph and of all the islands within the limits of the survey have been reduced by a pantograph, and plotted on this plan, which accompanies this report.

The country as a whole is rolling and rocky, the valleys being filled with the muskegs typical of this section of Northern Ontario. There is very little agricultural land, and what there is occurs for the most part in small isolated tracts. There are several fairly large areas of gravelly and stony land, particularly near Lake St. Joseph, from the commencement of the base line up to about the fourth mile, and again near the twenty-third and twenty-fourth miles on the base line and on the fourth meridian. There is a fairly large area of sandy land near the Hudson's Bay Co.'s Post at Osnaburgh, and some sections of this are capable of being successfully cultivated. There is a good garden at Osnaburgh, and potatoes and other vegetables appeared to grow very well. Some of the Indians have small gardens scattered about on some of the islands, but they do not appear to grow anything but potatoes. The potato patches were usually very well cultivated and gave evidence of considerable care and attention. On the whole, however, the amount of land suitable for cultivation is relatively very small.

The prevailing timber is spruce, white birch, jack pine and balsam, with considerable scrubby cedar close to the shores. No red or white pine was seen.

Forest fires have wrought great destruction throughout the greater part of this territory. A very great portion of the country adjacent to the south shore of Lake St. Joseph has been burnt over only a very few years ago, and extensive areas are now covered with masses of fallen timber, which make travelling very difficult. On the areas which have been burnt for some time, a healthy second-growth of jack pine, spruce, white birch, etc., is growing very nicely, and if fires are kept out in the future, will eventually form a considerable addition to the forest wealth of this country.

Between the fourteenth and fifteenth miles on the base line, there is a striking example of what the timber resources of this country might have been had the fires been prevented. For a distance of about half a mile along the base line in this locality there is an area which has apparently never been touched by fire, and there is a stand of splendid spruce, balsam and white birch of large size. This is the largest and best timber seen during the season. Another splendid example of what is apparently original forest is found on a large island in Pashkokogan Lake, near the twenty-eighth mile on the base line.

There is a considerable quantity of good spruce, etc., scattered throughout the country, as there are still large areas which have escaped the many fires. It is difficult to estimate the proportion of the total area that has been burnt over, but I would venture to say that in the neighbourhood of fifty per cent. of the country seen from the lines, and from the south shore of Lake St. Joseph, has been burnt over within comparatively recent years. Notwithstanding the great destruction that has been caused by fire, however, there is still a great quantity of timber suitable for pulpwood, which will some day be a very valuable asset to the Province. It is not impossible that the timber resources of this territory are greater than one would at first be led to believe. The desolation caused by a forest fire stands out so prominently on the landscape, that there may well be a tendency to estimate the damage done by it as being greater than it really is.

Most of these fires are caused by carelessness on the part of the local Indians, and I would suggest that some effort be made to impress on the Indians the necessity for care in the use of fire. If arrangements were made to have

the Hudson's Bay Co. put up notices where the Indians congregated around the various posts in the summer, it might have some effect. These notices should be printed in the Indian language, using the syllabic characters which all these Indians read and understand. I would also suggest that an effort be made to have the importance of this matter impressed upon the Indians by the Indian Agent who goes into Lake St. Joseph to pay them their treaty money every summer. If the chief of the band of Indians at Osnaburgh were appointed a fire ranger at a very small salary, I firmly believe that a great improvement would result.

The country north of Lake St. Joseph does not appear to have been burned over to nearly the same extent in recent years as that south of the lake, and there is a large amount of pulpwood in this section of the country. North of Lake St. Joseph the country is not so hilly. There are not nearly as many rock exposures and muskeg areas larger and more frequent.

Regarding the geology of this section of the country, I have very little to say. Dr. E. L. Bruce, professor of mineralogy at Queen's University, spent the summer with several assistants making a geological survey of the country adjacent to Lake St. Joseph, and his report, which will be made in the Department of Mines, will give complete information as to the geology of this whole region.

I would merely say in this connection that on the south side of Lake St. Joseph there are several large Keewatin areas which would appear to be well worth prospecting. From a point about three miles east of the second meridian, and extending as far east as the Indian Reserve south of Osnaburgh, there is a very large area where local magnetic attraction is most pronounced. In many places along the shore there are indications of iron ore. Along the third meridian, particularly near the second mile, local attraction is very strong, and this condition extends for a long distance both east and west of this line. Unfortunately the portions of this territory that I was able to see, are covered with a heavy growth of deep moss with muskeg in places, and there is very little rock exposed. All the indications point to the continuation easterly of the iron range which exists in the westerly portion of Lake St. Joseph and which was mentioned in the report of the survey of that portion of the lake in 1920.

Lake St. Joseph is the predominating feature of the topography of this section of the country. The shore line of this lake is very irregular, with many deep bays and long points. There are numerous islands, ranging in size from bare rocks to some of several hundred acres in extent. The largest island, No. 606, has an area of 1,827 acres. The first island surveyed was numbered 472, the numbers being continued from the previous year, and the last one, near Osnaburgh, was numbered 925. A detailed description of each of these islands is given separately. The data given regarding the islands gives the number of the island, the area, the nearest transit station, and the number of the detail sheet on which the details of the survey of the island are shown.

The shores of Lake St. Joseph are generally rocky and stony, but many of the bays run back into fairly extensive marshes where the exact location of the shore line is hard to determine with any degree of certainty. A peculiar feature of the portion of Lake St. Joseph surveyed this season, is the large number of stretches of almost straight shore, the shore consisting entirely of boulders and the land behind being composed of boulders and gravel. This was particularly noticeable for a few miles east and west of the third meridian and on some of the large islands north of this section.

There are very few streams of any size flowing into Lake St. Joseph from

the south. The largest stream enters the lake in a deep bay east of the fifty-ninth mile on the meridian line run by myself in 1919. This bay joins the main lake about four miles east of the sixty-fourth mile on the meridian of 1919. This is a fairly large stream and drains an exceedingly intricate system of lakes with shore river stretches between. These lakes extend south to about the twenty-fifth mile on the meridian of 1919 and forms part of a very good canoe route to the Canadian Government Railway near Fowler Station. This canoe route is shown on the plan which accompanied the report of the survey of the meridian run by myself in 1919.

Another stream enters Lake St. Joseph near the twenty-third mile on the base line run this season, and drains a number of small lakes lying to the south. This stream is not very large, but forms part of a canoe route by which access is obtained to a considerable area to the south.

There are a couple of streams entering Lake St. Joseph on the north side which are navigable for canoes, but not for any great distance, as the divide between the waters flowing towards Lake St. Joseph and those tributary to the Attawapiskat River is not far from Lake St. Joseph. A route which was used by myself for transporting supplies to the meridian run in 1919, enters the deep bay on the north shore, which it was not possible to traverse this year. A sketch of this route, by which one can travel by canoe from Lake St. Joseph to Cat Lake, is also shown on the plan of the meridian run by myself in 1919.

Fish and game of the varieties common to this country are fairly plentiful.

Accompanying this report is a mounted plan on a scale of one mile to an inch, as previously mentioned; also my accounts in triplicate, which I trust that you will find satisfactory. The field notes of the lines run, and the tracings showing the details of the traverse, were forwarded to your department some time ago.

I have the honour to be, Sir,

Your obedient servant,

JAMES S. DOBIE,

Ontario Land Surveyor.

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

Appendix No. 35.

SURVEY TOWNSHIP OUTLINES, DISTRICT OF ALGOMA.

PEMBROKE, ONT., January 28th, 1922.

SIR,—I have the honour to submit the following report of the survey of the township outlines in the District of Algoma, made by me under instructions from your Department, dated April 15th, 1921.

I proceeded from Pembroke via Canadian Pacific Railway to Franz, and then up Algoma Central Railway to Tatnall Station, thence via canoes from

Oba Lake up small stream, the outlet of Cat Lake, from which there is a chain of lakes and portages to lake near the northeast corner of Moorhouse Township, which was my starting point. Here I planted new jack pine post alongside the old iron post and from this corner ran the line between Townships of Moorhouse and Makawa south astronomically a distance of nine miles and established the corner of Mildred, Makawa, Nebotik and Hook Townships. From this corner I ran north between Townships of Hook and Mildred to intersection with south boundary of Legge Township, I then cut a trail to southwest corner of Irving Township, where I found an old line which I retraced thirty-three chains and ninety-eight links easterly to old wooden and iron posts marked Mildred on the southeast, and Martin on the southwest. I produced this line easterly to intersection with my meridian between Mildred and Hook Townships. I then returned to my base line and ran south between Makawa and Nebotik Townships a distance of nine miles. I again returned to my base line and ran easterly to intersection with southerly production of boundary of Hayward. From southeast boundary of Hayward I ran south astronomically a distance of fourteen miles, seventy-seven chains and seventy-nine links to intersection with Niven's base line.

To run between Farquhar and Alderson Townships I proceeded to MacDuff Station on the Canadian Northern Railway, which is only a short distance east of three mile post on Patten's base line, my starting point, from which I ran north astronomically, a distance of nine miles, six chains and fifty-eight links to intersection with line run east astronomically from southeast corner of Dowsley Township.

Returning to the railway, I went east to Minnipuka Lake and proceeded to the northeast corner of Legge Township along north boundary of that township, and from this corner I ran eight miles, seventy-six chains and twenty-two links east astronomically to intersection with Speight's meridian at a point two chains and seven links north of his thirty-third mile post. I then returned to northeast corner of Legge Township and ran north between Minnipuka and Byng Townships a distance of eight miles, seventy-seven chains and seventy-two links, intersecting south boundary of Doherty Township at a point five chains and thirty-two links east of its southwest corner, from which I ran west astronomically between Minnipuka and Pelletier Townships a distance of eight miles, sixty-nine chains and twenty-eight links, to intersection with east boundary of Township of Walls, at a point three chains and fifty-nine links south of its northeast corner; then starting at northeast corner of Walls Township, I ran north astronomically a distance of eight miles, seventy-eight chains and fifty-eight links, intersecting south boundary of Schofield Township at a point nine chains and eighty-five links east of post between lots twenty-five and twenty-six, concession one.

East and west lines are run on chords of latitudes and meridians were run north or south astronomically, frequent observations for azimuth were taken. Wooden posts properly marked were planted at every mile, and iron posts alongside wooden posts at every third mile, and pits dug and mounds constructed where required so to do in accordance with instructions.

SOIL.

I did not see any land suitable for agricultural purposes in sufficient areas to warrant the belief that it could be developed in to farm lands. The best soil is along Fire River, in the Township of Makawa, Mildred and Hook, where there is some clay loam, but not of sufficient quantity for agricultural purposes.

TIMBER.

There is considerable brule in the Townships of Makawa, Moorhouse and Martin, the only timber large enough and suitable for commercial purposes being some jack pine on the line between Townships of Moorhouse and Makawa between the first and third mile posts. There is also some spruce and jack pine along the line between Makawa and Mildred, tributary to Fire River, which does not appear to extend easterly on line between Nebotik and Woolrich beyond second mile post, and along line between Mildred and Hook Townships there is fairly heavy timber consisting principally of spruce, jack pine, poplar and balsam, from six to twenty inches in diameter, and on line between Mildred and Marjorie timber is also fairly heavy, mostly spruce, poplar, balm of gilead, from six to twenty inches in diameter. Along east boundary of Nebotik and Abigo Townships the country is heavily timbered with spruce, poplar, balsam, jack pine and balm of gilead up to twenty inches in diameter, this latter is all tributary to the Greenhill River along which lumbering operations are being carried on, principally in taking out ties for railroad purposes.

On the line between Farquhar and Alderson I did not encounter any burned country, but this timber is small, consisting principally of spruce from four to eight inches in diameter, with scattered areas of jack pine up to ten inches in diameter on the higher ground.

On that portion of my contract lying north and northeast of Lake Minnipuka, the lines between the Townships of Byng and Puskuta, between Minnipuka and Byng, and between Minnipuka and Pelletier, is all green country covered with a dense growth of spruce, balsam, poplar and birch, four to ten inches, with occasionally some jack pine four to eight inches on the ridges, and appears to have been all burned over about eighty years ago, and will have some valuable timber possibilities providing fire is kept out of it. The line between Roche and Pelletier is practically all through brule, apparently burned over about forty years ago, with areas more recently burned over, and the country is quite open in places. This brule extends to the southwest and northeast from about twenty chains south of the first mile post.

MINERALS.

No indication of economic minerals were found, there being rocky ridges scattered generally throughout whole area covered by this survey. The highest and most prominent rock outcrop being between chainage fifty and seventy on the fourth mile of the south boundary of Byng Township. From top of the ridge one can see a great distance in all directions, Brunswick Lake being seen to the east.

STREAMS AND LAKES.

The main branch of Fire River is navigable by canoe through northeast corner of Makawa Township, but through southeast part of Mildred it is very crooked and blocked by logs and brushwood and with very little water flowing in it this summer. From Mildred east there are numerous shallow rapids. Report on Greenhill River has already been made to your department, it having been surveyed in 1920.

Goat River is a fair-sized stream, from a chain to two chains in width and is navigable by canoes through Township of Minnipuka, that being only portion I am acquainted with, it flows through a lake from ten to thirty chains wide and about two and a half miles long, located about two miles north of Minnipuka Lake.

There are no water powers capable of development that I know of.

GAME, ETC.

Large game is very scarce. The fishing in lakes was only fair, but we did not have many opportunities of investigating. I understood from the Indians there is good speckled trout fishing in lake on Goat River, and we took some fine specimens of from ten to fifteen inches long in the river at its crossing of north boundary of Minnipuka Township, also in the creek which crosses same boundary on the fourth mile.

Speaking generally, the area covered by survey this season is valuable only for its timber possibilities, which depend on the success in keeping down forest fires.

Accompanying this report are a plan, field notes, timber plan, with usual affidavits and account in triplicate.

I have the honour to be, Sir,

Your obedient servant,

HERBERT J. BEATTY,

Ontario Land Surveyor.

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

Appendix No. 36.

RESURVEY OF PART OF THE TOWNSHIP OF BLOUNT, DISTRICT OF TIMISKAMING.

NORTH BAY, ONT., December 5th, 1922.

SIR,—I have the honour to submit the following report on the survey of part of the Township of Blount, in the District of Timiskaming, performed by me under instructions from your Department, dated September 26th, 1922.

I left North Bay on October 4th with a party of seven men and travelled to Cochrane, remaining over night at Cochrane, and the next morning hired a motor truck which carried men and supplies to where the Timiskaming and Northern Ontario Railway crosses the south boundary of the Township of Blount, where we made camp and commenced work in the afternoon. Survey work was carried on continuously till the completion on November 3rd, arriving at North Bay on November 4th.

The party consisted of eight men, made up as follows: one surveyor, two chainmen, four axemen and one cook.

Observations for azimuth were taken on the centre line of the Timiskaming and Northern Ontario Railway and bearing carried on side lines between every sixth lot to the east and west boundaries of Concessions "A" and "B."

Traverse of the Abitibi River was made by chaining along the north shore and taking stadia readings to the south shore. Also traverses of lakes were made by chaining on the ice along the shore and taking stadia readings to the opposite shore.

Iron posts were marked and planted, and pits and mounds made at the points shown in accordance with the instructions.

The soil is well adapted for agricultural purposes, being clay, and several of the lots have already been settled on and small clearances made.

Fire has run through the district and destroyed the timber on the high land, and the only green timber is in the spruce swamps, except a portion on the east boundary, lots twelve and thirteen, Concession "A," and on the west boundary of lots twenty-eight to thirty-two, Concession "B."

The road along the southerly limit of Concessions "A" and "B" has been opened and graded, also road between original lots eighteen and nineteen from the southerly limit of township northerly as far as the Abitibi River.

Accompanying this report are plan, field notes and accounts, all of which I trust will be found complete and satisfactory.

I have the honour to be, Sir,

Your obedient servant,

G. P. ANGUS,
Ontario Land Surveyor.

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

Appendix No. 37.

TOWNSHIP OUTLINES IN DISTRICT OF SUDBURY.

PETERBOROUGH, ONT., October 23rd, 1922.

SIR,—I beg to report that, agreeably to your instructions dated April 12th, 1922, to survey certain township outlines in the district of Sudbury, I have completed this work and beg to submit herewith my plans, field notes and report, all of which I trust will be found complete and satisfactory.

The survey was commenced at an iron post planted by myself in 1916, to mark the intersection of the line between concessions four and five in the Townships of Hall and Joffre with the line between these townships. After a delay of a few days at this point in getting an astronomical observation, the line between the Townships of Hall and Joffre was produced south to O.L.S. Patten's base line and from the sixth, twelfth, eighteenth and twenty-fourth mile points. Lines were run due west on six-mile chords to O.L.S. Niven's base line. My meridian six miles west of my first meridian was run due south from a point six miles west of the southeast angle of the township of Hall to O.L.S. Patten's base line. Wooden posts made of the most durable wood in the locality, and at least six inches square and three feet high, were planted at the end of every mile, excepting when that point fell in a river or lake, in which case the post was planted on the line at the nearest shore. At the end of every third mile, where possible, the iron posts supplied by your Department were planted and pits and mounds made according to Department instructions. Where it was not possible to plant these posts at the exact points, they were planted according to instructions and witness mounds and trenches made.

On the hills and uplands of the eight townships outlined by me the country is broken and rocky and has been repeatedly overrun by fire, so there is practically no timber now remaining on the uplands, which are covered with small poplar, white birch and banksian pine. In the vicinity of Upper Green Lake there still remains considerable scattered white and red pine of good size and quality.

In the lowlands between the hills are found the usual swampy tracts covered with spruce, dead and decaying tamarac with alder and willow underbrush and considerable windfall; the average size of this timber ranges from two to ten inches in diameter. Probably eighty-five per cent. of these townships is high and rocky, the remaining fifteen per cent. being low and swampy.

I am very sorry to have to report there is absolutely no agricultural land in any of the townships outlined by me, nor does there appear on the surface any indication of the existence of economic minerals. The whole country is traversed by numerous rivers, creeks and lakes, containing considerable very good fish, particularly pike and lake trout. Moose and red deer are also very plentiful in this locality. While the country cannot be called exactly mountainous, it is very rough and broken throughout.

All the survey was carried out under my personal supervision, and at only one or two points did I find it necessary to depart from the instructions with respect to having angles opposite the base over ten degrees in triangulation work.

There is a considerable tourist traffic passes through the townships, this being the chief waterway leading south from the Canadian Pacific Railway to the Mississaga Forest Reserve. Many of these parties were met with during the progress of the survey.

I have the honour to be, Sir,

Your obedient servant,

J. W. FITZGERALD,
Ontario Land Surveyor.

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

Appendix No. 38.

CERTAIN TOWNSHIP OUTLINES IN THE DISTRICT OF SUDBURY.

NORTH BAY, ONT., November 21st, 1922.

SIR,—We beg to report on the survey of certain township outlines in the District of Sudbury, surveyed by us under instructions from your Department dated the 12th day of April, 1922.

We left North Bay on the 14th of June, arriving at Roberts Station on the Canadian Pacific Railway the same day with a small number of our party; the balance of the party, being Indians, were hired at Biscotasing.

We commenced our survey at a post planted by E. Stewart, O.L.S., in 1891 on the north side of the Canadian Pacific Railway, between townships number

12 and Joffre. The original notes for this point show a wooden post and a gas pipe planted, but the gas pipe had disappeared, the wooden post and a cairn of stones remaining, as was the case on the opposite side of the railway and at all other points with one exception, where the original notes showed a wooden post and gas pipe. From this post we ran north astronomically between the Township of Joffre and Township 12, and continued north astronomically between the Township of Carew and the Township of Alcona to the south boundary of the Township of Fingal, which boundary had been run by us in 1920.

Again, starting at a post planted by E. Stewart in 1891 on the northeasterly side of the Canadian Pacific Railway between the Townships of Joffre and Carew, we ran east astronomically between those two townships to our meridian line and continued thence east astronomically between Township Number 12 and Alcona to the southerly production of the west boundary of the Township of Smuts, which boundary had been run by us the previous year. Producing the said west boundary of the Township of Smuts we ran south astronomically between the Township of Biskotasi and Township Number 12 to a point, where we established the southeast angle of Township 12 due east astronomically from the northeast angle of Township Number 10, which we found marked by a wooden post in a stone cairn planted by E. Stewart in 1891. This completed our work on the north side of the Canadian Pacific Railway. We then proceeded to the southwest angle of Township 12, which had also been established by Mr. Stewart in 1891, but as this country had been burned over since 1891, we found it necessary to run a line south astronomically the distance shown on Mr. Stewart's original field notes from the post we had already found between the Township of Joffre and Township Number 12 on the north side of the Canadian Pacific Railway, and after searching nearly half a day we succeeded in finding the original iron post (gas pipe) and the point of the wooden post, though a four or five inch spruce tree had grown exactly on the top of it. From this point we ran south astronomically six miles exactly between Townships 10 and 11, and at this six-mile point we established the adjacent angles of the four Townships 10, 11, Kelso and McPhail. From the same point we ran west astronomically between the Townships of Joffre and Number 11 to the east boundary of the Township of Hall, which was run this summer by O.L.S. Fitzgerald. From the said adjacent angles of the Townships 10, 11, Kelso and McPhail, we ran west astronomically between Township Number 11 and Township of Kelso to the east boundary of the Township of Abney, which was also run this summer by O.L.S. Fitzgerald, east astronomically between Townships Number 10 and McPhail to the west boundary of Township Number 9, run this summer by O.L.S. Gallagher, and south astronomically between Townships of Kelso and McPhail six miles and twenty-seven links, where we established the adjacent angles of the Townships of Kelso, McPhail, Ivy and Earl. From this point we ran west astronomically between the Townships of Kelso and Ivy to the east boundary of the Township of Cortez, which was also run this summer by O.L.S. Fitzgerald, east astronomically between the Townships of McPhail and Earl to the west boundary of Township Number 8, run this summer by O.L.S. Gallagher, and south astronomically between the Townships of Ivy and Earl six miles, where we established the adjacent angles of the four Townships, Ivy, Earl, Durban and Jasper, and from this point we ran west astronomically between the Townships of Ivy and Durban to the east boundary of the Township of Ethel, which was also run this summer by O.L.S. Fitzgerald, east astronomically between the Townships of Earl and Jasper to the west boundary of Township Number 6, which was also run this summer by O.L.S. Gallagher, and south astronomically between the Town-

ships of Durban and Jasper to the north boundary of the Mississaga Forest Reserve run in 1908 by O.L.S. Patten.

A wooden post not less than six inches square and of the most durable wood obtainable was planted at the end of each mile, or where such point came in a lake the post was planted on the nearest shore and the chainage carved thereon. The posts were all set firmly in the ground and around many of them were built cairns of stones. On the side of the post facing the initial point of the line, the number of the mile was marked by carving deeply in the wood with a sharp knife, as 1 M., 2 M., etc. At the township corners and at the three-mile point on the township boundaries an iron post of the standard pattern was planted flush with the surface of the ground, and at each of these the required pits and mounds were made, or in the case of a witness post a circular trench and mound were made. Where an iron post was planted a wooden post was also planted a foot from the iron post, but in all cases the iron post was set at the true point.

Two bearing trees were marked wherever they were available by blazing the tree and carving thereon the letters "B.T." The distance and astronomic bearing from the post to the face of the blaze was noted and shown in our field notes.

The lines were well opened out and the trees adjacent to the lines and on each side thereof were blazed on three sides in the usual manner.

All lakes across which we could not chain in the usual manner were triangulated and the angles of such triangles were invariably read twice or more to insure accuracy and the bases of such triangles measured with great care.

On the north boundary of Township 11, between four and a half and five and a half miles, we encountered considerable difficulty and the morals of our party suffered much, when we ran into about a mile of drowned land so densely wooded with standing and fallen timber that it was impossible to bring a canoe in, yet the water was from four to eight feet deep. We finally succeeded in getting it cut through and chained with the loss of some time.

The measuring was all done with tapes two chains in length, which were carefully tested with a standard of measure before we commenced operations. On sloping ground the clinometer was used to measure the vertical angle and the horizontal distance derived therefrom.

Frequent astronomical observations were taken on Polaris, records of most of which are attached to our field notes. North and south lines were run as true astronomical meridians. East and west lines were run as chords of latitude passing through the township angles. The magnetic readings were taken frequently and found to be nearly constant at seven degrees west of north.

SOIL.

No agricultural land was met with in the whole country traversed by the survey. The soil is composed of sand, generally underlaid with gravel and strewn with boulders. Many rock outcrops occur.

PHYSICAL FEATURES.

The country for the most part is hilly and dotted with innumerable small and large lakes, most of which contain very clear water, particularly so in the south part of the survey. The principal lakes are Ramsay, Biscotasing and Indian Lakes. Ramsay Lake extends through the Townships of Joffre, Number 11, and Kelso, and extends into the northeast angle of Ivy, the northwest angle of Earl and the southwest angle of McPhail. The water of this lake has been

raised several feet by a dam at its outlet into Biscotasing Lake. Owing to this increased height of water there is a great deal of drowned land around its shores. There are several small rivers or creeks coming into this lake, two running north through the Township of Kelso, one running east in the southwest angle of Township 11 and one running southeast in the northwest angle of Township 11.

Biscotasing Lake extends through the Townships of McPhail, Number 10, Number 9 and Biskotasi. This lake in most places has rocky shores and is made up of long bays running in all directions, which makes it difficult to travel on without an accurate map.

Indian Lake is a long narrow lake lying north and south in the Townships of McPhail, Earl and Jasper. It has also rocky shores and many bays.

While the presence of so many lakes made life in the bush more pleasant and were very helpful for transportation purposes, they were usually more of a hindrance than an advantage to running a line.

TIMBER.

The timber in the Townships of Carew, Alcona, Joffre, 12, 10 and 11 and the north part of Kelso and McPhail is of little importance as it is nearly all second growth, having been burned over some twenty or twenty-five years ago, and this area is now grown up with jack pine, poplar, birch, balsam and spruce averaging six to eight inches in diameter. The Townships of Ivy, Earl, Durban and Jasper and the south part of Kelso and McPhail are fairly well timbered with jack pine, spruce, poplar and birch of merchantable size. In this area there is also an occasional red and white pine of good size.

GAME.

The large game is quite plentiful throughout the area covered. Moose, red deer and bears were often seen. Partridge and rabbits were seen in abundance and the small fur-bearing animals were also numerous. The only fish we were able to catch were pike and pickerel and were plentiful in all the lakes of any size.

ROCK.

The rock formation is of granite and feldspar and no evidence of valuable minerals were seen.

Accompanying this report we are forwarding general plan on mounted drawing paper, timber plan on linen, field notes, accounts in triplicate and the usual affidavits, all of which are respectfully submitted, and we sincerely trust the same will meet with your approval.

We have the honour to be, Sir,

Your obedient servants,

MCAUSLAN, ANDERSON & MOORE,
Ontario Land Surveyors.

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

Appendix No. 39.

BASE AND MERIDIAN LINES, DISTRICT OF THUNDER BAY.

PORT ARTHUR, November 9th, 1922.

SIR,—Under instructions from your Department dated April 21st, 1922, to survey certain base and meridian lines in the District of Thunder Bay, we beg to report that we have completed the work.

Our party, accompanied by Mr. W. L. Swanson, Geologist for the Department of Mines, left Port Arthur on June 7th for Mack on the Lake Superior branch of the Canadian National Railway. From Mack the route was by way of a chain of small lakes and short portages to Cedar Lake, where O.L.S. Ross's base line was located and followed to the thirty-sixth mile post which was our starting point.

From this point a base line was run twelve miles east, and from this twelve mile point a meridian line was run twelve miles north and produced south eleven miles and sixty-seven chains and ninety-eight links to intersect the second base line run by us in 1921. The base line was then continued for a total distance of forty-two miles and four chains and thirty-nine links to intersect the west limit of the Black Sturgeon Pulp and Timber Limit run by us in 1918. From the twenty-fourth mile post on the base line a meridian was run south eleven miles, sixty-six chains and sixty-three and four-tenths links to intersect the second base line run by us in 1921. This meridian was also run north twelve miles and thence a base line was run east seventeen miles, seventy-nine chains and seventy links to intersect the west limit of the Nepigon Forest Reserve run by us in 1920. The instructions in regard to the details of the performance of the work were followed carefully. Where a closure was obtained the actual chainage checked very closely with the theoretical, showing that the chaining was well done. In one case, viz., at the end of the first base line, the pits and mounds were omitted owing to the ground being composed of boulders for a considerable distance from the corner. The iron post was, however, well planted.

The country passed through was in general well timbered except for a portion approximately between the seventeenth mile and the twenty-sixth mile on the first base line and all of the second meridian south of the first base line. This area in parts has been burnt several times and is bare of trees, while in other parts it is covered with a dense growth of poplar, birch and jack pine. There is good spruce in the swamps in this area, but these do not appear to be of any great extent. Other areas which have been burnt within recent years are, an area extending from the fifteenth mile on the second base line to the end of the line, and for a distance of about one-half a mile on each side of the four mile post on the first base line. The remainder of the country was well covered with timber, the varieties being as shown on the accompanying timber plan. Spruce is the principal species. There is also a good stand of jack pine extending along the second meridian north from about the fourth mile to the end and along the second base line to the burnt area near the fifteenth mile post, although the timber gets smaller as we travel east. There are also a few small stands of jack pine as shown on the plan.

The country along and adjacent to the first twelve miles of the first base line appears to contain a large number of good sized lakes not shown on any map. No effort was made to make a survey of these, any information shown on the plan being approximate and from information given by the freighters.

The land is generally level or rolling, and the soil sandy or rocky or boulders. Near Lac des Isles, on the second meridian south of the first base line, there are high rocky hills and the country is very rough and broken. On the second meridian north of the first base line where the jack pine is found, the country is very hilly and broken, being full of dry sloughs and small lakes which apparently have neither inlet nor outlet. This is the only portion of the country which shows any agricultural possibilities at all, the soil being sandy loam; the area, however, is insignificant.

On account of the party being accompanied by a geologist, Mr. W. L. Swanson, M.A., sent out by the Department of Mines, no attempt was made to note the geology.

There were no well defined water routes within the limits of the survey. There is a well travelled route from Mack to Cedar Lake. From Cedar Lake supplies were brought to the lake on the fifth mile of the first base line by a series of small creeks which were said to be very indifferent travelling. From this lake a good route was obtained to Sucker Lake and the river running out of Sucker Lake to where it crosses the first base line. The next route used was via Kelley and Dog River to the lake shown on the plan about three miles west of the second meridian and thence north and following the dotted line shown on the plan. This river was said to be very rapid in places and no portages or other signs of use were found except for a short distance north and south of the first base line where it had been used by trappers who have another route branching off to the west, south of the first base line. From this river, which crosses the second base line on the eighth mile, a portage was made along the line to the small lake shown on the fifteenth mile and the lake and river running out of it were followed to Kavitotikwia Lake. This river is full of rapids and extremely crooked and at this time of the year (September) was very poor travelling on account of low water. The whole district covered does not appear to be travelled to any extent except in the winter by trappers, of whom frequent signs were seen.

The usual animal life was present in the shape of moose, deer, bears, beaver, wolves, etc. The most common fish was found to be pike, although it was stated by the Indians that some of the streams contain trout.

With this report are the usual plan, field notes, etc.

We have the honour to be, Sir,

Your obedient servants,

PHILLIPS & BENNER,
Ontario Land Surveyors.

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

Appendix No. 40.

TOWNSHIP OUTLINES IN DISTRICT OF SUDBURY.

SOUTH PORCUPINE, ONT., December 1st, 1922.

SIR,—I beg to submit the following report of the survey of certain township outlines in the District of Sudbury, made by me during the past summer under instructions from your Department, dated April 12th, 1922.

The survey was commenced on the 29th July at the northwest angle of Township No. 4, which point was, and is, marked by an iron and a wooden post. From this point a line was run west six miles between Townships No. 6 and Alton, an observation having been taken the night of July 27th, and from the same point a meridian was run north between Townships Nos. 5 and 6, 7 and 8, Chalet and 9, and Arden and Biscotasi, a distance of twenty-four miles four chains and twenty-seven and seven-tenths links, to the south limit of the Township of Smuts, intersecting the latter limit, four chains and fifty-one links, west of the southeasterly angle of the said township.

From the six mile point on this meridian a line was run east between Townships 5 and 7 to the westerly limit of the Township of Battersby, intersecting this limit 45.7 links south of the northwest angle, and west six miles between Townships Nos. 6 and 8. Near this six mile point, which is now the corner of four townships, only one iron post, planted by O.L.S. Stewart in his survey of townships along the Canadian Pacific Railway, is in place, and its location with reference to this corner is shown in the field notes accompanying this report.

From the twelve mile point on this meridian a line was run east between the Townships of Chalet and No. 7 to the northwesterly angle of the Township of Marquette, and west six miles between Townships Nos. 8 and 9, crossing the Canadian Pacific right of way. Near this point of crossing posts had been planted by O.L.S. Stewart in his survey mentioned above, but they have been removed and the only evidence of their location is a cairn of stones which is referenced in the field notes of this line, page fifty-two.

From the eighteen mile point on this meridian a line was run east between the Townships of Chalet and Arden to the west limit of the Township of Paudash, and west between Townships No. 9 and Biscotasi to the easterly limit of Township No. 10, intersecting this latter limit 2 chains and 99.6 links south of the northeasterly angle of the said township.

A second meridian was run south from a post planted by O.L.S. Stewart, in his survey mentioned above, south of the Canadian Pacific Railway on the line between Townships Nos. 9 and 10, this post being a piece of gas pipe marked 9 on the east, and 10 on the west side, to the northerly limit of Township H in the Mississauga Forest Reserve, forming the west boundary of part of Township No. 9 and of Townships Nos. 6, 8 and Alton.

Your instructions, including the general instructions relating to the planting of iron posts, were rigidly adhered to in every particular. The base lines were, in all cases, run in the direction indicated as chords of parallels of latitude, passing through the township corners, and the meridians north and south astronomically, observations on Polaris being taken whenever possible. The lines were well opened out and well blazed. Posts of the most durable wood obtainable, at least six inches square, well made and well carved, were planted at all points ordered, each in a cairn of stones where the latter were procurable, and two carefully selected bearing trees marked near each. The iron posts furnished by your

Department were placed where directed in your instructions, and the mounds, pits and trenches well formed in the proper position that applied to each case, except at the point of intersection of the line between Townships No. 9 and Chalet with the westerly limit of the Township of Marquette. This point was 4.5 links south of the northwest angle of the latter township, and as the placing of another iron post, and the making of the necessary pits and mounds, would interfere with those already there, the latter angle was made the point of intersection, and the old posts marked accordingly.

The chainmen were instructed as directed by you, the steel tapes compared with the standard before, and during, the survey; a clinometer used on all grades, and every precaution taken to insure accurate measurements.

TIMBER.

A great part of the area included in the outlines has been timbered over many years ago, but at the present time pulpwood is being taken out in places, and some stands of jack pine adjacent to the Canadian Pacific Railway have been cut quite recently. There is considerable timber of pulpwood size along the first meridian, excepting the last five miles, and along the south boundaries of Chalet and part of No. 7. The timber along the north boundary of Alton, the west boundaries of Alton and 6 and 8, and the east half of the north limit of 6 and 8 is of good quality, much of it being suitable for pulp, with several good stands of jack pine well suited for ties. Along the north and west limits of Alton there is a considerable number of white and red pine, big and apparently of good quality. Two large areas were recently burned over, one between the Hog's Back Channel and the west branch of the Spanish River, on both sides of the line between Townships 8 and 9; the other between the east and west branches of the Spanish River on either side of the line between Townships 5 and 6.

WATER COURSES.

In this district is a network of excellent water courses. East of the C. P. R. the three branches of the Spanish River, and the Dead River, with their connecting lakes, furnish good routes for canoe traffic and river driving, the portages being well cut out and comparatively short. West of the C. P. R. the Indian Lake and the Hog's Back Channel provide a fine route to the Mississaga Forest Reserve.

ROCK FORMATION.

The predominant rock in this area is reddish coloured biotite granite of Laurentian age. It is well exposed on the shores of many of the lakes, and on the steep slopes of some of the hills. On the north limit of Township No. 5 inclusions of Keewatin schist were observed in the granite. On the north boundary of Township No. 8 where the rock is well exposed in the brule area there are several diabase dykes, and on the east shore of Indian Lake a big dyke, similar in nature, some chains wide, on which have been staked a number of claims, was noted, but no mineralization was detected. No indications of economic minerals were observed during the entire survey.

PHYSICAL FEATURES AND SOIL.

The area as a whole is very hilly, and the granite ridges and the lakes have a general north and south direction. The soil of nearly the entire area is a sandy

loam, mostly shallow, with a few small areas of clay, the whole country being unsuitable for agriculture.

FISH AND GAME.

Big pike were taken from many of the lakes and from the Spanish River, and they seemed to be plentiful; no other kinds of fish were seen, but Winnie Lake on the north boundary of Alton Township is locally reported to abound in trout.

Moose and red deer, and indications of them were frequently seen in all parts of area, as were also signs of bear and beaver.

Partridge of two distinct varieties were very plentiful.

WATER POWERS.

The only water power, worthy of consideration, encountered during the survey is on the west branch of the Spanish River, two chains north of the north limit of Township No. 8, where there is a fall of twelve and one-half feet, which could be, with a short dam, increased to twenty-five feet. There are three rapids on the west branch below this point with a combined fall of about eight feet.

Accompanying this report are the township plan on mounted drawing paper, a timber plan, field notes, the required affidavits, and account in triplicate. I am also returning the set of dies furnished by your Department.

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

CHAS. V. GALLAGHER,
Ontario Land Surveyor.

*The Honourable the Minister of Lands and Forests,
Toronto, Ontario*



Sturgeon caught in the Abitibi.

Appendix No. 41.

SURVEY OF THE ABITIBI RIVER.

SAULT STE. MARIE, December 23rd, 1922.

SIR,—Acting on instructions from you dated 28th March, 1922, to survey the Abitibi River from the north boundary of the Township of Leitch to its mouth, I commenced organizing for this work on May 25th, 1922, leaving Sault Ste. Marie via North Bay and Cochrane with five men and arriving at



Mounding post on Niven's Base Line.

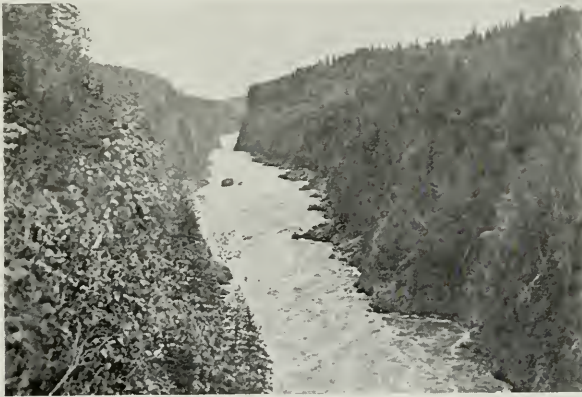
Clute on May 29th. At Clute I bought supplies, etc., and after overhauling same, had part of them together with outfit and canoes teamed to the landing at the Frederick House River, a distance of about four miles. To attempt taking my whole outfit and supplies down the river in one trip in three canoes



Lower Otter Canyon, looking upstream from near foot.

was almost impossible, which made it necessary to make a trip with half the load as far as Island Portage. On June 6th, arrived back at Clute, and after getting remainder of supplies, etc., proceeded down the Frederick House River to its mouth, or its junction with the Abitibi.

From the north boundary of the Township of Leitch (below Kettle Falls) the point of commencement to the Three Carrying Places, a distance of about twenty miles, the river has a strong current but is easily navigable for loaded launches or scows, there being a depth of from ten to twenty-five feet at low water stage. From the Three Carrying Places to Island Portage Rapids, a distance of about four miles, is swift and generally wide and shallow with occasional narrows



Abitibi Canyon, looking up stream to near head of canyon.

of heavy fast water. About the centre of this stretch is the T. & N. O. Railway Crossing, the right of way having been cleared to this point. Following down stream from the foot of Island Portage Rapids to the Lobstick, a distance of about twenty miles, the river is a series of sweeping curves with a width of about twelve chains, almost free from boulders and is good motor boat navigation, considerable portion of the width of the river.



Sextant Rapids, Abitibi River.

From the Lobstick to the foot of the Abitibi canyon (taking in Burntwood Chutes, Clay Rapids, Birch Rapids and Oil Can Rapids) a distance of about seven miles, the river has a very heavy current, with almost continuous rapids, chutes and falls, and can only be navigated by expert canoemen making at least five portages. From the foot of the Abitibi canyon to the Otters, a distance of about twenty-two miles, the river is swift and rapid for the first three miles,

the remaining distance being moderately swift, but could be navigated by loaded launches or scows.

The navigable parts of the three stretches of river heretofore mentioned traverse between banks of clay, generally sloping gently back from the river to a height of from about twenty to one hundred feet or more. Along the unnavigable parts, such as rapids, falls, chutes and canyons, the shores are rocky and in some places precipitous.



The Lobstick, looking down stream towards Burntwood portage from foot.

Continuing down stream from the foot of the Otters to where the river empties into the Moose, a distance of about seventy-five miles, the river becomes wide, shallow and swift, having a fall of about 245 feet, mostly taken up in the Sextant, the Corals, the Nine Mile Rapids and Allan Rapids. The river bed, most noticeable at the above mentioned rapids, is of limestone shale, the



Burntwood Chutes, looking up stream, both channels.

banks are of clay with occasional outcroppings of limestone shale, sloping back to a height of from twenty to sixty feet. In many places along the river's shore will be seen large deposits of oil shale, pieces of which when thrown into a fire will give off heavy black smoke and strong gases. Lignite outcrops are frequent along this part of the river which when dried burns well and gives off

a blue flame with coal-like gas. I am of the opinion that in the lower regions of this and other rivers which I have surveyed there is great inducements for prospecting for oil and coal. One of my party found a float of coal on the Little Abitibi River near its mouth.

WATER POWER.

At the Three Carrying Places the fall at mean water level is twenty-three feet. The site is not especially adapted for water power development as the gorge is wide and flat at this point and it will be discussed hereafter with Island Portage Rapids.

Island Portage Rapids is about thirty chains in length and has a fall of 6.5 feet. Slightly below head of rapids is an island which is a satisfactory location for a dam. A dam has been proposed to give a head of fifty feet; the length would be about twelve hundred feet. This is being investigated by Messrs. Kerry and Chace, engineers. A fifty foot head would flood out the



Burntwood Chutes, west channel.

Three Carrying Places and back up the river as far as the foot of the Long Sault Rapids, flooding out Kettle Falls.

At the Lobstick there is a drop of about thirty-six feet at mean water in a distance of forty chains. To develop this a dam could be placed down stream near the foot of the portage where the gorge, which is rocky and canyon like, is about five chains wide with a small island in the centre. This could be developed in conjunction with Burntwood Chutes, the head of which is about twenty-five chains below high rock above noted.

Burntwood Chutes has a fall of twenty-one feet. The foot of this chute is a satisfactory dam site. It would appear easy to place a dam of sufficient height at this point to flood back to the head of the Lobstick, and such a dam would be about four hundred feet long and could develop a head of about fifty-seven feet. A short distance below this the river widens to about ten chains.

The Abitibi Canyon has a fall of ninety-two feet and is about one and three-quarter miles in length, whose walls of rock run up to an elevation of about one hundred and sixty feet. Its width at the water's edge averages about three chains. Water power for this stretch of river could most cheaply be developed by a dam in the lower part of the canyon. The length of spillway required to pass maximum floods might be a controlling factor in location of dam. It would be possible to construct a dam to flood back to the head of the Lobstick develop-

ing a head of 210 feet. The length of dam required for this head would be nearly one thousand feet. A proposed dam is indicated about one mile below head of Canyon, creating a head of 150 feet by flooding water back to foot of Burntwood Chutes, such dam would have a crest length of about three hundred feet. There appear to be several alternative ways of making this development, and it



Abitibi Canyon, looking down stream to near foot of canyon.

requires much detail study. The watershed area at this point is about 8,575 square miles. The flow of the river at the Abitibi Paper Company's development at Iroquois Falls is known and the watershed area at that point is also known, and the additional flow for the total area can be computed, thus giving total flow with fair accuracy.

The Otters is a series of rapids and chutes and in places canyon like and falls over a distance of one and three-quarter miles with a total drop of eighty-



Upper Otter.

seven feet. There is a good dam location at the foot, where the width is about four chains, including a rocky island. A dam to develop the full head of the Otters would be required to be a considerable length, but would be founded on exposed rock for the greater part. Depth of overburden might be considerable at the extreme ends. The river widens out considerably at the foot of the rapids.

TIMBER.

The timber along the river consists chiefly of poplar, spruce, balsam, birch and cedar. In many places the country has been fire swept years ago, but since the timber has grown up to a fair size, such as poplar to sixteen inches, and spruce to fourteen inches. There still remain areas of land with small poplar and birch, also other numerous stretches of river banks with almost virgin forest timbered with spruce to thirty inches and poplar to twenty inches. On the whole taking the above into consideration the timber along the Abitibi River from a pulp standpoint is very good.



Below foot of Upper Otter.

Comparing the Abitibi River with rivers which I have surveyed and travelled, it is the most dependable water route to James Bay, there being at all stages water enough to carry loaded canoes.

I have the honour to be, Sir,

Your obedient servant,

C. R. KENNY,
Ontario Land Surveyor.

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

Appendix No. 42.

SURVEY OF TOWNSHIP OUTLINES, DISTRICT OF ALGOMA.

PEMBROKE, ONT., January 6th, 1923.

SIR,—I have the honour to submit the following report of the survey of Township Outlines in the District of Algoma, made by me under instructions from your Department, dated April 12th, 1922.

I proceeded from Pembroke via the Canadian National Railway to Oba,

and then down the Oba River to a point nearly opposite the southwest corner of the Township of Hawkins, my starting point, where I found cedar post marked Hawkins on the northeast and Irving on the southeast sides and to which I added Ermine on the southwest and Derry on the northwest sides, and ran my first base line west nine miles, one chain and forty-seven links between Township of Derry and Ermine, to establish the southwest corner of the Township of Derry in accordance with instructions, and owing to this point coming in Lake Kabinakagami I located the point of commencing of line between Derry and Lipton by latitudes and departures on an island and continued west along the south boundary of Township of Lipton about nine miles; then returning to the point of commencement of line between Derry and Lipton, I ran north astronomically to intersection with south boundary of Township of Woolrich, which came in Lake Kabinakagamis and I established the commencement of line between Townships of Lascelles and Lipton by offsets from south boundary of Woolrich and proceeded to run my second base line west a distance of nine miles from the southwest corner of Woolrich, thus establishing the corner of Lascelles, Lipton, Beaton and Larkin Townships; from this corner I ran north between Lascelles and Larkin Townships to intersection with south boundary of Haig Township, and south between Lipton and Beaton Townships to intersection with the south boundary of Lipton, I then ran west along the south boundary of Beaton Township about nine miles and returning to my second base line. I ran west between Townships of Larkin and Beaton a distance of nine miles to the corner of Larkin, Chelsea, Bayfield and Beaton Townships; as this point came in a lake I ran an offset around northwest side of lake and established the point of commencement of line between Larkin and Chelsea which I ran north to intersection with south boundary of Township of Wickstead. I then returned to my second base line and ran south between Townships of Beaton and Bayfield to intersection with south boundary of Beaton on my first base line; returning again to my second base line I ran west between the Townships of Chelsea and Bayfield a distance of nine miles and established township corner from which I ran south along west boundary of Bayfield a distance of nine miles, then returned to my second base line and ran north along west boundary of Chelsea to its intersection with south boundary of Lessard. I also re-ran south boundary of Township of Marjory, part of my contract of 1921. I removed and destroyed all posts, mounds and pits on the abandoned line and am forwarding field notes of new line herewith.

The east and west lines were all run on chords of latitudes, and meridians north or south astronomically as recorded in the field notes; frequent observations for azimuth were taken, the records of which are enclosed in the field notes. The lines were cut out and blazed, wooden posts properly marked planted at every mile, with standard iron posts, pits and mounds at every third mile, as shown in field notes, and in accordance with instructions.

SOIL.

I did not see any land suitable for agricultural purposes, the soil being mostly sandy with stones or boulders, the surface generally being rolling with very few hills.

TIMBER.

Along the south boundary of the Township of Derry east of Lake Kabinakagami the timber is small, principally spruce, jack pine, beech and poplar from four inches to eight inches in diameter with some jack pine and spruce up to

ten inches, but there is some spruce, jack pine, white birch and balsam of gilead up to fifteen inches in diameter on the seventh and eight miles of this boundary. Along the first four miles of the south boundary of Lipton, line runs through old brule with small poplar and white birch, but from the fourth mile post west along this boundary and the south boundary of Beaton the country is fairly well timbered, there being some good jack pine and spruce up to fifteen inches in diameter. On the line between Lipton and Derry the southerly three miles is mostly in lake and from end of fourth mile north timber is small as is also that along line between Lipton and Lascelles. The west boundary of Lipton is fairly well timbered with spruce and jack pine and balsam and birch from six to ten inches in diameter, but the west boundary of Lascelles and the north and west boundaries of Beaton run through old brule with poplar, birch, spruce and jack pine from two to six inches in diameter. There is some fairly good jack pine and spruce along the southerly five miles of the west boundary of Larkin, but from there north the timber is smaller and large spruce and jack pine is scattered. On the south and west boundaries of Chelsea the timber is mostly spruce, balsam, birch and poplar from four to fourteen inches in diameter, while along the west boundary of Bayfield there is some fairly good jack pine and spruce from five to fifteen inches in diameter with balsam and white birch from four to twelve inches. The southeast part of Beaton and the northeast part of Bayfield contains the best timber and on the balance of the area within the limits of this survey the timber is, as yet, not suitable for lumbering operations excepting scattered areas whose timber is suitable for pulpwood; the southeast part of Bayfield and Larkin, northeast part of Beaton and nearly all of the Township of Lascelles has been badly burned over, and is now covered with second growth poplar, white birch, spruce and jack pine from two to six inches in diameter. The only sign of fresh fire that we saw this season was in the southeast corner of Lascelles and appeared to be about one mile north of Kabinakagami Lake.

MINERALS.

I saw no indications of economic minerals.

STREAMS AND LAKES.

The largest body of water encountered was Kabinakagami Lake which extends for about six miles north into the Township of Derry and about five miles into Lipton; in it there are many islands, some of which are of considerable area and nearly all well timbered. The next lake of importance is Kaginakagamis Lake, in the northeast corner of Lipton. There are smaller lakes scattered throughout, varying in length from a few chains up to two or three miles, the larger ones being as a rule not more than twenty or thirty chains wide.

The most important stream being Kabinakagami River, the outlet of lake of that name, and on this there are only three or four short portages between north end of Lake and Canadian National Railway; the next in importance is Shekak River, flowing through Chelsea and Larkin Townships and the northwest corner of Lascelles. This stream is not navigable by canoes in low water as it is badly blocked by logs and driftwood and is not used as a canoe route now that the railroad affords transportation facilities for trappers and hunters. The Little Ground Hog River has its source in the Township of Beaton, flows northerly through southwest corner of Lascelles and the easterly part of Larkin, again enters Lascelles and joins the Shekak, is very shallow in places in low water, but there are only two short portages north of the north boundary of Beaton Township.

There is also a small stream which crosses the south boundary of Lascelles near the five mile post and flows westerly into the Little Ground Hog.

I did not see any falls capable of development.

GAME.

Moose are fairly plentiful; there are also some small deer. In Kabinakagami Lake pickerel are very plentiful, and speckled trout in the Shekak River, the Little Ground Hog and the stream flowing into it in the southwest corner of Lascelles Township, the fire rangers reporting that they have caught them up to three pounds in weight.

The area covered by this survey is not of any value for agricultural purposes, and if fire is only kept out it will yield a considerable revenue from its timber resources in time.

Accompanying this report are a general plan, timber plan, field notes and usual affidavits, with account in triplicate.

I have the honour to be, Sir,

Your obedient servant,

HERBERT J. BEATTY,
Ontario Land Surveyor.

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

Appendix No. 43.

QUETICO PROVINCIAL PARK.

KAWENE, P.O., October 31st, 1922.

HONOURABLE SIR,—I beg to submit my report on Quetico Provincial Park for the fiscal year ending October 31st, 1922.

During the year our staff consisted of an average of seven rangers and a superintendent. This staff is, I think, very inadequate to properly patrol an area the extent of Quetico Park. Unfortunately we lost one ranger by drowning on May 13th, 1922. This is the first serious accident to our staff in the Park. Ranger Stubbs was a strong swimmer and a fairly good canoe-man, but the water being ice-cold, he succumbed before getting ashore. The body has not been recovered, although every means was taken to do so.

As by your advice and authority some preparations were made for the taking alive of some fur-bearing animals, but on account of the drowning accident all available men were engaged in searching for the body for a considerable time, the proper time for taking such animals passed without our having secured any.

In the matter of bush fires we have, considering the weather, been very fortunate, there being only one small fire on White's Island, Basswood Lake.

This burnt over about forty acres covered with scrub and some balsam, containing in all about fifty cords of pulpwood. This speaks well for the care taken by tourists and others passing through the park.

The threatened railway strike hindered many tourists from visiting the park this season, it being mostly Americans who travel here.

Excellent work has been done by the rangers in cutting new trails, cleaning old ones and improving waterways, in order to have easier and quicker access to places, which are threatened by fire. I would strongly recommend that a pump and engine and about one thousand feet of hose, such as is supplied to fire rangers, be supplied to headquarters for fire protection. The buildings at headquarters are without any protection except what might be rendered by the one or two men usually there, but with such equipment they would be reasonably safe. This equipment could be carried by our own gasoline boat down French River and over Pickerel Lake, thus, if necessary, rendering double service.

I find that two new canoes will be necessary for the coming summer.

I would strongly recommend the taking of a number of beaver from certain parts of the park. These animals have become so numerous that in places they have become a nuisance by building their dams across canoe-ways, flooding portages, etc., also along the boundary between Quetico Park and The Superior National Forest, Minnesota, where permits are granted to trap. The American trapper gets the full benefit of the protection afforded by us in so far as the natural overflow from a protected territory is concerned. A good number might be taken each year without any detriment to the park whatever, and also form a nice revenue.

Fur-bearing animals, deer and partridge are very numerous, but the moose apparently have moved to later burns for fresh feeding grounds.

The roofing on some of our shelter huts has been destroyed by hail, but has since been repaired. I also find that about 500 feet of lumber will be required for general repair purposes.

I have the honour to be, Sir,

Your obedient servant,

HUGH McDONALD,
Superintendent.

*The Honourable Beniah Bowman,
Minister of Lands and Forests,
Toronto, Ontario.*

Appendix No. 44.

ALGONQUIN PROVINCIAL PARK OF ONTARIO.

HONOURABLE SIR,—I have the honour to submit my annual report for the fiscal year ending October 31st, 1922.

In some respects the fiscal year just drawn to a close proved to be somewhat of an eventful one, in that it witnessed the superannuation of Mr. G. W. Bartlett on April 10th, 1922, who retired after an active and meritorious career of a quarter of a century. The following day, April 11th, the writer assumed the duties of Acting Superintendent.

In order that the Government might possess first-hand knowledge concerning conditions and the extent of its holdings in Algonquin Park, it was found necessary to take an inventory of all buildings, machinery, horses, wagons, furniture, fire-arms, traps, blankets and shelter house equipment in use by the Park Ranging Staff. Much difficulty was encountered in making an accurate inventory, for the reason that no books could be found at headquarters which might prove helpful in this respect. Therefore, it was found necessary to have a personal interview and obtain an affidavit from each ranger, covering a list of articles furnished by the Government.

In due course the inventory was completed and submitted to the Department, the total value of which being \$37,802.20, and includes all buildings at headquarters, forty-eight shelter houses, contents of the whole and all park equipment.

FISHING.

Notwithstanding the past tourist season was short, cold and disagreeable from a weather standpoint, the anticipated number of tourists did not arrive, and at no time were the hotel facilities taxed, while forty per cent. of reservations were cancelled before the season was half over. The revenue received from the sale of fishing licenses, however, exceeded by far the cash receipts of any season heretofore recorded. The sale of domestic and non-resident fishing licenses amounted to \$2,805.00.

There is no sport in our Provincial Park which appeals to visitors more than good fishing and a permanent fish hatchery would be a great acquisition. In this connection I would recommend the building of a hatchery at the lower end of Source Lake, where a never-failing flow of cold spring water is assured and where it could be so easily controlled.

If a hatchery in the park was an established fact, the fry could be kept until one year of age before releasing them in the lakes. The fingerlings, one year of age, would have a fighting chance to survive and are better able to take care of themselves.

Fishing in the waters of Algonquin during the past season was exceptionally good. In the early part of the season, irrespective of the mosquito and black-fly nuisance, several fine catches of speckled trout were taken from Rock, Louise and Bruff Lakes and the white water streams in the locality. From Cache and Big Island Lakes some record catches of grey and land-locked salmon were taken, varying in weight from twelve to sixteen and seventeen pounds. In an effort to keep the waters of the park supplied with fish, some 500,000 trout fry were distributed in the following waters,—Rainy, Brule, Joe, Canoe, Cache and Rock Lakes.

FOREST FIRES.

Although the past summer was very dry and numerous small fires broke out within the park, we should consider ourselves fortunate in escaping with only one serious fire, viz., that of Rock Lake, which burned over an area four miles in length along the G. T. Ry. by an irregular width of three and a half miles.

In the early part of the season, when the section men are engaged in dead-grass burning along their right-of-way, many small fires were started. However, the railway employees, who are usually near at hand, together with the park rangers, joined forces and extinguished these fires before they made much headway or assumed dangerous proportions. The railway sectionmen need some stern education in regard to bush fires. They are in the habit of applying the torch, touching off the dead grass close to the tracks and allowing the fire to burn backward towards the woods.

This is a dangerous practice and a man caught in the act should be expelled from the park.

The erection of two steel observation towers, one at White Trout Lake and one at Cache Lake, connected up by telephone with headquarters, will prove of inestimable value in detecting fire. I must also mention the erection of two wooden observation towers at Little Nipissing and on the Bonnechere River, respectively. It is expected that all towers will be manned and equipped this coming season and splendid results are anticipated. Constant vigilance with regard to bush fires is absolutely necessary.

Owing to the prompt action of park and fire rangers, equipped with the small gas engine, the majority of fires were quickly extinguished and the damages were confined to a few acres.

TRAILS AND ROADS.

Guides to the number of sixty-five were employed in the park during the season of 1922 and the majority of them report that the trails and portages are in fairly good condition. The trails leading from headquarters are in excellent condition and in some instances are clean enough to permit the passage of horse and buggy. As every wind storm causes trouble, many of the trails in constant use must be cleaned out several times during a season and outlying trails made passable.

This season, all guides were required to keep a diary, giving the names of parties guided, duration of trip, route travelled, number of fish taken and the serial number of fishing license in possession of each tourist. Guides must return the diaries, properly filled out to the Superintendent at the end of each week or on completion of a trip. No province in the Dominion of Canada equips a guide with a license to do a lucrative business as cheaply as our Provincial Parks. Not only does Algonquin furnish a license for one dollar, but extends the privilege of travelling over portages and trails, cut out and kept clean by the rangers. The fee should be \$2.00, which seems inadequate.

It may be of interest to note that the extension of a trail or the cutting of a new road to a lake heretofore unfrequented, has an important bearing upon the question of game protection.

As soon as a road or trail is constructed in a new district, the wild animals make use of it to come and go.

It is advisable to have more trails and roads throughout the park. It is a well-known fact that wild animals will follow the trails, travelling along the lines of least resistance, the same as humans. Poachers will avoid all well-worn trails for fear of detection.

POACHING.

Complaints by the score arrived at the Department, to the effect that the park was frequently invaded by outside trappers, creating the impression that portions of the park boundary were unprotected and poachers could come and go at will.

These conditions led to much adverse criticism, that the rangers were remiss in their duties and reflected strongly against the Superintendent.

A new plan was introduced in an endeavour to control the outlaw element, and with the assistance of the rangers the enforcement of the park regulations was rigidly carried out.

In the course of a fortnight, ten poachers were brought to headquarters. Fines were imposed to the extent of \$540.00. Rifles, canoes, traps, camp outfits were confiscated and one particularly vicious culprit was incarcerated at North Bay.



Ranger's Shelter House, Big Island Lake, Algonquin Park.

The result of concerted action, assisted by a flying squad of rangers, became apparent almost immediately. The public took considerable interest and gave the matter wide publicity, and I am of the firm opinion that, for a time, Algonquin Park was absolutely free from poachers.

ALGONQUIN PARK TELEPHONE SYSTEM.

There are twenty-six or twenty-eight telephones installed and in use by rangers and park headquarters, hotels, lumber companies, physicians and cottagers. The line is connected with the Bell Company at Huntsville, thus affording communication with Toronto and points outside of the park.

Mr. Fraser, proprietor of Mowat Lodge, had on many occasions explained

the urgent need of telephonic connection with the outside world, not only for the important part it would play in case of forest fires, but the hundreds of visitors to Mowat Lodge would be very thankful for the convenience. Mr. Fraser volunteered to cut, haul out and stand the poles if the Department would run the wires. This arrangement appeared satisfactory and the line was completed on October 2nd, 1922, at a cost of less than one hundred dollars to the Department.

From Rock Lake Station to Menwahtay the old wire, which had been in use for some ten years, was taken down and replaced with new No. 9 wire.

It is advisable that arrangements should be made with the telephone subscribers, so that the Department may collect the regular annual rental on each 'phone in addition to the tolls on long distance calls.

A great many new applications were received during the past year for camping and cottage sites. The revenue received in rentals and accompanying new applications, amounted to \$1,562.67.

Received from rental of team of horses, \$112.50.

It is a well-known fact that there are persons who visit the park every summer for the purpose of collecting eggs, and a regulation should be enacted forbidding the taking or destroying of any nest or eggs of game birds, insectivorous or song birds, without a permit from the Minister of Lands and Forests.

I am very sorry to report the sudden death of Ranger Henry Foy, who died in Eganville, May 2nd, 1922.

I am also very sorry to report a fatal accident which occurred at Whitney, June 4th, 1922. Jos. Davis, a young aviator, went out in a small motor boat to guide one of the new big planes to anchorage. Misjudging the distance, he approached too close and the wash of the plane upset the boat, throwing Davis into the Lake. Davis left a wife and four small children.

GAME AND PREDATORY ANIMALS.

Notwithstanding the perpetual menace of the timber wolf, the deer are everywhere abundant.

The rangers have had a large measure of success in the destruction of predatory animals. In addition to the increase of big game, the valuable fur-bearing animals, such as beaver, fisher marten, mink and otter are increasing in the park.

Algonquin Park is serving well one of the great purposes for which it was created. A wonderful fountain of wild life which overflows its invisible boundaries to the benefit of the border hunters and trappers.

REVENUES.

The Department of Lands and Forests is not, nor has it been, receiving the revenue from Provincial Parks to which it is entitled. Many sources of revenue remain untouched and in order to secure the control which is necessary to the proper administration of the park, regulations should be enacted to govern and license every business now carried on, or which may be introduced in the future. In this connection I am mentioning the sources from which revenue is derived at the present time, viz.:

Resident Fishing License.

Non-resident Fishing License.

Guides' License—(should be two dollars instead of one).

Timber License.

Wood-cutting License.

Boarding and Tourist Houses.

Hotels and Resorts.

Lease of Lots, Rentals, etc.

Campers' License.

Tolls collected from Algonquin Park Telephone Line.

The following suggestions are worthy of consideration:—

License to take gravel.

Annual charge to telephone subscribers.



Beaver dam above White's Lake, Algonquin Park.

License to graze live stock within the park.

Retail store of every description.

Horse liveryes.

Boat and launch liveryes.

Carpenter contractors, builders, living and doing business in park.

Pool and bowling alley license.

Pedlar's license—the man with a pack should be licensed.

Egg collectors.

Taxidermists. Make it a misdemeanour to take any animal or bird license within the park for the purpose of mounting, without a permit.

License to take sphagnum moss.

The Department should have the entire revenue from live animals secured for breeding stock, and the sale of skins from all animals taken in the park.

I have the honour to be, Sir,

Your obedient servant,

JOHN W. MILLAR,
Acting Superintendent.

*The Honourable Beniah Bowman,
Minister of Lands and Forests,¹
Toronto, Ontario.*



Provincial Parks' Exhibit, Toronto Exhibition, 1922.

Appendix No. 45.

RONDEAU PROVINCIAL PARK,
MORPETH P.O., ONT., October 31st, 1922.

HONOURABLE SIR,—I beg to submit my report for the fiscal year ending October 31st, 1922.

Rondeau Provincial Park is becoming more popular every year as a summer resort, a greater number of visitors coming here this last year than ever before. Lying as it does, between Rondeau Bay and Lake Erie, the park, with



Road in Rondeau Park.

its 5,000 acres, affords great interest to lovers of nature. The forest itself is the only one of its kind in Western Ontario, and as most of it is in its natural state, the beauty of its wildness is unsurpassed. It is densely wooded with most valuable timber, considerable pine, walnut, whitewood and all the varieties of hardwood being found here. The trees are tall, straight and well proportioned.

In these beautiful woods may be seen any number of deer. They have

become very numerous of late years and threaten to destroy all chances of reforestation as they destroy all the young growth. Steps are being taken to lessen their number, nearly two hundred having been shot this last winter for venison, which was sold at the park by the carcase, bringing in a revenue of over \$1,600.00. Plans are being made to confine a certain number of the deer in an enclosure of perhaps 100 acres and if this is done, reforestation would not be impeded as it is, under present conditions.

Black squirrels are very numerous. The beaver colony is thriving and they are evidently very energetic little animals as shown by their work. There are plenty of muskrats throughout the marshes. The wild duck season, from the sportsman's point of view, has been very good, ducks having been just as numerous as in other years.

The Canadian geese and wild turkeys have not increased in numbers as in other years on account of the racoons and skunks breaking up their nests and destroying their young.

Pheasant rearing has been very successful with the different varieties we have here. We have a good stock of reeves, goldens, Lady Amhersts, silvers, Chinese and English pheasants. Many of the English pheasants have been liberated, and a large number of eggs have been supplied to those who are interested in the rearing of these beautiful birds.

Over forty new cottages were built on the park this year, ranging in price from \$1,000.00 to \$3,000.00. Lots are still very much in demand. Last spring a new survey was made of ninety-one lots and the greater number of these are already taken. Many communications are received every year asking for hotel accommodation and we hope in the near future to see a modern summer hotel erected, which will provide ample accommodation for the public.

Tenting is very popular. The grounds are ideal and the beautiful oaks furnish shade and shelter.

Some new roads have been constructed this year, at an expenditure of about \$1,700.00. Bowman Avenue, at the east end of the park, has been levelled and clayed, as has also a road known as the Lake Shore Road, connecting Bowman Avenue and the "Loop." These roads will be gravelled this coming winter.

One of the greatest improvements the park has ever had or could have, is that of the installation of the Hydro-Electric, which was completed about the middle of July last. It is greatly appreciated by the public and is a wonderful boon to the place, which was formerly in dense darkness.

A large modern ice-house was built on the park this year. The lessees of the public stand have control of it and they supply ice at a moderate price to all who require it.

Angling has been good on the bay this year, and the addition of a boat livery fills a long-felt need.

Another convenience this year has been the establishing of a gasoline and oil station. This convenience has indeed been greatly appreciated by the travelling public.

I have the honour to be, Sir,

Your obedient servant,

GEORGE GOLDWORTHY,

Park Superintendent.

*The Honourable Beniah Bowman,
Minister of Lands and Forests,
Toronto, Ontario.*

Appendix No. 46.

TORONTO, ONT., October 31st, 1922.

Honourable Beniah Bowman, Minister of Lands and Forests, Ontario.

SIR,—I have the honour to submit my report of the work performed by the Colonization Roads Branch of the Department of Lands and Forests for the fiscal year ending October 31st, 1922.

This report is presented in tabulated form. On its final page is shown a summary of the total expenditures on the various classes of work performed.



Mining Road, Frontenac County.

The total expenditure for the year was \$671,184.48. Of this amount \$414,863.74 was expended directly by this department upon roads and bridges in approximately three hundred townships. The expenditure for inspection, engineering and miscellaneous services was \$33,710.19. The remainder, \$222,610.55, was

distributed as grants towards the expenditures made by one hundred and ninety-nine municipalities, who passed Road, Machinery, and Road Overseer by-laws, in accordance with the provisions of the Colonization Roads Act.

The inspectors in nearly every district have acted as paymasters, and while this has increased the burden of their duties, nevertheless, it is proving more satisfactory than appointing overseers to handle the money and make the expenditures.



Road Construction in Muskoka.

The efficiency could be further increased by providing clerical assistance for the inspectors, and furnishing them with light motor cars to supervise their work.

More attention was given during the past fiscal year to the proper surveying and locating of new roads and diversions from roads previously constructed. Municipalities and district organizations are co-operating with this department more than ever before, but there is still room for marked improvement.

I would strongly urge that legislation be enacted, making all grants conditional on those benefited being compelled to assume some of the burden of, and responsibility for, the cost in every expenditure.

All of which is respectfully submitted.

I have the honour to be, Sir,

Your obedient servant,

C. H. FULLERTON,
Superintendent Colonization Roads.

COLONIZATION ROADS BRANCH.

MENT, 1921-1922.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE							MILEAGE	EXPENDITURE	NUMBER	
Number	Span	Material	Number	Material	Material	Cubic yards	Side-Brushed		Graded and Shaped		SURFACED						
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet				
																	18	19	20	21	22	23	24
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
1	12	wood	5	iron	stone	400	15	18	460	22	gravel	540	6	2.00	\$	1,000.37	1
									30	20	gravel	140	5	.50		200.47	2
			14	metal	stone	400	960	20	50	18	gravel	130	9	8.50	14,100.00		3
			11	wood					1,735	14	gravel	65	8	.50	1,607.24		4
									750	25	gravel	550	8	2.50	502.75		5
											stone	380	5	1.19	600.00		6
			7	cedar			470	15	1,550	16	gravel	575	10	5.25	1,121.08		7
			6	cedar			150	35	2,515	20	gravel	300	12	8.25	1,715.00		8
			2	cedar			275	18	1,695	18	gravel	700	8	5.50	1,375.98		9
			11	metal	stone	25	410	12	130	24	gravel	545	7	3.00	1,549.94		10
1	9	cedar	4	cedar	earth	72			180	18	gravel	345	6	2.00	598.70		11
			2	stone	stone	11			527	12	gravel	701	6	3.75	300.00		12
			11	cedar					758	14	gravel	48	6	3.00	950.10		13
			11	cedar	clay	190			240	18	gravel	320	8	1.50	1,205.18		14
			2	cedar	clay	2,930			254	24	gravel	1,031	6	5.15	4,278.48		15
			4	wood							gravel	450	8	1.68	1,093.10		16
4	25	cedar	5	cedar	earth	4,339								8.00	9,554.79		17
			8	wood	earth	360								.75	500.00		18
1	10	cedar	12	cedar	rock	20			1,263	14	gravel	246	6	5.75	4,056.27		19
			4	cedar			400	40	2,140	18	gravel	800	5	6.75	1,117.17		20
			4	wood	earth	590			300	22	gravel	100	6	2.25	1,504.82		21
			1	wood	stone	920	160	10	80	30	gravel	230	10	1.00	1,446.35		22
			8	cedar	stone	350	40	20	1,474	18	gravel	136	7	5.00	998.23		23
			4	t'm'r'c			200	20	620	30	clay	80	8	2.50	1,150.00		24
			5	stone	stone	50	35	10	52	14	gravel	216	9	.75	451.54		25
			4	wood					280	20	gravel	790	7	2.60	1,298.41		26
														7.00	990.00		27
			8	cedar					462	14	gravel	416	8	2.00	751.18		28
			14	cedar			80	30	200	18				1.00	800.15		29
			13	wood	stone	540	180	20	812	14	gravel	571	8	5.00	2,640.63		30
3	12	cedar	5	metal	rock	25,735								2.00	21,759.27		
			9	t'm'r'c	clay	600			900	20	gravel	565	6	4.00	1,900.00		31
1	16	cedar	16	cedar			150	16	400	12	gravel	455	5	2.50	1,001.86		32
			3	tile	stone	191			225	18	gravel	432	6	4.00	999.40		33
			7	wood	earth	1,029	1,980	20	840	30	gravel	1,350	10	9.00	3,950.83		34
1	16	wood	5	wood	earth	75					gravel	82	7	1.50	1,546.96		35
			10	rock	stone	500	680	20	240	22	gravel	890	7	7.00	3,351.63		36
			2	cedar	earth	1,000			160	33				.50	199.71		37
			25	wood	earth	340			1,755	16	gravel	215	6	7.52	3,496.52		38
			11	wood					460	18	gravel	55	6	3.00	1,510.62		39
1	24	rep'd	2	stone	rock	5,447	200	12	80	16	gravel	320	7	2.00	5,007.51		40
			3	t'm'r'c	clay	200	530	24	50	30	gravel	175	6	2.75	2,940.00		41
			4	wood			180	14	80	18	gravel	700	6	2.05	999.57		42
3	12	cedar	10	cedar	earth	370	1,200	33	1,600	20	gravel	1,004	8	12.66	4,607.63		43
							640	20	1,550	15	gravel	600	8	5.00	642.00		44
			3	cedar			200	20	450	18	gravel	400	6	2.10	501.80		45
			11	stone	stone	1,745	940	30	2,190	20	gravel	200	7	8.25	2,420.85		46
			4	cedar							gravel	100	8	.37	150.00		47
									300	20	gravel	294	6	1.00	2,400.00		48
			3	cedar					3,227	10	gravel	738	8	11.00	1,710.75		49
			6	wood	earth	555	440	12	960	24	gravel	660	7	4.00	2,158.21		50
1	12	cedar	4	cedar			350	25	200	16				1.10	402.50		51

COLONIZATION ROADS BRANCH.—Continued.

MENT, 1921-1922.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE						MILEAGE	EXPENDITURE	NUMBER	
Number	Span	Material	Number	Material	Material	Cubic yards	Side-brushed		Graded and Shaped		SURFACED					
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods				Width, feet
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
			3	wood	stone	1,500			200	14	gravel	30	6	1.00	\$ 499.17	52
			8	wood	rock	5			534	16	gravel	1,211	7	3.70	4,950.00	53
			13	wood					865	16	gravel	435	8	3.61	2,007.12	55
			5	wood	earth	625	380	30	180	20	gravel	1,060	7	6.20	3,930.21	56
			10	wood					370	15	gravel	10	10	2.20	1,629.87	57
			3	u'm'r'c			60	12	1,050	30	gravel	445	6	3.20	2,839.90	58
2	16	wood		sand	earth	1,400	160	16	1,120	33	gravel	960	12	3.50	1,196.16	59
			3	stone	earth	18	245	30	319	22	gravel	548	6	2.00	1,214.55	60
			9	wood	earth	167	260	20	360	20	gravel	155	6	2.00	602.59	61
			14	wood	rock	195	280	20	230	18	gravel	20	5	1.18	1,000.64	62
			6	cedar	stone	60								.50	501.40	63
			3	cedar	earth	160	40	20	330	18	gravel	172	5	1.02	499.80	64
			10	wood	earth	200	80	12	380	26	gravel	920	7	4.39	2,604.90	65
														.50	150.25	66
			4	u'm'r'c			240	40	560	30	gravel	469	6	3.94	3,670.00	67
			2	pine					117	12				1.00	731.76	68
			1	cedar			316	12	1,435	12	stone	13	7	4.50	200.24	69
			4	cedar	stone	215					gravel	190	5	.75	702.88	70
			5	cedar			310	40	515	10	gravel	385	7	2.61	706.65	71
1		rep'd	9	wood										1.12	2,000.00	72
			4	cedar			400	24	320	14	gravel	240	7	1.25	380.00	73
			22	wood					1,285	15	gravel	611	8	5.18	3,578.70	74
			9	cedar	clay	2,406	400	12	560	16	gravel	480	7	2.18	3,028.30	75
			11	stone	earth	400	320	20	1,075	14	gravel	1,095	8	6.41	2,146.58	76
			1	wood			40	16	50	20	gravel	140	6	.50	298.36	77
					earth	100	360	55	240	30				13.40	5,999.78	78
1	10	wood	2	wood	earth	400	90	12			gravel	100	7	.93	653.75	79
			16	cedar	rock	10			867	14	gravel	400	6	3.90	2,608.82	80
														.44	240.00	81
														.75	202.55	82
2	16	cedar	1	cedar	earth	550			180	16				.75	240.00	83
			7	cedar			10	20	1,095	14	gravel	620	6	3.94	2,000.00	84
			9	cedar			50	20	388	14				1.49	793.21	85
									105	14	gravel	458	9	4.10	1,583.15	86
			2	cedar			400	30	1,000	20	gravel	575	10	3.10	901.98	87
			2	tile	stone	40	45	20			gravel	576	6	1.80	1,103.25	88
			5	cedar			600	25			gravel	600	8	1.85	850.69	89
														.56	589.37	90
									80	22	gravel	90	6	.25	200.00	91
			7	cedar					87	14	gravel	48	6	.52	603.13	92
			6	cedar	earth	45	30	20	295	14	gravel	210	8	1.13	870.00	93
			2	cedar	stone	38	85	30	22	16	gravel	93	6	.30	300.25	94
			10	wood	stone	47								.92	1,002.50	95
			1	cedar	cord'y	500								.30	100.00	96
			6	stone	rock	100	60	16	140	18	gravel	660	5	2.07	1,203.11	97
2	16	cedar	8	pine	earth	400	50	35	160	15				.80	777.40	98
			7	cedar	earth	256	187	20	626	18	gravel	428	5	2.10	1,311.65	99
			8	wood	rock	11	25	20	827	14	gravel	370	6	3.40	1,361.81	100
1	20	wood	2	wood	clay	25			320	28	gravel	990	6	3.70	4,810.00	101
1	10	cedar	11	metal	earth	400	600	12	535	22	gravel	637	7	4.70	808.41	102
											gravel	140	7	.44	151.75	103

COLONIZATION ROADS BRANCH.—Continued.

MENT, 1921-1922.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE							MILEAGE	EXPENDITURE	NUMBER	
Number	Span	Material	Number	Material	Material	Cubic yards	Side-brushed		Graded and Shaped		SURFACED						
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet				
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
					earth	300	600	12	340	22	gravel	150	7	2.00	\$	599.25	104
			17	metal	earth	105			195	22	gravel	182	7	2.12	1,002.75	105	
			12	cedar				90	30	320	12			1.00	248.95	106	
1	30	wood	6	cedar										1.70	804.05	107	
			2	cedar	earth	1,140			95	20	gravel	200	6	2.16	799.49	108	
4	20	wood			sand	300	264	16	514	24	gravel	196	6	1.76	1,990.41	109	
1	18	pine	35	wood	stone	120	200	5	2,045	16	gravel	1,532	8	9.40	6,488.07	110	
			1	cedar										.21	206.40	111	
			3	cedar	clay	30			320	14	gravel	140	6	1.00	780.00	112	
			9	wood	clay	592			310	22	gravel	180	6	1.00	700.00	113	
			14	cedar	earth	240	200	16	525	16	gravel	25	5	2.10	1,501.09	114	
			2	stone	earth	60	80	25	80	18	gravel	100	5	.31	500.65	115	
			14	metal	stone	2,053	75	20	592	18	gravel	600	10	2.40	5,440.70	116	
					rock	10	80	16	280	16	gravel	565	6	1.80	801.65	117	
							80	16	160	12	gravel	40	5	.50	300.00	118	
1	12	cedar	10	cedar			149	10	815	12	gravel	392	8	3.83	1,208.55	119	
			4	cedar					410	16				1.28	302.20	120	
			3	cedar				960	10	640	20	gravel	480	10	3.00	995.70	121
			1	wood	earth	60			139	18	gravel	419	6	1.40	750.00	122	
			17	metal	stone	97	200	20	600	18	gravel	245	6	4.40	900.79	123	
1	18	rep'd	8	wood	earth	80	80	30	260	24	gravel	755	7	2.36	1,727.28	124	
			6	wood	earth	250			250	18	gravel	130	6	1.70	805.37	125	
			2	cedar	gravel	900	600	20	950	18	gravel	250	10	2.97	807.37	126	
			5	cedar			300	20	950	18	gravel	700	8	2.97	752.89	127	
1	10	cedar	8	cedar			1,440	20	1,280	16	gravel	300	6	5.00	1,198.05	128	
			4	cedar					90	14	gravel	26	6	.28	309.10	129	
			9	cedar	earth	294			310	16	gravel	337	7	5.22	1,357.86	130	
			1	cedar			100	20	120	16	gravel	70	6	2.00	298.20	131	
			8	cedar			1,000	25	1,000	12				3.13	301.50	132	
			7	cedar	earth	1,200	975	25	2,700	16	gravel	875	10	9.76	2,527.55	133	
			9	wood	earth	540	300	14	540	20	gravel	80	5	2.04	604.12	134	
1	16	wood			stone	250			320	22	gravel	100	6	1.00	299.99	135	
					stone	68			70	24	gravel	80	5	.25	300.03	136	
1	75	cedar			earth	60	385	50	320	33	earth	65	33	2.20	344.80	137	
1	16	cedar	6	cedar	clay	1,613	370	16	448	24	gravel	483	6	2.70	3,640.00	138	
1	re	paired	10	cedar			215	28	215	28	gravel	1,222	6	4.24	3,320.00	139	
			13	stone		20	929	20			gravel	560	8	3.70	1,107.44	140	
			2	cedar	earth	450								.56	506.75	141	
			3	wood					225	16	gravel	55	10	.89	802.00	142	
1	14	pine	5	wood	clay	3,400			660	30	gravel	490	6	3.34	3,020.00	143	
					clay	3,400			190	6	gravel	190	6	.90	3,030.00	144	
							60	30	80	20	gravel	130	6	.41	302.56	145	
			4	t'm'rc										1.50	799.00	146	
1	10	cedar	10	cedar	stone	449	320	50	410	22	gravel	390	6	2.20	1,308.07	147	
			3	conc'r	stone	115	10	10	120	16	gravel	465	8	1.50	1,060.00	148	
2	42	cedar	13	cedar	earth	5,400			560	28	gravel	250	6	2.92	3,092.39	149	
							150	35			gravel	475	10	1.50	404.20	150	
			1	wood	stone	320			30	26	gravel	70	8	.25	667.74	151	
			12	cedar	clay	200	440	15	840	28	gravel	1,006	6	5.50	3,950.22	152	
			13	cedar					704	14	gravel	172	6	3.29	1,554.55	153	
			5	metal	earth	220	300	20	210	14	gravel	210	7	.90	1,099.87	154	
			2	cedar	stone	50	120	16	512	18	gravel	682	5	2.13	979.98	155	

COLONIZATION ROADS BRANCH.—Continued.

MENT, 1922-1923.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE						MILEAGE	EXPENDITURE	NUMBER	
Number	Span	Material	Number	Material	Material	Cubic Yards	Side-brushed		Graded and Shaped		SURFACED					
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet			
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
			4	cedar					409	20	gravel	171	5	1.28	\$ 505.40	156
			4	pine										.87	316.13	157
			3	cedar					480	14	gravel	440	6	1.50	801.23	158
			2	wood	earth	350	160	30	120	20	gravel	170	5	.53	300.59	159
			2	wood			40	12	200	22	gravel	160	6	.63	301.07	160
			4	wood					77	20	gravel	160	5	.65	349.90	161
			4	wood										1.10	522.50	162
			11	cedar	earth	148	30	40	57	14	gravel	301	8	.94	901.66	163
			1	t'm'rc					100	20	gravel	798	6	2.49	3,480.80	164
			4	wood					742	14	gravel	575	6	2.72	1,403.00	165
1	12	cedar	3	wood					306	14	gravel	580	6	1.80	749.08	166
			7	wood	stone	530	40	10			gravel	320	6	1.08	875.62	167
			1	cem'nt	clay	1,696					gravel	37	7	.13	1,000.00	168
			1	cem'nt	earth	550			110	22	gravel	190	6	.60	599.62	169
					stone	12			162	10				.52	100.50	170
			12	cedar	earth	768	110	20	2,199	20	gravel	899	6	6.87	3,002.99	171
			4	cedar			200	30	1,575	25	gravel	950	8	4.90	1,259.82	172
			5	cedar			100	20	130	14	gravel	90	6	.67	550.10	173
					earth	100	450	18	500	16	gravel	500	8	3.43	854.73	174
			8	wood	stone	68	50	30	233	16	gravel	228	6	.87	614.45	175
			2	metal	earth	49	40	30	720	18	gravel	235	8	2.20	803.15	176
			2	c'ment	earth	280			210	20	gravel	270	6	.86	743.86	177
			1	metal	earth	1,600					gravel	20	5	.10	200.62	178
					stone	254	64	25	25	20	gravel	64	6	.22	201.10	179
					stone	20					stone	555	6	1.70	900.82	180
2	16	wood	10	wood	earth	170	100	12	660	20	gravel	85	8	4.25	1,975.37	181
			4	tile					60	16	stone	605	8	1.90	908.80	182
1	16	pine	4	cedar	stone	100	320	20	380	16	earth	320	10	6.60	899.90	183
			6	wood	rock	20			400	20	gravel	100	6	1.88	692.96	184
			1	cedar	rock	18	20	20	100	16	gravel	100	7	.31	200.80	185
			2	cedar			113	50	103	16	gravel	153	7	.47	598.45	186
			8	wood	earth	100	500	60	640	16				2.00	706.65	187
1	repaired		5	stone	rock	4	245	20	260	18	gravel	296	6	.94	602.15	188
			13	wood					1,010	16	gravel	85	10	3.15	998.61	189
			2	cedar	rock	27			100	16	gravel	100	5	.31	602.23	190
			6	stone	rock	320	100	10	240	16	gravel	233	7	.75	2,605.02	191
			6	cedar	stone	48	380	16	360	18	gravel	480	7	1.50	1,000.00	192
			3	cedar					82	20	gravel	85	5	.27	202.58	193
									357	24	gravel	294	7	3.19	2,094.88	194
			1	metal	stone	60			142	22	gravel	112	5	.43	199.73	195
1	12	cedar	3	cedar					742	14	gravel	85	6	2.30	1,269.82	196
									280	14	gravel	118	6	.87	299.60	197
1	226	wood	1	cedar					160	14				.72	256.94	198
			2	pine					160	14	gravel	116	6	1.85	859.62	199
														.35	250.50	200
					stone	29	166	16			gravel	175	8	.79	511.37	201
1	10	pine	8	wood					1,015	18	gravel	365	10	8.25	1,508.45	202
			6	wood	earth	170	70	20	200	20	gravel	582	5	2.00	1,050.10	203
			2	cedar	earth	110			510	20	gravel	310	6	1.60	500.48	204
			3	wood	earth	105			100	24	gravel	450	6	1.50	907.61	205
			4	cedar	earth	94	320	30	480	16	gravel	480	6	1.50	800.00	206
			4	cedar					100	12	gravel	280	6	.93	499.00	207

COLONIZATION ROADS BRANCH.—Continued.

MENT, 1921-1922.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE						MILEAGE	EXPENDITURE	NUMBER	
Number	Span	Material	Number	Material	Material	Cubic Yards	Side-brushed		Graded and Shaped		SURFACED					
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods				Width, feet
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
			4	cedar			300	12	150	16	gravel	375	6	1.30	\$	c.
			3	wood	sand	69								1.15	599.00	208
			16	wood					860	14	gravel	486	6	3.22	624.55	209
			2	cedar					468	14	gravel	20	6	2.18	1,600.00	210
			4	metal	earth	3,535	20	10	143	18	gravel	141	8	1.00	792.13	211
			9	wood	earth	80								2.25	2,260.00	212
			8	cedar	stone	52			205	10	stone	203	8	.64	796.86	213
			4	wood	stone	1,206	280	20	130	24	gravel	345	7	1.69	488.50	214
			9	cedar					180	14	gravel	100	6	1.09	1,682.87	215
			4	wood	stone	90	135	8	215	16	gravel	68	6	.67	806.21	216
			3	cedar	stone	25	35	20	120	16	gravel	69	6	.43	301.33	217
			2	stone	stone	138	12	20	43	18	gravel	16	6	1.50	199.87	218
			17	cedar	earth	318	600	20	1,248	18	gravel	117	7	3.90	300.60	219
			16	wood	stone	25			240	16				2.25	1,193.49	220
					stone	200					gravel	500	12	1.56	2,001.13	221
			2	stone	stone	300			200	16	gravel	160	5	.62	425.60	222
			3	wood					480	12	gravel	150	10	1.50	502.75	223
			1	wood										4.00	499.75	224
			11	stone	stone	116	150	10	125	18	gravel	240	5	.75	1,499.12	225
			6	wood	earth	100	100	20			gravel	90	7	2.08	1,000.14	226
2	12	wood	7	cedar			50	16			gravel	160	8	1.06	708.87	227
			4	cedar			337	20	300	16	gravel	650	7	2.03	452.35	228
			7	cedar	rock	295	240	16	140	18	gravel	100	5	1.15	1,203.33	229
			3	tile	stone	36			127	14	gravel	83	8	.50	1,004.39	230
					clay	325			180	30	gravel	198	8	1.00	200.01	231
			3	metal	earth	4,497			539	22	gravel	606	8	2.00	1,050.00	232
			6	metal					87	14	gravel	267	8	.85	1,973.18	233
			17	metal	stone	100	85	40	310	18	gravel	415	8	1.30	300.78	234
			8	wood					1,325	12	gravel	240	7	4.50	1,270.07	235
					stone	20			190	18	gravel	170	6	.61	2,112.05	236
			3	wood					120	22	gravel	210	5	.65	499.00	237
			4	stone	stone	30	160	12	250	18	gravel	15	7	.80	349.87	238
			5	wood	earth	490	60	16			gravel	80	6	1.25	297.09	239
			1	cedar										1.40	499.98	240
			4	cedar					160	18	gravel	100	7	.50	798.91	241
									100	18	gravel	175	5	2.10	296.10	242
			5	wood										3.00	400.50	243
			4	cem'nt	stone	210			320	22	gravel	587	5	2.80	1,538.49	244
					earth	640	40	26	320	20	gravel	300	6	2.90	1,599.75	245
			2	cedar	stone	200					gravel	30	5	.12	749.82	246
			3	cedar	earth	1,344	240	40	140	28	gravel	135	6	.75	500.95	247
														.50	984.65	248
			5	cedar			1,150	35	1,175	20	gravel	300	6	5.55	250.63	249
			7	cedar			675	30	1,575	18	gravel	500	7	5.85	916.37	250
			3	tile	earth	3,710	20	17	259	28	gravel	374	6	1.75	941.16	251
			9	cedar					410	14	gravel	60	7	1.80	2,398.55	252
			6	cedar										.50	893.80	253
			10	stone	earth	105								1.25	299.98	254
1	10	wood	4	wood	rock	150	700	30	140	20	gravel	730	7	4.09	500.00	255
			1	cedar					1,900	20	gravel	200	8	6.00	1,531.17	256
			1	cedar							gravel	150	9	.47	708.00	257
			15	cedar	stone	50			290	16	gravel	460	5	1.70	200.10	258
														1.70	1,001.37	259

DEPARTMENT OF LANDS AND FORESTS, ONTARIO,
ANNUAL STATE

NUMBER	TOWNSHIPS	NEW CONSTRUCTION							DITCHED Length, rods
		Cleared and Stamped		Graded and Shaped		SURFACED			
		Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet	
1	2	3	4	5	6	7	8	9	10
260	Ryerson Township roads.....								
261	Sabine Township roads.....	800	40	150	20				
262	St. Edmunds Township roads.....	20	66	120	24	gravel	120	6	240
263	Salter Township roads.....	240	50	240	20				
264	Sandfield Township roads.....	300	24	700	20				20
265	Sebastopol Township roads.....								250
266	Shakespeare Township roads.....								
267	Shedden Township roads.....	300	60	160	17	gravel	120	6	70
268	Sheffield Township roads.....								
269	Sheguiandah Township roads.....								
270	Sherwood Township roads.....	600	28	600	22				
271	Snowden Township roads.....								
272	Snowdon and Minden Township road.....								
273	Somerville Township roads.....								
274	Spence and Monteith Township roads.....								
275	Springer Township roads.....								
276	Stafford Township roads.....								90
277	Stanhope Township road.....								
278	Stanhope, Dorset-Minden Trunk road.....	3,200	45	426	14				860
279	Stephenson Township road.....								
280	Stisted Township roads.....								
281	Striker Township roads.....								100
282	Strong Township roads.....	100	40	220	22	gravel	200	6	440
283	Sunnidale Township roads.....								
284	Tarentorous Township roads.....			840	30	gravel	36	6	216
285	Tay Township roads.....	236	66	326	36				8
286	Tehkummah Township roads.....								30
287	Thessalon Township roads.....								
288	Thompson Township roads.....								140
289	Tiny Township roads.....								24
290	Torbolton Township roads.....								
291	Tudor and Cashel Township roads.....	30	40	90	24	gravel	20	6	180
292	Vankoughnet Township roads.....	323	50	147	20				294
293	Vespra Township roads.....	120	66	30	22				43
294	Victoria Township roads.....								15
295	Waters Township roads.....	225	22	100	16				250
296	Wells Township roads.....								60
297	Westmeath Township roads.....								
298	Widdifield Township roads.....	170	40	105	20	gravel	90	10	230
299	Wilberforce Township roads.....								
300	Wollaston Township roads.....								
301	Wood Township roads.....	1,400	30						
	Total.....	48,499		32,110			6,378		31,417

COLONIZATION ROADS BRANCH.—Continued.

MENT, 1921-1922.

BRIDGES			CULVERTS		CUT AND FILL		MAINTENANCE						MILEAGE	EXPENDITURE	NUMBER		
Number	Span	Material	Number	Material	Material	Cubic Yards	Side-brushed		Graded and Shaped		SURFACED						
							Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet				
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
			6	cedar	earth	200	100	16	260	18	gravel	640	7	2.25	S c.	260	
			2	wood	earth				150	16				3.00	669.65	261	
					clay	375								.38	1,106.48	262	
			4	wood	earth	300			160	20	gravel	160	6	1.25	499.41	263	
			6	stone	stone	285	50	20	50	20	gravel	150	8	2.65	1,196.43	264	
			2	cedar	rock	100			300	20	gravel	400	10	3.28	831.88	265	
					earth	200			100	22	gravel	250	6	.77	400.00	266	
									15	14	gravel	165	8	.51	200.00	268	
					rock	10	40	26	60	24	gravel	380	7	1.19	700.05	269	
			1	cedar	earth	1,800	800	18	1,150	22	gravel	150	15	5.47	1,240.26	270	
			4	cedar			55	30			gravel	122	6	.38	200.10	271	
			3	cedar	earth	13	60	16	330	20	gravel	210	6	1.03	398.95	272	
			1	metal	stone	79	36	12	159	18	gravel	386	8	1.20	800.92	273	
1	14	cedar	3	cedar					20	14	gravel	500	7	1.56	421.13	274	
			3	wood					120	14	gravel	303	6	1.04	757.10	275	
			1	cedar	earth	230	90	50	90	28				.28	399.80	276	
			1	cem'nt	stone	108	10	20	25	18				.08	300.50	277	
2	12	stone	4	stone	earth	7,497								10.00	19,944.59	278	
1	16	wood	3	wood	earth	100	80	16	340	16	gravel	250	5	1.06	1,000.64	279	
			3	cedar	stone	118	80	20	100	16	gravel	370	5	1.15	702.75	280	
					earth	150	200	14			gravel	220	5	.69	495.62	281	
1	10	cedar	16	cedar					580	18	gravel	290	7	2.50	1,024.13	282	
					sand	100					gravel	40	16	.14	450.00	283	
			3	cem'nt	rock	28								2.62	999.95	284	
														1.02	1,515.16	285	
			9	wood	stone	80	380	15	380	26	gravel	1,300	7	4.06	2,299.09	286	
1	40	wood	2	wood	earth	360	160	20	400	20	gravel	260	6	1.25	602.98	287	
			2	wood	stone	50					gravel	465	6	1.45	703.15	288	
					sand	350			285	22	gravel	222	5	1.08	649.48	289	
					earth	250					gravel	250	10	.78	500.52	290	
			3	stone	stone	550					stone	159	7	.78	748.31	291	
1	12	cedar	4	cedar	earth	1,521	78	20	230	24	gravel	154	6	2.10	1,973.10	292	
					sand	200					gravel	175	8	.93	880.00	293	
					earth	100			460	20	gravel	570	6	1.80	960.46	294	
2	22	stone	7	cedar	earth	1,300	30	8	50	12	gravel	305	8	2.10	1,250.10	295	
			4	wood	earth	467	180	16	390	20	gravel	300	5	1.34	947.50	296	
					stone	50	150	20	575	22	gravel	404	10	2.58	804.95	297	
			26	wood					1,716	16	gravel	669	10	6.33	3,835.82	298	
			4	tile	earth	500	1,400	15	3,640	18	gravel	2,285	10	12.72	2,905.00	299	
											stone	120	8	.38	200.00	300	
2	16	wood	5	stone										4.38	1,001.05	301	
67			1,504			127,370			41,806		121,220			88,774	721.20	414,863.74	...

SCHEDULE SHOWING THE AMOUNT OF WORK OF ROAD CONSTRUCTION,

NUMBER	MUNICIPALITY	CLEARED AND STUMPED		GRADED		SURFACED		
		Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet
1	2	3	4	5	6	7	8	9
1	Admaston, By-law No. 256	300	25	3,375	25	gravel	1,975	15
2	A berrmarle, By-law No. 600					gravel	1,675	5
3	Albermarle, By-law No. 611					gravel	1,485	6
4	Alberton, By-law No. 1	166	66	506	25	gravel	1,097	6
5	Algona, North, By-law No. 25	100	40	650	18	gravel	300	8
6	Algona, South, By-law No. 82	300	20	1,500	20	gravel	500	10
7	Algona, South, By-law No. 77			1,625	14	gravel	175	8
8	Alice and Fraser, By-law No. 4	220	30	1,695	28	gravel	1,025	10
9	Armour, By-law No. 414	400	20	380	17	gravel	90	6
10	Assiginack, By-law No. 447	100	12	310	24	gravel	905	7
11	Assiginack, By-law No. 444 (grader)							
12	Atwood, By-law No. 118	696	66	287	34	gravel	429	6
13	Bagot and Blythfield, By-law No. 345	1,250	40	3,200	30	gravel	2,150	10
14	Balfour, By-law No. 67	1,120	18	8,330	33	gravel	460	8
15	Belmont, By-law No. 631	215	10	54	10	gravel	603	8
16	Billings, By-law No. 261	400	20	810	24	gravel	500	7
17	Blezard, By-law No. 136			320	33	gravel	410	10
18	Blezard, By-law No. 128	229	12	785	12	stone	366	8
19	Blue, By-law No. 61	484	66	525	28	gravel	140	6
20	Brethour, By-law No. 20 (overseer)							
21	Bromley, By-law No. 323			2,420	20	gravel	4,625	10
22	Bromley, By-law No. 309			1,700	18	gravel	1,305	8
23	Bromley, By-law No. 313 (grader)							
24	Brougham, By-law No. 721	700	20	900	20	gravel	400	7
25	Burleigh, By-law No. 1					stone	154	6
26	Burleigh, By-law No. 2 (grader)							
27	Burpee, By-law No. 121			220	24	gravel	450	7
28	Cardiff, By-law No. 608	280	20	943	18	gravel	288	6
29	Caldwell, By-law No. 308					gravel	1,325	6
30	Carling, By-law No. 134	640	16	800	20	gravel	430	6
31	Carlow, By-law No. 139	160	20	865	18	gravel	216	7
32	Carnarvon, By-law No. 351	100	12	540	22	gravel	755	7
33	Casey, By-law No. 365 (overseer)							
34	Casimir, Jennings and Appleby, By-law No. 98			915	14	gravel	624	6
35	Chamberlain, By-law No. 91	320	28	160	28			
36	Chamberlain, By-law No. 87			320	28	gravel	160	6
37	Chamberlain, By-law No. 76 (overseer)							
38	Chandos, By-law No. 70	502	40	646	10	stone	214	7
39	Chandos, By-law No. 72 (machinery)							
40	Chandos, By-law No. 59 (overseer)							
41	Chapman, By-law No. 5			865	22	gravel	990	6
42	Chapple, By-law No. 307	1,485	50	1,936	24	gravel	3,936	6
43	Connce, By-law No. 58	614	25	680	16	gravel	174	7
44	Connce, By-law No. 54	820	30	720	18	gravel	400	8
45	Cosby and Mason, By-law No. 62			1,594	14	gravel	503	6
46	Cosby and Mason, By-law No. 52			2,230	14	gravel	218	8
47	Crosby, South, By-law No. 899			90	16	gravel	518	8
48	Dalhousie, By-law No. 848			605	22	gravel	275	10
49	Day and Bright, By-law No. 3					gravel	8	6
50	Dilke, By-law No. 104 (overseer)							
51	Dilke, By-law No. 106	421	40	765	32	gravel	337	6
52	Draper, By-law No. 411	60	20	370	18	gravel	985	5
53	Drury, Denison and Graham, By-law No. 208			175	20	gravel	3,060	8
54	Dungannon, By-law No. 92			321	18	gravel	102	7
55	Dysart, By-law No. 665	5,035	20	2,186	22	gravel	5,471	7
56	Eldon, By-law No. 527	160	18	896	20	gravel	1,514	7

COLONIZATION ROADS BRANCH, MUNICIPAL BY-LAWS, 1922.

DITCHED	CUT OR FILL		BRIDGES			CULVERTS		NEW ROAD MILEAGE	OLD ROAD MILEAGE	GOVERNMENT EXPENDITURE	NUMBER
	Length, rods	Material	Amount in Cu. yards	Number	Span, feet	Material	Number					Material
10	11	12	13	14	15	16	17	18	19	20	21
								.55	10.00	\$ 1,299.87	c. 1
						2	tile		5.25	735.92	2
	rock	40							4.65	849.75	3
25	clay	191				2	tile	2.66	1.50	1,095.62	4
						1	cedar		2.15	200.00	5
						7	cedar		4.70	500.00	6
						8	cedar		5.08	499.62	7
150						2	cedar		5.30	499.97	8
			1	10	cedar	3	cedar		1.25	300.00	9
	concr't	120				4	wood	.12	2.82	1,497.90	10
										103.39	11
	clay	1,150				2	wood	2.50	.95	1,325.00	12
			1	10	wood	36	metal		10.00	2,306.83	13
90	stone	1,340	5	20	cedar	11	cedar		29.10	1,500.00	14
	stone	500				5	metal		1.88	600.00	15
						9	stone		3.75	700.00	16
	earth	3,840							2.00	300.00	17
	stone	103							2.93	375.00	18
95	earth	120				4	wood	3.16		1,063.50	19
										99.60	20
	earth	300	1	10	wood	18	wood		5.80	2,700.00	22
										150.00	23
									2.81	300.00	24
						3	cedar		.48	200.00	25
										41.25	26
20	stone	110				8	stone		1.65	500.00	27
	stone	50				18	cedar		3.00	800.00	28
						8	metal		4.15	1,171.28	29
						8	metal	.50	2.00	600.00	30
						7	cedar		2.70	400.00	31
	stone	15	1	12	repaired	3	wood		3.08	700.00	32
										85.90	33
25						4	wood		4.00	1,700.00	34
						2	wood		1.00	250.00	35
						8	metal		1.25	500.00	36
										100.00	37
						3	cedar		2.15	200.00	38
										46.00	39
										8.80	40
	clay	175				17	cedar		3.15	500.00	41
521	clay	5,791	1	12	wood	28	wood	12.60	4.50	7,499.98	42
228	earth	200				5	wood	1.00	2.92	959.05	43
	earth	3,060	1	10	cedar	18	cedar	.25	3.50	1,000.00	44
						14	wood		5.00	562.31	45
110						10	wood		7.00	599.56	46
									1.62	399.56	47
						3	stone	.33	1.56	450.00	48
	gravel	586				1	cement	.03		290.00	49
										18.00	50
	earth	684						1.00	1.85	500.00	51
10	earth	495				67	cedar		3.30	1,249.89	52
654	earth	1,292	3	12	cedar	13	cedar		9.56	1,474.56	53
100	earth	200				6	cedar		1.32	296.75	54
927	stone	448	3	10	cedar	94	wood	2.24	20.35	6,458.08	55
47	earth	94	4	16	cement	12	metal		4.75	2,499.54	56

COLONIZATION ROADS BRANCH, MUNICIPAL BY-LAWS, 1922.—Continued.

DITCHED	CUT OR FILL		BRIDGES			CULVERTS		NEW ROAD MILEAGE	OLD ROAD MILEAGE	GOVERNMENT EXPENDITURE	NUMBER
	Length, rods	Material	Amount in cubic yards	Number	Span, feet	Material	Number					Material
10	11	12	13	14	15	16	16				
										56.00	57
	earth	200				4	cedar	1.53	499.87		58
140						9	wood	9.12	7.10	3,671.23	59
42	earth	400	1	12	wood	4	wood	1.06	5.00	2,978.30	60
320									1.00	150.00	61
200	stone	420				2	wood	.44		299.93	62
						6	cedar		1.48	449.96	63
										94.25	64
159	earth	3,120	1	18	wood	36	metal	2.30	10.60	1,450.57	65
309	earth	900	1	85	rep'd	12	tamarac		21.80	1,999.08	66
	stone	20				5	cedar		3.85	1,249.91	67
										103.26	68
						31	wood		7.50	724.92	69
						1	cement		1.23	499.21	70
100	stone	40				4	cedar		1.50	548.80	71
						1	stone	31		150.00	72
						11	metal		7.75	683.32	73
264						1	wood		2.66	643.12	74
	stone	55				6	cedar	3.00	2.60	835.00	75
						12	tile		6.20	1,743.42	76
240	stone	130				14	metal		3.50	1,500.00	77
	rock	180				16	wood		3.77	1,100.00	78
						2	cedar		4.24	400.00	79
	rock	40				6	stone		.30	200.00	80
	rock	3,332				1	cedar		1.10	690.90	81
						5	metal		1.00	299.55	82
240	earth	1,010				26	cedar	1.25	1.50	1,333.34	83
110	earth	560				6	wood		1.75	600.00	84
						2	wood		1.36	400.00	85
160	earth	1,928	5	20	wood	12	wood		4.37	1,328.55	86
	earth	178				1	cement		2.86	999.77	87
93	earth	526	1	16	wood	11	wood	7.72	2.60	3,125.00	88
										86.40	89
124	stone	898				1	stone	.19		250.00	90
	stone	150				12	wood		3.62	1,096.00	91
									2.03	811.27	92
						9	tile		4.22	1,459.12	93
	earth	705				27	cedar		3.48	1,000.00	94
100	earth	2,573	1	10	wood	8	wood		1.89	584.25	95
	earth	70				9	metal		2.77	800.00	96
						2	cement		5.60	1,419.38	97
	earth	942				5	cedar		1.95	774.96	98
151						33	wood	.26	1.46	1,006.96	99
54	stone	38				6	metal	.08	3.33	752.61	100
	earth	349				8	cedar		1.54	399.40	101
	earth	80				1	tile	.31	2.90	923.52	102
25	stone	500	2	40	wood	37	cedar		8.65	3,200.00	103
2			1	12	wood	17	cedar		2.92	400.00	104
									1.50	500.00	105
168						3	wood	3.76	.78	500.00	106
			3	12	wood				5.00	1,500.00	107
	earth	580	1	20	wood	15	cedar	.13	3.88	1,998.37	108
80	stone	2,150				13	metal		1.64	1,500.00	109
79	earth	1,924				6	metal		5.34	1,199.90	110
	earth	2,679				66	cedar		3.84	3,500.00	111
										296.56	112

SCHEDULE SHOWING THE AMOUNT OF WORK OF ROAD CONSTRUCTION,

NUMBER	TOWNSHIPS	CLEARED AND STUMPED		GRADED		SURFACED		
		Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet
113	Minden, By-law No. 365	441	16	1,475	14	gravel	533	6
114	Minden, By-law No. 344	798	16	2,145	16	gravel	487	6
115	Monck, By-law No. 486	15	30	945	18	gravel	400	5
116	Monmouth, By-law No. 256	703	16	1,390	16	gravel	232	6
117	Monmouth, By-law No. 265 (overseer)							
118	Monteagle and Herschel, By-law No. 526	459	20	885	20	gravel	160	7
119	Morley and Pattullo, By-law No. 242	900	66	1,830	28	gravel	1,253	6
120	Muskoka, By-law No. 302	630	16	365	18	gravel	605	5
121	Nairn, By-law No. 132	120	40	120	28	gravel	20	7
122	Necbing, By-law No. 406	3,110	50	3,286	24	gravel	2,476	8
123	Neelion and Garson, By-law No. 156			720	16	gravel	1,780	8
124	Nipigon, By-law No. 203	1,362	20	1,482	20	gravel	338	7
125	Nipigon, By-law No. 204 (machinery)							
126	Oakley, By-law No. 213	50	16	240	18	gravel	110	5
127	O'Connor, By-law No. 200	1,345	20	1,990	20	gravel	330	7
128	Olden, By-law No. 65-B	340	30	900	16	gravel	1,700	8
129	Olden, By-law No. 62B (overseer)							
130	Oliver, By-law No. 200	1,085	16	1,180	24	gravel	1,316	7
131	Orillia, By-law No. 1118			974	18	gravel	1,457	8
132	Orillia, By-law No. 1001			671	22	stone	1,797	6
133	Oro, By-law No. 468	55	20	697	22	gravel	1,019	10
134	Oso, By-law No. 181	60	30	210	16	gravel	2,200	8
135	Oso, By-law No. 173			451	12	gravel	1,014	8
136	Paipoonge, By-law No. 185	140	66	1,460	24	gravel	3,521	7
137	Palmerston, By-law No. 256	70	30	310	16	gravel	1,615	8
138	Palmerston, By-law No. 250	310	20	566	14	gravel	2,612	8
139	Palmerston, By-law No. 257 (overseer)							
140	Perry, By-law No. 164	324	40	1,220	18	gravel	280	8
141	Plummer, additional By-law No. 175	320	20	595	20	gravel	1,721	6
142	Prince, By-law No. 89	40	10	360	30	gravel	758	6
143	Rama, By-law No. 397	615	27	81	22	stone	247	6
144	Ratter and Dunnet, By-law No. 34	52	16	585	14	gravel	811	6
145	Ratter and Dunnet, By-law No. 32 (overseer)							
146	Ratter and Dunnet, By-law No. 29	182	16	684	14	gravel	1,350	6
147	Rayside, By-law No. 263	80	12	7,700	33	gravel	1,770	10
148	Rayside, By-law No. 251 (overseer)							
149	Rayside, By-law No. 246	640	25	8,360	16	gravel	540	12
150	Rear of Yonge, By-law No. 604							
151	Ridout, By-law No. 48	560	16	140	18	gravel	825	5
152	Ridout, By-law No. 44	700	16	1,600	18	gravel	2,680	5
153	Ross, By-law No. 380			1,165	12	gravel	1,910	8
154	Ryerson, By-law No. 469	125	10	40	20	gravel	140	8
155	St. Edmunds, By-law No. 273					gravel	509	6
156	St. Joseph, By-law No. 454			648	22	gravel	1,388	7
157	Sandfield, By-law No. 256			50	24	gravel	305	7
158	Sandfield, By-law No. 257 (grader)							
159	Sarawak, By-law No. 8			245	22	stone	1,027	7
160	Sheffield, By-law No. 625			90	16	gravel	1,428	8
161	Sherwood, By-law No. 20	1,475	25	870	15	gravel	100	10
162	Sherborne, By-law No. 290	220	18	2,044	18	gravel	572	6
163	Sherborne, By-law No. 296	137	24	296	18	gravel	408	6
164	Shuniah, By-law No. 460	3,131	40	2,000	20	gravel	5,095	7
165	Snowdon, By-law No. 216	663	16	1,108	16	gravel	567	6
166	Snowdon, By-law No. 209	420	20	663	16	gravel	309	6
167	Somerville, By-law No. 740	266	30	931	18	stone	1,046	6
168	Springer, By-law No. 321			1,540	14	gravel	515	6

COLONIZATION ROADS BRANCH, MUNICIPAL BY-LAWS, 1922.

DITCHED	CUT AND FILL		BRIDGES			CULVERTS		NEW ROAD MILEAGE	OLD ROAD MILEAGE	GOVERNMENT EXPENDITURES	NUMBER	
	Length, rods	Material	Amount in Cu. yards	Number	Span, feet	Material	Number					Material
10	11	12	13	14	15	16	17	18	19	20	21	
.....	stone	38	.....	.....	.....	31	cedar	.....	4.60	1,200.00	113
6	earth	670	1	15	wood	32	cedar	.....	6.73	1,200.00	114
.....	.....	.....	1	16	wood	20	cedar	.05	3.15	1,719.35	115
.....	.....	.....	.....	.....	.....	20	cedar	.31	5.00	800.00	116
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.20	117
.....	earth	566	.....	.....	.....	18	cedar	.....	3.07	748.45	118
118	earth	230	.....	.....	.....	5	metal	4.85	8.65	2,218.02	119
22	earth	185	2	26	wood	21	wood	.....	3.04	999.98	120
.....	earth	40	.....	.....	.....	.....	.....	.....	27.00	199.55	121
592	clay	1,400	1	30	wood	39	wood	8.71	8.39	7,013.87	122	
160	.....	.....	2	12	cedar	14	cedar	.....	6.81	1,000.00	123
18	.....	.....	.....	.....	.....	5	cedar	2.26	3.00	1,400.00	124
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	125
30	rock	61	.....	.....	.....	18	cedar	.....	.78	299.96	126
80	clay	2,900	2	16	wood	31	cedar	2.68	4.16	1,970.80	127	
.....	.....	.....	.....	.....	.....	27	metal	.....	5.31	1,250.00	128
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78.00	129
64	clay	480	.....	.....	.....	7	cedar	.....	6.68	2,365.75	130
260	stone	179	.....	.....	.....	1	metal	.....	6.13	2,100.00	131
30	clay	694	.....	.....	.....	1	cement	.....	5.90	2,083.25	132
81	gravel	702	1	repaired	.....	13	wood	.....	3.21	1,498.42	133
.....	earth	70	.....	.....	.....	7	metal	.....	6.87	1,600.00	134
.....	stone	60	.....	.....	.....	27	metal	.....	3.57	1,400.00	135
168	earth	500	.....	.....	.....	13	cedar	2.50	12.08	4,487.61	136
.....	.....	.....	.....	.....	.....	16	cedar	.....	5.05	1,500.00	137
.....	.....	.....	.....	.....	.....	15	stone	.....	8.35	1,300.00	138
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60.00	139
.....	.....	.....	2	repaired	.....	8	cedar	1.31	3.00	500.00	140
470	earth	104	1	12	wood	15	wood	.25	5.30	1,450.00	141	
.....	.....	.....	.....	.....	.....	4	wood	.....	2.37	584.15	142
686	earth	25	.....	.....	.....	2	metal	.....	2.09	600.00	143
.....	.....	.....	.....	.....	.....	29	cedar	.....	2.77	1,250.00	144
925	.....	.....	.....	.....	.....	.....	.....	.....	.....	89.00	145
110	stone	50	1	10	cedar	30	cedar	.....	4.44	1,250.00	146
.....	.....	.....	1	10	cedar	78	cedar	.....	24.40	2,165.56	147
1,090	earth	3,020	2	12	cedar	50	cedar	.....	28.00	2,318.28	149
.....	stone	398	.....	.....	.....	.....	.....	.....	.....	400.00	150
.....	stone	713	.....	.....	.....	22	cedar	.....	3.10	1,000.00	151
.....	earth	440	.....	.....	.....	20	cedar	.....	8.40	2,500.00	152
.....	.....	.....	1	10	cedar	5	cedar	.....	6.20	1,500.00	153
125	.....	.....	.....	.....	.....	3	cedar	.43	.....	450.00	154
.....	.....	.....	.....	.....	.....	2	cedar	.....	1.59	500.00	155
180	earth	330	.....	.....	.....	6	wood	.....	4.93	1,600.00	156
.....	rock	52	2	15	cedar	4	wood	.....	.98	400.00	157
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	96.75	158
123	rock	614	.....	.....	.....	3	cement	.....	3.30	1,000.00	159
.....	4.45	1,000.00	160
.....	.....	.....	.....	.....	.....	5	cedar	.....	5.84	700.00	161
.....	rock	200	.....	.....	.....	11	cedar	.....	6.65	800.00	162
.....	stone	35	.....	.....	.....	22	cedar	.....	1.28	500.00	163
882	earth	100	6	18	cedar	55	wood	2.09	20.25	7,803.25	164	
.....	.....	.....	3	16	wood	33	cedar	.....	3.51	999.97	165
.....	earth	58	1	16	cedar	23	wood	.....	2.35	790.82	166
.....	earth	346	.....	.....	.....	12	cedar	.....	4.55	1,500.00	167
.....	.....	.....	.....	.....	.....	.....	.....	.....	6.35	895.19	168

SCHEDULE SHOWING THE AMOUNT OF WORK OF ROAD CONSTRUCTION,

NUMBER	MUNICIPALITY	CLEARED AND STUMPED		GRADED		SURFACED		
		Length, rods	Width, feet	Length, rods	Width, feet	Material	Length, rods	Width, feet
1	2	3	4	5	6	7	8	9
169	Stafford, By-law No. 719			2,150	20	gravel	1,475	10
170	Stanhope, By-law No. 378	332	20	830	16	gravel	290	6
171	Stisted, By-law No. 265			200	18	gravel	381	5
172	Stisted, By-law No. 255	80	16	240	18	gravel	410	5
173	Storrington, By-law No. 499			40	16	stone	1,127	8
174	Strong, By-law No. 434	480	35	260	16	gravel	330	7
175	Strong, By-law No. 623	150	40	230	22	gravel	120	6
176	Sunnidale, By-law No. 506			736	24	gravel	634	9
177	Sunnidale, By-law No. 497			329	22	gravel	1,425	6
178	Tarbutt and Tarbutt, additional By-law No. 6-A					gravel	791	6
179	Tarentorus, By-law No. 217	81	40	2,305	28	gravel	323	6
180	Tay, By-law No. 813	30	20	914	24	gravel	1,366	8
181	Tay, By-law No. 798	51	24	724	22	gravel	1,709	6
182	Thessalon, By-law No. 11	60	20	160	20	gravel	210	6
183	Tiny, By-law No. 639			324	20	gravel	881	8
184	Tiny, By-law No. 620			661	22	gravel	860	6
185	Tisdale, By-law No. 235					gravel	593	12
186	Tisdale, By-law No. 237					gravel	652	9
187	Tudor and Cashel, By-law No. 5	235	20	2,081	18	stone	301	7
188	Tudor and Cashel, By-law No. 12 (grader)							
189	Vespra, By-law No. 643			306	22	gravel	1,863	8
190	Watt, By-law No. 550	90	12	770	18	gravel	1,785	5
191	Watt, By-law No. 545	300	16	1,750	18	gravel	2,230	6
192	Westmeath, By-law No. 292	950	20	3,800	25	gravel	2,860	10
193	Westmeath, By-law No. 298 (grader)							
194	Whitney, By-law No. 191	231	40	231	24	gravel	862	10
195	Widdifield, By-law No. 323	645	16	375	24	gravel	2,170	10
196	Wilberforce, By-law No. 507	600	20	3,065	18	gravel	1,625	10
197	Wilberforce, By-law No. 494	375	20	4,105	18	gravel	2,340	8
198	Wollaston, By-law No. 1	1,146	20	1,427	18	stone	323	7
199	Worthington, By-law No. 113	367	66	660	28	gravel	118	6
	Total	58,761		169,505			170,147	

COLONIZATION ROADS BRANCH, MUNICIPAL BY-LAWS, 1922.

DITCHED	CUT AND FILL		BRIDGES			CULVERTS		NEW ROAD MILEAGE	OLD ROAD MILEAGE	GOVERNMENT EXPENDITURE	NUMBER
	Length, rods	Material	Amount in Cu. yards	Number	Span, feet	Material	Number					Material
10	11	12	13	14	15	16	17	18	19	20	21
						4	cedar		6.72	950.00	169
						24	cedar		2.60	622.15	170
	rock	130				12	cedar		1.53	450.00	171
						14	wood		1.28	550.00	172
									3.54	1,050.00	173
450	earth	100				14	cedar	1.47	.53	573.81	174
20			1	11	cedar	6	cedar	.47	.48	542.00	175
24	earth	1,030				9	cement	10	3.28	2,468.35	176
62	clay	378				1	wood		4.38	1,000.00	177
						2	wood		2.47	497.87	178
839	rock	151	2	14	wood	24	metal		8.00	771.20	179
71	stone	563				14	metal		4.59	1,998.87	180
70	earth	1,810				4	metal	.16	6.00	1,874.95	181
	stone	540	1	11	cement	3	wood		1.00	450.00	182
43	clay	1,570	6	repaired		5	metal		2.90	1,500.00	183
94	earth	620				6	metal		3.76	1,496.97	184
									1.83	2,250.00	185
									2.03	762.87	186
	earth	955				6	cedar	.13	6.39	748.20	187
										42.97	188
7	stone	20				5	metal		5.88	2,099.19	189
	earth	511	2	19	cedar	30	wood	.06	5.58	2,000.00	190
	rock	50				73	cedar		7.39	1,985.25	191
			1	12	cedar	3	cedar		13.82	1,899.35	192
										137.77	193
35			1	44	wood	6	metal	.72	2.69	1,485.70	194
800	stone	661				17	wood	.13	7.40	1,500.00	195
						3	cedar		9.47	1,000.00	196
						5	cedar		12.83	1,750.00	197
	earth	1,250				12	cedar		6.57	890.48	198
						2	wood	1.74	2.90	800.00	199
14,897		73,180	82			2,126		87.29	808.19	222,610.55	

MISCELLANEOUS.

Inspection of Roads and Bridges.....	\$18,956.67
Engineering, Surveying and Locating Roads.....	9,008.87
Road Machinery.....	3,251.32
Compensation for Workmen injured.....	863.97
Storage of Machinery and Tools.....	141.45
Balances Road Accounts, 1921.....	1,296.91
Parke Township Accountable.....	190.00
Southworth Township, C.P.R. Right-of-Way (Rental).....	1.00
	<hr/>
	\$33,710.10

No.	RECAPITULATION	Cleared and Stumped	Graded and Shaped	Surfaced	Ditched	Cut and Fill	Bridges	Culverts	New Road	Old Road	EXPENDITURE
		rods	rods	rods	rods	cu. yds.	number	number	miles	miles	
1	Direct Grants.....	90,305	153,330	95,152	31,417	127,370	67	1,504	171.92	549.28	\$414,863.74
2	By-law Grants.....	58,761	169,505	170,147	14,897	73,180	82	2,126	87.29	808.19	222,610.55
3	Miscellaneous.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33,710.19
	Total.....	149,066	322,835	265,299	46,314	200,550	149	3,630	259.21	1,357.47	\$671,184.48

Appendix No. 47.

TORONTO, ONT., Oct. 31st, A.D. 1922.

To the Honourable Beniah Bowman, Minister of Lands and Forests, Ontario.

SIR,—I have the honour to submit to you the report on the construction and maintenance of highways and bridges, under the provisions of the Northern and Northwestern Ontario Development Act, 1912, and amendments during the season ending 31st October, 1922.

The rapidly increasing volume of traffic on the trunk roads under the jurisdiction of the Northern Development Branch called for a large expenditure during the past year, and "Maintenance Patrols" have been established on all the principal roads. These "patrols" have proven to be very satisfactory and, well organized, they are executing a maximum amount of road work at a minimum expense.

Where a trunk road requires attention beyond the powers of the maintenance patrol, construction parties have been organized, either on a contract basis or by day labour, and in this way the efficiency of the patrol has not been impaired.



Severn to North Bay road widening.

The road from Severn to North Bay, for example, was maintained in good condition, but widening, grading, and surfacing being necessary at certain points, as between Severn and Gravenhurst and between Gravenhurst and Bracebridge, this was looked after by construction parties, without interference with the maintenance arrangements.

Branching from the foregoing, the Gravenhurst-Bala-Parry Sound, Huntsville-Dwight, Burks Falls-Magnetawan, Sundridge-Magnetawan, Trout Creek-Loring, Powassan-Loring and Powassan-Chisholm Roads, were taken care of by both maintenance and construction parties as well as the road from Parry

Sound northerly in the direction of Magnetawan, and the expenditure in the Districts of Muskoka and Parry Sound was practically all on the roads referred to.

Work on the Pembroke-Sault Ste. Marie Road was better organized than ever before, the maintenance patrols performing effective work, while the construction parties on the gap between Mattawa and Chalk River opened up approximately fourteen miles which makes it very probable that during the season of 1923 the gap will be removed and the road graded all the way. Extensive betterments and improvements were made on the sections between North Bay and Sudbury and between Sudbury and Sault Ste. Marie, the whole road being maintained in very fair condition.

Surveys were commenced in the fall with a view to the location of a road to connect Temiskaming District with the roads in Southern Ontario and the survey parties are still engaged on the work.

The work on the Latchford-Cochrane Trunk Road, progressed very satisfactorily, the section connecting Swastika, and the Kirkland Lake gold area



International Highway, Thunder Bay District.

with the Cobalt silver camp being advanced so near completion that it will only be a short time until vehicular traffic can move over the entire road without difficulty. Seven miles of the previously unopened portion lying immediately south of Cochrane was cut out, and many miles of gravelling done on the already opened portions.

On the Porquis Junction-Timmins Road, a distance of about three miles was cut out and about six miles graded, and the heavily travelled section between South Porcupine and Timmins was maintained in fair condition and considerably improved.

In addition to the foregoing the following roads in the Temiskaming District, received considerable attention:—North Cobalt to South Lorrain, Milberta to Elk Lake, Elk Lake to Gowganda, Englehart to Charlton and Elk Lake, Swastika to Kirkland Lake and extension into Lebel and Gauthier townships, Dane to Larder Lake, Boston Creek to Skead Township, Boston Creek to Round Lake, Kirkland Lake to Goodfish, Lightning River Road through townships



Grading new road, Northern Ontario.



McKenzie River Bridge, Northern Ontario.

of Munro, Michaud, and McCool, Matachewan Road, Munro Road, Matheson-Shillington Road, Monteith-Shillington Road and Porquis Junction-Iroquois Falls Road.

In the Thunder Bay District the policy inaugurated the previous year was again followed with success and the principal roads then mentioned were maintained in good condition. The Eastern Highway between Port Arthur and Nepigon was further cut out a distance of nearly six miles.

The leading roads in Kenora and Dryden Districts were well taken care of, the principal work being the cutting out of a road from Keewatin to the Manitoba boundary, a distance of over thirty miles, and the cutting out of the road to Redditt, a distance of over ten miles.

The expenditure in the Rainy River District was mainly taken up by betterments and improvements on the Trunk Road, Fort Frances to Rainy River and the main roads leading to it. There was, of course, the systematic maintenance of the roads, and extensions to the leading roads referred to so as to reach outlying settlers.

The Consolidated School Routes were given special attention, and the co-operation of this branch has assisted materially in the success of this system.

In conclusion last year I referred to the increase of expenditures on road drainage and I would now point out that this increase—again in evidence this year—is already showing a marked improvement in the condition of the roads.

All of which is respectfully submitted. I have the honour to be, sir,

Your obedient servant,

C. H. FULLERTON,
Director, Northern Development Branch.



Motor truck with fire-fighting equipment and hose reel.



Rangers' cabins.

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
ALGOMA DISTRICT.														
<i>Trunk Road, Sudbury to Sault Ste. Marie.</i>														
1	Sault Ste. Marie to Day Mills, Section I										58200	clean'd	66	9669
2	.25	66	.25	66	.25	40	.25	30			1200	3x1	51	4672
3	22.0	si	do				7.75	30			2410	3x2	78	6991
	11.0	do									500	3x1½		
											900	3x2½		
											400	2x1½		
4	Bet. Webbwood and Massey.....						3.75	34			1450	2x1½		
	1.0	20									1200	2x2		
5	Victoria Mine Diver- sion.....		1.0	66	1.0	66	1.5	30			1200	3x2		
	1.0	66	1.0	66	1.0	33	1.5	30			250	2½x1½	1.5	1480
6	Garden River Indian Reserve.....						3.5	36						
7	At Ladouceur Creek.....													
8	At Harmon Creek.....													
9	At Naughton.....													
10	4.0	50	4.0	50	3.5	30	3.0	20	.23	20	2600	3x2	5.0	2300
					1.5	25	1.5	re			1500	5x3		
											1515	3x1		
11	Lorne-Louise Rd.....				1.0	33	1.5	18			2178	2½x1½	1.5	1335
<i>St. Joseph's Island & Campement D'Ours.</i>														
12	2.5	s.	brushed		1.0	8	2.25	26			170	2x15	4.0	1572
											2828	3x1½		
											800	3½x1½		
13	Richards Landing, Hilton.....		.75	do			1.5	26			420	2x2		
											330	2x1	1.5	301
14	"A" Line.....										6600	4x2	3	435
											1650	2½x1¼		
15	"W" Line & Trainor's Side Road.....		1.0	do							1320	2x2	.66	219
16	"C" Line, west of Richards Landing..		2.0	do							1320	3x2½	.5	263
17	"PV" Line & 5th Side Road.....		2.5	do			1.25	24			200	2x1	1.25	113
18	1.88	66	.75	66	1.88	33	1.75	30			228	3x2½		
											3552	3x2		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS		
Yds. crush- ed	L cov- ered			Wood	Stone or Conc.	Metal	Size	No.	Description			
		281		1			15''			1		
							18''					
							12''					
							15''					
		145					18''	1	Repaired.	400 c.yd. rock fill.	2	
							24''					
		504					21				3	
							12					
							24''					
							30''					
8198	4.5			2			4'x6'					
				2			5'x2½'					
				2			18''				4	
							18''					
							12''					
							30''	2	Concrete 16'	2560 c.yd. clay fill.	5	
							24''					
							18''					
5631	2.3										6	
								1	Concrete 16'		7	
								1	Concrete 16'		8	
								1	Concrete 16'		9	
				2			3x2x20		1	16x4x16	1500 c.yd. rock excav.	10
				4			1x1x16				15000 c.yd. earth fill.	
				2			5x3x20				7800 c.yd. gravel fill.	
				1			2x2x22					
				4			2x4x22					
				1			7x3x22					
				1			6x2x20					
				1			4x2x20					
		3		1			2½x2½					11
							1x1					
							2½x2½					
		225		13			2x2	1	Repaired.	1 new ferry landing.		12
				3			3x2					
				1			2x2½					
				1			6x2					
				1			2x2					13
							2x2					
		7.5					2x2		1	20' span.		14
												15
												16
				1			2½x2½	1	Repaired.			17
				2			4x3			100 c.yd. rock excav.		18
						9	3x3			3454 c.yd. earth fill.		

DEPARTMENT OF LANDS AND FORESTS,
 ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling		
	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L ft.	W & D	L mfs.	Yards used	
ALGOMA DISTRICT.— <i>Continued.</i>															
<i>Manitoulin Island.</i>															
19	Gore Bay-Silverwater- Meldrum Bay Rd..		3.0 2.25	66 60	2.0 2.25	66 60	3.5	30	4.83 3.5	30 24	.....	300	3x2	8.63 5043
20	Gore Bay-Kagawong Road.....		.....	.....	.....	.....	.....	1.44	24	.....	1760	3x2	.....	.....
21	Gore Bay-Providence Bay-Road		.13 4.75 1.25 .25	66 60 s. 10	3.25	60	1.25 1.13	35 30	.....	.....	.....	165 2200	2x2 4x1½	8.75 7690
22	Providence Bay- Mindemoya Rd....		.25 .06	10 60	.25	10	1.88 .25	40 10	.5 2.0	34 26	.....	.....	.....	7.25 3928
23	West Bay- Sheguindah Rd....		.5	60	.....	.....	.....	.25	30	.....	.....	.....	.....	.25 150
24	Manitowaning-Little Current.....		.63 1.5	12 66	.....	.....	.63 1.5	20 30	2.0 5.18	12 30	.....	.....	.....	10.25 7857
25	Little Current-West Bay.....		.5	s.	brushi	ng	.....	.5	30	.....	.....	.....	.....	2.5 1415
26	Gore Bay-Barrie Is...		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.5 250
27	Mindemoya-West Bay.....		2.0	s.	brushi	ng	.25	40	.5	26	.....	.....	.....	2.33 1656
28	Manitowaning- Mindemoya.....		1.0 2.5	66 60	.....	.....	.25 .56 1.25	30 24 28	1.63 .25 .5	24 28 30	.....	.....	.....	8.75 6473
29	West Bay-Kagawong.		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.75 567
COCHRANE DIST.															
30	Brower Township....		3.7 2.0	66 s.	3.7 .5	66 24	1.0	24	.23	33	.04	10	1341	3½x3½

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1921.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush-ed	L. cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		33		2			4x1½			200 c.yd. earth fill.	19
				1			6x2			140 c.yd. earth fill.	
				7			3x2				
				1			3x1½				
				1			2x1½				
				1			4x2½				
				3			6x3				
					1		2x1				
1363	.88	3		4			4x3				
				1	repa ired						20
				1			9x2				
2794	2.0	3		1			6x3	1	Repaired.	1230 c.yd. earth fill.	21
		3½		5			3x2			730 c.yd. stone fill.	
		11½		2			5x2			800 c.yd. earth and stone fill.	
				1			10x2				
				1			5x9				22
					1		3x3				
				1			4x4				
				1			4x3				
						1	24'				
				1			4'x4'			150 c.yd. stone fill.	23
		1		1			6x2			500 c.yd. earth fill.	24
				1			6x3				
				2			2x1				
					2		2x1				
					1		1x1				
				2			4x2				
				2			4x3				
				1			4x4				
		4		1			4x2				25
				1			4x1				
				1			6x2				
				1			7x5				
				2	repa ired						26
							2x1				27
					1		6x2				
		4		2			3x1½			50 c.yd. stone fill.	28
				2			2x2½				
				3			2x1½				
					1		1x1½				
				1			4x4				
		.75		2			10x3				29
				3			2x2x20			.1 mile clay covered with 42 c.yd.	30

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L ft.	W & D	L m/s.	Yards used
COCHRANE DISTRICT. —Continued.														
31 Calder Township.....	4.13	s.	brushi	ng	.34	6	3.10	24	.1	16	990	clean'd	.....	.....
	1.13	do									1800	5x3		
	.92	66									4356	3x2		
			.35	66	.5	8					7128	3½x2		
					1.02	24					330	5x2½		
32 Clergue Township...	1.	66	.....	.....	1.7	24	.7	24	.....	.....	3700	3½x2	.....	.....
33 Clute Township.....	3.0	66	3.0	66	3.64	24	3.0	30	.....	.....	19030	3½x2	1 88	1300
	1.23	s.	brushe	d							300	cleaned		
			.64	24							380	5x2½		
											1000	3x1½		
											680	4x2		
											695	6x3		
34 Township of Fournier	3.38	66	5.38	66	3.25	24	.....	.....	.....	.....	.....	.....	.....	.....
35 Fox Township.....	2.5	66	4.5	66	2.5	24	.....	.....	.....	.....	22790	3½x2	.....	.....
			2.5	24										
	.23	66	.23	56	.23	24								
36 Kennedy Township..	.75	66	.75	66	.75	24	.5	24	.....	.....	2500	3½x2	3	2554
	.47	40	.47	40	.47	30					1500	3x2		
	.17	20	.17	20										
37 Lamarche Township.	.....	.....	1.0	66	.....	.....	.04	24	.....	.....	225	3½x2	.87	610
											1037	4x3		
											2640	3½x2		
38 Leitch Township....	2.43	66	.5	24	2.14	24	.75	24	.06	18	.....	.....	.....	.....
			1.30	66										
39 McCart Township...	2.5	66	2.5	66	1.0	24	.....	.....	.....	.....	.....	.....	.....	.....
40 Pyne Township.....	7.0	66	.5	24	.5	24	.....	.....	.....	.....	1900	5½x4½	.....	.....
			7.0	66							2540	3½x2		
<i>Township Boundary Lines.</i>														
41 Blount-Glackmeyer, Lots 19-28 inclusive	2.25	42	2.25	42	.....	.....	2.5	24	.....	.....	305	2½x1½	.....	.....
							.5	33	.....	.....	880	2½x2		
							.25	26	.....	.....	500	3x2½		
											75	3x1½		
											125	3x1½		
											92	6x3		
											225	4x2½		
											50	4x2		
											100	2x2		
											435	3x2		
											1320	5x3		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1921.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush-ed	L. cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
			.75	3			4x3x16	1	16' span.	150 c.yd. earth fill.	31
				0			3x3x16				
				0			2x2x16				
				2			4x3x16				
				3			4x2x16				
				1			6x2½x16				
				2			4x2½x16				
				2			3x2x16	1	Repaired.		
				4			1½x1½x18	1	12x5x16	240 c.yd. clay cut.	32
				1			4x4x16	1	Repaired.	180 c.yd. clay fill.	
				5			4x4x20				
				4			3x3x20				
				1			2x1½x16	1	20x16	2237 c.yd. earth cut and	33
				1			2x2x16	1	Repaired.	fill.	
				1			5x4x22				
				2			4x3x20				
				1			5x4x23				
				3			5x4x32				
				2			5x5x32				
				2			4x2x20				
				7			repaired				
							6x16	1	30x14	Ferry built and installed	34
				3			4x16	1	20x16	175 c.yd. earth fill.	35
				1			5x16				
				1			6x2x16				
				1			7x16				
				1			12x16				
				3			2x16				
				1			4x16				
				1			4x4x28	1	16x35	900' creek cleared 30'	36
				1			5x5x28			wide.	
				1			4x4x20			750 c.yd. earth fill.	
				1			5x5x40				
				1			5x5x20				
								3	Repaired.	50 c.yd. earth fill.	37
			1					1	34x18x5		38
								1	20x18x5		39
											40
				11			2x2x18	2	Repaired.	300 c.yd. earth excav.	41
				1			2x1½x18			1500 1 ft. road clay	
				4			3x3x18			covered.	
				2			6x3x25				

NORTHERN DEVELOPMENT BRANCH

DONE, YEAR 1921.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush- ed	L cover- ed			Wood	Stone or Conc.	Metal	Size	No.	Description		
				8			18x1½x1½			1.75 miles covered with	42
				2			18x3x3			800 yd. clay.	
				5			18x2x2				
				1			24x2x2				
										Ferry dock filled and	43
										paired.	
				1			2x2x18				44
				1			2x3x18				
				1			2x4x18				
				1			2x1x18				
				1			3x5x18				
				1			2x3x20				
				1			2x6x22				
				1			2x2x20				
				1			4x4x20	1	392x15	5541 c.yd. cut and fill.	45
				1			4x4x24				
		3		1			3x3x20			Ferry constructed and	46
				1			2x2x20			installed.	
		3		1	re	paired					47
				1			2x3x20				
								1	152'x14'		48
				1			4x2½x24			310 c.yd. earth excav.	49
				4			4x2x20			Ferry constructed and	
				3			4x3x20			installed.	
		7		2	re	paired		1	Repaired.		50
				2			2x2x20				
				1			2x2x18				
				3			3x2x18				
				2			2x3x20				
				1			2x5x20				
				3			2x4x20				
				1			2x6x24				
				1			3x5x24				
				1			4x7x22				51
							2'x24'				
				1			4x2x20				
				1			4x6x22				
				2			4x4x22				
				3			4x4x22				52
				2			3x2x22				
				2			4x2x22				
				3			3½x2x24				
							14''x22'				
							18''x22'				
		3	3							Approaches to bridge	53
										repaired.	

DEPARTMENT OF LANDS AND FORESTS

ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L mfs.	W ft.	L ft.	W & D	L mfs.	Yards used
DRYDEN DISTRICT. <i>Continued.</i>														
54 Eton Township.	1.5	66	1.0	66	2.17	35	2.33	22			36 200 1320	3x1½ 4x3 4x2		
55 Finn Settlement Rd., Wabigoon Twp.	3.75	66	3.5	66	1.75 2.5	33 35	4.0	22	.13	18	2550 2540	3x2½ 3x2	.25	168
56 Ignace-Ossaquin Rd..	3.5	66	3.0	66	3.0	33	.5 1.5	22 24	.13	16	2145	3x2		
57 Melgund Township. . .	.13	33					5.25	22			450 378	3x3 3x1½		
58 Mutrie Township. . . .	.56	40	.5	40	.56	24	3.4	22			1050 2755 220 2640	5x2½ 4x2 5x1½ cleane d		
59 North Rd.-Rugby Township . . . . .	.25	66	.5	66	.06 .04	33 33					5876 60 200	4x1½ 8x3½ 5x2		
60 North Waldhof Rd., Mutrie Township.	1.5	66	1.0	66	1.38	35	1.75	22			1625 900	4x2 cleane d		
61 Rice Lake Rd.-Zea- land Township.	1.0	66	1.0	66	1.0 .25	33 35	1.83	22			264 96	3x2 3x1½	.38	300
62 Sanford Township. . . .	5.58	66	4.15	66	2.83 2.0	35 33	.6 3.5	22 24			5955 2088 530 390 900 900 700	5x2 4½x2 4x2 3½x1½ 4x1½ 3x1½ 5x1½		
63 Vermilion-Quibell Rd.	8.0	30	12.0	30			.5	22			900	4x3	.17	135
64 Wabigoon - Vermilion Rd.	1.0	32	1.0	32			2.0	24			450 600	4x1½ cleane d	8.5	7138
65 Wainwright Twp. . . . .	.5 .16 .94	32 44 66	.16 .44	44 66	.94	35	1.06	22			330 1120 1980	4x3 18x4 4x2		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1921.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crushed	L. covered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		1		1			2x1½x18			Grade reduced on three hills.	54
				1			2½x1½x20				
				10			4x2x24				
				1			3x3x20			Grade reduced on two hills.	55
				1			4x12x18				
				16			3x3x18				
				1			3x3x24				
				1			3x7x18				
				2			4x6x18				
				6			2x3x18				
				1			2x2x18			repaired	
				3			3x5x20				
				3			2x3x22			Grade reduced on three hills. Rock and boulders removed from 2 miles of road. 2850 c.yd. earth fill for covering.	56
				7			3x2x20	2	16x6		
				1			3x4x20	2	Removed.		57
				1			2x4x20	1	Repaired.		
				8			2x2x20				
		3.4		1			5x1½x20	1	16' span.		58
				1			4x1½x20				
				9			3x3x18				
				1			4x6x18				
				1			3x8x20			Grade reduced on two hills.	59
				1			6x1½x20				
				1			4x2½x20				
				8			2x4x20	1	7x20x18	Grade reduced on one hill.	60
		.47		5			4x3x20			Grade reduced on four hills.	61
				8			4x3x22				62
				4			2x2x22				
				4			2x4x24				
				2			4x4x18				
				4			2x2x18				
				1			3x3x20				
				1			4x4x22				
				1			1½x1½x22				
		14		1			3x3x16	1	14x16	111 c.yd. rock excav.	63
								1	16x18	Grade reduced on one hill.	
		63	2½	2		repaired				Grade reduced on one hill.	64
				1			4x4x22			20 c.yd. rock excav.	65
				4			2x2x20				
				1			4x2x18				
				1			4x2x24				

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L ft.	W & D	L m/s.	Yards used
DRYDEN DISTRICT.— <i>Continued.</i>														
66 Zealand Township...	1.0 .69	40 66	1.0 .69	40 33	1.0 .3	32 33	1.71 .5	22 re	.09 .05	16 14	1180 220 938 2480	4x2½ 4x2 4½x2½ 3x2	1.38	1040
67 Wainwright-Zealand Boundary.	1.75	66	1.75	66										
ENGLEHART DISTRICT														
68 Beauchamp Twp.....					2.0	20	1.42	18						
69 Bryce Township.....													.04	40
70 Buck Township.....														
71 Chamberlain Twp....	.25 .5	12 66	.25	12	.25 .5	12 20	.25 .5	12 18					1.0	726
72 Dack Township.....							1.5	re					.31	244
73 Evanturel Township.													3.5	661 293
74 Ingram Township...	1.25	66	1.25	66	3.25	20	3.25	18						
75 Lorrain Township...	3.75	66	3.75	66	3.75	33								
76 Marter Township....	1.5 1.5	66 br	1.0 ushing	66 ..	2.0 1.0	20 24	4.0 1.0	18 20	.06	10	660	2x2	.06	44
77 Otto Township.....	2.0	66	2.0	66	1.0	18								
78 Pacaud Township...	1.5	br	ushing	..	2.5	20	1.5	20						
79 Robillard Township..	3.0	66	3.0	66	4.25	20	3.0 3.75	re 18			660	2x3		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS
Yds. crush-ed	L. cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description	
		.62		1			3x3x20	1	7x6x22	66
				6			4x2x18	2	4x6x20	
				1			5x7x18			
				2			2x3x18			
				1			4x4x18			
				2			4x2x20			
				2			3x1½x20			
				1			3x2x20			
				1			4x4x20			
										67
				6						68
			1					1	Repaired.	69
								1	50' span.	70
				2			3x4x16			71
				3			3x4x16	1	22x16	72
				2			4x5x16	1	21x16	Grade reduced on 11 hills.
				1			4x5x20			
				2			4x4x16			
							20''x40'			
		3	3		1		3x4x40			
							18''x65'	1	60' span.	Grades to bridge im-
								1	Repaired.	proved
					2		3x4x16			74
2.0				6				1	15' span.	75
				4						76
				1			2x3x16			
				4			3x4x16			
				4			3x4x16			77
				1			3x4x20			
				1			8x6x20			Grade reduced on four hills.
				4			3x4x16			
				1			4x12x18			Grade reduced on 25 hills.
				2			5x5x18			
				1			3x6x18			.98 mile covered with
				1			5x8x18			59 c.yd. clay.
				2			3x3x16			
				1			5x12x16			
				1			5x5x22			
				1			5x5x20			
				1			3x4x16			
				1			5x6x30			
				1			5x3x16			
				1			5x8x16			
				1			14x6x16			
				1			4x5x22			
				1			5x3x22			
				1			6x4x22			
				1			5x3x22			

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
ENGLEHART DISTRICT. —Continued.														
80 Savard Township....	2.0	br	ushing		2.0	20	2.0	18					.5	391
81 Sharpe Township....	.5	66	.5	66	4.31	20								
82 Chamberlain-Dack Boundary.....	.25	66	.25	66	.25	20	.25	18						
83 Chamberlain-Pacaud Boundary.....														
84 Chamberlain-Savard Boundary.....														
85 Dack-Evanturel Boundary.....							1.0	re						
86 Evanturel-Marter Boundary.....														
87 Marquis-Savard Boundary.....	2.0	br	ushing											
88 Robillard-Truax Boundary.....	1.0	66	1.0	66	1.0	20								
HEARST DISTRICT.														
89 Casgrain Township..	1.68	66	2.0	24	.33	24	.33	24					.83	664
90 Casgrain-Hanlan Boundary.....					1.60	24					2874	3½x2		
91 Elber Township.....	2.0	66	2.0	66	3.25	28					233	4x2		
92 Hanlan Township....	4.12	66	4.12	66	3.15	24					6300	3½x2½		
93 Hanlan-Way Bdry...											522	3x2		
94 Kendall Township...	2.45	66	2.45	66			.13	re			2664	3½x2½		
95 Kendal-Way Bdry...											1450	4½x2		
96 Lowther Township...	6.12	66	6.12	66							14845	2x3½	6.5	5194
97 Lowther-Way Bdry..	4.13	66	4.13	66							975	2x4½		
98 Way Township.....	5.0	66	5.0	66			.06	re			1320	cleane d		
KAPUSKASING DIST.														
99 Fauquier-Township..	10.55	66	1.59	24	3.46	24					2000	cleane d.		
			6.55	66							1500	4x2		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts			Bridges		REMARKS		
Yds. crush- ed	L cov- ered			Wood	Stone or Conc.	Metal	Size	No.			Description
			2½	6			16x3x14	1	Re-covered and	approaches filled.	80
				2			5x6x25	1	Repaired.	Grade reduced on 23	
				5			3x4x16			hills.	
				2			4x4x16				
				2			3x6x20				
				2			2x3x16				
				1			4x3x18				
				1			6x6x30				
				1			4x4x20				
				1			3x5x16				
				1			8x6x16				81
				3			3x4x16				
				1			4x4x16				
										.25 mile covered with	82
			6							244 c.yd. clay.	83
				1			4x6x20	1	30' span.	Fill 300'x22'x5'	84
								2	Rebuilt.		85
				1			3x4x20	1	80' steel.	Approaches improved.	86
			2	3			3x4x16				87
				1			6x6x30			Grades reduced on 2	88
										hills.	
			3.5	5			3x3x18	2	Partly built on	Grade reduced on 1 hill.	89
								only.			90
											93
			6.75	1	2		3x3x18	1	Partly built	.88 mile covered with	94
					2		2x3x18	only.		2305 c.yd. clay.	
					2		3x3x17				95
											96
											97
			2.5					1	Partly built	1.5 mile covered with	98
								only.		1160 c.yd. clay.	
										790 c.yds. cut and placed	99
										on one mile of road.	

DEPARTMENT OF LANDS AND FORESTS.
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mils.	W ft.	L mils.	W ft.	L mils.	W ft.	L mils.	W ft.	L mils.	W ft.	L ft.	W & D	L mils.	Yards used
KAPUSKASING DIST.— <i>Continued.</i>														
100	Fauquier-Machin Boundary	2.0	66	1.0	66									
101	Fauquier-Nansen Boundary.					1.5	24							
102	Haggart-Shackleton Boundary.	1.75	66											
103	Machin Township. . .	1.5	66											
104	Nansen-Shackleton Boundary.	2.45	66											
105	O'Brien Township. . .	1.0	66			1.0	24	1.0	24		525	4x3		
106	Shackleton Twp.	6.11	66	2.67	66						19134	2x3½		
107	Trunk Road along C. N. Railway. . . . .			.75				1.25	25		850	6x2		
								2.78	24		1500	4x3	21.0	8887
								1.73	26		5500	cleaned		
KENORA DIST.														
108	Charlesbois Rd.	2.0	36	2.0	36	.25	36	.75	22		3960	3x1½	1	999
109	East Melick Rd. . . . .					.5	36	.25	24	.11	18	1300	4x1½	2.75
								.7	20			5600	4x2	2700
								.2	16					
110	Keewatin-Manitoba Boundary Rd.	31.31	66	31.31	66	5.0	33	.6	16	.04	14	2000	6x2	.25
								.37	20			5200	4x2	349
111	Kenora-Redditt Rd. . .	4.25	66	4.25	66	.4	50	2.4	24	.64	16	2700	4x1½	4.88
		1.08	20	1.18	20	1.18	40	1.23	22	.46	18	7800	3x1½	6175
		.23	10	2.0	40	.74	33	.51	20			4500	3x16	
		4.0	40	.37	45	.85	20	.12	26			6300	3x2	
		1.4	45	.57	8			.45	30			330	2x1	
		2.25	33	3.25	33			.4	33			1200	4x2½	
112	Muriel Lake Rd.	2.5	20	1.0	20	1.5	20	1.5	20			10560	3x1½	1.38
				2.0	12			.5	18					2200
113	Round Lake Rd. . . . .	.75	40	.75	40	.5	30	.5	30			2640	4x2	.25
114	West Melick Rd. . . . .	.08	30	.05	30	.08	6	.05	30			699	3x2	1.0
		.5	10	.5	10			.56	5			1200	2x1	726
								.11	20					

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS
Yds. crush- ed	L cover- ed			Wood	Stone or Conc.	Metal	Size	No.	Description	
										100
										101
										102
										103
										104
										105
		15	1	6	temporary			1	Re-covered.	106
				2	temporary					107
				4	repaired			1	46' span.	
				2			7'	1	20' "	
				2			8'	2	10' "	
				2			4'	2	12' "	
				1			6'	3	7' "	
				1			8'			
				13	temporary					
				1			16x3			
				1			16x4			
				3			23x3			
		1.25	.5	1			16x2x2			108
					1		22x2½x2½			
					1		26x2x3			
					1		16x1½x1			
				1			18x4x4			109
				1			12x8x20			110
					1		20x3x3			
					1		20x2½x2½			
					1		20x4x4			
				1			24x3x2	1	Repaired.	111
				2			24x4x2			
				10			20x1x1¼			
				1			18x2x1			
				1			20x2x1¼			
				3			22x1½x1¼			
				7			18x2x3			
				1			14x12x3			
				5			14x2x2			
		1			7		26x1½x1½	1	18x20	112
					4		24x4x2			
					6		22x2x2			
				4			18x4x4			
					1		48x1½x1½			113
					1		45x2x2			
					2		24x2x2			
				3			22x2x2			114

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
MATHESON DIST.														
115	Beatty Township...	3.5	66	3.5	66	3.5	26	4.5	24					
116	Beatty-Carr Bdry...													
117	Beatty-Hislop Bdry...													
118	Benoit Township...	1.0	66	1.0	66			1.0	20					
119	Bond-Currie Bdry...	.13	12			1.5	26	2.0	26	.08	12	2075 4980 6920	4x2½ 4x1½ cleaned	
120	Bowman Township...	.11	66			.11	50	.95	24					
121	Bowman-Currie Bdry...							2.0	re					
122	Carr Township...	1.0	66	1.0	66	1.25	26	.5	24					
123	Carr-Taylor Bdry...							1.25	22					
								1.0	re					
								1.0	24					
124	Carr-Wilkie Bdry...							2.0	20			900 100 4416	3x2 4x3 off take	
125	Currie Township...	2.0	66	2.0	66	2.0	26	1.0	20					
126	Hislop Township...	3.0	66	1.0	26	4.7	26	1.5	re			50 74 830 3595	2x1 3x1 3x2 off take	
				3.0	66			.08	30					
								3.25	20					
127	Hislop-Playfair Bdry...	.28	66	.28	66	.28	26	1.2	20			3600	off take	
128	Playfair Township...							1.25	20			1347 5388	3x2 off take	
129	Stock Township...	1.0	66					.75	20			1085 1627	2x1 off take	
								.5	24					
								.25	re					
130	Taylor Township...	1.0	66	1.0	66	2.43	26	6.61	20			60 1073 242 184 154 30 6433	6x3 3x2 3x1 2x2 2x1 7x4 off take	
								.88	26					
131	Taylor-Walker Bdry...													
132	Walker Township...	1.5	66	1.5	66	2.0	26	3.39	20			120 225 1140	3x1 3x2 off take	

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush- ed	l. cov- ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
				1			2x4x18	1	15' span. 1 Repaired.	3600 c.yd. clay removed.	115
		3.5									116
		3									117
		9.75					2x4x18				118
				1			4x6x19			1067 c.yd. clay fill.	119
				1			3x4x18			1.7 mile covered with	
				1			3x4x35			1484 c.yd. clay.	
				1			4x2½x22				
				1			2x3x18	1	105'x 18'	2644 c.yd. earth excav.	120
				8			2x4x20	1	16'		
				4			2x2x20			.36 mile muskeg covered	121
		6.5								with 315 c.yd. clay.	122
				6			2x2x18	2	Repaired.	12 c.yd. gravel fill.	122
				3			2x2x16	1	Two 15' spans.	2068 c.yd. clay used in	123
				2			4x4x20			covering muskeg, 888	
				4			2x3x20			c.yd. clay fill.	124
				12			2x4x18				
				9			3x4x18				125
				2			2x4x18				
				7			4x4x16	1	30' and two 16'	72 c.yd. clay and 50	126
				3			2x2x16			c.yd. rock fill.	
				1			6x6x16				
				2			1x12x16				
				12			2x4x16				
				4			1x4x16				
				7			2x4x16				127
				3			4x4x16				
				1			6x6x16				
				3			2x4x16	1	16' span.		128
				1			1x4x16				
				1			4x4x16				
				4			2x4x16				129
				1			1x4x16				
				2			6x6x20				
				6	repaired						130
				34			2x4x15	2	16' span.		
				23			3x4x16				
				2			6x6x16				
				2			3x4x22				
				1			4x5x20				
				1			4x4x20				131
				15			2x4x16	1	104' long.		132
				16			4x4x16				
				1			6x10x16				
				2			6x16x16				

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
MUSKOKA DIST.														
133 Gravenhurst-Bala-Parry Sound Rd...	1.45	40	.....	.....	.....	.....	2.36	16	.....	.....	1700	3x1	5.1	4680
	.8	br	ushing								14000	2x1		
134 Huntsville-Dwight Rd.....	.....	.....	.....	.....	.....	.....	11.5	re	.....	.....	225	3x1 $\frac{1}{2}$	.....	.....
											40	2 $\frac{1}{2}$ x1		
											30	3x2		
											400	creek		
135 Severn - North Bay Road, Severn to Novar Section.....	12.38	s.	brushi	ng	.25	20	30.30	re	.....	.....	1500	2x1	36.5	6584
					2.5	24					1125	2x1 $\frac{1}{2}$		
					.35	30	.....	.....	.....	.....	125	2x2		
					.44	50	.....	.....	.....	.....	2000	2x2 $\frac{1}{2}$		
											450	3x1		
											2000	3x1 $\frac{1}{4}$		
											3545	3x1 $\frac{1}{2}$		
											15	3x2		
											160	3x2 $\frac{1}{2}$		
											175	4x4 $\frac{1}{2}$		
											5676	cleaned		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crushed	L covered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		6		2			1x3x14			350 c.yd. earth fill. 200 c.yd. rock fill.	133
				6			4x4x16				
				2			2x2x16				
				6			1x1x16				
				6			1½x1½x16				
				2			3x3x24				
				1			4½x5x20			129 c.yd. stone fill. 104 c.yd. earth fill.	134
							1½x18				
							32"x20'				
							10"x20'				
							25"x20'				
675 placed in piles for maintenance.	675 covered	105.91		1			5x5x18	2	10'x 14'	11,210 c.yd. rock excav. 44,600 c.yd. earth excav. 524 c.yd. stone fill. 1315 c.yd. earth fill.	135
				1			8x12x30	1	15'x 24'		
				1			10x10x16	2	Temporary.		
				1			2x2x20				
				1			1x2x24				
						1 Conc.	7' span				
						1 Conc.	10' span				
						3 Stone	18"x24'				
							8"x18'				
							12"x18'				
							16"x18'				
							18"x18'				
							24"x18'				
							12"x20'				
							20"x20'				
							24"x20'				
							18"x22'				
							20"x22'				
							12"x24'				
							18"x24'				
							20"x24'				
							24"x24'				
							30"x24'				
							38"x24'				
							10"x26'				
							18"x26'				
							20"x26'				
							24"x26'				
							24"x27'				
							34"x27'				
							12"x28'				
							18"x28'				
							20"x28'				
							24"x28'				
							36"x28'				
							30"x35'				
							12"x36'				
							24"x36'				
							30"x36'				
							20"x40'				

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
NIPISSING-SUDBURY- RENFREW DIST.														
136	Balfour-Dowling Boundary	1.25	66	1.25	66	.5	24	.....	.....	.....	.....	.....	.....	.....
137	Callander-Mattawa Road	6.25	brushing	.....	.....	.....	.....	4.15	re	.....	.....	.....	40.0	8946
138	Hagar-St. Charles Road .....	.41	40	.....	.....	1.0	30	.5	16	.....	5280	3x1½	1.0	156
139	Larchwood-Phelan Road	2.75	66	2.75	66	2.0	24	2.75	24	.....	300	4x1½	.....	.....
140	Mattawa-Pembroke Road	12	brushing	4.14	44	11.02	24	11.69	24	.....	300	1½x1½	36.13	4440
		4.14	44	1.8	40	.....	.....	.....	.....	.....	100	1½x2	.....	.....
		3.3	40	4.23	24	.....	.....	.....	.....	.....	225	6x3	.....	.....
		4.23	21	2.55	45	.....	.....	.....	.....	.....	225	2x5	.....	.....
		2.55	45	.....	.....	.....	.....	.....	.....	.....	40	2x2	.....	.....
		.....	.....	.....	.....	.....	.....	.....	.....	.....	25	2x3	.....	.....
141	North Bay-Callander Road .....	.....	.....	.....	.....	.....	.....	.25	re	.....	300	cleaned	8.0	1428
		.....	.....	.....	.....	.....	.....	.....	.....	.....	50	do	.....	.....
142	North Bay - Sudbury Road	19.5	s. brushing	.....	.....	.....	.....	1.0	18	.....	12540	cleaned	.....	.....
		.25	40	.25	40	.....	.....	.....	.....	.....	3860	do	85.35	17114
		.....	.....	.....	.....	.....	.....	.....	.....	.....	228	3x1½	.....	.....
		.....	.....	.....	.....	.....	.....	.....	.....	.....	264	3x3	.....	.....
		.....	.....	.....	.....	.....	.....	49.75	re	.....	2050	2x1½	.....	.....
		.....	.....	.....	.....	.....	.....	.....	.....	.....	400	2x2	.....	.....
		.....	.....	.....	.....	.....	.....	.....	.....	.....	20	4x3	.....	.....

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS
Yds. crushed	L covered			Wood	Stone or Conc.	Metal	Size	No.	Description	
		172		2	repaired					136
				1			1 1/2 x 1 x 24	1	Recovered.	137
				1			2 x 2 x 18			
				1			2 x 1 x 12			
					1 Stone		1 1/2 x 1 1/2 x 18			
					2 Stone		2 x 4 x 20			
					1 Stone		1 x 1 x 24			
				1			2 x 4 1/2 x 16			
				3			2 x 2 x 24			
				8			4 x 4 x 16		2000 c.yd. stone in Rip-	138
				1			4 x 8 x 16		Rap.	
				3			2 x 3 x 16			
				1			2 x 6 x 24			139
				5			2 x 4 x 21			
		106.83		1			3 x 6 x 18	1	Railing repaired	1347 c.yd. earth cut.
				2			2 x 2 x 18			4489 earth fill.
				15			2 1/2 x 2 1/2 x 18			140
				3			3 x 3 x 18			
				5			3 1/2 x 3 1/2 x 18			
				1			7' x 18' x 18'			
				1			1 1/2 x 1 1/2 x 18			
				4			2 x 6 x 18			
				1			6 x 2 1/2 x 18			
				8			5 x 5 x 18			
							32' x 24'			
							1 replaced			
				1			1 1/4 x 1 1/2 x 18			
				1			8' x 8' x 18			
				1			3 x 3 x 20			
							24' x 18'			
				3			repaired			
		77		1			2 x 2 x 16			141
							2 Conc. 1 1/2 x 20			
							2 Conc. 2 x 20			
							1 replaced			
				1			repaired			
				6			cleaned			
								1 King truss, 200'	830 c.yd. rock fill.	142
								long.	1150 earth cut and fill.	
		272	8.25				1 27' x 20'	1	Rebuilt.	
							3 27' x 20'	4	Re-covered.	
							1 Conc. 30' x 20'			
							6 repaired			
				5			repaired			
				1			rebuilt			
				1			lengthened			
				1			10 x 14' x 22'			
				1			2 x 3 x 18			
				1			2 1/2 x 4 x 16			
				2			3 x 4 x 16			
				7			2 1/2 x 6 x 16			
				2			1 x 1 1/2 x 20			
				1			1 x 1 1/2 x 24			
				1			1 1/4 x 1 1/2 x 18			

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
NIPISSING-SUDBURY-RENFREW DIST.— <i>Continued.</i>														
143 North Bay-Widdifield Road.	3.0	br	ushing	..	3.5	24	4.16	re	.....		30	3x3	12.0	1205
					1.0	20								
144 Noelville-Rutter Rd.							8.0	24	.....		1800	1½x3	4.5	3002
145 St. Charles-Noelville Road.	5.0	66	5.0	66	4.25	30	.75	20		.08	14	2000	3x1½	7.0
							1.5	18				2000	2½x1½	
							6.25	16						
146 Sturgeon Falls Field Road.	4.66	si	debrus	hi	ng		9.4	re	.....		100	2x3	4	2504
147 Sturgeon Falls-Smoky Falls Road.											200	2x1½	.....	60
148 Sudbury-Capreol Rd.							7.0	re	.....				14.80	4996
149 Sudbury-Chelmsford Road.							5.0	re	.....		2000	3x1½	10.00	2472
											1100	2x3		
150 Warren-St. Charles Road.														95
151 West Tree - Shining Tree Road.	2.0	40	1.0	40	1.0	40	1.5	20		.5	16	2640	2x3	3.5
	.25	50	.....	.....	.25	16	.25	12		.04	10			
PARRY SOUND DIST.														
152 Burks Falls-Magnetawan Rd. ....	.97	24	.....	.....	.....	.....	.36	re	.....		3200	cleaned	.....	.....
							.35	24			850	3x1	8.3	3259
							.25	36			400	2x1½		
153 Chisholm-North Bay Road. ....							.25	18	.....		8430	2x1	.13	190

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush- ed	L cov- ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		16.5		5			2x5x18			465 c.yd. earth fill.	143
				1			2x3x18				
				4			6x2x18				
				2			5x2x18				
				2			4x2x18				
				6	Conc.		1½'x 18				
				3			2x3x16			2000 c.yd. earth cut and fill.	144
				1			3x3x16			50 c.yd. rock repair to Rip-Rap.	
				1	recovered					3020 rock fill.	145
				5			2x4x16				
				1	recovered						
				7	Stone		4x2½x16				
		16.66		18			3x4x16				
				1	repaired			3	Repaired.	18 c.yd. stone fill.	146
				14			1½x1½x18	3	Re-covered.		
				1	Stone		1½x1½x20	1	24'x 16'		
				1			1½x2 x20	1	16x8		
							3x20				
		10									147
		18		1			4x8x16			.5 mile clay road covered with 300 c.yd. earth.	148
		4				1	10'x20'			300 c.yd. rock fill.	149
				1			1¼x2'x20'				150
			19	25			2x4x16	3	Repaired.		151
		9.5		1	extended		2'			4125 c.yd. earth fill.	152
				1			5'x 18'				
				7			6x18				
				1			4x16				
				2			4x18				
				1			12x18				
				1			4x6x18				
							30'x24'				
							24'x20'				
							18'x20'				
							12'x20'				
							20'x24'				
				1			3x3x20				153
				1			1½x3x18				
				1			2x3½x16				
				1			1x2x16				
				1			1½x2x16				
				1			1x3x18				
				1			2x4x18				
							8'x18'				
							12'x18'				

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
PARRY SOUND DIST —Continued.														
154 Parry Sound - Magnetawan Road..... (Waubanik-McKellat Section).							4.29	18			4050	3x1	4.0	1711
155 Powassan-Chisholm Road.....	.1		brushing								2500	cleaned	7.5	268
156 Powassan to Loring, (via Christian Valley)	.5	42 1/2	.07	66	.55	30	4.25	24			1300	4x1 1/2		
					.56	35	2.25	24			396	2x1	4.0	3235
					.07	66					4138	3x2 1/4		
											6627	2 1/2 x 1 1/2		
											4820	3x2		
											1275	3 1/2 x 1 1/4		
											260	1 1/2 x 1		
157 Powassan - Nipissing-Restoule Road.....							16.0	re			300	2x8	9.14	831
158 Cross over Road from Powassan - Loring Rd., to Trout Creek -Loring Rd. in Twp. of Pringle.....	1.25	66	1.25	66										
159 Severn - North Bay Road..... (Novar - Callander Section).	.25		brushing				11.25	re			2006	3x2	63.0	9977
											11757	2x1		
											2220	3x1 1/2		
											200	2x 1/2		
											160	2 1/2 x 1		
											65	5x1 1/2		
											21300	cleaned		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS
Yds. crush-ed	L. cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description	
					6 Stone		18''x18'			154
					5 Stone		24''x18'			
							9 12''x18'			
							8 18''x18'			
							3 24''x18'			
				1			6x3x18		4 c.yd. stone fill.	155
		4.25		1			2x4½x16			
		3.25		1			2x3x24		50,441 c.yd. earth cut and fill.	156
				1			3x3x25			
				1			3x3x20		4,387 c.yd. stone wall.	
				5			2½x3x20		2,005 c.yd. stone fill.	
				2			4x4x20		1,500 lin. ft. fencing.	
				4			2x3x20		50 c.yd. rock excav.	
				2			2x3x30		4½ miles creek cleaned.	
				1			2x2x20			
				1			4x8x20			
				12			2x3½x20			
				1			2x4x20			
				2			2½x3½x18			
				2			2x4x30			
				1			2x3x40			
				2			2x3½x18			
				2			1x3x18			
					1 Stone		1x4x20			
					1 Stone		2x3x20			
					1 Stone		2½x3x16			
		8			1 Stone		1x3x18			
				1			4x3x18		705 c.yd. rock excav.	157
				1			3x6x14		227 c.yd. earth fill.	
					1 Stone		2x4x16		50 c.yd. stone fill.	
					1 Stone		1x2½x16			
				14	repaired					158
		208.8		1			21x16	1 Repaired.	994 c.yd. earth fill.	159
				1			2x4x18	1 Re-covered.	229 stone fill.	
				1			1x3x16		70 c.yd. cinders placed on road.	
				2			3x4x18		85 c.yd. stone removed from road.	
				3			2x3x18		36 c.yd. rock excav.	
					2 Stone		2x1x20			
					1		4x6x20			
					1		3x4x18			
				16	cleaned					
				2	re-covered					
				1	repaired					
							2 20''x24'			
							1 20''x20'			
							1 36''x20'			
							2 24''x20'			
							4 12''x20'			
							4 18''x20'			
							1 14''x20'			
							1 10''x20'			
							1 24''x20'			
							1 24''x26'			
							1 24''x24'			
							1 18''x19'			

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L m/s.	W ft.	L ft.	W & D	L m/s.	Yards used
PARRY SOUND DIST. —Continued.														
160	.20		brushing				2.7	14			2862	3x2	16.0	2365
											20229	2x1		
161	2.88	66	2.88	66	.25	18	.5	24	.02	12	60	2x12		
							1.25	18			5247	3x1		
											80	4x2		
											40	2x2		
											140	2½x1		
PORCUPINE DIST.														
162	.4	66	.4	66	.4	30	3.25	26			2112	3x2	2.25	1831
							.5	22			420	4x3		
163													.25	150
163 a											5280	3x2		
164							.09	22	.04	16			3.31	1425
165													.75	576
165 a											21120	3x2		
166					.75	30	.25	26			475	2x2	.5	450
166 a	4.0	20	4.0	20										
167	1.5	24	1.5	24	1.5	24								
RAINY RIVER DIST.														
168	2.38	66	.5	66	2.38	30	1.62	30	.06	12	720	4x2	1.34	1313
	.5	20									329	4x1		
169							.5	32					4.0	1722
170	.31	66			.32	30	.75	26			84	3x3	.5	326
171					.4	10			.39	9	1200	4x3	.55	345
									.22	10				
172							1.0	28			660	3x2½	2.0	1060
173													2.0	1300

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
RAINY RIVER DIST. —Continued.														
174							1.25	28					4.25	2514
175							1.75	30					.31	207
176	5.31	br	ushed				4.70	re			1100	5x3	46.0	12934
											1980	5x2 $\frac{1}{2}$		
											1940	6x2 $\frac{1}{2}$		
											2230	3x3		
											2390	3x2 $\frac{1}{2}$		
											17700	5x2		
177													2.0	450
178	1.5	66			1.5	33	1.0	26			1073	4x2		
179							1.38	26			600	4x2		
180													1.0	400
181													1.0	650
182	1.0	66					1.31	28					2.2	1437
183													.5	320
184											2640	3x2		
185	2.0	66	2.0	66	2.0	33								
186											5280	3x2		
187	.25	66	.25	66			.31	26			235	5x2	.15	96
											4950	4x2		
188	1.0	66	1.0	66										
189													2.5	1625
190													4.0	731
191													19.00	1515
192	2.0	66	.5	66			.62	28			561	4x2	1.45	963
							1.52	26			1568	4 $\frac{1}{2}$ x2		
193											330	4x2	2.5	1625
													12.0	1600
194	2.0	66	2.0	66							2640	5x2		
195											13200	4x2		
196	.13	66			.25	30	1.0	34	.03	8	2910	5x2	7.0	1210
							1.0	40			5034	5x3	.44	272
							1.0	36			247	3x1 $\frac{1}{2}$		
							.09	20						
197	3.78	66	2.28	66	.78	66	1.5	36			325	4x2	2.0	1300
					.38	36	.5	26			1300	4x1		
					.5	20					1500	5x2 $\frac{1}{2}$		
					.5	28					4010	5 $\frac{1}{2}$ x2		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crushed	L covered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		80		1			4x3x20			35 c.yd. stone fill.	174
		8		8			rebuilt				
				4			2x2x16				175
				4			3x16 ¹¹ x16				
		24.56		1			3x1x16				
				4			3x4x20	3	Re-covered.	A small portion of this work was executed on the Devlin Road and the Lavallee Road.	176
				1			1½x3x40				
				1			4x6x24				
				1			4x5x24				
				1			4x4x20				
				1			3x4x24				
				1			2x2x24				
				1			2x3x20				
				1			4x4x16				
				4			repaired				
											177
				2			2x4x18				178
				1			2x4x16				
		58									179
											180
											181
		1		1			3x3x16				182
											183
											184
											185
											186
											187
											188
											189
		12									190
											191
				2			4x3x18				192
				1			3x4x16				
		216									193
											194
											195
		252		2			4x3x16	2	Repaired.		196
				2			re-covered				
											197
		4		4			3x4x16				
				5			4x4x18				

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

		Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
		L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
	TEMISKAMING TRUNK ROAD														
198	Boston Creek-Round Lake Road.....	1.47	66	.93	66	.56	26								
199	Boston Creek - Skead Road .....					.93	22	.62	18			4500	2x3		
200	Charlton-Englehart..	3.0	brushed					4.0	re						
201	Charlton-Elk Lake...	2.0	brushed							.01	14			.75	597
202	Dane-Larder Lake...							10.0	re			5280	3x2	15.0	1263
203	Elk Lake-Gowganda..	5.1	brushed					2.3	re			3960	2½x1½	12.11	6439
												3230	2 x 1½		
												750	1½x1½		
204	Elk Lake - Milberta Road	2.5	brushed												
		2.9	66	2.9	66	1.85	33	3.6	22			594	2 x 2½		
												264	2½x1		
205	Kirkland-Goodfish...														
206	Kirkland-Lebel Road.	.15	66			1.40	33	4.45	18	.13	18	5280	2x1	3.0	694
												2220	3x2		
												2700	2x1½		
												750	2x2		
207	Latchford - Cochrane Trunk Road:—														
(a)	Cobalt-New Liskeard Section.	3.5	brushed			.3	12	10.0	re			7920	3x2	9.5	5281
						.4	16					1650	4x3		
(b)	Dane-Swastika Sec...	.85	10					5.0	22			400	1½x1½		
		.5	16									2000	3x2		
												2100	4½x4½		
												500	2 x 2		
												2500	7 x 2½		
												5280	3 x 3		
(c)	Ramore-Matheson Section.....							5.75	re			1000	2x3	3.0	2486

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag- ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush- ed	L. cov- ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
										198	
				4			6x3x16	1	22x14	100 c.yd. earth cut.	199
				1			9x6x16			100 c.yd. earth fill.	
				4			3x4x16				200
				2			3x4x16				
				2			3x2x16				
				1			4x4x23				
						5	20''x20'				
			4	5			3x4x16	3	Repaired.		201
860	1.5	6		16			3x2x16				
		10.5		3			2x2x16				202
				1			14'x 14'	2	Repaired.	799 c.yd. earth cut.	203
				1			4x16			1676 c.yd. earth fill.	
				8			1½x16				
				3			3x16				
				1			1x16				
						5	18''x14'				
						11	12''x14'				
						1	12''x16'				
				5			1x21	1	32x16	535 c.yd. earth cut.	204
				1			4x21	1	45x16	773 c.yd. earth fill.	
				2			4x6x20			896 c.yd. rock fill in piers.	
824	2.5							1	Repaired.		205
				5			4x2x20				206
				2			4x2x16				
				2			2x2x16				
				1			2x2x20				
				3			2x4x16				
											207
		5		1			6x4x24			2086 c.yd. cut and fill.	(a)
						17	18''x22				
						2	24''x22'				
				2			3x2x20	1	54 x 16 cement piers.	200 c.yd. gravel fill.	(b)
				4			4x2x20	1	Timber.	3255 c.yd. earth cut.	
				2			3x8x20	2	16' pile bents.	780 c.yd. earth fill.	
				2			18x19x25			4032 c.yd. rock excav.	
				5			2x2x16				
				2			4x2x16				
				1			7x8x16				
				4			2x4x16				
				2			3x4x16				
				2			4x5x16				
				6			2x2x24	2	Rebuilt.	6815 c.yd. earth cut and fill.	(c)
				3			1x2x20				
				1			3x4x20				
				1			2x4x20				
						1	48''				

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
TEMISKAMING TRUNK ROADS—Continued.														
(d) Matheson-Monteith Section.....														7.5 6912
(e) Monteith-Porquis Section.....							2.8	33			2800	3½x2		
											700	6 x2½		
											1200	6 x3		
											500	4 x3		
(f) Porquis Jct.-Holland Section.....													1.65	1134
(g) Holland-Cochrane Section.....	7.0	66	7.0	66	1.5	33	.5	33			300	3½x3	1.5	25
208 Lightning River Rd., (Munro - McCool & Michaud Twps.)	12.0	br	ushed		12.0	10								4.0 1442
209 Matachewan to Island Rapids.....	1.25	66	1.25	66										
210 Matheson-Shillington -Porcupine Road.	.5	br	ushed				1.08	26			4575	3x1½	3.75	3366
211 Monteith-Shillington-Road.....														
212 Munro Road.....							7.0	re						2.0 452
213 Porquis Jct.-Iroquois Falls Road.....							1.55	24			9880	3½x2		
							.87	33			2900	2 x4		
											900	4 x4		
214 Porquis Jct. - Timmins Road.....	2.45	66	11.45	66	2.89	30	5.61	26			310	3 x3	1.58	2501
							.38	24			3000	3½x1½		
											1524	3x2		
											500	6x3		
											1550	2x2		
215 South Lorrain Road.	3.76	66	3.76	66	4.43	33	5.17	22			9290	3x1	5.0	1453
	1.17	br	ushed		4.0	8								
					.5	12								
216 Swastika-Kirkland Road.....														223
THUNDER BAY DIST.														
217 Arthur St. Road.....	3.43	br	ushing &	wideni							7062	4x2	1.8	734
				ng	.75	30					450	3x1		
218 Conmee Road, Oliver Township.....	.75	br	ushing										.5	432
219 Conmee Township.....													1.55	1209
220 Current River Road.....							.25	24					.25	200
221 Dawson Road.....	1.0	40	1.0	40	.75	26	1.0	25			8560	2½x1½	5.38	3656
	1.25	br	ushing				1.0	re			2000	3 x1½		
222 Dawson Road Lots Township.....	1.0	66	1.0	66	1.0	26	.5	24			5280	2x1½		
											300	3x2		
223 Dog Lake Road.....	3.75	br	ushing								3590	cleaned	3.5	1385

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush-ed	L. cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		4.5						2	Rebuilt.	2527 c.yd. earth cut and fill.	(d)
		1		2			20x20"x16			1000 c.yd. earth cut and fill.	(e)
				3			1½x1½x16				(f)
		2	2	1			2x2x20				(g)
				4			4x4x18			1 mile roadway cleared of boulders.	208
				2			2x6x18				209
			15	3			2x4x18				210
		7			1	Conc.	42"x35 Double				211
		11			1		2x2x16				212
				1			4x4x18	2	18x12x24	356 c.yd. earth cut and fill.	213
				3			1½x1½x16				
				5			3x4x20				
500	.57	2		1			2x2x24	4	Timber.	1575 c.yd. earth fill.	214
				14			3x4x24	1	Concrete abutments.	15673 c.yd. earth cut.	
				1			4x2x22				
				4			2x2x16				
				1			1½x1½x16				
				2			20"x22				
				16			18"x22				
		2		3			4x4x22	1	Re-covered and repaired.		215
				1			4x2x22				
							13 18"x22				
							1 24"x22				
936	2		5				18 12"x22	1	Timber.	275 c.yd. rock fill. 313 c.yd. gravel fill. 1.9 miles tarred, 12' wide.	216
		67.25			2		18"x25'	1	Repaired.		217
											218
		12									219
		26		4			16x3x3	4	Re-covered.	1000 c.yd. rock excav. 800 c.yd. earth excav.	220 221
					2		25x18"				
				1			22½x18"				
				5			18x2½x2				222
				5			18x2x1				
		3.5		3			18x4x2	1	30' truss on cribs.	625 c.yd. earth and stone excavation.	223
				1			16x4x4	1	Re-covered.		

DEPARTMENT OF LANDS AND FORESTS.

ANNUAL REPORT OF WORK

	Cutting		Burning		Stumping and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
THUNDER BAY DIST. —Continued.														
224 Dog River Road.....					.5	24	.33	18			325	2 x1	.5	388
											865	2 x1½		
225 Dona-Forbes Road..	.5	66	1.75	66	1.25	26	3.0	24			3600	2½x1		
					1.5	24					150	2 x1		
226 Dorion Township....	4.75	br 40	ushing ..		1.0	24	2.13	18			580	3x2	3.57	1425
	2.13		2.13	40	.63	26								
					.5	20								
227 Dorion-Sterling Bdry.	1.04	66	1.04	66	1.04	24					1320	2 x1½		
228 Gillies Township....	2.0	br 40	ushing ..		1.25	8	3.5	24			2243	2½x1½	.03	60
											197	3 x1¼		
											205	3 x1		
229 Gillies-Scoble Bdry...	.25	br 40	ushing ..				.5	re					.13	57
230 Gorham Township....	7.0	br 25	ushing ..				.75	16			10140	cleaned		
	1.50		1.5	25	3.0	20	.75	18			2640	2½x1	4.20	2136
							.5	20			600	3 x2		
231 Gorham-McIntyre Boundary.....	.2	40	.2	40	.2	26					1037	cleaned	1.0	242
232 Gorham-Ware Bdry..	.5	br 40	ushing ..				.5	24					.25	30
233 International High'y.	4.96	br 40	ushing ..		.06	26	1.0	24			160	3½x2½		
											520	2½x1½	9.0	5717
											3000	cleaned		
234 Kakabeka-Hymers Road.....							7.25	re			700	cleaned	2.5	2520
235 Lybster Township....	.75	40	.75	40	.75	20	.75	20			200	2x1	.33	250
	8.0	br 40	ushing ..		1.0	24								
					.5	26	7.0	18						
236 Lybster-Marks Bdry.	.5	40	.5	40	.5	20								
237 Lybster-Strange Rd.	1.25	40	1.25	40	.75	26	.75	20			2650	2x1		
238 Marks Township....	3.57	br 40	ushing ..		1.0	24	2.51	22			7350	2x1	.31	250
											500	3x2		

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS
Yds. crush-ed	L cov-ered			Wood	Stone or Conc.	Metal	Size	No.	Description	
		2		1			18x2½x1¼			224
				3			24x3x2½			225
				3			24x2x1½			5000 c.yd. earth cut and
				5			24x3x2			
				2			20x3½x2			
					2		18x2x1			
				3			16x4x3	1	Repaired.	700 c.yd. earth cut and
				3			16x3x3			fill,
				5			16x3x2			Retaining wall, 250'x4'
										x3'.
										227
					2		22½x1½			6500 c.yd. earth cut and
					5		22½x1			fill.
					1		20x1¼			377 ft. retaining wall,
					1		25x1½			3'x 4'.
					1		20x1			
				7			18x2x2			60 c.yd. earth cut and
										fill.
				4			16x2x2			190 c.yd. earth cut and
				9			16x3x2			fill.
				3			18x4x3			
				3			18x3x2			
				2			18x2x2			
				2			16x5x2			
				1			20x3x2			
					3		16x3x2			
				2		repa ired				
				6			18x4x2			
				1			20x14x8			231
				3			18x3x2			
				1			20x3x2			232
		342					20x12''	2	30' temporary.	5471 earth cut.
				2			24x4x2	2	20' span.	3704 earth fill.
				4			24x4x2½			385 c.yd. rock excav.
				1			22x4x2½			
				1			25x4x2½			
				1			25x3½x2½			
				1			25x4x3			
		48		2		re-co vered				1365 c.yd. earth cut and
										fill.
				2			18x6x2	1	Removed.	3300 earth cut and fill.
				7			18x2x1			235
				18			18x3x1			
				1			18x4x3			
				3			18x3x1			
				1			18x6x3			
					1		45'x2'			
				1			18x3x2			236
				5			18x3x2			237
				36			18x3x2			238

DEPARTMENT OF LANDS AND FORESTS,
ANNUAL REPORT OF WORK

	Cutting		Burning		Stump- ing and Grub'g		Grading		Cross Lay		Ditching		Gravelling	
	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L mls.	W ft.	L ft.	W & D	L mls.	Yards used
THUNDER BAY DIST. —Continued.														
239	8.88 .25 3.5 .5 6.75	br 66 10 35 40	ushing .25 1.75	.. 66 40	5.63 .25 1.6 1.0	26 26 24 20	5.13 2.38 1.0	24 20 18	.....	.....	12500 4770 2970 300	2x1½ 3x2 3x1½ cleaned	10.94	8006
240	Oliver Township.....													
241	13.5	br	ushing	..	.....	.....	.....	.....	.....	.....	1254 225 2298	2½x1 3 x1¼ cleaned	3.37	2355
242	O'Connor Township.....													
243	.25 2.6	60 40	.25 2.6	60 40	.25 1.6 1.0	26 24 20	2.38 1.0	20 18	.....	.....	6090	2x1½	.24	140
244	.75	50	.75	50	.75	26	.75	24	.13	10	10110 8460	3x2 2x2	1.25	1368
245	.5	br	ushing	..	.....	.....	.1	24	.....	.....	630	3x1½	3.19	2486
246	Scoble Road.....													
247	.5 .5 .13 1.0	br 40 15 20	ushing .5 .13 1.0	.. 40 15 20	......25 .33 .13	..... 16 26 24	......75 1.38	18 16 20	.08	12	300	2x1	.5	400
248	1.5	br	ushing	..	1.5	12	3.5	24	.....	.....	.....	.....	5.63	4397
249	1.13	66	1.13	66	1.13	24	1.0	20	.....	.....	2032 6578 4620	2½x2 3 x2 cleaned	1.63	1194
250	.31	br	ushing	..	.25	16	.63	24	.....	.....	2200 2160 600	3x1½ 3x2 3x1	1.5	1179
251	6.0 1.0 .5 1.5	br 66 40 50	ushing 1.0 .5 1.5	.. 66 40 50	3.38 .50	24 20	1.0 .5 3.00	24 20 re	.1	10	2310 2340 6699	3x1½ 2x1 cleaned	.33 .25	204 254 277
TOTALS.....														
344.13 .. 307.97 225.14 340.77 4.05 984818 976.45 316287 229.61 br ushing 217.06 re -gradi ng														

NORTHERN DEVELOPMENT BRANCH.

DONE, YEAR 1922.

Crushed Rock		Drag-ging Miles	Other Rep'rs Miles	Culverts				Bridges		REMARKS	
Yds. crush-ed	L covered			Wood	Stone or Conc.	Metal	Size	No.	Description		
		32.66	.33			1	40'x10''	8	Whitewashed.	500 c.yd. rock excav.	239
						1	30'x15''			7426 c.yd. earth cut and fill.	
						2	20'x18''			530 c.yd. burrow for fill.	
				5			40x4x3			Retaining wall 110'x12''	
				13			24x3x2			x4½'	
				16			various			190 ft. lineal, guard rail.	
										465 ft. lineal, iron guard rail erected at Kaka-beka Falls.	240
		1.43				6	25'x18''				241
						1	20'x18''				
							20'x14''				
							24'x15''				
								2	22' span.		242
								1	20' span.		
				3			18x4x1½				243
				10			20x3x2				
				3			18x1½x1½				
						3	18x2x2				
						2	18x2½x2				
				6			18x2x2				
		1		1			18x5x2½			1200 c.yd. earth cut and fill.	244
				2			18x5x3			420 c.yd. clay surfacing.	
				2			18x3x2			485 c.yd. rock excav.	245
		12		1			18x4x4	1	Re-covered.		246
				4			18x2x2	1	15' span.		
								1	12' span.		
				1			14x2½x1½				247
				1			15x2x1				
				6			18x3x2				
				3			18x3x1½				
				7			18x2½x1½				
				1			18x4x2	1	30' span.	2430 c.yd. earth cut and fill.	248
				14			22x4x2				
				2			22x3x2				
				2			18x5x3	1	16' span.		249
								1	14' span.		
				2			18x3x1½	1	Re-covered.	1700 c.yd. cut and fill.	250
				1			20x6x2				
				1			20x4x2				
				3			18x3x2				
				1			18x8x4	1	28' span.		251
				4			18x3x3	1	12' span.		
				3			18x2x2				
				3			18x1½x1				
				8			18x3x2				
				3			16x2x2				
				3			20x2½x2				
23108	20 mls.	3851.84	77.83	1762	139	335		105	Built.		
								80	Repaired.		

Appendix No. 48.

NORTHERN DEVELOPMENT BRANCH.

STATEMENTS FOR REPORT FOR THE YEAR ENDED 31ST OCTOBER, 1922.

SECTION 1 (D).

THE ASSISTANCE OF SETTLERS.

Re Feed Shortage.

The indifferent growing season of 1921 necessitated assistance being given to the farmers of Manitoulin Island and in the neighbourhood of Mattawa during the summer of that year; and during the succeeding fall and winter the same shortage of feed became evident in those parts of Northern Ontario west of Mattawa, and extending along the main line of the Canadian Pacific Railway to Sudbury, and along the Soo Branch as far as Walford; north from Sudbury along the Canadian Northern Railway to Hanmer; south from Sudbury along the Canadian Pacific Railway to Rutter; and south from North Bay along the Grand Trunk Railway to Powassan. This territory embraces numerous excellent farming communities, the produce from which, in normal seasons, is sufficient not only to provide for local requirements, but for considerable sale to outside points. The poor growth during 1921, however, produced such a reduced crop that fodder was not available in sufficient quantity to feed the stock which the farmers had on hand. The assistance which had been provided by the Branch to the farmers of Manitoulin Island was, therefore, extended to meet the additional needs. Sixteen distribution centres were established in the area of the shortage, at Mattawa, Eau Claire, Rutherglen, Bonfield, Rankin Siding, Warren, Markstay, Nairn Centre, Webbwood, Massey, Walford, Blezard Valley, Hanmer, Rutter, Callander and Powassan; to these points hay was shipped for sale to farmers, from other sections of the Province, at a considerable saving in cost over the prevailing local rate. The total quantity supplied amounted to 1,307 tons of hay, and 3,070 bushels of corn. Part of this was paid for in cash; the remainder was sold on guaranteed promissory notes payable in 12 months, with interest at 6 per cent. per annum. The feed supplied was of great benefit to the farmers, as it enabled them to retain their stock during the winter, instead of being compelled to dispose of them at sacrifice prices, as would otherwise have been the case.

Refunds were received during the year for cash sales and for feed previously supplied on promissory notes to the amount of \$24,287.08.

SECTION 1 (E)—CREAMERY.

NEW LISKEARD, ONT.,

November 10, 1922.

*To The Honourable Beniah Bowman,
Minister of Lands and Forests,
Parliament Buildings,
Toronto.*

DEAR SIR,—I beg to enclose report of the operations of the Government Creamery for the year ending 31st October, 1922.

For the past year we took in 347,856 lbs. of cream, made 119,278 lbs. of butter, and paid farmers for cream delivered \$35,896.83, at an average price of 38.6 cents per lb. fat. The quantity of cream received in 1922 represents an

increase over 1921 of 50,289 lbs., which would be equivalent to a gain of over 500,000 lbs. in milk produced by the dairy farmers of the district over the preceding year. The number of patrons was increased from 236 in 1921 to 319 in 1922. This development was very gratifying indeed, and our increase in butter and cream would have been somewhat greater but for the disastrous fire of October 4th, which destroyed a number of cows as well as farm buildings and feed. This year I think the farmers of this part of the district had the best crops they have had in the history of the north country, both in hay and grain. Although the latter part of the season up until the time of the fire was dry, yet the grass was quite plentiful, and the second growth of clover was nearly as good as the first. A great many of our patrons were burnt out and some even lost their lives in the fire. This will no doubt affect our winter business, which promised to be the greatest in the history of this institution. We had been working toward this end for the last five years; encouraging and educating our patrons to go in for winter dairying, and just when our hopes seemed to be fully realized with abundant crops and a great number of fresh cows, on October 4th our prospects were shattered by the great calamity that befell our district.

SUMMARY OF OPERATIONS.

FROM AUGUST 17th, 1917 TO OCTOBER 31st, 1922.

Pounds of Cream received.....	1,483,599
Pounds of Butter manufactured.....	484,156
Value of Butter.....	\$222,848.18
Paid to Patrons.....	\$195,076.31

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

(Sgd.) A. MACLACHLAN,
Manager.

SECTION 2 (1)—SEED GRAIN.

The shortage of the grain crop in Northern and Northwestern Ontario during 1921 necessitated an increase in the quantity of seed grain distributed in that area for spring seeding in 1922. Applications were received for upwards of 32,000 bushels of oats and 1,700 bushels of wheat. Considerable difficulty was experienced in obtaining seed oats of the necessary high quality, as the crop shortage in Ontario during the previous season had the effect of reducing the available quantity of seed grain to a minimum. This necessitated supplies being purchased from the Western Provinces, which was a departure from the usual practice of the Branch in supplying seed grain for distribution in Northern Ontario. Wherever possible, local supplies were obtained in preference to importation of Western grain.

Sixteen distribution centres were established in co-operation with the representatives of the Department of Agriculture or of this Branch. The seed was supplied either for cash or upon promissory note secured by a lien placed upon the land of the applicant. The results, in spite of the difficulties above alluded to, have on the whole proved very satisfactory, although experience has shown the advisability of sowing Ontario seed when it is available.

In some districts, particularly Manitoulin Island and in the vicinity of Sudbury, grasshoppers made their reappearance during the past season, and seriously affected the crops. A large quantity of arsenic was provided by the Branch and used in the affected areas under the superintendence and with the co-operation of the Agricultural Representatives. In other districts, however, the season proved to be an excellent one, and satisfactory crops were raised.

The total expenditure incurred in the purchase and local costs of distribution of the seed amounted to \$37,174.84.

SECTION 2 (2)—CATTLE PURCHASE.

The purchase of cows by the Branch for resale to farmers in the northern part of Temiskaming district was so successful in the year 1921, that it was found advisable to repeat the procedure this year. A further car-load was purchased in the Powassan section, consisting of an excellent grade of cattle, viz.: 19 cows, 1 bull, 3 heifers and 3 calves. The bull was sold for \$75.00, the three calves produced \$25.00; the heifers and cows realized from \$35.00 to \$115.00 each; the total returns being sufficient to repay the cost of the cattle and distribution. The advantage of this method of purchasing cows for the northern settlers by car-load lots ensures their obtaining the cattle at the lowest cost, and brings the expert judgment of the Superintendent of the Monteith Experimental Farm to the assistance of the farmers in procuring the best and most suitable type of animal for the locality.

SUMMARY OF EXPENDITURE.

FOR THE ELEVEN YEARS ENDED 31ST OCTOBER, 1922.

Northern and Northwestern Ontario Development Fund.

SECTION.	Summary of Expenditure 23rd May, 1912, to 31st Oct., 1921.	Expenditure for year ended 31st October, 1922.	Total Expenditure to 31st October, 1922.
Section 1 (a) Works and Improvements.....	\$2,100.00	.....	\$2,100.00
Section 1 (b) Roads.....	8,369,576.78	\$1,603,148.53	9,972,725.31
Section 1 (d) Farms.....	79,968.37	30,278.16	110,246.53
Section 1 (d) Assistance of Settlers.....	60,056.87	57,841.20	117,898.07
Section 1 (e) Creamery and Grain Elevators.....	45,844.67	11,305.86	57,150.53
Section 2 (1) Seed Grain.....	190,612.63	37,174.84	227,787.47
Section 2 (2) Cattle Purchase Account.....	20,094.61	1,523.38	21,617.99
Section 2 (4) Schools and Public Buildings.....	.....	17,353.85	17,353.85
Section 2 (6) Fire Protection.....	3,773.45	.....	3,773.45
Returned Soldiers' and Sailors' Settlement Act, 1917.....	1,177,913.16	3,169.35	1,181,082.51
	\$9,949,940.54	\$1,761,795.17	\$11,711,735.71
Settlers' Loan Acct., Clause 9 (Amend. Act 1916).	665,176.81	248,358.12	913,534.93
	\$10,615,117.35	\$2,010,153.29	\$12,625,270.64

STATEMENT OF EXPENDITURE.

UNDER NORTHERN AND NORTHWESTERN ONTARIO DEVELOPMENT ACTS, 1912 AND 1915 AND AMENDMENTS.

FOR THE YEAR ENDED 31ST OCTOBER, 1922.

Districts and Sections.	Expenditure, year ended 31st October, 1922.
1. Kenora.....	\$63,629.48
2. Dryden.....	72,615.36
3. Port Arthur.....	65,747.90
4. Fort William.....	98,215.42
5. Rainy River.....	94,961.19
6. St. Joseph Island.....	11,581.08
7. Sault Ste. Marie.....	169,625.13
8. Sudbury.....	74,343.23
9. Nipissing.....	85,253.19
10. Parry Sound.....	76,824.11
11. Muskoka.....	103,673.80
12. Renfrew.....	17,899.82
13. Manitoulin Island.....	76,127.87
14. Temiskaming.....	565,100.34
15. General Administration.....	27,550.61
	<u>\$1,603,148.53</u>
16. Farms.....	30,278.16
17. Assistance of Settlers.....	57,841.20
18. Creamery.....	11,305.86
19. Seed Grain.....	37,174.84
20. Cattle Purchase.....	1,523.38
21. Schools and other Public Buildings.....	17,353.85
22. Returned Soldiers' and Sailors' Settlement Account.....	3,169.35
23. Settlers' Loan Account.....	248,358.12
TOTAL.....	<u>\$2,010,153.29</u>

STATEMENT OF EXPENDITURE.

YEAR ENDED, 31ST OCTOBER, 1922.

Making of Roads, Section 1 (b):

Bruce, A. E. D., Secretary and Accountant, salary.....	\$3,450.00	
Sinton, Jas., Road Engineer, salary.....	2,700.00	
Beardall, F. G., Principal Clerk, salary.....	2,300.00	
Lawer, W. L., Senior Account Clerk, salary.....	2,100.00	
Reid, A., Map Draughtsman, salary.....	1,800.00	
Dicker, C. L., Clerk, salary.....	1,500.00	
Fleming, Miss E., Clerk, salary.....	1,300.00	
Carefoot, Miss O., Clerk-Stenographer, salary.....	1,100.00	
		\$16,250.00
Wages.....	\$ 911,923.04	
Contracts.....	239,329.14	
Supplies, Equipment and Services.....	435,646.35	
		<u>1,586,898.53</u>

\$1,603,148.53

Advancement of Settlement and Colonization, Section 1 (D):

Wages.....	\$3,610.53	
Purchase of Land.....	24,800.00	
Supplies, Stock and Equipment.....	1,867.63	
		<u>30,278.16</u>

Assistance of Settlers, Section 1 (D):

Hay, Oats, Corn, Freight, Services and Disbursements.....		57,841.20
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Creamery, New Liskeard, Section 1 (E):

Wages.....	\$4,679.96	
Supplies, Equipment, Freight and Expenses.....	6,625.90	
		<u>11,305.86</u>

Seed Grain, Section 2 (1):

Wages.....	\$324.50	
Seed, Freight, Services and Disbursements.....	36,850.34	
		<u>37,174.84</u>

Cattle Purchase Account, Section 2 (2):

Cost of Cattle, Freight and Disbursements.....		1,523.38
--	--	----------

Schools and other Public Buildings, Section 2 (4):

Continuation School, New Liskeard, contracts for erection, heating, etc.....	\$15,912.86	
Material and Supplies.....	1,440.99	
		<u>17,353.85</u>

Returned Soldiers' and Sailors' Land Settlements Act, 1917:

Services, Repairs and Disbursements.....		3,169.35
--	--	----------

\$1,761,795.17

Settlers' Loan Account, Amending Act, 1916:

Dane, F., Commissioner, salary.....	\$5,000.00	
Kennedy, W. K. P., accountant, salary.....	2,700.00	
Crawford, G., Stenographer, salary.....	1,050.00	
		<u>\$8,750.00</u>

Net amount of loans issued..... \$237,255.00

Expenses..... 2,353.12

239,608.12

248,358.12

\$2,010,153.29

NORTHERN DEVELOPMENT BRANCH.

STATEMENT OF REVENUE FOR THE YEAR ENDED 31ST OCTOBER, 1922.

<i>Section 1 (B) Roads:</i>	
Sale of Supplies, Stock and Equipment, Rentals and Refunds.....	\$3,008.13
<i>Section 1 (D) Farms:</i>	
Sale of Produce and Cartage.....	1,836.15
<i>Section 1 (D) Assistance of Settlers:</i>	
Cash Sales of Feed and Notes retired.....	24,287.08
<i>Section 1 (E) Creamery:</i>	
Butter Revenue, Sale of Buttermilk, Cans, etc.....	7,521.08
<i>Section 2 (1) Seed Grain:</i>	
Cash Sales and Notes retired.....	19,338.83
<i>Section 2 (2) Purchase of Cattle Account:</i>	
Cash Sales and Notes retired.....	2,826.84
<i>Clause 5 (1-12) Soldiers' Settlement Account:</i>	
Note retired and Sale of Stock, Kapuskasing Colony.....	18,110.46
	\$76,928.57
<i>Settlers' Loan Account:</i>	
Payments on Principal, Interest, etc.....	84,096.98
	\$161,025.55

RECORD OF CORRESPONDENCE.

FOR YEAR ENDED 31ST OCTOBER, 1922.

Letters received.....	9,742
Letters mailed.....	10,712
Circulars mailed.....	652
	11,364

November 16, 1922.

ARTHUR E. D. BRUCE,
Secretary and Accountant.*Appendix No. 49.*46 RICHMOND STREET WEST,
TORONTO, January 10th, 1923.*To the Honourable, the Minister of Lands and Forests.*

DEAR SIR,—I have the honour to herewith submit a report of the business of this Department to the end of October, 1922, as follows:—

Total number of applications received, 3,871. These applied for loans amounting to \$1,554,800.00, being an average application of \$392.47.

Consideration of each application being on its own merits, and the basis, as usual, on which the loans have been advanced was that of the actual improvements to land.

The total number of loans granted to settlers being 2,549, amounting to \$860,235.00, being an average loan of \$323.40. This amount includes a loan to the Sudbury Co-Operative Creamery Co., Ltd., of \$24,000.00, and a loan of \$10,000.00 to the Kenora Dairy Co-Operative Association; also \$3,500.00 to the Producers Co-Operative Creamery Co., Ltd., of Lavallee, District of Rainy River.

It is a pleasure to refer to the manner in which repayments on account of

loans have been met; being 89.16% on account of interest, and 90.83% on account of principal. The repayments on principal include some loans paid in advance.

From information received from the several districts, the Department learns that settlers are giving more attention to the development of their own lots than in former years, and seem more anxious than ever to get themselves in a position to carry stock.

During the year there have been many expressions of appreciation of the service that the loan has been to settlers.

All of which is respectfully submitted.

F. DANE,
Settlers' Loan Commissioner.

Memorandum of Settlers' Loans to October 31st, 1922.
Applications.

Total number of applications received.....	3,871
Total amount applied for.....	\$1,554,800.00
Average per application.....	392.47
Amount applied for under approved applications.....	1,070,810.00

Loans.

Number of loans issued.....	2,549
Equal to 66% of applications.....	
Amount granted.....	\$860,235.00
Equal to 55% of total amount applied for and	
Equal to 80% of total amount applied for under approved applications.....	
Average loan.....	\$323.40
Total acreage covered by liens.....	387,443
Acreage improved land.....	56,120
Equal to 14% of total acreage.....	
Average loan per acre on total acreage.....	\$2.12
Average loan per acre on acreage improved land.....	\$14.66

Note.—Figures, except averages, include application for, and loan of \$24,000.00 to Sudbury Co-operative Creamery Co., Ltd., \$10,000.00 to Kenora Dairy Co-operative Association, and \$3,500.00 to the Producers Co-operative Creamery Co., Ltd., Lavallee, Ont., District of Rainy River..

Repayments.

Accrued interest due.....	\$122,028.78
Accrued interest received.....	108,812.29 or 89.16%
Payments on principal due.....	278,273.16
Payments on principal received.....	252,759.23 or 90.83%
Total payments due.....	400,301.94
Total payments received.....	361,571.52 or 90.32%

Details of Loans Issued and Outstanding.

District.	No. of Loans.	Amount.	Unpaid Principal and Accrued Interest.
Algoma.....	72	\$22,460.00	\$19,965.73
Kenora.....	257	94,120.00	74,732.48
Manitoulin.....	10	3,850.00	3,800.00
Nipissing.....	140	49,545.00	39,821.12
Rainy River.....	204	67,350.00	45,911.56
Sudbury.....	136	75,500.00	61,623.18
Temiskaming.....	1,083	336,705.00	223,320.87
Thunder Bay.....	647	210,705.00	151,517.32
Totals.....	2,549	\$860,235.00	\$620,692.26

Appendix No. 50.

REPORT OF FORESTRY BRANCH, 1922.

SIR,—The report of the work of this Branch for the year ending October 31st, 1922, is given under the sections of Forest Fire Protection, Forest Investigations, Reforestation and Forest Pathology.

I.—FOREST FIRE PROTECTION.*(1) Legislation.*

The Forest Fires Prevention Act has not been changed since 1918. Experiences since then have indicated, however, that certain amendments are desirable. The lack of compulsory fire-fighting, and jail sentences as well as fines for certain infringements of the Act, are particularly felt.

(2) Organization and Personnel.

The supervision of the field force was carried on by one Forest Supervisor with headquarters at Kenora, one Fire Inspector with headquarters at Cochrane, one Assistant Superintendent of Fire Ranging and one Fire Inspector with headquarters at Sudbury, and three District Foresters, each with a Forest Assistant, with headquarters at Parry Sound, Pembroke and Tweed. The District Foresters and Forest Assistants are all technical foresters.

A rearrangement of Chief Ranger Districts was made, whereby one new district was created, and two old districts abolished, the territory in these being divided among the adjoining districts. In addition to this, the country south of the French River and Lake Nipissing, and within the Fire District, was divided into three Forest Districts, each in charge of a District Forester, who was directly responsible for the fire protection in his district.



Fig. 1.—Aircraft patrolling forest in Algonquin Park.

There were on duty a total of thirty Chief Rangers and sixty-two Deputy Chief Rangers, allowing direct field supervision of one Deputy or Chief Ranger to every eleven Rangers.

The average daily force was as follows: April, 29; May, 595; June, 1,053; July, 1,054; August, 1,024; September, 463; October, 70. The largest number of men on duty at any one time, including ninety-two Chief and Deputy Chief Rangers, was 1,067.

As a result of the fire season being early, there were 595 men on duty by the middle of May, and at the end of the month 1,002. On the 15th of June, the total number was 1,052; on the 13th of June, 1,065; on the 15th of July, 1,054; on the 31st of July, 1,044; on the 15th of August, 1,040. It was possible to discontinue some patrols during the last days of August so that by the end of the month the total number on duty was 980. By the middle of September the number had been reduced to 545, and at the 1st of October to 101. On the 15th of October there were 44 men on the pay roll.

One of the greatest drawbacks to proper forest fire protection in Ontario is the impermanency of the personnel. Fire ranging is a specialized line of work, requiring special training, and until a permanent staff is built up, whereby the chief and deputy chief rangers at least may be put on a permanent basis, the organization will not have the degree of efficiency which is desired. A ranger school where these men could be given from one to three months' special training each year would also aid materially.

(3) *Expenditure.*

The expenditure for the fiscal year was \$643,902.63, classified as below, with the figures for the preceding years given for comparison. Against this expenditure, protection accounts for the year totalled \$309,938.40.

CLASSIFICATION OF EXPENDITURE.

ITEM.	1922	1921	1920	1919
Pay roll.....	\$417,023.88	\$433,463.02	\$398,919.61	\$405,212.30
Equipment.....	44,504.49	28,384.40	22,287.83	22,899.02
Expendable property.....	3,048.16	19,505.86	16,589.99	13,903.06
Travel (inspection).....	23,088.33	21,034.95	17,495.93	15,826.37
Improvement work.....	40,999.77	3,621.06	1,591.01	4,765.35
Extra fire fighting.....	40,969.67	65,267.79	41,491.24	58,863.92
Express, postage, etc.....	9,561.17	7,926.65	5,401.02	5,646.47
Air patrol.....	23,437.84	.....	.....	.....
Repairs, upkeep, etc.....	17,670.45	.....	.....	.....
Miscellany.....	23,598.77	31,331.01	2,331.08	5,955.02
Total.....	\$643,902.63	\$610,534.74	\$506,107.71	\$528,071.51

(4) *Fires.*

The spring of 1922 was fairly wet up until about the last week in April, when, in some districts the weather turned warm and dry and continued so until after the 1st of June, and as a result, some of the worst fires of the season occurred during the month of May. During the summer there were short periods of hot dry weather, but these were almost invariably followed by enough precipitation to relieve, in many instances, very serious conditions. The latter part of September was extremely dry and hot, and serious fires occurred.

CLASSIFICATION OF FOREST FIRES.

BY MONTH.

MONTH.	1922	1921	1920	1919	1918	1917
	No.	No.	No.	No.	No.	No.
April.....	35	5	...	...	...	...
May.....	280	296	1* 422	362	294	449
June.....	194	290	309	414	273	320
July.....	77	475	142	613	124	158
August.....	212	97	300	377	268	117
September.....	121	105	2* 114	14	6	66
October.....	102	1	...	...	...	...
Totals.....	1,021	1,269	1,287	1,780	965	1,110

1* April and May.

2* September and October.

BY ORIGIN.

ORIGIN.	1922		1921	1920	1919	1918	1917
	No.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Settlers.....	164	16.1	9.6	11.0	7.7	8.1	8.2
Campers.....	122	11.9	8.8	11.7	9.2	9.7	13.9
Railways.....	166	16.3	14.8	23.9	37.0	46.5	49.5
Lightning.....	52	5.1	11.0	1.1	3.0	3.8	2.9
Logging operations.....	42	4.1	5.0	4.6	2.5	4.1	4.1
Miscellaneous.....	8	.8	1.1	7.2	4.3	4.6	3.6
Unknown.....	467	45.7	49.7	40.5	36.3	23.2	17.8
	1,021	100.0	100.0	100.0	100.0	100.0	100.0

BY SIZE.

SIZE.	1922		1921	1920	1919	1918	1917
	No.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Quarter acre and under.....	242	23.7	20.8	23.2	30.5	40.5	36.3
Over quarter to 5 acres.....	297	29.1	24.0	29.4	27.7	33.7	19.5
Over 5 to 10 acres.....	64	6.3	6.8	8.1	6.1	6.0	4.8
Over 10 to 100 acres.....	196	19.2	20.4	17.1	16.5	13.6	9.5
Over 100 to 500 acres.....	129	12.6	13.3	12.0	8.7	5.1	4.7
Over 500 acres.....	.....	.....	.....	.....	.....	1.1	25.2
Over 500 to 1,000 acres.....	37	3.6	5.5	5.0	3.3	.....	.....
Over 1,000 to 10,000 acres.....	50	4.9	8.1	4.9	5.9	.....	.....
Over 10,000 acres.....	6	.6	1.1	.3	1.3	.....	.....
	1,021	100.0	100.0	100.0	100.0	100.0	100.0

Of the total number of fires, settlers were responsible for 164 or 16.1 per cent., a slight increase over previous years. Of this number, 36 were permit fires which got beyond control.

During the season three convictions were secured for carelessness in allowing fires to run, one for burning without a permit, and two for operating open burners in connection with sawmills.



Fig. 2.—Aircraft, landing in Algonquin Park.

The number of fires known to be caused by campers was 122, or 11.9 per cent. of the total. Special efforts were made to trace the parties responsible for some of these fires, but it was found impossible to get sufficient evidence to warrant court proceedings.

Railways are known to have caused 166 fires, or 16.3 per cent. of the total. This is slightly above the total for 1921, but the general trend in the number of railway fires is downward. Although the attention given by our locomotive inspectors to the fire protective appliances on locomotives has been responsible for a decrease in the number of railway fires, much credit must also be given to the co-operation between our own field organization and that of the railway companies.

The fires of railway origin were distributed as follows:

RAILWAY.	Per cent. of Total Number of Railway Fires.				
	1922	1921	1920	1919	1918
Canadian National Railway (exclusive of northern lines)...	25.9	44.7	32.3	24.6	25.4
Canadian Pacific Railway.....	25.3	29.8	27.9	26.3	24.9
Canadian National Railway (northern transcontinental line, only).....	13.3	7.9	16.4	25.9	21.8
Temiskaming and Northern Ontario Railway.....	14.5	10.6	9.9	17.9	10.5
Algoma Eastern Railway.....	2.4	2.8	5.0	0.3	2.9
Algoma Central Railway and Hudson Bay Railway.....	8.4	1.0	4.4	1.5	1.1
Grand Trunk Railway.....	10.2	3.2	4.1	3.5	13.4
	100.0	100.0	100.0	100.0	100.0

AVERAGE NUMBER OF RAILWAY FIRES PER HUNDRED MILES OF LINE.

RAILWAY	1922	1921
Canadian National Railway (exclusive of northern lines).....	2.9	5.8
Canadian Pacific Railway.....	2.7	3.9
Canadian National Railway (northern transcontinental line only).....	2.4	1.8
Temiskaming and Northern Ontario Railway.....	7.3	6.3
Algoma Eastern Railway.....	4.5	5.9
Algoma Central and Hudson Bay Railway.....	4.2	0.6
Grand Trunk Railway.....	4.5	1.6
Total.....	3.3	3.7

Lightning was reported as having started 52 fires, or 5.1 per cent. of the total number. Of this total 29 were in the Algonquin District.

Logging operations were credited with having started 42 fires, or 4.1 per cent. of the total, and 8 fires were due to miscellaneous causes.

A total of 1,021 fires were reported, with an area burned of 346,193 acres, the lowest figures since 1918. Of this total, 539 fires or 52.8 per cent., were confined to areas of 5 acres or less in extent, and 78.3 per cent. of the total to areas of 100 acres or less. The fires which burned areas of more than 500 acres were almost entirely in logged-over regions where the logging slash made fire fighting almost impossible.

CLASSIFICATION OF BURNED-OVER AREA.

FOREST CONDITION.	1922.		1921.	1920.	1919.	1918.	1917.
	Acres.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Timber land.....	46,395	13.4	13.2	14.7	26.8	15.8	19.1
Cut-over land (some timber left).....	70,109	20.2	25.5	38.8	27.3	37.0	39.2
Young growth (below six inches).....	87,123	25.2	20.2	26.7	25.3	23.5	19.5
Barren and grass land.....	142,566	41.2	41.1	19.8	20.6	23.7	22.2
	346,193	100.0	100.0	100.0	100.0	100.0	100.0

As is shown in the above table, the area of timber land burned over was 13.4 per cent. of the total area burned. While the per cent. of the total is about the same as in 1921, the area was only 46,395 acres as against 99,104 acres in 1921.

Land which had been cut over, but upon which there was still some timber standing, totalled 70,109 acres, or 20.2 per cent. of the total, and land upon which some young growth existed totalled 87,123 acres, or 25.2 per cent. of the total, while in 1921 these figures were respectively 190,977 acres, or 25.5 per cent. and 151,700 acres, or 20.2 per cent. The need of protection on these two classes of land can not be too strongly emphasized, as it is to just such land that we must look for our next timber crop.

The area of barren and grass land burned totalled 142,566 acres, while in 1921 the total was 307,753 acres.

CLASSIFICATION OF FOREST AREAS BURNED OVER, 1922.

RANGER DISTRICT.	Number of fires	Timber land, mainly coniferous, i.e., soft-wood	Timber land, mainly hardwood	Cut-over land, softwood left	Cut-over land, some hardwood left	Young growth, mainly coniferous	Young growth, mainly hardwood	Barren land	Grass land	Totals (acres)
I. Western Inspectorate—										
1. Kenora.....	16	5	.....	205	11	1,851	260	1,100	.....	3,432
2. Rainy River.....	26	6	5	.....	185	5	350	585	.....	1,136
3. Thunder Bay.....	82	594	62	7,420	190	2,494	1,679	5,269	321	18,029
4. Nipigon.....	20	1,395	.....	.....	.....	1,303	381	22,160	.....	25,239
5. C. G. R.—Western.....	24	150	1	.....	.....	.....	.....	19	.....	170
6. C. G. R.—Central.....	7	12,040	5,344	.....	.....	3,037	2,120	1,546	1	24,088
	175	14,190	5,412	7,625	386	8,690	4,790	30,679	322	72,094
II. Northern Inspectorate—										
1. C. G. R.—Eastern.....	13	.....	.....	95	16	1	.....	162	.....	163
2. Hearst.....	19	105	.....	5	20	33	.....	51	8	308
3. Kapuskasing.....	9	.....	.....	139	5	76	.....	265	.....	300
4. Cochrane.....	32	230	.....	.....	.....	47	41	229	11	702
5. Abitibi.....	6	.....	.....	.....	.....	60	20	1,006	.....	1,086
6. Timmins.....	24	2	.....	59	.....	4	.....	7	5	77
7. Matheson.....	1	.....	.....	.....	.....	.....	.....	2,000	.....	2,000
	104	337	.....	298	41	221	61	3,720	24	4,702
III. Central Inspectorate—										
1. Soo.....	11	.....	.....	70	450	5	40	641	5	1,211
2. Webwood.....	47	52	5	.....	1,730	10	2,508	3,214	1,104	8,713
3. Sudbury.....	65	3,243	23	755	47	588	4,787	14,783	1,637	25,863
4. North Bay.....	54	7,651	205	2,711	19,351	2,901	920	29,424	20	63,183
5. Mississagi.....	3	.....	.....	600	600	.....	15	6	.....	1,221
6. Chapleau.....	15	1,000	200	960	900	5,443	11,017	823	.....	20,343
7. Longlac.....	36	10,402	10	561	.....	21,779	1,990	4,637	.....	39,379
8. Foleyet.....	39	5	.....	6,267	1,500	187	296	1,449	.....	7,904
9. Timagami, West.....	5	961	.....	6,720	.....	.....	.....	250	.....	7,931
10. Timagami, East.....	60	706	70	224	265	248	1,945	830	109	4,897
11. Timagami, North.....	23	233	.....	1,775	1,140	4,031	3	7,146	6,150	20,478
12. Algoma Central.....	36	17	53	1,250	62	181	316	555	16	2,450
	394	24,270	566	21,893	26,045	35,373	23,837	63,758	9,131	204,873

IV. Georgian Bay Forest District—												
1. Georgian Bay, West.....	70	14	6	354	496	56	2,168	642	38	3,774	38	3,774
2. Georgian Bay, East.....	41	113	155	3,952	1,016	1	1,750	925	189	8,101	189	8,101
Totals.....	111	127	161	4,306	1,512	57	3,918	1,567	227	11,875	227	11,875
V. Algonquin Forest District—												
1. Algonquin North.....	58	130	.....	1,631	408	209	580	10,696	55	13,709	55	13,709
2. Algonquin South.....	76	17	12	851	3,700	1,465	2,073	18,913	400	27,431	400	27,431
Totals.....	134	147	12	2,482	4,108	1,674	2,653	29,609	455	41,140	455	41,140
VI. Trent Forest District—												
1. Trent.....	52	531	136	432	561	350	2,346	1,100	714	6,170	714	6,170
2. Madawaska North.....	15	304	110	325	10	428	50	455	225	1,907	225	1,907
3. Madawaska South.....	36	40	52	55	30	5	2,670	482	98	3,432	98	3,432
Totals.....	103	875	298	812	601	783	5,066	2,037	1,037	11,509	1,037	11,509
Per Cent.....	1,021	39,946	6,449	37,416	32,693	46,798	40,325	131,370	11,196	346,193	11,196	346,193
.....	.....	11.5	1.9	10.9	9.5	13.5	11.64	37.9	3.2	100.0	3.2	100.0
1921 Totals.....												
1920 Totals.....	1,269	95,782	3,322	108,508	82,469	56,569	95,131	305,769	1,984	749,534	1,984	749,534
1919 Totals.....	1,287	38,539	14,319	116,312	23,126	46,595	49,135	70,093	732	358,851	732	358,851
1918 Totals.....	1,780	223,022	24,244	102,884	148,471	109,752	123,444	189,701	643	922,161	643	922,161
1917 Totals.....	965	3,123	1,634	5,661	5,513	1,797	5,303	6,465	676	30,172	676	30,172
1916 Totals.....	1,110	73,160	135	148,408	2,160	61,806	13,202	82,959	2,334	384,164	2,334	384,164



Fig. 3.—Unloading fire pump and hose from aircraft.



Fig. 4.—Steel lookout tower on left. Wooden tower on right.

(5) *Permits.*

Permits were issued in 189 townships, as compared with 139 townships in 1921, 123 townships in 1920, and 136 townships in 1919. A total of 8,603 permits were issued, covering an area of 29,455 acres.

As in previous years, the greatest number of permits were issued in the Districts of Cochrane, Matheson and Hearst. The bulk of the permits, 3,034, were issued in June, with 1,992 in May, 1,580 in August and 1,502 in July.

STATEMENT OF PERMITS ISSUED.

RANGER DISTRICT.	NUMBER OF PERMITS.					
	1922	1921	1920	1919	1918	1917
Cochrane.....	2,497	1,503	1,982	2,275	3,493	....
Matheson.....	2,126	1,599	1,887	1,691	2,346	....
New Liskeard.....	.....	916	1,169	1,557	2,179	....
Hearst.....	1,774	1,082	756	702	514	....
Timmins.....	754	407	193	199	651	....
All other districts.....	1,452	459	167	211	407	....
Totals.....	8,603	5,966	6,154	6,635	9,590	3,486

MONTH.	NUMBER OF PERMITS.					
	1922	1921	1920	1919	1918	1917
May.....	1,992	1,154	1,003	1,536	2,248	....
June.....	3,034	3,085	2,011	2,786	2,899	....
July.....	1,502	364	891	496	2,050	....
August.....	1,580	1,329	1,620	1,475	2,156	....
September.....	495	34	629	342	237	....
Totals.....	8,603	5,966	6,154	6,635	9,590	3,486

RANGER DISTRICT.	ACREAGE BURNED OVER UNDER PERMIT.					
	1922	1921	1920	1919	1918	1917
Cochrane.....	8,108	4,652	4,984	5,437	10,267	....
Matheson.....	7,613	5,442	5,427	4,760	7,371	....
New Liskeard.....	.....	7,726	9,768	13,521	17,863	....
Hearst.....	3,837	2,124	1,478	1,379	1,134	....
Timmins.....	2,591	988	424	925	1,971	....
All other districts.....	7,306	2,746	686	768	1,072	....
Totals.....	29,455	23,678	22,767	26,790	39,683	15,186

(6) *Equipment.*

The amount of equipment required to outfit the ranging staff is necessarily large. Replacements must be made each year, and additional equipment added for use on new patrols and to increase the efficiency on old patrols.

A total of 116 tents were purchased in 1922. These were the ordinary style of tent, and used mostly where the rangers must carry their shelter from place to place along their routes.

In a large part of the Province the only means of travel is by water, and for this purpose fifty-three new canoes and three power boats were added to the equipment. The boat best suited to the requirements is the lumberman's pointer equipped with a six or twelve horse power motor. These boats are strong, seaworthy, and will make a speed of from seven to ten miles per hour.

A large number of the chief rangers are also ex-officio officers of the Board of Railway Commissioners. These men act as local fire inspectors over railway lines in their districts which are under the jurisdiction of the Railway Commission, on a co-operation basis, and are supplied in most cases with railway motor cars. These cars are indispensable for inspection work, and in those districts where the train service is infrequent, afford an excellent means of transportation, not only for the chief ranger, but for fire fighting equipment as well. Seven of these cars were purchased during the season.

Portable forest fire fighting units have proved to be the most valuable part of our equipment. The unit consists of a small pump driven by a 5-6 horse power gasoline motor, all mounted on a metal base, and capable of throwing a good stream of water at the end of fifteen hundred or two thousand feet of hose. The unit itself weighs about one hundred and twenty pounds and can be transported without difficulty, either by canoe or back-pack. An unlined one and one-half inch linen hose is used, in one hundred foot lengths, weighing about twenty pounds per hundred feet. These pumps have been operated continuously for as much as fourteen hours, and have been estimated to be equal to forty men. Sixteen units were purchased at the beginning of the season, and it is desirable that at least as many more may be procured for next season.

In the more settled parts of the fire districts light motor trucks can be used to good advantage, not only for inspection purposes, but for the transportation of fire fighting equipment. Two such trucks were purchased.

For use by the rangers and emergency fire fighting, one thousand blankets were added to the equipment.

(7) *Locomotive Inspection under Board of Railway Commissioners.*

No change was made in the organization of the inspection of fire protective appliances on railway locomotives, two inspectors devoting their whole time to this work.

LOCOMOTIVE INSPECTION, 1922.

RAILWAY	Number Inspected						Total No. Engines	Total Number Inspections						Inspections Showing Defects	Percentage Defective					
	Times							1922	1921	1920	1919	1918	1917		1922	1921	1920	1919	1918	1917
	1	2	3	4	5 & over															
C.P.R.	161	98	66	44	16		385	815	723	660	499	448	328	48	5.8	8.3	18.8	29.9	36.4	19.5
C.N.R.	73	50	36	23	12		194	440	498	351	317	232	154	16	3.6	9.7	7.9	15.5	22.4	39.6
G.T.R.	87	52	14	2	...		155	241	242	226	155	184	60	8	3.3	1.7	4.8	11.0	28.3	20.0
A.C. & H.B.R.	4	2	8	2	1		17	45	35	25	23	36	37	1	2.2	22.8	12.0	13.0	38.8	45.9
A.E.R.	2	2	1	...	2		7	22	28	26	18	20	36	...	...	21.4	46.1	16.7	70.0	55.5
	327	204	125	71	31		758	1,563	1,526	1,288	1,012	920	615	73	4.6	8.3	12.8	21.8	32.1	28.3

A total of 49 round-houses and gravel pits were visited, and 1,563 locomotive inspections made, covering 758 locomotives. In addition to this 9 inspections of locomotives operated by lumber companies were made, bringing the total number of inspections up to 1,572. The above table shows that the number of inspections has increased each year, and the percentage of locomotives found defective has steadily decreased from 32.1 per cent. in 1918 to 4.6 per cent. in 1922.

The average cost per inspection in 1922 was \$1.61, as compared with \$1.70 in 1921, \$1.86 in 1920, and \$2.07 in 1919.

(8) *Improvements.*

The improvements carried out during the season consisted of the construction of cabins, store houses, lookout towers, telephone lines, the cutting of new and the cleaning out and improving of old roads and trails. Most of the work was done by the rangers themselves.

It is necessary each spring to clear all existing roads and trails of debris which has accumulated during the winter months, and in a burned-over section this is often an arduous task. It is, however, one of the first duties of the rangers as a good rail is most necessary in transporting equipment in case of fire. Several hundred miles of roads and trails are cleaned out each year and repaired where necessary. Landing docks are built for boats and canoes, camping grounds made in safe places, and signs put up directing travellers to these camp sites.

In some districts it is possible to assign rangers to permanent headquarters, and here cabins are often built as they add to the comfort of the men and provide a safe place for the storage of equipment. Storehouses are also built at the headquarters of the chief and deputy chief rangers for the storage of emergency equipment during the fire season, and all field equipment during the winter months. Where boats or motor cars are used it is necessary to build shelters for them. There were built during 1922, 38 cabins, 3 storehouses, 1 car house, 1 boathouse, 2 oil houses for the storage of gasoline and oil, and 2 kitchens for cabins already constructed.

The construction of lookout towers was continued and seventeen wooden and eleven steel towers erected. The wooden towers were built almost entirely by ranger labour, and are from twenty-five to eighty feet in height. The steel towers are eighty feet in height, of much the same type as the ordinary windmill tower, but are surmounted by an eight foot octagonal cabin fitted with windows on all sides. The ranger, who is stationed in the cabin during the hazardous part of the day, has an uninterrupted view of the surrounding country, and on clear days has little difficulty in locating smoke twenty miles away. These towers are connected by telephone lines to the deputy or chief ranger's headquarters, so that fires observed may be reported immediately.

Telephone Lines.—Considerable progress was made in the construction of telephone lines during the season, a total of 171½ miles being completed. Included in this total were the following:—

Gogama to Mattagami Post in Mattagami Township.....	18	miles
Milnet to Frederick Lake in Stobie Township.....	28	"
Chudleigh to Upper Goose Falls on the Sturgeon River in Sheppard Township.....	30	"
Brule Lake to lookout tower in Osler Township with branch to lookout tower in Biggar Township.....	50½	"
Whitney to south end Opeongo Lake in Sproule Township.....	15½	"
Pakesley to lookout tower south of Key Junction.....	11	"
Apsley to lookout tower in Methuen Township.....	7	"

These lines make it possible for the rangers in the district to report fires promptly, and to call for assistance without wasting valuable time in travelling to the nearest point where help is available. They also enable the officer in charge to keep informed as to the exact conditions existing in the district at any time.

(9) *Air Patrol.*

Aircraft for forest fire detection were used this season for the first time. The operation was carried on in co-operation with the Dominion Air Board and proved highly satisfactory. A main base was established at Whitney, a station on the Grand Trunk Railway in Algonquin Park and a sub-base at Parry Sound, the patrols covering the Districts of Parry Sound and Muskoka, Algonquin Park and the adjacent country. This territory lends itself admirably to the use of sea-planes or flying boats and this type of machine was used. Patrols were carried on from May 23rd to October 4th with a total of 613.8 flying hours. Usually only one flight was made over the territory each day, but when conditions warranted, two flights were made. Fires were reported by dropping messages, by landing at some point where telephone or telegraph communication was possible, or when the machine returned to its base.

The season's operations have clearly demonstrated that for similar country, aircraft have no equal for sighting and locating forest fires. From a height of five or six thousand feet the smoke of a camp fire can be seen for several miles, and located within one-quarter of a mile by an experienced observer. When bad fires occur the chief ranger is able, by flying over the area, to place his men to greater advantage, and when a patrol is finished the officer in charge of the district knows the exact condition of fires throughout his territory. The moral effect on the people within the patrol area is also of great importance.

In addition to the locating of fires, the machines were used for transporting fire fighting equipment to fires in remote areas, for mapping forest types, and for taking photographs of particular areas.

II.—FOREST INVESTIGATION

During the past season two large forest survey projects were undertaken.

The first area covered about 13,500 square miles of the lower watersheds of the Abitibi, Mattagami and Moose Rivers. This area, little known except along the main waterways, was mapped from aircraft, working in conjunction with ground parties. A detailed report is appended herewith.

Another large area of 4,000 square miles in extent forming a portion of the upper watershed of the Missinaibi and Kapuskasing Rivers was done with aircraft and ground parties. A detailed report of this survey is not yet available, but the following is a classification of the forest conditions on the above survey.

1. Timber.....	1,828 sq. miles		
2. Immature Growth			
(a) Above 5 inches D.B.H. but below merchantable.....	152		
(b) Below 5 inches D.B.H.....	1,602		
	1,755	„	„
3. Barren.....	101	„	„
4. Water.....	306	„	„
	3,990	„	„

ESTIMATE OF THE TIMBER.

1. Pulpwood—cords		
Spruce.....	3,700,000	
Balsam.....	900,000	
Poplar.....	1,600,000	
		6,200,000
2. Ties.		
Jack Pine.....	33,000,000	
3. Lumber—board feet.		
White Pine.....	56,000,000	
Red Pine.....	27,000,000	
		83,000,000

AIR AND GROUND REPORT OF THE JAMES BAY FOREST SURVEY MADE IN 1922
UNDER SUPERVISION OF R. N. JOHNSTON, FORESTER.

I. AREA.

The James Bay survey covered the territory north of the Canadian Government Railway (Transcontinental) from Quebec boundary westward to Moose and Mattagami rivers and including their west banks to a depth of five miles. The area involved was around 13,500 square miles or, 8,640,000 acres.

II. OBJECT.

The purpose of the survey was to obtain an estimate of the forest resources, and a map showing forest types and conditions, together with supplemental information on physiographic features.

III. PROCEDURE.

1. *Aerial Type Mapping*:

In view of (a) the inaccessible nature of the country, (b) the shortness of the working season (less than 100 days possible) and (c) the desire to complete the work within one season, it was planned to use aircraft to delimit timber types and thus avoid the examination by the estimating party of waste areas and areas of non-commercial timber. The contract for flying was awarded to the Laurentide Air Service who established an air station at Remi Lake, 55 miles west of Cochrane in Fauquier Township and supplied 342 flying hours between June 2 and October 3.

The subdivision of a forest area into types by the use of aircraft, can be carried out either (a) by the records of observations made during flight by an observer (by a direct method), or (b) by the use of photographs which are afterwards related and interpreted (indirect).

(a) *Direct Mapping*.—While the direct method as above defined may very conceivably lead in its further developments to complex methods with a considerable use of instruments, as yet it consists essentially in sketch mapping the information required as directly observed while in flight. The requirements for satisfactory results by this method may be discussed under two heads (a) Machines (b) Observers and their equipment.

Machines.—The machines used in the past season and in 1921 in this work, while of different types, including the H.S.2.L., F.3., Vickers Viking, and Loening Air Yacht have been alike in that in all of them the observer's cockpit is placed directly in the nose or front of the machine. It is believed that this position for observation purposes can hardly be improved on.

The correct choice of machine to use is a matter having the greatest bearing on the cost and results of the work. The requirements as regards performance of machines will of course vary for different classes of work and in different localities. But, in general, rapid climb is of great advantage as tending to conserve flying time. Also a machine capable of high speed is more independent of wind conditions and can with equal fuel capacity operate successfully from the same base over a much larger area than a slower type. While actually typing, however, it is found that when flying between 2,500 and 4,000 feet—which is a satisfactory height from which to identify tree growth—the ground speed of the machine should not exceed 85 miles per hour. By ground speed is meant the speed at which the machine passes over the ground; it does not correspond with the speed shown by the air speed indicator of the machine but is greater or less depending on the influence of the wind.

Observers.—This season there were two foresters with previous experience both in flying and mapping, while a third was trained during the progress of the work. Observers, to produce reliable type maps should have comfortable working conditions in the machine, complete unconcern about the pilot and machine, and the best base maps available.

The quality of the map produced depends most largely on the experience and judgment of the individual observer. This should not be confined entirely to aerial experience, but should be checked by comparing aerial observation with ground study of forest conditions. Too much stress cannot be laid on this phase of the observer's work, and during the past season, whenever feasible, landings were made as a regular part of the procedure in order to allow the observer to investigate any stand of peculiar appearance, or to refresh his memory as to the actual conditions of more familiar types. It was found also in this connection that ground studies were of more value when made by the observer in person rather than through the study of strip tallies, descriptions, etc., however full and precise.

Base Maps.—Finally the field sheet on which the observer does his sketching should contain as much survey data as possible. This is even more necessary in the air than in the same class of work on the ground, since it is not practicable with the existing aerial instruments, to locate or orient the map in flight by travelling on a known course for a known distance. Consequently the observer is dependent for his location and judgment of distance and direction on the detail of his base map. Experience in both ground and aerial mapping has shown, however, that the aerial observer is in a much better position to work in this way than the ground mapper, since he can see a greater number of reference points at one and the same time and is also (hills and valleys are not apparent from the air) free from the difficulties arising from differences in elevations. Indeed, with a good base map, the aerial observer's work may be compared to the copying—on a small scale—of a highly coloured carpet lying beneath him, a great deal of the pattern of which, the base map detail, has already been drawn.

From the above it is readily apparent that the rate at which any given territory can be typed is intimately connected with the completeness and accuracy of the observer's base map, since a rational representation of the timber types is usually dependent on these base maps details, particularly where lakes and drainage systems are involved. Actual experience has shown that for the above reasons, that is the relations between topography and timber types, some additions to the existing topographic data—except in surveyed townships—are always necessary before typing of timber areas can be commenced.

Such information can be supplied by additional sketching, though experience has shown that this class of work can be done to better advantage from a much greater height than that used for mapping timber, since a distinction between land and water surfaces is possible from practically any altitude. For the same reasons it is often possible at this higher altitude—10,000 feet if weather conditions are suitable—to greatly expedite subsequent closer examination of timbered areas at lower altitudes, by splitting the territory into two or three general types, such as green timber, muskeg, barren, all of which can be recognized at the above altitudes.

Of the total flying time for the season, 342 hours, an analysis of the flight records shows that over 90 per cent. was given to sketching forest types and topography, the remainder being taken up with transportation of ground parties and photography.

(b) *Indirect Mapping.*—While it is realized that photography can produce results which sketch work cannot hope to replace, it was not used in the past season as an essential part of type mapping. So far no photographic system has been developed which could produce the information desired at a cost which the nature of the work would justify. Undoubtedly photography will eventually go much further in this direction than at present. But while the carrying of timber type lines over immense areas by photography is still very expensive, it is considered that in its present state of development it can be used to advantage to give information for the construction of base maps for sketching which would render the work more accurate and would also effect an economy in the whole operation, since a very small saving in flying time will pay for a great deal of photographic work.

Procedure for type mapping in the past season's work may therefore be summarized as follows:—Type maps were prepared by an experienced forest observer, sketching directly on base maps two miles to the inch scale. In all 13,500 square miles or 8,640,000 acres were thus mapped, requiring flights totalling 25,000 air miles. Information from these maps prepared in flight was then, on returning to the base at Remi Lake, transferred to an office map, and from the latter information as to timber was given to the ground parties in map form from time to time as required. It might be well to state here as an indication of the accuracy of this work that information as to type limits given to and checked by the ground parties was found to be reliable except in two instances; (1) during the first three or four flights the difference between dense stands of scrubby dwarf spruce and merchantable stands of the same species, while recognized, was not known to indicate such significant differences in the stand as actually existed. Ground study by the observers, as mentioned above, settled this question so that throughout the remainder of the season no trouble was experienced in this connection, (2) there was throughout the season a tendency to overestimate the percentage of hardwoods associated with the conifers in the mixed type.

2. *Ground Work.*

After the area had been typed and mapped from the air, a copy of this map was delivered to the ground parties, who then were in a position to locate starting points for samples for the estimate. The strip method was adopted, and was confined to areas bearing commercial quantities.

Fifteen men were used on the Abitibi and Mattagami rivers, one chief, two sub-chiefs, six other forestry men, four canoe men and packers and two cooks. The whole party with seven canoes, seventeen and eighteen foot "Chest-

nut" model, did not leave Clute on the Frederickhouse river until June 3rd, owing to the spring flood. The party proceeded to Moose Factory, one of the Hudson Bay Co. posts, with five weeks' supplies, slightly over a ton. Arrangements were made at Cochrane to have a similar amount cached at the junction of the Abitibi and Little Abitibi rivers within the five weeks.

Work commenced five miles north of Moose Factory and extended south up the Moose river to the junction of the Moose and Abitibi rivers, where the party split, eight men going up the Moose and Mattagami rivers and seven men up the Abitibi river.

In addition to the above fifteen men on the rivers, two men were stationed at the air base at Remi Lake to be placed by aircraft in regions lacking practicable canoe routes. Later in the season two other men were taken from the river party and used on this work. These parties were landed on lakes with from one to three weeks' supplies and acted on the instructions of the aerial observers, who decided what strips were necessary to cover the pulpwood in that particular locality. In this way parties were placed on the following lakes; Kesagami, Pierre, Indian Reserve No. 9 and unnamed lakes designated by the letters F., G., J., K., L., N. on the map. For the final estimate, areas on which strips were not run were compared by the observer with areas where samples were taken. The aircraft was not equipped to carry a canoe which handicapped the effectiveness of these parties. In some instances the planes while on sketching work would land and transfer a party to another camping ground.

The strip method consisted in running a compass and chain line 11 feet wide and measuring all commercial species 4 inches (diameter taken at breast height) and over, in one inch diameter classes. In this region in general the cordage runs heaviest adjacent to the water courses, the types paralleling the shore line. This characteristic feature of the timber distribution was directly responsible for the field procedure of the ground parties, which usually consisted in running a single straight strip per day at right angles to the general direction of the shore line; occasionally a shorter strip in from the water, an offset of $\frac{1}{2}$ mile and a second strip back to water was substituted for the single long strip. It was found that where a single strip was run it was possible to tally $4\frac{1}{2}$ miles; with two strips and offset, three in and three out, or a total of six for the day. Results of the season's work go to show, however, that $4\frac{1}{2}$ miles in a single strip, besides allowing for a better check of the aerial type map, gives a much better basis for an estimate of the timber in this type of country than the two parallel three-mile strips, whose tallies tend to give too much prominence to the better stands close to the shore and not enough to the poorer growth on undrained areas inland.

Two and three-man parties were used, three-man is recommended, that is one caliperman, one compass man and a tally man. With three men, calipers may be used and the caliperman is in a position to size up every tree. Calipers were used every day for the first two weeks, after which dimensions were estimated by eye. The caliperman checked himself once a week by taking his calipers into the field. This gives actual calipering for 30 per cent. of the time.

Throughout the season, June 3rd to September 20th, 470 miles of strip were run.

In addition to running strips, volume table data was collected for black spruce generally throughout the whole area. The figures were compiled into two general regional tables. (See tables 5, 6.). Measurements were made on white spruce but it was found the volumes compared favourably with existing tables and these were used.

The measurements for black spruce were taken as follows:

Location	No. of Trees	Av. Age on 12-inch stump
Remi Lake.....	119	.....
Grand Rapids, Mattagami River.....	51	109 years
Lower Abitibi River, at Little Abitibi River.....	30	.....
Upper Abitibi.....	39	.....
Upper Mattagami.....	133	112 years
Fernow Lake.....	20	111 "
Indian Reserve No. 9.....	50	109 "
Total.....	442	

IV. FOREST TYPES AND CONDITIONS.

1. *Relief and Drainage.*

From this standpoint the characteristic feature of the whole territory is the low monotonous relief and slow drainage, the total fall in the 175 miles from the Canadian Government Railway track to James Bay being only 900 feet.

The most important topographic and drainage feature in the whole region is undoubtedly the low escarpment—perhaps more pronounced in the western part of the area—which marks the northern limit of the Clay Belt. This formation, which runs in a fairly definite northwesterly-southeasterly direction crosses the Ontario-Quebec boundary line about forty miles north of the Canadian Government Railway, runs north of Little Abitibi Lake, strikes the Abitibi river in the neighbourhood of the Canyon, crosses the Mattagami about the Long Rapids and continues westward out of the territory examined.

Elevations on the Abitibi river as shown by O. L. S. Kenny in a survey of this river made during the current year (1922), may serve to indicate the character of this formation and of drainage conditions in the country generally.

From Cochrane to the head of the Lobstick Rapids taken as the edge of the escarpment, a total fall of 271 feet is recorded or five feet to the mile. The drop over the escarpment—a distance of about $6\frac{1}{2}$ miles from the head of the Lobstick to the foot of the Abitibi Canyon—is 234 feet, or 36 feet to the mile. From the foot of the Canyon to James Bay the fall is given as 406 feet in 120 miles or about 3.4 feet to the mile.

The drainage is peculiar in that the main rivers—the Mattagami and the Abitibi—have few feeders of importance and appear to flow through the country without any very perceptible increase in volume of water. Perhaps the best developed river system in the region is shown by the French which flows into the estuary of the Moose from the west not far above Moose Post, and which with its tributaries drains about one-third of the whole area examined.

Lakes are usually small and of infrequent occurrence in the western and northern sections of the country. South and east, however, in the territory between Kesagami and Little Abitibi the occurrence of lakes of good size is rather common. This condition continues eastward into Quebec.

Finally it should be noted that the whole territory, because of the difference in slope, falls naturally into two sections, a northern and a southern.

In the former, the slope, as before noted, is only 3.4 feet to the mile and in the latter five feet, giving a difference of 1.6 feet, which, though actually small, is seen to be proportionately large.

2. *General Forest Conditions.*

The resultant difference in drainage conditions noted above is strongly reflected in the character of the forest growth, giving two distinct timber regions

which may be designated as the Coastal Plain region to the north and the Northern Clay Belt region to the south. The former comprises 5.8 million acres and the latter 2.8 million acres.

The Coastal Plain is poorly timbered from a commercial viewpoint. The bulk of the timber standing on the area is inland and inaccessible, the largest area being west of Kesagami Lake, with blocks scattered in that portion of the region south and east of this lake. The commercial stands to-day are restricted to a narrow belt up to one-half mile in width along the rivers and streams. Practically 70 per cent. of the coastal plain area is given over to endless scrubby stands of dwarf black spruce and various classes of muskeg.

In the northern clay belt region, however, pulpwood conditions are much better. Not only are drainage conditions more favourable to true development, but the region exhibits more relief inland from the rivers. In consequence, the pulpwood supplies are not confined to the rivers but additional stands, both pure and mixed, occur on the low ridges and knolls scattered throughout the extent of non-commercial scrubby spruce.

The difference in character of the coastal plain and northern clay belt regions is summed up in the fact, that the timber bearing areas in the former aggregate only 6.8 per cent. of its acreage, while in the case of the northern clay belt they constitute 38.8 per cent.

3. *Forest Types.*

The forest growth of the territory under consideration resolves itself into a very few strongly marked types with a limited number of species. The rivers everywhere are lined with a narrow belt of mixed evergreen and broad-leaved trees. Beyond this belt and paralleling it, runs one of practically pure black spruce. As one gets farther from the river, the spruce rapidly and progressively falls off in diameter and height, the number of trees per acre increasing, with a tendency towards growth in clumps. Finally, at a distance in general of a few hundred yards up to one-half mile in the coastal plain, trees of commercial size are left behind, and a scrub type is entered. Here the trees are extremely dwarfed although very old, and eventually give way to open muskeg. In the northern clay belt, however, the black spruce, is continued inland indefinitely, depending on drainage, assuming a patchy character among mixed stands and scrub.

Inland, these same types are repeated around all lakes, and wherever there is any variation in the relief.

(a) *Mixed Type.*—This type along the rivers consists of black and white spruce, balsam, cedar, both balsam and aspen poplar and paper birch. It varies but little in composition throughout the total length of these long waterways, there being a slight increase in the quantity of birch, balsam and cedar, and a general improvement in the stands as one comes south; this was particularly noted in the poplar, although nowhere is it found free from heart rot, after reaching seven and eight inches D.B.H.

This type is also to be found inland from the rivers in small areas, in association with black spruce stands, generally on gentle rises in the ground and adjacent to lakes. The occurrence of these mixed stands (and as well, stands of pure spruce) inland, and additional to the river timber, is a feature characteristic of the northern clay belt region; whereas they are of relatively infrequent occurrence in the coastal plain. This inland mixed type differs from the river type in the absence of cedar and balsam poplar, and the poorer development especially of white spruce; it accordingly gives a lower yield of pulpwood.

On the basis of pulpwood cordage, the mixed type runs 54 per cent. black spruce, 24 per cent. white spruce and 22 per cent. balsam, in the northern clay belt; the corresponding figures in the coastal plain are 54, 19 and 27.

The mixed type exclusive of hardwood (broad-leaved) species produces the heaviest cordage, averaging 10.7 cords in the coastal plain and 9.1 cords in the northern clay belt, per acre of timbered area. It is to be recalled that in the former, little of the inland mixed type is concerned, which yields less than the river mixed type.

In all, 543,434 acres, or 36.6 per cent. of the total timbered area, is classified as mixed stands containing 40 per cent. of the total pulpwood. Of the timbered area of the coastal plain, they constitute around 22 per cent. and in the case of the northern clay belt around 42 per cent.

(b) *Black Spruce Type*.—This type supplies around 60 per cent. of the pulpwood wealth of the whole territory and occupies in round figures 942,000 acres in the total timbered area or 64 per cent. of it. As previously stated the fringe of mixed stands along the river banks is succeeded, as one leaves the river, by practically pure black spruce; this in turn gives way to the black spruce scrub. In addition to such occurrence, the black spruce type is to be found generally throughout the inland areas in the northern clay belt, in particular, the western two-thirds of it.

Spruce stands are healthy, the only damage observed being that of wind-throw in small plots 200 or 300 feet across. Their development is better in the southern section. Under the stands is a thick carpet of sphagnum moss with openings in the stand filling in with alder, especially in the northern clay belt section.

The composition of the black spruce type on a pulpwood cordage basis is 90 per cent. black spruce and five per cent. each of white spruce and balsam in the northern clay belt region; in the coastal plain, the percentage of both black and white spruce increases slightly at the expense of balsam.

Black spruce stands have an average yield per acre of 7.0 cords in the coastal plain, and 8.4 cords in the northern clay belt.

(c) *Dwarf Black Spruce Type*.—This type is related to the excessive water conditions, the ground being covered with several feet of sphagnum moss, which retains the moisture and keeps the ground frozen late into the growing season. The trees are stunted, reaching a maximum of 30 feet in height and four inches D.B.H. at ages up to 150 years. They are mature and have no commercial value. The type runs 1,000 or 1,200 of these dwarfs per acre gathered into a clump-like stand. A certain amount of dwarf tamarac is present among the prevailing black spruce scrub.

This type covers 2.4 million acres or 28 per cent. of the territory and is more prevalent in the coastal plain region.

(d) *Muskeg Type*.—The separation of the muskeg type from the dwarf black spruce was almost entirely aerial. From an aeroplane a very definite line is evident in the scrub spruce surrounding the open muskeg. The trees are much shorter, more distinctly in clumps and with the clumps at greater distances from one another, so that from the air the intervening ground spaces stand out. Consequently, an arbitrary division line between muskeg and the dwarf spruce type was chosen, corresponding to this characteristic appearance from the air. Study of these stands by the ground parties, gave a figure of around 400 trees, averaging nine feet in height as a maximum growth condition for this type. Hence the muskeg type includes the treeless areas and the open portion of the dwarf black spruce type.

The muskeg type as defined above covers 2.4 million acres or 28 per cent. of the whole. Percentically the proportion is much higher than in the coastal plain where it reaches 40 per cent.

(e) *Burn.*—In all, around 1.9 million acres were mapped as burn, or 22 per cent. of the whole. This is made up of about 20 per cent. of the coastal plain region and 26 per cent. of the northern clay belt. The loss has been small in the coastal plain, since the burned areas originally were largely dwarf spruce or muskeg. In the northern clay belt, however, fire has burned considerable timber. The greatest damage has resulted west of Little Abitibi Lake towards the Abitibi Rivèr. Reproduction in the northern clay belt is by poplar and birch with spruce coming in as an understory. East and west from the Matta-gami River along the escarpment between the two main regions, dense jack pine reproduction is to be found.

(f) *Jack Pine.*—This species was found in clumps in short ridges or low gravelly knolls in a virgin state in the belt of country intermediate between the northern clay belt and coastal plain. Most of the mature jack pine found was in the vicinity of New Post on the Abitibi River, where it was accompanied by an understory of black spruce.

4. *Tree Species.*

Black Spruce.—This is the tree characteristic of the whole territory, occurring in mixed and pure stands. It reaches a development up to 80 feet in height and 15 inches D.B.H. and is in general quite sound. Average conditions confine the species to a general diameter range of five to nine inches and height of 45 to 60 feet. This species constitutes three-fourths of the total pulpwood supply of the area.

White Spruce.—This species, while forming a small percentage in the black spruce type, is mainly found in the mixed type on the banks of rivers and streams. It is a less important feature in the pulpwood resources of the coastal plain than of the southern region. About 13 per cent. of the total pulpwood is white spruce. The tree reaches 120 feet and 30 inches D.B.H.

Balsam.—The balsam ranks third after the two spruces as a source of pulpwood in the region. It reaches a maximum D.B.H. of 18 inches with a height of 60 feet, the common diameters being seven to nine inches. Balsam is severely affected with heart rot, and the estimated deduction would be one-third of the volume.

Jack Pine.—Trees of this species were tallied up to 18 inches D.B.H. and 70 feet high. The northern limit for the species was a scrubby growth inland from the mouth of the Onakawana River.

Tamarac.—Scattered young trees were noted throughout the whole area, but of no commercial value. Along the smaller streams, trees were seen up to six inches D.B.H. It occurred in pure stands of a scrubby character north of Moose Factory, adjacent to James Bay; southward, it merged in with dwarf black spruce.

Cedar.—Cedar occurs in the mixed type along the main rivers and streams to James Bay. It shows only a stunted growth.

Aspen Poplar.—This is the typical hardwood (broad-leaved) species of the region, just as the black spruce among the conifers. While occurring throughout the whole region, it is largely confined to the better drained banks of the streams, and is the predominating hardwood in the inland patches of the mixed type. It grows well to a D.B.H. of 20 inches and height of 80 to 90 feet, but suffers severely from heart rot.

Balsam Poplar.—This poplar grows close to the water, usually in clumps along river banks, and is found extensively on the islands in the lower Moose River, near the Bay. Like the aspen, it is much affected with heart rot.

Paper Birch.—Going north down the rivers towards James Bay, the birch becomes reduced in numbers. It is not plentiful, except around the lakes on Indian Reserve No. 9, where a considerable quantity was found in mixture with conifers; here about two cords to the acre.

White Pine, Black Ash, Elm.—These species are of botanical interest only. A few white pine were seen on an island below Little Long Rapids, Mattagami River. Black ash was noted near Devils Rapids on Mattagami River, growing to tree size, and below Island portage towards the Lobstick portage on the Abitibi River, a shrubby growth of the species occurs. A few trees of white elm, 36 inches D.B.H. were observed near Devils Rapids on the Mattagami River.

V. RESULTS

The total area of 13,500 square miles or 8,640,000 acres falls naturally into two regions—a belt of low-lying very poorly drained country adjacent to James Bay, called in this report the coastal plain, and containing 5.8 million acres, or 67.4 per cent. of the whole; with the remainder, or northern clay belt better drained and comprising 2.8 million acres or 32.6 per cent. On the map, these two regions are separated by a broken black line running slightly southeasterly from the Long Rapids on the Mattagami River to the Quebec boundary.

Of the territory, slightly over 1,500,000 acres, or 17.2 per cent., support tree growth of pulpwood size. Of this acreage 36.6 per cent. consists of mixed stands and 63.4 per cent. of pure black spruce. Approximately 73 per cent. of the timbered area is in the northern clay belt, with only 27 per cent. in the coastal plain. It covers 38.8 per cent. of the area of the northern clay belt, and only 6.8 per cent. of the coastal plain.

The remainder of the territory, around seven million acres, contains no commercial pulpwood supplies. It is classified as muskeg, dwarf black spruce, burn and water, constituting respectively, 28.4, 27.9, 21.9 and 4.6 per cent. of the whole.

The details of the classification of the whole territory are given in table I. below.

TABLE I.—CLASSIFICATION OF JAMES BAY FOREST SURVEY AREA.

Type	Coastal Plain		Northern Clay Belt		Total	
	Acres	Per Cent.	Acres	Per Cent.	Acres	Per Cent.
<i>Timbered:</i>						
Mixed.....	85,540	1.5	457,894	16.4	543,434	6.2
Black Spruce.....	312,124	5.3	629,982	22.4	942,106	11.0
Total.....	397,664	6.8	1,087,876	38.8	1,485,540	17.2
<i>Non-Timbered:</i>						
Dwarf Black Spruce.....	1,715,192	29.5	685,360	24.4	2,400,552	27.9
Muskeg.....	2,357,248	40.3	95,280	3.5	2,452,528	28.4
Burn.....	1,155,952	19.8	740,320	26.4	1,896,272	21.9
Water.....	210,216	3.6	195,928	6.9	406,144	4.6
Total.....	5,438,608	93.2	1,716,888	61.2	7,155,496	82.8
Grand Total.....	5,836,272	100.0	2,804,764	100.0	8,641,036	100.0

The timbered area contains pulpwood supplies totalling in all a little over 12,750,000 cords, including trees four inches D.B.H. and up. Of this quantity, a little over three million cords or 24.3 per cent. are in the coastal plain, and 9.6 million cords or 75.7 per cent. stand in the northern clay belt.

The total quantity of pulpwood consists of 9.6 million cords of black spruce, 1.6 million cords of white spruce, 1.4 million cords of balsam and less than 100,000 cords of jack pine.

It may here be repeated that the mixed type averages 10.7 cords in the coastal plain, and 9.1 cords in the northern clay belt, per acre of the timbered area; while the black spruce type averages 7.0 cords and 8.4 cords in the same two regions respectively. The general average for the whole timbered area is 8.6 cords per acre.

A considerable proportion of the total standing pulpwood does not lend itself to profitable exploitation, owing in some cases to the scattered distribution of the stands concerned and in others on account of the location of the timber. Such timber has been inserted in the tables under the heading of "remote areas." In all, 2.8 million cords are so listed, or 22.2 per cent of the total pulpwood; of the quantity, however, almost two million cords are in the coastal plain.

If the timber in "remote areas" be neglected, there still remains 9.9 million cords, of which 11.8 per cent. is in the coastal plain and 88.2 per cent. in the northern clay belt (here largely in the western portion). This gives a final average of 8.5 cords per acre of the area of accessible pulpwood.

Of the total timber in the territory, 3.7 million cords or 29.2 per cent. is tributary to the Mattagami River, three million cords or 23.5 per cent. on the Abitibi; 2.3 million cords or 18.1 per cent. on the Little Abitibi, and under 500,000 cords each to the French and the Moose (3.7 and 3.3 per cent. respectively); leaving 2.8 million cords or 22.2 per cent. remote.

The details of the estimated pulpwood cordage embracing all trees four inches D.B.H. and over, are given in the tables below. A cord is taken as 85 solid cubic feet of wood.

TABLE II.—PULPWOOD RESOURCES BY REGIONS.

UNIT	Timbered Area Acres	Black Spruce Cords	White Spruce Cords	Balsam Cords	J. Pine Cords	Total Cords
<i>A. Northern Clay Belt:</i>						
Mattagami R.....	368,410	2,877,523	375,923	348,099	14,911	3,616,456
Abitibi R.....	346,584	2,047,960	499,122	242,735	43,129	2,832,946
Little Abitibi R.....	284,155	1,584,560	315,924	411,530	....	2,312,014
	999,149	6,510,043	1,190,969	1,002,364	58,040	8,761,416
Remote Areas.....	88,727	583,496	94,211	183,979	35,885	897,571
Totals.....	1,087,876	7,093,539	1,285,180	1,186,343	93,925	9,658,987
<i>B. Coastal Plain:</i>						
Mattagami R.....	16,340	66,616	33,870	17,301	....	117,787
Abitibi R.....	23,400	146,447	14,566	10,579	....	171,592
French R.....	62,572	352,290	108,249	6,319	....	466,858
Moose R.....	61,672	333,855	76,039	9,641	....	419,535
	163,984	899,208	232,724	43,840	....	1,175,772
Remote Areas.....	233,680	1,627,171	92,101	212,617	....	1,931,889
Totals.....	397,664	2,526,379	324,825	256,457	....	3,107,661
Grand Totals....	1,485,540	9,619,918	1,610,005	1,442,800	93,925	12,766,648

TABLE III.—PULPWOOD RESOURCES BY FOREST TYPES

UNIT	Timbered Area Acres	Black Spruce Cords	White Spruce Cords	Balsam Cords	Total Cords	%
A. MIXED TYPE:						
1. <i>Northern Clay Belt:</i>						
Mattagami R.....	86,720	401,515	185,056	131,296	717,867	..
Abitibi R.....	145,040	673,928	419,494	183,294	1,276,716	..
Little Abitibi R.....	175,367	889,285	315,924	411,530	1,616,739	..
Remote Areas.....	50,767	280,150	94,211	183,979	558,340	..
TOTALS.....	457,894	2,244,878	1,014,685	910,099	4,169,662	32.7
2. <i>Coastal Plain:</i>						
Mattagami R.....	3,420	17,562	2,492	14,647	34,701	..
Abitibi R.....	3,840	14,208	13,440	6,528	34,176	..
Moose R.....	9,360	39,023	67,987	9,641	116,651	..
Remote Areas.....	68,920	429,683	92,101	212,617	734,401	..
TOTALS.....	85,540	500,476	176,020	243,433	919,929	7.2
GRAND TOTALS...	543,434	2,745,354	1,190,705	1,153,532	5,089,591	..
B. BLACK SPRUCE TYPE:						
1. <i>Northern Clay Belt:</i>						
Mattagami R.....	281,690	2,476,008	190,867	216,803	2,883,678	..
Abitibi R.....	201,544	1,374,032	79,628	59,441	1,513,101	..
Little Abitibi R.....	108,788	695,275	.....	.....	695,275	..
Remote Areas.....	37,960	303,346	.....	.....	303,346	..
TOTALS.....	629,982	4,848,661	270,495	276,244	5,395,400	42.3
2. <i>Coastal Plain:</i>						
Mattagami R.....	12,920	49,054	31,378	2,654	83,086	..
Abitibi R.....	19,560	132,239	1,126	4,051	137,416	..
French R.....	62,572	352,290	108,249	6,319	466,858	..
Moose R.....	52,312	294,832	8,052	.....	302,884	..
Remote Areas.....	164,760	1,197,488	.....	.....	1,197,488	..
TOTALS.....	312,124	2,025,903	148,805	13,024	2,187,732	17.1
GRAND TOTALS...	942,106	6,874,564	419,300	289,268	7,583,132	..
C. JACK PINE:						
GRAND TOTALS...	.....	.....	.....	.....	93,925	0.7
GRAND TOTALS...	1,485,540	9,619,918	1,610,005	1,442,800	12,766,648	100.

TABLE IV.—SUMMARY OF PULPWOOD RESOURCES

UNIT	Timbered Area Acres	Black Spruce Cords	White Spruce Cords	Balsam Cords	J. Pine Cords	Totals Cords	%
Mattagami R.....	384,750	2,944,139	409,793	365,400	14,911	3,734,243	29.2
Abitibi R.....	369,984	2,194,407	513,688	253,314	43,129	3,004,538	23.5
Little Abitibi R.....	284,155	1,584,560	315,924	411,530	.....	2,312,014	18.1
French R.....	62,572	352,290	108,249	6,319	.....	466,858	3.7
Moose R.....	61,672	333,855	76,039	9,641	.....	419,535	3.3
TOTALS.....	1,163,133	7,409,251	1,423,693	1,046,204	58,040	9,937,188	77.8
Remote Areas.....	322,407	2,210,667	186,312	396,596	35,885	2,829,460	22.2
GRAND TOTALS...	1,485,540	9,619,918	1,610,005	1,442,800	93,925	12,766,648	100.
Per cents.....	.....	75.4	12.6	11.3	0.7	100.0	.....

TABLE V.—VOLUME TABLE FOR BLACK SPRUCE.

JAMES BAY SURVEY, 1922.

Northern Clay Belt.

Volume to 4" top I.B. stump height 12". No allowance for rot or defect.

Basis 361 trees.

D.B.H.	Vol. Cu. Ft.	Vol. Cords
4	.70	.009
5	1.65	.020
6	3.28	.039
7	5.30	.062
8	7.70	.090
9	10.60	.125
10	14.00	.165
11	18.00	.210
12	22.70	.267
13	28.10	.330

TABLE VI.—VOLUME TABLE FOR BLACK SPRUCE.

JAMES BAY SURVEY, 1922.

Coastal Plain.

Volume to 4" top I.B. stump height 12". No allowance for rot or defect.

Basis 81 trees.

D.B.H.	Vol. Cu. Ft.	Vol. Cords.
4	.74	.009
5	1.42	.017
6	2.53	.030
7	4.23	.050
8	6.50	.076
9	8.90	.105
10	11.24	.130

III.—REFORESTATION.

During the past year the work of reforestation has been marked chiefly by the preparation for production of planting material. Two new forestry stations have been established, one in Durham County near the village of Orono; the other at Midhurst, five miles from Barrie. A description of these two stations together with reports on work already being carried on, is here appended.

PROVINCIAL FORESTRY STATIONS.

ST. WILLIAMS.

Spring sowing of seed beds commenced April 5th and continued until May 20th, a total of 382 beds being sown. On November 10th work was commenced in connection with fall sowing. By the 9th of December, when cold weather compelled a cessation of the work a total number of 414 beds were sown.

SPRING SOWING OF CONIFEROUS SEED.

SPECIES.	Collected	Origin.	No. of Beds Sown.	Amount Seed Lbs.	Per bed Ozs.	Total Amount Seed lbs.
Scotch Pine.....	1921	Norfolk County	90	.	10	56 $\frac{1}{4}$
Scotch Pine.....	1921	Danish	80	..	10	50
Jack Pine.....	1921	Norfolk County	100	..	9	56 $\frac{1}{4}$
Red Pine.....	1921	Simcoe County	1	..	12	$\frac{3}{4}$
White Spruce.....	1920	Simcoe County	1	1	..	1
Norway Spruce.....	1921	German	20	1	..	20
European Larch.....	1921	Switzerland	90	1	4	112 $\frac{1}{2}$
Total.....			382	..	..	296 $\frac{3}{4}$

FALL SOWING OF CONIFEROUS SEED.

SPECIES.	Collected	Origin.	No. of Beds Sown.	Amt. Seed Lbs.	Per Bed Ozs.	Total Lbs.	Amt. Seed Ozs.
White Pine.....	1922	Simcoe County	185	1	4	231	4
Red Pine.....	1921	Simcoe County	100	..	13	81	4
Scotch Pine.....	1921	Danish	18	..	12	13	8
Scotch Pine.....	1921	Scotland	2	..	12	1	4
Japanese Larch...	1921	.....	5	1	4	6	4
White Spruce.....	1922	Simcoe County	35	1	..	35	..
White Cedar.....	1922	Simcoe County	35	1	4	43	12
Red Cedar.....	1922	Pr. Edward County	20	3	8	70	..
Balsam.....	1922	Simcoe County	14	1	8	21	..
Totals.....			414	.....	.....	603	4

In addition to the foregoing, a large quantity of hardwood seed was sown in drills, flats and beds.

SOWING OF HARDWOOD SEED.

SPECIES.	Origin.	Date of Sowing.	How Sown.	Amt. of Seed Sown, Bus.
Soft Maple.....	Norfolk County	June 5	Flats	30
White Elm.....	Toronto	June 5	Flats	6
Black Walnut.....	Norfolk County	Oct. 17	Drills	400
Hard Maple.....	Pr. Edward County	Oct. 19	Flats	15
White Walnut.....	Simcoe County	Oct. 26	Drills	90
White Ash.....	Simcoe County	Nov. 16	Flats	14
Red Ash.....	Norfolk County	Nov. 16	Flats	1
Sweet Chestnut.....	Norfolk County	Nov. 16	Drills	1 $\frac{1}{2}$
Hard Maple.....	Lanark County	Dec. 1	Flats	8
Black Cherry.....	Norfolk County	Dec. 1	Seed Beds	1 $\frac{1}{4}$
Basswood.....	Norfolk County	Dec. 1	Seed Beds	1
Basswood.....	Simcoe County	Dec. 1	Seed Beds	1 $\frac{1}{2}$
Red Oak.....	Simcoe County	Dec. 9	Drills	1 $\frac{1}{2}$
Beech.....	Simcoe County	Dec. 9	Seed Beds	1 $\frac{1}{4}$
Black Locust.....	Norfolk County	Dec. 9	Seed Beds	$\frac{1}{4}$
Total.....				572 $\frac{1}{4}$

Small quantities of seed of the various hardwoods indigenous to Southern Ontario were also sown, comprising water beech, American mountain ash, hackberry, pepperidge, dogwood, cucumber tree, tulip, catalpa and sassafras.

NURSERY LINES.

During the spring, 710,000 two-year old jack pine seedlings were lined out, while 230,000 one year old Scotch pine were transferred from seed beds to nursery lines.

A much larger number of seedlings were lined out during late summer and autumn. Planting began on 7th of August, terminating on the 9th of November. In addition to the regular staff employed, thirty boys, ranging from twelve to fifteen years of age were employed on this special work until school was reopened. The use of planting boards was resorted to with unvarying success, resulting in greater speed and more careful planting.

FALL TRANSPLANTING.

SPECIES.	Origin.	Age.	No. of Plants.
White Pine.....	Norfolk County	2 year old	548,000
Jack Pine.....	Algoma District	2 year old	1,473,300
Austrian Pine.....	Norfolk County	2 year old	12,300
White Spruce.....	Simcoe County	2 year old	945,000
Norway Spruce.....	Norfolk County	2 year old	71,000
White Cedar.....	Simcoe County	2 year old	164,400
European Larch.....	Western Alps	1 year old	474,820
Balsam.....	Simcoe County	2 year old	7,980
Total.....			3,696,800

A number of hardwoods comprising 70,200 white elm and 79,600 soft maple, too small for distribution, were also lined out, making a total of 3,846,600 seedlings planted in nursery lines during the fall season.

In addition to the foregoing disposal of seedlings, a considerable number were shipped to the several recently organized Provincial Forestry Stations and Plantations in the following proportions:

SPECIES.	Provincial Forestry Stations.		Provincial Forestry Plantations.		Totals.
	Orono.	Midhurst.	Simcoe Co.	Sand Banks.	
White Pine.....			286,700		286,700
Scotch Pine.....	114,000	200,000		63,900	377,900
Red Pine.....			3,500		3,500
Jack Pine.....		50,000	13,000	59,300	122,300
White Spruce.....	22,000	100,000	854,500	326,900	1,303,400
Norway Spruce.....	84,000	50,000		7,000	141,000
White Cedar.....			14,600	70,500	85,100
Totals.....	220,000	400,000	1,172,300	527,600	2,319,900

FERTILIZERS.

Fertilizers applied during the year in connections with the nursery lines and seed beds are as follows:

Location.	Animal.		Mineral.	
	Manure Tons.	Dried Blood Lbs.	Acid Phosphate Lbs.	Sulphate of Ammonia Lbs.
Lot 2.....	..	100	270	..
Lot 3.....	..	120	320	60
Lot 4.....	..	280	1,100	140
Lot 5.....	52	600	1,100	300
Lot 6 to 11 inclusive.....	5	..	..	..
Lot 20 to 23 ".....	5	..	..	..
Lot 24.....	5	..	400	..
Lot 25.....	5	..	400	..
Lot 26.....	30	..	..	150
Lot 30, 31, 32.....	..	..	800	150
Lot 34, 35.....	..	..	800	150
Lot 36.....	..	250	900	180

Additions to Property.—Although very little building was done during the year, one important construction was completed, namely, an underground room for storing tree seed. This building or room 16' x 22' in dimension, is composed of concrete and is completely surrounded by earth to the extent of seven feet. An even temperature the year round is thus obtained, a medium essential to the storing of seed over a number of years. The seed itself is contained in sealed glass bottles which in turn are labelled to indicate the species, origin, quantity and quality of seed stored.

Roads.—An effort has been made to divide the 1,720 acres comprising the property into workable compartments in order to facilitate the management of the wooded areas of the plantation. The old timber roads have been cleared of all debris, widened and otherwise improved, while one and one-half miles of new road was built to link up these older trails, thereby increasing accessibility and reducing fire hazard. All fire roads were kept clean by ploughing and discing. The sixth concession road extending from the town line west to the quarter town line was cleaned of all inflammable material and diseased and ill-formed tree growth.

The erection of a thirty-five foot tower overlooking a large plantation provides an observation point from which records may be made of the development of the reforested area, for a number of years to come. Moreover, situated as it is on a prominent hill this tower is serviceable as a "look-out" in connection with protection from fire.

To meet with increasing demands for planting material, it has been found necessary to rent a twenty-five acre field abutting the nursery. This field will produce approximately 6,000,000 transplants suitable for permanent planting purposes.

Silviculture.—During the late fall and winter months 140 acres of the wooded section of the forest station was subjected to improvement cutting.

Weed trees, windfalls, standing dead timber and trees showing evidence of fire scar, butt rot, ill-form, oppression and senility were removed and converted into logs and cord wood, the remaining slash being burned.

As a result of this improvement cutting only sound healthy vigorous trees are left, while with the removal of slash, fire hazard is minimized.

Moreover, underplanting was made possible, since by the removal of all undesirable material, a greater growing area was obtained and the resultant reduction of crown density permitted a greater percentage of light ingress, essential to the successful development of the underplanting.

Protection (Disease and Insects).—The policy of eradication of members of the family Ribes for the prevention of the infection of nursery material with white pine blister rust was continued during the recent summer. Three men were constantly employed on this work.

An immunity belt of over one mile in width surrounding the nursery has been freed of host plants, up to the present there has been no evidence of infection of nursery stock from this source.

The destructive work of the white pine weevil has also been held in check by removing all attacked leaders in the older plantations. An interesting and important observation relative to the work of combating this pest may be noted that where the white pine is planted in conjunction with other conifers or along the border, or under an older stand of hardwoods little or no evidence of white pine weevil has been found.

NURSERY STOCK ON HAND DECEMBER 14TH, 1922.

CONIFERS

Balsam.....	7,980
Cedar, White.....	716,400
Larch, European.....	1,469,820
Pine, White.....	2,643,000
Pine, Scotch.....	1,670,100
Pine, Jack.....	4,196,300
Pine, Red.....	2,120,700
Pine, Austrian.....	12,300
Spruce, White.....	1,545,000
Spruce, Norway.....	571,000
	<hr/>
	14,952,600

HARDWOODS

Ash, White.....	4,450
Birch, White.....	2,300
Basswood.....	1,250
Chestnut.....	6,000
Cherry, Black.....	900
Elm, White.....	84,200
Hickory, Shellbark.....	400
Hackberry.....	550
Locust, Honey.....	900
Locust, Black.....	2,000
Maple, Soft.....	116,300
Maple, Hard.....	16,500
Maple, Manitoba.....	1,300
Oak, Red.....	24,400
Poplar Cuttings.....	250,000
Sycamore.....	450
Tulip.....	1,500
Walnut, Black.....	30,000
Walnut, White.....	3,000
Willow Cuttings.....	50,000
	<hr/>
	596,400

Conifers.....	14,952,600
Hardwoods.....	596,400
	<hr/>
Net Total.....	15,549,000

ORONO.

As this station was acquired during the late summer of 1922, a description of the property, its area, position and conditions may be given first. This new nursery consists of approximately $147\frac{3}{4}$ acres and is situated in Clarke Township, Durham County. The headquarters are on the outskirts of the Village of Orono, about one-third mile from the C. N. R. station. The C. P. R. and G. T. R. are also available in emergency, the former being three miles, the latter five miles south. There are also excellent opportunities for securing labour and a creek which flows to the north of the area, along the east side, penetrates the boundary in two places. Telephone and electric light services are also available.

The area chosen is on the shore line of the glacial Lake Iroquois, with a general southerly aspect. The soil varies greatly from a medium heavy loam in a small portion to a pure medium sand, blowing in patches in the south. In general, however, the soil is a warm, sandy loam. The southerly aspect of the property and the general porosity of the soil renders the solution of the drainage question fairly easy.

There are approximately 100 acres of land suitable for intensive nursery work—seed beds and transplant lines. The remainder of the area, $47\frac{3}{4}$ acres, is largely included in a valley of from 20 to 60 feet deep and from 200 to 600 feet wide which extends from the northeast corner along the east side of the property swinging diagonally in the southern portion to the west side. This offers a good chance for demonstration plantations and, as stated before, since the soil embraces practically all classes from heavy loam to blow sand and as all aspects from north to south are available in larger or smaller areas, practically all species may be represented.

This nursery situated in the heart of a rolling farming country, where every farm contains a percentage of unprofitable hillside, with a wide area of light soil to the west and with the so-called "pine ridge," largely a blow sand area, approximately six miles wide, extending through York, Ontario, Durham and Northumberland Counties a few miles north. It is excellently placed to serve private requirements as well as any project which may be instituted for the complete reforestation of the ridge. The position of the nursery in a thickly populated and prosperous district is also exceptional for the dissemination of educational propaganda.

Owing to the fact that the property was taken over late in the season, most of the work instituted was in the nature of soil cultivation and organization of the property.

However, a small start was made in seed bed work and nursery lines as follows:

TRANSPLANT BEDS.

Transplanting commenced September 7th and terminated October 4th. Material was secured from St. Williams and planted with the Yale Planting Board.

SPECIES.	Origin.	Age.	No. of Plants.
Norway Spruce.....	St. Williams	1 year	2,000
" ".....	"	1 "	82,000
White ".....	"	2 "	22,000
Scotch Pine.....	"	1 "	114,000
Total.....			220,000

SEED BEDS.

SPECIES.	Collected.	Origin.	No. of Beds sown.	Amount of Lbs.	Seed per Bed, Ozs.	Total Amount.
White Pine.....	1922	Simcoe Co.	20	1	8	30

The following hardwood seeds were sown in drills and belts:

SOWING OF HARDWOOD SEED.

SPECIES.	Origin.	Date of Sowing.	How Sown.	Amount of Seed Sown.
				Bushels.
Hard Maple.....	Pr. Ed. Co.	Nov. 15	Belts	3
White Ash.....	" "	" 20	"	3
Butternut.....	Simcoe Co.	" 23	Drills	20
Black Walnut.....	Durham Co.	" 27	"	18
			Total.....	44

Hard maple and white ash were sown in belts 120 feet long by 11 inches wide. These belts were formed by the use of a seeding roller 35 inches long by 8 inches in diameter. A belt 11 inches wide and 10 inches in diameter formed the centre of the roller. When rolled over the area this left a depression three-quarter inch to 1 inch deep for the whole width of the area with a 12 inch path between belts. In so far as the actual seeding was concerned this device undoubtedly proved its efficiency in speeding up the operation.

NURSERY STOCK ON HAND, JANUARY 1ST, 1923.

CONIFEROUS.	CLASSIFICATION.		TOTALS.
	4" to 6"	4" to 8"	
Norway Spruce.....	74,000	2,000	84,000
White Spruce.....	22,000	.....	22,000
Scotch Pine.....	112,000	.....	114,000
Totals.....	208,000	2,000	220,000

Additions to Property.—A strip of land forty rods long by four rods wide was purchased across the valley which separated the village from the nursery land and a road constructed. This necessitated the erection of two concrete abutments with wings and a concrete culvert.

MIDHURST.

The property purchased for this station consists of approximately one thousand acres of land in Vespra Township, Simcoe County, five miles from the Town of Barrie. It covers a part of a large sand plain at one time occupied with fine stands of red and white pine. Some of the property since then has been

stumped and cropped, but the greater part has been used for pasture farms and wood lots. The approximate areas of the different types are as follows:—

Broken and stumped.....	50 acres
Broken and partially stumped.....	100 “
Second growth in pasture.....	300 “
Pine stumps and pasture.....	350 “
Mixed growth along creek bottoms.....	100 “
Swamp.....	100 “

There were no buildings on the property of any great value at the time of purchase. One six roomed bungalow was built and made ready for use for the winter. As the property was not taken over until September of 1922, most of the work done was of the nature of clearing up and cultivation of the soil. Owing to the unclean condition of the land, no seed beds were sown. A few nursery beds were put in containing 400,000 seedlings from St. Williams and twenty-five bushels of butternuts were planted.

PROVINCIAL FOREST PLANTATIONS.

SAND BANKS.

During the past year, the work at the Sand Banks has been put on a permanent basis. A foreman has been placed in charge and a house and a few acres of land purchased to serve as headquarters. In addition to this, a storehouse and workshop combined and a stable have been erected during the summer. As the work of checking the sand dunes is not expected to show tangible results until the trees planted have put on a few years' growth, and as the sand still continues to cover up privately owned property, the government has offered to purchase land which is thus endangered as well as that which has already been covered up. A flat rate of fifty dollars an acre for agricultural and forested land, and ten dollars an acre for sand covered land has been decided upon, and up to the present most of the land owners adjacent to the banks have sold their property at this price.

By having control of these fringes of good land and especially by insuring permanency of the remaining clumps of mature cedar, the work for the future is safe guarded. Also, some of the land thus acquired is suitable for nursery work, and already a large quantity of planting material has been transferred from St. Williams to nursery beds here, awaiting final planting on the banks.

The work of tree planting was continued during the spring. The protective belts of willow and poplar were widened and supplemented where necessary. Large areas, where the drift was most severe, were planted solid with limb material. In addition to the planting on the exposed areas, a number of small plantations were set out in corners of good fields and in protected places.

SIMCOE COUNTY.

Simcoe is the first of the counties to take advantage of the offer of the government to reforest waste land. The tract purchased consists of one thousand acres of light soil in Vespra Township about eight miles from Barrie. At one time this section of the township was covered with big pine, and since it was cut, small areas have been farmed with varying success. The greater part, however, remains unstumped.

Work was commenced here in April of last year. Five hundred thousand one-year old seedlings were transferred from St. Williams and planted in nursery beds, in preparation for permanent planting in succeeding years. Sixty acres of the property were planted out permanently with Scotch pine and mixed hardwoods. Autumn transplanting was continued with material from St. Williams, bringing the total of seedlings in nursery beds to 1,172,300. In the work of transplanting at the Simcoe plantation, the use of the Yale planting tool was experimented with, on a large scale, for the first time in our work. The rapidity with which small stock can be transplanted by this means, more than justifies its continued use.

During the summer, the section of the property chosen for nursery compartments and headquarters was improved. Buildings on the property were renovated and made ready for the occupancy of a foreman who took charge in the autumn.

TREE PLANTING.

PRIVATE PLANTING.

The distribution of trees for waste land planting and wood lot work on privately owned lands was greater this year than previously. More applications were received than the branch could fill and in all 311 separate persons received trees for planting work.

DEMONSTRATION PLOTS.

In accordance with the plan outlined by the government, for the establishing of plots to demonstrate the utilizing of non-agricultural land for tree growing purposes, the following municipalities have purchased land which has been planted free of cost during the year.

BURFORD TOWNSHIP—BRANT COUNTY.

Situated about one mile from Burford Village on the Provincial County Highway, 5-1/20 acres planted with 3,000 Scotch pine and 2,000 red oak.

DARLINGTON TOWNSHIP—DURHAM COUNTY.

Situated on Toll Gate Hill about two miles from Bowmanville on the County Provincial Highway, a five acre corner lot planted with 4,000 Scotch pine, 2,000 jack pine and 1,000 walnut.

COLBORNE TOWNSHIP—HURON COUNTY.

A part of the township cemetery which is unfit for burial purposes, five acres planted with 3,000 Scotch pine and 1,000 jack pine.

SUNNIDALE TOWNSHIP—SIMCOE COUNTY.

Situated one and a half miles from New Lowell on the Glen Cairn Road. The drifting sand from the adjoining fields has practically blocked one section of the road. Eleven acres of land, a part of which was planted with 2,000 Scotch pine, 3,000 jack pine, 1,000 willow cuttings, 1,000 poplar cuttings and a quantity of willow limb material.

BEETON VILLAGE—SIMCOE COUNTY.

Situated one and a half miles from the village, being a part of the reservoir reserve. This plot not only serves as a demonstration in tree planting, but also shows the use to which trees may be put for protecting the margins of streams and lakes used for water supply. The areas planted are the slopes of hillsides which drain into two streams which feed the village reservoir. Trees planted were, 2,000 Scotch pine, 8,000 jack pine, 1,000 cedar and 2,000 spruce.

ESSA TOWNSHIP—SIMCOE COUNTY.

Situated on the road between Thornton and Essa, being a part of a large sand area unimproved since the mature timber was removed. Ten acres planted with 3,000 Scotch pine and 2,000 jack pine.

NORFOLK COUNTY.

Situated in the Township of South Walsingham and close to the government owned nursery at St. Williams. One hundred acres of land, a part of which was planted with 35,000 Scotch pine.

EDWARDSBURGH TOWNSHIP—GRENVILLE COUNTY.

Situated on the Ottawa Prescott Highway between Kemptville and Spencer-ville. This plot was commenced about six years ago. One thousand Scotch pine were used for completing the area and filling up fail places.

CRAMAHE TOWNSHIP—NORTHUMBERLAND COUNTY.

Situated west of Dundonald on the town line between Brighton Township. One and a half acres of drifting sand planted with 3,000 Scotch pine and 2,000 jack pine.

PLANTAGENET TOWNSHIP—RUSSELL COUNTY.

Situated one and a half mile from the Village of Plantagenet. Ten acres, a part of which was planted with 6,000 Scotch pine.

SUMMARY OF TREES PLANTED PERMANENTLY, 1922.

	Misc. Species	Scotch Pine	Jack Pine	Walnut	Butternut	Hard Maple	Soft Maple	Red Oak	White Ash	Poplar Cuttings	Willow Cuttings
Private Planting.....	.....	199,600	49,401	12,871	6,651	10,827	5,086	7,372	11,324	13,500	11,100
Demonstration Plots..	3,000	62,000	18,000	1,000	.....	.....	.....	2,000	.....	1,000	1,000
Sand Banks.....	9,500	5,000	20,000	2,000	.....	2,000	2,000	.....	2,000	230,000	82,000
Simcoe County.....	5,000	30,000	20,000	2,000	64 cords of Limb Material	equal to.....	.....	.....	.....	.....	225,000
	17,500	296,600	107,401	17,871	6,651	12,827	7,085	11,372	13,324	249,500	319,100

Total, 1,059,232.

PLANTATION INSPECTION.

Inspection of plantations was carried on this year over the greater part of Western Ontario, embracing the following counties: Welland, Lincoln, Haldimand, Simcoe, Grey, Wellington, Dufferin, Waterloo, Perth, Middlesex, Brant, Oxford, Wentworth, York, Peel, Halton, Peterborough, Durham, Northumberland.

Taking into account the inspection done in previous years this means that with the exception of a few plantations in the northern part of Old Ontario, the whole of the peninsular part of the Province has been covered with the exception of the counties bordering Lake Huron and Kent, Essex and Norfolk Counties. The total area of these plantations inspected amounts to some five hundred acres. There were 448 plantations inspected, none of those having fewer than 500 trees were visited; of these approximately 84 per cent. have been successful, making 30 per cent. and over as the test of success.

The trees were found to be remarkably free of disease. There were no cases of white pine blister rust and only a very few of white pine weevil. An exception



Fig. 5.—Type I: Butt rot of balsam.

to this rule is black locust, which almost everywhere is infested with borer, though the trees are usually not killed for a long time by this insect. The Scotch pine were invariably in a healthy condition.

The plantations were of all ages, ranging from those planted in the spring of this year (though only a few of these were visited) to the oldest, which were begun as far back as 1907 and 1908. Individually, the area of these averages from three-quarters of an acre to one acre, though many were no more than patches a few rods square. The largest visited were from eight to ten acres in extent. There were very few of these.

Below are given some height figures for various species ten years old, as averaged from several of the more successful plantations.

Scotch Pine.....	16.2 feet
White Pine.....	10.4 "
Jack Pine.....	15.3 "
White Ash.....	11.3 "
Walnut.....	7.9 "
Soft Maple.....	13.5 "

SEED COLLECTING.

The season of 1922 has been a prolific seed year for many of our native species used in reforestation work. Gathering of cones and seed was carried on at Angus, St. Williams and at the Sand Banks.

The following seed was secured:

SPECIES.	Bushels.	Lbs. of Seed.
Scotch Pine.....	.....	25.0
Jack Pine.....	.....	38.0
Red Pine.....	.....	6.5
White Pine.....	.....	731.0
White Spruce.....	.....	33.25
Balsam.....	.....	160.0
Tamarac.....	.....	5.0
White Cedar.....	.....	243.0
Red Cedar.....	.....	70.0
Hemlock.....	.....	22.5
Walnut.....	575.0	.....
Butternut.....	267.0	.....
White Ash.....	60.5	.....
Hard Maple.....	60.0	.....
Soft Maple.....	70.0	.....
Elm.....	6.0	.....
Beech (Unshelled).....	15.95	.....
Black Cherry.....	6.8	.....
Basswood.....	2.0	.....
White Birch.....	2.68	.....

IV.—FOREST PATHOLOGY

(Report of Dr. J. H. Faull for 1922.)

Investigations on the following topics in forest pathology were continued or initiated during the season of 1922.

(a) *Physiological diseases.* (1) *Needle blight of white pine.* Several hundreds of trees marked in 1918 and 1919 in connection with studies on needle blight in the Temagami Forest Reserve were checked over. In order to determine the effect on the annual accretion of wood, increment boring and blocks were taken from the majority of them; the results are being collated and will be presented in the next report. (2) *Effects of late spring or early summer frosts on balsam and spruce.*

(b) "*Red branch*" of balsam, pine, and arbor vitae, and "*spike branch*" of spruce. In the Report of the Minister of Lands and Forests for the Province of Ontario for 1920, a brief account was given of an unexplained dying of the branches of balsam, particularly striking and abundant in some localities, and the causes were demonstrated. Observations have been extended since to other conifers. On the entomological side of this problem interesting data have been contributed by Dr. F. C. Craighead of the Federal Entomological Branch, Ottawa. A summary is included in this report.

(c) *Butt and heart rots.*—Special attention has been given to the pulp woods, in part because of requests for information from several limit holders, and in part because of the vast and almost virgin field of research offered by the pulp woods. It has seemed particularly desirable to concentrate on balsam (*Abies balsamea*) for the reason that it is extremely susceptible to disease, and it presents some of the most vital forest problems confronting us to-day in Eastern Canada. Preliminary analyses have been made of the distribution of the various

types of rots, of the extent of their ravages, and the age at which the tree species become susceptible to them. Studies on the rate of progress of deterioration are also planned, information of essential importance in the rectifying of working plans on a sustained yield basis, and of value in determining when a given stand should be harvested.

Owing to the fact that the identity of the fungi responsible for many of the heart and butt rots is unknown, intensive laboratory research has been carried on in this subject by C. W. Fritz, M.Sc., through the co-operation of the University of Toronto; investigations on fifteen forms have been completed and an account of them will shortly be published.

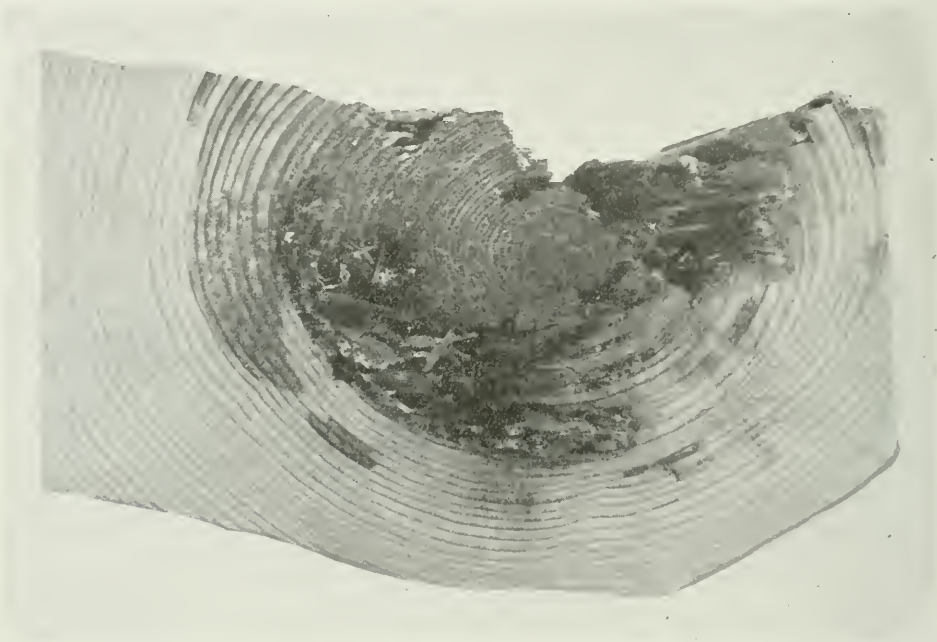


Fig. 6.—Type II: Butt rot of balsam.

As an extension of the work on butt and heart rots some time has been given to the question of their relation to the dying of balsam following bud worm attack.

(d) *Rusts of balsam*.—As a part of the preparation of a monograph on the diseases of balsam, attention has been given to needle diseases. The rusts are among the more important causes of such; they are essentially leaf parasites, though in some cases the stems and branches may be involved. This special group has been investigated by Dr. H. P. Bell, of Dalhousie University, Halifax, who was associated with me in the field, and to whom a working place was granted in the field laboratory through the courtesy of the Forest Branch. Many interesting facts have been brought to light and two new species of rusts on balsam discovered. Dr. Bell's paper on one set of these rusts has been accepted for publication in the *Botanical Gazette*.

(e) *Collections*. (1) *Fungus diseases*.—Many additions have been made to our reference collections in pathology, including contributions from correspondents in various states and provinces.

(2) *Flora of the forest floor*.—For the sake of acquiring a better knowledge of the forest floor, and especially its “index” plants, an annotated and representative, though not exhaustive, collection of seed plants and ferns has been assembled by Mr. H. P. Watson from the Temagami Forest Reserve—about 450 species in all.

1. “Red branch” of balsam, pine, and arbor vitae, and “spike branch” of spruce.

“Red branch” of balsam is of frequent occurrence. The dead, red-needled branches located here and there throughout a balsam tree are conspicuous objects against the dark green setting of normal living foliage, and are bound to attract attention. Various explanations to account for them have been offered; one of the commonest theories is that of snow pressure. But this explanation

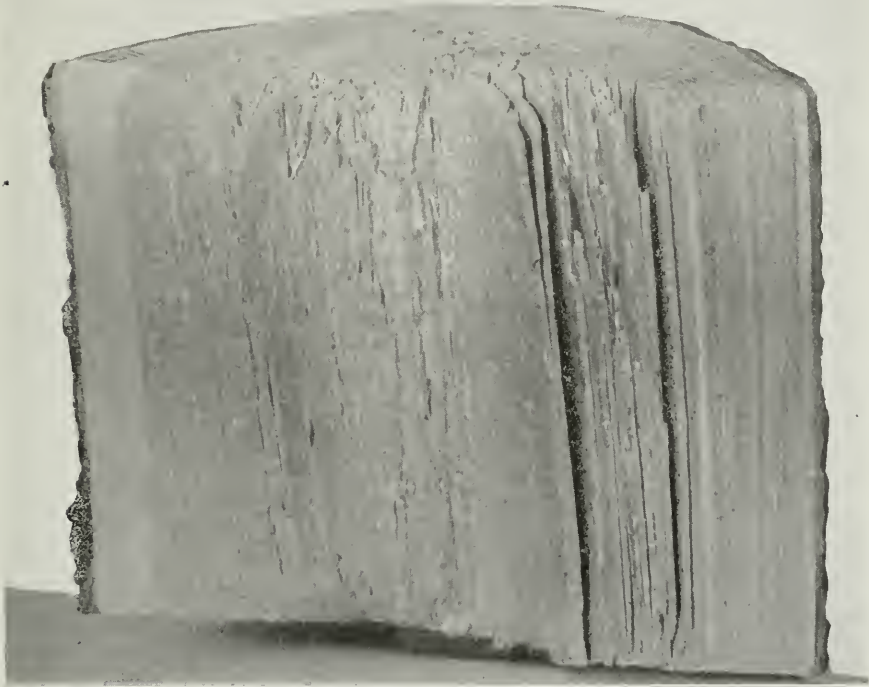


Fig. 7.—Type III: A butt rot of balsam.

lacks proof. The most frequent cause is not snow pressure, but a combination of two factors, namely insect-gnawing of the bark (which is almost invariably restricted to the lower surface, and is by no means a girdling) and the subsequent “drying out” of the living tissues at the same level, a process that is favoured by the action of frost, and by the inactivity of these tissues during the fall and winter.

An examination of the branch at the base of the dead portion almost invariably shows a more or less extensive spot from which the bark has been removed, a ragged-edged wound at once suggesting the gnawing of some small animal. This spot is usually on the under side; it never extends more than half way around the branch and usually much less, so that the branch is not girdled.

It may extend indefinitely towards the tip of the branch, commonly for not more than half an inch, but sometimes for several inches. Occasionally the leader is destroyed in the same way as the branches.

The wound in itself is not sufficient to cause the death of the branch. This was proved by similarly removing the bark with a knife from healthy branches in July of 1919. The wounds healed before the end of the season, and they have shown no ill effects of their maltreatment since then. But when the wounding takes place so late in the season that there is no time left for covering the edges of the wounds with new tissues the result is different. Twenty-five branches were wounded in the same manner in October, 1919. Without exception every one of these branches died from the point of wounding outward and their foliage was red by the following May.

The cause of the wounding in most cases is the large bark beetle *Monohamus scutellatus*. It would also appear from experiments that the rarer *M. marmorator* exhibit the same habit—a habit of these beetles not before known; indeed, it is altogether probable that other species of *Monohamus* (*Monochamus*) resort at times to bark-chewing.

A few instances of what appear to be snow pressure or fungus action occur at times, but in such cases the bark remains intact. Likewise, there are instances of removal of the bark by rubbing, or of the pulling off of low-placed twigs or small branches in the fall or winter, followed by the death of the branches, but they are not frequent. So, too, branches are sometimes killed by breakage due to wind or sleet, or insect burrowing. But the prevalent cause of "red branch" is the combination referred to above.

Now what is true of balsam is also true of white pine (*Pinus strobus*), red pine (*P. resinosa*), jack pine (*P. banksiana*), arbor vitae (*Thuja occidentalis*), black spruce (*Picea mariana*) and white spruce (*P. canadensis*). In the case of the spruces there is an early defoliation and naked branches appear as bushy spikes—hence the term "spike branch." Dr. Craighead reports that at Bathurst, N.B., about 50 per cent. of the "spruce trees standing in old logging operations were defoliated by *M. scutellatus* feeding on the under side of twigs."

In proof of the statement that *Monohamus* is the cause of the wounding Dr. Craighead deposited two males of *M. marmorator* and two females in a cage placed over a living balsam tree six feet high on July 7th. On August 24th much gnawing on the under side of the branches was noted, and by September 15th nearly all of the branchlets had been wounded in this way. By the following spring twenty-one branches had died and reddened. A similar experiment was carried out with *M. scutellatus* and with like results.

2. BUTT AND HEART ROTS.

(a) *General*.—A distinction is drawn between butt and heart rots. The former are rots of any kind localized in the lower part of the trunk and the adjoining roots of a living tree; such rots commonly begin in the roots at the base of the trunk and work their way upwards. The heart rots occur in the heartwood of the main trunk; they commonly enter by way of knots or wounds. Fundamentally there is no difference between the two kinds. Both are caused by fungi. Delicate fungal threads, visible only with the aid of a microscope, except where they form sheets or strands, penetrate the wood partially digesting it; the undigested remains constitute the "rotted" wood. Fruit bodies, usually in the form of brackets or punks (but in a few species as mushrooms or toadstools) eventually develop on the surface of the diseased parts, but as a rule only after

the decay is well advanced or after the affected trunk has fallen to the ground. The fruit bodies produce large quantities of spores, microscopic in size, which are liberated from their surfaces, and which, carried by currents of air or other agents, serve to spread the fungus to other trees. Infection of living trees takes place through the spores lodging and sprouting on wounds or dead branches or branch stubs. Infection by butt rot fungi may also take place through contact between diseased and healthy roots, or in certain species through fungus strands that may traverse the soil.

The amount of loss due to butt and heart rot fungi is enormous; they are



Fig. 8.—Type IV: Heart rot of balsam ("hemlock rot" of balsam).

easily the most destructive agents of the forest. Mature stands will show a destruction up to 50 per cent. or more. The butt rots as a rule do not extend more than a few feet up from the ground, but they weaken the trees at their bases and so facilitate windfall. Indeed, most windfalls are due to this cause, so that in a very direct way the butt rot fungi increase the fire hazard in addition to destroying the timber. The heart rots work throughout the merchantable part of the trunks; they may weaken the stems at any level, so that broken tops are frequent, and in time they spoil the entire tree for any purpose. Even after the death of their hosts these fungi continue to be active, and so they are

found in dead standing timber, fallen trunks, stumps and slash, where they persist as agents of destruction and as breeding centres of infection.

Now as for control, which after all is the ultimate problem, certain facts must be borne in mind. (1) There is not a uniformity of behaviour among the butt and heart rot fungi—hence the various types demand individual study. It is important to know the identity of each, where it fruits (whether on slash, stumps, etc.), what kinds of trees it may attack, and at what ages, and how they work and how rapidly. It is for these reasons that the fungi of the balsam, the spruces and the pines, etc., should receive individual and detailed attention. (2) Sufficient observations have been made to show that young stands do not suffer from butt and heart rots. Trees will grow to merchantable size before they are attacked, though they do fall a prey before they have attained their maximum size. Thus if control be desired it must be considered in connection with leasing and cutting plans. Control will follow automatically when an adequate system of management is put into operation. The rectification of the plans adopted can be effected from time to time as the information indicated above becomes available. Such plans are already being initiated by certain limit holders in Quebec. This has come about through the necessity of doing something if a continued supply at the present rate of consumption is to be assured within competitive reach. The virgin timber left is ever more and more inaccessible and is often much over mature. The harvesting and transportation of this timber easily reaches a point at which the burden of added cost is insupportable. (3) To what extent slash disposal is important as a control measure remains to be seen. Probably it would not much affect the butt rot fungi as they can and do reproduce in connection with the stumps and roots; but it would have a bearing on the control of the heart rot fungi. (4) Methods of harvesting also have a bearing on the question of control. Thus a system of harvesting that permits the leaving of defective and suppressed trees to remain uncut would appear to favour the perpetuation of infection centres, and at the same time threaten the vigour of the succeeding generation of trees. In nature the strongest survive, but by such a system it is the weakest that win out.

(b) *Butt and heart rots of Balsam*.—So far as I know no account has yet been published of the butt and heart rots of the balsam (*Abies balsamea*). Rankin in his "Manual of Tree Diseases" (1918) briefly discusses the butt and heart rots of the American firs in general, including the Douglas fir, but of the six mentioned by him it is not certain that any are applicable to the balsam.

In any case our knowledge of the diseases of our balsam fir is meagre, so that to secure information on the pathology of this tree, which is finding such an extensive use in paper-making and to some extent as lumber, it will be necessary to begin at the foundation and work up.

There are three important butt rots of balsam and one heart rot. A preliminary description of them follows.

Type I.—This is a butt rot (the "brown butt rot" of the lumberman) found in the heart wood of the lower part of the trunk and the larger roots. It may extend ten to fifteen feet upwards into the trunk, but is commonly more restricted. It is the prevalent type in some stands—in very mature stands almost every tree being affected, while in other parts of the country it may be comparatively infrequent. This type is characterized by the heart wood being converted into a light brownish mass due to the removal of the cellulose, which in more advanced stages checks into more or less cubical masses, up to an inch or more in length. On being rubbed up between the thumb and fingers these masses readily pulverize just as does chalk or charcoal. The cracks between the masses

may partly fill the indefinite delicate white sheets of the fungus. This decay will eventually extend out almost to the bark, so that only a very thin shell of sound wood may remain. Such a butt rot is known to occur in all of the conifers, both in Europe and America. It has, on inconclusive grounds, been commonly referred to a fungus botanically known as *Polyporus Schweinitzii*. But our studies both in the field and in the laboratory so far have connected it with a fungus called *Polyporus balsameus* Peck. Culture studies have borne out this conclusion and association of the fruit bodies with the decay in the forest.

It is, of course, possible that *P. Schweinitzii* or even some other fungus may at times attack balsam, causing a similar type of decay. If such findings be established, then this type will be subdivided into Type Ia, Ib, etc.

Types II and III.—These are also butt rots, and are probably not dis-



Fig. 9.—Young balsam attacked by a fern rust (*Uredinopsis*).

tinguished from one another by the casual observer. They pass under the name of “feather rot” because of the light coloured, shredded or flaky rot that characterizes the later stages. This decay does not extend as far up into the trunk as Type I, but causes just as great a weakening of the butt. It is very abundant in some localities.

Type II is described in my field notes as follows: The newly decayed wood is clay colour or tawny olive, later a cinnamon buff. It is soon marked by tiny longitudinal pockets or cavities of indefinite length arranged in close concentric series, typically a single row in the fall wood of each annual ring. This results in the lamination or flaking of the wood, the decayed wood readily falling into sheets, each sheet consisting of an annual ring. The surfaces of these sheets, as one might expect, are etched. Eventually there is a shredding of the sheets due to the radial deepening of the longitudinal furrows. This continues until

the wood is reduced to cottony shreds, with at the same time a fading of the colour. In extreme cases the shreds may disappear to a greater or less extent, leaving the butt hollow. One of the curious features of this decay is the frequent occurrence of small black spots.

Type III is quite similar, but there is a tendency for radial perforations to form quite early in the decayed wood. There is also a delamination, (but more tardy), and an eventual shredding. With this type we have found *Poria subacida* associated as a causal agent.

Type IV.—This is a heart rot confined exclusively to the main trunk and in Quebec known as “hemlock rot” of balsam. In one case only so far have I found it extending down to the butt. This heart rot is probably the outstanding menace of the balsam stands of Eastern Canada at the present time. In some stands recently cut over 65 per cent. of the timber has been rejected from this cause, including what was left uncut because of its evident uselessness, and what was culled from the skids. Regarding its distribution we have little information other than what has been gathered in the course of our own investigations. It is found in Northern Ontario, and in Western Quebec, but how extensively we are as yet unprepared to state. It is extremely common in Middle and Eastern Quebec. There is, as yet, no report from Gaspé, the Maritime Provinces or the United States.

The heart wood of this rot is rather firm and of a reddish brown colour. As seen in a cross section of the trunk its outline is marked by radial extensions of the decay, these rays being up to half an inch in width. Sometimes instead of rays there is a more or less indefinite large-figured mottling. The decayed wood is typically wet and heavy. Indeed, affected logs float very badly; they are known to the lumbermen as “sinkers.” On tracing this decay downwards it is found to pass into the “frost patches” or watery-looking spots commonly seen in normal balsam at the time of felling.

Infection has been found to take place through the lower dead branches or branch stubs, and the decay appears to work very rapidly up and down in the heart wood for long distances from these points. In addition, infection in tops injured by the bud worm are very frequent and the decay starting there may work down several feet. They are a frequent cause of the broken topped balsams so common in such stands—the “chicots” of the French-Canadian lumberjack.

Type V.—There is still a form that should be mentioned and that is a root rot due to the “shoe string” fungus or *Armillaria mellea*—one of the common and abundant toadstools. This fungus attacks the roots of trees that have just or recently died. It forms white sheets of fungus threads immediately under the bark and these may work up some distance under the bark of the stem. The sap wood is whitened and softened and occasionally the heart is affected. The fresh decayed wood and sheets of fungus threads are phosphorescent. Whether or not this fungus is the cause of the death of such trees is not known. In Europe it is regarded as a highly destructive parasite of certain kinds of conifers, but in America wide differences of opinion are held.

The *control* of the butt and heart rots of the balsam is fundamentally based on the age at which the host trees become susceptible to the attacks of the various types, and the rate of deterioration subsequent to infection. Regarding the “hemlock” rot of balsam in Quebec, Mr. W. E. Hiley, of the investigational staff of the Forestry School of Oxford University, found that more than half of the balsam trees over eighty years of age examined by him were affected, while those under sixty-five years of age were almost invariably sound. If this finding should prove to be general, a cutting cycle of sixty years would practically

avoid and eliminate this type. From our own analyses of butt-rotted balsams made in 1922 in the Temagami Forest Reserve we have found that balsams under sixty years of age are as a rule free from attack. But for all types many more analyses should be made before final conclusions can be reached.

Spruce Bud Worm.—At the request of the Federal Entomological Branch in 1921, an examination of dying balsam, primarily injured by the spruce bud worm, was made to determine to what extent fungi were responsible for the decadence of these trees. The first studies were made at Otter. It was soon discovered that the absorbing roots of such trees were dead, and that in consequence the trees were dying from inability to obtain water and nourishment from the soil. An explanation of the death of the roots seems apparent; injury to the foliage by the bud worm meant loss of the power to manufacture food, and the roots, dependent on such food, are starved and die. Thus a vicious circle is established. Mr. Hiley has also pointed out that the flow of materials in bud worm injured trees would be greatly lessened, because of the abrupt decrease in the size of the annual rings. That such a condition would affect the health of the tree is quite obvious. They, too, would in all probability the more quickly succumb to the attacks of butt and heart rot fungi. But as many of the dying or dead trees are free from butt and heart rot fungi, it is clear that the physiological disturbances are quite sufficient to cause their death. In the case of surviving bud worm injured trees it would be interesting to compare the ravages of the butt and heart rot fungi in them with what takes place in uninjured trees of the same class. Do such trees, for example, suffer more severely from the "hemlock rot", and if so, to what extent? Casual observations indicate that they do, but there are no data on this subject.

Indeed, from the standpoint of utilization, data should be collected relative to the subsequent history of balsam stands attacked by the spruce bud worm. Some trees die during the bud worm epidemic, but a large proportion survive. Then a few years after the epidemic has passed, as clearly stated by Mr. Hiley, "great numbers of the convalescent trees mysteriously died; and as this mortality continued for several years the loss appears in some places to have been as great as that which resulted from bud worm feeding."

3. BALSAM RUSTS.

The foliage of balsam (*Abies balsamea*) is subject to the parasitism of many rust fungi. In all cases these rusts parasitize an alternate host, so that there are two phases in their life cycles. Thus one alternates between the blueberry and the balsam, another between the fireweed and the balsam, a third (comprising several species) between various ferns and the balsam, a fourth between chickweeds and the balsam, and a fifth between willows and the balsam. The fern rusts of the balsam cause the greatest damage, especially to seedlings and younger trees. The others are probably of little or no economic importance at any time. The chickweed rusts of the balsam are the cause of the often large conspicuous crows' nests or witches' brooms common enough on the balsam in some localities.

The willow rust of the balsam appears as small open pustules on the affected needles. All of the others form small white or yellow cylindrical bladders on the discoloured (usually whitened) affected needles. These bladders, or peridermia, as they are called, break irregularly at their apices to discharge their spores; the latter are capable of infecting the alternate host only.

Two new species were described and named by Dr. H. P. Bell, in 1922, from abundant material discovered in the Temagami Forest Reserve. Both

are remarkable for their habit of parasitizing the older needles of balsam. One of them (*Peridermium pycnogrande* Bell) is found on needles from two to eight years old, and this rust is associated with and is probably the cause of a loose broom-like habit of growth of balsam branches very frequent in Temagami. This rust also appears to pass over to the polypody fern and to be represented there by a rust not before noted. The second new rust (*P. pycnoconspicuum* Bell) was found on needles three years old. Culture experiments indicate that this is the alternate phase of a rust on the oak fern, *Hyalopsora Aspidotis* (Peck) Magn., a rust which was believed to pass over to some conifer, but which one, if any, had not heretofore been demonstrated. The peridermia of the first are white and associated with deeply seated spherical pycnia, those of the second are yellow and associated with very large flat and shallow pycnia.

As a record of distribution a list of the balsam rusts found in Northern Ontario (all in the Temagami Forest Reserve) is appended with the names of the rusts as they are known on the various hosts.

ABIES BALSAMEA.	ALTERNATE HOSTS.
<i>Peridermium columnare</i> (O and I)	<i>Calyptospora columnaris</i> (III), on <i>Vaccinium pennsylvanicum</i> and <i>V. canadense</i> .
(Blueberry rust of balsam).	
<i>Peridermium pustulatum</i> (O and I)	<i>Pucciniastrum pustulatum</i> , on <i>Epilobium angustifolium</i> (II and III) and <i>E.</i> <i>adenocaulon</i> (II and III).
(Fireweed rust of balsam).	
<i>Peridermium balsameum</i> (O and I)	<i>Uredinopsis Osmundae</i> (II and III), on <i>Osmunda claytoniana</i> and <i>O. cinnamomea</i> .
(Fern rusts of balsam).	<i>U. mirabilis</i> (II and III), on <i>Onoclea sensibilis</i> . <i>U. Struthiopteridis</i> (II), on <i>Onoclea Struthiopteris</i> . <i>U. Phegopteridis</i> (II and III), on <i>Phegopteris Dryopteris</i> . <i>U. Atkinsonii</i> (II and III), on <i>Asplenium filix-foemina</i> .
<i>Peridermium pycnogrande</i> Bell (O and I)	<i>U. polypodophila</i> Bell (II), on <i>Polypodium vulgare</i> (connection with balsam not yet established by artificial infections).
(Fern rust of balsam).	
<i>Peridermium pycnoconspicuum</i> Bell (O and I)	<i>Hyalopsora Aspidiotis</i> (II), on <i>Phegopteris Dryopteris</i> .
(Fern rust of balsam).	
<i>Peridermium elatinum</i> (O and I)	<i>Melampsorella elatina</i> (II), on <i>Cerastium vulgatum</i> and <i>Stellaria graminea</i> .
(Chickweed rust of balsam).	

Caecoma arctica with the alternate phase *Melampsora arctica* on willows has been found on balsam in Nova Scotia, but has not yet been reported for Ontario.

THE OCCURRENCE AND FREQUENCY OF SPECIES OF RIBES AND GROSSULARIA IN ONTARIO.

Report of Dr. G. H. Duff.

All present methods for the control of the White Pine Blister Rust, in places where it has already become established, are based upon the eradication of its alternate hosts, the currants and gooseberries. It is of great importance, therefore, to have an accurate knowledge of the different species of *Ribes* and *Grossularia* occurring in any region threatened by the disease, together with reliable information concerning their frequency and the correlation (if such exists) between the species and their frequency on the one hand and the forest and topographical conditions on the other. In fact, any information we acquire

concerning the oecology and biology of these plants may turn out to be useful, if not essential, to the formulation of a proper policy in respect to this problem.

The survey, the results of which are presented here, was undertaken with these considerations in view. The territory to be covered by the survey was determined by the fact that if large-scale eradication measures were ever to be adopted it would probably be along some line between the Ottawa River and Georgian Bay, and further, that even for the purposes of local eradication, information gathered in this territory would have a wide application on account of the variety of conditions encountered. Consequently, a beginning was made at Petawawa and Pembroke and, travelling along the line of the Grand Trunk Railway, the survey terminated at Parry Sound with sufficient observations on the Islands of Georgian Bay to make it certain that these must be taken into consideration in any wholesale eradication project. The only deviation from the line of the railway of more than fifteen or twenty miles was an excursion into Himsworth Township between Powassan and Lake Nipissing, undertaken on the advice of the district forester.

METHOD.

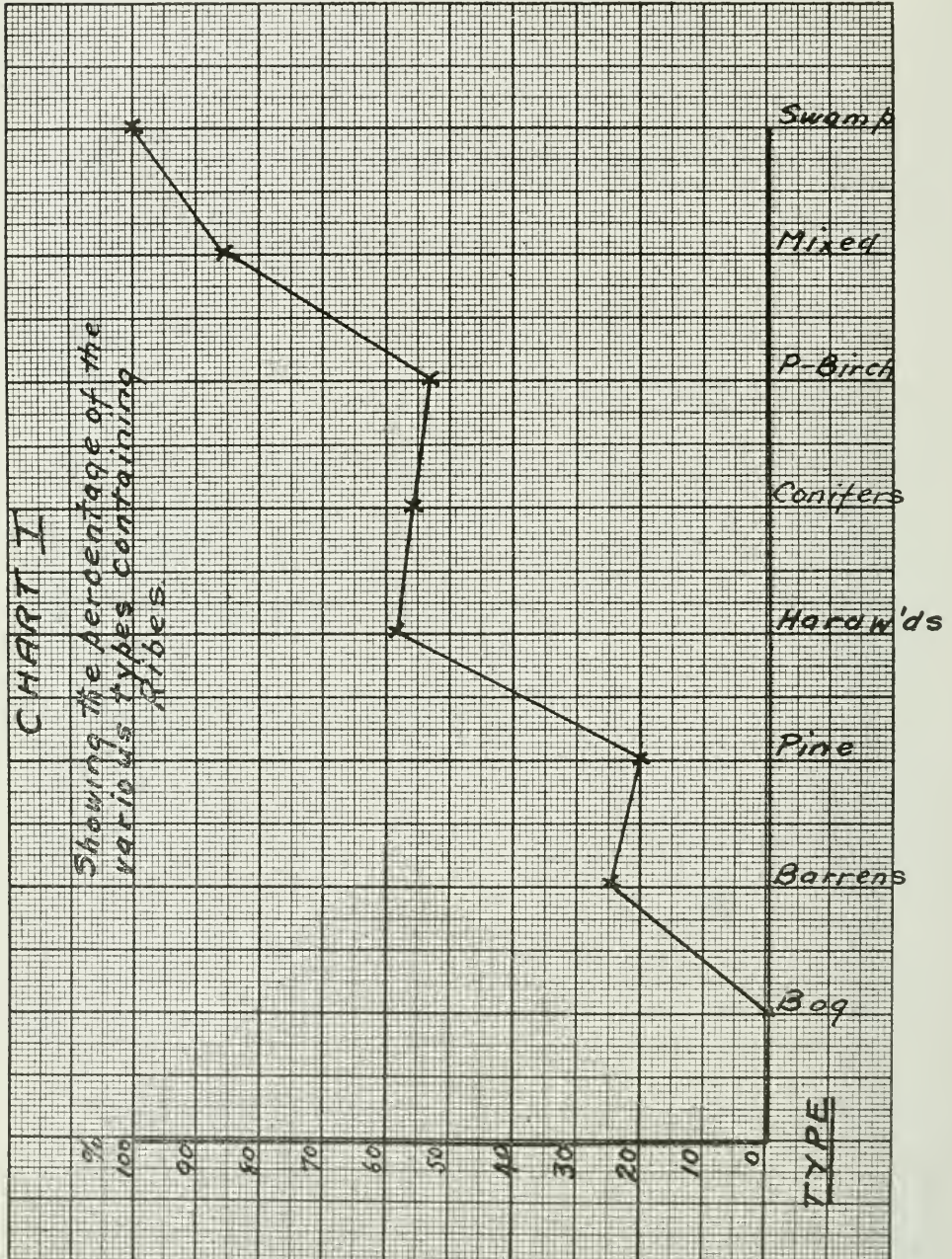
The mode of procedure was roughly as follows: On account of the desirability of visiting a suitable variety of localities the topographical and type maps of the district foresters' offices at Pembroke and Parry Sound were first consulted. In this way a route was planned such as would make possible the use of various stations along the Grand Trunk Railway as headquarters from which excursions could be made. In as far as possible the travelling was done on foot, though canoe and motor were used when necessary to reach desirable locations. When "on location" an intensive search for currants and gooseberries was made. If these were found the place was marked and the neighbouring territory was examined cursorily to see that the spot chosen was typical of the particular topographical or forest conditions represented at that point. If this turned out to be so a plot was measured out by tape-line usually 100 by 100 feet in size. In many cases this size of plot proved unnecessarily large on account of the number of currants and gooseberries found. In these cases a smaller plot 50 by 50 feet was adopted. The plot was divided into lanes ten feet wide and these lanes were carefully traversed up and down and the plants of the various species found counted and recorded. This plot was then considered a "station" and was located on the map and numbered. The notes taken were of the following sort:

<i>Station 63:</i>	Wolf Lake—Lot 19, Con. XII, Hunter Tp. Near portage from McIntosh Lake.
<i>Topography:</i>	Fairly uneven, somewhat rocky, about 30° slope towards lake.
<i>Forest Cover:</i>	Mixed second-growth. Hardwoods.
<i>Ground Cover:</i>	Almost entirely young maple seedlings, fairly dense.
<i>Soil:</i>	Deep litter, raw humus and humus 1½ inches, sandy loam beneath. Moist, but well drained.
<i>Ribes:</i>	<i>Ribes glandulosum</i> 14
	<i>R. lacustre</i> 8
	<i>Grossularia cynosbati</i> 2
<i>Dimensions:</i>	50 x 50 feet.

In all ninety-four such plots were established, embracing every topographical and forest type encountered.

The counting of gooseberry plants presents no difficulties on account of their more or less solitary habit. Nearly all the currants, however, and especially the skunk currant (*Ribes glandulosum*) propagate vegetatively and frequently form dense masses in which it is impossible to distinguish individual plants.

For the purpose of enumerating these species where they occur densely an arbitrary unit was evolved, based upon the maximum area of ground which can be freed from stem and foliage in a single up-rooting operation. This was fixed at about four square feet, and is, as these plants grow in that territory, a liberal allowance.



If search at any point failed to reveal the presence of currants or gooseberries, it was extended, many times for hours, until it was certain that these plants did not occur. The location was then given a station number, the usual notes taken and "no ribes" recorded.

Frequently in the eastern end of the territory the blister rust was found on currants. These cases were recorded and their locations and other details are presented elsewhere in this report. In each case the occurrence of the rust was given some attention and neighbouring pine trees were examined, but no pretence is made of having given this aspect of the problem exhaustive treatment.

RESULTS.

1. *Species occurrence.*—The following species occur:

- Ribes glandulosum* (skunk currant),
- “ *triste* (swamp red currant),
- “ *lacustre* (swamp black currant),
- “ *hudsonianum* (Hudson Bay currant),
- “ *americanum* (wild black currant),
- Grossularia cynosba i* (prickly gooseberry),
- “ *oxyacanthoides* (smooth gooseberry),
- “ *hirtella*
- “ *rotundifolia*

2. *Susceptibility.*—It is significant that all the species occurring in this territory are among the most susceptible to attack by the rust. According to an analysis by Spaulding (U. S. D. A. Bulletin 957) of inoculation experiments with these plants both in the greenhouse and out of doors, all except the Hudson Bay currant fall easy victims to the rust. There are no data on the susceptibility of this latter species. Though there is but little to choose between the others, the wild black currant is apparently the most susceptible, and the various species may be arranged in the following order on the basis of their susceptibility:

- | | |
|--------------------------------------|------------------------|
| 1. Wild black currant, | 6. Prickly gooseberry, |
| 2. Swamp red currant, | 7. Skunk currant, |
| 3. Swamp black currant, | 8. Smooth gooseberry, |
| 4. <i>Grossularia hirtella</i> , | 9. Hudson Bay currant. |
| 5. <i>Grossularia rotundifolia</i> . | |

3. *Distribution.*—Of the five species of currants, the skunk currant is overwhelmingly preponderant. All of them except the wild black currant are swamp forms. Nevertheless the skunk currant exhibits a remarkable versatility and was found in every type of locality, dry and moist, except under virgin white pine (on the Opeogo River) and in sphagnum bogs. The ground cover in a virgin pine forest is usually almost entirely wanting and in sphagnum bogs is composed exclusively of a very definite flora consisting of the moss, certain Ericaceae, pitcher plants, orchids, etc., so that the absence of the skunk currant here is not noteworthy. Four extensive bogs were examined to see if it could be found in this habitat, and though the plants occur around the edges in mucky soil or even in the clefts of rocks among ferns, they were never seen in the bog proper. It is hardly an exaggeration to say that in this territory the skunk currant is universally distributed.

All the other species of currants are of secondary importance from the point of view of distribution. In only three cases were other currants found growing

in places where the skunk currant was absent. Consequently from the point of view of the distribution of wild currants in the territory, the skunk currant is the limiting factor.

Of the gooseberries, the prickly gooseberry (*Grossularia cynosbati*) is the commonest and most widely distributed. This species also is cosmopolitan, having been found in all the habitats possible except sphagnum bog and swamp. In this case too, it is found practically wherever other gooseberries occur, very few exceptions to this rule having been noted. The smooth gooseberry *G. oxyacanthoides*) ranks next in distribution followed by *G. hirtella* (very similar to the smooth gooseberry) and *G. rotundifolia*. Nevertheless, here, as with the currants, one common and widely distributed species determines the distribution of the whole group.

4. *Frequency*.—The appended Table (I) shows an analysis of the number of times currants were encountered in various habitats and forest types.

TABLE I.

TYPE.	No. Stations.	Absent.		Few.		Moderate.		Numerous.	
Bog.....	4	4	100%	.....	.....	.....	.....	.....	.....
White Pine.....	10	8	80%	1	10%	.....	.....	1	10%
Barrens.....	4	3	75%	.....	.....	.....	.....	1	25%
Hardwood.....	26	11	42%	2	8%	4	15%	9	35%
Other Conifers.....	16	7	44%	3	19%	1	6%	5	31%
Poplar-Birch.....	15	6	40%	2	13%	.....	.....	7	47%
Mixed.....	7	1	14%	.....	.....	3	43%	3	43%
Swamp.....	12	.....	.....	.....	.....	2	16%	10	84%

Legend:—Few: 1-5 plants per plot, 50 x 50.

Moderate: 5-25 plants per plot.

Numerous: Over 25 plants per plot.

Bog: Sphagnum bog only.

White pine: White pine stands, not necessarily pure.

Other conifers: Includes all conifers except white pines.

Barrens: Fairly recent burns.

Swamp: All swampy types included, except sphagnum bog.

Chart No. I is based upon the figures of the table. For the purposes of the chart, however, no account is taken of the numbers in which the currants occur, but it shows the percentage of the various types that contain currants, whether few, moderate or numerous.

From this chart it will be seen that the types fall into three groups on the basis of the percentage of cases in which currants occur:

1. Bog, white pine, barrens—small percentage or none.
2. Hardwoods, other conifers, poplar-birch—between 50 and 60%
3. Mixed and swamp—80 to 100%.

The figures of the table show, moreover, that where currants do occur, they frequently are present in large numbers, running up to several hundreds per acre.

Table II shows the number of times gooseberries were encountered in these same topographical and forest types, and Chart II is derived from this table in a manner similar to the way in which Chart I was derived.

TABLE II.

TYPE.	Stations.	Absent.		Few.		Moderate.		Numerous.	
Bog.....	4	4	100%	.....	.....	.....	.....	.....	.....
White Pine.....	10	4	40%	4	40%	2	20%	.....	.....
Barrens.....	4	3	75%	1	25%	.....	.....	.....	.....
Hardwood.....	26	10	38%	3	12%	7	27%	6	23%
Other Conifers.....	16	7	44%	3	19%	3	18%	3	19%
Poplar-Birch.....	15	7	47%	2	13%	5	33%	1	7%
Mixed.....	7	4	57%	1	14%	2	29%	.....	.....
Swamp.....	12	12	100%	.....	.....	.....	.....	.....	.....

It will be seen that gooseberries are somewhat more uniformly distributed among the various types than currants. A comparison between Charts I and II shows that the percentages are practically equal in barrens, while the group consisting of hardwoods, conifers and poplar-birch is very uniform in both cases. For the rest, gooseberries are frequent where currants are infrequent and vice versa. Table II shows that gooseberries are not "numerous" as often as currants. This is chiefly because the unit in the case of gooseberries, is, on the whole, larger than that of currants. While the unit for currants was taken to be about four square feet of ground many gooseberry bushes grow to a size four times this.

Chart III shows graphically the percentages of the various types containing either currants or gooseberries. From it may be seen that apart from bog, swamp, mixed and barrens, all the types gather about 50 per cent. Of the irregular types swamp and mixed are as high as bog and barrens are low.

It may be concluded that there is an even chance that some species of currants or gooseberries will be found at any arbitrarily selected spot in the territory. Almost every foot of ground in this region is a potential bearer of one of the hosts of the blister rust.

The actual number of plants found per unit area in the various types is, of course, widely variable. The two species which chiefly determine the number of currants or gooseberries found in any given area are the ones that also delimit their distribution, namely the skunk currant, *Ribes glandulosum* and prickly gooseberry, *Grossularia cynosbati*.

The former species occurred in 69 per cent. of the stations established and in 29 per cent. was growing in great numbers, not often less than 50 and frequently over 100 plants per 10,000 square feet. In terms of acres this would mean from 200 to 500 plants. It is to be remembered in this connection that these represent maximum figures and that in 31 per cent. of the stations the skunk currant was absent entirely.

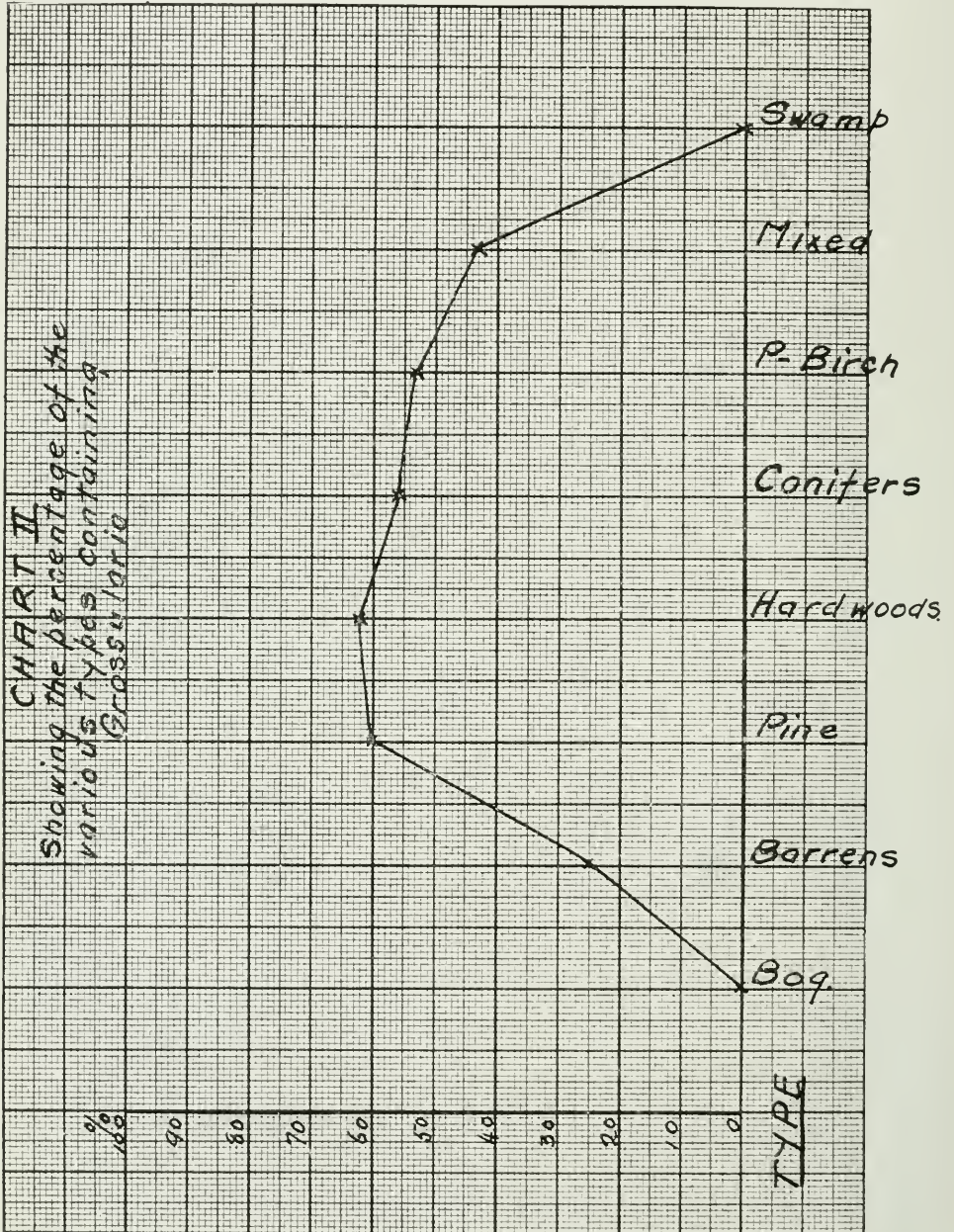
The other currants rarely exceed the skunk currant where they occur together. An exception to this might be made in the case of the swamp black currant (*Ribes lacustre*), which in a few instances was found to outnumber the skunk currant. In two such stations in Algonquin Park the currants were distributed as follows:—

<i>Ribes lacustre</i>	56	55
<i>R. triste</i>	20	15
<i>R. glandulosum</i>	11	46

The prickly gooseberry was found in 46 per cent. of the stations. The fact that it does not occur in swampy locations where there is a 100 per cent. occurrence of the skunk currant accounts in large part for this lower figure. In only

9 per cent. of the stations were these plants really numerous. The highest record for this species was at a station at Rainy Lake, where no less than fifty-four plants were counted in an area 50 by 50 feet. This is very unusual, however, and is to be explained by the fact that though in fairly deep shade, the mature bushes were fruiting heavily and the ground was dotted with young plants as a consequence.

Practically never do the other gooseberries outnumber the prickly goose-



berry where they occur together. One station at Seguin Falls showed twenty-three smooth gooseberry plants (*G. oxyacanthoides*) to eight prickly gooseberries, and this is the only one recorded of which this is so. This is also by far the largest figure for any gooseberry other than the prickly form.

The following table (Table III) shows maximum and average figures for the prickly gooseberry, skunk currant and total currants and gooseberries from stations arbitrarily selected. In each case the figures have been expressed as numbers of plants per acre. The minimum figure for each is 0.

TABLE III.

	Max.	Average.
Prickly gooseberry.....	544	61
Skunk currant.....	860	130
Total currants and gooseberries.....	1,600	180

Although such figures cannot be given any broad application or exact interpretation, they convey, in a general way, an idea of the numbers in which these plants may be found.

INCIDENTAL OBSERVATIONS.—(1) The occurrence of *Ribes glandulosum* completely hidden under a dense ground cover of young maple was noted in one place, and in another this species was found similarly growing under brambles. (2) The survival of gooseberries in burned over country was noted several times. This takes place chiefly where large rocks occur. The gooseberries become established in the crevices of the rocks, as well as close beside them and in this way are protected from ground fires. They are able to fruit abundantly in the light after the trees above have been removed by the fire and very soon seed dissemination takes place. Burning over certainly does not rid the country of these plants, in fact, by making possible the production of seed, the reverse is accomplished. (3) At several points in the eastern portion of the territory the blister rust was found in several species of currants and gooseberries. The species found infected were: *Grossularia cynosbati*, *G. oxyacanthoides*, *Ribes glandulosum*, *R. tris e*.

The infections in the case of *G. cynosbati* were several times very heavy indeed. All the other species, however, were only slightly affected. The places at which these observations of the rust took place were:

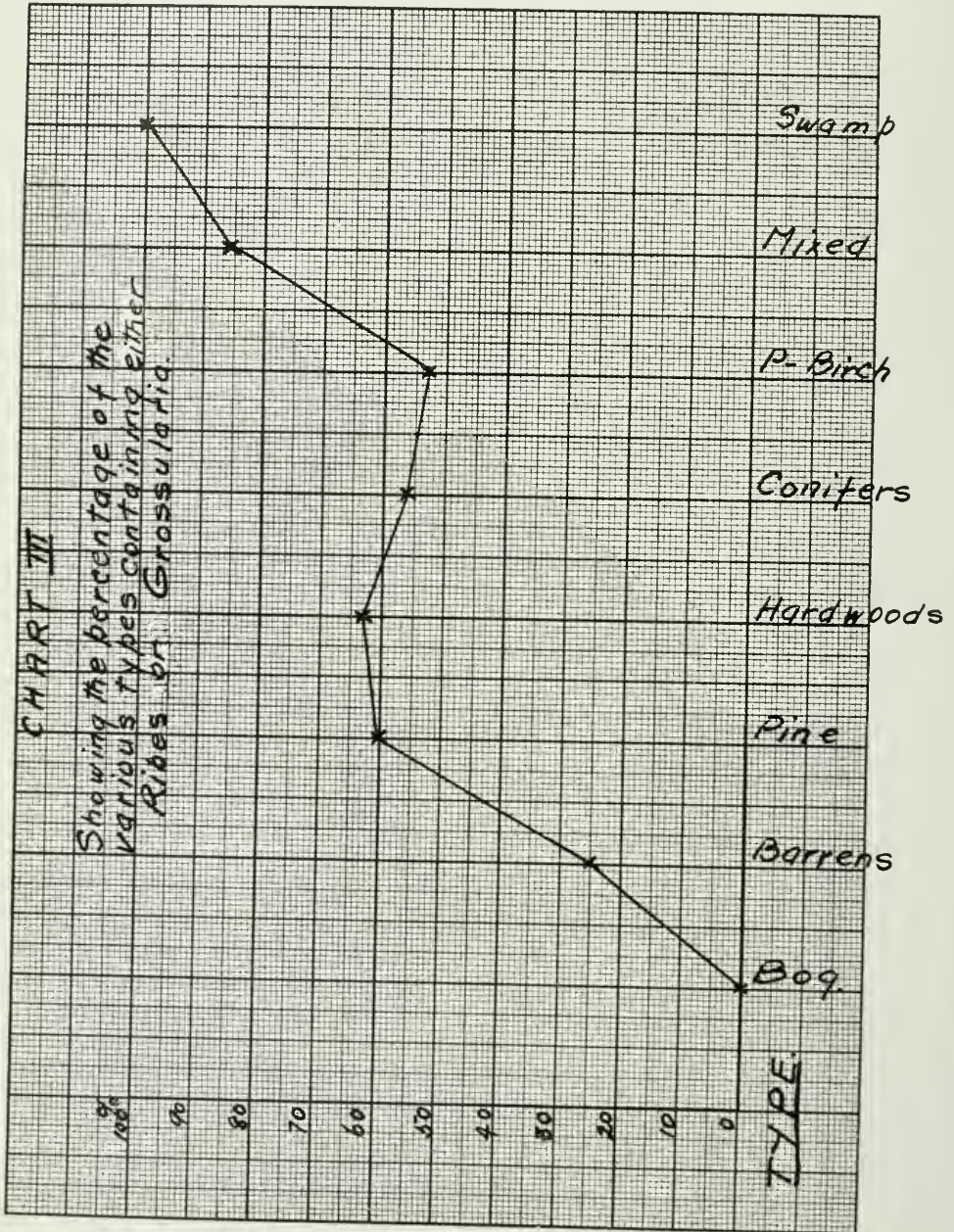
1. Lot 16, Con. VI, Petawawa Township.
2. On the outskirts of Pembroke, across from General Hospital.
3. Lot 20, Con. VIII, Alice Township.
4. Lot I, Con. XIV, Wilberforce Township.
5. B. N. 190, Sherwood Township.
6. B. S. 185, Sherwood Township.
7. Lots 14-15, Con. IV, Sherwood Township.

CONCLUSIONS.—The first thing to do in going about the eradication of currants and gooseberries is to locate the plants. It is not sufficient that some of them or even most of them should be located, all of them must be found.

To do this in an extensive territory would be greatly simplified if it could be shown that certain topographical and forest types are devoid of currants and gooseberries and consequently do not require inspection. The reverse has been the result of this survey. The distribution of currants and gooseberries has been shown to include every type except the sphagnum bog. In all but one of these types their occurrence is in from 50 to 100 per cent. of the possible total. Consequently, no territory, however small, may safely be left uninspected.

The difficulty of inspection is increased when it is remembered that currants are sometimes found in most inconspicuous and unexpected places, such as beneath dense young maple seedlings or brambles and on rocky ledges among ferns. In such habitats it is an extremely difficult matter to find them.

Even if all currants and gooseberries are satisfactorily found, however, it next remains to uproot them. This must be done in such a way as to free the soil as completely as possible of their roots. If portions of root are left, especially



near the surface exposed to light, sprouts are sure to arise. The power of vegetative propagation is possessed by all currants and gooseberries, but the swamp forms are notorious in this respect. The skunk currant, the swamp red currant and the swamp black currant reproduce in this way much more regularly than by means of seeds.

The difficulty of uprooting is greatly enhanced where the plants grow among dense young maple seedlings or brambles. In such cases the whole ground cover must be completely uprooted and destroyed in order to make sure of the currants.

Finally, the difficulty and expense of eradication increases the larger the number of plants that must be handled. The survey reveals astonishingly large numbers in many places. This consideration alone would make it doubtful whether any large-scale eradication enterprise could be undertaken successfully except at a prohibitive expenditure. When all the factors are taken into consideration this conclusion would seem to be amply confirmed.

I have the honour to be, Sir,

Your obedient servant,

E. J. ZAVITZ,
Provincial Forester.

Toronto, Ont.,
October 31st, A.D. 1922.

Appendix No. 51.

Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

Date offered.	Date sold.	Locality.	Area.	To whom sold.	Price paid.	Proposition.	File No.
1921 Oct. 4.	1921 Nov. 1.	An area lying east of Stokes Bay and south of Pipestone River running into Rainy Lake, District of Rainy River	6½ sq. miles.	A. G. Murray, Fort Frances.	\$10.00 per M. ft. B. M. for White and Norway Pine; \$8.00 per M. ft. B. M. for Jack Pine; \$8.00 per M. ft. B. M. for Spruce; \$5.00 per M. ft. B. M. for Poplar; 6c. per tie for railway ties; \$2.00 per cord for Spruce pulpwood; 35c. per cord for other pulpwood; 25c. per cord for fuelwood, all in addition to Crown dues.	Ties and Pulpwood.	39582
1921 Aug. 22.	1921 Nov. 10	Township 2 B., Mississauga Forest Reserve, District of Algoma.	36 sq. miles.	McFadden & Malloy, Spragge.	\$5.56 per M. ft. B. M. for Pine; \$2.56 per M. ft. B. M. for Spruce and Poplar; \$2.00 per M. ft. B. M. for other timber; 25c. per tie for railway ties; 75c. per cord for Spruce pulpwood; 75c. per cord for other pulpwood; 10c. each for Cedar posts, all in addition to Crown dues. Cedar poles—30 ft. and less in length, 25c; 31 to 40 ft. in length, 50c.; 41 to 50 ft. in length, 75c.; 51 ft. and over, \$1.00, all in addition to Crown dues.	Sawmill.	37698
1921 Sept. 21.	1921 Nov. 10.	Berth W.R. 4 A., District of Kenora.	53½ sq. miles	The Indian Lake Lumber Co., Ltd., per D. L. Mather, Winnipeg, Man.	\$7.50 per M. ft. B. M. for Pine; \$6.85 per M. ft. B. M. for Spruce and Poplar; \$5.40 per M. ft. B. M. for other timber; 5c. per tie for railway ties; 75c. per cord for Spruce pulpwood; 50c. per cord for other pulpwood; 10c. per cord for fuelwood, all in addition to Crown dues.	Sawmill.	39599
1921 Sept. 16.	1921 Nov. 10.	Township of Jack, District of Sudbury.	36 sq. miles.	The Harris Tie & Timber Co., Ltd., Ottawa, Canada.	\$8.00 per M. ft. B. M. for R. and W. Pine; \$6.00 per M. ft. B. M. for Jack Pine, Spruce and Poplar and other timber; 10c. per tie for railway ties; \$1.00 per cord for Spruce pulpwood; 45c. per cord for other pulpwood, all in addition to Crown dues.	General lumber.	26405

1921 Oct. 31.	1921 Nov. 22.	Fowler Township—Lots 7 to 20 inclusive. Con. 1—South pts. 7 to 19 inclusive, Con. 2—being all that part of the lots lying south of Timber Berth A.L. 10 and Block D. in said township, District of Thunder Bay.	9 1/2 sq. miles.	James T. Greer, Port Arthur.	\$8.00 per M. ft. B.M. for Pine; \$8.50 per M. ft. B.M. for Spruce; \$5.00 per M. ft. B.M. for Poplar; \$6.00 per M. ft. B.M. for other timber; 20c. per tie for railway ties; 50c. per cord for Spruce pulpwood; 25c. per cord for other pulpwood, all in addition to Crown dues.	Ties and pulpwood.	8616A
1921 Oct. 21.	1921 Dec. 10.	Township of Pardo, S.W. 1/4; lots 6 to 11 inclusive, Con. 1; lots 6 to 12 inclusive, Con. 2; lots 6 to 12, Con. 3; District of Sudbury.	9 1/2 sq. miles.	Mageau Lumber Co., Ltd., Field, Ont.	\$16.15 per M. ft. B.M. for R. and W. Pine; 25c. per tie for railway ties, all in addition to Crown dues.	Pine sawlogs.	40157
1921 Oct. 27.	1921 Dec. 10.	Lynan Township, Lot 4, Con. 5—Lot 4, Con. 6, District of Nipissing.	1 sq. mile.	Canadian Timber Co., Ltd., Toron- to.	\$8.10 per M. ft. B.M. for R. and W. Pine; 30c. per tie for railway ties, all in addition to Crown dues.	Pine sawlogs.	39737
1921 Nov. 23.	1921 Dec. 17.	Umbach Township—Lots 13, 14, 15 and 16 in Con. 1, District of Kenora.	2 sq. miles.	Frank Haksell, Kenora.	\$2.50 per M. ft. B.M. for Pine, in addition to Crown dues; \$2.00 per M. ft. B.M. for Spruce, in addition to Crown dues; \$2.00 per M. ft. B.M. for Poplar, inclusive of Crown dues; \$1.50 per M. ft. B.M. for other timber, inclusive of Crown dues; 5c. per tie for railway ties in addition to Crown dues; 80c. per cord for Spruce pulpwood, inclusive of Crown dues; 40c. per cord for other pulpwood, inclusive of Crown dues; 25c. per cord for fuelwood, inclusive of Crown dues.	Ties, etc.	10744
1921 Nov. 23.	1921 Dec. 31.	Area S. of mileage 102 to 105 on the C.P. Ry., bounded on the north by C.P. Ry., and on the south by Pyramid Lake, vicinity of Sheba, District of Thunder Bay.	12 sq. miles.	J. J. Gracie, Fort William.	\$22.75 per M. ft. B.M. for Pine; \$9.78 per M. ft. B.M. for Spruce and Poplar; \$7.92 per M. ft. B.M. for other timbers; 8/2c. per tie for railway ties; 35/4c. per cord for Spruce pulpwood; 10 7/8 cents per cord for other pulpwood; 3/4c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and Ties.	7280A
1921 Oct. 28.	1921 Dec. 31.	East half of Sheraton Township, District of Temiskaming.	18 sq. miles.	Hawk Lake Lumber Co. Ltd., Mon- teith.	\$11.00 per M. ft. B.M. for W. Pine; \$5.50 per M. ft. B.M. for Jack Pine; \$5.00 per M. ft. B.M. for Spruce; \$2.00 per M. ft. B.M. for other timber; 5c. per tie for railway ties; 50c. per cord for Spruce pulpwood; 25c. per cord for other pulpwood; 15c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and general Logging.	10870

Appendix No. 51.—Continued
Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

Date offered.	Date sold.	Locality.	Area.	To whom sold.	Price paid.	Proposition.	File No.
1921 Dec. 5.	1921 Dec. 31.	Lundy Township.—Lot 2, Con. 2. On the south half of said lot the Pine timber only was offered for sale, as this is a patented Veteran Claim.—District of Temiskaming.	1 sq. mile.	John Aitchison, New Liskeard.	\$2.00 per M. ft. B.M. for every description of timber in addition to Crown dues.	Sawlogs.	16080
1921 Dec. 17.	1922 Jan. 7.	The area north of the Township of McGregor.—District of Thunder Bay.	5/4 sq. miles.	Scott Lumber Co., Port Arthur.	\$8.50 per M. ft. B.M. for Pine; \$6.50 per M. ft. B.M. for Spruce; \$4.50 per M. ft. B.M. for Poplar; 21c. per tie for railway ties; \$1.50 per cord for Spruce pulpwood; 75c. per cord for other pulpwood; 25c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and Sawlogs.	16064
1921 Dec. 29.	1922 Jan. 19.	Lundy Township—South 1/2 Lot 2, Con. 5.—District of Temiskaming.	1/2 sq. mile.	John and Jabe Barnard, New Liskeard.	\$2.25 per M. ft. B.M. for Pine; 9c. per tie for railway ties, all in addition to Crown dues.	Sawlogs.	16080
1921 Dec. 30.	1922 Jan. 20.	Cane Township—South half Lot 10 in Con. 2.—District of Temiskaming.	1/2 sq. mile.	H. A. Palmer, Cane P.O.	\$1.50 per M. ft. B.M. for Jack Pine; \$1.50 per M. ft. B.M. for Spruce; 2c. per tie for railway ties, all in addition to Crown dues.	Ties, etc.	18645
1921 Dec. 30.	1922 Jan. 20.	Gorham Township.—Mining Location N. 8.—District of Thunder Bay.	1 sq. mile.	Elford Wray, Port Arthur.	\$8.50 per M. ft. B.M. for Pine; \$5.50 per M. ft. B.M. for Spruce and Poplar; 20c. per tie for railway ties; 80c. per cord for Spruce pulpwood; 50c. per cord for Balsam pulpwood, all in addition to Crown dues.	Pulpwood, etc.	19760
1921 Dec. 21.	1922 Jan. 16.	Areas comprising part of timber berth C. 33, and pt. of timber berth N. 7.—District of Rainy River.	5/4 sq. miles.	Geo. W. Hughes, Barwick, Ont.	\$5.00 per M. ft. B.M. for R. and W. Pine; \$3.00 for Jack Pine per M. ft. B.M.; \$2.50 per M. ft. B.M. for Spruce; 6c. per tie for railway ties; 50c. per cord for Spruce pulpwood, all in addition to Crown dues.	Pulpwood and Sawlogs.	39847
1922 Feb. 24.	1922 Mar. 10.	Glamorgan Township, Lots 20 and 21 in Con. 14.—District of Haliburton.	1/2 sq. mile.	Fred. Dart, Haliburton, Ont.	\$1.20 per cord for Spruce pulpwood; \$1.20 per cord for Balsam pulpwood; 60c. per cord for other pulpwood, all in addition to Crown dues.	Pulpwood.	26207

1922 Feb. 14.	1922 Mar. 14.	Township of Fauquier. A peninsula running into Remy Lake in the said township.—District of Cochrane.	2 sq. miles.	M. Maurice, Moonbeam, Ont.	\$2.15 per M. ft. B.M. for Spruce, in addition to Crown dues.	Sawlogs.	26805
1922 Mar. 22.	1922 April 24.	Beauchamp Township. — South half lot 9, south half lot 10, Con. 1.—Temiskaming District. Pine only on south half lot 9, Con. 1.	½ sq. mile.	Blair Kushton, Kenabeek, Ont.	20c. per M. ft. B.M. for Pine, in addition to Crown dues; \$2.00 per M. ft. B.M., for Spruce, inclusive of Crown dues; \$1.50 per M. ft. B.M. for other timber inclusive of Crown dues; 2c. per tie for railway ties in addition to Crown dues; 10c. per cord for Spruce pulpwood, in addition to Crown dues; 40c. per cord for other pulpwood inclusive of Crown dues; 25c. for cordwood per cord, inclusive of Crown dues.	Sawlogs and Ties.	8923A
1922 July 13.	1922 Aug. 8.	Ware Township.—North half lot 6, Con. 6; lot 6, Con. 8; north half lot 7, Con. 8.—District of Thunder Bay.	1 sq. mile.	J. C. Greer, Port Arthur.	\$1.45 per cord for Spruce pulpwood; \$1.25 per cord for other pulpwood; 15c. per tie for railway ties; 10c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and Ties.	19757
1922 July 10.	1922 Aug. 7.	Nipigon Township. West half lot 8, Con. 5.—District of Thunder Bay.	½ sq. mile.	Russell Timber Co., Ltd., Port Arthur.	\$18.79 per M. ft. B.M. for Pine; \$8.61 per M. ft. B.M. for Spruce; \$6.02 per M. ft. B.M. for other timber; 8¼c. per tie for railway ties; \$1.03 per cord for Spruce pulpwood; 33c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and Ties.	17390
1922 July 12.	1922 Aug. 8.	MacLennan Township. — Parts of lots 8 and 9, Con. 5; lots 9 and 10, Con. 6; lots 9 and 10, Con. 7.—District of Sudbury.	1 sq. mile.	Clarke & Lounsbury, North Bay.	\$7.50 per M. ft. B.M. for Pine; \$5.00 per M. ft. B.M. for Spruce, Poplar, etc.; \$3.00 per M. ft. B.M. for other timber; 10½c. per tie for railway ties; 20c. per cord for Spruce pulpwood; 15c. per cord for other pulpwood; 25c. per cord for cordwood (hard); 20c. per cord for cordwood (soft); 4c. each for Cedar posts, all in addition to Crown dues. Cedar Poles 30 ft. and less in length, 20c. each; 31 ft. to 40 ft. in length, 52c. each; 41 to 50 ft. in length, \$1.56 each; 51 ft. and over in length, \$3.21 each, all in addition to Crown dues.	Cedar Poles and Posts, etc	25117
1922 July 12.	1922 Aug. 8.	Nipigon Township. — East half lot 8, Con. 8.—District of Thunder Bay.	½ sq. mile.	D. A. Clark, Port Arthur.	\$1.57 per cord for Spruce pulpwood; \$1.15 per cord for other pulpwood, all in addition to Crown dues.	Pulpwood.	10022

Appendix No. 51.—Continued
Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

Date offered.	Date sold.	Locality.	Area.	To whom sold.	Price paid.	Proposition.	File No.
1922 July 11.	1922 Aug. 8.	Bryce Township. — North half lot 2, Con. 3; north half lot 3, Con. 3; north half lot 4, Con. 3.—District of Temiskaming.	1 sq. mile.	J. L. McCaulky and J. N. Robinson, Kenabeck	\$5.25 per M. ft. B.M. for Pine, including Crown dues; 15c. per tie for railway ties, including Crown dues.	Sawlogs.	19762
1922 July 17.	1922 Aug. 8.	Sterling Township. — East half lot 7, Con. 5.—District of Thunder Bay.	½ sq. mile.	Russell Timber Co., Ltd., Port Arthur.	\$18.79 per M. ft. B.M. for Pine; \$8.61 per M. ft. B.M. for Spruce; \$6.02 per M. ft. B.M. for other timber; 8¼c. per tie for railway ties; \$1.03 per cord for Spruce pulpwood; 64c. per cord for other pulpwood; 33c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood.	34146
1922 June 27.	1922 July 27.	Henwood Township. — North half lot 8, Con. 5.—District of Temiskaming.	½ sq. mile.	James Simpson, Kenabeck.	50c. per M. ft. B.M. for Pine, in addition to Crown dues.	Sawlogs.	10853
1922 July 13.	1922 Aug. 15.	Block D, situated on Pigeon River.—District of Thunder Bay.	13½ sq. miles	Hughes Bros. Timber Co., Ltd., Duluth, Minn., U.S.A.	\$20.00 per M. ft. B.M. for Pine; \$22.00 per M. ft. B.M. for Basswood; \$4.51 per M. ft. B.M. for Spruce; \$4.10 per M. ft. B.M. for Poplar; \$4.51 per M. ft. B.M. for Balsam; \$6.51 per M. ft. B.M. for Cedar; 11c. per tie for railway ties; \$2.56 per cord for Spruce pulpwood; \$2.00 per cord for other pulpwood; 25c. per cord for fuelwood; 3c. each for Cedar posts, all in addition to Crown dues. Cedar Poles 30 ft. and less in length, 12c.; 31 ft. to 40 ft. in length 20c.; 41 ft. to 50 ft. in length, 30c.; 51 ft. and over, 35c., all in addition to Crown dues.	Pulpwood and Sawlogs.	41545
1922 July 17.	1922 Aug. 8.	Nipigon Township. — East half lot 5, Con. 6.—District of Thunder Bay.	½ sq. mile.	John W. Aho, Nipigon.	\$3.00 per M. ft. B.M. for Pine; \$3.00 per M. ft. B.M. for Spruce and Poplar; \$2.00 per M. ft. B.M. for other timber; 45c. per tie for railway ties; 95c. per cord for Spruce pulpwood; 85c. per cord for other pulpwood; 60c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood.	13772

1922 July 3.	1922 July 31.	Henwood Township.—North half lot 12, Con. 6.—District of Temiskaming.	1/2 sq. mile.	McCauley Bros., Kenabeck, Ont.	\$3.00 per M. ft. B.M. for Pine; 5c. per tie for railway ties; 25c. per cord for Cordwood, all in addition to Crown dues.	Sawlogs.	10521
1922 Aug. 11.	1922 Sept. 15.	An area in the vicinity of Jellicoe and Nezah Stations along the C. N. Ry. partly in the Nipigon Forest Reserve and immediately to the east thereof.—District of Thunder Bay.	77 1/5 sq. miles.	Western Stevedore Co., Ltd., Fort William,	\$3.50 per M. ft. B.M. for Pine; \$2.00 per M. ft. B.M. for Spruce, Poplar and Basswood; \$1.50 per M. ft. B.M. for other timber; 20c. per cord for Spruce pulpwood; 5c. per tie for cord for other pulpwood; 2c. per tie for railway ties; 25c. per cord for fuelwood; 2c. each for Cedar posts, all in addition to Crown dues. <i>Cedar poles</i> , 30 ft. and less in length, 10c.; 31 to 40 ft. in length, 10c.; 41 to 50 ft. in length, 10c.; 51 ft. and over in length, 25c., all in addition to Crown dues.	Ties and Sawlogs.	43881
1922 Aug. 16.	1922 Sept. 15.	Gilbons Township.—Lots 1 to 10 inclusive, Con. 5, lots 1 to 9 inclusive, Con. 6.—District of Nipissing.	10 sq. miles.	Alfred Gignac, River Valley, Ont.	\$5.00 per M. ft. B.M. for Pine; 15c. per cord for Spruce pulpwood, all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less in length, 10c.; 31 to 40 ft. in length, 10c.; 41 to 50 ft. in length, 15c.; 51 ft. and over, in length, 15c., all in addition to Crown dues.	Pulpwood and Cedar.	43590
1922 Aug. 14.	1922 Sept. 15.	Lutterworth Township.—Lot 27, Con. 11; Lots 26 and 28, Con. 12.—District of Haliburton.	1 sq. mile.	Samuel Bryant, Norland, Ont.	\$75.00 per M. ft. cubic, being Crown dues only.	Sawlogs.	25366
1922 Aug. 14.	1922 Sept. 15.	Nipigon Township. — East half lot 7 in Con. 4; east half lot 8 in Con. 4.—District of Thunder Bay.	1/2 sq. mile.	Arvo Paju, Port Arthur.	\$7.50 per M. ft. B.M. for Pine; \$5.00 per M. ft. B.M. for Spruce and Poplar; 50c. per M. ft. B.M. for other timber; 35c. per tie for railway ties; \$1.70 per cord for Spruce pulpwood; \$1.60 per cord for other pulpwood; 25c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood.	33772
1922 Aug. 23.	1922 Sept. 20.	Field Township.—North half Lot 15, Con. 1.—Lots 14 and 15, Con. 2.—Lot 14, Con. 3.—S. half Lot 14, Con. 4.—District of Nipissing.	2 sq. miles	Honore Turanne, Verner, Ont.	\$7.00 per M. ft. B.M. for Pine; \$5.00 per M. ft. B.M. for Spruce and Poplar; \$2.00 per M. ft. B.M. for other timber; 5c. per tie for railway ties; 80c. per cord for Spruce pulpwood; 40c. per cord for other pulpwood; 1c. each for Cedar posts; 10c. per cord for fuelwood, all in addition to Crown dues. <i>Cedar poles</i> —30 ft. and less in length, 25c.; 31 to 40 ft. in length, 50c.; 41 to 50 ft. in length, 60c.; 51 ft. and over in length, 75c., all in addition to Crown dues.	Cedar and Pulpwood.	27821

Appendix No. 51.—Continued
Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

Date offered.	Date sold.	Locality.	Area.	To whom sold.	Price paid.	Proposition.	File No.
1922 Aug. 24.	1922 Sept. 20.	Part of Timber Berth No. 6, south of Ash Bay.—District of Rainy River.	3½ sq. miles.	Angus Shaw, Fort Frances.	\$3.50 per M. ft. B.M. for Pine, in addition to Crown dues; \$2.00 per M. ft. B.M. for Spruce and Poplar, inclusive of Crown dues; 80c. per cord for Spruce pulpwood, inclusive of Crown dues; 5c. per tie for railway ties, in addition to Crown dues.	Pulpwood and Ties.	42417
1922 Aug. 24.	1922 Sept. 20.	Area lying north of Township of Halkirk on the north shore, and between Black Sturgeon Lake and Red Gut Bay.—District of Rainy River.	4 sq. miles.	Shevlin-Clarke Co. Ltd., Fort Frances, Ont.	\$14.10 per M. ft. B.M. for Pine; \$7.05 per M. ft. B.M. for Spruce; \$6.05 per M. ft. B.M. for Poplar; \$6.55 per M. ft. B.M. for Jack-pine; 8c. per tie for Jack Pine ties; 80c. per cord for Spruce pulpwood; 30c. per cord for other pulpwood, all in addition to Crown dues. <i>Cedar poles</i> —30 ft. and less in length, 10c.; 31 to 40 ft. in length, 15c.; all in addition to Crown dues.	Sawlogs.	43520
1922 Sept. 20.	1922 Oct. 5.	Gorham Township.—South half Lot 2, Con. 7.—District of Thunder Bay.	½ sq. mile.	John Keivu, c/o Scott Lumber Co., Port Arthur.	\$2.25 per cord for Spruce pulpwood; \$1.35 per cord for other pulpwood, all in addition to Crown dues.	Pulpwood.	18216
1922 Aug. 24.	1922 Oct. 16.	South half Shackleton Township.—District of Temiskaming.	40½ sq. mls.	Hawk Lake Lum- ber Co., Ltd., Monteith, Ont.	\$12.00 per M. ft. B.M. for Pine; \$1.80 per M. ft. B.M. for Spruce, and Poplar; 70c. per M. ft. B.M. for other timber; 18c. per tie for railway ties; \$1.00 per cord for Spruce pulpwood; 45c. per cord for other pulpwood; 15c. per cord for fuelwood, all in addition to Crown dues.	Pulpwood and Sawlogs.	16067
1922 Sept. 22.	1922 Oct. 31.	Berth No. 4-G.—Mississauga Reserve.—District of Algoma.	36 sq. miles.	Hope Lumber Co., Ltd., Thessalon, Ont.	\$8.26 per M. ft. B.M. for Pine; \$2.50 per M. ft. B.M. for Spruce, Poplar or Basswood; \$2.00 per M. ft. B.M. for other timber; 25c. per tie for railway ties; 75c. per cord for Spruce pulpwood; 75c. per cord for Balsam and other woods; 10c. each for Cedar posts, all in addition to Crown dues. <i>Cedar poles</i> —30 ft. and less in length, 25c.; 31 to 40 ft. in length, 50c.; 41 ft. to 50 ft. in length, 75c.; 51 ft. and over in length, \$1.00, all in addition to Crown dues.	Sawlogs.	42318

1922 Sept. 22.	1922 Oct. 31.	Berth No. 4-H.—Mississauga Reserve.—District of Algoma.	36 sq. miles.	Hope Lumber Co., Ltd., Thessalon, Ont.	\$7.76 per M. ft. B.M. for Red and White Pine, in addition to Crown dues.	Sawlogs.	42318
1922 Oct. 2.	1922 Oct. 31.	Northeast quarter Township of Henry.—District of Nipissing.	9 sq. miles.	Mageau Lumber Co., Ltd., Field, Ont.	\$9.00 per M. ft. B.M. for Red and White Pine; \$9.00 per M. ft. B.M. for Jackpine; \$2.50 per M. ft. B.M. for Spruce; 5c. per tie for railway ties; 21c. per cord for Spruce pulpwood; 10c. per cord for other pulpwood; 2c. each for Cedar posts, all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less in length, 30c.; 31 to 40 ft. in length, 31c.; 41 to 50 ft. in length, 41c.; 51 ft. and over, 51c., all in addition to Crown dues.	Sawlogs.	11635
1922 Sept. 22.	1922 Oct. 31.	Sherlock Township.—District of Sudbury.	81 sq. miles.	Continental Wood Products Co., Ltd., Elsas, Ont.	\$2.00 per M. ft. B.M. for White Pine; \$1.00 per M. ft. B.M. for Red Pine; \$1.00 per M. ft. B.M. for Jackpine; \$1.00 per M. ft. B.M. for Spruce, Poplar or Basswood; 75c. per M. ft. B.M. for other timber; 2c. per tie for railway ties; 15c. per cord for Spruce pulpwood; 10c. per cord for other pulpwood; 5c. per cord for fuelwood; 3c. each for Cedar posts, all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less, 15c.; 31 to 40 ft., 20c.; 41 to 50 ft., 25c.; 51 ft. and over, 50 c., all in addition to Crown dues.	Pulpwood and Sawlogs.	12334

Appendix No. 51.—Continued

Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

Date offered.	Date sold.	Locality.	Area.	To whom sold.	Price paid.	Proposition.	File No.
1922 Sept. 26.	1922 Oct. 25.	Berths Nos. 3 and 4.—Mudlock Township.—District of Nipissing.	7¼ sq. miles.	Herbert Brennan, Hamilton, Ont.	<i>Berth No. 3.</i> \$3.00 per M. ft. B.M. for Jackpine; \$2.00 per M. ft. B.M. for Spruce, Poplar or Basswood; 50c. per M. ft. B.M. for other timber; 10c. per cord for Spruce pulpwood; 10c. per cord for other pulpwood; 5c. per tie for railway ties; 3c. each for Cedar posts; all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less in length, 5c.; 31 to 40 ft. in length, 10c.; 41 to 50 ft. in length, 20c.; 51 ft. and over, 40c., all in addition to Crown dues. <i>Berth No. 4.</i> \$8.50 per M. ft. B.M. for Jackpine; \$5.50 per M. ft. B.M. for Spruce, Poplar or Basswood; \$3.20 per M. ft. B.M. for other timber; 80c. per cord for Spruce pulpwood; 55c. per cord for other pulpwood; 15c. per tie for railway ties; 6c. each for Cedar posts; all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less in length, 30c.; 31 ft. to 40 ft. in length, 50c.; 41 ft. to 50 ft. in length, 80c.; 51 ft. and over, \$1.25, all in addition to Crown dues.	Sawlogs.	1817
1922 Sept. 27.	1922 Oct. 31.	An area lying south and west of Greenwater Lake, near Kashabowie.—District of Thunder Bay.	25 sq. miles.	E. E. Johnson, Port Arthur, Ont.	\$10.00 per M. ft. B.M. for Pine; \$7.50 per M. ft. B.M. for Spruce; \$5.50 per M. ft. B.M. for Poplar; 12c. per tie for railway ties; \$1.22 per cord for Spruce pulpwood; 90c. per cord for other pulpwood; 25c. per cord or fuel-wood; 2c. each for Cedar posts, all in addition to Crown dues. <i>Cedar Poles</i> —30 ft. and less in length, 15c.; 31 to 40 ft. in length, 60c.; 41 to 50 ft. in length, 80c.; 51 ft. and over, 90c., all in addition to Crown dues.	Pulpwood and Sawlogs.	16083

Appendix No. 51.—Continued

Timber areas disposed of from 1st November, 1921, to 31st October, 1922.

When granted.	Locality.	Area.	To whom granted.	Price paid.	Proposition.	File No.
1921 Nov. 15.	Township of Irving, (North half) Township 27, Range 23; Township 28, Range 22.	113 sq. miles.	Algoma Central & Hudson Bay Railway Co., under authority of 63 Victoria, Chap. 30, Sec. 9.	\$5.00 per M. ft. B.M. for Pine timber; 2c. each for railway ties, all in addition to Crown dues.	Ties.	175
By Order- in-Council dated 24th, Aug., 1922.	Lyman Township (Pt.) Lots 1 to 12 inclusive, Con. 1, 2 and 3; Lots 2 to 12 inclusive, Con. 4; Lots 5 to 12 inclusive, Cons. 5 and 6.—District of Nipissing.	31½ sq. miles.	Petawawa Lumber Co., Ltd., Pembroke, as compensation for surrendering to the Crown timber limits situate within the Townships of Hunter and Devine in the Algonquin Provincial Park.	\$5.00 per M. ft. B.M. for Red and White Pine, in addition to Crown dues.	Sawlogs.	39737
By Order- in-Council dated, 24th Aug., 1922.	East half Township 41; west half of Township lying immediately east of Township 41; south half of the Township lying immediately north of Township 41, known as the Township of Lang; southwest quarter of the Township lying immediately east of the Township north of Township 41, known as the Township of Lang.	18 sq. miles. 18 “ “ 18 “ “ 9 “ “ respectively.	Austin & Nicholson Limited, Chapleau, in order that area over which it was alleged the firm trespassed during the past few years, might be cleaned up.	\$3.10 per M. ft. B.M. for Red and White Pine; \$2.10 per M. ft. B.M. for Jackpine; \$3.00 per M. ft. B.M. for Spruce; 20c. per cord for pulpwood; ½c. each for railway ties, all in addition to Crown dues.	Ties and Sawlogs.	332

Appendix No. 52.

DR. JUDSON CLARK'S REPORT.

TORONTO, August 12th, 1922.

*Hon. E. C. Drury, Premier of Ontario,
Parliament Buildings, Toronto.*

DEAR SIR,—Complying with your request, I beg to submit what in my judgment might be done to better the administration of the public forest lands of the Province of Ontario:

I.—DEPARTMENTAL REORGANIZATION.

I am convinced that the outstanding need of the present, and for much time that is past, is the placing of the administration of the provincial forests in the hands of a competent forest engineer under the Minister of Lands and Forests.

The man for the position must be a forest engineer of thorough training in his profession, of proven capacity as an executive, and wide business experience and outlook. The logical position for such a man in the Department of Lands and Forests should be that of Commissioner of Forests; though of much greater importance than the name of the position would be an entire freedom, under the responsible Minister, to develop the department along business lines so that the provincial forests may increasingly be a greater provincial asset and an ever increasing source of provincial revenue.

No words of mine are needed to emphasize the vast interests involved or the vast opportunity for service afforded in this matter. I might, however, be pardoned for adding a personal conviction that this position affords the greatest opportunity for a constructive work open to the members of the forest engineering profession on this continent, and your Government should be able and willing to command the services of the best available man. Were I looking for such a man for a similar position in my own business, I would not hesitate to pick Mr. E. T. Allen, of Portland, Oregon, as the man who would best work out the problem. I am sure that the professional opportunity for a great public service would appeal to him strongly. Whether he could make the financial sacrifice involved in giving up his present work, I am not so sure.

The present Department of Lands and Forests, as the name indicates, calls for two distinct, though closely related, departments of public service. The present volume of detail work coming to the desk of the Deputy Minister of Lands and Forests makes it entirely impossible, even with much overtime work, to find the necessary leisure for study of the larger problems of policy and administration. It is even impossible for the Deputy to have that personal contact with the workings of his department inside and out, which is so necessary if progress is to be made. The present enormous volume and prospective growth of departmental work in caring for the public forests and public lands amply justify the division of this great department into two separate departments, which might be termed the Department of Forests and the Department of Lands, both remaining as now under the responsible care of the Minister of Forests and Lands.

In organizing a Department of Forests for the care of the public forest lands, it would be logical and in the highest degree desirable that all forest

interests should be included under the one administrative head. For example, the administrative care of the provincial parks and of all minor forest products, such as game and fisheries, would naturally find its place in this Department.

Having created a separate Department of Forests, and appointed a Commissioner of Forests, who from a business standpoint will always mean the business manager of the public forests, this business manager must be required and permitted to manage the public forest business. That is to say, the public which deals with the department must quickly learn that he is the real executive officer, to carry out the policies, laws and regulations of the Department as enacted by the Legislature or ordered by the responsible Minister.

It is high time that all the public having business with this great department should understand that hard luck stories of sick wives and children, personal losses and interesting angles of local political situations and such, have absolutely no place as a part of a business transaction having to do with the care of the public forest lands or the sale of the public forest products. For many years the harassing of the Minister and his secretary with personal and other appeals in the settlement of simple business matters, fully covered by law and departmental regulations, has wasted a vast deal of exceedingly valuable time, and greatly hindered the regular functioning of the Department.

II.—SUNDRY OTHER MATTERS.

Should the Department be reorganized along the lines suggested, it may safely be left to the forestry staff, in conjunction with the responsible Minister to work out the further reorganization in the office and in the field. I shall, however, as you request, comment on some of those problems which my previous connection with the Department and long acquaintance with its work have convinced me need special attention at this time. In this I have been greatly helped by the information made available to the public by the Timber Commission who have so long and carefully examined into the affairs of the Department, and by the courtesy of the department officials who have assisted my inquiry in every way possible.

(1) RE MEASURING WOOD.

The modern diversity of wood products has long since antiquated the measurement of the main forest product—wood—by the Doyle rule, the Scribner rule, Clark's international rule or any other *product* rule. The forest administration of the Province sells *wood*, and it should not in the measurement of that wood concern its mind with what the purchaser may do with it after he has bought it and paid for it. The Province should sell its customers just so much wood; so many cubic feet of wood; and let the buyer saw it into "feet board measure" with a good or bad saw or a good or bad sawyer (getting, of course, from the same sized logs various quantities of "feet board measure"); or let him pulp it, or burn it for fuel. Why, indeed, should the forest administration be concerned if a customer should convert the wood, which is sold and paid for, into sugar and eat it, or distil it for moonshine and drink it?

The ridiculous side of using a *product* unit instead of a *volume* unit in measuring wood has not been generally appreciated. This is no doubt due to the fact that we can in time become accustomed to almost anything (we have used the present product unit for over forty years), and perhaps more especially to the circumstance that the evils of a product unit were of gradual development as the methods of manufacture and the uses of wood gradually changed. Should

a gasoline merchant decide to measure his gasoline on the basis of the *mileage* that he *thought his customers ought to get* in their various cars, or the number of pairs of gloves that they ought to be able to clean with the gasoline, his troubles would be well begun.

The troubles of the Province with its habit of measuring the wood it sells by a *product (board feet) unit* instead of a volume (*cubic foot*) unit, have long since been well begun, and have bred much undeserved loss and unearned gain, also endless suspicion and controversy.

There can, of course, be no question that the cubic measurement of wood is the ideal measurement. It is also clear that it is entirely practicable. It is, indeed, much the simplest means of measurement for future sales. Happily, it is already being used by the Department of Lands and Forests in a large way in the scaling of pulpwood and the cullers are, therefore, already familiar in a practical way with measuring wood according to its cubic contents. Its adoption for all wood measurements would quickly dispel the absurd belief held by many citizens that the lumbermen are a class of semi-professional robbers and that they are even aided and abetted by the Department itself. This absurd and exceedingly vicious impression has been the result of the using of a *product* unit instead of a volume unit in the measurement of its logs, plus the said circumstance that the Doyle rule, which has been the official rule in Ontario since October 18th, 1879, is the very worst of its class in that it is less and less a true measure of value as the logs grow smaller. And the average logs coming to the mills of the Province are apparently forever growing smaller, paradoxical as that may sound.

On the other hand, the Doyle rule has been the official rule of the Province for many years, during which period many timber limits have been sold. And it must be clearly kept in mind that when bids were made for these timber limits at public auction or by sealed tender they were based on the scale the Doyle rule would give under the conditions then obtaining. It is, therefore, of course, obvious that any change in the manner of measurement must have regard to the equities thus established. It should also be appreciated by the public that in maintaining these equities the lumberman is getting nothing but his own, and the Province is being paid the full value of the timber sold as determined at the time of sale by public competition.

If then the equities as between buyer and seller were correctly adjusted at the time of sale, why suggest a change to cubic measurement? The answer has already been given. The Doyle rule, by virtue of its unscientific construction, is less and less a true measure of volume in logs as it is applied to the smaller and ever smaller logs that are being cut.

The following table shows the increasing volume of wood required to produce one thousand feet board measure, as scaled by the Doyle rule:

Diameter of logs in inches.	No. of cubic feet required to give 1,000 feet board measure as scaled by Doyle Rule.	Additional per cent. of volume required as logs decrease in diameter.
inches.	cu. feet.	per cent.
30	123	.....
25	134	9
23	139	12
21	146	19
19	155	26
17	167	36
15	185	50
14	196	59
13	211	71
12	230	87
11	256	108
10	293	138
9	349	184
8	442	260
7	621	405
6	1,070	770
5	3,140	2,453

Here is the crux of the whole problem of wood measurement. *One thousand feet* board measure scaled by the Doyle rule has long been the unit of measurement by which all logs sold have been paid for. Had this been a *stable* unit (i.e., remaining essentially the same in practical effect from year to year) even though entirely unscientific, there would be no good reason for change. It, however, is not a stable unit—far from it, and for two fundamental reasons:

- (a) The logs now cut on Crown Lands average much smaller than formerly, and the tendency is still downward.
- (b) The Doyle rule underscales all logs below thirty inches in diameter, and as the diameters decrease, the Doyle rule becomes an increasingly unfair measure. When applied to logs of twelve inches in diameter or under it becomes a joke.

The decreasing size of the average log cut on all operated timber limits is a matter of record in vaults of the Department of Lands and Forests.

The practical effect of this decrease in size when the Doyle rule is the measure is strikingly shown by the table above. For example, if the average log is 17 inches in diameter, 167 feet are the equivalent of 1,000 Doyle scale. If the average log be 10 inches in diameter, 293 cubic feet are required to scale 1,000 Doyle rule. If the average log were but 7 inches, no less than 621 cubic feet would be required to yield 1,000 by Doyle.

This is the demonstration that the Doyle rule—by virtue of its unfair scale of small logs and its ever increasing unfairness as the logs become smaller, together with the established fact that our logs are smaller from year to year—profoundly disturbs the equities established between the lumbermen and the Province at the time the timber was sold.

Fortunately the full and complete records of the scaling from year to year on all timber limits, available in the files of the Department of Lands and Forests, afford the means of readily determining the correct converting factor for trans-

lating the Doyle scale into its cubic volume equivalent, which will preserve undisturbed the equities established by the sales contracts, for there can surely be no truer index as to what the purchaser had in mind to buy when he made his bid than what he actually cut after the bid was accepted.

For greater clearness, let us assume the case of a timber sale in 1906 at \$12.00 per 1,000 Doyle scale, (the \$12.00 covering both Crown dues and bonus). Here the lumberman bids \$12.00 for the amount of logs that will scale 1,000 feet, board measure, by the Doyle rule. By reference to the records of the timber cut on that limit during 1907 it will quickly be found just how many cubic feet of logs were required to yield the 1,000 feet, board measure, Doyle rule, he was paying for. If a more conservative basis were desired, the converting factor might be based on the cut of the two seasons following the timber sale, thus in case of the sale in 1906, used as an illustration, the converting factor might be based on the returns on the timber cut on the limit during the two following logging seasons of 1907 and 1908. If the average log cut on this limit during the two years following the sale should prove to be thirteen inches in diameter it would take 211 cubic feet of logs to give the lumberman his 1,000 feet as scaled by Doyle. Thus we find an exact parity between \$12.00 per 1,000 feet as scaled by Doyle rule, and \$12.00 for 211 cubic feet as measured by actual volume, and during the years 1907 and 1908 the amount of money paid the Province by the operator on this limit would have been the same whether paid on the basis of \$12.00 per 1,000 feet, Doyle rule, or \$12.00 for each 211 cubic feet, or in other words, \$5.69 per hundred cubic feet. And if in all subsequent years the lumberman operating on this limit had paid his Crown dues on a basis of \$5.69 per hundred cubic feet, he and the Province would each be rightfully receiving what they were entitled to under the contract entered into at the time this timber was sold.

From this example it will be clear that a converting factor that gives equitable adjustment as between buyer and seller may quickly be worked out for every scale that has been made since the Doyle rule was adopted in 1879, and once determined, this converting factor is valid as long as the contract obtains.

For timber limits disposed of before 1879 it would be equitable to accept the *then relation between Doyle rule and its cubic volume equivalent* as determined by the cubic volume and scale of the average log cut during, let us say, the five-year period following the adoption of the Doyle rule, namely; 1880 to 1884.

In its practical application to those old timber limits, a change from the Doyle rule scale to a cubic volume scale as suggested above will increase the amount of Crown dues paid into the Provincial Treasury. It is evident, however, that it is equitable that an owner of these old timber limits should not receive more cubic feet of wood for his unit of Crown dues than he did in 1880 to 1884. A change to cubic volume measurement with an adjustment by a converting factor (obtained as outlined) *merely makes a correction for the fact that the Doyle rule requires so much more cubic volume of wood to scale one thousand feet board measure with our present small logs than it did with the larger logs, 1880-1884.* In other words, under this adjustment the limit owner would again be receiving the identical volume of wood per unit of Crown dues which he received in the early eighties. The practical effect on the amount paid for logs cut from areas recently sold will be slight; in some cases possible nil. In any event, any change obtaining will be, as has been shown, equally fair to buyer and seller.

(2) RE CHECKING CULLERS' SCALING.

The Timber Commission made a timely reference to the desirability of all cullers being employees of the Department, and of the necessity of properly checking their work in the woods, and particularly pointing out the importance of marking all skidways so that the check scalers would have every opportunity to make a real check of the work of the cullers in determining the amount of wood cut on which Crown dues are payable.

These recommendations are obviously entirely sound, and I am very pleased to find that the matter of establishing a checking of the scale on all operations, and the closely related and very necessary detail of marking each skidway, has already been adopted by the Department of Lands and Forests, and has been in effect during the past year. I would suggest as an additional aid to the check scaler, that the number of logs reduced for defect be noted for each skidway on the culler's report.

The discounting logs for defect is undoubtedly a procedure in which there now obtains a great diversity in judgment and method, with corresponding differences in the scale returned. An occasional—perhaps an annual—cullers' conference at a convenient milling point, which would provide facilities for practical demonstrations, would be most helpful in promoting accuracy and, therefore, uniformity in scaling methods and results. The discussions and exchanging of ideas on such an occasion would also greatly contribute to the same result.

(3) RE SHANTY BOOKS.

In time it may be found that the check-scaling of the culler's work which now obtains on all limits, is a sufficient check on the accuracy of the cullers, returns on which the provincial forest revenue is computed. Until that is demonstrated, however, the "Shanty Book" record should be retained and made more effective than it has been in the past. To this end I am glad to pass on the suggestion of the provincial forester that all shanty books be serially numbered so that they may be all readily accounted for at the end of the season. Also, they should be paged so as to prevent the possibility of removal of pages containing original records. The desirability of the record being made daily, and the affidavit being taken as provided by statute and Departmental Regulations has been forcefully pointed out by the Timber Commission.

(4) RE MEASUREMENT OF PULPWOOD.

Already a considerable proportion of the pulpwood of the Province is being measured by cubic volume because of the greater convenience to all parties of this method of measurement.

The determination of a converting factor which will accurately express the wood volume relation between the cubic foot unit and the standard cord of stacked wood measuring eight feet long by four feet wide by four feet high, and containing 128 cubic feet of wood, bark and air spaces, is, of course, a simple matter, and can probably be obtained from measurements already in the Department. The writer made a number of careful measurements with different sizes of pulpwood in Northern Ontario some years ago, but has not now the results at hand. The study, however, indicated that a correct converting factor for different sizes of pulpwood ranged from about eighty-five to ninety-eight cubic feet per cord; a converting factor of 100 cubic feet per cord would be a conserva-

tive and a very convenient converting factor. The 115-cubic-foot converting factor now in use is from 15 per cent. to 25 per cent. above actual wood volume.

(5) RE METHOD OF SELLING TIMBER.

Prior to 1906 sales of timber limits were conducted on the basis of inviting bids for a lump sum, known as a "bonus" which was to be paid in cash at the time of the sale, this bonus being the sum which the purchaser was willing to pay over and above the regular Crown dues, which in all cases are paid as the timber is cut.

Since 1906, the bids have been invited on a per 1,000 foot basis; the amount bid to be paid together with the Crown dues as and when the timber is cut. The payment of the entire purchase price as and when the timber is cut has many advantages over the former system. Perhaps the greatest advantage is the better prices which are realized under this plan of sale. The fact that higher prices may be realized, is due, in part, to the fact that a much larger number of lumbermen can compete at a sale where the timber is to be paid for as cut, as purchases under this plan are much more easily financed. It also implies a much less expensive examination of the tract by the prospective purchasers in advance of the sale, in as much as this examination would confine itself chiefly to the quality of the timber and the cost of logging, a knowledge of the approximate amount of the timber being sufficient when the payment is to be made on a measured basis as the timber is cut.

It has been urged by some that the former system of a lump sum "bonus" was desirable from a standpoint of immediately interesting the lumbermen in a larger financial way in the tract, and thus enlisting his very especial interest in protecting it from fire; also that the comparatively small payment for the timber as it was cut presented but little temptation to improperly influence the culler in the measurement of the logs. As regards honest measurement, it may be admitted that in lessening the amount that a thief can get, one somewhat decreased the risk of theft. The thing to do, however, in the measurement of wood sold by the Province is to make it impossible for anyone to steal it and get away with it. The improvements suggested in this report in conjunction with what the Department has already done during the past year, as noted above, will, I am sure, speedily end any such practice. It is, of course, true that the larger the financial interest of the owner, the greater is his interest in preventing fire. Efficient fire protection can, however, best be developed by provincial organization. There are many reasons for this. Sufficient here to say that the safety of any particular tract is in a very large measure assured by work done far beyond its boundaries. In any event the added interest of the lumbermen owner in protecting from fire a limit purchased on the lump-sum-bonus plan is not a value that has been created by the method of sale. The fire hazard, which the lumberman necessarily assumes under these circumstances, is a factor which he as a business man must have discounted for at the time he made his bid to purchase the tract.

(6) RE SELLING SMALL QUANTITIES OF TIMBER.

The Shevlin-Clarke case has clearly shown that large timber sales made in recent years without public competition were not legally so made. It would appear that there is not any essential legal difference between the lack of authority for the selling of these larger tracts and the apparent lack of authority for the granting of permits to cut small quantities of timber, cordwood, ties, etc.

It is, of course, in the best interests of the forests, of the settlers, and of all concerned that the Department should have a clear legal mandate to sell such small parcels at prices adjudged fair by the responsible officers of the Department without public competition, which in such small matters would be quite impracticable; such authority should, of course, be properly safeguarded as to the amount so sold, and the time and matter of removal.

(7) NOTICE OF NEW OPERATIONS.

A point that has been overlooked in the administration of the forests has been a failure to require operators to notify the Department before a logging operation is begun. This is desirable from every point of view, and is especially necessary from the standpoint of the fire hazard, and for the proper supervision of the logging operations and the scaling of the log output. Wide publicity should immediately be given of an order making such notice mandatory and immediately effective.

(8) FIRE PROTECTION.

Fire prevention, and the early detection of such fires as do occur, together with efficient fire fighting, form the very foundation of all forest management.

Much progress has been made in recent years by the Department of Lands and Forests in all these matters. Prevention of fires set by locomotives will illustrate the progress made in one detail as a result of persistent and intelligent work:

YEAR.	Percentage of locomotives reported defective by Department Inspectors.	Percentage of fires in the Province caused by railways.
	Per cent.	Per cent.
1917	28.3	49.5
1918	32.1	46.5
1919	21.8	37.0
1920	12.8	23.9
1921	8.3	14.8

The disposal of the debris incident to logging operations promises to be one of the largest problems to be solved by the coming forest administration. It is my conviction that at best fire prevention and fire fighting will, from time to time—as the seasons vary—be a losing battle so long as the brush is left to litter the ground where the future forest must be grown. For the present I am confident that a requirement that all brush lying within specified distances of all buildings, machinery, tote roads, railroads and other points of frequent human contact be piled and burned, is immediately justified. Such cleaning up is obviously as much in the interest of the operator as it is in the interest of the Province. I understand that a start has already been made in this matter by the Fire Ranging Department. It should be made obligatory on all operators.

(9) RE RECORDS.

It appears to me that the testimony of Mr. Grigg, the former Deputy Minister, before the Timber Commission, gives a decidedly wrong impression as to the efficiency of the bookkeeping in the Department of Lands and Forests. I am confident that an investigation by competent parties will show that while

it may not have been as thoroughly modern in its form as it might have been, it has always been done with scrupulous care. During the past year the system has been much improved by the introduction of more modern methods. Mr. Grigg's testimony in this connection to the effect that with proper reorganization the Department might become "a handsome money-maker," might, I fear, convey the impression that the bookkeeping methods were such as to cause the Province a monetary loss. While this implication might not have been intended, it may be reassuring to some people to know that not a penny of the Province's money has been lost in this way. A careful checking of the system now in use leaves me with but a single suggestion, namely, that the Audit Department should widen its sphere of activity to include an annual audit of the departmental records.

Exception has been taken to the failure of the Department to promptly collect all accounts immediately when due. I am not in a position to say whether there has or has not been undue leniency on the part of the Department regarding overdue accounts, but every business man must appreciate that there are many times when a creditor's best interest is served by reasonable leniency in regard to the collection of secured debts. And I can easily imagine that there have been times during the past few years of severe business depression, when the public interest could have been very badly served by the Department seizing and selling the lumber of the delinquent companies, which, of course, they have a perfect legal right to do. This could only have the effect of making a bad situation very much worse. In extending reasonable leniency in the case of secured overdue accounts, the Department is simply following the best business practice.

The Timber Commission has pointed out that the rate of interest charged on overdue accounts, namely, six per cent. simple interest, is unfair to the Province, and in effect makes the Province to some extent a banker to the lumberman. This point is well taken. I would suggest that the interest rate be made to conform to current banking usage, both as regards rate and the compounding of accumulated interest, plus perhaps an additional one per cent. in the rate.

(10) FOREST RESERVES.

Several large areas of provincial forest lands have been set apart as Forest Reserves. The statute provides that timber may not be cut on those reserves areas except when mature or when killed by fire. I submit that this leaves them on a par with all other forest lands, except that such reserved lands may not be cut over for the purpose of opening up for agricultural settlement.

It will be the duty of the forest administration to prevent the cutting of timber on non-agricultural lands, except as and when it is silviculturally mature or has accidentally been killed by fire, just as it will be their duty to see that all silviculturally mature timber is sold and cut from time to time as the best interests of the forest and the markets for wood products require.

Respectfully submitted,

Yours very truly,

(Sgd.) JUDSON F. CLARK.

Appendix No. 53.

SUBDIVIDED AREA OF PROVINCE TO END OF 31ST OCTOBER, 1922

DISTRICT OF MANITOULIN.

Township:	Area
Surveyed portion of Manitoulin Island, including Barrie and Cockburn Islands.	1,000 sq. miles.
Surveyed islands in north shore of Lake Huron and throughout the north part of the Province, approximately.....	200 " "

Summary:—

Area in Province of Ontario south of French River, Lake Nipissing and Mattawan River.....	50,482 sq. miles.
Area district of Nipissing, north of French River subdivided.....	1,827 " "
Area district of Timiskaming subdivided.....	1,994 " "
Area district of Sudbury subdivided.....	4,428 " "
Area district of Algoma subdivided.....	2,976 " "
Area district of Cochrane subdivided.....	6,842 " "
Area district of Thunder Bay subdivided.....	1,883 " "
Area district of Kenora subdivided.....	1,118 " "
Area district of Rainy River subdivided.....	1,245 " "
Area Manitoulin Island and other islands.....	1,200 " "
Total.....	<u>73,995 sq. miles.</u>

L. V. RORKE,
Director of Surveys.

October 31st, 1922.



PROVINCE OF ONTARIO
DEPARTMENT OF MINES

HON. CHAS. MCCREA, *Minister of Mines*

THOS. W. GIBSON, *Deputy Minister*

THIRTY-SECOND ANNUAL REPORT
OF THE
ONTARIO DEPARTMENT OF MINES

BEING

VOL. XXXII, PART I, 1923

Statistical Review
of
Ontario's Mineral Industry in 1922

By W. R. Rogers

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO

Printed and Published by Clarkson W. James, Printer to the King's Most Excellent Majesty

1 9 2 5



LETTER OF TRANSMISSION

TO HIS HONOUR HENRY COCKSHUTT,
Lieutenant-Governor of the Province of Ontario.

SIR,—I have the honour to transmit to you herewith, for presentation to the Legislative Assembly of the Province of Ontario, the Thirty-second Annual Report of the Department over which I have the honour to preside.

I have the honour to be, Sir,

Your obedient servant,

CHAS. MCCREA,
Minister of Mines.

Department of Mines,
Toronto, 1923.

INTRODUCTORY LETTER

TO THE HONOURABLE CHAS. MCCREA,
Minister of Mines.

SIR:—

Herewith I beg to submit to you the Thirty-second Annual Report of the Department of Mines, being for the year 1923. The Report consists of seven parts, published separately, as follows:—

PART I.—Statistical Review of Ontario's Mineral Industry in 1922, by W. R. Rogers. This review gives a complete account of the industry for the year, compares the production with that of previous years, and presents a large number of tables and much other information pertinent to the long and varied list of the metals and non-metallic substances produced in the Province.

PART II.—Geology of the Ontario-Manitoba Boundary. That part of the boundary extending from the Winnipeg River to the Bloodvein River was covered by E. M. Burwash and H. A. Rickaby in 1921, and the remainder of the line as far north as the Twelfth Base Line of the Dominion system of surveys, where the boundary is deflected to the northeast on its way to Island lake and thence to the shore of Hudson bay, by Mr. Rickaby in 1922.

PART III.—This Part contains a description of the geology of the country traversed by the Base Line running west from near Mile 19, on the western boundary of the Nipigon Forest Reserve, by W. F. Green; and also of the geology of certain Base and Meridian Lines west of Lake Nipigon, by W. L. Swanson. A Third Report included in this Part is by E. W. Todd, who made a geological examination of an area adjacent to Kenogamissi lake and including the townships of Denton and Keefer.

PART IV.—The important Kirkland Lake Gold Area is reviewed and its deposits described by P. E. Hopkins and A. G. Burrows. The townships of Lebel and Gauthier, on the eastern extension of Kirkland Lake camp proper, are dealt with separately by Mr. Hopkins. The Kirkland Lake Area is rapidly growing in output and importance, and this revision and enlargement of the Report of 1920 by the same authors will meet the demand for fuller information concerning its geology and structural relationships.

PART V.—Natural Gas in 1922 and Petroleum in 1922, by R. B. Harkness, deals with the production of these substances, the former of so much local importance as the chief domestic fuel of a large part of Southwestern Ontario, and the latter whose yearly declining yield now supplies only a fraction of the oil requirements of the Province. The falling off in the output of gas is in part due to the restrictions placed upon its use by the Legislature, and in part to the natural depletion of the fields.

PART VI.—The Mines of Ontario, by T. F. Sutherland, Chief Inspector, J. G. McMillan, Jas. Bartlett, Geo. E. Cole and A. R. Webster, Inspectors, describes the operating mines in detail. There is also a chapter on the Mining Accidents for the year, and an account of the Instruction Classes for Prospectors, carried on by Dr. W. L. Goodwin in the mining centres of the Province.

PART VII.—This Part, by Madeleine Fritz, W. S. Dyer and W. A. Parks, completes the series begun in the 29th Report descriptive of the Stratigraphy and Paleontology of Toronto and Vicinity.

A limited number of the several parts making up the complete volume, containing the accompanying maps and bound in buckram, are available for individuals and institutions who may wish to possess them in this more permanent form.

I have the honour to be, Sir,

Your obedient servant,

THOS. W. GIBSON,
Deputy Minister of Mines.

Department of Mines,
Toronto, 1924.

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STATISTICAL REVIEW OF ONTARIO'S MINERAL INDUSTRY IN 1922

By W. R. Rogers

The mining industry of Ontario showed very satisfactory progress during 1922. There was a period of a year or more following the war in which an abnormally large output was stimulated by high prices. During the autumn of 1920 these prices broke sharply and the following year, 1921, was one of severe depression throughout Canada. During 1922 it became evident that the large stocks of metal on hand for war purposes, and the large volume of scrap originating from manufactured war materials no longer necessary, had been absorbed, and also that a demand for many commodities existed. The revival in the nickel-copper industry during the latter part of the year was a case in point, while a keener demand for cobalt and white arsenic assisted the metallurgical plants and indirectly the mines supplying them. Coupled with this recovery in the base metal trade was a decrease in the cost of materials and labour, which was of considerable advantage to gold mining. During 1922 the United States dollar on the average was worth only \$1.01½ in Canadian currency as against \$1.11½ in 1921. Since all new gold was paid for in New York funds by the Federal Government, such a decrease would have been injurious, but the better economic conditions prevailing offset this loss and 1922 proved to be a banner year for Ontario gold mining.

Since the major portion of the new wealth created in Ontario each year by the mining industry comes from the gold, silver-cobalt, and nickel-copper mines, a study of these groups will indicate the state of the metal mining industry, and comparative figures of the quantity and value of these metals produced from year to year may be used as a barometer of progress. For the year 1922 the value of the gold production increased from \$14,692,357 in 1921 to \$20,579,569 or 40.1 per cent., silver from \$5,763,908 in 1921 to \$7,800,029 or 35.3 per cent., nickel-copper from \$5,152,331 in 1921 to \$9,108,026 or 76.7 per cent. These marked increases, implying growth in wages paid and cost of materials consumed, give an indication of the general business improvement caused by the mining industry to the country at large.

The activity displayed in building and construction work was indicative of noteworthy advances in the production of clay products, cement, stone, sand and gravel and other materials. Production of gypsum, salt, quartz and talc in increasing volume showed that the mining industry had regained much of its old-time prosperity, with the future bright for continued expansion.

During 1922 the total value of the mineral production amounted to \$68,466,454 as against \$54,564,209 in the previous year, or a gain of 25.5 per cent. The value of the metallics increased from \$28,777,581 to \$40,290,157, or 40 per cent., while non-metallics advanced from \$25,786,728 in 1921 to \$28,176,297 in 1922, or 9 per cent. Wages rose from \$14,518,487 to \$16,323,326.

Details regarding output and conditions in the several phases of the mining industry are noted under separate headings. The value of metalliferous production exceeded that of any pre-war year, while the combined valuation of non-metallics, construction materials and clay products was the greatest in Ontario's history. Table I, which follows, gives a summary of Ontario's mineral statistics for 1922.

TABLE. 1—SUMMARY OF MINERAL STATISTICS OF ONTARIO FOR 1922

Product	Quantity	Value	Employees	Wages
METALLIC:				
Gold..... ounces	995,623	\$20,579,569	3,554	\$5,285,521
Silver..... " "	10,925,305	7,800,029	1,300	1,290,579
Copper in matte (a)..... short tons	7,774	1,554,731	1,035	1,339,036
Nickel in matte (a)..... " "	8,689	3,475,649		
Iron ore (b)..... " "	4,304	25,261	2	2,640
Iron, pig (c)..... " "	14,052	340,730	227	334,670
Copper, metallic..... lbs.	4,503,358	515,093	(d) 462	676,523
Nickel..... " "	11,175,326	3,171,434		
Nickel oxide..... " "	2,399,887	391,119		
Platinum metals..... ounces	11,788	924,712	(e) 203	187,193
Cobalt, metallic and in residues..... lbs.	109,067	282,602		
Cobalt oxide..... " "	398,697	798,271	113	110,082
Other Cobalt and Nickel compounds and residues..... " "	1,070,935	255,034		
Lead, pig..... " "	2,895,695	173,742	113	110,082
Zinc (f)..... " "	100,283	2,181		
Total metallic.....		40,290,157	6,896	9,226,244
NON-METALLIC:				
Actinolite..... tons	50	575		
Arsenic, white..... " "	2,058	299,940	(e)	(e)
Clay products—(\$6,944,218):				
Brick, common..... M	148,831	2,614,120	2,452	2,415,910
Brick, rug and pressed..... " "	108,778	2,179,104		
Tile, drain..... " "	13,790	368,180		
Tile, building and floor tile..... tons		720,101		
Pottery.....		88,889	48	53,637
Sewer pipe.....		973,824	223	252,450
Construction materials—(\$13,640,166):				
Cement, Portland..... bbls.	3,104,386	6,235,370	784	990,997
Lime—				
Hydrated..... tons	36,408	455,980	442	408,731
Quicklime..... bush.	3,939,954	1,311,563		
Sand and gravel..... tons	3,576,420	1,816,320	805	437,094
Sand-lime brick..... M	52,749	851,007	199	233,287
Stone, building, trap, granite, etc..... tons	2,317,265	2,969,926	846	800,694
Feldspar..... " "	15,255	120,576	136	67,782
Fluorspar..... " "	284	3,905	7	1,570
Graphite, crude and refined..... " "	626	34,124	19	9,125
Gypsum, crushed, ground and calcined..... " "	110,227	621,668	150	143,685
Iron pyrites..... " "	11,235	39,763	21	19,028
Mica..... " "	2,229	56,480	25	15,501
Mineral water..... Imp. gals.	209,072	10,528	2	249
Natural gas..... M. cu. ft.	8,568,301	4,024,767	520	434,872
Peat..... tons	3,000	14,500	23	17,350
Petroleum, crude..... bbls.	164,732	466,587	134	132,402
Quartz and silica brick..... tons	82,387	146,446	89	69,610
Salt..... " "	176,741	1,573,657	409	539,813
Talc, crude and ground..... " "	12,874	178,397	46	53,295
Total non-metallic.....		28,176,297	7,380	7,097,082
Add metallic.....		40,290,157	6,896	9,226,244
Grand Total.....		\$68,466,454	14,276	\$16,323,326

(a) Copper and nickel in the matte valued at 10 and 20 cents per pound respectively.

(b) Exports and shipments to points other than Ontario blast furnaces. Total shipments of iron ore, 16,191 tons, valued at \$52,054.

(c) Production from Ontario ore only. Total output of blast furnaces, 293,662 tons of pig iron, worth \$6,493,513.

(d) Employees and wages for nickel-copper refineries.

(e) Employees and wages for silver-cobalt smelters and refineries (Southern Ontario).

(f) Recovery from concentrates shipped in 1919 and not previously reported.

The following comparative statement shows the course of the mining industry, as indicated by the value of the total production, during the five-year period, beginning with 1918, the year of maximum output:

TABLE II.—VALUE OF MINERAL PRODUCTION, 1918 TO 1922.

Product	1918	1919	1920	1921	1922
METALLIC:					
Gold.....	\$ 8,502,480	\$ 10,451,709	\$ 11,686,043	\$ 14,692,357	\$ 20,579,569
Silver.....	17,415,882	12,904,312	10,873,496	5,763,908	7,800,029
Platinum metals.....		200,000	1,996,535	862,034	924,712
Cobalt (a).....	1,615,130	868,107	1,603,736	502,370	1,080,873
Nickel (b).....	27,840,422	11,925,220	15,689,131	4,050,601	7,038,202
Other Nickel and Cobalt compounds.....	73,347	188,083	16,959	114,258	255,034
Copper, metallic and in matte.....	8,532,790	3,709,687	3,970,744	1,101,730	2,069,824
Iron ore (c).....	624,364	48,341	60,981	459	25,261
Pig iron (d).....	1,364,736	1,200,793	2,204,205	1,588,751	340,730
Lead, pig.....	149,841	94,507	179,714	191,113	173,742
Molybdenite.....	59,067				
Zinc (e).....					2,181
Total.....	66,178,059	41,590,759	48,281,553	28,777,581	40,290,157
NON-METALLIC:					
Actinolite.....	2,508	1,176	1,160	975	575
Arsenic.....	566,332	485,360	432,434	233,763	299,940
Barite.....	900				
Corundum.....	26,120		27,000	55,965	
Feldspar.....	111,173	88,663	268,295	150,457	120,576
Fluorspar.....	153,190	60,389	67,381	1,744	3,905
Graphite.....	208,848	99,841	132,882	63,439	34,124
Gypsum.....	151,564	278,111	404,162	433,053	621,668
Iron pyrites.....	1,144,737	366,422	618,283	101,306	39,763
Mica.....	49,575	56,199	54,169	28,891	56,480
Mineral water.....	133,808	19,290	15,059	14,438	10,528
Natural gas.....	2,498,769	2,583,324	3,163,500	2,975,502	4,024,767
Peat fuel.....		1,750	15,600	6,664	14,500
Petroleum, crude.....	781,097	632,789	724,145	559,193	466,587
Phosphate of lime (apatite).....		31			
Quartz (silica).....	452,711	179,070	366,441	220,806	146,446
Salt.....	1,287,039	1,395,368	1,544,867	1,649,626	1,573,657
Talc, crude and ground.....	246,691	240,399	306,319	140,390	178,397
Total.....	7,815,062	6,308,182	8,141,796	6,724,646	7,591,913
CONSTRUCTION MATERIALS:					
Cement, Portland.....	1,910,839	3,659,720	4,377,814	6,424,356	6,235,370
Lime.....	872,177	1,268,290	1,799,763	1,344,188	1,767,543
Sand and gravel.....	553,638	501,666	1,390,704	1,496,729	1,816,320
Sand-lime brick.....	91,508	367,815	407,766	534,531	851,007
Stone, building, crushed, etc.....	869,239	1,230,922	3,944,972	4,167,582	2,969,926
Total.....	4,297,401	7,208,413	11,921,019	13,967,386	13,640,166
CLAY PRODUCTS:					
Brick, common.....	665,454	1,966,711	2,209,265	2,025,643	2,614,120
Brick, fancy and pressed.....	396,698	539,908	809,126	1,241,375	2,179,104
Tile, drain.....	309,899	354,700	359,373	397,104	368,180
Tile, building and floor.....	195,588	186,592	369,530	421,127	720,101
Pottery.....	88,275	119,551	127,049	69,984	88,889
Sewer pipe.....	362,536	609,100	860,811	939,463	973,824
Total.....	2,018,450	3,776,562	4,735,154	5,094,696	6,944,218
Grand Total.....	80,308,972	58,883,916	73,079,522	54,564,209	68,466,454

(a) Cobalt oxide, metallic cobalt, and cobalt content of residues marketed.

(b) Nickel in matte, oxide and metallic nickel.

(c) Exports and shipments to points other than Ontario blast furnaces.

(d) Product from Ontario ore only.

(e) Shipped in 1919 but not reported until 1922.

In Table III is given the aggregate value of the metals and metallic products since the several substances began to be produced in Ontario down to the end of 1922. It should be pointed out that since 1914 the statistics of annual production credit the Province only with the value of the pig iron product made from Ontario ore. This is but a small part of the total output, since the great bulk of the iron ore charged into the blast furnaces of the Province is "lake" ore from the mines of Michigan, Minnesota and Wisconsin. Conversely, part of the iron ore raised in Ontario is exported to the United States in the form of briquettes produced from low-grade magnetite ores. In the production tables credit is taken only for the ore exported or shipped to points other than Ontario blast furnaces, since to include the value of the domestic ore converted into pig iron in Ontario furnaces would involve a duplication of this item.

TABLE III.—VALUE OF TOTAL PRODUCTION OF METALS IN ONTARIO.

Metal or Product	Production to 31st December, 1921	Production 1922	Production to 31st December, 1922
	\$	\$	\$
Gold.....	87,900,442	20,579,569	108,480,011
Silver.....	214,479,306	7,800,029	222,279,335
Platinum metals.....	4,358,569	924,712	5,283,281
Cobalt, including cobalt oxide.....	8,893,112	1,080,873	9,973,985
Nickel, including nickel oxide.....	169,675,494	7,038,202	176,713,696
Other cobalt and nickel compounds.....	550,077	255,034	805,111
Copper.....	58,729,241	2,069,824	60,799,065
Iron ore.....	9,411,693	25,261	9,436,954
Pig iron.....	83,919,666	340,730	84,260,396
Lead.....	975,929	173,742	1,149,671
Zinc ore.....	92,410	2,181	94,591
Molybdenite.....	209,735	.....	209,735
Total.....	639,180,462	40,290,157	679,485,831

Gold

Because of the fixed standard value of gold (\$20.671834 per fine ounce) the gold mining industry did not benefit as did all other mineral producers during the period of rising prices which obtained throughout the war, and although in great demand, the output, due to the stress of labour shortage, high wages and greatly increased cost of materials, was, as a consequence, greatly curtailed. As the cost of production increased the margin of profit declined. With the close of hostilities and the resulting period of depression and falling prices the condition of the industry changed, with the result that gold mines increased both their output and net profits as compared with the war years. The increase noted during 1922, in which the production was the largest to date, reflected this reversal of economic conditions.

The output of gold from all sources, amounting to 995,623 fine ounces and having a selling value of \$20,579,569, exceeded the 1921 production by 40.7 per cent. or \$5,887,212, and showed the same advance approximately over California, the next largest producer among the provinces or states on the American continent. Such a record in a year when the world's production of gold (\$319,420,063)¹ was the lowest for two decades, has attracted the attention of investing capital both at home and abroad.

¹ Annual report of the Director of the United States mint.

In addition to the producing mines, considerable development work was carried on at Porcupine by the Night Hawk Peninsular, Northcrown, Porcupine Davidson, March Gold, Hayden, Beaumont, etc., and at Kirkland Lake by the Hunton, Continental, Bidgood, Goodfish, Harvey Kirkland, King Kirkland, Argonaut and others.

Two noteworthy features regarding operating conditions among the mines was the shortage of hydro-electric energy which prevented an expansion of milling capacity and output from the Porcupine gold mines, and the disastrous forest fire early in October which destroyed several miles of transmission line between Cobalt and Kirkland Lake. A serious condition curbing the rapid development of Ontario gold mines lies in the power situation. Due to limited storage facilities on the Mattagami river there has been a yearly curtailment of operations during the late winter and early spring months. In 1922 two new hydro-electric power plants were being constructed, one at Sturgeon Falls on the Mattagami and one at Indian Chutes on the Montreal river, while the Hollinger had planned to secure a lease of Island Falls on the Abitibi river about seventy-five miles to the north of the mine. When these developments are completed the extra power will permit an increase in milling capacity on which the expansion of the mines depend. Towards the close of the year the Hollinger treated approximately 4,500 tons daily, the Dome 1,000 tons, and the McIntyre 500 tons. The total average daily tonnage treated in the Kirkland Lake camp was between 500 and 600 tons.

Details of production from gold mines (gold \$20,579,569 and silver \$107,532) are given in the table which follows:

TABLE IV.—ONTARIO'S GOLD PRODUCTION, 1922

Source	Ore milled, tons	Bullion shipped		Total value bullion, less exchange*
		Gold, fine ounces	Silver, fine ounces	
PORCUPINE				
Dome.....	368,400	201,124	29,250	\$ 4,178,936
Hollinger Consolidated.....	1,491,381	590,385	104,441	12,274,114
McIntyre.....	217,208	97,229	17,711	2,021,811
Clifton Porcupine.....		80	21	1,664
Porcupine Paymaster.....		134	23	2,800
Total.....	2,076,989	888,953	151,449	18,479,325
KIRKLAND LAKE				
Kirkland Lake.....	37,489	10,814	1,279	224,396
Kirkland Lake Proprietary (1919).....	16,108	5,144	1,870	97,481
Lake Shore.....	24,279	22,737	1,974	471,340
Ontario-Kirkland.....	6,496	483	143	10,082
Teck-Hughes.....	41,194	28,780	2,322	596,495
Wright-Hargreaves.....	66,181	36,521	4,866	762,753
Total.....	191,747	104,479	12,454	2,162,547
MISCELLANEOUS				
Cobalt Frontenac.....		50	26	1,056
White Rock.....		47	10	987
Nickel-Copper refining.....		†2,094		43,186
Total.....		2,191	36	45,229
GRAND TOTAL.....	2,268,736	995,623	163,939	20,687,101

*Exchange premium received by gold mines on bullion marketed was \$208,612.

†Includes small quantity of iridium and ruthenium not separated from gold recovered in nickel refining.

The following operators produced gold in 1922:

PRODUCING GOLD MINES, 1922

Name of Company	Name of Mine	Locality	P.O. Address of Manager, etc.
Clifton Porcupine Mines, Ltd.	Clifton Porcupine	Deloro township	South Porcupine
Cobalt Frontenac Mining Co.	Cobalt Frontenac	Kaladar township	Flinton
Dome Mines Company, Ltd., The Hollinger Consolidated Gold Mines, Ltd.	Dome	Tisdale township	South Porcupine
Kirkland Lake Gold Mining Company, Ltd.	Hollinger	Timmins	Timmins
Kirkland Lake Proprietary (1919) Ltd.	Kirkland Lake	Teck township	Kirkland Lake
Lake Shore Mines, Ltd.	Lough-Oakes and Burnside	Teck and Lebel townships	Kirkland Lake
McIntyre Porcupine Mines, Ltd.	Lake Shore	Teck township	Kirkland Lake
Ontario Kirkland Gold Mines, Ltd.	McIntyre	Schumacher	Schumacher
Teck-Hughes Gold Mines, Ltd.	Ontario Kirkland	Kirkland Lake	Kirkland Lake
White Rock Mining Co.	Teck-Hughes	Teck township	Kirkland Lake
Wright-Hargreaves Mines, Ltd.	White Rock	W. Shiningtree	Sudbury
	Wright-Hargreaves	Teck township	Kirkland Lake

In the following table the total gold output of the Province is given, also that from Porcupine and Kirkland Lake, beginning in 1910 and 1913 respectively:

TABLE V.—TOTAL GOLD PRODUCTION OF ONTARIO

Year	Total Production Value \$	Porcupine		Kirkland Lake	
		Value \$	Per Cent.	Value \$	Per Cent.
1866-1891	190,258*				
1892-1909	2,509,492				
1910	68,498	35,539	51.8		
1911	42,637	15,437	36.2		
1912	2,114,086	1,730,628	81.8		
1913	4,558,518	4,294,113	94.1	65,260	1.2
1914	5,544,979	5,206,006	93.8	114,154	2.0
1915	8,501,391	7,462,111	88.6	551,069	6.5
1916	10,339,259	9,391,408	90.8	702,761	6.8
1917	8,698,735	8,229,744	94.5	404,346	4.6
1918	8,502,480	7,767,907	91.4	632,007	7.4
1919	10,451,709	9,941,803	95.1	486,809	4.7
1920	11,686,043	10,597,572	90.7	1,033,478	8.8
1921	14,692,357	13,103,526	89.3	1,524,851	10.4
1922	20,579,569	18,374,658	89.3	2,159,581	10.5
Total	108,480,011	96,150,452	88.7	7,674,316	7.0

*Estimated.

The following statement of output by the leading gold-producing countries for the last pre-war year, for 1915 (year of maximum world production) and for the post-war period, has been abstracted chiefly from annual reports of the Director of the United States mint. It will be noted that Canada now holds third place among the gold-producing countries of the world, and for this the Province of Ontario is chiefly responsible.

OUTPUT BY LEADING GOLD-PRODUCING COUNTRIES AND STATES
(Millions of Dollars)

Source	1913	1915	1919	1920	1921	1922
World.....	459.9	468.7	365.8	337.0	330.2	319.4
Transvaal.....	182.0	188.0	172.2	168.0	167.7	145.1
United States.....	88.9	101.0	60.3	51.2	50.1	47.3
Canada.....	16.6	19.0	15.9	15.8	19.1	26.1
ONTARIO.....	4.6	8.5	10.5	11.7	14.6	20.7
*Australasia.....	51.8	49.0	26.1	22.6	20.7	18.8
Australia.....	.....	.....	.....	.....	15.6	15.9
Mexico.....	19.3	6.6	15.2	15.3	14.2	15.5
California.....	20.4	21.4	17.4	14.8	15.7	14.7
West Australia.....	27.1	25.0	15.2	12.8	13.7	11.1
Rhodesia.....	14.1	18.9	12.3	11.4	12.1	13.5
India.....	11.2	11.5	10.5	10.3	9.7	9.0
Russia.....	.....	26.3	11.0	1.4	0.9	3.0

Maximum World production.....468.7 million dollars in 1915.

Maximum U.S. production.....101.0 " " "

*Includes New Zealand.

Dividends.—The important period of gold mining in Ontario began with the opening of the Porcupine mines in 1910. Since that time the gold mines have paid out in returns to shareholders a total of \$28,096,699.80, details of which are given in Table VI.

TABLE VI.—DIVIDENDS AND BONUSES PAID BY GOLD MINING COMPANIES TO DECEMBER 31, 1922.

Name of Company	Date of Incorporation	Authorized Capital	Capital Stock Issued	Par value per share	Dividends and Bonuses paid to end of 1921, Amount		Dividends and Bonuses paid during 1922, Amount		Rate per cent., 1922	Total of Dividends and Bonuses paid to Dec. 31st, 1922	Date when last Dividend or Bonus paid
					\$	c.	\$	c.			
*Dome Mines Company, Ltd.	Mar. 27, 1911	4,500,000	4,290,003	9 00	2,395,833	75	715,005	50	16.7	3,110,834 25	Oct. 26, 1922
†Hollinger Cons. Gold Mines, Ltd.	May 25, 1916	25,000,000	24,600,000	5 00	16,558,000	00	3,198,000	00	13	19,756,000 00	Dec. 30, 1922
Lake Shore Gold Mines, Ltd.	Feb. 25, 1914	2,000,000	2,000,000	1 00	400,000	00	80,000	00	2	480,000 00	Nov. 15, 1922
McIntyre-Porcupine Mines, Ltd.	Mar. 16, 1911	4,000,000	3,640,283	5 00	2,540,698	10	546,042	45	15	3,086,740 55	Sept. 1, 1922
Porcupine Crown Mines, Ltd.	May 26, 1913	2,000,000	2,000,000	1 00	840,000	00				840,000 00	July 15, 1917
Rea Consolidated Gold Mines, Ltd.	April 5, 1911	1,000,000	200,000	5 00	12,000	00				12,000 00	1915
#Schumacher Gold Mines, Ltd.	Jan. 6, 1914	2,000,000	1,850,000	1 00							
Tough-Oakes Gold Mines, Ltd.	July 15, 1913	3,000,000	2,657,500	5 00	398,625	00					
Wright-Hargreaves Mines, Ltd.	June 16, 1910	2,750,000	2,750,000	1 00			412,500	00	15	412,500 00	Oct. 2, 1922
Total.					23,145,156	85	4,951,542	95		28,096,699 80	

*Dividends in 1921 include \$4,079 paid to former Dome Extension shareholders. On April 20th, 1922, a disbursement of \$476,667.00 was made to shareholders, being \$1.00 per share on the issued stock, thus reducing the authorized capital from \$5,000,000 to \$4,500,000 and the par value from \$10 to \$9. This was in addition to the "Dividends and Bonuses" mentioned above.

†Hollinger Consolidated Gold Mines, Limited, is a consolidation of the Acme Gold Mines, Limited; Millerton Gold Mines, Limited; and Hollinger Gold Mines, Limited. Dividends include \$160,000 paid by Acme prior to the amalgamation.

#The Schumacher mine was sold to the Hollinger in 1922 and \$647,500 or 35 per cent. of the assets distributed to shareholders.

Silver-Cobalt

Although the average price of silver remained at a low point (67.52 cents per ounce) silver mining was more profitable during 1922 on a basis of each ounce produced than at any time since the collapse of the price of the metal in 1921. The price during 1922 was, however, considerably better than the average quotation for the previous year and, as a result, several idle properties were enabled to reopen. It should be mentioned, however, that, in addition to the low price, shortage of power during 1920 was the original cause of the cessation of operations on the part of these mines. The demand for and price of silver are influenced by several factors, among which are the requirements of India and China, where good trade conditions require quantities of silver for the marketing of produce, and the needs of European countries for silver as a medium of coinage. During 1922 good markets for the metal were reflected in Ontario by increased activity in silver mining.

Production from the old established mines at Cobalt was well maintained during the year, while large shipments of high-grade ore and concentrates were made from rich deposits in South Lorrain, first noted in 1921. Both the Keeley company and Mining Corporation of Canada were active during the year in this area. In Gowganda the Miller Lake O'Brien and Castle-Trethewey both made shipments. The output of silver from all sources in Ontario amounted to 10,925,305 fine ounces, having a selling value of \$7,800,029 in 1922 as against 8,435,593 fine ounces worth \$5,673,908 in 1921.

Mines shipping over a quarter million ounces of silver in 1922 are given in order:

Mine.	Ounces.
Nipissing.....	3,864,291
Mining Corporation of Canada.....	2,272,828
Coniagas.....	1,899,571
O'Brien.....	896,195
Keeley.....	775,349
La Rose.....	434,560
McKinley-Darragh-Savage.....	254,308

In addition to the silver content, of ores, concentrates, residues, etc., producing mines are paid for the cobalt content, provided the percentage is sufficiently high. Mine shippers in 1922 were paid \$268,700 for 792,238 pounds of cobalt. Mines shipping flotation concentrates are paid for the copper content, which totalled 25,170 pounds worth \$1,950 in 1922.

From weekly statements issued by the General Freight and Passenger Agent of the Temiskaming and Northern Ontario Railway, showing railway shipments of ore, concentrates, etc., from the Cobalt area, the following information has been compiled: Total shipments, 6,811 tons, of which 5,796 were consigned to southern Ontario and 1,015 tons to United States smelters and refineries.

Classified according to source, shipments of silver in 1922 were derived as follows:

	Fine Ounces.
Cobalt.....	9,239,147
South Lorrain.....	1,284,307
Gowganda.....	170,651
Casey township.....	1,028
Silver Islet.....	15,994
Recovered from gold ores.....	163,939
Recovered from nickel-copper refining.....	50,239
Total.....	10,925,305

The producers of silver are given in the following list:

SILVER PRODUCERS IN 1922.

Operator	Mine or Source	Location
Bailey Silver Mines, Ltd.	Bailey and Silver Cliff.	Cobalt.
Beaver Consolidated Mines, Ltd.	Beaver.	Cobalt.
Canadian Casey Cobalt Mining Company, Ltd.	Casey (clean-up).	Casey township.
Cann and McKinney	Orillia smelter (clean-up)	Orillia.
Castle-Trethewey Mines, Ltd.	Castle.	Gowganda.
Coniagas Mines, Ltd.	Coniagas and Trethewey	Cobalt.
Crown Reserve Mining Company, Ltd.	Crown Reserve.	Cobalt.
Dominion Reduction Company.	Dominion.	Cobalt.
Hermo Mining Company, Ltd.	Reliance.	Cobalt.
Islet Exploration Company, Ltd.	Silver Islet.	Thunder Bay district.
Keeley Silver Mines, Ltd.	Keeley.	South Lorrain.
La Rose Mines, Ltd.	La Rose.	Cobalt.
McKinley-Darragh-Savage Mines of Cobalt, Ltd.	McKinley-Darragh-Savage.	Cobalt.
Mining Corporation of Canada, Ltd., The	Cobalt Lake, Townsite-City, Buffalo.	Cobalt.
Lorrain Operating Co., Ltd. ¹	Haileybury Frontier.	South Lorrain.
Nipissing Mining Company, Ltd.	Nipissing.	Cobalt.
O'Brien, M. J., Ltd.	O'Brien.	Cobalt.
" " "	Miller Lake O'Brien.	Gowganda.
Peterson Lake Silver Cobalt Mining Company, Ltd.	Peterson Lake.	Cobalt.
Sweet, Joseph L. (lessee)	Cobalt Silver Queen.	Cobalt.

¹Controlled and operated by the Mining Corporation of Canada, Ltd.

In Table VII are shown the shipments of ore, concentrates and bullion from the mines of Cobalt, South Lorrain, Gowganda and outlying silver areas since mining began in 1904. By "shipment" is meant consignment to outside points, whether in Canada or abroad, but not movements within the camp, for example: ore shipped from a mine to a concentrating or reduction plant in Cobalt itself. It will be noted that the quantity of ore shipped away from the camp has been reduced to small proportions in recent years.

TABLE VII.—SHIPMENTS FROM SILVER MINES, 1904-1922.

Year.	Pro- ducing Mines.	Ore.			Concentrates and Residues.			Bullion.	Total.		
		Tons.	Silver content, Ounces.	Av. per ton, Oz.	Tons.	Silver content, Ounces.	Av. per ton, Oz.	Silver, Ounces.	Silver, Ounces.	Value, \$	
1904	4	158	206,875	1,309					206,875	111,887	
1905	16	2,144	2,451,356	1,143					2,451,356	1,360,503	
1906	17	5,335	5,401,766	1,013					5,401,766	3,667,551	
1907	28	14,788	10,023,311	677					10,023,311	6,155,391	
1908	30	24,487	18,022,480	736	1,007	1,415,395	1,244	19,436,875	9,133,378		
1909	31	27,729	22,436,355	809	2,948	3,461,470	1,714	25,987,825	12,461,576		
1910	41	27,437	22,581,714	821	6,845	7,082,834	1,030	980,633	30,645,181	15,478,047	
1911	34	17,278	20,318,626	1,176	9,375	8,056,189	858	3,132,976	31,507,791	15,953,847	
1912	30	10,719	15,395,504	1,436	11,214	9,768,228	871	5,080,127	30,243,859	17,408,935	
1913	35	9,861	13,668,079	1,386	10,016	8,489,321	770	7,524,575	29,681,975	16,553,981	
1914	32	4,302	6,504,753	1,511	12,152	8,915,958	733	9,742,130	25,162,841	12,765,461	
1915	24	2,865	6,758,286	2,359	11,996	10,001,548	834	7,986,700	24,746,534	12,135,816	
1916	28	2,177	4,672,500	2,146	8,561	7,598,011	887	7,644,579	19,915,090	12,643,175	
1917	28	2,288	3,271,353	1,429	13,720	6,445,243	469	8,053,318	19,401,893	16,121,013	
1918	38	1,456	1,401,050	962	17,958	5,793,756	323	10,466,888	17,661,694	17,341,790	
1919	33	850	806,341	949	15,208	4,024,764	265	6,383,764	11,214,317	12,738,994	
1920	35	578	668,081	1,152	9,757	3,777,812	387	6,402,423	10,846,321	10,654,471	
1921	28	948	986,597	1,041	3,101	2,962,771	955	4,312,603	8,261,931	5,564,594	
1922	22	1,485	1,712,878	1,154	7,897	1,675,055	212	7,323,194	10,711,127	7,658,802	
Total	.....	156,885	157,285,905	1,002	142,885	89,477,803	626	85,033,910	333,419,562	205,909,212

TABLE VIII.—TOTAL SHIPMENTS FROM SILVER MINES, SMELTERS AND REFINERIES, 1904 TO 1922.

Year	Copper (a)		Lead (a)		Nickel (b)		Cobalt (c)		Arsenic		Silver		Total Value
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Ounces	Value	
1904		\$			14	3,467	16	19,960	72	903	206,875	111,887	\$
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
1913					377	13,526	821	420,386	3,663	64,146	29,681,975	16,553,981	17,051,839
1914					90	28,978	351	590,406	2,030	116,624	25,162,841	12,765,461	13,501,469
1915					35	28,353	206	383,261	2,490	148,379	24,746,534	12,435,816	12,695,809
1916					79	59,380	400	805,014	2,160	200,103	19,915,090	12,643,175	13,707,672
1917	53	28,840			155	125,071	337	1,138,190	2,592	608,483	19,401,893	16,121,013	18,021,597
1918	72	35,712	3	453	180	156,893	380	1,640,310	2,545	566,332	17,661,694	17,341,790	19,741,490
1919	110	40,976	12	1,296	276	188,418	298	1,019,479	2,834	485,360	11,214,317	12,738,994	14,474,523
1920	50	17,494	5	792	127	93,233	283	1,605,365	1,883	431,527	10,846,321	10,654,471	12,802,882
1921	103	34,504	3	270	10	7,665	126	616,235	1,491	233,763	8,261,931	5,564,594	6,457,031
1922	93	26,346	16	1,891	61	34,987	776	1,333,676	2,059	299,940	10,711,127	7,658,802	9,355,642
Total	481	183,872	39	4,702	4,718	765,165	10,813	10,603,465	49,601	3,541,491	333,419,562	205,909,212	221,007,907

(a) Copper and lead are recovered from certain silver ores and concentrates shipped to United States refineries. These metals are valued at the average prices for the year, namely: copper, 13.382 cents and lead 5.734 cents per pound in 1922.

(b) Nickel metal and metallic contents of all Nickel compounds.

(c) Cobalt metal and metallic contents of all Cobalt compounds.

(d) Prior to 1914 an estimate based on assays was made of the nickel, cobalt and arsenic contained in the ores; subsequently actual recoveries have been reported.

(e) Includes 460 tons of speiss residues worth \$153,116.

Since the discovery of silver at Cobalt in 1903, shipments from the camp and the most important outlying silver areas have been as follows:

TABLE IX.—SILVER SHIPMENTS BY CAMPS

Year	Average price, cents per ounce (New York)	Silver Shipments in Troy Ounces, 1904-1922					Montreal River and Maple Mountain
		Total Ounces	Cobalt	Casey Township	South Lorrain	Gowganda	
1904	57.221	206,875	206,875				
1905	60.352	2,451,356	2,451,356				
1906	66.791	5,401,766	5,401,766				
1907	65.237	10,023,311	10,023,311				
1908	52.864	19,437,875	19,424,251	500	13,124		
1909	51.502	25,897,825	25,658,683	26,185	194,955		18,002
1910	53.486	30,645,181	29,849,981	92,544	221,133	471,688	9,835
1911	53.340	31,507,791	29,989,893	114,789	933,912	468,687	510
1912	60.835	30,243,859	28,605,940	253,824	834,119	549,976	
1913	57.791	29,681,975	28,105,505	825,108	248,992	502,370	
1914	54.811	25,162,841	24,155,699	499,643	108,199	399,300	
1915	49.684	24,746,534	24,280,366	223,939		242,229	
1916	65.661	19,915,090	19,008,517	445,900	77,280	383,393	
1917	81.417	19,401,893	18,327,258		10,000	1,064,635	
1918	96.772	17,661,694	16,807,407	143,901	72,188	638,198	
1919	111.122	11,214,317	10,314,689	171,278	4,586	723,764	
1920	100.900	10,846,321	10,402,249		8,253	433,352	1,582
1921	62.654	8,261,931	7,673,535	1,101	328,886	258,292	117
1922(a)	67.528	10,711,127	9,239,147	1,028	1,284,307	170,651	
Total		333,419,562	319,926,428	2,943,641	4,339,934	6,306,535	30,046

(a) See page 9 for further details.

Refineries.—The operations of the refining companies during 1922 are summarized in the table which follows:

OPERATIONS OF SILVER-COBALT REFINERIES IN ONTARIO, 1922.

Schedule	Production		Sales	
	Quantity	Quantity	Quantity	Value
Ore and concentrates treated..... tons	1,795			\$
Residues treated..... "	1,925			
Silver..... fine ounces	1,917,333	1,901,591		1,282,354
Silver content of matte and residues..... ounces	12,817	12,817		(b) 153,116
Arsenic, white..... lbs.	3,335,613	4,118,695		299,940
Cobalt oxide..... "	360,495	398,697		798,271
Cobalt-nickel oxides, unseparated..... "	86,730	123,605		99,687
Cobalt, metallic..... "	106,274	109,067		282,602
Nickel oxide..... "	115,341	10,047		1,721
Nickel sulphate and hydrate..... "	27,270	27,270		2,231
Nickel, metallic..... "	18,789	109,853		31,035
Copper content of matte and sulphate..... "	17,028	17,028		2,335
Arsenate of iron..... "	75,000	75,000		938
Total value of products marketed.....				\$ 2,954,230

(b) Includes value of some cobalt.

The companies named hereunder, with plants situated in southern Ontario, treat silver-cobalt ores, concentrates and residues:

REFINERS OF SILVER-COBALT ORES, 1922.

Name of Company	Location of Works	P.O. Address
Deloro Smelting and Refining Co., Ltd.....	Deloro.....	Deloro.
Coniagas Reduction Co., Limited.....	Thorold.....	St. Catharines.
Ontario Smelters & Refiners, Ltd.....	Welland.....	Welland.

Late in 1921 the new insecticide plant of the Deloro Smelting and Refining Company commenced operations, the principal products being arsenate of lime and arsenate of lead. The price of white arsenic (arsenious oxide) rose as high as 20 cents per pound in 1920 and fell as low as six cents in 1921. Arsenic is in demand, calcium arsenate particularly, as an antidote for the boll weevil in the cotton-growing areas of the United States. Antimony was substituted for arsenic in glass manufacture during the war, owing to the latter being reserved for the manufacture of insecticides. Generally speaking, arsenic is preferred to antimony in the glass industry. In the Province the recovery of arsenic is entirely as a by-product in the treatment of silver-cobalt arsenides by southern Ontario refineries.

The following figures have been compiled from information furnished by refineries in the United States which treated products from Ontario silver mines:

	Quantity
Ore, concentrates, etc., treated, tons.....	1,460
Silver, recovered, ounces.....	924,499
Gold recovered, ounces.....	2
Copper, recovered, lbs.....	196,862
Lead recovered, lbs.....	32,578

Shipments were consigned to the following companies in the United States:

American Smelting and Refining Company, (Pueblo, Col., and Perth Amboy, N.J.).
 Pennsylvania Smelting Co., (Carnegie, Pa.).
 United States Metal Refining Co., (Chrome, N.J.).

Dividends.—Table X, which follows, gives a record of dividends and bonuses paid by silver mining companies from the discovery of Cobalt up to the end of 1922.

TABLE X.—DIVIDENDS AND BONUSES PAID BY SILVER MINING COMPANIES TO DECEMBER 31, 1922.

Name of Company	Date of Incorporation	Authorized Capital	Capital Stock Issued	Par value per share		Dividends and Bonuses paid to end of 1921		Dividends and Bonuses paid during 1922		Total Dividends and Bonuses paid to 31st Dec., 1922	Date when last Dividend or Bonus was paid
				\$	c.	\$	c.	\$	c.		
Aladdin Cobalt Company, Limited.....	Aug. 23, 1912	\$ 500,000	500,000	\$ 5	00	\$ 75,000	00			\$ 75,000 00	April 30, 1917
Beaver Consolidated Mines, Ltd.....	Mar. 1, 1907	2,000,000	2,000,000	1	00	710,000	00			710,000 00	May 31, 1920
Buffalo Mines, Ltd., The (a).....	April 27, 1906	500,000	500,000	50		2,787,000	00			2,787,000 00	May 28, 1914
Casey Cobalt Silver Mining Co., Limited.....	Dec. 19, 1906	100,000	100,000	1	00	203,249	33			203,249 33	April 22, 1914
Cobalt Central Mines Co., Ltd.....	Dec. 13, 1905	5,000,000	5,000,000	1	00	192,845	00			192,845 00	Aug. 25, 1909
Cobalt Comet Mines, Ltd. (b).....	April 16, 1913	1,000,000	1,000,000	1	00	230,000	00			230,000 00	April 1, 1915
Cobalt Silver Queen, Ltd.....	April 1, 1906	1,500,000	1,500,000	1	00	315,000	00			315,000 00	Dec. 31, 1908
Coniagas Mines, Limited, The.....	Nov. 24, 1906	4,000,000	4,000,000	5	00	10,940,000	00	200,000	00	11,140,000 00	Nov. 1, 1922
Crown Reserve Mining Co., Ltd.....	Jan. 16, 1907	2,000,000	1,999,957	1	00	6,190,849	00			6,190,849 00	Dec. 28, 1916
Foster Cobalt Mining Co., Ltd.....	Feb. 14, 1906	1,000,000	915,588	1	00	45,000	00			45,000 00	Jan. 1, 1907
Hudson Bay Mines, Ltd.....	July 16, 1909	3,500,000	3,200,050	5	00	778,909	42			778,909 42	Aug. 31, 1913
Kerr Lake Mining Company, Ltd. (c).....	Aug. 9, 1905	40,000	40,000	100	00	9,475,000	00	380,000	00	9,855,000 00	Oct. 13, 1922
La Rose Mines, Ltd.....	May 31, 1908	1,500,000	1,500,000	1	00	7,505,409	56	150,000	00	7,655,409 56	April 20, 1922
McKinley-Darragh-Savage Mines of Cobalt, Ltd.	April 27, 1906	2,500,000	2,247,692	1	00	5,955,391	86			5,955,391 86	Oct. 1, 1920
Mining Corporation of Canada, Ltd.....	Nov. 23, 1916	8,300,250	8,300,250	5	00	5,498,874	97			5,498,874 97	Sept. 15, 1920
City of Cobalt Mining Co., Ltd. (d).....	Oct. 5, 1906	500,000	500,000	1	00	145,000	00			145,000 00	April 15, 1920
Cobalt Lake Mining Co., Ltd. (d).....	Jan. 7, 1909	1,500,000	1,500,000	1	00	465,000	00			465,000 00	May 29, 1914

TABLE X.—Continued.

Name of Company	Date of Incorporation	Authorized Capital	Capital Stock Issued	Par value per share	Dividends and Bonuses paid to end of 1921	Dividends and Bonuses paid during 1922	Total Dividends and Bonuses paid to 31st Dec., 1922	Date when last Dividend or Bonus was paid
		\$	\$	\$ c.	\$ c.	\$ c.	\$ c.	
Cobalt Townsite Mining Co., Ltd. (d).....	May 8, 1906	100,000	45,011	1 00	1,042,259 61		1,042,259 61	Nov. 11, 1914
Nipissing Mining Co., Ltd. (e).....	Dec. 16, 1904	250,000	250,000	100 00	24,293,297 25	1,120,000 00	25,413,297 25	Oct. 20, 1922
Penn-Canadian Mines, Ltd. (f).....	April 24, 1912	1,500,000	1,349,705	1 00	175,461 65		175,461 65	Sept. 10, 1917
Peterson Lake Silver-Cobalt Mining Co., Ltd.....	April 11, 1906	3,000,000	2,469,802	1 00	462,350 35		462,350 35	Jan. 2, 1917
Right of Way Mining Co., Ltd.	July 13, 1906	500,000	499,518	1 00	324,643 93		324,643 93	Oct. 1, 1909
Right of Way Mines, Ltd.....	Sept. 11, 1909	2,000,000	1,685,500	1 00	252,825 00		252,825 00	Mar. 17, 1917
Seneca-Superior Silver Mines, Ltd.....	Sept. 29, 1911	500,000	478,884	1 00	1,579,817 20		1,579,817 20	Dec. 15, 1916
Tenniskaming Mining Co., Ltd.....	Nov. 5, 1906	2,500,000	2,500,000	1 00	2,159,156 25		2,159,156 25	Jan. 31, 1920
Tenniskaming and Hudson Bay Mining Co., Ltd.....	July 10, 1903	25,000	7,761	1 00	1,940,250 00		1,940,250 00	Nov. 10, 1914
Trethewey Silver Cobalt Mines, Ltd.....	May 30, 1906	2,000,000	1,000,000	1 00	1,211,998 50		1,211,998 50	Jan. 2, 1919
Wettlaufer Lorrain Silver Mines, Ltd.....	June 1, 1911	1,500,000	1,416,590	1 00	637,465 50		637,465 50	Sept. 22, 1913
Total.....					85,592,054 38	1,850,000 00	87,442,054 38	

(a) In 1917 the capital stock of the company was reduced from \$1,000,000 to \$750,000, in 1918 from \$750,000 to \$500,000, and on December 21, 1919, from \$500,000 to \$150,000, by returning to shareholders amounts equal to the reduction in capital, leaving 300,000 shares issued of 50 cents each. The mine was sold to the Mining Corporation of Canada, and operated by it in 1920 and subsequently.

(b) Cash assets amounting to \$50,000 paid on April 27, 1917.

(c) In addition a return of capital amounting to \$600,000 was made on July 3, 1919, to stockholders of the Kerr Lake Mines, Ltd.

(d) Mining Corporation of Canada, Limited, owns and operates the City of Cobalt, Cobalt Lake and Cobalt Townsite mines.

(e) Includes \$16,288,297.25 paid in dividends by the Nipissing Mines Co. (the holding company) to the end of 1916.

(f) Paid out of capital \$40,491.15 on Sept. 10, 1917, and an equal amount on April 24, 1918.

Nickel-Copper and Platinum Metals

The nickel-copper industry, which in 1921 and during the first part of 1922 experienced a period of depression, made a remarkable recovery towards the end of the year, indicating an early resumption of its position as one of the leading metal-producing industries of Canada. This new activity is the result of much research in the work of applying nickel to the arts of peace instead of those of war, accelerated by a reduction in the selling price of the metal. New uses and fields for the product have been found, while further avenues of consumption are being vigorously prospected. It is confidently expected that the future will demonstrate that nickel may be employed just as widely as it has been heretofore when large quantities were consumed in the manufacture of nickel steel for warships. As a result of this work the plant and equipment which was much enlarged through the necessity of war will be utilized again to meet new industrial demands for the metal.

A few years ago engineers were confined to the use of steel, brass or bronze in the design and construction of plant and equipment, but research and experiment has changed this condition and now there are numerous alloys available, each with one or more outstanding properties, which make it particularly desirable for special applications. The use of nickel has figured largely in these alloys and the one most widely used is the natural alloy called "Monel" metal, which is produced by the International company directly from nickel-copper matte after the sulphur content has been eliminated. It is stronger than mild steel, retains its strength at high temperatures and has maximum resistance to corrosion and erosion. It resists crystallization and fatigue and will take a high nickel polish. Monel metal, though possessing a high melting point and high shrinkage, may be cast into any desired form and can be machined and polished readily. The annealing temperature is 850-1,000 degrees C. in a reducing atmosphere. This alloy may be welded either by oxy-acetylene or electric arc methods in the same manner as steel.

During the last quarter of the year both the International and the Mond companies largely increased the number of employees. The refinery of the former company resumed operations in September, while the Mond company exported its entire stock of matte towards the close of the year. The British America Nickel Corporation smelter and refinery were idle throughout the entire period.

The production of ore during the year from the several mines was as follows:

International Nickel Company of Canada:—	Tons
Creighton.....	55,980
Mond Nickel Company:—	
Levack, Garson, Worthington, Victoria No. 1, and Frood....	203,589
Total.....	259,569

In Table XI, following, is indicated the course of the nickel industry during the last five years. That this metal takes on added importance during times of war is sufficiently shown by the fact that while in 1914 the quantity of ore smelted was 947,053 tons, it rose in 1918 to 1,559,892 tons, and fell again, as noted in the table, to 393,768 tons in 1921, and to 314,120 tons in 1922.

For the purpose of this table the nickel and copper in matte exported in 1922 were valued at 20 cents and 10 cents per pound, respectively.

TABLE XI.—NICKEL-COPPER MINING AND SMELTING, 1918-1922.

Schedule	1918	1919	1920	1921	1922
Ore raised..... tons	1,643,040	614,955	1,200,830	262,593	259,569
Ore smelted..... "	1,559,892	754,567	1,087,531	393,768	314,120
Bessemer matte produced..... "	87,184	42,735	57,938	19,498	17,324
Nickel contents of matte..... "	45,886	22,035	30,615	9,128	8,678
Copper contents of matte..... "	23,843	12,099	16,021	6,323	5,421
Matte exported*..... "		25,207	40,367	10,466	19,831
Matte refined in Canada..... "	5,334	10,911	17,297	5,558	10,340
Men employed..... No.	3,145	2,536	3,258	1,895	1,492
Wages paid.....	\$7,861,772	\$3,382,154	\$5,555,469	\$1,557,696	\$2,009,335

*All matte was exported prior to 1918 when refining in Canada began at Port Colborne, Ontario.

The following figures summarize the operations of the refinery of the International Nickel Company of Canada at Port Colborne and that of the British America Nickel Corporation at Deschênes on the Ottawa river:

TABLE XII.—NICKEL-COPPER REFINING, 1922.

Schedule	Quantity	Value
		\$
Matte, treated..... tons	10,340	
Nickel oxide, marketed..... lbs.	2,389,840	389,398
Metallic nickel, recovered..... "	11,065,473	3,140,399
Blister copper and electrolytic copper, recovered..... "	4,382,922	502,293
Gold, recovered*..... ounces	2,094	43,187
Silver, recovered*..... "	50,239	33,695
Platinum metals, recovered*..... "	11,788	924,712
Employees..... No.	462	
Wages paid.....		676,523

*Includes recoveries by the Mond Nickel Company at Clydach in Wales.

Recoveries from Ontario silver ores treated show a total of 59,226 pounds of copper. In addition 109,853 pounds of nickel, 10,047 pounds of nickel oxide and 5,638 pounds of nickel contained in nickel sulphate were marketed by Southern Ontario silver refineries.

The average New York price of electrolytic copper was 13.382 cents per pound for the full year, as compared with 12.502 cents in 1921 and 17.456 cents in 1920.

Platinum Metals.—Ontario nickel-copper ores of the Sudbury area contain the precious metals, gold, silver and metals of the platinum group. The latter may be divided into two main sub-groups on a specific gravity basis as follows:

Metal	Specific Gravity	Metal	Specific Gravity
Palladium (Pd.).....	12.16	Platinum (Pt.).....	21.40
Rhodium (Rh.).....	12.44	Iridium (Ir.).....	21.42
Ruthenium (Ru.).....	12.10	Osmium (Os.).....	22.50

In the last two annual reports figures were given showing platinum metals produced in Canada, United States and Great Britain from the refining of Ontario nickel-copper matte. Recoveries of platinum metals by the British America, International and Mond companies follow:

1922	Platinum	Palladium	Iridium, etc.*	Total
Quantity.....Troy ounces	4,802	6,862	124	11,788
Value.....	\$468,762	\$446,030	\$9,920	\$924,712

*Iridium and rhodium in small amounts were grouped by the Mond Company with gold and are not recorded in the above figures.

At the Bayonne plant 3,112 tons of matte were treated, although the matte bears little relation to precious metals recovered as the residues treated accumulate over irregular periods. In the figures above given, platinum metals contained in precious metals cement shipped from Port Colborne to the refinery of the International Nickel Company, at Bayonne, N.J., are included with recoveries from the matte treated in the United States. The Bayonne refinery operated for a couple of months only during 1922 and was dismantled. Such machinery and equipment as could be used was shipped to Port Colborne, together with a small tonnage of matte on hand.

Average prices, as reported by the U.S. Geological Survey, were: platinum \$97.62 per ounce troy, palladium \$65, iridium \$80 (containing 5 per cent. platinum).

Iron Ore

No iron ore was mined during 1922 in the Province of Ontario, although shipments were made during the period.

The total shipments, which amounted to 16,191 short tons having a value of \$52,054, consisted of 15,891 tons of briquettes from Moose Mountain, and 300 tons of roasted siderite from the Magpie mine owned by the Algoma Steel Corporation. During 1921 the total shipments were 54,499 tons worth \$227,134.

SHIPPERS OF IRON ORE, 1921

Company or Firm	Mine	Location	Kind of Ore	P.O. Address of Company
Algoma Steel Corporation, Limited.....	Magpie.....	Algoma dist.....	Siderite.....	Sault Ste. Marie.
Moose Mountain, Ltd.....	Moose Mount'n	Hutton tp. (Sudbury dist.).....	Magnetite.....	Sellwood.

By Order-in-Council, dated 25th October, 1922, a Committee of six was appointed by the Provincial Government, their work to be under the general supervision of the Minister of Mines, "to make research, investigate and report upon the extent and quality of the deposits of low grade iron ores in Ontario, the best commercial methods of beneficiating the same, and generally, what steps or measures should be adopted to enable the low grade and other iron ores of this Province to be utilized in the production of pig iron and steel." The personnel of the Iron Ore Committee is as follows: J. G. Morrow, Hamilton; G. S. Cowie, Sault Ste. Marie; G. A. Guess and H. E. T. Haultain, University of Toronto; R. J. Hunt, Montreal, and Lloyd Harris, of Brantford. The last

mentioned was appointed chairman and Mr. Balmer Neilly, 302 Bay Street, Toronto, was engaged as Engineer-Secretary. The Committee is at work preparing its report for the Ontario Legislature. Experiments are being carried on at the plant of the Steel Company of Canada, Hamilton, using Moose Mountain briquettes mixed with "lake" ores in varying percentages as a blast furnace charge.

Pig Iron, Steel and Ferro-Alloys

The depression noted in the iron and steel industry during 1921 became more acute during 1922. Prices returned practically to pre-war levels. The average Valley quotation for the year was \$25.88 per gross ton (2,240 pounds) for basic pig iron at Pittsburgh.

During the year five blast furnaces operated part time, two of these at Sault Ste. Marie, two at Hamilton and one at Port Colborne. A total of 538,200 short tons of iron ore and briquettes were charged, of which 25,753 tons or 4.8 per cent. was of Ontario origin. The pig iron product was 293,661 tons, valued at \$7,120,800. The figures in Table I represent only the proportional product from Ontario ore.

The following table gives particulars of the iron and steel-making industry of the Province for the last five years:

TABLE XIII.—IRON AND STEEL STATISTICS, 1918-1922.

Schedule	1918	1919	1920	1921	1922
Ontario ore smelted..... short tons	99,852	97,514	152,176	126,653	23,398
Foreign ore smelted..... "	1,400,085	1,201,834	1,341,661	818,749	1,217,543
Limestone for flux..... "	405,683	343,907	349,960	221,761	137,852
Coke..... "	869,729	736,872	818,698	420,358	336,301
Charcoal..... bush.....		177,795			
Pig iron produced..... short tons	751,650	623,586	748,173	494,901	293,662
Value of pig iron produced..... \$	20,522,356	16,010,537	21,652,308	11,856,352	6,493,513
Steel made..... short tons	881,509	616,251	707,692	932,473	358,126
Value of steel made..... \$	28,792,361	17,913,263	26,366,524	15,861,635	12,812,927

In January, 1923, *Canadian Machinery and Manufacturing News* reported as follows:

There has been an increasing demand for finished steel products, especially those required for the building industry. Merchant steel pipe is a striking example. Stocks are very low, not only in the States, but also in Canadian markets, where, owing to difficulties in securing materials, very short supplies are available. All conditions point to an aggressive building season with the coming spring, and Canadian dealers regard it as advisable to place a liberal estimate upon requirements. United States Steel Products report that bookings for first quarter in plates, bars and structural represent good volume and indicate that an active season is being anticipated. The railroads are again appearing on the scene, and tenders for extensive purchases are being considered.

Pig-iron markets continue strong, with more active buying than has appeared for months. Foundry pig iron in Western Ontario holds at \$31.80 and at \$34.15 in Quebec. American furnaces are holding strong at around \$27, some are asking \$28, and predictions are that \$30 will soon be reached. Coke prices, an important factor, are very high, ranging from \$9 to \$9.50, as against \$6.50 in December. Furnaces would lose money on pig iron at present figures, using coke at this price.

Conditions developing with the year-end, according to Pittsburgh reports, indicate that steel consumption will be heavy, mill operation at a high rate, and prices firm for, say, three months. Canadian industry appears to be in better position to more correctly reflect this activity.

BLAST FURNACES IN ONTARIO FOR THE PRODUCTION OF PIG IRON.

Company	Location	Furnaces		Remarks
		No.	Daily capacity, gross tons	
Algoma Steel Corporation, Ltd.	Sault Ste. Marie.	4	1,450	Active.
Atikokan Iron Company.	Port Arthur.	1	175	Idle since 1911.
Canadian Furnace Co., Ltd.	Port Colborne.	1	325	Active.
Canadian Steel Corporation, Ltd.	Ojibway (near Windsor)	2	1,100	Under construction.
Midland Iron and Steel Co., Ltd.	Midland.	1	120	Idle since Feb., 1921.
Parry Sound Iron Co., Ltd.	Parry Sound.	1	90	Idle since Oct. 1, 1919.
Standard Iron Co., Ltd.	Deseronto.	1	60	Idle since June 9, 1919.
Steel Company of Canada, Ltd.	Hamilton.	2	750	Active.

Note.—The first and last mentioned produce open-hearth steel as well as pig iron.

Ferro-Alloys.—The Algoma Steel Corporation produced 5,299 tons of spiegel valued at \$180,216. Electro-Metals, Limited, of Welland, produced 14,049 gross tons of ferro-silicon valued at \$587,852. For this output of several grades, ranging from 15 to 80 per cent. ferro, the following raw materials were used: 1,286 gross tons of pyrite cinder from the United States; 8,285 tons of steel turnings and 13,583 tons of Killarney quartzite containing 99 per cent. silica.

Lead and Zinc

The only producing lead mine in Ontario is that of the Kingdon Mining, Smelting and Manufacturing Company, Ltd., which also operates a smelter at Galetta, on the Ottawa river. Including a small recovery of lead in United States refineries from Ontario silver ores, the total sales amounted to 2,895,695 pounds worth \$173,742. During the year 36,138 tons of ore were mined and concentrated. Shipments of pig lead were made to Canadian points. The average New York price for the year was 5.734 cents per pound. Prices at Montreal, the main Canadian market, are generally higher than in the United States, the Montreal average price being 6.219 cents per pound in 1922.

During the year the Kingdon company installed a blast furnace to treat lead-zinc slags which accumulate from treatment of concentrates in a Newnan hearth furnace. The zinc reported in the table resulted from a shipment of 180 tons of zinc concentrates in 1919 to the United States by the Jas. Robertson Estate, former owners of the Galetta mine. This shipment had not been reported previously to the Department. United States refineries recovered 34,979 pounds of lead from Ontario silver ores. Lead has been valued at 6 cents per pound.

NON-METALLIC MINERALS

Abrasives

No production was reported in 1922. During the previous year the entire production of 403 tons of corundum, a natural abrasive, valued at \$55,965, was the output of Corundum, Limited, operating at Craigmont. This company milled 11,256 tons of tailings from lot 4, concession XVIII, Raglan township, in 1921. Shipments were made in "grain" form. Artificial abrasives, such as carborundum, are replacing corundum for many purposes.

Actinolite

Shipments during 1922 amounted to 50 tons, valued at \$575. There is only one producer in the Province, namely, the Actinolite Mining Company, with a mill at the village of the same name, situated about four miles north of Tweed station on the Canadian Pacific railway. The mineral, which is found in serpentine rocks, is mined in the townships of Kaladar and Elzevir, Hastings county, and the head office of the company is Bloomfield, New Jersey. The product, which is fibrous in nature, is used principally for roofing purposes, as an ingredient in coal-tar compounds. Mining in a small way has been carried on intermittently for many years.

Barite (Barytes)

There was a production of barite (heavy spar) in 1921 by H. C. Bellew, 6 Saint Sacrament St., Montreal, Que., of approximately 200 tons, from a deposit which is located on lot 20, concession X, township of North Burgess, Lanark county. No shipments, however, were reported during 1921 or 1922.

Calcite and Dolomite

There has been a small demand for ground calcite and dolomite in the paint trade and for use in cleansing powders. From Palmerston township in Frontenac county, T. B. Caldwell, of Perth, shipped 70 tons of pure calcite to paint manufacturers, for experimental use, during 1921. No production was reported during the following year.

During 1921 a dolomite deposit was opened up at Baptiste lake, Herschel township, by the Ontario Dolomite Manufacturing Company, Limited. No shipments to the Toronto grinding plant of the company were made in either 1921 or 1922. This mineral is coming into use as a surface material in the manufacture of artificial stone.

Feldspar

For several years prior to 1920, Ontario's output of feldspar ranged from 12,000 to 20,000 tons per annum. In 1920 shipments jumped to 37,335 tons, worth \$268,295, due to an increased demand by United States pottery and porcelain manufacturers. In the second half of 1921 shipments fell off, particularly those of second-grade spar. Prices dropped during that year from \$9.00 per ton f.o.b. cars to \$7.00 for No. 1 spar, and from \$6.00 to \$5.00 per ton for the No. 2 grade. The bulk of the supply was quarried in Frontenac and Hastings counties. During 1922 the output decreased to 15,255 tons, valued at \$120,576 f.o.b. cars. The total value shown includes \$27,332 as the increment value resulting from grinding 2,413 tons. Operations were widened considerably

during 1922 and deposits in the vicinity of Perth and Sudbury were worked. The average value received was \$6.65 per ton for crude spar. Shipments went chiefly to the pottery and porcelain centres of New York, New Jersey and Ohio.

Two companies were active during the year in the production of ground feldspar. The Feldspar Milling Company, Limited, of Toronto, which operated a grinding plant on Don Esplanade, having a milling capacity of 6,000 tons per year, ground some 1,845 tons; while the Frontenac Floor & Wall Tile Company at Kingston, having a capacity of 1,500 tons, ground 568 tons during the year. The output from these grinding plants was partly absorbed in the manufacture of floor and wall tile, while the balance found a market among the porcelain and enamelware manufacturers of Ontario. The building trades absorb a small quantity of pink spar chips in the construction of dwellings, for which it makes an attractive stucco dash.

Shippers in 1922 are noted hereunder:

FELDSPAR SHIPPERS, 1922.

Name	Location of Deposit	P.O. Address
Canadian Non-Metallic Minerals, Ltd.	Dickens tp.	207 James St., Montreal.
Campbell, A. M.	Bathurst tp.	Box 30, Perth.
Cleveland Feldspar and Products Co., Ltd.	Monteagle tp.	327 Union Bldg., Cleveland, Ohio, U.S.A.
Cross and Wellington	Huntingdon tp.	Madoc.
Craig, T. H.		Verona.
Dillon and Mills.	Lot 23, Con. VI, Monteagle tp.	Hybla.
Federal Feldspar, Ltd.	Lot 25, Con. III, Bedford tp.	46 Elgin St., Ottawa.
Feldspar Quarries, Ltd.	Portland tp.	60 Front St. E., Toronto.
*Feldspars, Limited.	Richardson mine, Bedford tp.	103 Bay St., Toronto.
Feldspar Mines Corporation, Ltd.	Monteagle tp., Lots 16 and 17, Con. VIII.	Toronto.
Industrial Minerals Corp. of Canada, Ltd.	Lots 29 and 30, Con. XV, Monmouth tp.	805 Bank of Hamilton Bldg., Toronto.
McPhee Bros.	Dryden tp., Lot 9, Con. II.	Wanapitei.
Orser-Kraft Feldspar, Ltd.	S. Sherbrooke, Bathurst and Drummond tps.	Box 366, Perth; 563 William St., Buffalo, N.Y., U.S.A.
Orser and Wilson	Lot 11, Con. IX, Loughborough tp.	Perth, Ont.
Rock Products Company, The.	Lot 10, Con. VI, Bathurst tp. (Jas. Keays' quarry).	1154 Nicholas Bldg., Toledo, Ohio.
Treadwell, W. G.	Loughborough tp., Lots 1 and 2, Con. XI.	Hartington.
Verona Mining Co.	Lots 18, 19 and pt. 20, Con. VII, Monteagle tp.	Hybla and 404 Harrison Bldg., Philadelphia, Pa.
Wheeling Feldspar Company.	Chapman tp., Lot 26, Con. II.	Wheeling, W.Va.

*Operated, but did not ship.

Fluorspar

The output of this mineral, which declined from 3,704 tons in 1920 to 115 tons, worth \$1,744, in 1921, amounted to 284 tons, valued at \$3,905, in 1922. Curtailed operations in the steel industry was the primary cause of this situation. The maximum output was in 1918, when 7,286 tons were marketed.

There were only two shippers in 1922, as follows:

FLUORSPAR SHIPPERS, 1922.

Name	Location	Address
Cross and Wellington	Lot 11, Con. XIII, Huntingdon.	Ma doc.
Mineral Products, Limited.	Madoc tp	Ma doc.

Graphite

The Black Donald Graphite Company, the only active producer, operating a mine and mill at Whitefish lake, near Calabogie, Renfrew county, treated 1,700 tons of crude ore during 1922. No ore was mined during the year. Of the total shipments, 95 tons were flake, and 531 tons were dusts, the total value being \$34,124. Exports to the United States totalled 488 tons, and 138 tons were shipped to Canadian points. There remained on hand 746 tons of the material at the end of the year.

Artificial graphite, a product of the electric furnace, is manufactured by the Acheson Graphite Company of Niagara Falls, Ontario. The output in 1922 was 724,524 pounds, nearly twice that of any other post-war year.

Gypsum

The Ontario Gypsum Company is the only operating company in the Province, with mines and mills at Caledonia and Lythmore, in Seneca and Oneida townships, Haldimand county, and head office at Paris. When the Crown Gypsum Company's mill at Lythmore was purchased, a new mine at Lythmore, about five miles east of Hagersville on the Michigan Central railway, was opened up and the old Martindale mine abandoned. The company mines, crushes, grinds and calcines gypsum; manufactures wall plaster, plaster of Paris, and other gypsum products. Crushed and fine-ground gypsum marketed in 1922 totalled 44,171 tons, calcined gypsum 11,661, and calcined gypsum, used in manufactured products, 54,395 tons, a total of 110,227 tons, valued at \$621,668. Gypsum products, including wall board and fireproof blocks, are finding an increasing market in the building industry.

Iron Pyrites

The market for pyrites was stagnant, the output in 1922 being considerably short of the 1921 figures. Production was 11,233 tons, valued at \$39,763, in 1922 as against 27,785 tons, valued at \$101,306, during the previous year. This industry flourished during the war period, when there was an abnormal demand for sulphuric acid. Native sulphur from the Gulf States has displaced pyrite to a large extent. Low cost production on a large scale has enabled the United States, during the past three years, to take first place as a producer of sulphur, about one-half of which is used in acid making. Prior to 1903, when the Frasch method of melting sulphur in wells by the use of steam or boiling water was introduced, Sicily supplied about 95 per cent. of the world's sulphur. In 1922 Ontario producers were the Grasselli Chemical Company and the Nichols Chemical Company. The sulphide property of the Nichols Company had a production, but the large deposits of this company at Goudreau and Northpines were not worked.

Following is a list of pyrite shippers in 1922:

IRON PYRITES SHIPPERS, 1922.

Name of Owner, Firm or Company	Location or Name of Mine	P.O. Address of Manager, etc.
Grasselli Chemical Co.	Caldwell.	Flower Station.
Nichols Chemical Co., Limited, The.	Sulphide.	Sulphide.

Mica

The industry, which is centred in Eastern Ontario, revived considerably during 1922. Shipments totalled 2,229 tons, including 2,119 tons of scrap mica. The total value of all grades was \$56,480, as compared with \$28,891 in 1921, when 218 tons were marketed. Scrap mica is now being concentrated and ground to various degrees of fineness for a wide variety of uses, including the rubber trade, but principally for the manufacture of prepared roofing materials. The chief market is in the United States.

Although the total tonnage of mica marketed greatly exceeded that of 1921 or 1920, the proportion of scrap was large. Rough-cobbed mica sold was 86 tons, worth \$21,955; thumb-trimmed, 24 tons, valued at \$13,294; and scrap, 2,119 tons, worth \$21,231. Owing to the occasional nature of sales to dealers, trimmers and splitters and to resales it is difficult to keep an accurate record of mica operations. Prices for thumb-trimmed mica, depending on quality, ranged as follows:

Size	Price per lb.	Size	Price per lb.
1" x 1".....	7c. to 22c.	2" x 4".....	60c.
1" x 2".....	20c. to 30c.	3" x 5".....	\$1 50
1" x 3".....	25c. to 30c.	4" x 6".....	\$2 00 to 2 25
2" x 3".....	40c.		

Following is a list of mica shippers:

MICA SHIPPERS, 1922

Name of Owner or Producer	Location or Name of Mine	P.O. Address of Manager, etc.
Bennett, H. V.	Loughborough township, lot 12, Con. VII.....	Perth
Elliott, Wm. M.	Mica lake, Butt tp.....	3433 Walnut St., Chicago, Ill.
Green, George.....	Bedford tp.....	Perth Road
Kent Bros. and Estate J. M. Stoness	Bedford tp.....	Kingston
Loughborough Mining Co., Ltd.....	Loughborough tp.....	Sydenham
Martin, A. G.....	Sydenham.....	236 Besserer St., Ottawa
Tory Hill Marble and Mica Company, Ltd.....	Lots 33, 34, Con. XIII, Glamorgan tp.....	Tory Hill
Wildman and Burk.....	Otter lake.....	Perth

Mineral Waters

Statistics of production and valuation are not entirely satisfactory, for the reason that in many cases mineral waters are shipped from the springs in barrels or other containers to bottling works, and only a nominal valuation is given for

such shipments. In other cases a much higher valuation is placed on the product where bottling works are located at the springs. The record does not include consumption of mineral waters for medicinal or bathing uses in connection with sanitarium, such as those located at St. Catharines and Preston Springs. Shipments reported were 209,072 imperial gallons, valued at \$10,528.

Below are tabulated records of shipments for the past five years:

SHIPMENTS OF MINERAL WATERS, 1918-1922

	*1918	1919	1920	1921	1922
Imperial gallons	208,498	276,833	127,150	308,647	209,072
Value.....	\$133,808	\$19,290	\$15,059	\$14,438	\$10,528

*The value includes containers in some cases.

Peat

Experimental work by the Peat Committee appointed jointly by the Ontario and Federal Governments was continued during the season of 1922 at the Alfred bog, east of Ottawa. The Fourth Report of this Committee, issued by the Ontario Department of Mines, was accompanied by an Appendix, being an interim statement, dated December 5, 1922, reviewing progress from 1918, the year of appointment.

The season for peat manufacture is about 100 days in southern Ontario. In 1921, 4,000 tons were made, but unfortunately a large part was lost through fire. In 1922 the output was 4,700 tons, of which 3,000 tons worth \$14,500 were sold. A great improvement in the quality of peat made last year resulted from the use of a "Swing Hammer Pulverizer." In view of the fuel shortage in central Canada when the import of United States anthracite is curtailed, it is the part of wisdom to thoroughly investigate every possible source of a substitute fuel supply. Peat fuel has many good qualities, being best adapted for fall and spring burning and fireplace use. Its bulk, however, confines its use to within a radius of about 100 miles from point of manufacture.

To date some 46 Ontario peat bogs, convenient to transportation, have been surveyed by the Federal Department of Mines. These have a total area of 123,321 acres and contain approximately 110,000,000 short tons of peat fuel containing 25 per cent. moisture.

Petroleum

A report on "Petroleum in 1922," by R. B. Harkness, Natural Gas Commissioner, appears in Vol. XXXII, Part V. The following statistical tables, which are repeated here for convenience, are taken from the above-mentioned report.

CRUDE PETROLEUM PRODUCTION BY FIELDS, 1918-1922¹

Field	1918	1919	1920 ²	1921	1922
	Bbls.	Bbls.	Bbls.	Bbls.	Bbls.
Petrolia and Enniskillen	65,467	70,087	65,082	68,484	64,934
Oil Springs	44,671	45,245	39,388	40,967	43,213
Moore township	6,367	4,029	7,036	7,536	7,274
Sarnia township	3,438	4,259	3,495	4,068	3,223
Plympton township	412	560	531	481	695
Bothwell	29,116	29,425	25,563	26,877	25,680
Dover, West } Tilbury	25,288	16,705	12,171	7,473	5,482
Tilbury, East }		1,660	623	1,003	126
Raleigh township			(²)	3,320	663
Dutton	1,875	1,272	837		386
Onondaga township	1,186	197	341	566	489
Belle River	447				
Mosa township	108,988	45,860	24,063	10,764	11,959
Thamesville	1,565	801	1,131	1,320	383
Dawn township					216
Total Production Bbls.	288,760	220,100	181,750	172,859	164,732
Value, including bounty	\$781,097	\$632,789	\$724,145	\$559,198	\$466,587
Average price per bbl. ³	\$2.70 ¹ / ₂	\$2.87 ¹ / ₂	\$3.98 ¹ / ₂	\$2.68 ¹ / ₂	\$2.67

¹Figures supplied by J. C. Waddell, Supervisor of Petroleum Bounties, Petrolia.

²Production for 1920 in Raleigh township was included with that of Dover, West.

³In addition, a bounty of 52¹/₂ cents per barrel (35 imperial gallons) is paid by the Federal Government under "The Petroleum Bounty Act."

Four refineries operated in the Province in 1922, as noted hereunder:

PETROLEUM REFINERIES, 1922

Company	Location of Refinery.	Days Operated	Head Office Address
British American Oil Co., Ltd.	Toronto, Cherry St.	304	Toronto, Royal Bank Bldg.
Canadian Oil Companies, Limited	Petrolia	300	Toronto, Excelsior Life Bldg.
Cities Service Oil Co., Ltd.	Wallaceburg	365	Wallaceburg
Imperial Oil, Limited	Sarnia	365	Sarnia

The table on page 27, summarized from annual reports of the Ontario Department of Mines for the years 1907-1920 and tables supplied by the Dominion Bureau of Statistics for 1922, shows refinery operations for the past five years:

CRUDE PETROLEUM AND REFINERY STATISTICS, 1918-1922

Schedule	1918	1919	1920	1921	1922 ³
Crude petroleum production					
Imp. gals.	10,106,615	7,703,515	6,361,234	6,050,062	5,756,602
¹ Value	\$781,097	\$632,789	\$724,145	\$559,198	\$466,587
Imported Crude, distilled					
Imp. gals.	137,065,788	141,157,309	148,540,511	150,692,113	152,888,816
Value	\$12,612,882	\$12,486,174	\$20,102,784	\$14,537,339	\$13,834,118
Ontario Crude, distilled					
Imp. gals.	9,513,222	7,693,385	6,402,118	5,880,086	5,612,645
Value	\$781,703	\$661,927	\$769,775	\$500,418	\$462,346
Per cent. of total	6.49	5.17	4.13	3.75	3.54
Products					
Illuminating oil... imp. gals.	36,211,715	34,800,233	33,897,891	29,774,134	36,650,134
Value "	\$4,239,816	\$5,073,647	\$6,331,706	\$3,335,200	\$4,077,350
Lubricating oil... imp. gals.	12,595,305	12,501,385	13,804,074	13,848,721	14,556,150
Value "	\$2,118,002	\$2,293,640	\$3,276,569	\$2,351,975	\$2,558,278
Benzine, Naphtha, Gasoline... imp. gals.	39,156,447	44,625,590	47,418,420	51,033,337	59,223,186
Value "	\$10,244,328	\$11,677,077	\$14,485,935	\$12,655,244	\$13,920,089
² Gas and Fuel oil, Tar, imp. gals.	40,949,358	40,581,499	45,025,050	44,364,794	34,508,790
Value "	\$2,943,503	\$2,265,457	\$5,486,636	\$2,130,685	\$2,510,427
Paraffin Wax and Candles, lbs.	13,650,128	10,903,202	10,398,127	10,777,994	12,063,768
Value "	\$1,148,726	\$1,044,798	\$973,805	\$310,267	\$329,147
Employees..... Ave. No.	1,312	1,580	1,736	1,560	1,393
Wages paid	\$1,486,677	\$2,045,072	\$2,695,507	\$2,176,700	\$2,018,765

¹The value includes bounty paid to producers.

²Figures for 1921 and 1922 do not include Tar product, which was 18,971,400 pounds with selling value of \$142,285 in 1921, and 8,186,013 pounds worth \$265,150 in 1922.

³In 1922 there was also an output of 38,016 tons of acid and petroleum, valued at \$263,034.

Quartz and Silica Brick

The production of quartz and silica brick during 1922 totalled 82,387 tons valued at \$146,446 as against 72,068 tons worth \$220,806 in the previous year. This large increase in quantity resulted from the resumption of mining quartzite at the Killarney quarry by the Electro-Metals, Limited, of Welland. At the same time the value, in common with those of many other commodities, fell off considerably. The bulk of shipments by this company go to Welland for the production of ferro-silicon. The Algoma Steel Corporation of Sault Ste. Marie manufactures its own silica brick and silica cement, the quartz coming from a quarry at Mile 19 on the Algoma Central Railway operated by Wright and Company. The Mond Nickel Company worked its quarry in Neelon township, the output going to the smelter at Coniston for fluxing purposes. The quarry in Dill township of the International Nickel Company of Canada is drawn upon for fluxing material for the Copper Cliff smelter.

The following operated quarries and made shipments in 1922.

QUARTZ SHIPPERS, 1922.

Name of Owner, Firm or Company	P.O. Address of Operator	Location of Quarry
International Nickel Co. of Canada	Copper Cliff	Dill tp.
Mond Nickel Company	Coniston	Neelon tp.
Orser-Kraft Feldspar Company	Perth	Bathurst, Drummond and S. Sherbrooke tps.
Wright & Company	Sault Ste. Marie	Deroche tp.
Electro-Metals, Ltd.	Welland	Killarney

Salt

The total quantity of salt sold or used by the nine producing companies during 1922 showed an increase of 15,717 pounds in quantity and a decrease of \$69,870 in value. Details are given in the accompanying table. There were slight decreases in the quantities of fine, coarse, and pressed blocks including other grades. The nine salt plants operated are all situated in the south-western peninsula of the Province, between Kincardine on Lake Huron and Amherstburg on the Detroit river. Brine with salt equivalent of 48,253 tons was used in the chemical plant of Brunner Mond, Canada, Limited, at Amherstburg, and that of the Canadian Salt Company, Limited, at Sandwich. Chemicals produced include soda ash by the former company, while the latter turns out caustic soda, bleaching powder and liquid chlorine.

The following table gives details on Ontario's salt industry over a five-year period:

SALT STATISTICS, 1918-1922

Schedule	1918	1919	1920	1921	1922
Land tons	2,041	1,720	2,054	2,599	6,585
Coarse "	25,232	35,150	28,709	28,925	28,154
Fine "	53,908	47,571	39,663	36,074	34,684
Table and dairy "	34,324	34,396	42,474	40,931	41,119
Pressed blocks and other grades "				2,966	2,489
Brine (salt equivalent) "	16,221	29,275	93,712	50,529	63,710
Total sold or used "	131,726	148,112	206,612	161,024	176,741
Value "	\$1,287,039	\$1,395,368	\$1,544,867	\$1,643,527	\$1,573,657
Employees* No.	312	296	338	264	409
Wages	\$275,842	\$319,463	\$442,004	\$311,205	\$539,813

*Employees of chemical works are not included.

The list of companies producing brine or salt in 1922 was as follows:

OPERATING SALT COMPANIES, 1922

Name of Owner, Firm, or Company	Location of Wells or Works	P.O. Address of Manager, etc.
Brunner, Mond Canada, Limited	Amherstburg*	Amherstburg.
Canadian Salt Company, Limited, The	Windsor Sandwich*	} Windsor.
Dominion Salt Company, Limited, The	Sarnia	Sarnia.
Elarton Salt Works Co., Ltd.	Warwick	Watford, R.R. No. 5.
Exeter Salt Works Company, Limited	Exeter	Exeter.
Goderich Salt Co., Limited	Goderich	Goderich.
Western Canada Flour Mills Co., Ltd.	Goderich	Goderich.
Western Salt Company, Limited	Courtright	Courtright.
Wingham Salt Works (Young Estate)	Wingham	Wingham.

*Chemical works using salt brine as raw material.

Talc and Soapstone

Shipments of crude and ground talc rose from 9,967 tons, valued at \$140,390, in 1921, to 12,874 tons, worth \$178,397 in 1922. There was a larger proportion of ground talc sold than in 1921, as the valuation figures indicate. The American Talc Corporation early in 1921 turned over its mill and the Connolly mine to the Asbestos Pulp Company, Limited. The latter company operated to September 1st, when the plant was shut down, becoming active again early in 1922 and continuing throughout the year. The Henderson mine, an adjacent property, delivered its entire output of 10,169 tons of crude talc to the mill of Geo. H. Gillespie and Company, Limited. Ground talc prices ranged from \$12.83 to \$14.13 per ton, depending on grade. The entire industry is centred at Madoc in Hastings county.

The United States is the largest talc-producing country. Consumption of ground talc in 1921, as reported by the United States Geological Survey, was as follows: paper, 38 per cent.; paint, 23; roofing, 18; rubber, 9½; textile, 4; toilet powder, 2½; other uses, 5 per cent.

A deposit of soapstone has been located near Wabigoon station, District of Kenora. It closely resembles the Alberene stone of Virginia in mineral composition. There is no record to date of soapstone of domestic origin having been used in a commercial way in this Province. The Wabigoon Soapstone Company, Limited, was organized during October to operate this deposit.

TALC STATISTICS, 1918-1922.

Schedule	1918	1919	1920	1921	1922
Crude talc shipped	1,044	1,644	5,228	} 9,967	12,874
Ground talc shipped	16,421	15,927	15,131		
Total value of shipments	\$246,691	\$240,339	\$306,319	\$140,390	\$178,397
Employees, mine and mill	43	87	60	30	46
Wages paid	\$41,936	\$76,384	\$77,818	\$41,978	\$53,295

The following companies and firms were engaged in the mining and milling of talc and soapstone during 1922.

TALC AND SOAPSTONE OPERATORS, 1922

Firm or Company	Location of Mine or Works	Address of Manager, etc.
Asbestos Pulp Company, Ltd.	Huntingdon tp.	Madoc.
*Henderson Mines, Limited.	Huntingdon tp.	Madoc.
Geo. H. Gillespie and Company, Ltd.	Ma doc (grinding mill).	Madoc.
Wood, H. H.	Mine Centre†.	Mine Centre.

*The Henderson mine was operated under lease by Henderson Mines, Limited, the product going to the mill of Geo. H. Gillespie and Company.

†Soapstone deposit under development.

STRUCTURAL MATERIALS

After the general decline of wholesale prices which began in May, 1920, and a period of hesitation throughout 1921 in which large building programmes were held up through fear that the downward trend might continue, there followed in 1922 a marked expansion in the construction industry.

General Remarks

It was stated in the January, 1923, number of *The Canadian Building Review*¹ that in the whole field of Canadian business it was doubtful if the year 1922 could show any achievement more gratifying than the remarkable expansion of building. At the end of 1922 after two trying and uncertain years conditions were restored as nearly as possible to normal, as indicated by the greater productivity of labour, freer movement of capital and the comparative stability attained by material costs. During 1922 in Ontario the total cost of new work was placed at \$166,628,000, of which \$61,000,000 was credited to residential, \$56,000,000 to engineering, \$40,000,000 to business, and \$10,000,000 to industrial construction. The figures for costs of new construction in this Province have shown a steady rise: in 1918, 33 millions; 1919, 87 millions; 1920, 108 millions; and in 1921, 114 millions of dollars, which increased in 1922 as mentioned above to 167 millions of dollars.

Reports received by the Dominion Bureau of Statistics from municipal officials showed that the value of the building permits issued in 25 cities in Ontario making returns increased during 1922 by \$17,969,775 over the preceding year; the figures were \$67,246,774 in 1922 as against \$49,276,999 in 1921.

Clay Products

The clay products industry is widely distributed throughout Ontario but, as might be expected, depends on favourable deposits of clay advantageously situated with regard to transportation and large centres of population. The industry is therefore highly developed in York, Peel, Halton and Wentworth counties in proximity to the cities of Toronto and Hamilton, as well as in other counties of southwestern Ontario, where the bulk of drain tile production is consumed. Many of the smaller and less efficient clay-working plants which closed down during the war have not reopened as the present-day tendency is towards larger production in better equipped plants. The Canadian National Clay Products Association continued to influence the industry in the way of standardization of products and the application of improved methods of manufacture.

Like all other materials brick rose to its highest price level during 1920 and has since gradually declined. While the pre-war quotations may not soon be reached, decreases in fuel, labour and other costs will no doubt be reflected in the prices of clay products. In 1915 the average price of common brick was \$7.96 per thousand, which advanced to \$13.92 in 1919 and \$17.74 in 1920; receded to \$17.68 in 1921 and to \$17.56 in 1922.

The total value of brick, drain and structural tile, sewer pipe and pottery increased from \$5,094,696 in 1921 to \$6,944,218 in 1922, and with the exception of drain tile showed gains in each commodity, as may be noted in the table, which follows:—

¹MacLean Building Reports, Limited, Toronto.

VALUE OF CLAY PRODUCTS SOLD OR USED, 1913-22

Year	Brick		Pottery	Drain Tile	Sewer Pipe	Total
	Common	Pressed, Fancy, Building Tile, etc.				
	\$	\$	\$	\$	\$	\$
1913	3,283,894	1,162,860	52,875	292,767	600,297	5,392,693
1914	2,336,207	894,381	25,720	277,530	571,750	4,165,597
1915	763,591	375,865	49,387	321,253	361,283	1,871,379
1916	509,559	495,895	87,025	275,471	216,749	1,584,699
1917	713,824	776,302	94,501	546,040	379,923	2,509,590
1918	665,454	592,286	88,275	309,899	362,536	2,018,450
1919	1,966,711	726,500	119,551	354,700	609,100	3,776,562
1920	2,209,265	1,178,656	127,049	359,373	860,811	4,735,154
1921	2,025,643	2,059,606	69,984	397,104	939,463	5,094,696
1922	2,614,120	2,899,205	88,889	368,180	973,824	6,944,218

Following is a list of 150 brick and tile operators who reported an output in 1922:—

BRICK AND TILE PLANTS, 1922

Name	Address	Product
Atlas Brick Co., Ltd.	Toronto, 30 Toronto St.	Pressed brick.
Alvinston Brick and Tile Co., Ltd.	Alvinston	Common brick, Hollow tile.
Armstrong Brothers	Fletcher	Tile.
Batchelor, Samuel	Proton	Brick and tile.
Baird & Son, H. C.	Parkhill	Brick and tile.
Bechtel, B. E.	Waterloo	Brick.
Bennett, Robert	Dunnville, Box 21	Brick and tile.
Booth Brick and Lumber Co., Ltd.	New Toronto	Pressed brick.
Brampton Pressed Brick Co.	Brampton	Pressed brick and tile.
Broadwell & Son, B.	Kingsville	Tile, brick and blocks.
Browncombe, H.	Cargill	Brick and tile.
Bond, Samuel	Woodstock, R.R. 5	Brick.
Campbell, Neil F.	West Lorne, R.R. 1	Brick and tile.
Canadian Pressed Brick Co., Ltd.	Hamilton, 36 Sun Life Building	Pressed brick.
Chapman, John	Napanee	Brick and tile.
Cheeseman, Peter	Hamilton, 670 King St., W.	Brick.
Cooksville Shale Brick Co., Ltd.	Toronto, 26 Queen St., E.	Brick.
Cornhill, Jas., & Sons, Ltd.	Chatham, Grand Ave. E.	Brick.
Cooper, W. H.	Hamilton, 104 Clyde Block	Brick.
Cragg, Jethro	Toronto, 2 Regal Rd.	Brick.
Crawford Bros.	Hamilton, King and Macklin Sts.	Brick.
Curtin, Frank	Lindsay	Brick.
Curtis Bros.	Peterboro, Box 809	Brick and tile.
Dalton, Maurice	Dresden, R.R. No. 3	Tile.
DeLaplante, J. E., & Co.	Toronto, 1000 Gerrard St., E.	Brick.
Deller, Albert E.	Vienna	Brick, tile and blocks.
Deller Bros.	Norwich, R.R. No. 2	Brick, tile and hollow blocks.
Dockhart Brick & Tile Works	Arnprior	Brick and tile.
Dolan, John	Watford, R.R. No. 2	Tile.
Dominion Sewer Pipe and Clay Industries, Limited	Aldershot and Swansea	Brick, blocks and tile.
Don Valley Brick Works	Toronto, 714 Dominion Bank Building	Brick and blocks.
Dublin Brick and Tile Company	Dublin	Brick and tile.
Elliott, Charles	Bluevale	Brick and tile.

BRICK AND TILE PLANTS, 1922—*Continued*

Name	Address	Product
Elliott, Wm.	Glenannan.	Brick and tile.
Elliott, Jas., Jr.	Sault Ste. Marie, 519 Wellington St. N.	Common and rug brick.
Erie Clay Products, Ltd.	Port Dover.	Blocks and tile.
Forman, S. H.	St. Marys.	Brick and tile.
Fort William Brick and Tile Company.	Fort William, 509 Victoria Avenue.	Brick.
Fox, Geo. J.	Dresden.	Brick.
Fraser & Leith.	Blyth.	Brick and tile.
Frid Bros.	Hamilton.	Brick.
Frid, Geo., Company.	Hamilton, Main St., W.	Brick.
Gardiner, William.	Blenheim.	Brick and tile.
Godfrey & Co., Thos.	Carleton Place.	Brick.
Grigg, William.	Theford, R.R. No. 1.	Tile.
Haines, W. H. J.	Toronto, C.P.R. Bldg.	Brick.
Hallatt, Wm.	Merlin.	Tile.
Hallatt & Son, H.	Comber.	Brick, tile and blocks.
Halton Brick Co., Ltd.	Terra Cotta.	Pressed brick.
Hamilton Pressed Brick Co., Limited.	Hamilton, Kensington Ave. S.	Pressed brick.
Hill, Aaron.	Essex.	Tile.
Hill, A. W.	Coatsworth, R.R. No. 1.	Brick and tile.
Hill, Jas. S., & Son.	Madoc.	Brick.
Hinde Bros.	West Toronto.	Brick.
Hircock Bros. & Company.	Bowmanville.	Brick and tile.
Hitch, D. A.	Ridgetown.	Brick and tile.
Hitch, Thes.	St. Thomas, Box 254.	Brick and tile.
Hodder, J. H.	Dutton.	Brick and tile.
Holland & Son, William.	Ruscomb.	Brick and tile.
Howlett, Fred.	Petrolia.	Brick and tile.
Huntsville Brick Co.	Huntsville, Box 308.	Brick.
Interprovincial Brick Co. of Canada, Ltd., The.	Toronto, 30 Toronto St.	Pressed brick.
Jackson Bros.	Brantford.	Brick.
Janes, D. A.	Mt. Brydges.	Brick and tile.
Jamieson Lime Co.	Renfrew.	Brick and tile.
Jasperson Brick and Tile Co.	Kingsville.	Brick, hollow blocks and tile.
Jervis & Son, John.	Dorchester Station.	Brick and tile.
Johnson, Jas., Sr.	Pembroke, R.R. No. 3.	Brick.
Kerr, Fred.	Crediton.	Brick.
Kerr and Pettman.	Goderich.	Brick and tile.
Koebel, Joseph Z.	St. Clements.	Tile.
Kruse Bros.	Seafarth, R.R. No. 3.	Brick and tile.
Kuhn, Henry H.	Centralia, R.R. No. 2.	Tile.
Lisbon Brick and Tile Yard.	Wellesley, R.R. No. 1.	Brick and tile.
Lowes, Gordon.	Chatham, R.R. No. 3.	Brick and tile.
Labey & Son, Geo. A.	Foxboro.	Tile.
Lindsay, Earl.	Wallaceburg.	Tile.
MacKay Bros.	Dutton.	Tile.
Martin Estate, David.	Thamesville.	Tile.
McCormick Bros.	Watford, R.R. No. 5.	Brick and tile.
McComb, Chester.	Denfield, R.R. No. 2.	Brick, blocks and tile.
McCue, T. J.	Kincardine.	Tile.
McGregor and Gammage.	Dresden, R.R. No. 2.	Tile.
McIver Bros.	Ceburg, Box 636.	Brick.
McMahon, Robert.	Kerwood, R.R. No. 2.	Tile.
Midland and Penetanguishene Brick Works.	Penetanguishene.	Brick.
Merkley's, Ltd.	Ottawa, 53 Queen St.	Brick.
Middleton, Chas.	Wyoming.	Tile.
Milton Pressed Brick Co., Ltd.	Milton.	Pressed brick.
Miner, J. T.	Kingsville, R.R. No. 2.	Tile.
Missouri Tile Yard (W. H. Deller).	Thorndale, R.R. No. 4.	Tile.
Moscow Brick and Tile Works.	Greenock, R.R. No. 1.	Brick and tile.
National Fire Proofing Co. of Canada, Ltd.	Toronto, 601 Dominion Bank Building.	Tile and blocks.

BRICK AND TILE PLANTS, 1922—Continued

Name	Address	Product
National Slag Products, Ltd.	Hamilton, Gage Ave. N.	Blocks.
New, Edward	Hamilton, Dundas Rd.	Brick.
O'Dell, & Sons, Wm.	Ingersoll	Brick, tile and blocks.
Ontario Brick and Tile Plant	Mimico	Brick, tile and blocks.
Ontario Paving Brick Co., Limited	West Toronto	Brick.
Ollman Bros.	Hamilton, Macklin St.	Brick.
O'Reilly, T. E.	Ottawa, 320 Bay St.	Brick.
Ott Brick and Tile Mfg. Co., Ltd., The	Kitchener	Brick, tile and blocks.
Ottawa Brick Mfg. Co., Limited, The	Ottawa, 53 Queen St.	Brick.
Owen Sound Brick Co., Limited, The	Owen Sound	Brick.
Paxton & Bray	St. Catharines, Queenston Street	Brick.
Pears & Son, James	Toronto, Eglinton Ave., W.	Brick.
Pembroke Brick Co., The	Pembroke	Brick.
Phillips & Son, Thos.	Lucknow, R.R. No. 2	Tile.
Phippen & Field	Toronto, Dawes Road	Brick.
Parks, H. W.	Dresden, Box 477	Tile.
Phinn Bros.	London, St. James Park	Brick and tile.
Piggott & Co., Geo.	Mount Dennis, 20 Guestville Ave.	Brick.
Port Credit Brick Co., Limited, The	Port Credit	Pressed brick.
Price & Cumming	Humber Bay, Salisbury Avenue	Brick.
Price & Smith	Toronto, 458 Greenwood Avenue	Brick.
Price, Ltd., Jno	Toronto, 395 Greenwood Avenue	Brick.
Port Rowan Brick & Tile Co.	Port Rowan	Brick, blocks and tile.
Quinte Brick Works, Bay of	Belleville, R.R. No. 4	Brick.
Red Star Brick and Tile Yard	Stratford	Brick.
Reid, Jas.	Belmont, R.R. No. 3	Brick and tile.
Richardson & Son, James	Kerwood	Brick and tile.
Russell, J.	Toronto, 329 Leslie St.	Brick.
Russell Shale Brick, Ltd.	Ottawa, Standard Bank Building	Brick.
Shale Products, Ltd.	Inglewood	Brick.
Snelgrove, A.	Beaverton	Brick and tile.
Sproat, Wm. M.	Seaforth, R.R. No. 4	Brick and tile.
Standard Brick Co., Ltd.	Toronto, 363 Broadview Avenue	Brick.
St. Joseph Brick & Tile Yard	Zurich	Tile.
Smith & Son, Alex.	Dutton, R.R. No. 2	Brick and tile.
Steele, Edwin	Yankleek Hill	Brick.
Staples Brick & Tile Co.	Staples	Tile.
Streetsville Brick Co., Ltd., The	Streetsville	Brick.
Stroh, M. C.	Conestogo	Brick and tile.
Superior Tile Co., Limited	Fort William	Common and Tapestry Brick.
Sun Brick Co., Ltd.	Toronto	Tile.
Tilbury Brick and Tile Co., Ltd., The	Tilbury	Brick, tile and blocks.
Tope Estate, Richard	Hamilton, 171 Queen St. S.	Brick.
Toronto Brick Co., Limited	Toronto, 60 Victoria St.	Brick.
Tweed Brick & Tile Works	Belleville, R.R. No. 4	Brick.
Wagstaff and Co., A. H.	Toronto, 348 Greenwood Avenue	Brick.
Wagstaff, Charles	Lindsay, R.R. No. 4	Tile.
Waite, John E.	Forrester Falls	Brick and tile.
Wallace & Sons, R.	North Bay	Brick.
Watson Brick Co.	Crediton	Brick and tile.
Whitby Brick and Clay Products Co., Ltd.	Whitby, Box 96	Brick.
Wilson, Samuel, and Sons	Paisley, R.R. No. 2	Brick and tile.
Winch Bros.	Paisley, Box 220	Brick and tile.
Windsor Brick and Tile Co.	Windsor, 201 Exchange Building	Brick, tile and blocks.
Woodslee Brick and Tile Co.	Woodslee	Brick and tile.
Wright & Sons, Geo.	Comber, Box 56	Tile.

Sewer pipe is produced by three firms. Clay suitable for this ware is found at Aldershot, near Hamilton. Only the rougher types of pottery such as flower pots and crockery are made from domestic clay. Some finer glazed ware is produced but the clay is imported. Following are the makers of these two kinds of clay products:—

SEWER PIPE AND POTTERY WORKS, 1922

Name of Company	Location of Plant and P.O. Address of Manager, etc.
SEWER PIPE	
Dominion Sewer Pipe and Clay Industries, Ltd.....	Swansea.
Hamilton & Toronto Sewer Pipe Co., Ltd.....	Hamilton, Wentworth St. N.
Ontario Sewer Pipe & Clay Products, Ltd.....	Mimico.
POTTERY	
R. Campbell's Sons.....	100 Locke St. South, Hamilton.
Davis & Son, John.....	601 Merton St., Toronto.
Foster Pottery Company.....	Main St. West, Hamilton.

Northern Ontario Clays

In 1921, D. G. H. Wright, now geologist for the Dome Mines, reported for the Department on the Black River area. Brick manufactured by the Matheson Brick Company from clays in the township of Bowman were taken for test to Queen's University and the laboratory work was done at Kingston in February, 1922, by William Greenwood, field assistant to Mr. Wright, under the supervision of Prof. Alexander Macphail. Mr. Greenwood reports as follows:—

The absorption test for the red brick showed an increase in weight of 15.9 per cent. when saturated and the white brick 18.9 per cent. In the transverse test the former showed a modulus of rupture of 923 pounds per square inch and the latter 151 pounds. The compressive strength of half bricks tested on edge averaged 3,240 pounds per square inch for the red brick and 2,630 pounds for the white.

All tests are those specified by the American Society for Testing Materials and were carried out as prescribed by them with the one exception that they call for at least five bricks of each kind to be tested whereas we had only one. On sheet No. 2 is given a table showing ratings as adopted by the A.S.T.M. and the requirements for these ratings.

On comparing these with the results obtained it will be seen that the red brick may be classed as a hard brick, which is the highest classification possible for a brick made by the wire-cut process. The white or tapestry brick did not show up nearly as well, but I do not think this brick should be taken as a representative one. Upon immersion in water it showed considerable evidence of containing quantities of lime localized at different points and the low transverse bending strength was undoubtedly caused by these particles of lime slaking during the absorption test, thus expanding and weakening the brick. While no cracks were visible on the surface of the brick after the absorption test, under the transverse test the brick cracked along several longitudinal lines. This shows that the brick must have been weakened along these lines due to the expansion mentioned above, for under ordinary conditions the brick will only break cross-wise under the transverse test.

STANDARDS OF AMERICAN SOCIETY FOR TESTING MATERIALS

Name of Grade of Brick	Absorption Limits		Compressive Strength on Edge. (Lbs. per sq. in.)		Modulus of Rupture (Lbs. per sq. in.)	
	Mean of 5 Tests	Individual maximum, per cent.	Mean of 5 Tests	Individual Minimum	Mean of 5 Tests	Individual Minimum
Vitrified.....	5 or less	6.0	5,000 or over	4,000	1,200 or over	800
Hard.....	5 to 12	15.0	3,500 or over	2,500	600 or over	400
Medium.....	12 to 20	24.0	2,000 or over	1,500	450 or over	300
Soft.....	Over 20	No limit	1,000 or over	800	300 or over	200

Undoubtedly northern Ontario will require more brick in the future than in the past to meet requirements in mining camps and towns, and it would appear that local clays may be used for the purpose as long haulage makes the price of brick from southern Ontario prohibitive.

Portland Cement

The capacity of the plants operated during the year was 10,700 barrels per day. An average of 768 men were employed, and wages amounted to \$990,997. Following is a list of the operating plants:—

PORTLAND CEMENT PLANTS OPERATING IN 1922

Company	Location of Plant	Head Office Address
Canada Cement Company, Ltd.		Herald Bldg., Montreal,
Plant No. 4.	Thurlow tp.	Quebec.
Plant No. 8.	Port Colborne.	
Hanover Portland Cement Co., Ltd., The	Hanover.	Hanover.
St. Marys Cement Co., Limited.	St. Marys.	St. Marys.

The following table gives details of the industry during the past decade:—

PORTLAND CEMENT STATISTICS, 1913-1922

Year	No. of Operating Plants	Stock on hand Dec. 31st bbls.	Sales		Average Price per bbl. (350 lbs.)
			Barrels	Value	
1913.	13	450,213	3,802,321	\$ 4,105,455	\$ 1.08
1914.	11	846,562	2,665,650	2,931,190	1.10
1915.	7	755,799	2,302,242	2,534,537	1.10
1916.	7	380,458	2,143,949	2,242,433	1.05
1917.	6	567,261	2,063,231	2,934,271	1.42
1918.	4	473,184	1,226,244	1,910,839	1.56
1919.	5	278,188	2,022,575	3,659,720	1.81
1920.	5	248,142	2,035,594	4,377,814	2.15
1921.	5	174,686	2,723,072	6,425,266	2.37
1922.	4	396,911	3,104,386	6,235,370	2.01

In the United States the factory price per barrel of 380 pounds ranged from \$1.61 in Illinois to \$2.40 in Washington, the average price being \$1.76 per barrel.

Cement Products.—Although the value of these building materials is not included in Table I, the output of cement brick, artificial stone, concrete, drain tile and sewer pipe, blocks, caps, sills, etc., is considerable, as will be seen from the detailed statistics which follow covering the past five years:—

CEMENT PRODUCTS STATISTICS, 1918-1922

Schedule	1918	1919	1920	1921‡	1922‡
Brick.....	\$1,290	\$10,631	\$11,117	\$9,235	\$25,244
Blocks, sills and caps.....	41,362	147,895	382,994	409,722	479,949
Drain tile.....	81,351	142,072	338,286	70,412	45,570
Sewer pipe and culvert tile.....					
Artificial stone and other products.....				317,811	293,322
				87,701	109,705
Total value of output.....	\$124,003	\$300,598	\$732,397	\$894,881	\$953,790
Number of operating plants.....			48	86	103
Employees.....	72	148	218	230	210
Wages.....	\$25,901	\$90,653	\$212,014	\$212,372	\$207,417

‡ Reported to Dominion Bureau of Statistics, Ottawa.

Lime

Statistics of both quicklime and hydrated lime marketed or used during the past five years are given in the following table:—

LIME STATISTICS, 1918-1922

Year	Hydrated Lime** Marketed			Quicklime Marketed or Used			Fuel Cost	Em- ployees	Wages
	Tons	Total Value	Per Ton	Bush. (70 lbs.)	Value	Ave. Price per bush.			
1918...	14,865	\$ 132,748	\$ 8.93	2,650,285	\$ 872,177	32.9	\$ 237,425	287	\$ 300,746
1919...	22,743	226,455	9.96	3,341,772	1,041,835	30.8	302,144	363	366,686
1920...	28,591	397,305	13.89	4,166,026	1,402,458	33.6	546,604	448	568,513
1921...	26,863	381,749	14.58	2,763,062	962,439	34.8	.....	366	341,826
1922...	36,408	455,980	12.52	3,939,954	1,311,563	33.3	312,825	425	408,731

** Hydrated lime statistics for 1918 and 1919 from Mines Branch, Ottawa.

Below are given the names of producers and the location of plants operated in 1922:—

LIME PRODUCERS, 1922

Name of Owner or Company	Location of Kilns	Head Office Address
Alabastine Co., Paris, The.....(*)	Elora and Teeswater.....	Paris.
American Cyanamid Co.....(†)	Niagara Falls.....	Niagara Falls.
Beachville White Lime Co., Ltd.....	Beachville.....	Beachville.
Bergin, Patrick.....	Napanee.....	Napanee.
Brunner Mond Canada, Limited.....(†)	Anderdon tp., near Am- herstburg.	Toronto, Bank of Com- merce Building.
Biederman, A. G.....	Golden Lake.....	Golden Lake, R.R. No. 1.
Cameron, W. M.....	Carleton Place.....	Carleton Place.
Chalmers Lime Works.....	Owen Sound.....	Owen Sound.
Christie, Henderson & Co., Limited.....	Hespeler (*), Galt, Puslinch, Kelso.	Toronto, 201 Crown Office Building.
Dominion Sugar Company.....(†)	Chatham, Wallaceburg and Kitchener.	Chatham.
Flieler, Edward.....	Clarendon tp.....	Fernleigh.
Gallagher Lime and Stone Co., Limited...	Barton tp.....	Hamilton.
Harvey, E., Limited.....	Rockwood.....	Guelph.
Jamieson Lime Co.....	Renfrew.....	Renfrew.
Jamieson, J. M.....	Ross tp.....	Forrester Falls.
Marshall, James.....	Barton tp.....	Hamilton.

*Producers of hydrated lime.

†For use in chemical plants.

LIME PRODUCERS, 1922—Continued

Name of Owner or Company	Location of Kilns	Head Office Address
O'Donohue, Michael.....	Campbellford.....	Campbellford.
Parks Bros.....	Beverly tp.....	Troy.
Robertson Co., Limited, D.....	Nassagaweya tp.....	Toronto, 26 Queen St. E.
Smith, John S.....	Kincardine.....	Kincardine.
Standard White Lime Co., Limited.....	Beachville, Guelph (*).....	Guelph.
Standard Chemical Company, Ltd.....(*)	Eganville.....	906 Drummond Bldg., Montreal, Que.
Toronto Brick Co., Limited.....	Coboconk.....	Toronto, 60 Victoria St.
Toronto Lime Co., Limited.....	Dolly Varden.....	Toronto, 26 Queen St. E.
Toronto Plaster Co., Limited, The.....(*)	Teeswater.....	Teeswater.
Vogan, Samuel.....	Wiarton.....	Wiarton.
Wepler, Henry.....	Glenclg tp.....	Priceville, R.R. No. 2.

*Producers of hydrated lime.

Sand-Lime Brick

Brick are made from sand and lime by compressing these materials in moulds and subjecting the resulting product to a steam bath. These brick find a ready market, particularly as inside brick, the cost being less than for the clay product. The industry is confined almost exclusively to Toronto and vicinity. Two new plants (Don Valley and Harbour Brick) commenced operations in 1922.

Eleven plants operated in 1922, the output being 52,749 thousand worth \$851,007, or an average of \$16.13 per thousand. The industry gave employment to 199 men whose wages totalled \$233,287. Production in 1921 was 36,482 thousand, worth \$534,531, or an average of \$14.64 per thousand.

The following plants were operated during the year:—

SAND-LIME BRICK PRODUCERS, 1922

Name	Location of Plant	Address
Caledon Brick Co., Ltd.....	Caledon E.....	171 Yonge St., Toronto.
Canada Sand-Lime Pressed Brick Co., Ltd.....	West Toronto.....	28 Symes Rd., Toronto.
Don Valley Brick Works, Ltd.....	Toronto.....	Dominion Bank Bldg., Toronto.
Harbour Brick Company, Ltd.....	Bathurst St. Dock, Toronto	Lumsden Bldg., Toronto.
Toronto Brick Co., Limited.....	Scarboro and Swansea.....	60 Victoria St., Toronto.
West Lake Brick and Products Co.....	West Lake.....	R.R. No. 1, Picton.
Willcox Lake Brick Co., Ltd.....	Whitchurch tp.....	Richmond Hill.
York Sandstone Brick Co., Ltd.....	Gerrard St. and Victoria Avenue.	E. Toronto.

Sand and Gravel

Exclusive of the material excavated by railway companies and used as ballast or for concrete, the sand and gravel production in Ontario during 1922 totalled 3,576,420 tons with a selling value of \$1,816,320. Sales consisted of 154,440 tons of moulding sand, worth \$105,864; 1,160,833 tons building sand, worth \$836,920; core sands, 104,962 tons, value \$33,620; sand for concrete and road building, 1,911,849 tons, worth \$712,330; railway ballast supplied by private producers, 130,950 tons, valued at \$62,427; and crushed gravel,

113,386 tons, worth \$65,159. Railway companies produced and consumed 367,854 tons for various purposes.

During the period, seventeen companies licensed by the Ontario Department of Mines, carried on dredging operations in the Great Lakes, Rainy lake, St. Clair, Thames and Niagara rivers, and produced 860,979 tons of sand and gravel worth \$447,090, which is included in the figures given above and also in Table I.

Following is a list of sand and gravel pit operators who marketed or used 1,000 cubic yards or more during the year:—

SAND AND GRAVEL OPERATORS, 1922

Name of Owner or Company	Material G = Gravel S = Sand	Location of Deposits	Address
Adelaide, Municipality of	S. and G.	Adelaide tp., lots 1 and 7, con. III, and 3, con. IV.	Arkona.
Aldborough, Township of	G.	Aldborough tp., lot A, con. VII.	Rodney.
Allan Bros	S. and G.	Stop 19, Kingston Rd.	Toronto, 60 Birchcliffe Ave.
Allan, Mrs. M	S.	Grantham tp., lot 7, con. II.	St. Catharines, R.R. No. 4.
Armstrong Supply Co., Ltd., The	S.	1143 York St., Hamilton.	Hamilton, 34 James St. N.
Ashton & Sons, E	S.	Scarborough tp., Victoria Park, W.	Toronto, 1354 Queen St. E.
Atkinson, Wm	S. and G.	Seymour tp., lot 12, con. VII.	Campbellford.
Burrows, John	S.	Widdifield tp.	North Bay.
Baxter, Jas	S.	Dereham tp., lot 16, con. X.	Brownsville.
Bellyou, Norman E	S. and G.	Murray tp., lot 6, con. I.	Trenton, R.R. No. 4.
Bennett, Sarah	S.	Scarlett Rd., York tp.	Toronto, 145 Caledonia Rd.
Benson & Patterson	S. and G.	Stamford tp., lots 17, 18	Stamford.
Blair & Son, James	S.	Fitzroy tp., lot 22, con. IV.	Armprior.
Boyd Bros	G.	Osgoode tp., lot 27, con. IV.	Osgoode.
Brantford, Corporation of City of	S. and G.	Brantford tp.	Brantford, City Hall.
Brown & Sons, Wm	S. and G.	Smith tp., lot 19, con. III and lot 18, con. II.	Peterborough, Box 784.
Bourne & Son, John	S.	Scarboro tp.	Kingston Road.
Carroll Bros	S.	Humberstone tp., lots 3—9, con. I.	Buffalo, N.Y., 490 Elliott Square.
Conlon, John J	S.	Pelham tp., lot 4, con. VIII.	St. Catharines, 31 Maple St.
Construction and Paving Co. of Ontario	S. and G.	Erin tp.	Toronto, 708 Confederation Life Bldg.
Collège du Sacré-Coeur	S.	Kingston Road.	Scarboro.
Elgin, County Highways	S. and G.	Yarmouth tp., lot 3, con. IV; Aldborough tp., lot C, con. VII; Southwold tp., lot 13, con. V.	St. Thomas, Court House
Ellins, Wesley	S.	Lot 16, con. C, Etobicoke tp.	West Toronto.
Empire Limestone Co.	S.	Sherkston, Welland co.	Buffalo, N.Y., 19 Hudson St.

SAND AND GRAVEL OPERATORS, 1922—*Continued*

Name of Owner or Company	Material G = Gravel S = Sand	Location of Deposits	Address
Faulds, Morley	S. and G.	Southwold tp., lots 12 and 14, con. V.	Iona Station, R.R. No. 4.
Forbear Sand and Gravel Co.	S.	Vaughan tp., lot 22, con. III.	Maple.
Foster, R.R.	S. and G.	Ottawa, Gloucester tp.	Ottawa, 278 Echo Drive.
Frid Bros.	S. and G.	Hamilton, Dundas Rd. and Macklin St.	Hamilton, Dundas Rd. and Macklin St.
Godson Contracting Co., Ltd.	S. and G.	Brock tp., lot 12, con. IV.	Toronto, 113 Manning Chambers.
Gole, G.	S.	Preston.	Preston.
Guelph, City of.	G.	Guelph.	Guelph, City Hall.
Hamilton Sand and Gravel, Ltd.	S. and G.	Burlington Heights.	Hamilton, 110 Queen St. N.
Iroquois Sand and Gravel Co., Ltd.	S. and G.	Scarborough tp., lot 9, con. II.	Toronto, 1107 Royal Bank Bldg.
Johnston, G. F.	S.	Westminster tp., lot 21, Con. V.	Wilton Grove, R.R. No. 2.
Johnston, Peter.	S.	Manor Park.	London, 51 Briscoe St.
Kent, County of.	S.	Raleigh tp.	Chatham.
Killbourne & Son, Harvey.	S.	Westminster tp., Wharnclyffe Rd.	London, 9 Cove Road.
Kingston Sand and Gravel Co.	S.	Kingston tp., lots 33-34, con. V.	Kingston, 179 Stuart St.
Larter, Chas.	S. and G.	North Dumfries tp.	Galt, 76 Chalmers St.
Lambton, County of.	S.	Enniskillen tp., lot 9, con. XIII.	Sarnia.
Le Viness & Sons, A.	S.	Stamford tp., lot 37.	Stamford.
Malahide tp.	G.	Malahide tp., lot 21, con. VI.	Aylmer.
Malloy, Wm. B.	S. and G.	Ellice tp., lot 8, con. IV.	Sebringville, R.R. No. 1.
Maple Sand, Gravel and Brick Co.	S. and G.	Vaughan tp., lots 21-24 con. III.	Toronto, 454 King St. W.
McAllister, Wm.	G.	Guelph tp., N. lot 3, div. E, con. I.	Guelph, 247 Woolwich St.
McLean & Son, A. B.	G.	Parke tp.	Sault Ste. Marie, 129 Spring St.
Middlesex, County of.	S. and G.	Numerous places.	London, County Bldgs.
Moyer, Lovelace Co., Ltd.	S.	Pelham tp., lots 6 and 7, cons. VIII and IX.	St. Catharines.
Moore, John.	G.	East Williams tp., lot 8, con. II.	Ailsa Craig.
Oakland Sand and Gravel Co.	S. and G.	Oakland tp., con. III.	Niagara Falls.
Ollman Bros.	S.	Hamilton, Macklin St.	Hamilton, Macklin St.
Ontario Highways Dept.	S. and G.	Numerous pits.	University and Dundas Sts., Toronto.
Paris Sand and Gravel Co.	S. and G.	S. Dumfries tp., lot 34, con. I.	Paris, R.R. No. 2.
Ponsford, A. E.	S. and G.	Yarmouth tp., lot 1, con. VII.	St. Thomas, 605 Talbot St.
Porter, Thompson.	S.	York tp., lots 28 and 29.	Mt. Dennis, 866 Weston Road.
Quigley, B. C.	S. and G.	Saltfleet tp., lot 29, con. III.	Hamilton.
Redden, Henry.	S. and G.	Campbellford, Kent St.	Campbellford.
Rideau Canal Supply Co., Ltd.	S.	Hogs Back, Gloucester tp.	Ottawa, Rideau Canal Basin.
Sand and Supplies, Ltd.	S. and G.	Waterloo Co., near Ayr	Toronto, 54 University Ave.
Sarjeant Co., The.	S. and G.	Barrie, James and Pen-etang Streets.	Barrie, Dunlop St.
Shannon, Hiram L.	S. and G.	Richmond tp., lot 6, con. III.	Napancee, R.R. No. 5.
Shirk, Geo. M.	S. and G.	Bridgeport.	Bridgeport.

SAND AND GRAVEL OPERATORS, 1922—Continued

Name of Owner or Company	Material G = Gravel S = Sand	Location of Deposits	Address
Skinner, Robt.....	G.	Usborne tp., lot 11, con. V.	Exeter.
Sleeman, P.....	S. and G.	Hope tp., lot 9, con. II.	Port Hope.
Smith Estate (F. S. Scott).....	S. and G.	N. Dumfries tp., lot 8, con. XII.	Galt.
Smith, Edward.....	S. and G.	Howard tp., lot 16, con. IX.	Ridgetown, R.R. No. 3.
Smith, McMillan & Fineout.....	S. and G.	McGregor tp.....	Fort William, 12 Royal Bank Bldg.
Smythe, Ltd., C.....	S.	Etobicoke tp.....	Toronto, 477 Runnymede Rd.
Stothart, James.....	S.	Smith tp., lot 17, con. II.	Peterborough, R.R. No. 4.
Stover, Elmer.....	S. and G.	Tillsonburg.....	Tillsonburg.
Thompson, George.....	S.	Widdifield tp.	North Bay.
Thompson, Peter.....	S. and G.		Ottawa, R.R. No. 1.
Townsend, Township of.....	G.	Townsend tp., con. V.	Waterford.
West Hawkesbury, Township of...	S. and G.	W. Hawkesbury tp., lot 14, con. VI.	Vankleek Hill.
White & Co., Homer.....	G.	Hallowell tp., lot 22...	Pictou.
Willox, Hervey.....	S.	Stamford tp., part lots 4 and 17.	Niagara Falls, 209 Bridge St.
Windsor Sand and Gravel Co., Ltd.,	S. and G.	Two miles west of Leamington.	Windsor, 57 Hall Ave.
Wright & Co.....	S.	Korah tp., sec. 13....	Sault Ste. Marie, 960 Queen St.
Yack, Henry.....	S.	London tp., lot 12, con. II.	London.
Yarmouth, Township of.....	S.	Yarmouth tp., lot 8, con. V.	St. Thomas, Southern Loan Chambers.
York Sand & Gravel, Ltd.....	S. and G.	Gerrard St., Victoria Park Ave.	Toronto.

The following companies holding sand and gravel licenses from the Department of Mines carried on dredging operations during the period:—

SAND AND GRAVEL LICENSEES, 1922

Licensee	Location	Address
Cadwell Dredging Company.....	St. Clair river.....	Windsor.
International Sand & Gravel Company.....	St. Clair river.....	Detroit, Mich.
Northern Sand & Gravel Company.....	St. Clair river.....	Sarnia.
Chick Contracting Company.....	St. Clair river.....	Windsor.
National Sand & Material Company.....	Lake Erie.....	Welland.
Lake Erie Sand Company.....	Lake Erie.....	Sandusky, Ohio.
Homegardner Sand Company.....	Lake Erie.....	Sandusky, Ohio.
Cadwell Dredging Company.....	Lake Erie (S.E. shoal)...	Windsor.
Cadwell Dredging Company.....	Lake Erie (old dummy)...	Windsor.
Harbour Brick Company.....	Lake Ontario.....	Toronto.
P. Lyall & Sons Construction Company.....	Lake Ontario.....	Montreal, Que.
MacDonald, A. G.....	Lake Ontario (stone).....	Bronte.
MacDonald, A. N.....	Lake Ontario (s' one).....	Bronte.
Pickard, L.....	Lake Ontario (stone).....	Bronte.
A. B. McLean & Son.....	Lake Superior.....	Sault Ste. Marie.
Lapish & Small.....	Lake Superior.....	Sault Ste. Marie.
Smith, McMillan and Fineout.....	Lake Superior.....	Fort William.
Great Lakes Transportation Company.....	Thunder Bay.....	Fort William.
J. E. Carroll and T. E. Milburn (Niagara Sand Corporation).....	Niagara river.....	Buffalo, N.Y.
Chatham Sand & Gravel Company.....	Thames river.....	Chatham.
C. & J. Hadley Company.....	Thames river.....	Chatham.
Ontario & Minnesota Power Company.....	Rainy lake.....	Fort Frances.

In all 528,193 cubic yards of gravel were excavated for which the Province received \$83,453.71 in royalties. Removals were as follows: River St. Clair, 289,358 cubic yards; Lake Erie, 109,026; Lake Ontario, 90,685; Lake Superior, 21,629; Thames river, 12,379; and the balance (5,116 cubic yards) from Niagara river and Rainy lake.

Stone

As noted in Table I, the total output of stone of all grades was 2,317,265 tons valued at \$2,969,926 during 1922, as against 2,716,080 tons worth \$4,167,582 during the previous year.

The table which follows shows the valuation of the several kinds of stone marketed or used during the past five years:—

VALUE OF STONE PRODUCTION, 1918-1922

Year	Limestone	Sandstone	Trap	Granite	Marble	Total
1918.....	\$ 820,985	\$ 145	\$ 24,744	\$ 23,334	\$	\$ 869,238
1919.....	1,112,340	5,544	82,995	10,683	19,360	1,230,922
1920.....	3,786,263	10,502	92,630	55,277	300	3,944,972
1921.....	3,934,045	6,423	158,467	68,647	.....	4,167,582
1922.....	2,547,485	9,454	167,630	245,357	.....	2,969,926

The following were engaged in the stone quarrying industry in 1922:—

LIMESTONE OPERATORS, 1922

Name of Owner, Firm or Company	Location	Address
Belton, Peter.....	Grantham tp.....	St. Catharines.
Bergin, Pat.....	Napanee.....	Napanee.
Bolender Bros.....	Haliburton.....	Haliburton.
Britnell & Co., Ltd.....	Burnt River.....	Rear C.P.R. Yonge St. Sta., Toronto.
Brunner Mond Canada, Ltd.....	Anderdon tp.....	Amherstburg.
Caldwell Bros.....	Gloucester tp.....	Limebank.
Canada Crushed Stone Corp., Ltd.....	West Flamboro tp....	Dundas.
Carleton, County of.....	Osgoode, Gloucester, Nepean tps.	71½ Sparks St., Ottawa.
Cayuga Stone Company.....	North Cayuga tp....	21 Central Chambers, Ottawa.
Cook & Son, J. S.....	Amabel tp.....	Wiaron.
Crushed Stone, Ltd.....	Kirkfield.....	47 Yonge St., Toronto.
Crystalline Milling Co., Ltd.....	Herschel tp.....	120 Bay St., Toronto.
Farmer, Geo., & Sons.....	Osgoode tp.....	45 Bertrand Ave., Ottawa.
Farr, Mrs. L. G.....	Bucke tp.....	Haileybury.
Foster, R. R.....	City View, Merivale Rd.	278 Echo Drive, Ottawa.
Gallagher Lime & Stone Co., Ltd.....	Barton tp.....	James St., Hamilton.
Gavard, L. H.....	Gloucester tp.....	12 Delorimer St., Hull.
Gosselin, Chas.....	Gloucester tp.....	Quarries.
Gow, James.....	Fergus.....	Fergus.
Hagersville Contracting Co., Ltd.....	Walpole tp.....	Hagersville.
Hagersville Crushed Stone Co.....	Oneida tp.....	Hagersville.
Hagersville Quarries, Ltd.....	Walpole tp.....	4 Flora St., St. Thomas.
Haldimand County Good Roads System..	Rainham, Walpole tps.	Hagersville.
Hanover Cement & Stone Co.....	Walkerton.....	157 Bay St., Toronto.
Halliday, Fred.....	Gloucester tp.....	297 Booth St., Ottawa.
Hildreth, Chas.....	Barton tp.....	R.R. No. 4, Hamilton.
Innerkip, Corporation of.....	Innerkip.....	Innerkip.
Kingston Penitentiary.....	Portsmouth.....	Portsmouth.

LIMESTONE OPERATORS—Continued

Name of Owner, Firm or Company	Location	Address
Kirby Co., Ltd., T. Sidney.....	Gloucester tp.....	213 Sussex St., Ottawa.
Lally Estate, M.....	South Grimsby tp.....	Smithville.
Law Construction Co., Ltd., The.....	Bertie tp.....	107 Hillsdale Ave., Toronto.
Lincoln Road Dept., County of.....	North Grimsby tp.....	St. Catharines.
Longford Quarry Co., Ltd.....	Rama tp.....	Longford Mills.
Markus, Wm., Ltd.....	Pembroke tp.....	Pembroke.
Marshall, Jas.....	Barton tp.....	Hamilton.
McNeely, D. R.....	Carleton Place.....	Carleton Place.
Mills, Jas.....	Napanee.....	Napanee.
Oliver Rogers Stone Co., Ltd.....	Owen Sound.....	841 Fourth Ave. E., Owen Sound.
Ontario Hydro-Electric Power Commission	Walkerton.....	Toronto.
Ontario Reformatory Industries.....	Guelph tp.....	Parliament Bldgs., Toronto.
Ontario Stone Corporation, Ltd.....	Uthhoff.....	611 Excelsior Life Bldg., Toronto.
Ottawa Improvement Commission.....	Ottawa.....	53 Queen St., Ottawa.
Perkins, Geo. A.....	Owen Sound.....	830 6th Ave. W., Owen Sound.
Pickard, L.....	Lake Ontario.....	Bronte.
Point Anne Quarries, Ltd.....	Thurlow tp.....	Foot of Jarvis St., Toronto.
Prescott, Town of.....	Wood St.....	Prescott.
Public Highways, Dept. of.....	Various locations.....	Toronto.
Robertson, D., & Co.....	Nassagaweya tp.....	Milton.
Robillard, H., & Son.....	Gloucester tp.....	195 Nicholas St., Ottawa.
Roddy & Monk.....	Kingston.....	24 Elm St., Kingston.
Standard White Lime Co., Ltd.....	Beachville and Guelph	15 Douglas St., Guelph.
Thames Quarry Co., Ltd., The.....	St. Marys.....	St. Marys.
Walker Bros.....	Stamford tp.....	Thorold.
Wallace, R., & Sons.....	Kingston.....	116 Patrick St., Kingston.
Wattam, Geo. H.....	Amaranth tp.....	Shelburne.
Webber, John.....	Dunn tp.....	Dunnville.
Webster, Jas. S.....	Galt.....	2 Augusta St., Galt.
Wehman, John.....	Kingston.....	251 Division St., Kingston
Wentworth, County of.....	Barton tp.....	Court House, Hamilton.
Wentworth Quarry Co., Ltd.....	Saltfleet tp.....	Vinemount.
Woodhouse Crushed Stone Co., Ltd.....	Woodhouse tp.....	Port Dover.

SANDSTONE OPERATORS, 1922

Name of Owner, Firm or Company	Location	Address
Rogers, F., & Co.....	Chinguacousay tp.....	1193 Queen St. W., Toronto.

TRAP OPERATORS, 1922

Name of Owner, Firm or Company	Location	Address
Bruce Mines Trap Rock Co., Ltd.....	Bruce Mines.....	Sault Ste. Marie, Mich.
Fort William, Corporation of.....	Rifle Range.....	Fort William, City Hall.
Mond Nickel Company, Ltd.....	Garson, Worthington and Levack mines..	Coniston.
Ontario Rock Company, Ltd.....	Belmont and Methuen tps.....	Toronto, 410 Crown Office Bldg.

GRANITE OPERATORS, 1922

Name of Owner, Firm or Company	Location	Address
Abrams, J. M.	Pittsburgh tp.	Gananoque.
Brown, A. C.	Leeds tp., lot 9, con. IX	Lyndhurst.
Campbell and Lattimore.	Findlay	C.P.R. Bldg., Toronto.
Fort William, Corporation of.	Fort William.	Fort William.
Gordon, D. J.	Leeds co.	Gananoque.
Horne, Wm.	Butler.	Ashford Block, Winnipeg.
Mond Nickel Co., Ltd.	Drury and Levaek tps.	Coniston.
Morrison Bros.	Wollaston tp., lot 24, con. V	Coe Hill.
Streets and O'Brien.	Gananoque.	47 Yonge St., Toronto.

Mining Divisions

Following are excerpts from comments by Mining Recorders on the subject of mining and prospecting activity in their respective Divisions:—

Sudbury.—Some claims were staked in new areas, namely, in the townships of Munster and Hess. There has been a revival of interest in prospecting in the vicinity of Wanapitei lake, more particularly in the townships of Scadding and Parkin.

Sault Ste. Marie.—The year was marked by much greater activity than in 1921, more especially in the Michipicoten and Goudreau areas. The business of the office showed a large increase over the preceding year.

Gowganda.—Several recent silver discoveries were made in the Miller Lake area. The Miller Lake O'Brien and Castle-Trethewey mines were active, as well as some smaller properties. Many mining leases have been renewed during the year.

Montreal River.—Considerable assessment work was performed in the townships of Cairo and Powell. The development of hydro-electric power at Indian Chutes is expected to benefit all properties of promise in the vicinity. Machinery was installed on the Thesaurus gold property in Baden township.

Timiskaming.—Activity was centred in South Lorrain as a result of the finding of high-grade silver ore on the Keeley and Frontier mines. The disastrous fire of October 4th wiped out the greater part of the town of Haileybury as well as devastating a large area in the Blanche River valley. The Recording Office was destroyed, but all important records were saved and moved to Cobalt town hall, where a temporary office was opened.

Larder Lake.—A revival of interest was manifested in the Larder Lake area as a result of encouraging assays secured by the Crown Reserve in McVittie township. Gold discoveries were reported from Ossian and Grenfell townships during the autumn. Business for the year was the largest in the history of the Division.

An index of activity in prospecting from year to year is furnished by the number of applications recorded for mining claims. The following tables give the record of the claims recorded since the Mines Act of 1906 became operative, the revenue received and remitted by the several Mining Recorders during the government fiscal year, and a summary of business transacted during the calendar year 1922:—

MINING CLAIMS RECORDED IN THE SEVERAL MINING DIVISIONS, 1907-1922

Mining Division	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Timiskaming.....	7,860	1,650	1,343	1,021	922	516	1,326	215		156	269	184	244	329	159	328
Coleman.....	291	270	150	40						464	262	168	673	267	319	701
Sudbury.....	456 (est)	254	1,859	1,131	2,309	776	483	237		44	135	199	90	90	216	541
Sault Ste. Marie.....	291	100		181	119	137	127	23		172	180	66	171	108	120	296
Port Arthur.....	317	370	475	207	183	180	182	353		45	32	48	31	25	53	168
Kenora.....		73	102	95	89	91		25		10	25	12	39	33	Closed	
Parry Sound.....	102	56		26	15	5		2		783	160	423	1,015	712	918	2,344
Larder Lake.....	3,813	540	180	84	1,252	541	1,575	718		56	294	293	134	81	143	174
Montreal River.....	866	1,321	2,573	344	98	126	63	28		51	113	52	145	215	101	55
Gowganda.....			3,064	513	258	194	68	23		401	236	48	136	192	273	760
Porcupine.....				2,159	3,756	538	496	240		160	135		2	9	3	148
Kowkash.....																
Total.....	13,996	4,634	9,746	5,792	9,001	3,104	4,320	1,864		2,342	1,841	1,495	2,687	2,073	2,305	5,515

STATEMENT OF MONEYS REMITTED BY MINING RECORDERS FOR THE FISCAL YEAR ENDING OCTOBER 31ST, 1922

Mining Division	Name of Recorder	Address	Purchase Price	Forest Reserve Permits	Miner's Licenses	Recording Fees, etc.	Total
Sudbury.....	Campbell, C. A.	Sudbury.....	\$ 2,636 36	\$ 650 00	\$ 3,576 00	\$ 5,396 25	\$ 12,158 61
Porcupine.....	Donaghue, W. A.	S. Porcupine.....	5,099 81	290 00	2,749 00	4,431 00	12,569 81
Larder Lake.....	Ginn, H. G.	Swastika.....	13,634 02		7,195 00	18,217 15	39,046 17
Kenora.....	Holland, H. E.	Kenora.....			1,259 00	1,234 75	2,493 75
Timiskaming.....	McAulav, N. J.	Hatleybury.....	164 38	100 00	5,653 00	3,081 50	8,998 88
Sault Ste. Marie.....	Miller, W. N.	Sault Ste. Marie.....	5,003 44	80 00	2,941 50	3,662 25	11,687 19
Port Arthur and Kowkash.....	Morgan, J. W.	Port Arthur.....	3,067 25	210 00	2,689 00	3,720 50	9,686 75
Gowganda and Montreal River.....	Morgan, M. R.	Elk Lake.....	1,339 83	490 00	1,303 00	2,519 50	5,652 33
Total.....		Total.....	30,945 09	1,720 00	27,365 50	42,262 90	102,293 49

SUMMARY OF BUSINESS TRANSACTED IN THE SEVERAL MINING DIVISIONS DURING CALENDAR YEAR 1922

Schedule	Sudbury	Porcupine	Larder Lake	Sault Ste. Marie	Port Arthur	Kowkash	Timiskaming and Coleman	Gowganda	Montreal River	Kenora	Total
1. No. of letters received during the year.	2,951	2,255	7,527	1,288	2,791	682	1,974	353	1,936	1,361	23,118
2. No. of letters written during the year.	2,464	2,116	7,134	692	2,437	591	1,352	284	1,535	1,301	19,906
3. No. of Miner's Licenses issued.	425	421	606	337	299	30	384	.....	68	213	2,783
4. No. of Miner's Licenses renewed.	318	234	527	243	214	22	779	33	158	49	2,577
5. No. of Mining Applications recorded.	701	760	2,344	541	296	148	328	55	174	168	5,515
6. No. of Mining Applications cancelled.	184	173	407	167	126	93	201	33	92	14	1,490
7. No. of Agreements, Transfers, etc., recorded	212	357	1,357	104	188	19	197	24	185	23	2,666
8. Amount received for Miner's Licenses, Permits, Recording Fees, etc.	\$10,280 25	9,943 50	27,493 10	6,547 19	5,507 85	1,519 25	8,505 75	749 50	3,521 50	2,563 50	76,631 39
9. Amount received as Purchase Money or Rental	\$ 2,985 50	5,356 46	14,536 58	3,721 84	7,657 03	196 75	283 68	181 26	1,530 33	79 30	36,528 73
10. No. of Claims of which surveyors' plans were filed during the year.	45	41	292	71	112	.....	34	2	26	.....	623
11. No. of disputes entered	3	1	4	4	1	.....	3	.....	4	.....	20
12. No. of disputed cases decided by Recorders. . . . .	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13. No. of appeals to Mining Commissioner.	2	1	6	1	.....	.....	.....	.....	4	.....	14
14. No. of extensions of time granted.	132	123	578	5	133	30	54	18	52	4	1,129
15. No. of Certificates of Record granted.	60	73	227	20	96	2	26	8	54	.....	566
16. No. of Certificates of Performance of Work granted.	64	72	171	34	90	2	9	7	34	6	489
17. No. of Claims for which papers were forwarded to the Department for issue of title.	55	55	150	33	29	2	6	7	37	.....	374
18. No. of Forest Reserve Permits issued.	60	30	.....	.....	13	8	16	8	47	.....	182
19. No. of Substitute Miner's Licenses issued.	9	8	.....	1	8	1	41	.....	.....	.....	68

Mining Revenue

The revenue of the Department of Mines for the fiscal year ending October 31st, 1922, is given in detail hereunder:—

REVENUE FOR THE YEAR ENDING OCTOBER 31, 1922

Sales of Mining Land.....		\$28,495 89
Rent—		
Mining Leases.....	\$13,482 69	
Licenses of Occupation.....	6,784 74	
		20,267 43
Royalties.....		81,013 81
Fuel Investigation.....		7,614 57
Boring Permits.....		2,006 00
Sand and Gravel Royalty.....	\$100,954 65	
Sand and Gravel Licenses.....	5,578 00	
		106,532 65
Miner's Licenses.....	\$42,005 85	
Permits.....	1,770 00	
Recording Fees.....	43,518 70	
		87,294 55
Mining Tax Act—		
Acreage Tax.....	\$34,759 77	
Profit Tax.....	160,994 41	
Gas Tax.....	16,742 22	
		212,496 40
Casual Fees.....	\$3,873 06	
Patent Fees.....	190 00	
Timiskaming Testing Laboratories, fees.....	15,955 47	
Natural Gas Commissioner's Office, fees.....	1,593 50	
Draughtsmen, North Bay, fees.....	182 75	
Provincial Assay Office, fees.....	793 67	
Cable Testing Machine, fees.....	901 20	
		23,489 65
Refunds—		
Explorations and Investigations.....	\$538 96	
Mining Recorders.....	185 00	
Contingencies.....	284 24	
		1,008 20
Total.....		\$570,219 15

MINING LANDS SOLD AND LEASED IN YEAR ENDING OCTOBER 31, 1922¹

District	Sales			Leases			Total		
	No.	Acres	Amount	No.	Acres	Amount	No.	Acres	Amount
			\$			\$			\$
Timiskaming ...	217	8,601.06	18,265 67	232	9,107.61	2,302 20	449	17,708.67	20,567 87
Thunder Bay...	29	1,276.60	2,946 50	15	598.90	598 90	44	1,875.50	3,545 40
Sudbury.....	14	687.75	1,795 63	46	1,795.69	1,313 62	60	2,463.44	3,109 25
Algoma.....	32	1,470.53	3,717 01				32	1,470.53	3,717 01
Kenora.....	10	824.00	100 00				10	824.00	100 00
Nipissing.....				11	528.95	103 31	11	528.95	103 31
Elsewhere.....	12	460.40	820 51				12	460.40	820 51
Total.....	314	13,320.34	27,645 32	304	12,011.15	4,318 03	618	25,331.49	31,963 35

¹These figures do not agree with the first two items of the revenue statement above which records collections or moneys actually received during the fiscal year.

Under the Mining Tax Act, a graduated tax is levied on the net profits of mining companies in excess of \$10,000 per annum. The basal rate is 3 per cent.

The following statement, prepared by G. R. Mickle, Mine Assessor, gives details of the Profit Tax for the fiscal year ending October 31st, 1922.

DETAILS OF PROFIT TAX

Gold—

Hollinger Consolidated Gold Mines, Ltd.	\$110,986 63	
Dome Mines Company, Ltd.	5,079 55	
McIntyre Porcupine Mines, Ltd.	6,195 80	
Lake Shore Mines, Ltd.	3,458 15	
Teck-Hughes Gold Mines, Ltd.	683 73	
Wright-Hargreaves Mines, Ltd.	1,090 92	
		127,494 78

Silver—

Coniagas Mines, Ltd.	\$2,556 16	
La Rose Mines, Ltd.	1,303 82	
Nipissing Mining Company, Ltd.	29,639 65	
		33,499 63

Total..... \$160,994 41

Mining Companies Incorporated, Licensed, etc., 1913-1922

A synopsis of mining companies incorporated and licensed in Ontario during the past decade is given hereunder:—

Year	Incorporated		Licensed	
	Number	Capital	Number	Capital
1913	119	\$ 78,000,000	12	\$ 21,735,000
1914	80	39,030,000	13	5,445,000
1915	59	42,005,000	2	10,200,000
1916	83	109,079,500	8	7,011,650
1917	100	117,183,000	7	7,202,000
1918	71	49,800,000	7	15,000,000
1919	147	223,530,000	10	9,554,197
1920	119	146,094,000	12	9,435,000
1921	67	105,715,000	6	1,030,000
1922	92	181,540,000	6	830,500

The lists which follow on pages 49-51 record for the year 1922 the companies incorporated, licensed, etc.:—

MINING COMPANIES INCORPORATED IN ONTARIO IN 1922

Name of Company	Head Office	Date of Incorporation	Capital
			\$
Algonquin Mines, Ltd.	Toronto	Aug. 14	2,000,000
Allard Platinum & Gold Mg. Co. of Ont., Ltd.	Toronto	Mar. 3	50,000
Alschbach Gold Mining Company, Ltd., The	Kenogami Lake	Sept. 9	2,500,000
American Matachewan Gold Mines, Ltd.	Toronto	May 25	2,000,000
Anglo Porcupine Gold Mines, Ltd.	Toronto	May 17	3,000,000
Anglo-Saxon Gold Mines, Ltd.	Toronto	Oct. 13	3,000,000
Bancroft Mines Syndicate, Ltd.	Toronto	June 5	250,000
Beatty Gold Mines, Ltd.	Toronto	Aug. 11	2,000,000
Big Dyke Consolidated Gold Mines, Ltd.	Toronto	May 12	10,000,000
Bison Gold, Limited	Toronto	Aug. 15	40,000
Blanche River Kirkland Gold Mines, Ltd.	Toronto	Dec. 21	3,000,000
Border Mining Company, Ltd.	Toronto	Feb. 6	40,000
Brant-Kirkland Gold Mines, Ltd.	Toronto	Oct. 7	3,000,000
British-Colonial Gold Mines, Ltd.	Toronto	Jan. 12	500,000
British Lorrain Mines, Ltd.	Toronto	Nov. 17	1,000,000
Brookbank Gold Mining Company, Ltd.	Toronto	May 26	1,000,000
Buffalo Tisdale Mines, Ltd.	Toronto	Dec. 8	1,000,000
Cameron Porcupine Mines, Ltd., The	Timmins	Sept. 27	1,000,000
Canadel Gold, Ltd.	Timmins	Nov. 10	100,000
Canadian Lorrain Silver Mines, Ltd.	Haileybury	Apr. 18	2,000,000
Canadian Mining Syndicate, Ltd.	Toronto	May 5	250,000
Canadian Prospecting Company, Ltd.	Haileybury	Dec. 18	40,000
Castle-Trethewey Mines, Ltd.	Toronto	Jan. 20	2,000,000
Champion Gold Mines, Ltd.	Toronto	Oct. 11	500,000
Chippewa-Kirkland Mining Company, Ltd.	Toronto	Sept. 14	2,000,000
Columbus Kirkland Gold Mg. Company, Ltd.	Toronto	Oct. 30	2,500,000
Consolidated West Dome Lake Mines, Ltd.	Toronto	Aug. 4	5,000,000
Continental Mines, Ltd.	Sudbury	Apr. 26	2,500,000
Copper Lake Mining Company, Ltd.	Toronto	Feb. 17	500,000
Detroit-Goudreau Gold Development Co., Ltd.	Windsor	Jan. 11	2,500,000
Dufferin Coal Mining Company, Ltd.	Toronto	June 28	500,000
Dunwich Oil Company, Ltd.	Mimico	Sept. 28	100,000
Eureka Kirkland Gold Mines, Ltd.	Cobalt	Sept. 20	500,000
Gauthier Mines, Ltd., The	London	July 25	100,000
Gold Island Mining Company, Ltd.	Toronto	Oct. 18	5,000,000
Gold Range Mines, Ltd.	Sault Ste. Marie	Mar. 6	3,000,000
Gordon Murray Gold Mines, Ltd.	Toronto	May 29	2,500,000
Goudreau-Superior Mining Company, Ltd.	Windsor	Jan. 31	1,500,000
Grenfell-Kirkland Gold Mines, Ltd.	Toronto	Aug. 24	2,500,000
Grozzell Kirkland Gold Mines, Ltd.	Haileybury	Sept. 7	3,000,000
Harvey Kirkland Mines, Ltd.	Toronto	May 12	5,000,000
Hayden Gold Mines, Ltd.	Toronto	Jan. 24	5,000,000
Holding Consolidated Gold Mines, Ltd.	Toronto	Oct. 3	5,000,000
Industrial Minerals Corp'n of Can., Ltd.	Toronto	Jan. 26	150,000
Jarvis Gold Mines, Ltd.	Toronto	May 8	50,000
Kirkland Excelsior Gold Mines, Ltd., The	New Liskeard	Aug. 8	3,000,000
Kirkland Federal Mines, Ltd.	Toronto	June 1	2,500,000
Kirkland Gateway Gold Mines, Ltd.	Toronto	June 7	2,000,000
Mammoth Porcupine Mines, Ltd.	Toronto	Aug. 21	3,000,000
Matachewan Cairo Goldfields, Ltd.	Toronto	Sept. 9	40,000
Matachewan Canadian Gold, Ltd.	Toronto	May 13	5,000,000
Mawson, Syndicate, Ltd.	Toronto	Oct. 14	50,000
McDermott Gold Mines, Ltd.	Toronto	Nov. 9	3,000,000
McKenzie Porcupine Mines, Ltd.	S. Porcupine	Sept. 11	3,000,000
McQuire-Robinson Radium & By-Products, Ltd.	Parry Sound	Jan. 18	1,000,000
Meco-Catharine Development Company, Ltd.	Toronto	May 22	50,000
Menago Mining Company, Ltd., The	Sudbury	Mar. 22	200,000
Millions Lake Gold Mines, Ltd.	Toronto	May 10	2,000,000
Montreal-Ontario Mines, Ltd.	Kirkland Lake	Apr. 11	5,000,000
New York Porcupine Mines, Ltd.	Toronto	June 8	2,500,000
Night Hawk Peninsular Mines, Ltd.	Toronto	Mar. 24	5,000,000
Northern Canada Exploration & Development Corporation, Ltd.	Toronto	Dec. 4	5,000,000
Northern Ontario Mg & Development Co., Ltd.	Sudbury	Aug. 30	250,000
Northern Resources, Ltd.	Toronto	May 26	100,000

MINING COMPANIES INCORPORATED IN ONTARIO IN 1922—*Continued*

Name of Company	Head Office	Date of Incorporation	Capital
			\$
Ontario Anthracite Mines, Ltd.	Toronto	Mar. 2	500,000
Ontario-Lorrain Development Syndicate, Ltd.	Toronto	July 20	1,000,000
Ostrom-Catharine Development Company, Ltd.	Toronto	Mar. 2	50,000
Ossian Mines, Ltd.	Toronto	Dec. 1	200,000
Osweka Gold Mines, Ltd.	Cobalt	Oct. 9	3,000,000
Pawnee-Kirkland Gold Mines, Ltd.	Toronto	Apr. 18	3,000,000
Peace River Development Company, Ltd.	Toronto	Mar. 18	3,000,000
Peace River Drilling Company, Ltd.	Toronto	Mar. 8	1,500,000
Penn Kirkland Gold Mines, Ltd.	Toronto	Oct. 12	2,500,000
Porcupine Creek Mines, Ltd.	Toronto	June 5	3,000,000
Porcupine Grande Gold Mines, Ltd.	Toronto	Aug. 15	5,000,000
Porcupine Producer, Ltd.	Toronto	Oct. 26	2,000,000
Porter-Premier Gold Mines, Ltd.	Toronto	Jan. 19	2,500,000
Providence Gold Mines, Ltd.	Kirkland Lake	Jan. 26	2,000,000
Quill Mines, Ltd.	Toronto	Aug. 26	500,000
Rainbow Mines, Ltd.	Toronto	June 28	40,000
Shaw Porcupine Gold Mines, Ltd., The	Toronto	June 24	3,000,000
Shining Tree Consolidated Mines, Ltd.	Toronto	Dec. 6	5,000,000
South Argo Gold Mines, Ltd.	Toronto	May 18	2,000,000
Swastika Gold Mines, Ltd., The	Toronto	Nov. 8	2,000,000
Thomas Gold Mining Company, Ltd.	Toronto	June 14	600,000
Trainmen Silver Mining Company, Ltd.	Cobalt	Apr. 20	500,000
United Mineral Lands, Ltd.	Toronto	Oct. 31	40,000
United Molybdenum Corporation, Ltd.	Toronto	Jan. 16	750,000
Vickers Porcupine Mines, Ltd.	Toronto	Nov. 20	1,500,000
Vipond Consolidated Mines, Ltd.	Timmins	July 17	2,000,000
Wabigoon Soapstone Company, Limited	Toronto	Oct. 12	500,000
Wigwam Mining Company, Ltd., The	Elk Lake	June 1	2,000,000
Total—92			\$181,540,000

MINING COMPANIES LICENSED IN 1922

Name of Company	Head Office for Ontario	Date of License	Capital for use in Ontario
Coniagas Alkali and Reduction Company, Limited	St. Catharines	Oct. 17	\$400,000
E. J. Longyear Exploration Company	Sudbury	Nov. 8	30,000
North America Gold Corporation	Timmins	Nov. 8	300,000
Dryden Gold Corporation	Dryden	Sept. 26	50,000
Northern Area Development Company, Limited	Ottawa	May 25	500
LICENSE IN MORTMAIN			
Jefferson Mines, Limited		Nov. 8	50,000
Total—6			\$830,500

INCREASE OF CAPITAL STOCK IN 1922

Name of Company	Date	From	To
Beaumont Gold Mines, Limited	Sept. 28	\$2,000,000	\$3,000,000
Boston Creek Mining Company, Limited	June 17	2,000,000	4,000,000
Canadian Kirkland Gold Mining Company, Limited	Oct. 27	2,000,000	3,500,000
Canadian Non-Metallic Minerals, Limited	Feb. 18	40,000	100,000
Continental Mines, Limited	Sept. 13	2,500,000	3,500,000
Grace Mining Company, Limited, The	June 21	1,000,000	5,000,000
McEnaney Gold Mines, Limited, The	Oct. 23	3,000,000	4,000,000
Moffatt-Hall Gold Mines, Limited	May 23	3,000,000	5,000,000
Porcupine Crown Mines, Limited	Aug. 18	2,000,000	4,000,000

DECREASE OF CAPITAL STOCK IN 1922

Name of Company	Date	From	To
Dome Mines Company, Limited, The.....	Mar. 17	\$5,000,000	\$4,500,000
General Examining and Developing Company, Limited.	Dec. 8	800,000	500,000

CHANGE OF NAME IN 1922

From	To	Date
Burnand Gold Mines, Limited.....	Phosphate and Metals Mining, Limited...	Apr. 1
Northern Ontario Gold Mines, Limited...	McEnaney Gold Mines, Limited, The.....	Aug. 16
Silverado Extension, Limited.....	Pioneer Prospectors, Limited, The.....	Feb. 22
Swedish-Canadian Mines, Limited.....	British Canadian Mines, Limited.....	Dec. 7

MINING COMPANY CHARTERS SURRENDERED IN 1922

Name of Company	Date of Dissolution
Carveth Gold Mines, Limited.....	December 11
Central Operating Company, Limited.....	July 17
Hayden Gold Mines, Limited.....	November 27
Mikado Consolidated Gold Mines, Limited, The.....	February 27
Ontario Western Petroleum, Limited.....	December 11
South West Porcupine Syndicate, Limited.....	May 15

Provincial Assay Office

The Provincial Assayer, W. K. McNeill, reports as follows for the year 1922.

The Assay Office has been in operation without interruption during the entire year and the usual variety of work has been done with the assistance of T. E. Rothwell, Chemist and Assayer, and Robert Stewart, Laboratory Assistant.

The work during the year may be classified as follows:

FREE ASSAYS UNDER THE PROVISIONS OF THE MINING ACT OF ONTARIO

Mining Division	Samples Received for Free Assays
Kenora.....	35 for gold, 5 silver, 1 copper.
Fort Frances.....	21 for gold, 1 silver, 2 copper, 4 nickel, 1 iron.
Kowkash.....	36 for gold.
Sault Ste. Marie.....	115 for gold, 11 silver, 1 copper, 2 iron.
Sudbury.....	92 for gold, 7 silver, 1 tin, 1 copper.
Timiskaming.....	30 for gold, 16 silver, 1 copper, 1 iron, 2 cobalt.
Montreal River.....	23 for gold, 3 silver, 1 copper.
Porcupine.....	99 for gold, 18 silver, 1 alumina, 1 silica.
Gowganda.....	11 for gold, 8 silver.
Port Arthur.....	56 for gold, 12 silver, 2 copper, 2 nickel, 2 tungsten, 2 molybdenum, 4 iron, 4 platinum, 1 tin.
Larder Lake.....	210 for gold, 13 silver, 3 copper, 3 nickel, 1 platinum, 1 iron, 1 tin.
Eastern Ontario.....	13 for gold, 6 silver, 1 platinum, 1 potash.

The following is a statement of the samples submitted by the general public for which the regulation fee was charged, and also those submitted by geologists and officers of the Department of Mines.

CUSTOMS ASSAYING AND GENERAL WORK

Gold, Silver and platinum..	680 samples.
Copper.....	9 samples.
Feldspar.....	9 samples; 2 of these for complete analysis.
Rocks.....	12 samples were submitted by geologists of the Department of Mines for complete analysis.
Radium.....	40 samples were submitted on which reports were issued. A number were radio-active.
Identification.....	167 samples were received by mail and reports issued. A large number were brought directly to the Laboratory; of these no record was kept.
Miscellaneous.....	55 samples of other minerals were tested. These included tin, tungsten, iron, zinc, lead, cobalt, bismuth, antimony, etc.

The schedule of charges for the Provincial Assay Office and Chemical Laboratory is as follows:

TARIFF OF FEES FOR ANALYSES AND ASSAYS

<i>1. Assays:</i>		Fee
Gold.....		\$1 50
Silver.....		1 50
Gold and silver in one sample.....		2 50
Platinum minerals.....		5 00
Gold and platinum minerals in one sample.....		7 00
Separation of platinum minerals.....	Prices on application.	
<i>2. Iron Ores:</i>		
Iron (metallic).....		\$1 50
Silica.....		1 50
Iron and insoluble residue.....		2 50
Ferrous oxide.....		2 00
Phosphorus.....		3 00
Sulphur.....		2 50
Iron, sulphur, phosphorus and insoluble.....		8 00
Manganese.....		3 00
Titanium.....		4 00
Complete analysis.....	Prices on application.	
<i>3. Limestones, Dolomites, Marls, Clays, Shales:</i>		
Determination of:		
Insolubles.....		\$1 50
Silica.....		1 50
Ferric iron.....		3 00
Ferrous iron.....		2 00
Alumina.....		3 00
Lime.....		2 00
Magnesia.....		2 50
Potash.....		5 00
Soda.....		5 00
Alkalies (on one sample).....		6 00
Water (combined).....		2 00
Moisture.....		1 00
Carbon dioxide.....		2 00
Sulphur.....		2 50
Phosphorus anhydrite.....		3 00
<i>4. Examination of Clay, Shale, or Cement Rock for Cement Manufacture:</i>		
Determination of:		
Silica, Iron oxide, Alumina, Lime, Magnesia, Sulphur, and Volatile matter.....	Prices on application.	

5. *Coal, Coke, Peat, etc.:*

Determination of:	Fee
Moisture	\$1 00
Volatile combustible	1 50
Fixed carbon	1 50
Ash	1 50
Sulphur	2 50
Phosphorus	3 00
Caloric value (B.T.U.)	5 00
Ultimate analysis	Price on application.

6. *Mineral Waters* Price on application.7. *Ores and Minerals:*

Determination of:	Fee
Alumina	\$3 00
Antimony	4 00
Arsenic	4 00
Bismuth	4 00
Cadmium	4 00
Chromium	5 00
Cobalt	5 00
Nickel	5 00
Cobalt and nickel in same sample	6 00
Copper	2 00
Fluorite	4 00
Lead	3 00
Molybdenum	4 00
Manganese	3 00
Tin	4 00
Zinc	3 00

8. *Rocks, Complete Analysis* Price on application.9. *Slags, Sand, etc* Price on application.10. *Identification of Minerals and Rocks not Requiring Chemical Analysis* Free.11. *Test for Radio-Activity* Free.

Any analytical work not specified in this list will be undertaken on application to the Provincial Assayer.

The pulp of each sample is retained for future reference.

DIRECTIONS

Samples will be dealt with in the order of their arrival. In every instance specimens and samples should be accompanied by statement specifying the precise locality from which they were taken.

Crushed samples representing large quantities or samples less than five pounds weight may be sent by mail as third-class matter. Samples not exceeding eleven pounds in weight may be sent by parcel post. The name and address of sender should be written plainly on each parcel. Instructions, with money in payment of fees, should be contained in a separate letter. Samples may be sent by express, charges prepaid.

Sample bags addressed to this Laboratory for sending ore pulp by mail may be obtained free on application; also canvas bags for shipping.

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 sample to ensure prompt return of certificate, as no examination is commenced until the regulation fee is paid.

Samples should be addressed as follows:

Provincial Assay Office,

5 Queen's Park,

TORONTO, ONT.

Timiskaming Testing Laboratories

Campbell & Deyell, Limited, carried on the business of ore sampling and assaying in the town of Cobalt for some years prior to May 5, 1919, when the Temiskaming and Northern Ontario Railway Commission purchased their plant and subsequently operated it. The property on which the plant is situated is held under lease from La Rose Mines, Limited. This lease was assigned to the Ontario Government as represented by the Minister of Mines by Order in Council dated July 5, 1921. The plant was transferred July 1, 1921. Since that date the Department of Mines has maintained at Cobalt, under the management of A. A. Cole, Mining Engineer of the T. & N. O. Railway, and Geo. Dickson, Superintendent, laboratories for sampling, assaying, and the purchase of small lots of gold ores.

Following is a financial report for the year, together with receipts for the last half of 1921.

FINANCIAL STATEMENT OF THE TIMISKAMING TESTING LABORATORIES

Month	Earnings 1922	Expenditures 1922	Operating		Receipts	
			Profit 1922	Loss 1922	1922*	1921
January.....	\$1,131 95	\$1,572 15		\$440 20	\$2,305 41	
February.....	716 12	1,457 14		741 02	627 62	
March.....	900 63	1,457 37		556 74	931 90	
April.....	656 04	1,352 05		696 01	810 24	
May.....	1,605 74	1,433 81	\$171 93		736 59	
June.....	1,295 70	1,395 56		99 86	1,447 77	
July.....	1,320 31	1,251 88	68 43		759 59	\$600 35
August.....	2,854 45	2,047 76	536 69		1,081 32	1,096 53
September.....	2,125 56	1,842 20	283 36		2,657 54	1,501 52
October.....	2,325 44	1,933 00	392 44		2,139 94	772 92
November.....	2,199 75	1,834 94	364 81		2,587 75	1,186 05
December.....	887 82	1,595 33		707 51	2,010 52	1,271 50
Total.....	\$17,749 51	\$19,173 19		\$1,423 68	\$18,096 19	\$6,428 87

*In addition, from June to December, 1922, free assay coupons totalled \$64.50.

The following is a brief statement of the work of the year:

Assaying.—Gold, 2,771 samples; silver, 3,718; silver bullion, 438; cobalt, 166; nickel, 11; miscellaneous, 44; total, 7,148 samples.

Silver ore and concentrates milled, sampled, assayed and bullion melted.—50 lots weighing 944 tons, and 141 bars of bullion melted.

Ore Testing.—This consisted of 20 amalgamation, 7 flotation, 6 concentration, 21 cyanide and 6 screen tests.

Shipment of cobalt residues.—Moisture determinations were made on 196 cars in addition to weighing and sampling. Silver and cobalt assays were made for 25 cars.

Gold ore purchased.—Four lots of gold ore, weighing in all 3,193 pounds, were purchased. These lots assayed \$1.20 to \$246.25 per ton, the gross payment after deducting charges being \$121.38. The ore came from Painkiller lake, Matheson, Rickard township and Lightning river.

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