

2-3 EDWARD VII.

SESSIONAL PAPER No. 143

A. 1903

NATIONAL TRANSCONTINENTAL RAILWAY

RESOURCES OF THE COUNTRY

BETWEEN

QUEBEC AND WINNIPEG

ALONG THE LINE OF THE

GRAND TRUNK PACIFIC RAILWAY

(WITH MAP)

*Compiled from authentic sources by H. M. Ami, of the Geological
Survey Department, Ottawa*

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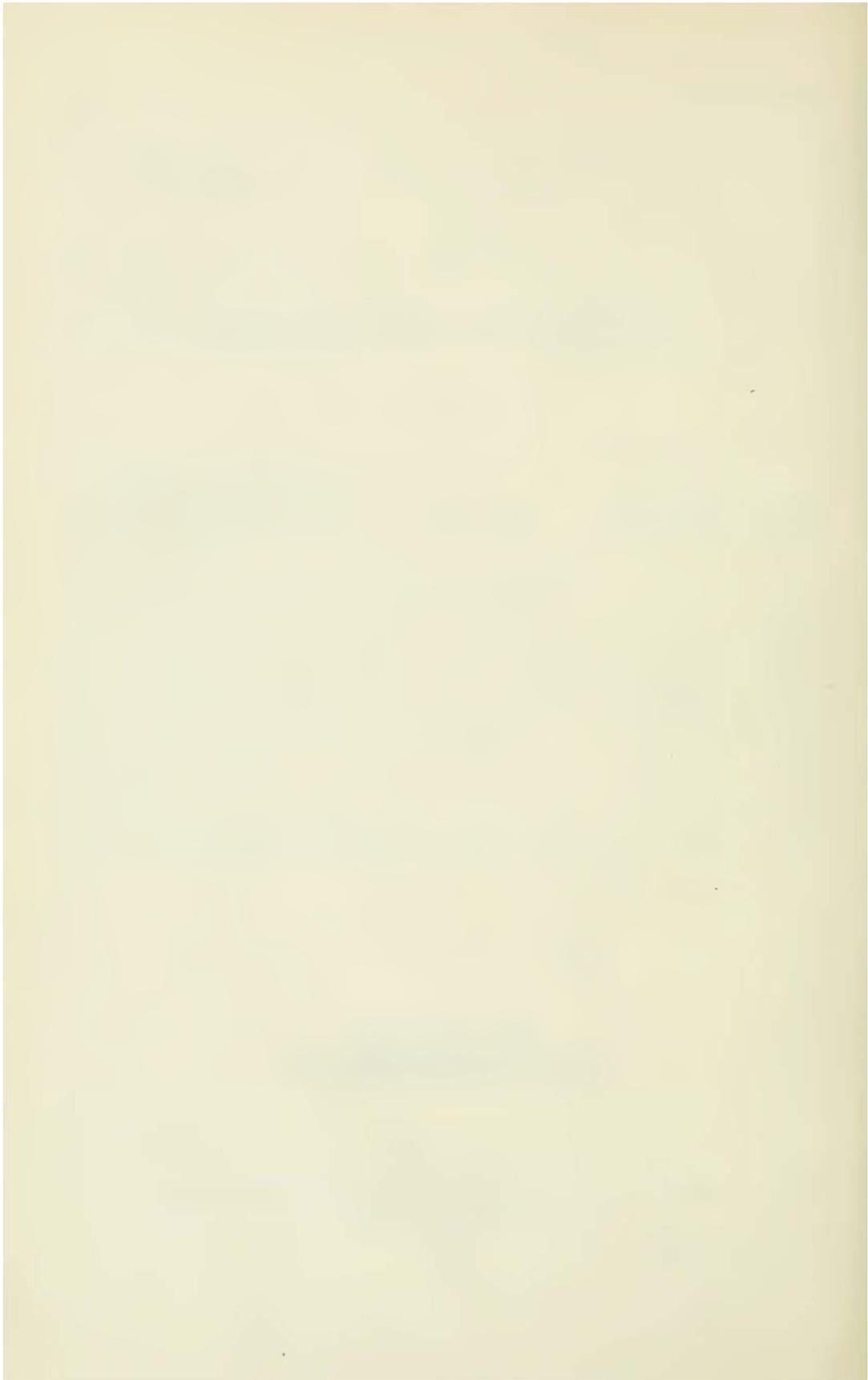


OTTAWA

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GEOLOGICAL SURVEY OF CANADA,
OTTAWA, September 3, 1903.

Right Hon. Sir WILFRID LAURIER, G.C.M.G., &c., &c.
Ottawa.

SIR,—In compliance with your request, I have the honour to transmit to you an account of the resources of the country between Quebec and Winnipeg along the line of the National Transcontinental Railway.

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

HENRY M. AML.



PREFACE

The following report contains a brief account of some of the resources of the country traversed by the National Transcontinental Railway between Quebec and Winnipeg.

With a view of better understanding the character of the country traversed, its physical features, soil, timber, mineral and other resources, the district has been divided into sections, 100 miles in length, taking in a belt of country seventy-five miles on each side of the proposed line of railway.

The twelve divisions comprise a total area of 180,000 square miles, each division comprising about 15,000 square miles.

For the sake of convenience these subdivisions are numbered in consecutive order from I to XII, beginning with the city of Quebec, in a westerly direction, to near Winnipeg, as follows :—

PROVINCE OF QUEBEC.

- I. Quebec Division.
- II. Saint Maurice Division.
- III. Upper Gatineau Division.
- IV. Upper Ottawa “

PROVINCE OF ONTARIO.

- V. Abitibi Division.
- VI. Upper Moose or Mattagami Division.
- VII. Mamattawan Division.
- VIII. Long Lake “
- IX. Nipigon Division.
- X. Lake Saint Joseph Division.
- XI. Lac Seul Division.
- XII. Lake of the Woods Division.

The information contained herein is compiled from reports of surveys and explorations made by the Geological Survey of Canada from 1843 to 1903, the Crown Lands Departments of Ontario and Quebec, as well as from other authentic sources.

Only such reports as deal with the country along the line of the transcontinental railway from Quebec to Winnipeg are included. It will be seen that whilst many of the reports of surveys and explorations cited deal more particularly with the division under which they are referred, nevertheless, there occur several instances where the details given along lines of explorations oftentimes overlap.

Chapters I to XII correspond to the divisions along the line of railway numbered from I to XII.

Chapters XIII and XIV are supplementary and deal with the explorations in Northern Ontario, and the resources of the Hudson Bay Basin respectively. Chapter XV is a summary of notes and general conclusions.

A list of the principal sources of information cited has been added. The works of reference consulted number in all nearly 10,000 pages.

TABLE OF CONTENTS

CHAPTER I.

QUEBEC DIVISION.

Counties traversed.—Lakes N. of St. Lawrence in Quebec Division.—Rivers, ditto.—Railways already in existence.—General Description, abstracts.—Character of Country.—Timber.—Climate.—Animals.—Water Power.—Minerals.—Surveys, pp. 1-3.

CHAPTER II.

ST. MAURICE DIVISION.

Counties traversed.—Lakes of this Division.—Rivers, ditto.—General Description. Summary of Reports.—Character of Country.—Timber.—Climate.—Surveys.—Water Power.—Animals.—Minerals.—Crown Lands Department Report for 1874-75.—Importance of St. Maurice Valley.—Extent of Basin.—Extract from Report of 1856.—Bouchette's Report for 1830.—Chains of Hills, not continuous.—Timber.—Arable land around lakes. Mr. Henry O'Sullivan's Report for 1901 :—Exploration from Quebec to James' Bay.—Nottaway River Valley Level Clay land.—Lake Matagami.—Soil.—Gently rolling clay land.—Timber.—Fish.—Water Power.—Dr. Bell quoted.—Huronian mineral-bearing Belt.—Mr. A. P. Low quoted.—Copper Ore at Lake Chibouganou. Sir William Logan's Report :—Timber varied and of excellent quality.—Farms established by Hamilton Bros. 90 miles up Rouge River, pp. 4-10.

CHAPTER III.

UPPER GATINEAU DIVISION.

Counties traversed.—Lakes.—Rivers.—Hudson Bay Post.—Character of Country.—Soil.—Timber.—Minerals.—Water Power.—Climate.—Surveys. Richardson's Report :—Gatineau River from River Desert to Height of Land.—Land under cultivation.—Soil.—Timber.—Character of River.—Hardwood limit.—230 miles North of Ottawa City.—Character of Country.—Soil.—Timber.—St. Maurice River.—Headwaters of Gatineau and St. Maurice.—Level plain.—Iron sand.—Well wooded as far as Loon Lake.—Pasture land.—Lake Traverse region.—Timber.—Hills two or three miles from Lake.—Clearwater River.—Sandy and Barren soil. Report :—Notice of Exploration.—Timber.—Hilly character of the Country. Henry O'Sullivan's Report :—Coulonge River.—Timber.—Lakes.—Timber.—Gently rolling country.—Nine Mile Bay.—Good flats and fair showing of Timber. Mr. Wagner's Report for 1868 :—Lake Bouchette.—River Desert.—Undulating country.—Timber.—Agriculture.—Mountains. Mr. H. C. Symmes' Report for 1867 :—Headwaters of the Ottawa.—Physical features.—Climate.—Crops.—Fauna, pp. 11-21.

CHAPTER IV.

UPPER OTTAWA DIVISION.

Lakes.—Rivers.—Hudson Bay Posts. Summary of Division IV :—Character of Country.—Soil.—Minerals.—Timber.—Hudson Bay Co's. Posts.—Principal Streams.—Surveys.—Water Power. Dr. A. E. Barlow's Report :—Pontiac and Nipissing Districts.—Synopsis of Surveys made.—Quinze River Survey.—Forrest Line.—Sinclair Line.—Russell's Surveys.—McKenzie's and Rowan's Surveys.—McQuat's Surveys.—Boundary Surveys.—C.P.R. Surveys.—Soil.—Agricultural Land.—Level clay Land.—Progress of Spring.—Summer frosts.—Draining required.—Timber.—Jackpine.—Spruce.—Cedar.—White Birch.—Balsam Hemlock.—Maple.—Oak, &c. Report of John Sullivan :—Temiscaming District.—Timber.—Route to Hudson Bay.—Lake Winnowaya.—Good Land.—Climate at Head of Lake Temiscaming.—Wheat.—Hay and Oats. Report of John Bignell :—Upper Ottawa Country.—Character of Country.—Fur-bearing Animals.—Timber.—Pine.—Farming Land. Dr. Bell's Map and Report on North-western Quebec :—Surveys.—Report.—Geology.—Mr. Brock's Survey from Lake Waswanipi to L. Mistassini.—Great Plateau. Lindsay Russell's and H. C. Symmes's Reports :—Upper Ottawa waters.—Results of Surveys compared.—Uniform level character of country.—Geographical data. Rock formation.—Boundary Line.—Gatineau and Jean (or Gens) des Terres Sections.—Rouge and Du Lièvre Sections.—Superior quality of Land.—1,500,000 acres of land fit for settlement.—Timber.—Upper Batiscan River Valley. Lindsay Russell's Report for 1868 :—Route of Survey and Exploration.—Character of country.—Soil.—Clay.—Timber.—Small Fruits.—Fish.—Fur-bearing Animals.—Game.—Climate. Mr. John O'Sullivan's Report for 1882 :—Resources. Mr. John O'Sullivan's Report for 1883 :—Good agricultural Land.—Level and well Timbered.—Character of country.—Direction of Line.—Land Rolling and Swampy.—Good Land between Roger's Lake and the Ottawa.—Climate. Mr. John Bignell's Report for 1887 :—The Upper Ottawa.—Start of Journey.—Kapitajewano River.—Rapids.—Settlements pp. 22-24.

CHAPTER V.

ABITIBI DIVISION.

District of Nipissing—Lakes—Rivers—Hudson Bay Company's Posts. Summary of resources of Division V :—Minerals—Timber—Soil and Climate—Opening and closing of Lake Abitibi—Surveys. Reports :—Report of Mr. Walter McQuat between Lakes Temiscaming and Abitibi—Route of survey described—Economic minerals—Iron, copper, magnetic iron pyrites, steatite, roofing slates—Timber—Soil and climate—Blanche River—Lake Abitibi—Farming at Hudson Bay Company's Post. Cochrane's Report to Dr. Bell :—Survey of Abitibi River.—Ascent of river—Smooth stretches—Character of country—Rocks and minerals—Lignite. Dr. Bell's report of the Basin of the Moose River :—Report and map—Soil—Missinaibi and Kapuskasing rivers. Dr. Bell's Report of country on the confines of Ontario and Quebec :—Temiscaming to Abitibi—Logan's previous surveys—Districts examined—Frederick House River—Explorations to sources of the Ottawa River—Barrier Lake—Source of the Ottawa—Sources of the Gatineau—Notes of observations made. Mr. W. A. Parks's Report along the Abitibi, Moose and Missinaibi in 1899 :—Clay soil—Timber resources—Mineral resources—Water powers—Fur and game. Additional extracts :—Frederick House Lake—Huronian rocks—Timber—Marshy tract. Report by

SESSIONAL PAPER No. 143

J. F. Johnston on eastern part of Abitibi region :—Timber—Soil—Game. Notes by W. J. Wilson on the western part of Abitibi region :—Game—Rich agricultural land—Forest growth—Kakameonan Lake—North River and its minerals—Kawagama River—Opening and closing of Lake Abitibi. Dr. Ells's report of portion of Ottawa and Pontiac Counties :—Ord's surveys—Gatineau River—Upper Lièvre River—Good land—Mica and timber—Level and drift-covered country, pp. 45-66.

CHAPTER VI.

UPPER MOOSE OR MATTAGAMI RIVER DIVISION (ALGOMA).

Lakes.—Rivers.—Hudson Bay Company's Posts. Summary :—Character of country.—Timber.—Soil.—Climate.—Minerals. Reports :—Extracts from Report of W. A. Charlton on the Hudson Bay Railway Route via Missinaibi and Valley of Moose River.—Maps.—Coal River.—Hudson Bay.—Moose River.—Soil.—Timber.—Minerals.—Borron's Report.—China Clay.—Fine Sand.—Professor Bell quoted.—Navigation.—Pulpwood. Dr. R. Bell's Report on the country between James' Bay and Lakes Superior and Huron :—Mineral-bearing rocks.—Surveys.—Portages, pp. 67-74.

CHAPTER VII.

KABINAKAGAMI DIVISION (ALGOMA).

Lakes.—Rivers.—Hudson Bay Post.—Altitudes. Summary :—Character of country.—Soil.—Timber.—Minerals.—Streams. Synopsis of Results of exploration of Northern Ontario.—Resources.—Arable Land.—Climate.—Pulpwood Forests, pp. 75-77.

CHAPTER VIII.

LONG LAKE DIVISION.

Lakes.—Rivers. Summary :—Character of Country.—Soil.—Timber.—Minerals, p. 78.

CHAPTER IX.

NEPIGON DIVISION.

Lakes.—Rivers.—Hudson Bay Company's Posts. Summary :—Character of the Country.—Timber.—Minerals.—Climate.—Surveys. Reports :—Dr. Bell's Report of Country between Lake Superior and the Albany River.—Nepigon Region.—Surveys.—Wabinoosh River.—Aspect of the Country.—Soil.—Ogoké River.—Kenogami River.—Lignite, Bagutchewan River.—Stiff gravelly Clay and Boulders. Report by Dr. Bell on the Lake Nepigon :—Surveys.—Railway Route.—Herriek's Line.—Railway Route and Colonization.—Soil.—Climate and Timber. Mr. J. W. Bain's Report on Lake Nepigon Region :—Topography of Iron Belt.—Clay.—Rocky ridges.—Iron Band described.—Analyses. Mr. W. A. Parks's Report of country North of Lake Nepigon :—Area described.—Physiography.—Nature of surface erosion.—Height of Land.—Soil, Clay and Sand.—Timber. Mr. W. McInnes's Report of country West of Lake Nipigon :—Surveys.—Topography.—Soil.—Game.—Fish, pp. 79-92.

CHAPTER X.

LAKE ST. JOSEPH DIVISION—THUNDER BAY DISTRICT.

Lakes.—Rivers.—Hudson Bay Posts. Dr. A. W. G. Wilson's Report about Headwaters of Albany River.—Instructions and Surveys.—Locating belt of Huronian rocks.—Topography, pp. 93-95.

CHAPTER XI.

LAC SEUL DIVISION—RAINY RIVER, DISTRICT OF ONTARIO.

Lakes.—Rivers.—Hudson Bay Company's Post.—Summary :—Character of Country.—Timber.—Minerals.—Animals. Mr. W. McInnes' Report on Resources of Rainy River District for 1899 :—Hay Meadows.—Locations of Free Gold.—Generally rolling country. Report of Mr. McInnes' Explorations in the Lac Seul Area :—Lac Seul Area.—Atikokan Iron Belt.—Gold-bearing Belt-Drift area.—Terraces.—Prospecting for Gold.—Mining Locations.—Iron Belt.—Mining in progress, pp. 96-100.

CHAPTER XII.

LAKE OF THE WOODS DIVISION.

Lakes.—Rivers.—Summary :—Character of Country.—Timber.—Minerals.—Soil.—Dr. G. M. Dawson's Report on the Resources of the Forty-Ninth Parallel.—Former Geological Explorers.—Mr. Sandford Fleming's Canadian Pacific Railway Report for 1877.—Notices of Surveys within the Area of the Divisions.—Work accomplished.—Topography.—Forest Lands.—Mineral Wealth.—Snowfall less in Woodland Region than in Ottawa, pp. 101-106.

CHAPTER XIII.

REPORT OF SURVEY AND EXPLORATION OF NORTHERN ONTARIO FOR 1900.

Note.—Synopsis.—Resources.—Arable Land.—Climate.—Pulpwood Forest. Digest of the ten Surveys and Explorations undertaken by the Ontario Government in 1900 : District No. 1, Abitibi Division :—Route of Survey.—Clay loam south of Lake Abitibi.—Rocky Hills white pine scarce north of the Height of Land. District No. 2, Upper Moose or Mattagami Division :—Character of Country.—Timber.—Rock formations.—Water Power.—Climate. District No. 4, Upper Moose or Mattagami Division :—Character of Country.—Timber.—Rock formations. District No. 5, Kabinakagami Division :—Soil.—Character of the Country.—Timber.—Rock formations.—Climate. District No. 6, Kabinakagami Division :—Agricultural capabilities.—Forests.—Rock formations.—Water Power.—Fish.—Climate. District No. 7, Long Lake Division :—Character of the Country.—Timber.—Rock formation.—Game. District No. 8, Nepigon Division :—Character of Country.—Rock formations.—Streams, game, &c. District No. 9, Lake St. Joseph Division :—Character of Country.—Timber.—Rock formations. District No. 10, Lac Seul and Lake of the Woods Divisions :—Character of Country.—Timber.—Minerals.—Game, water power, &c.—Notice of Map accompanying Report, pp. 107-119.

SESSIONAL PAPER No. 143

CHAPTER XIV.

RESOURCES OF THE HUDSON BAY BASIN.

Extracts from Dr. S. E. Dawson's work :—The Bay.—The Coast.—Drainage Basin.—Rivers—Churchill—Nelson—Hayes—Severn—Moose—Rupert's—East Main—Geology.—Minerals.—Climate.—Fisheries.—Fur-bearing Animals. Mr. A. P. Low's statement:—Cereals.—Soil.—Character of Country.—Drainage required.—Minerals.—Fisheries.—True Cod.—Note. Ogilvie's Report of Exploration to Hudson Bay :—Route.—Low Hills.—Fine Scenery.—Hudson Bay Post.—Moose River.—Moose Factory.—James's Bay distributing point.—Character of the surface and agricultural capabilities.—Garden at Abitibi.—Climatic conditions.—Extract from H. B. Co.'s Journals.—Gardens at Moose and Rupert's House.—Indifferent success.—Cattle.—Grass.—Hay.—Timber resources.—Minerals—New Post—Furs.—Fish—Porpoise—Seals.—Fowl. Dr. Bell's Letter :—Hudson Bay Basin.—Territory fit for settlement.—Good land.—Temperatures.—Snowfall.—Soil.—Objection raised.—Pine.—Other trees.—Minerals.—Coal.—Fish. Dr. R. Bell's Report on H. B. Basin for 1878-1879 :—Clay deposits.—Timber.—Crops.—Cattle.—Clay escarpments. Mr. H. O'Sullivan's Report for 1901 :—Railway lines.—Route.—Character of country.—Lake Matagami.—Mountain range.—Soil.—Swampy tract.—Timber.—Dr. Bell quoted.—Mr. Low quoted.—Mr. Low's note on the clay deposits of Hudson Bay Basin :—Statement. Mr. Wilson's Report for 1902 :—Instructions.—Survey.—Kapiskau Valley.—Clay, sand and shells.—Physical features. Kwatabohegan river.—Peat beds.—Track surveys checked.—Abitibi.—Climate and game.—Fish. Mr. E. B. Borron's Report of 1882 :—Object of explorations.—Divisions.—Peat.—Laurentian rocks.—Source of clay.—Second plateau.—Drift-covered region.—Soil.—Climate.—Crops.—Temperatures.—Mineral resources.—Iron.—Gypsum.—Rock exposures few.—Timber.—Bush fires.—Reforestation.—Opening up and settlement of country, pp. 120-163.

CHAPTER XV.

SUMMARY OF NOTES AND CONCLUSIONS.

Height of Land crossings :—Divide.—Nine crossings enumerated. Geological Survey map, 1842-1882 :—Huronian mineral-bearing belts :—Eastern belt.—Second belt.—Third belt.—Western belt. Meteorological observations :—Average summer temperatures between Quebec and Port Simpson. Moose river basin, by Dr. Bell :—Surveys.—Map.—Mineral-bearing rocks. Report of Royal Commission, Ontario, 1890 :—Minerals. Altitudes :—Trees found within railway belt. Surveys and explorations for past sixty years :—Geological surveys.—Other surveys.—Reports published.—Capabilities.—Timber limits.—Ontario Reports, farming operations.—Altitudes.—Hudson Bay basin.—Flora.—Mineral occurrences.—Quebec end.—North-western Quebec.—Mr. Gillies' statement regarding crops at Fort George.—Obstacles few.—Laurentide axis. Fleming's C. P. R. surveys for 1877 :—Resources, pp. 164-174.

CHAPTER I.

QUEBEC DIVISION.

Counties traversed.—Lakes North of the St. Lawrence in Quebec Division.—Rivers, ditto.—Railways already in Existence.—General Description.—Summary: Character of Country—Timber—Climate—Animals—Water Power—Minerals—Surveys.

Counties North of the St. Lawrence River: Montmorency, Quebec, Portneuf, Champlain, St. Maurice, Maskinongé, Berthier.

LAKES.	RIVERS.
Batiscon,	Shawenigan,
Mekinak,	St. Maurice and tributaries,
Edward,	St. Anne,
Lac des Commissaires,	Montmorency,
La Tortue,	Jacques Cartier,
Lac Clair,	Maskinongé,
Netasconac,	Batiscon,
Wayagamak, and many others.	Metabetchouan (ft. n.), and many others.

RAILWAYS.

Quebec and Lake St. John Railway;
Canadian Pacific Railway (North Shore);
Grandes Piles Branch, up the St. Maurice about forty miles.

This Quebec division includes the narrow flat lying and bordering alluvial and marine plain of the St. Lawrence, north and north-west of which the Laurentide Hills raise their well-wooded and majestic heads in beauty and grandeur, presenting a bold front in their southern exposure. It is well known that these hills lose their rugged appearance to the north—the country resembling more a generally level plateau. The St. Maurice River offers a natural highway into that well-timbered and well-watered region, which could be easily taken advantage of in reaching the broad and more generally level country along the height of land.

SUMMARY OF QUÉBEC DIVISION.

Character of Country.—Typical Laurentian country, rounded hills and valleys, with lakes and rivers everywhere.

Route.

In a northwesterly direction from the city of Quebec it is not difficult to reach the St. Maurice. The Lake St. John Railway runs in that direction quite a distance, and from the point near Rivière à Pierre in a northwesterly direction towards La Tuque and Iroquois Chute. Thence to the height of land there are no obstacles of any account, a general level plateau is struck which can be followed in a westerly direction for 800 miles, not varying 200 ft. in that distance.

Timber.—Abundant. Pine (red and white), spruce, cedar, tamarack, &c., &c.

Climate.—Same as in Quebec.

Animals.—Abundant, and the whole country is a paradise for trappers.

Minerals.—Iron, mica, plumbago, and other Laurentian materials.

Surveys.—Mr. Joseph Bouchette, Lieut. F. L. Ingall; Mr. H. O'Sullivan and Officers of Crown Lands Dept., from 1823-1901; Sir W. Logan, Murray, Richardson, Ells, Low, Ord, &c., of Geol. Survey Dept.

Excellent and valuable water-powers all along streams.

The St. Maurice valley can be easily reached and forms a natural highway towards the generally level tableland to the north.

EXPLANATORY NOTE.

Numerous surveys made.

Inasmuch as the area comprised within the Quebec division is either already fairly well or as yet only sparsely settled in its southern and central portions, it will not be deemed necessary to enter into details of the results of the numerous surveys and explorations made. From the time of Champlain and even anterior to that period in Canadian history, the Quebec city region has been well known. There is a zone or belt of flat undulating and alluvial land consisting of sand and clay loam which occupies the Saint Lawrence valley proper.

To the north, the country is generally hilly. The Laurentide Hills present a bold front here as they do all along their southern border. In a north-westerly direction as well as north of the city of Quebec, the hilly character of the country obtains for a considerable stretch, nevertheless, it is a well-known fact that a more open and less distinctly rugged country occurs as we proceed towards the height of land.

Quebec to James's Bay.

Along a line drawn from the city of Quebec to James's Bay, when the height of land is crossed, a comparatively level plateau is reached

SESSIONAL PAPER No. 143

where an easy grade can be obtained. All the reports consulted agree upon this point that there is a level tract of country from the headwaters of the Gatineau to Lake Mistassini. Between the city of Quebec and the height of land, the great valley or highway of the Saint Maurice river may be taken advantage of. As regards a line of railway through this region, there exists already at the disposal of engineers and surveyors an actual survey of a railroad line from Quebec to James's Bay, which, I am informed presents no serious obstacles whatever. The Laurentide Hills are not made up of continuous chains of hills which as a rule present barriers, but consist of innumerable bosses placed here and there, between which, on one side or the other, it is quite possible to obtain a valley suitable for a roadway or railroad line. The fact that the Saint Maurice river is navigable for upwards of seventy miles without interruption and forms a natural highway to the height of land, clearly points to the direction of least resistance, as well as easy grades.

CHAPTER II.

ST. MAURICE DIVISION.

Counties traversed.—Lakes of this Division,—Rivers ditto.—General Description.—Summary of Reports.—Character of Country.—Timber.—Climate.—Surveys.—Water Power.—Animals.—Minerals.—Crown Lands Department Report for 1874-75.—Importance of St. Maurice Valley.—Extent of Basin.—Extract from Report of 1856.—Bouchette's Report for 1830.—Chains of Hills not continuous.—Timber.—Arable land around lakes.—Mr. Henry O'Sullivan's Report for 1901.—Exploration from Quebec to James's Bay.—Nottaway River Valley.—Level Clay land.—Lake Mattagami—Soil.—Gently rolling clay land.—Timber.—Fish.—Water Power.—Dr. Bell quoted.—Huronian mineral-bearing Belt.—Mr. A. P. Low quoted.—Copper Ore at Lake Chibougamou.—Sir William Logan's Report.—Timber varied and of excellent quality.—Farms established by Hamilton Bros. 90 miles up Rouge River.

Upper portion of counties of Champlain, St. Maurice, Maskinongé, Berthier, Joliette.

LAKES.	RIVERS.
Assiwanah (1289),	St. Maurice and tributaries :—
Noudonak,	Ribbon,
Doré,	Windigo,
La Culotte,	Flamand,
Vemikachi,	Vermilion,
Nanuan,	Mattawin,
Kemft,	R. du Milieu,
Tourbis,	Post,
Cypress,	Trenche.
Oukammis.	

SUMMARY OF ST. MAURICE DIVISION.

Character of the country.—Country less hilly as we proceed towards head waters of St. Maurice and Rouge rivers.

Hills disappear at the height of land. (Joseph Bouchette, 1829 survey).

At three hundred and eighty miles from its mouth the St. Maurice is still a large river

SESSIONAL PAPER No. 143

Above Grand Piles station, last station up the St. Maurice Valley, navigation is good for seventy miles.

Good agricultural land in numerous areas, 3,000,000 acres fit for Good farming. settlement. Farming by Hamilton Bros. 90 miles up the Rouge river successful. (See report by Sir Wm. Logan on Rouge River on page 10).

Timber.—Well timbered country. Red and white and jack pines, spruce, tamarack and hemlock; birch, maple, beech and other hardwood trees, growth luxuriant.

Climate.—Climate is not any more severe than that of Quebec.

Surveys.—Numerous surveys by Richardson, Ingall, Bouchette, and other surveyors and explorers and geologists have been made.

Water Power.—Excellent water power all along the streams discharging into the St. Maurice.

Animals.—Excellent fishing in all the lakes and streams of this division, and the St. Maurice Valley forms an excellent hunting ground for trappers, to this day.

REPORT OF THE COMMISSIONER OF CROWN LANDS OF
THE PROVINCE OF QUEBEC FOR 1874-75.

St. Maurice River.

In his report for 1874-1875, printed by order of the Legislative Assembly, the Commissioner of Crown Lands of Quebec, Mr. H. G. Malhiot, describes the valley of the Saint Maurice as follows:—

‘To give an idea of the importance of the valley of the St. Maurice and of the vast field which it offers to commerce, industry and the colonization, it will suffice to state that the territory watered by the St. Maurice and its tributaries is 18,020 square miles in extent, and the greatest part of it is thickly wooded. Eight thousand and forty-five square miles of this forest are under license, producing a revenue of about \$70,000 a year, and capable of producing much more. This territory contains about 3,000,000 acres of land fit for settlement. The river St. Maurice, one of the largest in the province, is navigable for a great part of its length, from the Grand Piles Falls to about twenty-eight miles from its mouth; and when the Piles railway now undertaken, and which will connect the navigable waters of the St. Maurice and the St. Lawrence, is constructed, it will afford to settlers and immigrants an easy route by which to reach the interior of this vast region.’

Area of
district.

Commissioners' Report for 1856.

The following extract is taken from the report of the Commissioner of Crown Lands for the year 1856, with reference to this river:—

‘At three hundred and eighty miles from its mouth, where the survey of it terminated it is still a large river.

‘Besides its value as a means of sending down timber from a great distance its navigable reaches are so considerable as to be of much importance alike to the lumber trade and to the settlement of the country.

Navigation.

‘From the mouth of the river to the Grand Piles, a distance of thirty-three miles, the navigation is interrupted by the great falls of Shawenegan, one hundred and sixty feet in height, and other rapids and falls below and above them. Above the Grand Piles the navigation is good for seventy miles to La Tuque. A steamboat already plies on this part.

‘From La Tuque it is again interrupted for the thirty-four miles to Grand Détour; thence to Weymontachinque, forty-six miles, it is again navigable for steamers, then for thirty-six miles the navigation is again interrupted by rapids, above which it is uninterruptedly navigable for eighty miles. Thus presenting a hundred and ninety miles above the termination of the Grand Piles road, out of the two hundred and sixty, navigable for steamboats in reaches of such extent as to render their employment profitable.’

EXPLORATIONS ON THE ST. MAURICE, &c.

By JOSEPH BOUCHETTE, 1830.

St. Maurice to Lake St. John.

In a Journal of the St. Maurice exploring party, one of the expeditions fitted out under Commissioners appointed by Government to carry into execution an ‘Act of the Provincial Legislature of Lower Canada,’ Joseph Bouchette jr., Deputy Surveyor General, describes the ‘country between the St. Maurice and Lake St. John’ as follows: ‘I find it intersected by rivers and their innumerable tributaries rising more generally in the lakes and the immense swamps which cover this section of the Province. The essential feature of the land is its unfitness for cultivation, being composed for the most part of light sandy soil, or partaking of a rocky nature. It is frequently broken by chains of hills but of no continuity. The cliffs which in many cases discover their barren nature are principally composed of granite of irregular stratification. The hills disappear at the height of land

SESSIONAL PAPER No. 143

between the different waters where the common feature is an extensive spruce or tamarack swamp, frequently rocky or of a shaking boggy nature.

TIMBER.

The prevalent timber to be met with is spruce, tamarack, fir, white Pine, birch, pine and some cedar.

Around some of the large lakes some arable land is to be found, but so uncomeatable that it must ever remain waste and uncultivated. Indeed, upon the whole, this portion of the country appears to me to be yet in the primitive stage of its formation which I believe could be easily traced by a geologist, and therefore ages may perfect a tract which now is absolutely unfit for cultivation.

EXTRACT FROM MR. HENRY O'SULLIVAN'S REPORT
FOR 1901.

In 1901 Mr. H. O'Sullivan, Inspector of Surveys, D.L.S. &c., ^{North-west-ern Quebec.} Quebec, issued his Second Report of Progress of Exploration in the country between Lake St. John and James Bay, including the region of Lake Mistassini and the Basins of the great Nottaway and Rupert Rivers together with a key-plan to accompany remarks on the different proposed railways between Quebec and James Bay made under his directions from the Department of Colonization and Mines, Quebec.

This report contains sixty-nine pages of text and a map giving the approximate location of different railway lines from the City of Quebec to James Bay, Hannah Bay where the Ontario and Quebec interprovincial boundary line meets the salt waters of the bay.

This map indicates on a small scale the various lines of survey known to date and throughout the province of Quebec.

REPORT OF THE RIVER NOTTAWAY FROM THE DISCHARGE
OF GULL LAKE TO ITS MOUTH AT TIDE
WATER ON JAMES BAY.

Starting from Gull Lake, 660 ft. above sea-level, the discharge ^{Gull Lake.} draws off north-westward and sweeps round to west in a strong rapid, half a mile in length and giving a fall of six feet, and then it runs in a northerly direction one mile and a half amid rapids and expanses

2-3 EDWARD VII., A. 1903

then turns northeast where it falls off in racy rapids nearly a mile in length, giving a total fall of twenty feet since we left Gull Lake, distance $3\frac{1}{2}$ miles.

SLOPING AND LEVEL CLAY LAND.

Timber. The country on either side is level or gently sloping clay land, timbered mostly with gray and black spruce, bouleau and poplar.

The country around here is level or gently rolling clay land and fairly well timbered with mixed spruce, poplar and bouleau, but south of the lake, hills from two to three hundred feet in elevation, are seen not far off.

LAKE MATAGAMI.

Lake Matagami is a magnificent sheet of water ; its extreme length from east to west is twenty-four miles, and from one to three miles wide, excepting at its westerly end where it broadens out to about six miles in width, and encloses several beautiful islands.

Near its southwesterly end the broad majestic Mekiscan river, described in my report of May, 1895, comes in from the south.

Spruce. South of the lake and east of the Mekiscan a range of mountains parallel to the lake rises from five to six hundred feet above its level ; in every other direction the land is level or gently rolling and well timbered with spruce, fir, bouleau and poplar.

SOIL.

The soil is a rich brownish clay and outcroppings of Huronian rocks are seen here and there along the shore.

On page 52 of his report he writes :—The soil is a good clayey loam and free from stones as far as we could see from occasional runs made inland.

GENTLY ROLLING CLAY LAND.

Spruce. The country on either side all along is level or gently rolling clay land, well timbered with black and gray spruce, bouleau, poplar, larch, with cypres here and there on the drier knolls.

TIMBER.

The country around here is low and swampy and generally covered with black spruce and tamarack. There are no stones and the water is so muddy that even the fish can hardly see through it.

SESSIONAL PAPER No. 143

FISH.

These waters are alive with fish ; in going up and down the river the Indians killed several large pike and doré with their paddles ; they did not appear to see us or move until touched by the canoe or paddles, and then they jumped clean out of the water as if trying to see what was the matter.

CHARACTER OF COUNTRY.

The country on either side is level or gently rolling clay land ^{timbered} chiefly with black spruce and tamarack.

Below the island the river rolls rapidly north-westward for five miles falling ten feet in the said distance and then flows placidly three miles on a due westerly course.

WATER POWER.

At the end of the latter distance the whole river passes through a narrow gorge not a hundred yards in width. The fall here is ten feet, but by damming the river over thirty feet head can be easily had, which would give over 160,000 available horse power.

DR. BELL QUOTED.

On page 57 Mr. O'Sullivan gives a chapter on the geology of the ^{Geology of} district traversed and adds notes by Dr. Bell, as follows :—The whole ^{district.} country is underlaid with Archæan rocks ; these are divided into the Laurentian and the Huronian which constitute the base of the mineral bearing rocks in Canada east of the Rocky mountains.

HURONIAN MINERAL-BEARING BELT.

The largest Huronian belt so far known is the one which Dr. Bell has called the "Great Belt."

It runs continuously from the eastern side of Lake Superior all the way to the southern extremity of Grand Lake Mistassini.

One of the greatest expansions of this belt lies within the region under description.

If we draw a straight line due north from the northern extremity of Grand Lake Victoria, it will be found to pass over Huronian rocks for a distance of about a hundred miles to a point slightly beyond Lake Matagami.

COPPER ORE.

Note by Mr. A. P. Low. On page 58 Mr. A. P. Low writes :—The eastern extension of the Huronian belt carries copper at Lake Chibougamou and the granites of lake Obatagoman may carry gold.

SIR WILLIAM LOGAN'S REPORT OF SURVEYS ON THE
HEADWATERS OF ROUGE RIVER.

GOOD FARMING AND LEVEL LAND.

In the "Report of Progress for the year 1858" issued by the Geological Survey of Canada, Sir Wm. Logan reported to His Excellency Sir Edmund Head the result of his personal explorations carried on along the Rouge River.

Farms up
river.

In this report Sir Wm. Logan points out the fact that for ninety miles up the river, not only was its timber varied and of excellent quality and size but also that a series of farms were established by the Hamilton Bros., where excellent oats and potatoes and such products were produced.

CHAPTER III.

UPPER GATINEAU DIVISION.

Counties traversed.—Lakes.—Rivers.—Hudson Bay Post.—Character of country.—Soil.—Timber.—Minerals.—Water power.—Climate.—Surveys.—Richardson's Report.—Gatineau River from River Desert to height of land.—Land under cultivation.—Soil.—Timber.—Character of river.—Hardwood limit—230 miles north of Ottawa City.—Character of country.—Soil.—Timber.—St. Maurice River.—Headwaters of Gatineau and St. Maurice.—Level plain.—Iron sand. Well wooded as far as Loon Lake.—Pasture land.—Lake Traverse Region.—Timber.—Hills two or three miles from Lake.—Clearwater River.—Sandy and barren soil.—Lieut. Ingall's Report :—Notice of exploration.—Timber.—Hilly character of the country.—Henry O'Sullivan's Report :—Coulonge River. Timber.—Lake.—Timber.—Gently rolling country.—Nine-Mile Bay—Good flats and fair showing of timber.—Mr. Wagner's Report for 1868.—Lake Bonchette.—River Désert.—Undulating country.—Timber.—Agriculture.—Mountains.—Mr. H. C. Symmes's Report for 1867.—Headwaters of the Ottawa.—Physical features.—Climate.—Crops.—Fauna.

COUNTIES.—This Division comprises the north and north-westerly portions of the Counties of St. Maurice, Maskinongé, Berthier, Joliette, Montcalm, Wright, Labelle and Pontiac.

LAKES.

Matchi Manitou.
Shabogama, 850'.
Paskagama.
Wotimimata.
Kapitachuan.
Kamachigama.
Kakabouga.
Bark.
Island.
Lac Barrière.*
Eskwahani.
Paskagama.
Onkammis.

RIVERS.

Gatineau.
Ottawa.
Gens de Terre.
Kapitachman.
Shoshokvan.
Tomasine.
Coffee.

*Lac Barrière, Hudson Bay post on the Ottawa River.

SUMMARY OF UPPER GATINEAU DIVISION.

Character of country.—Above one hundred miles from mouth of Gatineau, the country is generally level, rocky hills and ridges occasionally seen.

Soil.—Sandy loam. Oats, barley, peas, spring and fall wheat under cultivation. Excellent reports from all sources consulted.

Pine, spruce,
etc.

Timber.—Abundant. Spruce, balsam, fir, white birch, black birch, white and brown ash, also maple, beside white and red pine.

Minerals.—Nickel, copper, iron, limestone, etc.

Surveys.—Surveyed by James Richardson, 1870, from Desert River to height of land, head waters of the Gatineau, head waters of the St. Maurice on to Lake Mistassini, revealed a flat undulating plain, with good flats of farming land throughout the country.

Water power.—Excellent.

Climate.—Character of crops grown indicate nature of the climate.

GEOLOGICAL SURVEY REPORT.

EXTRACT from the Report of Progress for 1870-71, Geological Survey of Canada, printed by order of Parliament, in Montreal, issued in 1872, embodied in a report of the country north of the Lake St. John, by Mr. James Richardson, addressed to A. R. C. Selwyn, Esq., F.G.S., Director of the Geological Survey of Canada, pages 283-303, with special reference to the Second Line of Survey from River Desert to the head-waters of the Gatineau river, across the height of land.

(Extract from Report by James Richardson, pp. 298 et seq.)

Gatineau River from Desert River to Height of Land.

Soil a sandy
loam.

The estimated height above sea level of the Gatineau at the River Desert, about one hundred miles due north from Ottawa city is 369 feet. At this point and for six miles further up the Gatineau, the soil is sandy loam, the general level of the country being from twelve to thirty feet above the river, although rocky hills of a hundred feet are seen occasionally.

SESSIONAL PAPER No. 143

LAND UNDER CULTIVATION.

Along this distance a considerable quantity of land was under cultivation with oats, barley, pease and spring and fall wheat. Several fields of the last looked healthy, and covered the ground well on the 26th of September. I was informed that the yield is from twenty-five to thirty bushels to the acre. Potatoes appear to yield well, and were found to be of excellent quality. Above this there are no settlements, and the only cultivation is on the farms of lumbering establishments. One of these is Farm Island, belonging to Messrs. Gilmour and Co.; the next and highest up belongs to Messrs. Hamilton Bros. Here I was furnished with the following facts by Mr. Grant the Superintendent. The clearing is about 400 acres in extent, producing 140 tons of hay, 3,500 bushels of oats, 200 bush. of pease, 50 bushels of buckwheat, 1,300 bushels of potatoes, with barley, turnips and mangold-wurtzel, the quantities of which I did not ascertain. There are three other farms in the neighbourhood, collectively of 350 acres, producing 150 tons of hay, 3,000 bush. of oats, 100 bushels of pease, and 1,400 bush. of potatoes. I am not aware whether wheat has been grown. These farms are chiefly for providing food for the horses and oxen used for drawing the lumber in winter.

SOIL.

It appears to me that the above facts indicate that the country is well adapted for settlement. The soil is very similar to that at River Desert, a sandy loam; and as far as observed it is very much the same for a distance of over fifty miles along the Gatineau from the mouth of the Desert. The banks of the former river are from twenty to fifty feet high. Rocky hills from 100 to 150 feet high sometimes rise from them but are oftener at some distance back.

TIMBER.

Besides the great quantities of pine which this distance is known to produce, it also contains spruce, balsam-fir, some white birch, as well as considerable areas of black birch, with occasionally white and brown ash. Curiously enough, where maple is met with, it is in groves on the most elevated points. The river, excepting at the portages, is generally lake-like, and from 100 yards to not less than half a mile wide. There are in all ten portages, varying in length from fifty yards to about one mile. The total rise from the Desert to Hamilton's Farm is 142 feet, making the latter about 512 feet above the sea. From Hamilton's farm to the junction of the northeast and southeast branches, a distance of about forty miles, the aspect of the country remains

Crops on
Farm Island.Spruce,
maple, pine,
etc.

2-3 EDWARD VII., A. 1903

the same, except that pine timber gradually becomes smaller and more rare. There is reason to believe that for a great portion of these forty miles the forest was burnt seventy or eighty years ago, and its place is now occupied by a second growth of white birch. Pines are seen overtopping them; in many places these are numerous, and judging from their appearance, they are of comparatively recent growth, very few of them being more than a foot in diameter. It would be for the interest of the country to have those young forests protected from the lumbermen for many years to come.

CHARACTER OF RIVER.

Above Hamilton's farm. The character of the river for about ten miles above Hamilton's farm is the same as below: in this distance four portages are passed, with a total rise of 114 feet. Above this the river becomes rapid, without portages, and narrower, the additional rise to the Forks being 185 feet, making the latter 815 feet above the sea. For about twelve miles up the southeast branch, the river is rapid, and rises nearly 300 feet, reaching 1,015 above the sea. The river is from half a chain to two chains wide, with rocky banks rising into broken rocky hills from 70 to 100 feet high, covered with a scanty sandy soil, supporting principally white birch, with here and there pines similar to those below the Forks.

LIMIT OF HARDWOOD TREES.

I may here remark that no hardwood trees such as maple, black birch, elm and ash, were observed above this. One small ash tree was however seen at the end of the distance.

230 MILES NORTH OF OTTAWA CITY.

Northern limit of pine. For the next twenty-five miles the river is less rapid, the rise being only sixty-five feet. The country is low with few elevations over fifty feet. The soil is sandy, but supports a large growth of spruce, balsam-fir, white birch, tamarack and poplar and a few pine trees of small size. Here, about 230 miles northward of Ottawa city, and 1,080 feet above the sea appears to be the northern limit of pine on this branch of the Gatineau. The succeeding twelve miles is hilly, but well wooded with spruce, balsam-fir, tamarack and white birch. The hills are from 150 to 450 feet high, showing occasionally bare rocky summits and escarpments. This is succeeded for about 10 miles by bare rocky hills, 100 to 500 feet high, with terraces of boulder sand from twenty to thirty feet high. Near the river on both sides, small thinly scattered poplar, cypress and white birch are seen. To Marten River, three miles further, the country is lower, rising above the river from twenty to 150 feet.

SESSIONAL PAPER No. 143

TIMBER.

The timber is of good size, the spruce and tamarack being from twelve to eighteen inches in diameter, and from seventy to eighty feet high. The country and timber retain the same character to White Bear Lake, about nine miles further. The river up to this point is full of rapids, showing a height above the sea of 1,450 feet. Beyond this to the height of land the stream rises to 1,500 feet above the sea. The aspect of the country is the same, except three or four miles to the southeast, where rocky hills are seen 300 or 400 feet in height, having a blackened appearance from recent fires.

HEADWATERS OF GATINEAU AND ST. MAURICE RIVERS.

The portage from White Bear Lake to Hair-cutting Lake is about half a mile; the summit is 1,514 feet above the sea and only four feet above the latter lake, making here a difference of only ten feet between the waters of the Gatineau and those of the St. Maurice. Along Hair-cutting Lake, which is about seven miles in length and from two chains to about two miles wide, is a level plain rising over the lake from ten to twenty feet, composed of brown sand, and mostly bare of vegetation. Along the lake shore, where the waves have acted on the sand, iron sands like those of the Lower St. Lawrence are met with. Proceeding down Hair-cutting River to Great and Little Beaver Lakes, the country continues comparatively level and consists of sandy plains rising in terraces sometimes sixty feet over the river, and covered mostly with blueberry bushes, and here and there remains of small burned spruce. From these lakes to where the traverse leaves Hair-cutting River and thence to Kirkendatch on the St. Maurice, a distance of about eighteen miles, the country is still covered with brown sand, and the inequalities of the surface are from twenty to one hundred and twenty feet high.

TIMBER, LOON LAKE REGION.

This region as far as Loon Lake is well wooded with spruce, tamarack, white birch, and some balsam-fir. To the north of Loon Lake, and thence to Kirkendatch, there is a level plain of brown sand of several square miles in extent. This plain, which rises sixty feet over the St. Maurice river, has been covered with a growth principally of spruce trees from six to nine inches in diameter but these have nearly all been destroyed by the frequent fires which have passed over this district. On the St. Maurice below Kirkendatch, the country is more elevated and rocky, and, for some distance at least, the woods seem likewise to have been destroyed by fire. The height of the St. Maurice above the sea at Kirkendatch is 1,275 feet.

WILD GRASS IN FLATS.

Pasture land. Following the St. Maurice upwards to the upper end of Lake Traverse, the country is comparatively level, and the river for considerable distance winds through extensive flats of sandy loam, which are covered by water in the spring time, and during floods. Some of these produce an abundance of wild grass, which would support many hundred head of cattle. Mr. Spence the Hudson Bay Company's officer at Kirkendatch, told me that the few cows that he keeps thrive remarkably well, pasturing in summer in the flats, while in the winter they are fed on the wild grass cut and dried to hay. The rise in the river from Kirkendatch to Sandy Beach Lake, which is immediately above Lake Traverse, is fourteen feet, making the latter 1,289 feet above the sea. Lake Traverse which is about 18 miles in length, and from a few chains to two and a half miles wide, has banks of sand rising from 10 to 40 feet above the water. Some hills two or three miles from the lake, rise from 100 to 300 feet, and others six or seven miles south east from the lake, attain from 400 to 600 feet. The woods are spruce, tamarack, balsam-fir, and white birch; the spruce and tamarack trees being from six to twelve inches thick at the base. The River St. Maurice, which, as already stated, falls into this lake one and a half mile below the northeast end, is about five chains wide.

GENERAL LEVEL COUNTRY.

Burnt area. In ascending the Clear-Water River, a tributary of the St. Maurice through Pemscahie, Watoush, Fishing, and Clear-Water Lakes to the Height-of-Land portage, a distance of about 17 miles, the country bears the same level aspect as on Sandy Beach Lake. For nearly half this distance the woods have been burnt, considerable areas now producing only small cypresses about four or five feet high. Where the forest has not been burnt, the sandy soil produces a smaller growth of timber than on Sandy Beach Lake.

Height of land.

The river in this distance, to the Height-of-Land, rises only 131 feet, reaching 1,418 feet above the sea. The distance from the Height-of-Land down from Falls River, through Lake Normandin, Kakaskapstethiouisse, and Askatiche, to Lake Nikaubau, is about 34 miles. For the whole of this distance the description given of the country along Clear-Water River is equally applicable. It presents the same alternation of green and burnt woods, as well as the comparatively level, barren, sandy soil. The height of Lake Nikoubau is 1,266 feet above the sea, showing a fall 152 feet from the Height-of-Land.

SESSIONAL PAPER No. 143

REPORT OF THE COMMISSIONERS APPOINTED UNDER
THE ACT 9TH GEORGE IV., CHAP. 29, FOR EXPLOR-
ING THAT PART OF THE PROVINCE WHICH LIES
BETWEEN THE RIVERS ST. MAURICE AND OTTAWA.

In 1829 Lieutenant F. L. Ingall, 15th Regiment, undertook an exploration of the St. Maurice and Ottawa Rivers, especially along the country lying between these streams, with a view of ascertaining the nature and character of the resources. This report was ordered to be published by the Legislative Assembly, March 20, 1830, and whereas the details of the exploration are embodied in a report containing 281 pages, an appendix is added giving a sketch of the district traversed by the St. Maurice and Ottawa Rivers expedition covering 24 pages of text.

Ingall notes the occurrence of black and white birch, spruce, ^{Trees.} white pine, balsam, maple, ash and other timber trees. He also notes the rugged character of the hills throughout the region traversed, which is mostly comprised within the southern portion of Divisions II. and III. of this report.

REPORT OF THE COMMISSIONER OF CROWN LANDS FOR
THE PROVINCE OF QUEBEC FOR THE YEAR 1895.

(Abstracts of Exploration and Survey by Henry O'Sullivan, Inspector
of Surveys, being Appendix No. 38 of said Report.)

In accordance with instructions from your Department, dated ^{Instructions.} Quebec, 6th October, 1891, and 6th December, 1892, I have the honour to inform you that I have surveyed most of the River Jean de Terre, lying west of Rapid Lake and Awasheameka, and thence westward to Birch Lake, and I have also continued the survey southward to verify the disconnected portion of the head waters of the River Coulonge, and have now the honour to submit my plan and report of the same.

TIMBER.

This country is well timbered all over, but it appears that a good deal of the pine is faulty.

The country all around this lake, as well as around the bay above ^{Pine, spruce,} mentioned, is fairly well timbered with pine, spruce, cyprès, fir, ^{etc.} bouleau, &c.

LAKES.

This lake is about on the summit between the Coulonge and the Ottawa waters, and from its eastern end a short portage of twelve chains takes us into a large winding lake nearly ten miles in length, and from 5 chains to a mile and a-half in width.

Gouin Farm. This lake discharges into the Ottawa, and from near the middle a portage or canoe route about two miles in length passing through two small lakes brings us into a bay of Rapid Lake, about two and a-quarter miles south-west of the Gouin Farm, as from E. to F. on the accompanying plan.

TIMBER.

The country on either side is undulating, and fairly well timbered with pine, spruce, tamarack, &c.

Pine, spruce, tamarack, etc. At the southern end the land is rocky and broken in places, but towards the north and east there are easy slopes and gently rolling north-westward, and the whole country around here is well timbered with pine, bouleau, spruce, tamarack and cedar,

The country all around is level or gently rolling, and well timbered with pine, spruce, bouleau, tamarack, &c.

Some good flats of farming land may be found through the country.

We surveyed Nine Mile Bay and found it to be only $7\frac{3}{4}$ miles in depth. The country on both sides is undulating and fairly well timbered, with pine, spruce and mixed timber all around.

There are some good flats of land along the river, and even on the heights the soil is good where not too rocky.

There is a fair showing of timber all along, some nice bunches of pine, mixed with spruce, tamarack and different kinds of hard wood.

EXTRACTS OF SURVEYS AND EXPLORATIONS BY
W. WAGNER, 1868.

Reference: P. 424, Description of the Surveyed Townships and Explored Territories of Quebec.

BOUCHETTE LAKE.

Surveys My instructions said to go down the Ottawa river until I would meet a post at Barrière rapids planted by Mr. Symmes, yet the temptation was to me too great not to take this lake into any plan,

SESSIONAL PAPER No. 143

so I measured the main direction without going into details of offsets to the deep bays, and, in memory and acknowledgment of the great services which our Surveyor General for the Province of Quebec had rendered to the exploration of the Ottawa river, I baptized this lake lac Bouchette, and that piece of river lying between lac Bouchette and lac Barrière I named Bouchette river.

I thence started with my party down the river and surveyed until I reached the Barrière rapids, where Mr. Symmes had planted a post.

This place is known either as Barrière rapids or as the Mission post at Lac Barrière. It is the burying ground of the Indians living in this district.

RIVER DESERT.

Mr. Symmes also surveyed that portion of water which runs from Lake rapid toward the Ottawa river and planted a post marked sixty-seven miles sixteen chains on Iroquois point, at the head of Lake rapid, where the waters run to the Kakebonga lake. From this post, on my return, I connected with a tree post marked H. B., at end of station twenty-nine in my former survey of Lake rapid and River Jean de Terre. By this operation the surveys are connected with old work on the river Desert.

UNDULATING COUNTRY.

That portion of land through which this part of my line runs is only Hills. in a few places interrupted with hills of any consequence; the rest was of an undulating character, broken up with a great many lakes, so much that I do believe at least thirty per cent is water.

TIMBER.

There can be no doubt entertained that the line runs outside of the Spruce, birch and balsam. timber region of our Ottawa waters, since I did not meet with a single grove of timber pine; the general sort of timber was spruce, birch, balsam and poplar.

The ridge east of lake Kakebonga has a little hardwood—maple and black birch.

AGRICULTURE.

For agricultural purposes, this tract of land has no value whatever.

MOUNTAINS.

The mountain ranges which I passed were all granite, belonging to the Laurentian formation, now and then interrupted with veins of quartz.

EXTRACTS OF SURVEYS AND EXPLORATIONS BY H. C. SYMMES, 1867.

Reference: P. 409, Description of the Surveyed Townships and Explored Territories of Quebec.

HEAD WATERS OF THE OTTAWA RIVER.

Grand
Victoria
Lake.

After making all the necessary preparation, I left Ottawa city on the eleventh of March on my journey up the DuMoine to the eighty-fifth mile post, the point from which I was to commence my explorations, arriving within nine miles of Big lake on the nineteenth of the same month. I came to the conclusion that as I had supplies sufficient forward to do my party until the opening of navigation, it would be better to push on to Victoria lake, which I accordingly did, arriving there on the seventeenth of April, scaling the canoe-route through, agreeable to instructions.

This route intersected Victoria lake at its western instead of its eastern extremity as was originally supposed. I next proceeded with the scaling of Victoria lake, which work I prosecuted with diligence until the eighteenth of May.

On the twelfth of July I made connection with Mr. P. L. S. Wagner's former survey of lac des Rapides, which lake has two outlets, one running into the Ottawa and the other into Kakebonga lake.

PHYSICAL FEATURES.

Comparison.

From the head waters of the Du Moine until you approach the Gatineau, the country is very level, and might be compared to the table lands of Mexico. In the vicinity of Big lake and the head waters of the Du Moine, white pine is found in considerable quantities and of a good quality; further north, a few scrubby, stunted pines can only be seen; white birch, balsam, spruce and cedar are the most common trees.

CLIMATE.

The frost begins about the 1st of September, and the ice disappears about the end of May, when vegetation proceeds with great activity.

CROPS.

Vegetable
grown.

Potatoes, turnips and vegetables generally are cultivated with success by the Hudson Bay Company, at their trading post, at Victoria

SESSIONAL PAPER No. 143

lake ; last year, three hundred bushels of potatoes and two hundred bushels of turnips were the produce of a very few acres of ill-tilled land. The Hudson Bay Company have oxen, cows and a number of other domestic animals at this post.

FAUNA.

The most common animals here are moose, deer, caribou and beavers ; the lakes and rivers team with fish of almost all descriptions, among the best are the whitefish, which can be caught in Victoria lake in great quantities ; they may be compared to shad in size and shape.

In conclusion I would state that lac Barriere, the highest point reached by me on the Ottawa, is, according to information received from employees of the Hudson Bay Company, about one hundred and twenty miles, following its sinuosities from Trout lake, its source. This lake lies between the river Jean de Terre and the west branch of the Gatineau river.

CHAPTER IV.

UPPER OTTAWA DIVISION.

Lakes.—Rivers.—Hudson Bay Posts,—Summary of Division IV :—Character of Country.—Soil.—Minerals.—Timber.—Hudson Bay Co.'s Posts.—Principal Streams.—Surveys.—Water Power.—Dr. A. E. Barlow's Report :—Pontiac and Nipissing Districts.—Synopsis of Surveys made.—Quinze River Survey.—Forrest Line.—Sinclair Line.—Russell's Surveys.—McKenzie's and Rowan's Surveys.—McOuat's Surveys.—Boundary Surveys.—C.P.R. Surveys.—Soil.—Agricultural Land.—Level clay Land.—Progress of Spring.—Summer frosts.—Draining required.—Timber.—Jack pine.—Spruce.—Cedar.—White Birch.—Balsam Hemlock.—Maple.—Oak, &c.—Report of John Sullivan :—Temiscaming District.—Timber.—Route to Hudson Bay.—Lake Winnowaya.—Good Land.—Climate at Head of Lake Temiscaming.—Wheat.—Hay and Oats.—Report of John Bignell :—Upper Ottawa Country.—Character of Country.—Fur-bearing Animals.—Timber.—Pine.—Farming Land.—Dr. Bell's Map and Report on North-western Quebec :—Surveys.—Report.—Geology.—Mr. Brock's Survey from Lake Waswanipi to L. Mistassini.—Great Plateau.—Lindsay Russell's and H. C. Symmes's Reports :—Upper Ottawa waters.—Results of Surveys compared.—Uniform level character of country.—Geographical data.—Rock formation.—Boundary Line.—Gatineau and Jean (or Gens) des Terres Sections.—Rouge and Du Lièvre Sections.—Superior quality of Land.—1,500,000 acres of land fit for settlement.—Timber.—Upper Batiscan River Valley.—Lindsay's Report for 1868 :—Route of Survey and Exploration.—Character of Country.—Soil.—Clay.—Small fruits.—Fish.—Fur-bearing Animals.—Game.—Climate.—Mr. John O'Sullivan's Report for 1882 :—Resources.—Mr. John O'Sullivan's Report for 1883 :—Good Agricultural Land.—Level and well Timbered.—Character of Country.—Direction of Line.—Land Rolling and Swampy.—Good Land between Roger's Lake and the Ottawa.—Climate.—Mr. John Bignell's Report for 1887 :—The Upper Ottawa.—Start of Journey.—Kapitajewano River.—Rapids.—Settlements.

County of
Pontiac.

This Division comprises a good portion of the unorganized northern portion of the County of Pontiac.

LAKES.

Grand Lake Victoria.
Obikoba.
Temiscaming 578.
Expanse.
Seals Home.
Otanabi.
Moose Lakes.
Wolf L. and Grass L.
Christopherson.
Simon.

RIVERS.

Ottawa.
Coffee.
Mattagami.
Blanche.
Kinojevis,

SESSIONAL PAPER No. 143

HUDSON BAY POSTS.

Grand Lake Victoria, H. B. Co. Post,
Long Pd. H. B. Co's Post, Lac des Quinze.

SUMMARY OF UPPER OTTAWA DIVISION.

Character of Country :—Generally flat or undulating plain, part of Hudson Bay basin. The southern portion hilly and rocky. Middle portion, through which the line traverses, is flat and easy grades, occasional ridges and hills.

Soil :—Large areas of dry clay soil extend around the height of land. Although the district as a whole in its southern portion cannot be said to be suitable for agricultural purposes, still, in many places, considerable areas of good land are known to exist.

Minerals :—Silver, lead, zinc, copper and other minerals exist. Gold, gypsum and lignite have also been discovered and recorded.

Timber :—On the low lands mostly spruce, tamarack and fir. On the high land, birch, poplar, spruce and red pine.

H. B. Co.'s Posts :—At Grand Lake Victoria and at Lac des Quinze, two Hudson Bay posts.

Principal Streams :—The Ottawa, Blanche, Mattagami and Coffee are amongst the principal streams.

Surveys :—The country has been many times surveyed, and traversed by explorers since the early part of last century. Surveys by the Geological Survey of Canada, by the Crown Land Commissioners of Ontario and Quebec, as well as by the officers of the Ontario Bureau of Mines, afford valuable information on the resources of this Division, who all report favourably concerning its resources.

Water Powers :—In this division water powers are numerous.

ABSTRACTS FROM REPORT ON THE GEOLOGY AND
NATURAL RESOURCES OF THE AREA INCLUDED BY
THE NIPISSING AND TEMISCAMING MAP-SHEETS COM-
PRISING PORTIONS OF THE DISTRICT OF NIPISSING,
ONT., AND COUNTY OF PONTIAC, QUE., BY Dr. ALFRED
ERNEST BARLOW.

(Annual Report, New Series, Vol. X, Geological Survey of Canada, for 1897.
issued 1899.)

Summary of Surveys.

SURVEY OF QUINZE RIVER.

Lake
Temiscaming. This survey was continued up the river as far as the first chute on
the Rivière des Quinze, a short distance above the head of Lake
Temiscaming.

FORREST LINE.

In 1867, Mr. A. G. Forrest, acting under instructions from the
Crown Lands Department of Ontario, made a survey with transit and
chain of the Montreal River, starting from its intersection with a due
west astronomical line supposed to be run on the parallel of latitude
of $47^{\circ} 56'$ between Michipicoten Harbour on Lake Superior and the
head waters of the Montreal River. The astronomical line was started
about the same time from its eastern and western extremities.

SINCLAIR'S LINE.

Montreal
River. Mr. Duncan Sinclair who was entrusted with the eastern portion of
the line succeeded in running a distance of 105 miles from the Montreal
River, while Messrs. A. P. Slater and R. Gilmour, ran eighty-four
miles eastward from Michipicoten Harbour. Mr. Forrest from the
intersection with Sinclair's line made an instrumental traverse of the
Montreal River to its mouth on Lake Temiscaming, a distance of $111\frac{1}{4}$
miles, at the same time taking notes on the timber and other natural
resources of the country extending for three miles on either side of the
stream. These surveys, commenced in 1866, were completed in 1867.
Their primary object seems to have been to determine the feasibility of
the construction of either a wagon road or railway to the Red R
country through the district in question.

SESSIONAL PAPER No. 143

RUSSELL'S SURVEYS.

About the same time (June 13 to August 16, 1867) Mr. Lindsay Russell made a micrometer traverse of Lac des Quinze and the Upper Ottawa, connecting with H. C. Symmes' survey of Grand Lake. Mr. Russell during the same season made a similar survey of the route to Lake Abitibi, as well as a traverse of this large sheet of lake, then for the first time correctly measured.

ROWAN'S SURVEYS.

In 1871 Mr. Alexander McKenzie, acting under instructions from Mr. James H. Rowan, who had charge of the Canadian Pacific Railway surveys from the Mattawa to the Red River, made a track survey northward by the Ottawa and Abitibi rivers to James Bay, returning by way of the Moose and Michipicoten rivers to Lake Superior.

In 1871 and 1872 Messrs. Lloyd, O'Hanly and Austen, also under Mr. Rowan's instructions, made exploratory surveys from Mattawa, by way of the Ottawa and Montreal rivers, to a point about half way between this latter stream and one of the branches of Moose River.

MCOUAT'S SURVEYS.

In 1872 Mr. Walter McQuat of this Survey was engaged in a geological examination of that portion of the country to the north and east of Lake Temiscaming. The work performed by Mr. McQuat in the Temiscaming region embraced a most painstaking geological examination of the Rivière des Quinze, Lac des Quinze and the route thence northward to Lake Abitibi, including a micrometer survey of the shores and islands of that lake. He also made a micrometer traverse of the Blanche River as far as Round Lake, accompanied by an examination of the rocks in the immediate vicinity of the stream.

PROVINCIAL BOUNDARY SURVEY.

In 1872-74 Messrs. O'Hanly and O'Dwyer, joint commissioners for Ontario and Quebec, made an instrumental traverse of the Ottawa from Mattawa to the head of Lake Temiscaming, and surveyed a line running northward from a point on the 'Chenail du Diable,' near the mouth of the Rivière des Quinze as far as the Height-of-Land.

CANADIAN PACIFIC RAILWAY SURVEYS.

During the year 1876, in connection with the location of the Canadian Pacific Railway, Mr. Marcus Smith, the acting engineer in chief,

made an examination of the eastern portion of Lake Nipissing as well as the 'Beuve' (Veuve) River as far as the Forks, about twenty-five miles from the mouth.

SOIL.

Townships settled.

Although the district as a whole cannot be said to be suitable for agricultural purposes, still in many places considerable areas of good land are known to exist. The large continuous tracts of such land are to be found in the vicinity of the northern portion of Lake Temiscaming, on both sides of the lake and thus both in Quebec and Ontario, although the larger portion is in the latter province. The Crown Lands Department of Quebec has subdivided the two townships of Guigues and Duhamel and portions of four others, Fabre, Laverlochère, Baby and Neudlac. These by no means exhaust the arable land on this side, but are sufficient for the present requirements of settlement. On the opposite side of the lake, Ontario has laid out and divided into lots twenty-five townships which extend along the western side of the lake and running in a northwesterly direction, include the valleys of Wabi Creek and the Blanche as far as Round Lake. Only five of these townships and the southern portion of four others are included within the area covered by the accompanying map. (An excellent geographical map accompanies the report.)

CLAY SOIL.

Rolling clay land between hills.

The area thus subdivided is in general composed of level or slightly rolling clay land. In some places the clay subsoil is overlain by clay loam, while in other instances a rather barren yellow sand appears at the surface. In the province of Quebec where the surface has in many places been almost completely denuded by repeated forest fires, this clay is best seen. From the Quinze River, a little south of Quinn Point, large areas are covered with a thick mantle of stiff gray clay, through which protrude exceedingly rough and prominent hills of quartzite, granite, diabase and breccia conglomerate. These hills rise abruptly from an otherwise level clay plain, for the surface characterized by the presence of this clay exhibits a singularly flat appearance, with only a gentle rise towards the base of the hills.

PROGRESS OF SPRING.

Sowing and reaping.

The snow begins to melt about the middle of April and has generally all disappeared by the 10th of May, although both snow and ice were noticed in secluded nooks and cracks along the side of the precipitous cliffs on the west side of the Ottawa River as late as the end of May. Mr. C. C. Farr, formerly of the Hudson Bay Company, and now post-

SESSIONAL PAPER No. 143

master of Haleybury, who has become identified with this young and flourishing settlement, states that "seeding time commences about the first week in May and ends as far as oats are concerned about the fourth of June, though oats have been sown as late as the 20th of June and have done fairly well. Potatoes can be planted as late as the 20th of June, and it does not profit much to put them in before the 24th of May. Corn, cucumbers and melons can be sown about that date. Haying commences about the 14th July, harvest the 15th of August.

SUMMER FROSTS.

Summer frosts, so much dreaded by the farmers, especially in districts newly opened for settlement, have in the past proved a rather serious barrier to the successful raising of wheat, while oats have suffered severely, particularly in clearances situated some distance from the larger bodies of water. Frosts generally occur from the 18th to the 25th of August on the calm, clear nights following the heavy north winds. In the vicinity of Lake Temiscamingue the settlers often escape them altogether on account of their proximity to this large sheet of water, or their crops are but slightly injured, the more tender vegetables frequently being the only sufferers. Usual dates.

DRAINING REQUIRED.

The gradual clearing up of the land and the draining of many of the swamps will, however, materially mitigate this difficulty, particularly in the district in the vicinity of Lake Temiscaming, which is the area most suited for extensive settlement.

TIMBER.

All the early explorers speak in terms of enthusiasm of the original great forests here described. The most valuable tree from a commercial standpoint is the white pine, and in spite of the extensive operations carried on almost uninterruptedly by the lumbermen throughout a large part of this region during the past fifty years this tree is still present in considerable quantity. Of late years the marked diminution in size and quantity of the white pine has again brought the red pine forward and both varieties are now cut without discrimination. White pine.

The red pine seems to flourish on the apparently sterile sand plains which are a feature in many parts of this district and frequently forms exceedingly thick groves on the sides of the hills where sand and gravel have collected, or on points composed of those drift materials which jut out into many of the lakes.

JACK PINE.

Growth on
more barren
areas.

Jack pine, called by some pitch pine, is very often encountered in the more barren and rocky areas, and its presence seems an almost certain indication of the extreme poverty of the underlying soil.

SPRUCE.

Both white and black spruce are frequently met with, the latter being more abundant, but are too small to be of any commercial value for lumber, although many individuals would make excellent masts or spars.

CEDAR.

White cedar is usually found fringing the banks of streams or shores of lakes, where it often forms a thick and at times an almost impenetrable undergrowth.

WHITE BIRCH.

Second
growth.

The white canoe birch is also of very common occurrence, and together with the aspen poplar, forms the prevailing second growth in areas which have been recently swept by fire.

BALSAM HEMLOCK.

The balsam or fir is one of the most common in the moist areas. Hemlock was noticed, northward to the Indian portage-route to Keepawa lake, a short distance below the mouth of Keepawa river, but no specimens were observed as far north as the Old Fort Narrows.

MAPLE.

Sugar maple.

Although nearly all the principal varieties of hardwood are found in this region, the proportion which such trees bear to timber of a softer description, is quite insignificant. Of the maple family, perhaps the most abundant is the sugar maple, which is frequently of large dimensions. The soft maple is also present in large quantities, but the black or bird's eye maple is only rarely met with in the valleys of the southern portion of the region.

YELLOW BIRCH, BLACK BIRCH AND OAK.

Lake
Temiscaming.

Large trees of yellow birch were remarked throughout the region, especially in the vicinity of the northern end of Lake Temiscaming,

SESSIONAL PAPER No. 143

while specimens of the black or cherry birch, were seen over thirty inches in diameter in the region to the north of Mattawa river. The blue oak or swamp white oak, is the most abundant of the oak family, and its favourite haunt seems to be the alluvial flats, or intervals along the banks of streams where the soil is sufficiently moist and fertile. Here is associated with the white elm, which forms large and beautiful trees, the black or water ash. The white oak seems to delight in dryer soil, and good specimens were seen growing in the vicinity of Fort Temiscaming. The red oak was also noticed in places as far north as our explorations extended.

BEECH.

Iron wood is tolerably abundant and good. Specimens were noticed growing with the American beech in the strip of hardwood land about five miles west of the Opimika Narrows on Lake Temiscaming.

ABSTRACT OF REPORT OF JOHN SULLIVAN TO THE
COMMISSIONER OF CROWN LANDS OF THE
PROVINCE OF QUEBEC, 1883.

APPENDIX No. 27, p. 57

Report of survey of Block A, County of Pontiac.

TEMISCAMING DISTRICT.

From Lake Temiscaming to the 20th mile post along the boundary line between the province of Ontario and the province of Quebec the country is fairly level and in great part good agricultural land.

About a mile north of the lake, the land commences to be wet and swampy land. for about three or four miles it is swampy, but if cleared and drained, it would become in part good meadow land.

Timber from the Indian reserve to the base line the land is higher and more cut up with streams and creeks. The timber on the low land is mostly spruce, tamarack, and fir, and on the high land bouleau, poplar, spruce and small red pine.

At 13 miles $33\frac{1}{2}$ chains the line crosses the west shore of lac la Barrière and at 14 miles 38 chains, the east shore.

ROUTE TO HUDSON BAY.

Through this lake is the general route for the Hudson Bay Company, between the Ottawa and Lake Abitibi and thence to Hudson Bay.

Meridian Line from 35th Mile-Post.

LAKE WINNOWAYA.

Good land. From the 35th mile post, I ran a meridian line south to Lake Winnowaya, a length of 11 miles 64½ chains. The land is good all along the line, but more particularly for the first five miles next the base line.

GOOD BELT.

Timber. Great part of that belt of land between Rodger's Lake and the Ottawa, appears to be good land and is pretty well timbered with tamarack, spruce, fir and poplar ; there is also large bouleau and some birch. At five and a quarter miles the line strikes a marshy bay in from the Ottawa, and at 6 miles 7 chains a bend of the river for over a quarter of a mile.

From the tenth mile to Lake Winnowaya, the land is low and level and apparently good, supporting spruce, tamarack, poplar and fir.

Climate.—The climate at the head of Lake Temiscaming is not much different from what it is in Quebec.

Length of season. The season may possibly be a few days shorter, but the snow fall is not so great. It is hard to judge by last spring as it was a late wet spring all through the province.

Wheat.—I saw very fine wheat growing last summer along the Quinze river, and Mr. Taggart has a farm he commenced sowing last year on the west shore of Quinze Lake, and I never saw finer potatoes and oats than he grew.

Hay and oats.—The Burwash Bros. have two farms, one on the south side of the Quinze River and another which I understand is on the Indian reserve ; and one of them told me last spring they had sold over two thousand dollars worth of hay and oats between Mr. Grant's and Mr. Taggart's shanties. When I was on my way up to survey, they were getting up a mowing and harvesting machine.

SESSIONAL PAPER No. 143

REPORT OF THE SURVEY AND EXPLORATION OF A
PORTION OF THE NORTH-WEST SECTION OF THE
UPPER OTTAWA MADE IN 1893 AND 1894, BY JOHN
BIGNELL, P.L.S.

QUEBEC, June 29, 1895.

To the Honourable
Commissioner of Crown Lands,
Quebec.

Sir,—Having received from your department instructions dated ^{Instructions.} December 6, 1893, for the survey and exploration of a portion of the N.-W. section of the Upper Ottawa, and supplementary instructions dated July 4, 1894, for an extension of the same survey, I beg to report as follows :—

The territory surveyed lying north of the Ottawa and east of the province line at the head of Lake Temiscamingue has an area of about fifteen hundred square miles or close on to one million of acres, enough for fifteen good sized townships.

CHARACTER OF COUNTRY.

The country throughout is level or gently undulating, the soil is a ^{Clay subsoil.} sandy loam with sometimes a subsoil of clay, very fertile and highly fit for culture and entirely free from stone, the only stone or rocks found are on the shores of some of the larger lakes. The country is well watered and lakes are numerous, some of them large and all well stocked with fish ; game is not plentiful, moose, however, are more numerous than in any other part of the province ; cariboo are scarce, and so are small deer.

FUR-BEARING ANIMALS.

Of the fur-bearing animals such as beaver, otter, mink, marten, lynx, ^{Getting} &c., there is not an abundance, as the country has been so much hunted ^{scarce.} over that not many are left, and consequently it is not much frequented by Indians.

TIMBER.

The growth of timber is large, abundant and thrifty, consisting of spruce, fir, bouleau, white and red pine, aspen, ash, elm, cedar and alders, placed in order of their relative abundance.

PINE.

Pine is pretty well distributed over this territory, but more plentifully in some localities than in others; there is a considerable belt of it on the N.E. side of Lake Kakinokamac or Long lake. There is no doubt that in the near future steamers will be placed on these lakes as they already have been on lakes Kippewa, Quinze and Winowa or Expanse by lumbermen to forward up their supplies and tow down their timber.

FARMING LAND.

Valuable
section.

This is a valuable section of the province, having such a large extent of excellent farming land which only requires to be known to become rapidly settled. It is easy of access and in a short time will be still more so, as there is a railway now being constructed which is in operation as far as the 'Long Sault' or beyond, and will shortly be carried as far as and beyond the head of the Lake Temiscamingue.

NOTE ON DR. R. BELL'S MAP AND REPORT ON NORTH-
WESTERN QUEBEC, EMBODIED IN A "REPORT
OF THE GEOLOGY OF THE BASIN OF NOT-
TAWAY RIVER—11 PAGES.

The Geological Survey Department has in the press a map of north-western Quebec in which much of the topography along the line of the Grand Trunk Pacific Railway belt is given.

The precise title of the map is: "Geological Map of the Basin of the Nottaway River, North-western Quebec." This map serves to illustrate a Report by Dr. Robert Bell, issued in February, 1903. (Scale, ten statute miles to one inch.)

Surveys
consulted.

This map is compiled from surveys made by Messrs. J. Richardson (1870-1871), R. Bell (1887-1896), A. P. Low (1884-1885), Walter McOuat (1871-1872), R. W. Brock (1896), all of the Geological Survey Department, besides official plans of surveys of the Quebec Crown Lands Office, including those of Messrs. Lindsay Russell (1868), J. Bignell (1873-1894), H. O'Sullivan (1892-1899), C. R. Lemoine (1898-1900), and from other authorities.

The map is nearly ready for distribution and contains all the available topographical data to date, whilst the report in the same will also embody the results as known.

SESSIONAL PAPER No. 143

The report accompanying this map forms No. 788 of the series of publications of the Geological Survey Department and has been distributed in part as a separate.

It contains lists of surveys made within the area covered by the map and dates; gives an account of surveys by Mr. R. W. Brock, M.A. (now Professor of Geology and Mineralogy in Queen's University). It also describes various lakes and rivers seen, and adds an account of the geology and general structure of the country about Mutchi Manitou, Grand Lake Victoria, Lake Mattagami, Lake Waswanipi, Christopherson Lake, and along Kiashk and Clay Rivers also.

GREAT PLATEAU.

By an inspection of the map it will be seen that the above chain of Water ways. lakes and rivers intercepts all the streams from the east, six of which are of considerable size, and that it receives none of any consequence from the west. This circumstance illustrates the fact that the whole country slopes westward. The Nottaway River in its course from Lake Mattagami, the Broadback river in that from Sandy Lake and the Rupert from Namiska lake, all descend more rapidly than do the rivers above these lakes, showing that the great plateau above them is more nearly horizontal than the tract between the lakes and the sea.

There is reported a large development of the Huronian or metalliferous series within the area of this map.

Surveys in the Province of Quebec.

REPORT OF THE COMMISSIONER OF CROWN LANDS OF
THE PROVINCE OF QUEBEC FOR 1868, PP. XVIII
AND XIX, QUEBEC, CANADA.

(NOTES ON THE SURVEYS AND EXPLORATIONS OF LINDSAY RUSSELL
AND H. C. SYMMES.)

UPPER OTTAWA COUNTRY.

Among the linear surveys enumerated in the statement, is the survey Surveys. of exploring the upper waters of the Ottawa River, authorized by Order in Council antecedently to the Union of the Provinces, for the special purpose of ascertaining its capabilities for agricultural purposes, and otherwise acquiring a better knowledge of the physical character and structure of the country, back in the interior of the district of Ottawa.

With these views, and contemporaneously with a similar service then being carried out in the Upper Canada to explore up the Montreal River from its mouth in Lake Temiscamingue, westward to its source, there to connect with other explorations up the Michipicoten River, eastward from Lake Superior. The exploration in Lower Canada of the upper waters of the Ottawa River, east from Lake Temiscamingue, was effected as far as the exploratory line to be run by another surveyor in charge of the land exploration in prolongation of the district line between the district of Montreal (old) now Terrebonne, and the district of Ottawa, to embrace the surveys of the Grand Lac, now from its dimensions and magnitude called Lake Victoria, the earliest seat of the missionary labours under the French government.

Lake Victoria. Much valuable and highly important and interesting information of the nature and characteristic features of the country explored, and otherwise from the natives and from the agents of the Honourable Hudson's Bay Company in charge of the trading posts at Lakes Victoria and Abitibi, by the three exploring parties charged with carrying out certain portions of the contemplated exploration, is to be collected from the reports, plans and sections deposited in this Department by the surveyors respectively entrusted with the service. Nevertheless a brief review of the general result of these joint labours may be here submitted to convey in the first place a knowledge of the geographical position of the country explored, including that of the Abitibi, at the height of land between the Hudson's Bay and this province.

RESULTS OF LINDSAY RUSSELL'S AND H. C. SYMMES'S SURVEYS
COMPARED.

Upper
Ottawa. The report of Mr. H. C. Symmes, Provincial Land Surveyor, to whom was assigned the exploration of the central section of the waters of the Ottawa embracing Lake Victoria, to their intersection by the exploratory line run by Mr. Wagner, and including the survey of the canoe route from the head of Lake Du Moine, and the report of Mr. Lindsay Russell, P.L.S., intrusted with the exploration of the western section embracing the survey of that portion of the upper waters of the Ottawa, west of Mr. Symmes' point of departure on Lake Victoria, to their discharge from Lake des Quinze, into Lake Temiscamingue embracing the reconnaissance or survey of the principal northerly streams flowing into Lake des Quinze, to their sources at the height of land or water-shed of the sources of the Abitibi River flowing northerly into the lake of that name, in the territory of the Honourable Hudson's Bay Company both more or less agree, apart from any distinctive features that attach to the sections thus explored, in the description they give to the general character and

Character of
country.

SESSIONAL PAPER No. 143

aspect of the country they observed in their respective traverses of the rivers and lakes assigned to them, representing it as a whole to be a rocky barren country, unfit for agricultural purposes and as chiefly timbered with a stunted growth of spruce, tamarack, white birch and balsam.

UNIFORMLY LEVEL CHARACTER OF COUNTRY.

The general surface as far as can be observed, is generally low and level for miles back from the rivers and lakes with, however, occasional exceptions in the western section, where some hills are noted above the uniform level of the surrounding country. The soil in general and with few exceptions, is sandy and rocky. The same characteristic features of country appear to extend northerly along the Lonely River which empties into Lake des Quinze, and beyond the watershed of the sources of the Abitibi, and around Lake Abitibi, as far as the eye can see, over the general horizontal level of this section of the Hudson's Bay Territory. Soil sandy and rocky.

GEOGRAPHICAL DATA.

While Mr. Symmes effected his traverse of the rivers and lakes with the theodolite and chain, Mr. Russell deduced his measurements of distances by one of Rochon's micrometers (with improvements of his own) the courses taken by compass and both results tested by astronomical observations. Thus the geographical position of the northern boundary of the province, at the height of land in the dividing line between the Abitibi and Ottawa Rivers, has been ascertained and which is in fact the only point in the northern boundary of the Province of Quebec determined with precision. Height of land.

Mr. Russell, from careful estimation of the courses of the rivers and occasional levels, also determined the elevation of the dividing line of waters between the Ottawa and the Abitibi, to be about 733 feet above the sea, and the height of the Lake Victoria 948 feet above the sea, thus establishing the important physical, but not less interesting fact, that the general range of the country explored, embracing the upper waters of the Ottawa River eastward from Lake des Quinze to their intersection with Mr. Wagner's exploratory line at its termination, lies under the mean parallel of $47\frac{1}{2}^{\circ}$ of latitude, and therefore, transversely as the letter 'T' to the sources of the rivers discharging into the Lower Ottawa, between the "Kupewa" and the "Gatineau" inclusively, and stands at a higher level above the sea, by some 100 or 200 feet than the height of land at the source of the Abitibi, consequently presenting a vast plain or plateau elevated about 1,000 feet above the sea extending northward to the northern boundary of the

province, in which plain flow the northerly tributaries of the Ottawa, (yet unexplored) north-eastward towards the head waters of the Saint Maurice, as far as ascertained from Indian accounts,

ROCK FORMATION.

The rocks noticed in the course of the above mentioned exploration belong to the granite or primary formation.

BOUNDARY LINE.

A more favourable result has happily attended the labours of Mr. Wagner to whom was assigned the survey of the exploratory line. He was instructed to run in prolongation of the divisional boundary line between the districts of Montreal and Ottawa, from a point in the intersection of the county line of Argenteuil with the county line of Terrebonne.

Bouchette
Lake.

The whole distance run or measured on said exploratory line, toward the northern boundary of the province is 129 miles, terminating at "Bouchette Lake" on the main Ottawa River which Mr. Wagner scaled to its junction with Mr. Symmes' survey at the Indian Cross (or Cemetery) shown on the plan.

Into this lake flow from the east a stream still of considerable width, coming northeastward toward the northerly headwaters of the Gatineau and St. Maurice.

This distance is divided into the following sections:—the Departure, the River Rouge, Du Lièvre, Gatineau, and Jean des Terres sections.

GATINEAU AND JEAN DES TERRES SECTIONS.

The Gatineau and Jean des Terres sections, are both rugged and mountainous, and much less adapted for cultivation, and the characteristic features of the latter section are very similar to those described in the Lake and River explorations.

THE ROUGE AND DU LIÈVRE SECTIONS.

Good land.

The Rivers Rouge and du Lièvre sections present, however, favourable exceptions to the above mentioned descriptions, inasmuch as Mr. Wagner reports his exploratory line to traverse in these sections a valley of great extent, consisting of a 'superior quality of land unequalled in Upper Canada or known in the province of Quebec.'

SESSIONAL PAPER No. 143

SUPERIOR QUALITY OF LAND.

This valley may be properly called the valley of the Du Lièvre and measuring in its breadth along the exploratory line about 24 miles in the Rouge, and about 10 miles in the Du Lièvre sections, and extending east and west of the line upwards of 60 miles in its aggregate length, contains an area of about 2,250 square miles, approximating one and a half millions of acres, generally fit for agricultural purposes, the soil of which is composed of yellow and black loam.

TIMBER

The predominating timber is yellow and black birch, with maple, and in the low land and swamps, cedar, ash, elm and balsam. The general surface of the land is undulating, without mountains of any consequence. Thus, the discovery of this great tract of good land presents a field for the future development and colonization of territory spreading over the counties of Ottawa, Terrebonne and Montcalm. From the direction of this alluvial valley eastward it would appear to trend towards the large tract of arable land, explored by the Reverend Mr. Provost at the head waters of the rivers Matawan and l'Assomption.

UPPER BATISCAN RIVER VALLEY.

From a plan of the river Bostonais, communicated to this department by the Hon. E. D. Price, exhibiting the position of Lake Edouard on the main branch of the river, the northerly part of this generally level tract of country, or upper valley of the Batiscan, was intersected by the surveying party in charge of the exploratory expedition to lake St. John, authorized by legislature in 1828.

The area of this valley may be estimated at about 500 square miles, or over 300,000 acres, bounded towards the south-east by the Laurentian mountains, or the townships of Colbert and Rocmont, and on the north-west by hills of the North Bostonais River.

EXTRACTS OF SURVEYS AND EXPLORATIONS BY
LINDSAY RUSSELL, 1868.

Reference :—P. 416, Description of the Surveyed Townships and Explored Territories of Quebec.

ROUTE OF SURVEY AND EXPLORATION.

On the thirteenth day of May following, my party left Ottawa *en route* for Victoria lake, and from that date to the thirteenth June, was

employed in travelling up the rivers Ottawa and Du Moine, in forwarding provisions from our depot to Messrs. Burnstall's shanty, across the height of land from the river Du Moine to Victoria lake, and in forwarding a portion of these supplies in advance of the survey, down the river Ottawa below Victoria lake.

From the fourth to the sixteenth of August, was occupied in an exploration of the route from the river Ottawa to lake Abitibi.

Survey.

The portion of the Ottawa river covered by my survey flows through a country of very uniform character in nature of surface, kind and quality of soil, and prevalent growth of wood. The surface is everywhere uneven, being broken by the low and generally rocky hills of the Laurentian formation which extends throughout; any of the small comparatively level acres are usually spruce and tamarack swamps.

CHARACTER OF COUNTRY.

Rugged plateau.

There is, though with great unevenness, a general uniformity of altitude in the country going from the height of land of the Coulonge, Du Moine and Keepawa rivers, northward, to the slope to Hudson bay. The depression in crossing the Ottawa being inconsiderable, it may be considered a rough plateau, and but slightly inclined to the westward, however much it may rise in the opposite direction towards the sources of the St. Maurice and Saguenay rivers.

These, the extreme highest points seen on the survey, would have an altitude above the sea of twelve hundred and fifty to thirteen hundred feet.

SOIL.

Deep soil

The hills, in many cases, were bare, rocky ridges; in others, but lightly covered with soil and growth. In the valleys and low grounds adjoining streams the soil was deeper, though generally similar in character if dry. The greater part of the level or low grounds was either tamarack or spruce or open mossy swamps. In a few exceptional cases a narrow border of richer soil was observed along the edges of streams, being the alluvium thrown up by them during floods. One instance in which this occurs to a considerable and important extent is on the banks of the Ottawa about the junction of its Abitibi branch.

CLAY.

Here the Ottawa has got far enough to the northward to be on the verge of the southern margin of the white clay which prevails on the adjoining slope of the Hudson bay basin. This clay seems to have in

SESSIONAL PAPER No. 143

places extended somewhat across the height of land and over the Ottawa formation. The reason for this opinion is that the Abitibi branch, and those of the small creeks falling into the main stream near it, are thick and of a milky color, through holding in suspense much of the white clayey material washed from their banks in the upper part of their course. ^{Muddy streams.}

TIMBER.

The prevalent growth of wood is similar throughout the whole ground traversed, with but slight changes in size corresponding to the changes in position from barren hill top to richer valley. The kinds observed were balsam, white birch, poplar, grey and black spruce, tamarack, pitch pine and cedar, enumerating them in the approximate order of frequency; little or no white pine fit for timber was seen. As the survey was confined to the vicinity of the river, it would be assuming too much to affirm that this would be the case all over the country, but I am afraid that the appearances would lead any one accustomed to explore for timber to judge that it would not be found in any size or quantity. ^{Spruce, cedar, poplar, etc.}

SMALL FRUITS.

Of small fruits the following were occasionally met with: blueberry, raspberry, strawberry, cherry bush and moss cranberry and the June berry or poirier.

FISH.

The main Ottawa seemed to be well stocked with fish of various kinds. The principal seen of the larger or finer as food were: maskinongé, pike, pickerel, bass, sturgeon, white fish, atanabit of the smaller or inferior kinds, gold eyes, suckers, dace, catfish and eels: trout are not found in the main streams, but, in some of the tributary lakes, they are got in abundance and of the finest quality. ^{Fish abundant.}

FUR-BEARING ANIMALS.

Some animals are not plenty and the fur-bearing ones but moderately so, being pretty well kept down by the native hunters trapping for the Hudson Bay Company. Moose and caribou are the representatives of the deer tribe, but in small numbers—nothing like what may be found in the St. Maurice or more eastern territories. The principal fur animals are on land: bear, lynx, fox and marten; those frequenting the water: beaver, otter, mink and muskrat. ^{Moose and caribou.}

GAME.

Of game birds and wild fowl, there are the ruffed partridge and the Canada goose, rarely, the ptarmigan, ducks of various kinds, bitterns, occasional geese and very rarely swan.

CLIMATE.

As to climate, the country traversed would seem to be nearly three weeks behind in spring that of the city of Ottawa, with a corresponding earlier setting in of winter. The greater altitude and nearer exposure to the bleak north winds of Hudson bay necessarily make the summer much colder than that of the lower Ottawa country, and also
 Severe frosts. a winter of longer continued severe frosts. The average fall of snow is about eighteen inches, or two feet more than at Ottawa, and the rainfall, if measured, would, I think, be in similar proportions.

As to the intensity and duration of the summer heat, I do not think it would ever be sufficient to ripen wheat; oats and barley might, perhaps, come to maturity; potatoes of medium size and excellent quality are grown at the Hudson Bay Company's post on Victoria Lake.

Of the fitness for settlement or other future resources of the country it is hard to draw any favourable picture.

Apart from climate, the nature of the surface and soil is such that with the exception on the small area before mentioned, at the junction of the Abitibi, I neither know nor have been told of any portion of it fit for profitable cultivation in the sense understood by settlers of the present day in Canada.

Agricultural capabilities. In giving information as to the agricultural capabilities of this and similar regions occupied by them, the gentlemen in the Hudson Bay Company's service are a little too apt to deal in wholesale condemnation; on the other hand some sanguine theorists wish the blank spaces on our Canadian maps to be looked upon as all more or less favourable for future immigration.

The opinions here given have been as little influenced by the former as those of any experienced Canadian explorer are likely to be affected by the latter.

SESSIONAL PAPER No. 143

EXTRACTS OF SURVEYS AND EXPLORATIONS BY
JOHN O'SULLIVAN, 1882.(Reference:—P. 426, Description of the Surveyed Townships and Explored Territories
of Quebec.)

RESOURCES IN BLOCK A, IN THE COUNTY OF PONTIAC.

With regard to the soil and timber, a reference to the plan and field notes of the survey will give the best information on those points. I may, however, state that there is a large quantity of good arable and agricultural land along the line, and that the country is in general fairly level, without any very high mountains. The soil is mostly good clay, and, as it is more than probable that in the near future a railroad may be built north of the Laurentides, there is no doubt that, in that event, the tide of emigration would soon turn in that direction. There is some very fine white pine on the second and also on the fifth limit, and a good deal of red pine on the first limit. There is also a great deal of very fine tamarack, and, should a railway be built, it would be very valuable for ties. Unfortunately, however, there is a great deal of the best timber blown down. There are also some large tracts overrun by fire, particularly on the fifth and sixth limits in the second range.

As the survey is not completed, I will not attempt to make a report of any length, but wait until such time as it is, when I shall be in a better position to report on the resources of the country.

EXTRACTS OF SURVEYS AND EXPLORATIONS BY JOHN
SULLIVAN, 1883.(Reference:—P. 427, Description of the Surveyed Townships and Explored Territories
of Quebec.)

GOOD AGRICULTURAL LAND.

Great part of this tract is good agricultural land, and, as the Indians are very poor farmers, I am of opinion it would be better for them and for the country if the Government would have the reserve surveyed off into township lots and give a certain amount of money each year instead thereof to buy provisions and clothing for the tribe. Several of the Indians, about fifteen or eighteen, I am told, died of starvation last winter within a circuit of thirty miles of where I was surveying. Had these poor creatures had some supply to call on for a hundred of

2-3 EDWARD VII., A. 1903

flour and a blanket or some clothing they might have managed to pass through the winter, whereas there are not more than five or six families who cultivate anything on the reserve.

LAND GOOD, LEVEL AND WELL TIMBERED.

Survey.

From the twentieth mile post on the province line, the initial point of departure of my survey, to the Otter Creek, the land is good and level and well timbered with tamarack, spruce, white birch or bouleau, red pine and poplar. The tamarack is not large, but would be splendid for railway ties. The line crosses the creek between 61 and 67½ chains from the province line. This creek is from forty to eighty feet wide and falls into the White river (Rivière Blanche) crossing province line on the nineteenth mile. From Otter creek the land continues pretty good for about a mile and a quarter, when it commences to be rocky and swampy in places, the timber being of poor quality.

CHARACTER OF COUNTRY.

Pine.

On the fifth mile there is a nice flat of land, and the timber is mostly spruce and tamarack, the latter being large and of splendid quality. On the seventh mile there is a great deal of the timber blown down, chiefly on the high land. On the eighth mile, between the 6th and 65th chains distance, there is a rise of about two hundred feet, and there is a splendid grove of white pine along this ridge, which runs nearly north and south. The first half of the tenth mile is swampy or low land, and on the rising land the timber is nearly all blown down, which continues on to the eleventh mile, the land being poor and rocky. On the twelfth mile there is a good deal of pine, but it is in great part blown down. On the east half of this mile it is mostly tamarack and spruce, the line crossing over a large beaver meadow which extends nearly a mile towards the north-east. The thirteenth mile is mostly rising land and is fairly good, but the higher part is very rocky.

DIRECTION OF LINE.

Route to
Hudson Bay.

At 13 miles 33½ chains the line crosses the west shore of Lac Obabika, and at 14 miles 38 chains the east shore. Through this lake is the general route for the Hudson Bay Company between the Ottawa and Lake Abitibi and thence to Hudson Bay.

LAND ROLLING AND SWAMPY.

From the 52nd to the 57th mile, the land is more rolling, with occasional patches of swamp and of high land, of rises of from 40 to

SESSIONAL PAPER No. 143

60 feet. The timber is mostly spruce, tamarack and cypress, with poplar on the patches of good land.

On the 59th and 60th miles, there is a pretty good ridge of white pine, the other timber is pretty large also, being bouleau, spruce and fir, with some old cedars.

GOOD LAND BETWEEN ROGER'S LAKE AND OTTAWA RIVER.

Meridian Line from 35th Mile-Post.—From the 35th mile-post, I ran Timber. a meridian line south to Lake Winnowaya, a length of 11 miles, 64½ chains. The land is good all along the line, but more particularly for the first five miles next the base line. Great part of the belt of land between Roger's Lake and the Ottawa appears to be good land, and is pretty well timbered with tamarack, spruce, fir and poplar; there is also large bouleau and some birch. At 5¼ miles, the line strikes a marshy bay in from the Ottawa, and at 6 miles, 7 chains, a bend of the river for over a quarter of a mile.

CLIMATE.

The climate at the head of Lake Temiscamingue is not much different Wheat. from what it is at Quebec. The season may possibly be a few days shorter, but the snow-fall is not so great. It is hard to judge by last spring as it was a late, wet spring all through the province; I saw very fine wheat growing last summer along the Quinze River, and Mr. Taggart has a farm he commenced sowing last year on the west shore of the Quinze Lake, and I never saw finer potatoes or oats than he grew.

EXTRACTS OF SURVEYS AND EXPLORATIONS BY JOHN
BIGNELL, NOVEMBER, 1887.

Reference: P. 433, Description of the Surveyed Townships and Explored Territories of Quebec.

THE UPPER OTTAWA.

In accordance with instructions received from your department, Instructions. dated 10th August last, for the sealing of a portion of the Upper Ottawa from the mouth of the River Shu-shu-guan to P. J. S. Wagner's post, at the end of the line between the counties of Pontiac

2-3 EDWARD VII., A. 1903

and Montcalm, and also of a portion of the tributaries coming from the North, I beg to report as follows :—

START OF JOURNEY.

Here (the head of Lake Temiscamingue) I procured canoes and men and proceeded up the river, arriving at Lake Waboosknan on October 4, and began scaling a stream coming in from the North, which was supposed to be another channel of the Ottawa, running out of the north end of Victoria lake into Lake Wabooskanan.

KAPITAJEWANO RIVER.

Easy current. After completing the scaling of the Ottawa, I went down to the river Kapitajewano and scaled it for about 25 miles. This river averages about two chains in width; it is deep, with an easy current. The banks are low and level throughout; the soil is excellent and the growth of timber is aspen, bouleau, spruce, fir and tamarack.

RAPIDS.

From above lake Temiscamingue to Lac des Quinze is a succession of rapids and portages, the dread of voyageurs and still more so of the lumbermen on the 'drive.'

From above lake Expanse to beyond lake Victoria, the river averages about 8 chains in width; the banks are low and in many places grassy, the soil is good and the growth of timber is, along the banks, aspen, bouleau, spruce, fir, tamarack and pine.

The country is level and no hills are to be seen; how far the growth of timber and good land extend back from the river I was not instructed to ascertain.

SETTLEMENTS.

I may remark before closing that, in view of the level nature of the country, the large extent of good land, and the facilities for making good roads thereto, we may expect to see extensive settlements formed there as soon as the country becomes known.

CHAPTER V.

ABITIBI DIVISION.

District of Nipissing.—Lakes.—Rivers.—Hudson Bay Company's Posts.—Summary of Resources of Division V.—Minerals.—Timber.—Soil and Climate.—Opening and Closing of Lake Abitibi.—Surveys.—Reports.—Report of Mr. Walter McQuat between Lakes Temiscaming and Abitibi.—Route of Survey described.—Economic Minerals.—Iron.—Copper.—Magnetic Iron Pyrites.—Steatite.—Roofing Slates.—Timber.—Soil and Climate.—Blanche River.—Lake Abitibi.—Farming at Hudson Bay Company's Post.—Cochrane's Report to Dr. Bell.—Survey of Abitibi River.—Ascent of River.—Smooth Stretches.—Character of Country.—Rocks and Minerals.—Lignite.—Dr. Bell's Report of the Basin of the Moose River.—Report and Map.—Soil.—Missinaibi and Kapuskasing Rivers.—Dr. Bell's Report of Country on the Confines of Ontario and Quebec.—Temiscaming to Abitibi.—Logan's Previous Surveys.—Districts Examined.—Frederick House River.—Explorations to Sources of the Ottawa River.—Barrier Lake.—Source of the Ottawa.—Sources of the Gatineau.—Notes of Observations Made.—Mr. W. A. Parks's Report along the Abitibi, Moose and Missinaibi in 1899.—Clay Soil.—Timber Resources.—Mineral Resources.—Water Powers.—Fur and Game.—Additional Extracts.—Frederick House Lake.—Huronian Rocks.—Timber.—Marshy Tract.—Report by J. F. Johnston on Eastern Part of Abitibi Region.—Timber.—Soil.—Game.—Notes by W. J. Wilson on the Western Part of Abitibi Region.—Game.—Rich Agricultural Land.—Forest Growth.—Kakameonan Lake.—North River and Its Minerals.—Kawagama River.—Opening and Closing of Lake Abitibi.—Dr. Ells's Report of Portion of Ottawa and Pontiac Counties.—Ord's Surveys.—Gatineau River.—Upper Lièvre River.—Good Land.—Mica and Timber.—Level and Drift-covered Country.

LAKES.

Frederick House.
Abitibi, 830 feet.
Little Abitibi, N. W. corner.
Lake Peiskachagami.
Mica Lake.
Kenogamisi Lake.
Pierre Lake.
Round Lake.
Lake Opasatika.

RIVERS.

Abitibi River.
Greene River.
Low Bush River.
Montreal River.
Blanche River.

HUDSON BAY COMPANY'S POSTS.

Fort Mattagami, H. B. Co. post along the southern border of the division. Fort Matachewan, H. B. Co. Post.
Frederick House.
Abitibi Lake Post.

SUMMARY OF ABITIBI DIVISION.

Minerals.—Iron, copper, magnetic iron pyrites and steatite are reported, and, inasmuch as the great Huronian belt of metalliferous rocks traverses this region further discoveries are anticipated.

White and
red pine.

Timber.—White and red pine found over the whole region. On the north side of the height of land pine trees measure from eight to nine feet in circumference. White spruce, yellow birch, cedar, also tolerably abundant. Poplar, canoe birch, banksian pine, elm and ash are also reported, and sugar maple and aspen.

Clay soil.

Soil and Climate.—The whole country northward from the mouth of the Montreal River is pretty correctly described as a level clay plain with rocky hills protruding here and there through it. Mark the distinction between this region and the country south. Clay appears to be uniform throughout the whole region. Several acres of this clay soil are cultivated at the Hudson Bay Company's post at Abitibi. All the ordinary cereals cultivated on the St. Lawrence can be cultivated at Abitibi. Indian corn is grown in several localities near the head of Lake Temiscaming.

OPENING AND CLOSING OF LAKE ABITIBI.

<i>Opening.</i>	<i>Closing.</i>
1898—April 11	Oct. 28
1899 “ 28	Nov. 11
1900 “ 30	Nov. 11
1901 “ 11	

Surveys.—Surveys by Sir William Logan, Walter McOuat, Ord, Lindsay Russell, Symmes, W. J. Wilson, J. F. Johnston and Dr. Barlow, and numerous other geologists and explorers.

REPORT OF AN EXAMINATION OF THE COUNTRY BETWEEN LAKES TEMISCAMING AND ABITIBI, BY MR. WALTER McOUAT; ADDRESSED TO ALFRED R. C. SELWYN, Esq., F.G.S., DIRECTOR OF THE GEOLOGICAL SURVEY OF CANADA.

Report of Progress for 1872-73, Geological Survey of Canada, pp. 112-135. Printed by Order of the Parliament of Canada and issued in 1873.

ROUTE OF SURVEY.

Lake
Temiscaming.

In accordance with your directions, I was engaged during the past season in making a geological examination of a portion of the

SESSIONAL PAPER No. 143

country on the Ottawa to the northward and to the eastward of Lake Temiscaming. The country bordering the Ottawa River, as far as the head of this lake, was explored some years ago by Sir Wm. Logan; and in 1870 and 1871, exploratory traverses were made, in the former year by Mr. Richardson, and in the latter year by myself, across the country in a northwesterly direction from Lake St. John, on the Saguenay, as far as Lake Mistassini. Between the latter lake and the head of lake Temiscaming, and extending northward to Hudson's Bay, there is a large area, of the geological character of which almost nothing was known. I was directed to turn my attention to this region, with a view of determining, as far as possible, the boundaries of the principal rock formations; a special interest has recently been given to it by the discovery in 1870, by Mr. Richardson of the Geological Survey, of a series of crystalline schists with serpentine and conglomerates occurring to the south of Lake Mistassini, and having a northeast and southwest strike. These rocks possess the double interest of containing important deposits of copper ore, and of having furnished a fossil coral. It was therefore part of my instructions to ascertain how far they extend to the westward, and if possible, what may be their relation to the Huronian mineral-bearing rocks so extensively exposed along the north shores of Lakes Huron and Superior.

ECONOMIC MINERALS.

Copper.—In several localities copper pyrites in small disseminated grains, and small quantities of the green carbonate of copper, were observed. The latter was noticed particularly in small veins in the diorites and dioritic schists below the eighth portage on the Quinze. At the foot of the seventh portage, which leads from the Ottawa to a small lake on the north side, copper pyrites associated with iron pyrites was observed disseminated throughout a bed, about three feet thick, of a grayish felspathic rock. The quantity, however, both here and at the other localities where copper ore was seen, is not sufficient to render it of economic importance.

Iron.—Magnetic iron was met with in several localities. The most important of these is that already mentioned, on the eighth portage of Quinze, which leads from the Ottawa River, immediately below the point where, after flowing northward for three or four miles, it turns abruptly round to the south-west. The portage is on the south or left hand side of the river, running in a direction about south-east to a small lake in a narrow ravine, and is not more than a quarter of a mile long. The iron ore crosses the portage near the upper or south end. It occurs in the form of layers from the thickness of paper to about an inch, and is interlaminated with similar layers of whitish, gray and dull red, fine-grained quartzite. The iron ore constitutes probably

from a fourth to a third of the whole, and as the thickness of the whole band is about thirty feet, the total thickness of the layers of iron ore would probably not be less than eight feet. The band was traced along the strike for about a hundred yards. Magnetic oxyde of iron was observed under similar conditions at several points on this portage, and on the next above, but in much smaller quantity. This ore occurs also on Lake Opatatika, about six miles south of the height of land. On Lake Abitibi, it was observed on the south side of the upper lake, and also on the west side of the lower lake. At none of these localities, however, was it found in important quantities.

Lake
Opatatika.

Magnetic Iron Pyrites.—A bed eight or ten inches thick, composed chiefly of the magnetic pyrites, was observed on the west side of Lake Opatatika, at the locality already described as the first where, in going north, the gneissoid and granitic rocks of the southern part of that lake are found to have given place to the crystalline schists and conglomerates of the northern part. It is associated with silicious layers containing a large proportion of magnetite.

Steatite.—This rock occurs largely in the same locality as the last, considerable exposures occurring on the west side of Lake Opatatika. Steatite was also observed on the Quinze, near the upper end of the island, on the south side of which are situated the fourth, fifth and sixth portages.

Perfect
cleavage.

Roofing Slates.—On the fifth portage of the Quinze, some of the dark gray and light greenish gray argillaceous slates which are there exposed, have a very perfect cleavage, and would probably be well adapted for roofing purposes.

TIMBER.

White and
red pine.

White and red pine are found over the whole region examined, and are by no means rare even as far north as Lake Abitibi; but on this lake, with the exception of a few healthy looking individuals, about six feet in circumference, observed near the outlet, they are all very small and scraggy, and are confined to the numerous islands and points. They are quite abundant and of excellent quality on the slopes of the hills along both sides of the height of land. When ascending the hill described as rising to a height of 700 feet above Lake Matawagogig, on the north side of the height of land, several fine trees were measured and found to be from eight to nine feet in circumference at a height of four or five feet from the ground; and from the summit of the hill groves of white pine were observed in all directions. White spruce, yellow birch and cedar, are also tolerably abundant and of good size. Fine specimens of the latter tree—tall and straight—were observed, chiefly in hollows among the hills, on the south side of Lake Abitibi.

Trees nine feet
in circumfer-
ence.

SESSIONAL PAPER No. 143

Groves of white pine are conspicuous along the shores of Lake Opasatika, generally a little distance from the water. Both red and white pine are met with, but not abundantly, on the lower portion of Lac des Quinze; but with one exception probably the best timber seen by us during the summer is that which grows on the hills on both sides of the upper part of Lac des Quinze and the lower part of Lake Mijicowaja. The exception mentioned is on the Quinze, in the vicinity of the fourth and fifth portages, where there is a great quantity of very fine pine, both red and white. There is very little pine on the Blanche, the only specimens observed being a few very small ones near Round Lake.

The most abundant tree in this region, north of the limit of sugar maple, is aspen, after which come canoe-birch, spruce, Banksian pine, and Canada balsam. Elm and ash occur occasionally on low flats as far north as Lake Abitibi. Other trees.

SOIL AND CLIMATE.

The whole region examined, extending northward from the mouth of the Montreal River, which is about thirty miles south of the head of Lake Temiscaming, may be pretty correctly described as a level clay plain with a great number of rocky hills and ridges protruding through it. There is a marked distinction between this region and the country to the south. Rocky hills in clay plain.

The height of the clay appears to be pretty uniform throughout the whole region. Around Lake Abitibi it is about thirty feet above the level of the lake, which was estimated to be 245 feet higher than Lake Temiscaming, giving 275 feet as the height of the clay at Abitibi above Lake Temiscaming. On the upper part of Lac des Quinze it is occasionally seen along the edge of the lake, and rising about twenty feet above it; and therefore as the latter lake is supposed to be about 260 feet above Lake Temiscaming, its height above the lake would be about 280 feet. On the Blanche, the highest clay plains about thirty-five miles up the river, are nearly on the same level with Round Lake, which was estimated to be 275 feet above Lake Temiscaming. Clay is seen, I believe, on all the portages between Lac des Quinze and Lake Abitibi. This would give a greater height than the foregoing, since on the highest of them—the height of land portage—it is about sixty feet above Lake Abitibi or 305 feet above Temiscaming. Taking the mean of all these heights and adding it to 612 feet, the height of Lake Temiscaming above the sea, we find that the height of the clay plain above the sea level is about 900 feet. Clay plain.

ARABLE LAND.

The largest areas of arable land are on the Blanche, and around Lake Abitibi. On the Blanche the banks are at first only eight or ten feet

Occasional
bosses of
gneiss.

above the ordinary summer level of the river, but ascending the stream they gain in height, step by step, until thirty miles up they rise to a height of from 100 to 150 feet above the water. Until within a few miles of Round Lake, no rocks are seen except in the channel of the stream or in the face of the cliffs. Towards Round Lake the gneiss only occasionally appears above the level surface. Bluish clay was exposed in the bed of the river all the way to Round lake, but about half way up is overlaid by a rather coarse brown sand, which in its turn, further up, is again overlaid by clay. Six or eight miles below Round lake, where the cliffs are upwards of 100 feet high, the middle portion consists of sand, while at the base and summit, nothing is seen but clay. The level land in the valley of this river will therefore be partly clay and partly sand, perhaps in nearly equal proportions. The width of arable land is probably, on an average, not less than six miles, and may be much more. On the lower levels, a good deal of the surface is probably swampy. The higher levels have been almost entirely denuded of vegetation by repeated fires.

LAKE ABITIBI.

Clay land.

Lake Abitibi is surrounded on all sides by level clay land. At a good many points however the rock rises above the level of the clay. This is especially the case along the south side of the upper lake, where the dioritic hills, already described approach the lake; but even here there is generally a strip of clay land along the shore. To the north, and especially the north-westward, the clay level seems almost unbroken, and it is well known that it extends in this direction to the shores of Hudson Bay.

FARMING AT HUDSON BAY Co.'s Post.

Potatoes.

Several acres of this clay soil are cultivated at the Hudson Bay Company's post at Abitibi, and with satisfactory results. The only crop grown at present is potatoes; but I was informed by the man who has charge of the farming operations (a French Canadian who has been more than thirty years at Abitibi, but was brought up as a farmer near Sorel, in the province of Quebec) that several other crops, including wheat, had been tried in former years, and with such results, that he is inclined to insist that all the ordinary cereals can be cultivated as successfully at Abitibi as on the St. Lawrence. Such an opinion from a man who has been for so many years practically engaged in the cultivation of the soil, is worth recording, and ought to be reliable.

INDIAN CORN.

Corn ripens
well.

Indian corn is grown at more than one locality near the head of Lake Temiscaming, and is said to ripen well. I am able personally to

SESSIONAL PAPER No. 143

testify to this, as I was shown some good ripe ears which had been grown during the summer of 1872, on the farm of Mr. Angus McBride, at the head of the Lake. It should be said however, that the locality is perhaps unusually advantageous as, besides being close to the lake, it is particularly well sheltered on all sides, except the south.

ABITIBI RIVER.

Survey of the Abitibi river by A. S. Cochrane, C. E., Assistant to Dr. R. Bell, published on pp. 33c-37c of the latter's 'Report on an exploration of the East Coast of Hudson's Bay', in 1877, issued in 1879 and published by Authority of Parliament in the 'Report of Progress of the Geological Survey of Canada for 1877-78.'

ROUTE TRAVELLED.

The description of the route travelled and the country examined runs as follows:—

'In following the stream itself (Abitibi River), the total distance Abitibi River to Abitibi Lake was found to be 212 miles, but taking the corrected length of each of the five stretches into which the river may be divided, the aggregate is 186 miles, as follows:—

1. From mouth to Sextant Rapids, 39 miles.
2. Sextant Rapids to mouth of Frederick House River, 60 miles.
3. Frederick House River to Jaw Bone Creek, 10 miles.
4. Jaw Bone Creek to Black River, $54\frac{1}{2}$ miles.
5. Black River to outlet of Abitibi Lake, $52\frac{1}{2}$ miles.

ASCENT OF RIVER.

Abitibi Lake is about 857 feet above the level of the sea, and as the junction of the river with the Moose is about fifty feet above the same level, the total rise in the Abitibi River would be about 807 feet. The first stretch has a swift current like that of the Main Moose. A rapid rise takes place in the ten miles about the end of this stretch, or from the foot of the Clay Falls to the head of the Otters. Beginning at fifteen miles higher up the stream, there is a rapid rise for another ten miles, or from the foot of the Long Portage to the head of the Little Long Portage. At the Couchiching Falls, seven miles below the outlet of Abitibi Lake, there is a rise of about fifty feet.

SMOOTH STRETCHES.

In other parts of the river, there are considerable stretches of smooth water between the rapids, in which the current is not too

strong for paddling canoes up-stream. The longest of these is between the Long Sault and Duck Deer Rapids, a distance of twenty-eight miles.

After giving a list of all the portages on Abitibi River, Mr. Cochrane describes the character of the country as follows:—The first or lowest stretch flows through a level country overspread with an even covering of drift, and the banks of the river, which are not high, consist of boulder clay overlaid by more or less sand or gravel and brownish loamy and gravelly earth.

Rocky hills. In the second stretch as far up as the Three Carrying Places Portage, a distance of forty-five miles, the river runs in a narrow valley with a clayey bottom and rocky hills, varying from 50 to 200 feet in height, on each side. No high ground was observed near the river throughout the rest of its upward course, except at the Duck Deer Rapids and at a bend nineteen miles, in a straight line, from the outlet of Abitibi Lake, where hills rise on either side to heights of 80 and 120 feet respectively.

ROCKS AND MINERALS.

Petroleum. Limestones (almost pure carbonate of lime), reddish-brown marls, black shales, granite, petroleum, and Huronian as well as Laurentian rocks and minerals are recorded.

LIGNITE.

Some loose pieces of lignite were found on the west bank of the Abitibi a short distance above Big Cedar creek, about twenty-three miles from the mouth.

Basin of the Moose River.

Surveys. The report on the geology of the basin of the Moose River and adjacent country by Dr. R. Bell issued in the Report of Progress of the Geological Survey of Canada for 1880–81–82, contains not only the results of the surveys and explorations made by him in 1881, but also those of 1870, 1875, 1876 and 1877. Together with the results of a geological exploration of the Upper Ottawa and lake Abitibi region made by the late Walter McQuat of the Geological Survey in 1872.

REPORT AND MAP.

These results are embodied in a report of nine pages together with a coloured map showing the topographical and geological features as known to date.

SESSIONAL PAPER No. 143

The areas of Huronian rocks (which are those which carry the nickel, Minerals, gold, silver, copper, and other economic minerals) are delineated on the map in question so far as the surveys allowed. A number of minerals and rocks are recorded.

A large proportion of the area covered by the map is coloured Huronian.

SOIL.

On page 8, Dr. Bell writes :—“The country around the lakes at the heads of the Michipicoten, Magpie and Kabinakagami rivers is generally hilly and broken. Some patches of fair land, mostly of sandy and gravelly loam, were found among the hills in the neighbourhood of all these lakes. The valleys of the Oba and Kabinakagami rivers are overspread with fine stratified sands which often contain much clay. On top of these deposits the soil usually appears to be good, but in some places it is of too light a character. Along the latter stream, the banks of sand sometimes attain a height of fifty feet and upwards, especially in the lower twenty or thirty miles examined. For a few miles above our turning point, a yellowish-drab clay, affording a good soil, was found on either side of the river.

BETWEEN MISSINAIBI AND KAPUSKASING RIVERS.

In the country examined between the Missinaibi and Kapuskasing rivers much of the land is of a coarse, sandy nature, broken here and there by ridges, and knolls of rock, but in the valley of the latter stream there appears to be a considerable proportion of loamy and fine sandy soil of fair quality.

EXTRACT FROM EXPLORATIONS AND SURVEYS OF
THE COUNTRY ON THE CONFINES OF THE
PROVINCES OF QUEBEC AND ONTARIO,
BY DR. R. BELL, IN 1887.

Summary Report of the operations of the Geological and Natural History Survey for 1887,—pp. 16-19. Printed by order of Parliament, Ottawa, Canada, 1888.

Dr. R. Bell was engaged during the summer in an exploration of a portion of a large tract of little known country on the confines of the provinces of Quebec and Ontario, including Lakes Temiscaming and Abitibi, the Montreal river and the upper waters of the Ottawa.

Upper
Ottawa.

The chief objects of the exploration were to ascertain more precisely the northern extension and the distribution of the great mineral bearing belt of Huronian rocks which commences on the Georgian Bay of Lake Huron and crosses the Canadian Pacific Railway at and in the vicinity of Sudbury, and also to investigate the question of the northern limit of the apatite or phosphate and mica bearing belts of Ottawa county, and likewise to make such additions as might be possible to the existing and very imperfect geographical knowledge of the region to be traversed.

PREVIOUS SURVEYS.

Logan's
survey.

The examination of the rocks of Lake Temiscaming was in continuation of the work of Sir Wm. Logan, in 1845, the result of which is summarized in Chapters IV and XII of the Geology of Canada, 1863, and where also the succession of the Laurentian and Huronian rocks on Lake Temiscaming is described. In the report for 1845 the rocks are more fully described, but they were not then known as Laurentian and Huronian.

DISTRICTS EXAMINED.

In 1875 I examined both these branches and the country thence to Lake Matagami, in connection with geological exploration, extending from Wanapite and Sturgeon Rivers, but the main Montreal River, below the bend, has not hitherto been examined geologically. The rocks along it were found to belong to the Huronian system, except in two parts, namely at Bass Creek, two miles above the head of Elk lake, and just below the extremity of Sinclair's line, or four miles below the junction of the East branch, where Laurentian gneiss were met with.

FREDERICK HOUSE RIVER.

Huronian
rocks.

From the great bend of the Montreal river I crossed the height of land northward and descended the Frederick House river, a branch of the Abitibi, to Paish-ko-tehagami lake. All the rocks seen on this route also belong to the Huronian. On returning from this exploration I descended the Montreal river to its junction with the Temagami lake and made a track survey and geological examination of the lakes through which it flows. The rocks on this route were found to consist principally of clay-slates, argillites and quartzites. At the time of my visit to the Temagami lake Dr. Barlow was engaged in making a micrometer and compass survey of it, having begun this work on July 23, and he completed it about the end of September, after which he made a similar survey of the route from Temagami lake *via* Rabbit

SESSIONAL PAPER No. 143

lake to the foot of lake Temiscaming. Temagami lake was found to measure thirty miles in its greatest extent, or from north to south, and nearly the same from east to west, but much of its general area is occupied by peninsulas and islands. It is remarkable for having two outlets which discharge its waters one into the St. Lawrence and the other into the Ottawa. The southern outlet is a branch of the Sturgeon river which flows into lake Nipissing and thence by the French river into lake Huron; while the northern outlet as already mentioned, falls into the Montreal river and thence into the Ottawa. The rocks around Temagami lake embrace felsites holding pebbles of syenite, which are the most abundant, quartzites, clay-slates, massive diorites and crystalline schists.

SURVEYS AND EXPLORATIONS OF THE LAKE TEMISCAMING TO SOURCE OF OTTAWA.

The next division of the season's operations consisted of the exploration of the district between Lake Temiscaming and the source of the Ottawa. Accompanied by Mr. Cochrane I proceeded from this lake by way of Kippewa, Birch, Sasiganaga, Wolf and Grassy Lakes to the Grand Lac du Moine, and thence to Grand or Victoria Lake of the Ottawa. Laurentian gneiss was the only rock observed on this route all the way from the foot of Lake Temiscaming.

GRAND LAKE.

From Grand Lake Mr. Cochrane was sent northward to ascertain whether or not the Huronian belt which crosses the canoe route between the height of land and Lake Abitibi extends eastwardly to that longitude. In connection with exploration he made a track survey of the northern arm of Grand Lake, which has a length of about twenty miles, and thence across the watershed, and down the chain of lakes and streams which leads in the same direction to Shabogamog Lake. A track survey and a geological examination were made of this lake, which proved to be over thirty miles long. Mr. Cochrane next descended the river flowing from this Shabogamog Lake for a distance of over ten miles, northwardly, where a series of rapids begins. It proved to be a large stream, fully equal to the Ottawa just below Grand Lake, and is apparently the head of the unnamed river flowing into Hannah Bay, at the southern extremity of James Bay. The height of land passes close to the northern extremity of Grand Lake and soon after crossing it Mr. Cochrane found crystalline schists of the Huronian system, and further on they were met with here and there, alternating with Laurentian-like gneiss, as far as the outlet out of Shabogamog Lake, beyond which the schists were continuous as far as

he descended the river. There is little doubt these rocks form a part of the Huronian belt, extending eastward from Abitibi Lake.

BARRIER LAKE, SOURCE OF THE OTTAWA.

Ottawa Lake. Above Barrier Lake, both a geological examination and a track survey of the Ottawa were made to its source which was found to be in a small lake at the head of the north-western and longest of the two branches into which it ultimately divides. This sheet of water which is only about two miles long, had no name and I called it, Ottawa Lake as an appropriate designation, and as following the almost universal rule which obtains in these regions by which the lake at the source of a river bears the same name as the river flowing from it. Laurentian gneiss continued to be the only rock observed all the way from Barrier Lake to Ottawa Lake.

SOURCES OF THE GATINEAU.

Gneiss rocks. From Ottawa Lake I crossed the watershed to Echaume Lake, one of the sources of the Gatineau River, and then descended that stream, which is constantly augmented by tributaries from either side as far as the river Desert, continuing to make both a track survey and a geological examination. No rock but gneiss was met with in descending the Gatineau until reaching a portage about thirty miles below Zigonse, or principal northeast tributary of the river, where a white-weathering coarsely crystalline light gray limestone made its appearance and was afterward traced, almost continuously down the river nearly to its mouth. This well characterized belt of limestone has evidently great thickness. Thinner bands of a somewhat similar crystalline limestone were observed interstratifying gneiss, &c., in the lower part of the valley of the Desert.

Fauna. Numerous observations for latitude were made, which will be used to give greater accuracy to the maps of our track surveys. Notes were constantly kept in reference to commercial timber and to the distribution of the northern limits of the trees in the region visited. Considerable information was gathered on the natural history of the districts especially in reference to food fishes; and collections of Coleoptera and Lepidoptera were made. The temperature of Lake Temagami and of other lakes was recorded three times a day by Mr. J. Fraser, a member of the party.

Forty photographic views were taken to illustrate the various characteristic features of the scenery, points of geological interest and the general aspect of the country.

SESSIONAL PAPER No. 143

EXTRACTS FROM MR. PARKS'S REPORT OF EXPLORATION ALONG THE ABITIBI, MOOSE AND MISSINAIBI RIVERS IN 1899.

(FROM REPORT OF THE BUREAU OF MINES FOR ONTARIO, VOL. VIII, PART 2, 1899.)

In a summary of an exploration undertaken by the Ontario Govern- Route.
ment along the Abitibi, Moose and Missinaibi Rivers, Mr. W. A. Parks describes the physical features, geology, timber and soil and other natural resources of the soil and agriculture in the basin of the Abitibi River, and writes as follows :—

CLAY SOIL.

'Large areas of dry clay soil extend around the Upper Abitibi and Level tracts.
in the region of Nighthawk Lake, while sandy tracts occupy the districts north-west of Frederick House Lake and the height of land between this lake and the Black River. Throughout this section on passing inland, we come to extensive level tracts, wet in places but underlaid by firm clay soil. If these stretches can be drained in the process of clearing it would open up the major part of the country as far north as the big bend for agricultural purposes. All along the river as far as the point the river bank itself, with a width of two miles, is dry enough to take the plough. North of this bend the country is decidedly wetter at any distance from the river, and cannot be described as any but muskeg. The river bank is still dry and high, but it is not composed of as good soil, being far more sandy and covered with less luxuriant vegetation. No considerable areas of arable soil exist on the lower river. The line itself for the last 100 miles traverses almost continuous muskegs. The climate permits the raising of roots, but it is a question whether the cereals will ripen. Root crops.
Barley has been raised at Moose Factory, but its maturing cannot be depended on. For stock raising I think that certain parts of the country would prove excellent, as grass grows well and the crop of roots would serve as fodder for the winter.

TIMBER RESOURCES.

With the exception of a few small isolated trees no pine was seen in the whole district. Along the rivers and on the shores of lakes the timber is uniformly poplar and birch, the rough bark variety of the former tree increasing to the north. In the wet clay flats, spruce of fair size extends over large areas. This timber will eventually be of great value for pulp wood. Trees of a large size are not numerous, the average being about ten inches. In the muskegs very small and

useless red spruce predominates, extending over hundreds of square miles in the northern part. Some cedar is seen, but not enough to warrant a permanent industry. Alder, hazel and several species of the willow are the characteristic shrubs.

MINERAL RESOURCES.

Lignite and gypsum. Excepting on the rivers no outcrops of rocks are seen in the whole region, so well is the country covered with soil. Where observed the rock is barren, only two substances of economical value seen—the previously described lignite and the deposits of gypsum. At the head waters of the Black River rather better looking waters were seen; I understand that some finds of gold and copper have been reported on Rivière Blanche. It may be that prospecting in this region might be rewarded.

WATER POWERS.

Iroquois Falls. The volume of water in the Abitibi, while subjected to enormous variations, is always sufficiently great to develop power at several places. On this river at the Iroquois Falls is an ideal location with a drop of 24 feet. Another excellent place is the first falls on the Frederick House River, where we have a 46 feet descent in the distance of two chains. Where vertical falls are not the rule on these rivers, we have sufficient descent within a few chains at Oil Can Portage, the Lobstick portage, the Three Carrying places, and possibly the Sextant.

FUR AND GAME.

Moose, beaver, etc. Small game as partridge and rabbit are not numerous. Duck are said to be plentiful on Nighthawk Lake in the spring, but they are very wild in autumn. Very few are seen on the lakes and rivers farther north, but the Indians report them to be numerous on the bay, although very shy and hard to obtain. In the southern parts of the district moose are coming in from the west; red deer are almost absent while caribou are rare. The small swampy lakes which abound in the level clay areas have at one time swarmed with beaver, which, although still plentiful, have suffered considerably from the improvidence of the hunters. As a whole the region may be considered a fair producer of fur, fox, otter, fisher, marten, mink, and muskrat.

SESSIONAL PAPER No. 143

ADDITIONAL EXTRACTS FROM MR. PARKS'S SURVEYS,
1899 (ONTARIO GOVERNMENT).

FREDERICK HOUSE LAKE.

Frederick House Lake, about the height of land near the Algoma Clay. Nipissing boundary, resembles Nighthawk Lake and is shallow, but has fewer islands. The southern and eastern shores are overlaid by extensive deposits of clay. These are interrupted by areas of sand both to the north and east where gravel and glacial accumulations begin to occur.

Frederick House River issues from the lake of same name. To the Trees. north-east the land gradually falls to low swampy flats, with almost impassable windfalls. South-west a ridge occurs on the shore, followed by a valley and a second ridge of clay soil well timbered with poplar, spruce, birch and balsam. This is succeeded by a muskeg with scrub, spruce and tamarack.

HURONIAN ROCKS.

Mr. Parks then describes the occurrence of Huronian rock, the same kinds which generally carry minerals and then continues his description of the country along the route from Frederick House Lake to Abitibi River.

"The description now turns back from the Frederick House river to the lake at its source. East of Frederick House Lake and in connection by a narrow pass is a lake of about two miles in length known to the Indians as Quaquaquitchwanook or 'The-lake-whose-waters-run-both-ways.'" The barrier separating the two lakes is composed of glacial accumulations and coarse sand. The shores of the smaller lake Good spruce . are of sand covered with good spruce and poplar and a few red and white pine. The water of this lake is much clearer than that of Hollow Sand, and fish are more plentiful. It seems to be the fishing ground for the Indians of the region, as many drying places were noticed on the shore.

A small creek enters from the southeast, a short distance up which is the head of a portage leading south 30° E to a clear lake with highly calcareous water and having its shores composed entirely of sand. From this lake a portage leads southeast for about two miles over a level sand upland with small pitch pine to a second lake about one-half mile long. South through this lake brings us to another portage of two miles over similar country, but with the pitch pine in part replaced by small spruce. This portage constitutes the height

Springs. of land separating the waters of Frederick House river from those of the Abitibi. The route then crosses a small pond of fifteen chains which receives some beautiful springs of ice cold water.

TIMBER.

Leaving this lake the trail turns north-east and traverses 60 chains of heavy poplar and spruce timber, then passes into a burnt area for about the same distance.

MARSHY TRACT.

Beyond this the trail makes an abrupt descent of about 60 feet, and passes through 60 chains of low, very wet spruce swamp, extremely difficult to portage over, ending in a small pond of 15 chains. Besides the lakes mentioned there are in the sand area numerous sheets of water of small size. A creek which the route follows flows out of the south-east corner of the last mentioned lake, it is very tortuous and narrow in places, having, however, a general width of 10 to 15 feet, and a depth of 5 feet.

Swamps. This stream traverses a low-lying tract, in places very swampy. The river bed itself is almost choked at intervals by a dense growth of alder and other marsh shrubs. In a straight line the distance to its mouth is 3 miles, while its total length is 8 to 10. Through a large marsh this river enters an open lake 2 miles in length by 1 in width, with brown water of no considerable depth. The shores are low and swampy for the most part, but a point on the east side contains many boulders of Laurentian origin imbedded in a sandy clay matrix. The river out of this lake rises in the north-east angle; it is 30 feet wide and flows south-east for a short distance, where it turns north and maintains that direction with uninterrupted navigation for 10 miles.

Trees. Throughout this stretch the shores are low and somewhat marshy with ash, tamarack, poplar and spruce in clay soil. Farther down the river is badly choked with drift-wood, in many places making the navigation very difficult. About twelve miles down occurs a small rapid over Huronian schists, the first outcrop on this river.

SESSIONAL PAPER No. 143

REPORT BY J. F. JOHNSTON, ESQ., C.E., ON 'SURVEYS
AND EXPLORATIONS IN THE EASTERN PART OF
THE ABITIBI REGION.'

Published in the Summary Report of the Geological Survey Department for 1901,
pp. 128 to 141. Printed by Order of Parliament, Ottawa, 1902.

Eastern Part of Abitibi Region.

TIMBER.

With regard to the timber, white spruce, aspen, balsam poplar, Tamarack, balsam, white birch, tamarack, Banksian pine, and cedar are the prin-^{ash, etc.} cipal trees found. Spruce and aspen are by far the most plentiful, and particularly on the northern portion on both sides of the height of land, excellent spruce for pulp wood is seen on the lake and river shores. Balsam poplar, balsam fir and white birch are probably the next most plentiful, and the tamarack is not far behind, but it is nearly all dead, particularly on the northern portion. Cedar is found scattered along the banks of some of the rivers and around the shores of nearly all the lakes. Small ash grows near the mouths of nearly all the brooks. Small elms are found in a few places and red and white pine occur from Lake Kewagama south, but not in sufficient numbers or large enough to be of importance.

SOIL.

The soil over a greater portion of the area is a clay loam, changing in places to a somewhat sandy loam, and in some localities would probably make fair farming land if not too wet and cold. Along the river banks it is generally good, and along the Kewagama River very good. With reference to this the conditions of Abitibi post may prove of interest. I was informed by Mr. Skene, the gentleman in charge, ^{Tempera-} that this year the last spring frost at the post was recorded on May ^{tures.} 25th, and then only one degree. The highest temperature was on July 15th 92° Fahr. and up to September 16th, there had been no frost. On June 8th there was a fall of snow, with the thermometer at 36° and in the interval between May 25th and September 16th rain fell on fifteen days.

FISH.

With regard to fish, I might say that all the lakes near the height of land are well stocked with pike, pickerel and suckers. In Makamik Lake however we found only suckers, while in Whitefish river we

caught whitefish, in addition to those mentioned. Farther south black bass can be caught in Crooked Lake, and possibly a little above it, but they are very scarce.

GAME.

Of the larger game, moose are undoubtedly the most plentiful. We saw their tracks often quite fresh all over the area examined and although not looking for them during the summer, we saw four of these animals, one on the Carcajou river, two on the outlet of lake Kaikaik, and one on lake Kekeko. We also heard them frequently in the calling season, and the Indians seemed to be able to go out and get a moose whenever they felt inclined. Caribou are not scarce but we saw only one and that had just been shot by an Indian. I saw a black bear on one of the small lakes of Kewagama, and a large lynx on the Nawapitechin river. Of the fur-bearing animals beaver, otter, marten, muskrat, mink, and fisher are common, and of these we saw many individuals. Ermine was rather scarce, but some skins were brought to the post. Rabbits were found to be comparatively abundant. Both the ruffled grouse and the spruce partridge are very plentiful, but ducks are rather scarce.

NOTES BY W. J. WILSON, ESQ., PH.D., "ON THE WESTERN PART OF THE ABITIBI REGION."

Embodied in the Summary Report of the Geological Survey Department for 1901, pp. 115 to 128. Printed by Order of Parliament, Ottawa, 1902.

GAME.

The whole country examined is frequented by fur-bearing animals, which forms a livelihood for the Indians. Each Indian has his own hunting-ground and it is said they are careful not to trespass on each other's property. A good hunter will secure furs to the value of \$400 in one winter, but many do not exceed \$200. The principal animals hunted are moose, caribou, deer, bear, fox, wolf, marten, muskrat, lynx, cat, weasel, beaver, mink, ermine, skunk, porcupine, fisher and rabbit. Moose are very plentiful on the head waters of Blanche and Black Rivers, especially the former. Fresh tracks are frequently seen in the soft mud along the streams and their paths were common and well beaten through the bush. The Indians say that the wolves are increasing alarmingly fast, and they fear if their rapid increase is not checked they will exterminate the deer and other animals. They are sometimes successful in their attacks on the moose, especially the young ones. Fish of various kinds are numerous in all the lakes and rivers, and many species of birds are seen during the summer.

SESSIONAL PAPER No. 143

RICH AGRICULTURAL LAND.

From my observation in this district I am convinced that there are large areas of agricultural land of excellent quality, especially in the river valleys, the soil in most cases being a clay loam, free from stones and easily cleared. The climatic conditions also seem favourable for farming operations, and these would improve with the clearing and drainage of the land. Out of a collection of nearly seventy species of plants from this district, Professor Macoun says there is only one which indicates a cold climate and that was found in a peaty swamp. When it is remembered that Lake Abitibi is further south than the southern boundary of Manitoba it will be seen that there is nothing in the latitude to prevent the successful cultivation of the soil, and further, it has been practically proved for many years that vegetables of all kinds can be successfully grown at Abitibi post.

FOREST GROWTH.

The country is thickly wooded with spruce (*Picea alba* and *Picea Nigra*), poplar (*Populus tremuloides* and *P. Balsamifera*), balsam or fir (*Abies balsamea*), canoe birch (*Betula papyrifera*), cedar (*Thuja occidentalis*), tamarack (*Larix americana*), pine (*Pinus Strobus*, *P. resinosa*, *P. Banksiana*), and numerous shrubs as alder, willow, American yew, mountain maple (*Acer spicatum*), rowan, sweet gale and a great variety of small flowering plants and ferns.

KAKAMEONAN LAKE.

Like all other lakes in this district, the shores of Kakameonan are well wooded with aspen and balsam, poplar, white spruce, balsam-fir, tamarack and an occasional pine. The rocks seen were greywacke, chert, a breccia with flinty felspathic quartzite pebbles, altered diabases and a hard, compact, light-gray Huronian rock. Below the outlet of Kakameonan there are no exposures on the west branch which flows over clay and is from sixty to a hundred feet wide.

NORTH RIVER.

The rocks on the river are somewhat varied, greenstone carrying Nickel, some pyrrhotite and giving indications of the possible presence of nickel, occurring about five miles up the river, while two miles beyond an altered granite is exposed. Within the next mile and a half, greenstone is seen again and also chloritic schist. An outcrop of light-gray altered granite is seen at intervals for about two miles beyond this, and gives place to a very hard cherty rock containing small specks of

2-3 EDWARD VII., A. 1903

chalcopyrite associated with greenstone, and further up the river, as far as we managed to ascend, greenstones were the only rocks seen.

KEWAGAMA RIVER.

Spruce.

This river flows over clay with good clay loam on its banks, which are well wooded with spruce, balsam, and white poplar. There are two rapids, one, about four miles up, with a fall of about six feet, and another near the head falling about fifteen feet. At both of these there are exposures of a rusty, somewhat gneissic biotite schist, striking about north-east.

OPENING AND CLOSING OF LAKE ABITIBI.

Mr. Skeene gave me the following dates as to the opening and closing of Lake Abitibi:—

<i>Opening.</i>	<i>Closing.</i>
1898—April 11	October 28.
1899— " 28	November 11.
1900— " 30	" 11.
1901— " 11	Not received.

The first frost at the post this fall (1901) was on Sept. 25.

OTTAWA AND PONTIAC COUNTIES.

EXTRACTS FROM THE ANNUAL REPORT, GEOLOGICAL SURVEY OF CANADA.

(Vol. xii, Part J., 1901, by Dr. R. W. Ellis).

GATINEAU RIVER.

Ord's survey.

This river was also traversed by Mr. L. R. Ord, in 1887, in connection with his explorations along the Lièvre, and the chain of lakes between this river and the Gatineau was then also surveyed. Among these are several of large size, including Whitefish and Thirty-one Mile or Grand Lake. An examination was also made by Mr. Ord of the Desert River west of the Gatineau and of its principal tributary, the Eagle, as also of the chain of lakes at their head waters. East of the Gatineau a traverse was made by the same gentleman of the country between this river and the Lièvre, by way of Baskatong creek and

SESSIONAL PAPER No. 143

lakes to the Height of Land, which was reached by way of Piscatosis river and lake, the descent to the Lièvre being made by the Tapance, which enters that stream about 95 miles in a direct line north of its junction with the Ottawa near Buckingham. From these examinations we have a fair knowledge of the country along these portions of the Gatineau and Lièvre rivers. As the result of Mr. Ord's explorations in this district have never been published, and as they contain many points of general interest, both as regards the character of the country and the distribution of the several divisions of the crystalline rocks they will be given in a subsequent chapter.

UPPER LIÈVRE RIVER.

A mile to the east of Wabassee farm on the upper Lièvre river, at Big Wabassee rapid, limestone and gneiss occur in fragments, and from this to the mouth of the Kiamika, where the river bends north again, the country is level and largely drift-covered, with occasional outcrops of dark, weathering, massive gneiss. For a mile above the Kiamika small outcrops of gneiss are seen along the Lièvre, and thence to the Red farm the river is broad, shallow and full of sand bars, the country flat and without exposures, presenting a considerable area of good farming land. One mile above the Red farm, a small exposure of limestone is seen at the Devil's rapid. This is nearly vertical and filled with lumps of rusty gneiss and with scattered grains of graphite and chondrodite and has a general strike of N. 20° W. Drift covered country.

GOOD LAND.

From this place to the L'Original Rapid, about eleven miles the land is low, flat and sandy, with good soil and covered with hardwood timber. This belt of good land apparently extends for a considerable distance on either side of the river, and the rocks seen are small exposures of limestone and dark weathering gneiss. Small rock exposures.

MICA AND TIMBER.

At L'Original Rapid a band of rusty gneiss and limestone with pyroxene and mica, strikes N.E. and dips N.W. 50°, and from this to Mountain farm, fifteen miles above, the rocks are dark weathering gneiss and limestone, nearly always occurring together in small exposures, with a general strike of N. 20° E. and a dip to the west. The country in the vicinity of the river is nearly all flat, and the land is good and well timbered with hardwood. Mountain Farm.

From Mountain farm to Rapide des Cèdres, fourteen miles further north, the river is broken by frequent rapids, the rock seen being

Minerals. principally gneiss boulders. At this point a band of limestone, about forty to fifty chains wide, strikes across the river and dips S.W. $< 45^\circ$ to 90° , holding mica, pyroxene and graphite and scattered lumps of orthoclase and pyroxenic rock. The band is covered over largely by sand and the full extent cannot be seen. North of this to the Chaudière rapid, two miles distant, sand drift prevails. At this place ledges of red massive granite-gneiss, showing but small traces of foliation appear, but with a general strike of N.W. and a S.W. dip 45° . One mile and a half north of this, at the mouth of the Tapanec a branch from the west, a small band of limestone is exposed. Although this portion of the river is beyond the limit of the map sheet in question, the information concerning it is of importance as helping to explain the structure of the crystalline rocks in this northern area, and it has therefore been included in the scope of this report.

DRIFT COVERED COUNTRY.

Level stretches

From Mr. Ord's notes it is clear that the great stretch of comparatively level and drift covered country, recognized on the upper portion of the Rouge and the Nation, extends westward to this area and that the development of limestone, so well seen near the Ottawa, here also disappears.

CHAPTER VI.

UPPER MOOSE OR MATTAGAMI RIVER DIVISION—ALGOMA.

Lakes.—Rivers.—Hudson Bay Company's Posts.—Summary: Character of Country—Timber—Soil—Climate—Minerals.—Reports: Extracts from Report of W. A. Charlton on the Hudson Bay Railway route *via* Missanabie and Valley of Moose River.—Maps.—Coal River.—Hudson Bay.—Moose River.—Soil.—Timber.—Minerals.—Borron's Report.—China Clay.—Fine Sand.—Professor Bell quoted.—Navigation.—Pulp wood.—Dr. R. Bell's Report on the Country between James Bay and Lakes Superior and Huron.—Mineral-bearing rocks.—Surveys.—Portages.

Upper Moose or Mattagami River district (Algoma).

LAKES.	RIVERS.
Opasatika,	Kapuskasing,
Muskutai,	Kakozishk,
Kinogaming,	Piskanoguni,
Wapiskagami.	Front River,
Kapuskasing,	Kenogami.
New Brunswick.	

HUDSON BAY COMPANY'S POSTS.

Flying Post, H. B. Co. New Brunswick Ho. H B. Co., post.

SUMMARY OF RESOURCES, &C., OF DIVISION VI.

Character of Country.—Fine agricultural land, clay and sandy loam Rolling plain. forms part of great clay basin of Moose river and its numerous tributaries, which take their rise near the C.P.R. line, north of lakes Huron and Superior, and even south of the line. The head-waters of the rivers in this division are well timbered, and the country may be described as an undulating, rolling plain, gently sloping towards James Bay.

Timber.—Red and white pine, spruce, tamarack, white birch, poplar, and balsam, abound.

Soil.—Is good for farming throughout the greater portion of the country. The hills are not very high. At Brunswick House, a Hudson Bay post, the soil is clay.

Climate.—Hay, oats and potatoes are grown successfully at New Brunswick House. Fine pasture land.

Dairying and farming.

The climate and soil are favourable to a mixed system of farming—stock raising and dairy farming would be most successful. The Kenogami and Missinaibi river basins comprise two large areas of excellent arable land.

Minerals.—Coal as lignite, fine sand, china clay and peat have been discovered and geologists report the occurrence of the mineral-bearing Huronian formation.

EXTRACTS FROM REPORT BY MR. W. A. CHARLTON ON
THE HUDSON'S BAY RAILWAY ROUTE *via* MISSANABIE AND VALLEY OF MOOSE RIVER.

Printed by order of the Legislative Assembly of Ontario, Toronto, 1898.

The undersigned respectfully reports that, in accordance with the request of the 'Governor in Council' I began preparations for making a personal examination of the northern section of the proposed route of the Sault Ste. Marie and Hudson's Bay Railway, on the 16th of September last.

MAPS.

Valuable map.

It should be here stated that the important matter of obtaining reliable and accurate maps of the region to be traversed was forced upon my attention by finding that the one furnished to me by the Provincial Crown Lands Department was too general and on too small a scale to be of any service. The railway company provided a map of their preliminary survey line, which, however, bore more to the east than the one now preferred by their engineer, and also a map of the section of Moose river for twenty miles south from the outer bar, made by the surveying party of 1891, with soundings, showing the depth of water inside the river, and outside, until a deep sea channel was reached. This was of special value so far as it went, but left a large portion of the route unindicated. This want was found to be best supplied by adopting a map published by the Dominion to accompany Dr. Bell's reports of 1875, 1877 and 1881, made to show the geological features of the Moose river basin. This portrayed the west or Missanabie branch of the Moose river to within a few miles of its mouth, and marked the rapids and falls along the

SESSIONAL PAPER No. 143

same, which were found, as we passed, very reliable, consequently it is adopted as the basis of arriving at the distances mentioned by connecting it with the railway survey of the northerly section of the river on the map accompanying this report. The line of the Canadian Pacific Railway has also been laid out upon it with approximate accuracy.

We came to the first portage in a little over two hours, crossing Crooked lake. from Dog lake over the divide about nine hundred feet into Crooked lake. These lakes are nearly on a level, Dog lake emptying into the lake Superior waters, and Crooked lake into the Moose river waters. Passing out of Crooked lake by a portage of about the same distance we reached Missanabie lake, and by night had traversed the length of that lake to the Brunswick House, the Hudson's Bay post, at the northerly end of the lake, about fifty miles from Missanabie station.

COAL RIVER.

On Friday, October 1, we went down the river to the mouth of Coal Lignite. river, a small stream coming in from the south sea. We arrived at the mouth at 10.45 a.m. Landing on the shore we left our canoe and walked up the deep valley (through which the small stream flows) about a quarter of a mile, in search of coal. We found some specimens of lignite and burned some on our fire when getting dinner. The specimens were black, some like coloured blocks of wood, others stony, others like lumps of black earth. The smoke from our fire had a coal gas odor. At one point in the river bank I saw a seam cropping out, commencing about three feet above the water and holding the same appearance below the water; depth of vein not determined.

MOOSE RIVER.

The Moose River has three main branches. The largest one is the Soil. Missanabie, the west branch, into which several large rivers empty from the west. The centre branch is the Matthoggomah, and the easterly branch the Abitibi. The Indians inform me that the country west of the Missanabie is principally level country, through which a railway could be easily constructed, and that the Missanabie river and its tributaries furnish immense water power at various points all the way down to the Big Falls; that the middle and the east branches of the Moose, although not so large, furnish abundant water power, and that the country along these branches is more broken than along the Missanabie and westerly therefrom, although all is well timbered with spruce and poplar of fine quality, some pine, tamarack, cedar, birch, balsam, &c. The soil on all branches, more particularly the west branch, is good soil for farming.

I noticed that a greater portion of the way down the river soil is clay, and with favourable climate would be very productive.

SOIL, TIMBER, MINERALS.

From Missanabie to New Brunswick House (fifty miles by water) the country is considerably broken, although the hills are not very high. The timber is small, and some portions of it have been destroyed by fire. I would suppose there is more rock than tillable land along that part of our journey.

Clay.

At New Brunswick House the soil is clay. I am informed that they grow hay, oats and potatoes, but have not tried wheat. The pasture was very fine when we were last there, October 13, and the cattle in the pasture field were in good condition for beef. I also noticed that at Old Brunswick post (now abandoned) some forty miles further down the river, that the grasses were luxuriant. The country lying along the river below lake Missanabie down to the point we reached is principally a level country, clay soil. There are occasionally rough rocky ridges in the vicinity of falls or rapids in the river, and at some of these points the rock formation is similar to that along the Michipicoten, and no doubt mineral-bearing.

Ridges.

The timber along the river is poplar, whitewood, spruce, small pine, tamarack, cedar, birch, balsam, and some ash and other varieties.

Timber.

I measured a number of spruce trees and found the circumference four feet from the ground to be in many instances from five to eight feet. The poplar of two varieties of poplar and whitewood were nearly as large and very tall and straight. The level lands are more heavily timbered than the broken portions, although there is more small pine on the ridges. Some burnings have destroyed portions of the timber, but not to any very considerable extent, so far as I could learn.

E. B. BORRON'S REPORT.

Climate and soil favourable.

He expresses the opinion that a tract of dry and fertile land extends across the territory from east to west not less than 400 miles long and 50 miles wide, comprising 20,000 square miles or 12,800,000 acres. Making every reasonable deduction for lakes, marshes, swamps, muskegs and unarable land, a very large quantity is fit for settlement, the climate and soil favourable to a mixed system of husbandry; stock raising and dairy farming will be the most successful. On page 46 he expresses the opinion that there is a large area of arable land along the Missanabie river than on any other, the Kenogami excepted (note 2). On the same page he mentions having seen elm trees and black ash at Old Brunswick, and on page 44 he states having seen

SESSIONAL PAPER No. 143

spruce trees four to eight feet in circumference. It is only fair, however, to say that he considers the belt of good sizeable trees of any kind as confined to the immediate banks of the rivers and streams.

CHINA CLAY AND FINE SAND.

On page, 64 Mr. Borron gives an account of an inexhaustible supply of china clay and fine sand below Coal river on the Missanabie, and adds: 'Should this clay prove, as I believe it will prove, suitable for the manufacture of china, associated as it is with the finest of sand for glass making, with beds of lignite coal and peat, this can hardly fail, I think, to be a point where manufactures of pottery and glass will ultimately be established.'

PROFESSOR BELL ON 'HUDSON BAY BASIN.'

Professor Bell testified before the Dominion Parliament committee in 1883 that Hudson's Bay is open the year round. Open water can be seen from the beach at all seasons. He was informed that on the eastern shore the sea washed against the rock coast all winter. Fishing can be prosecuted earlier and longer in Hudson's bay than in the largest lakes of the St. Lawrence basin.

I do not deem it necessary for me to extend this report at present, but can do so later on if desired. A full report of the mineral wealth of the Hudson's bay country, including the many islands, would be a volume almost in itself.

NAVIGATION.

Although the Hudson's Bay is open all the year, the entrance to the straits is blocked by the ice coming down from the north, so that navigation between the bay and the Atlantic ocean is only practicable about four or five months in the year, from August to December. But this would be the time of the year when a large portion of the Manitoba grain could be shipped by way of Moose Factory to Europe, as may be seen by consulting the map. This I consider an important matter.

PULP WOOD.

The Moose river country offers almost unparalleled opportunities for the manufacture of pulp. The province of Quebec is probably the only other known country where this industry could be carried on extensively under similar advantages.

OBSERVATIONS.

Commercial
aspect.

It seems to me a strange condition of things that a people so progressive as we are in Ontario, having for a portion of our northern boundary one of the greatest inland seas in the world, the sea and its surroundings possessing the greatest attractions for commercial enterprise, should be lacking of any means of communication between our commercial centres and this great field of wealth. I am not prepared to say to what extent the Government should assist in the construction of a railway, but I am sure it would be greatly to the advantage of the Dominion and more particularly to this province, and especially for the city of Toronto, the natural commercial centre, if railway communication were established at an early day. It would be the means of opening up a country hitherto shrouded in a very considerable degree of darkness and enable us to obtain full and reliable information as to its resources. It would inaugurate a direct trade between the merchants and manufacturers of Ontario and Hudson's bay and extend to regions beyond.

FERTILE BELT.

Resources.

It would open up for settlement the fertile belt north of the height of land. It would develop and make available the mineral and timber resources of an extensive country. I believe that the immense territory lying between Temiscamigue and Abitibi westerly and northerly to the great Albany river is of sufficient importance to this province in land, timber and mineral wealth, to warrant the construction of several lines of railway for the purpose of developing these resources.

In my judgment the Sault Ste. Marie and Hudson's bay route is more practical than any other route yet proposed, for the purpose of establishing direct communication with Hudson's bay at an early day and at a very limited cost, while at the same time it would pass through a larger area of arable land and be more nearly in the centre of this great but undeveloped region.

SESSIONAL PAPER No. 143

IN HIS REPORT OF AN EXPLORATION IN 1865 BETWEEN
JAMES BAY AND LAKES SUPERIOR AND HURON,
BY ROBERT BELL, C.E., F.G.S., ADDRESSED TO ALFRED
R. C. SELWYN, F.R.S., F.G.S., DIRECTOR OF THE
GEOLOGICAL SURVEY OF CANADA.

See Report of Progress for 1875-76, Geol. Surv., Can., pp. 294-342.

MINERAL BEARING ROCKS.

Dr. Bell writes.—‘I am now enabled to demonstrate that an immense area of mineral-bearing Huronian rocks, the largest as yet known in the Dominion, runs northward from lake Huron through the greater part of the distance lying between it and the area of unaltered rocks of the south-west part of James bay; also that the Michipicoten belt of these rocks is much more extensive than had hitherto been supposed. Some deposits of economic minerals were discovered, and others which have been little known were examined. In the Moose river basin a remarkable set of wide spreading trap dykes was found to exist. The occurrence of Tertiary lignite on this river was not previously known to the public, although a few persons living in the country were aware of it. The flat lying rocks of this region had been previously represented on geological sketch-maps as continuing up the eastern side of James Bay, but I found this supposition to be erroneous.’

SURVEYS.

A track survey was made of a somewhat circuitous route from lake Huron to Moose Factory at the south-western extremity of James Bay, a distance of some six hundred miles, with the exception of that portion of it nearest Lake Huron which had been more or less correctly mapped. A similar one was also made of the whole route from Moose Factory to Michipicoten on lake Superior, a distance of about 400 miles or about 300 miles in a straight line. Observations were made, many of which may prove important, in regard to the physical geography, the climate, the soil, timber and resources generally of the whole region explored, and notes were also taken in reference to its botany and zoology. An exploration of the valley of the Goulais river was made in order to ascertain the boundaries between the Laurentian and Huronian rocks in that part of the country.

From the forks of the Wanapiti river, above St. Paul's lake, I followed a series of lakes across the height of land to White Beaver

lake at the head of the east branch of the Montreal river, a tributary of the Ottawa. This branch was followed down to the junction with the main river, on reaching which I turned up stream and followed the Montreal river as far as Pigeon lake, from which, by a series of long portages, we struck the waters of Grassy river, flowing to the northward, and followed them as far as lake Shatagami. From this lake we made a portage nearly six miles long to Mattagami lake on which is styled the South Branch of Moose on the Geological Survey Map, but in the country itself it is known by the same name as the lake. The shores of the lake were carefully examined to its southern extremity. I next passed down the Mattagami river to Kenogamissee lake, and thence to the junction of this river with the western or Missinabi branch of the Moose river. I then descended Moose river to Moose Factory, examining every exposure of the rock, as well as making a track survey the whole way.

PORTAGES.

In describing the topographical features from the long portage on the Missinabi river to Michipicoten on the lake Superior, Dr. Bell gives the length of the portages and differences of levels of lakes and running streams, &c.

Character of
country.

Twenty-second or Height of Land portage from the southwest end of Crooked lake to the western extremity of Mattagaming (also called Dog) lake is low and level, only 356 paces long. The latter lake is about twelve feet lower than the former, so that the large lakes, close to either extremity of Crooked lake are on nearly the same level.

Looking from the Height of Land portage, Mattagaming lake has the form of the letter T, the foot of the perpendicular portion, which runs due west, eight and a half miles, being at the portage. The transverse portion runs north and south, and is eight miles long. At its southern extremity is the Twenty-third or Little Stony portage, 192 paces long, fall about ten feet.

Twenty-third or Big Stony portage, begins half a mile below the last; it has a total length of 1,780 paces (about 1 mile) but the lower third may be passed as a demi-charge; fall about seventy-two feet. Fleming's line of 1870 crosses the foot of this portage, which is at the head of lake Manitouwik.

CHAPTER VII.

KABINAKAGAMI DIVISION, ALGOMA.

Lakes.—Rivers.—Hudson Bay Post.—Altitudes.—Summary : Character of Country.
—Soil.—Timber.—Minerals.—Streams.—Synopsis of Results of Exploration of
Northern Ontario.—Resources.—Arable Land.—Climate.—Pulpwood Forests.

LAKES.

Big Pike.
Brunswick.
Oba (1,218 ft. ab. sea level).
Kabinakagami.
Missinaibi (1,134 ft.)
Natamasagami.

RIVERS.

Kenogami.
Bagutchewan.
Mattawaskevia.
Fire.

HUDSON BAY Co.'s POST.

Wapiskagami, H. B. post, north-east corner of Division VII.

ALTITUDES.

The Canadian Pacific Railroad track at Chapleau station is 1,418 feet above sea level. Grasset's, Amyot, White River are for the most part higher. Windermere is 1,408 feet above sea level.

SUMMARY OF KABINAKAGAMI DIVISION.

Character of the Country.—Generally level plain, slightly inclined to the west. Easy grade. Practically level country.

Soil.—Clay for the most part. Land low and swampy in places, ^{Drainage}needs drainage. Rolling land, heavily timbered. _{needed.}

Timber.—Good spruce, tamarack, banksian pine, poplar, red pine, cedar, reported throughout this division, beside white birch, balm of gilead.

Minerals.—Inasmuch as the greater portion of this division is covered by good agricultural land and surface deposits, mineral occur-

rences have not as yet been specially noted, but the Huronian mineral-bearing rock also crop up and may yield their quota of mineral species peculiar to that formation.

Okogé river. *Streams.*—The English river and Ogoke river sections require to be surveyed, whilst those sections of it that are surveyed indicate fine agricultural clay loam almost everywhere. Fine spruce limits on the Ogoke river.

SYNOPSIS OR ABSTRACT OF EXPLORATION OF NORTHERN ONTARIO, EXTRACTED FROM THE COMMISSIONERS' REPORT.

(Printed by order of the Ontario Legislature).

RESOURCES.

Forests. At the last session of the Legislature the sum of \$40,000 was voted for that part of the province lying between the Canadian Pacific Railway and James Bay. The knowledge possessed of this country, its topography and the character and extent of its resources in minerals, timber and agricultural land, was of a general nature and was limited indeed. It was believed from official and other information that there were in this country extensive forests of woods suitable for the making of pulp and paper, and great areas of tillable land. Early in the summer ten exploration parties were organized and sent out by the department, each being assigned a different and distinct section, and while it was not anticipated or hoped that they would succeed in penetrating every corner of so extensive a region, yet it was expected that enough would be learned to show that in the region north of the Height of Land dividing the James Bay from the St. Lawrence river waters, there are great areas of fertile country and immense forests of spruce and pulp woods.

ARABLE LAND.

Extent. The result of the exploration is that a tract of arable land has been found north of the Height of Land, stretching from Quebec boundary west across the districts of Nipissing, Algoma and Thunder Bay, comprising an area of about 24,500 square miles, or 15,680,000 acres. The soil is a clay or clay loam, nearly all suitable for farming purposes, and the region is watered by the Moose and its tributaries, the Abitibi, Matagami and Missinaibi, and the Albany and its tributaries, the Keno-

SESSIONAL PAPER No. 143

gami and Ogoke. Along this latter stream alone, about which nothing was known, a tract of good land was found extending on both sides of the river for a distance of over 40 miles, and in the district of the Rainy river, between the surveyed townships around Dryden and Lac Seul, another extensive area of good land was found, about 600 square miles or 384,000 acres in extent.

CLIMATE.

The climate of this region is reported to have no features which Crops. would prevent the ripening of grain or the growing of root crops. It lies for the most part south of the 50th parallel of latitude which crosses the province of Manitoba, near Winnipeg, and its climate will not differ much from that of the latter province. Crops of grain, potatoes and other vegetables, and even small fruits, were found growing as far north as James Bay.

PULPWOOD FOREST.

A great pulpwood forest has been located north of the Height of Trees. Land, extending across the districts of Nipissing, Algoma and Thunder Bay, with a depth in some places of 150 miles. The timber embraces all the common pulpwoods, such as spruce, poplar, jackpine and balm of gilead, as well as tamarack and cedar, along the banks of the streams. It is generally of good quality, usually thick on the ground and ranges in size up to three feet in diameter. In the district of Nipissing, south of the Height of Land, an extensive pine forest was explored and estimated to contain about 3,000,000,000 feet, B.M.

On the whole the information brought in by these exploration parties has been extremely gratifying, and the benefit to the province of conducting the exploration of so extensive a country has been abundantly demonstrated.

CHAPTER VIII.

LONG LAKE DIVISION.

Lakes.—Rivers.—Summary.—Character of Country.—Soil.—Timber.—Minerals.

Long Lake Division is mostly in the Thunder Bay district and partly in Keewatin and partly in Algoma.

	LAKES.	RIVERS.
Surveys.	Long. (1,013 feet above sea level).	Bagutchewan.
	Steel.	Pic.
	Eskiganaga.	Namewamimikan.
	Big.	Gravel.
	Wawonz.	Pays Plat.
	McKay.	Steel.
	Powgutchewan.	
	Front.	
	Owl.	
	Devilfish.	
	Namewaninikan.	
	Wild Goose.	

The Canadian Pacific Railway crosses the southern border of this division, north of Lake Superior.

SUMMARY OF LONG LAKE DIVISION.

Character of the Country.—Partially dissected plain. Fine agricultural land in numerous sections. Level and rolling country. Hilly and rocky in the southern portion. Flat and generally level along the projected line.

Soil.—Productive. Abundant vegetation everywhere. Good timber.

Timber.—Tamarack, spruce, balsam, white birch, pine, poplar abound throughout this district. Hardwood in the southern portion and jack pine along the sandy stretches.

Minerals.—Two large areas of Huronian mineral-bearing rocks are known to occur in this division.

Besides Beatty's line of surveys made in 1870 in the Long Lake district, Dr. R. Bell also traversed the same region and further information will be found in the following chapter.

CHAPTER IX.

NEPIGON DIVISION.

Lakes.—Rivers.—Hudson Bay Company's Posts.—Summary: Character of the Country—Timber—Minerals—Climate—Surveys.—Report: Dr. Bell's Report of Country between Lake Superior and the Albany River—Nepigon Region—Surveys—Wabinoah River—Aspect of the Country—Soil—Ogoké River—Kenogami River.—Lignite.—Bagutchewan River.—Stiff Gravelly Clay and Boulders.—Report by Dr. Bell on the Lake Nepigon :—Surveys—Railway Route—Herrick's Line—Railway Route and Colonization—Soil—Climate and Timber.

Nepigon Division forms part of the Thunder Bay district of Ontario.

LAKES.	RIVERS.
Nepigon (852 feet above sea-level).	Ogoké.
Whitewater.	Albany.
Whiteclay.	Miminiska.
Elbow.	Makoki.
Tunnel.	Ombabika.
Black Sturgeon.	Onamanisaga.
Wabinoah.	Humboldt.
Ogoké.	Kaiask.
Miminiska.	Nepigon.
Labamet.	

HUDSON BAY COMPANY'S POSTS.

Fort Hope, H. B. Co.
Nepigon House, H. B. Co.

SUMMARY OF NEPIGON DIVISION.

Character of the Country.—In part level and undulating and part rocky. The Nepigon region constitutes a dissected plane. Good agricultural land, clay soil and clay loam and sandy loam. ^{Dissected plain.}

Timber.—A little north of Lake Nepigon the country is heavily timbered with spruce, banksian pine, poplar and balsam, with occasional birch, also tamarack.

Minerals.—The iron-bearing band occurs in this division and resembles the iron from the Michigan Ranges. Lignite occurs in beds of clay.

Climate.—The climate of the Nepigon country seems to be well suited to agriculture. Farming has been successfully carried on at Nepigon House, Hudson Bay Company post.

Surveys.—The Nepigon country has been very extensively surveyed and numerous maps and reports describe and illustrate the country.

EXTRACTS FROM REPORT ON THE COUNTRY BETWEEN
LAKE SUPERIOR AND THE ALBANY RIVER, BY
MR. ROBERT BELL, C.E., F.G.S.

Addressed to Alfred R. C. Selwyn, Esq., F.G.S., Director of the Geological Survey of Canada, from the Report of Progress, Geological Survey of Canada for 1871-1872, pp. 101-114. Published by Authority of Parliament (1873).

NEPIGON REGION.

Wabinoah
river.

One of the duties assigned to me being to ascertain, if possible, the relation of the upper copper-bearing rocks to other formations to the northward, we entered the country by way of the Nepigon river, and proceeded to make surveys to the northwest, north, and northeast of Lake Nepigon. The first of these was by way of the Wabinoah river and chain of lakes, which together form the canoe route to Osnaburgh House; the second was by the Pikitigouching river, and was performed by Mr. Lount; while the third was by the Ombabika river. On our way to the country north of Lake Nepigon, we had opportunities of adding somewhat to the geological knowledge of that country, gained while making the survey of 1869, and also of perfecting, to some extent, our topographical plan of the region.

SURVEYS.

Albany river. *Two lines from Lake Superior to Albany River.*—Having ascertained that the best route for a further examination of the country, was from the head waters of the Ombabika river we continued thence, northward all the way to the Albany river surveying our course as we went. On reaching the Albany, we turned down stream, and surveyed the river to the point where it is joined by the Kenogami or 'English River', a distance of one hundred and eighty-four miles. Here we turned southward up the Kenogami river, and surveyed it as far as

SESSIONAL PAPER No. 143

Pambina Island which I had reached the previous year from Long lake; so that we have now completed two distinct lines of survey from Lake Superior to the Albany and also surveyed the intervening portion of that river.

THE WABINOSH RIVER.

The survey by which Wabinoſh river and the lakes beyond the Canoe route. height of land began at the outlet of Wabinoſh lake, one mile from Lake Nepigon (to which Mr. McKellar had surveyed it in 1869), and extended to a point twenty-nine miles in a straight line from the head of Wabinoſh bay, or thirty-three miles following the canoe route. In this distance we made nineteen portages and passed through eighteen lakes, the largest of which are Wabinoſh and Round lakes, each three and a half miles in width, and Oval Rock lake, four miles in length. The south branch of the Wabinoſh river enters the south-west angle of the lake of the same name, and is a larger stream than the north branch, which we followed. A portage which occurs on this route, between Clear and Oval Rock lakes, at a distance of twenty miles in a straight line from Wabinoſh bay, the Indians told us was on the height of land between the waters of Lake Nepigon and the Albany river, although the water of the next lake to the north-west of Oval Rock lake flowed into the latter. The surface of Clear Lake has an elevation of thirty feet over Oval Rock lake and of 100 feet over the lake to the southeast of it, into which it discharges.

ASPECT OF THE COUNTRY.

For a distance of ten miles from Lake Nepigon, or around Wabi- Cliffs. nosh and Round lakes, the country has the same mountainous aspect as above Wabinoſh bay, the trap hills rising from 200 to 500 feet above the level of the water, and often presenting perpendicular cliffs. The same kind of trap prevails as far as the height of land, beyond which gneiss was the only rock seen, with the exception of a ridge of dark gray crystalline trap, running in a north-westerly course, near the furthest point which we reached.

SOIL.

The country which we passed through by the route just described is Poor soil. generally rocky and of little value for agricultural purposes. The only good land which came under our observation was on the west and north sides of Wabinoſh Lake, where the soil consists of fine sandy and clayey loam.

SURVEYS.

Navigation. In crossing the country from Lake Nepigon to the Albany River we first followed the Ombabika river to its source, which is in Shoal lake, three and a half miles long and one mile wide, lying at a distance of twenty-five miles north-east of the mouth of the river. This lake lies due north and south, and discharges both ways, the stream flowing northward towards the Albany, called the Powitic river, being nearly as large as the southern outlet. No portage occurs on the Ombabika for about nine miles before reaching Shoal lake, nor for nearly five miles beyond its northern outlet; so that we passed the height of land with the greatest possible ease, having had about seventeen miles of uninterrupted canoe navigation, from the time we made the last portage in going up the southern side till we came to the first on going down on the northern. Shoal lake has an elevation of scarcely 300 feet over Lake Nepigon, or about 1,200 feet above the sea. Before reaching this (summit level) lake we passed through twelve others on the Ombabika river, the largest of them, Cross lake, being four miles in diameter.

OGOKÉ RIVER.

Smooth water. In the ten miles of the Ogoké river which we examined, it averaged about 500 feet in breadth, with large lagoons and marshes on either side, and was from fifty to sixty feet deep in the middle. The Indians informed us that it maintained the same dead-water character as in this section, for a long distance both above and below, so that it would appear to be well adapted for steamboat navigation in this part of its course; but it is said to spread out to a great width and to become very shallow after it reaches the flat-lying Palaeozoic rocks further down. We left the Ogoké river by what is called the French Channel, and at less than two miles crossed the height of land which separates its waters from those of another tributary of the Albany lying further north, and which is known in different parts by four distinct names, corresponding with those of the lakes upon its course, the largest of which is called Kagéinagami.

KENOGAMI RIVER.

The Forks. The Kenogami river and the Albany below the Forks flow in the same great valley, which appears to be a more considerable depression of the country than that occupied by the portion of the Albany already described. On coming to the Forks we found, for the first time, marine shells in the drab or bluish gray pebbly clay in the bank of the river.

LIGNITE.

Along the east bank at the junction of the two rivers, the drab or ^{Clay.} bluish gray, gravelly clay, which holds the marine shells, is about thirty feet thick, and is overlaid by about thirty feet more of clay, sand and gravel, holding fresh water shells, and having a band of impure black lignite, two feet thick, at about six feet from the top.

BAGUTCHEWAN RIVER.

From Mamattawa the river has a nearly straight upward course bearing S. 30° W. to the junction of the Bagutchewan river, the distance being twenty miles in a straight line, or only three more by the stream. The general upward course of the Kenogami from the mouth of the Bagutchewan river to Pembina Island is S. 60° W. and the distance is about twelve miles in a straight line, or sixteen by the river.

STIFF GRAVELLY CLAY AND BOULDERS.

In ascending the Kenogami river we have a repetition of the ^{Marls.} geological conditions which we observed on the Albany. From the Forks to Mamattawa, drab and chocolate coloured marls and interstratified bands of earthy yellowish limestone are exposed in a few places. Following up the stream, at about seven miles above Mamattawa, the bottom of the river is composed of beds of limestone which are in places somewhat disturbed. The river between this spot and the Albany appears to run upon the axis of a slight anticlinal. At the end of the seven miles indicated we enter between banks composed of chocolate coloured marl interstratified with bluish green bands, and varying from fifty to eighty feet in height. These banks continue on both sides, almost uninterruptedly, for about ten miles up the stream. Above this, which maintain almost the same height, especially on the southern side, are mostly composed of stiff gravelly clay with boulders, but the chocolate coloured marl is seen here and there almost to Pembina Island, beyond which the geology of the country, all the way to Lake Superior, was described in the report which I had the honour to submit to you last year.

REPORT OF MR. BELL ON LAKE NEPIGON.

Report of Progress of the Geological Survey of Canada. 1866-1869, pp. 313-364, issued in 1870.

SURVEYS.

In addition to the district first referred to, I was directed to make an exploration, or if possible a survey of Lake Nipigon. In tracing the run of the rocks eastward and northward from Thunder Bay, I found that many advantages would be gained by proceeding to this lake as early in the season as possible. By doing so I hoped to have enough of the summer left to make considerable topographical surveys in that region, which would serve as a correct basis for laying down our geological work.

Copper-bearing rocks.

In June last, I had the honour to communicate to Sir William Logan by letter, from Fort William, my reasons for believing that the Huronian and Upper Copper-bearing rocks would be found to occur around Lake Nepigon. In extending our exploration in the region assigned to me, from the Thunder bay side only, we were constantly in the dark as to the general nature of the geology of the country ahead of us. Whereas, by mapping that of the Nepigon district, we should have determined the geology of the two sides and thus rendered it much easier to work out that of the intervening area. Having ascertained from the officers of the Hudson Bay Company and the Indians, that Lake Nepigon was much larger than commonly supposed, and considering how desirable it would be for our purposes to have a complete traverse of its shores, I engaged Mr. Peter McKellar, of Fort William, who is both a surveyor and geologist, to assist me in the undertaking, and the result proved that I was very fortunate in doing so.

RAILWAY ROUTE.

Levels.

Before starting from Fort William, I had the honour to receive the additional instructions, which had been forwarded to me by Sir W. E. Logan, at the suggestion of the Hon. Mr. McDougall, then Minister of Public Works. These directed me to take levels, and to make all possible observations with a view to ascertaining the practicability or otherwise of a railway to the North-West Territories, through the country which we might examine. I am happy to have been able to report that our explorations have enabled me to trace a route which appears to be quite practicable for such a purpose, as far as we went or through a distance of about 100 miles in the proposed course, beginning at Lake Superior. In the following pages I propose to add some

SESSIONAL PAPER No. 143

details to those which were contained in the special report of February 22 on this subject, which I had the honour of addressing to you.

HERRICK'S LINE.

The Nepigon river having been carefully surveyed by Mr. Herrick, it only remained for us to make what geological observations we could while ascending it. Having arrived at Lake Nepigon, I divided our party and gave Mr. McKellar charge of one of the sections. Beginning on the south side of the lake at the point where Mr. Herrick's line intersected the shore, Mr. McKellar proceeded to the right or east side, while I took the west. At the end of about eight weeks, the two parties met at the northern extremity of the lake, having completed a survey of its shores excepting the deepest parts of a few of the bays. We had also explored and in some cases surveyed the lower reaches of the principal rivers entering the lake and determined the positions and forms of about 460 of the islands lying within easy reach of the shore, and more roughly the positions and outlines of about 100, lying further off, while time did not admit of our ascertaining, personally, anything with regard to a considerable number in the centre of the lake. When on the south-west side I made a journey of several days into the interior following the lakes and streams and making portages between them.

RAILWAY ROUTE AND COLONIZATION.

In the special report of the practicability of a railway through the Nepigon country, which I had the honour of addressing to you on February 22 last, a general description was given of the route which we discovered and its advantages. Our map of the district having been compiled since that time, I am now enabled to indicate this route upon it. It crosses Nepigon at the outlet of Lake Helen, where the river is narrow and the banks, consisting of boulder-drift, are from thirty to forty feet high. From this intersection it follows down the western side of Nepigon Harbour to a point about three and one-half miles south of Red Rock, where it turns westward through the level pass leading to Black Sturgeon river. This river would be crossed at some point below Eshquanonwaton lake. Continuing northwestward the route would pass either east or west of Pike and Cyclas lakes or between them. Further on it would pass the Poshkokagan and the Kabitotiquia not far from Chief's Bay, at a very moderate elevation above Lake Nepigon. Between the latter stream and the valley of the Gull river the country is level. The general grade in the above distance—about one hundred miles—is very slight; Lake Nepigon, according to the observations which I have given in a previous part of

Marl. this report, being only a little more than 300 feet above Lake Superior, while along the above route there appear to be no difficult local grades. Besides the rivers to be crossed, the only obstruction which I observed is a small point of rock on the west side of Nepigon Harbour, just before turning west towards Black Sturgeon river. This consists of a cliff of red marl, capped by trap, rising from the margin of the lake. The water at its base is very shallow, some stones rising above the surface, and sufficient of the rock to form an embankment could be easily dislodged from the jointed columnar trap above. The whole length is only from fifty to one hundred yards.

SOIL.

Loam. In the Nepigon country the largest tract of good land appears to lie on the southwestern side of the lake. From the Nonwatan river, northward to the Pajitchigamo, a distance of fifty miles, the country is comparatively level and the soil generally fertile; but we could not ascertain from our own explorations, how far westward this tract extends. The Indians and others, however, represent it as continuing nearly to Winnipeg river, and becoming more generally level in receding from Lake Nepigon. Some of the peninsulas in Lake Nepigon, within the above distance, are hilly, but the soil is generally good, even on these consisting of a brownish loam, sufficiently tenacious, when moist, to retain its form after having been pressed in the hand. The rivers entering this part of Lake Nepigon, as far as examined, were found to flow, with tortuous courses, between muddy banks of clay, overspread with a fine sand. The clay, as seen in the banks generally, appears sandy, from having become mixed with the overlying deposit, but when clean sections are obtained, it is generally found to be stiff, tenacious and free from grit. On the higher levels the sand is often coarser and interstratified with layers of gravel.

Grass. There is a considerable area of good land around the bottom of South and McIntyre's bays, and on the peninsulas east of the latter bay and Gull bay. From the mouth of the first rapid on the Poshkokagan, the loamy banks of the river are from twenty to thirty feet high. The Kabitotiquia river is so crooked that by following its windings from the mouth to the portage leading to Chief's bay, the distance covered was estimated to be fully thirty miles, although it is only nine miles in a stright course. The water is deep, and the current slack throughout, except at the slight rapid previously mentioned. In ascending the river the banks rise gradually in height, increasing from a few inches above the level of the water, at the mouth, to five and ten feet, in the above distance. For the first five miles there is a wide open margin on each side of the river, covered with grass. On both sides the country is level, and the soil sandy,

SESSIONAL PAPER No. 143

supporting a growth of grass and bushes, the timber having been all burnt off by repeated fires during the last few years. The land is free from stones and very little labour would be necessary to make it ready for the plough.

CLIMATE AND TIMBER.

The climate of the Nepigon country seems to be as well suited for ^{Trees.} agriculture as that of the greater part of the Province of Quebec. Farming has been successfully carried on, for a long time, by the Hudson Bay Company at Nepigon House. The timber round Lake Nepigon is principally white spruce, white birch, aspen and poplar, balsam fir, tamarack and white cedar, with occasional trees of black ash, gray elm, red and white pine.

MR. BAIN'S REPORT ON THE IRON BELT OF THE
NEPIGON REGION.

The iron belt on Lake Nepigon is the title of a report by Mr. Bain on some deposits of iron ore recently found on the east shore of Lake Nepigon by J. W. Bain. *See* Report of the Bureau of Mines for Ontario, No. 5, 1900, p. 212.

TOPOGRAPHY OF THE IRON BELT.

The country in the vicinity of Poplar lodge consists chiefly of large flat areas, generally swampy, lying in ridges with rocky basin as retaining walls. Rock and soil are covered alike with a thick carpet of moss, which very effectually conceals the surface of the ground and adds to the list of obstacles which beset the prospector. An almost unbroken sheet of green meets the eye in every direction; only here and there are to be found bare hills which have afforded no places of lodgement for the roots of trees. Birch and poplar form by far the largest portion of the forest growth; spruce is present in moderate quantity, but is all of limited size, varying from four to eight inches in diameter; jack pine, tamarack and cedar make up the balance. Occasional hills.

CLAY AND ROCKY RIDGES.

Immense deposits of glacial clay are found at some points, and were Poplar lodge. the land cleared and drained in some parts of the flats it would probably be found to take fair rank for agricultural purposes. At some points as at Poplar lodge the glacial deposits are sandy. This post is

situated at one end of a crescent shaped bay of the lake with a broad stretch of sandy beach such as one naturally associates with the sea-shore. From the beach back to the first rocky ridges some two miles inland, there is a flat tree covered plain with sandy soil, low swells of ground alternating with stretches of muskeg.

IRON BAND DESCRIBED.

The iron-bearing band is described as a bare rounded ridge affording an excellent section of some 200 feet in width across the strike of the rocks, which is north 85° east. To the north is dark gray country rock, exposed for some distance from the contact, and to the south black ferruginous schists are found at the edge of the iron belt.

Jasper and iron.

The material enclosed by these country rocks is a mixture of jasper and silicified hematite with a little magnetite, the whole resembling very much the similar mixture found in the Michigan iron ranges. The amount of jasper present varies greatly. At some points the proportion rises to 50 per cent, and the material has a beautiful banded structure with alternating layers of jasper and hematite. The jasper is of a good red colour and stands out prominently against the black background, so that where a portion of the surface has been smoothly finished by the glacier, the effect is very artistic. In other places the jasper is entirely wanting and the hematite has lustrous surfaces upon the cleavage planes; this appeared to be the highest quality, and a sample was selected for analysis. It yielded:—

ANALYSIS.

Analysis.

Metallie iron.....	38.06 per cent.
Silica.....	40.60 "
Sulphur.....	traces.
Phosphorus.....	traces.
Titanium.....	none.

EXTRACTS FROM REPORT ON SURVEYS AND EXPLORATIONS BY DR. WM. ARTHUR PARKS IN THE REGION LYING NORTH-EAST OF LAKE NIPIGON.

(Summary Report, Geological Survey Department, 1902.)

AREA DESCRIBED.

I have the honour to submit herein a summary report on the geology, physiography, economic resources, &c., of the region lying

SESSIONAL PAPER No. 143

north-east of Lake Nipigon in the Province of Ontario and constituting the eastern half of map-sheet No. 17 of the northern Ontario series. This sheet comprises an area measuring 72 by 48 miles, of which a considerable part is covered by the waters of Lake Nipigon. The area which I was instructed to explore contains about 1,500 square miles of land surface, roughly defined as follows:—

Early in June I received instructions to examine as fully as time ^{Instructions.} would permit the various features commonly dealt with in a geological report, as well as to extend our knowledge of the local geography by making track surveys of all water courses in any way accessible. Special attention was to be given to the economic resources of the region and the condition of the timber throughout the district.

PHYSIOGRAPHY.

Character of the country examined—(A tableland.)

The region under discussion, omitting certain trappean areas along ^{Swampy} the shore, consists of a tableland not exceeding 400 feet in height, ^{tract.} falling with some abruptness into Lake Nipigon. The height of land between the Nipigon waters and those flowing north and east may be said to lie just within the eastern border of the sheet and to be represented by an extensive level swampy tract extending from the vicinity of the 'dam' on the Sturgeon river northward to the boundary of the sheet. This wet area supplies a large brook entering the Sturgeon at the point above referred to. It sinks into a depression occupied by a large lake forming the headwaters of the south branch of the Red Paint river, supplies the drainage at the source of the north branch of this river and is responsible for Summit lake on the Obabika river, the headwater of both that river and a stream flowing north to the Albany river.

NATURE OF SURFACE EROSION.

The region is therefore a dissected tableland with a somewhat abrupt ^{Gradual} fall to Lake Nipigon and a gradual ascent ^{ascent.} to the eastward, followed by a minor descent occupied by a wet area constituting the source of a number of rivers.

HEIGHT OF LAND.

Continuing northward from the source of the Red Paint, the low ^{Two outlets} land extends to a lake forming the source of the Obabika. This lake is three miles long, and from it a stream, still in the low land, leads to a lake about seven miles east and west which discharges by a sluggish stream into a muddy lake stretching three miles north. This lake

occupies the Lake Superior-James Bay divide and sends a stream in both directions. The former, the Obabika, continues in the swampy land to Cross lake, where the higher land is met and the waters begin to fall over the ridge towards Lake Nepigon.

SOIL, CLAY AND SAND.

The height of land region at the eastern border of the sheet, though level and swampy, is mostly of a sandy nature, as revealed in the river cuttings in the district. The rocky land farther west is covered, where any soil is developed, by shallow beds of sand, while the slope
Obabika bay. to Obabika bay and Lake Nipigon presents much more clay. Therefore, the best agricultural land in the region is to be found in a belt of about five miles width along the shore, particularly along Obabika bay and in the region immediately east of Humboldt bay. North of Obabika bay a little clay is found, but extensive sand plains cover it as we proceed northward.

TIMBER.

The timber in the height of land region is small spruce and tamarack, with Banksian pine on the sand plains and higher land. The central rocky region is better timbered, particularly along the rivers, but extensive fires have wrought havoc with the once abundant wood in these highlands. Both for agriculture, and for timber, the best is to be found on the clay land bordering the lake. Along the north shore of
Fires. Obabika bay fires have practically destroyed the timber. On the lower reaches of the Obabika, however, and in the depression connecting that river with the valley of the Red Paint good stretches of spruce, balsam, poplar and birch still exist. Also north of the Obabika towards the Kabasashkandagogama and along East bay good timber is to be seen. The marketable spruce, which is really magnificent in this last region, has been unfortunately cut off a few miles east of 'Little Long' lake by an extensive fire from the south-west. All along the
Spruce. Sturgeon the timber is small, of about 20 years growth, while in the south-east corner of the sheet still younger forest is found.

SESSIONAL PAPER No. 143

ABSTRACT FROM SUMMARY REPORT GEOLOGICAL
SURVEY OF CANADA FOR 1902, P. 208A, BY
MR. WILLIAM McINNES, B.A.

Region on North-west Side of Lake Nipigon.

SURVEYS.

According to instructions, the work of the summer was to be carried on in the country lying to the west and north of the upper part of Lake Nipigon, with the object of gathering the data, both topographical and geological, necessary for the completion of the forthcoming map of Lake Nipigon and the surrounding country, and of exploring the district lying to the east of that reached last year from Sturgeon lake.

A micrometer telescope survey was started from the mouth of the Sand. Kobka river (the south branch of the Wabinosh). The river, which was found to be at a very high stage, shows here and there cut banks of a white silicious sand, which fills the bottom of the narrow valley between the high trap hills through which the river runs.

TOPOGRAPHY.

This sheet of trap gives to the whole basin occupied by it a highly Trap. indented topography, characterized by high, comparatively flat tablelands, intersected by deep narrow valleys. The sandstones and limestones are seen at but few places, at the base of cliffs of trap that overlie them and at the edge of the basin where they protrude from underneath the trap. Outliers are seen in a few places lying on the old rocks at some distance from the confines of the main area, but for the most part they have been entirely denuded where unprotected by the capping of more resistant rocks.

SOIL, &c.

Lands suitable for agriculture are confined mainly to the immediate Nipigon shores of Lake Nipigon and to the valleys of the larger rivers and House. lakes. At Nipigon House the ordinary varieties of garden vegetables succeed very well; clover and various grasses grow luxuriantly, and oats sown late grew very long and strong, but were hardly ripe before the early frosts.

GAME.

Moose were found to be numerous in the district during the summer. Animals. ; caribou fairly plentiful, and Virginia deer rare. One wolf was

seen, and the tracks of others, running singly, were observed. Bears, beaver, otter, marten and other fur-bearing animals still occur in good numbers, the unburnt condition of the forest favouring the preservation of the smaller fur-bearing animals.

FISH.

Trout. Many of the streams entering Lake Nipigon abound in speckled trout (*salmo fontinalis*) of large size. In the White-sand river they were particularly plentiful, those caught varying in weight from one pound to three pounds. On the main lake one was taken that scaled six and one-half pounds, and the diary at Nipigon House, the Hudson's Bay Company's post on the lake, records the netting of a 12-pounder. That this was really *salmo fontinalis* there can be no room for doubt as the lake trout and brook trout are well known and clearly distinguished from each other by both the company's officers and the Indians. Whitefish and lake trout are also plentiful in the main lake, and lake trout, pike and doré in most of the smaller lakes.

CHAPTER X.

LAKE ST. JOSEPH DIVISION-THUNDER BAY DISTRICT,
ONTARIO.

Lakes.—Rivers.—Hudson Bay Posts.—Dr. A. W. G. Wilson's Report about Headwaters of Albany River.—Instructions and Surveys.—Locating belt of Huronian rocks.—Topography.

Lake St. Joseph Division forms part of the Thunder Bay District of the province of Ontario.

LAKES.	RIVERS.
Saint Joseph (1,172 feet above sea-level.)	Root.
White Earth.	Cat.
Pike	Kaiashk.
Burntrock.	Albany.
Paskokogon.	
Greenbush.	
Sturgeon (1,327 feet above sea-level.)	
Bell.	
Otter.	
Mattawa.	

HUDSON BAY COMPANY'S POSTS.

Osnaburgh House, Hudson Bay Co.
Sturgeon Lake Post, H. B. Co., 1327 feet above sea-level.
Cat Lake Post, H. B. Co.

SUMMARY OF LAKE ST. JOSEPH DIVISION.

Character of the region.—Topographically, the region forms a part of a low, rocky, well-watered plateau. Except in a few cases the relief of the interior is rarely over fifty feet. The country is generally flat or very gently sloping.

Timber.—Spruce, poplar, tamarack, with birch and Banksian pine trees, occur near Osnaburgh House, Hudson Bay Company's post.

Lakes.—The water bodies lie in shallow basins, and many of the streams are sluggish, being situated near the height of land and intersection of three watersheds.

Minerals.—Huronian mineral-bearing rocks are reported to occur in this division.

The Canadian Pacific Railway track touches the south-western corner of this division.

REPORT BY DR. ALFRED W. G. WILSON ON A GEOLOGICAL RECONNAISSANCE ABOUT THE HEADWATERS OF THE ALBANY RIVER.

Extracted from the Summary Report of the Geological Survey Department, for the year 1902.

INSTRUCTIONS AND SURVEYS.

Your instructions advised me to undertake a geological reconnaissance of a portion of the southern part of Keewatin district, lying to the east of the area explored by Mr. D. B. Dowling, B. Ap. Sc., in 1893.

Route. Leaving Dinorwic on the 14th June we were delayed by unfavourable weather and did not reach Lac Seul Post until the 19th.

Mr. Johnston began a log and compass survey of the route from the narrows of Lac Seul, running about eighty-five miles of line, to Slate lake on the Wenessaga, reaching there on July 2nd.

On July 30th we started for the Hudson Bay Company's post on Cat lake, as from the account we had heard, we judged that the balance of our time would be required for the survey of this lake. The post was reached on the evening of July 31st, and on August 1st the survey of the lake was commenced. The work was continually interrupted by bad weather, and the survey of the shore of the lake, and of the adjacent islands, occupied us until the 19th.

LOCATING BELT OF HURONIAN ROCKS.

I decided to return via the Cat river route to the east end of Lac Seul, and to attempt to locate the southern boundary of the belt of so-called Huronian rocks which outcrop further east on Lake St. Joseph, or Osnaburgh lake. In descending the Cat river I made brief geological notes en route. We reached the mouth of a small

SESSIONAL PAPER No. 143

creek entering Lac Seul from the north-west on August 26th. This creek flows through a rough country burned over about six years ago, and all its portages had to be cut out as we ascended. On August 28th we reached the limit of canoe navigation, the upper part of the stream being very shallow and blocked with timber, and started on our return trip, reaching Lac Seul next day. We returned directly to Dinorwic, arriving there on the evening of Sept. 2nd.

TOPOGRAPHY.

Topographically the region through which our exploration line passed is a portion of the great uplifted modified peneplain of the Archean rocks of central Canada. Throughout this portion of southern Keewatin, the various water bodies lie in shallow basins in the peneplain surface. The maximum relief in the interior, except in the case of a few monadnocks, is rarely over fifty feet.

CHAPTER XI.

LAC SEUL DIVISION—RAINY RIVER
DISTRICT OF ONTARIO.

Lakes.—Rivers.—Hudson Bay Company's Post.—Summary :—Character of country—Timber.—Minerals.—Animals.—Mr. W. McInnes' Report on Resources of Rainy River District for 1899 :—Hay Meadows.—Locations of Free Gold.—Generally rolling country.—Report of Mr. McInnes' Explorations in the Lac Seul Area :—Lac Seul Area.—Atikokan iron belt.—Gold-bearing belt drift area.—Terraces.—Prospecting for gold.—Mining locations.—Iron belt.—Mining in progress.

Lac Seul Division forms part of the Rainy River District of Ontario. The Canadian Pacific Railway crosses the southern portion of this division between Summit and Bonheur Stations.

LAKES.

Seul (1,140 feet above sea-level.)
Front (1,295 feet above sea-level.)
Kus-Kus.
Otter.
Rowan.
Sturgeon.
Eagle.
Goose.
Woman.
Shabumeni.
Gull Rock.
Shallow.
Sand Bar.
Lost.
Minnitaki.

RIVERS.

Manitou.
Wenasaga.
Wabigoon.

HUDSON BAY POST.

Lac Seul, Hudson Bay Post.

In the Lac Seul Division, in nearing Winnipeg, the line of the National Transcontinental Railway first comes within 40 miles of the line of the Canadian Pacific Railway.

SESSIONAL PAPER No. 143

SUMMARY OF LAC SEUL DIVISION.

Character of the country.—Many of the islands and shores of the lakes are covered with clay and drift and other drift deposits. The drift area extends easterly to a considerable distance. Country is uniformly a level plateau, partly drift covered, with large areas of swampy country.

Timber.—The forest growth consists principally of black spruce, poplar and white birch, with occasional red and white pine.

Minerals.—Active mining is in progress in this district. Gold locations are reported. Iron pyrites, iron (occurring in a well marked iron belt), and other minerals peculiar to the Huronian.

Animals.—Moose, caribou, black bear, otter, fisher, mink, beaver, muskrat and foxes are plentiful. Marten and lynx are also taken by the Indians.

EXTRACTS FROM SURVEYS AND EXPLORATIONS IN
THE RAINY RIVER DISTRICT BY WM. McINNES.

Published in the Annual Report of the Geological Survey of Canada for 1899, pp. 115-122, including survey of the English River from the Canadian Pacific Railway station of that name to Bear Lake.

HAY MEADOWS.

'For the first twelve miles below the railway exposures of rock are infrequent, the river lying in a wide flat valley and sweeping from side to side in flat broad curves through wild hay meadows, with but a narrow fringe of low bushes along its immediate bank and occasional clumps of black spruce and tamarack.'

LOCATIONS OF FREE GOLD.

On page 120 of his report Mr. McInnes writes :—'Mineralized zones of sericitic quartz-schists with reticulating and bunchy quartz veins were noted along the lake, and late in the summer a number of locations were surveyed on which it was claimed that good showings of free gold had been found. Small working parties were sent in to do preliminary development work with a view to proving them.'

'This belt affords a practically new and apparently promising field for the prospector, as very little exploratory work has been done on

it, and the rocks are of a character that would seem to warrant closer examination.'

GENERALLY ROLLING COUNTRY.

The country is generally rolling, drift covered, with numerous lakes and banks of sand. The country through which the Megikons river flows is a great sandy flat with occasional ridges of sand and gravel.

EXTRACTS FROM SURVEYS AND EXPLORATIONS BY WM. McINNES IN THE LAC SEUL AREA IN 1901.

LAC SEUL AREA.

Metalliferous
belts.

The result of the surveys and explorations by Mr. Wm. McInnes of the Geological Survey Department for 1901 are embodied in the summary report of that department, pp. 87-93, which indicate the scope of the work, area covered, iron and gold bearing belts examined, topographical notes obtained, character of Lac Seul drift and soil, to which is added notes on the different locations of mineral remains and the active mining in progress in that district.

ATIKOKAN IRON BELT.

Iron belt.

While waiting for canoes at Port Arthur, I was enabled through the courtesy of Mr. Mann, to make a trip to the end of the track on the Canadian Northern Railway, where part of the Atikokan iron belt was examined. At locations 138X and 139X two bands of magnetic iron ore were seen, not apparently of high percentage and showing considerable sulphur in the form of pyrite. These belts lie about 200 yards to the north of the right-of-way and their outcrop on the hill is perhaps 100 feet above it. This favourable situation led to some exploratory work being done later in the season that resulted, I am informed, in showing up a band of much cleaner ore. These deposits form a part of the Atikokan iron-bearing belt and do not differ genetically from the others that have been described in earlier reports.

GOLD-BEARING BELT.

The primary object of the season's work was to trace with greater accuracy the Sturgeon lake gold-bearing belt and to work it out, as well as possible the geology of an area of 3,456 square miles lying to the south and east of the eastern half of Lac Seul. A micrometer

SESSIONAL PAPER No. 143

survey of Sturgeon lake made during the previous summer by Jas. Robertson, P.L.S., for the Ontario Crown Lands Department, was of great assistance and rendered a further topographical survey of that lake unnecessary. In the other parts of the area, boat-log and track surveys were carried on concurrently with the geological examinations. Starting from the Dinorwic station, the part of Minnitaki Lake not already examined and of which no detailed map was available was the first gone over. This lake lies entirely within the Huronian belt that has now been traced continuously from Whitefish bay on the Lake of the Woods to Albany river, having gold-bearing fields at intervals for the whole distance. About the lake typical Huronian (Keewatin) rocks everywhere occur, the greater proportion consisting of basic eruptives and their derived schists, with a considerable development of more acid eruptives of quartz-porphry types and of altered sedimentaries. Work was being done on two of the numerous gold locations on the lake, viz.: on Twin Lakes, near the inflow of English river, and at Grassy Narrows.

LAC SEUL DRIFT AREA.

Many of the islands and the north shore of the lake are drift covered, the drift consisting of clay with overlying stratified sands containing boulders and pebbles of gneiss, of various types of Huronian rocks and of limestone, dolomite and flint holding fossils of Devonian age that probably indicate a glacial origin from the Devonian areas near James bay.

TERRACES.

The drift area already referred to extends easterly for some distance along the north shore, showing at a number of places, well marked terraces rising about thirty feet above the lake level. No veins carrying valuable minerals were seen about the lake. The principal feeders flowing into this part of the lake are the Watap at the head of the lake, the Vermilion from the south-east, and the Wepessi, a large river entering the lake from the north above the eastern narrows and draining a number of lakes of good size.

PROSPECTING FOR GOLD.

Much prospecting was done during the summer and many gold claims were located. On only about half a dozen of these had any development been done. On one location, owned by a St. Catharines syndicate, with the precipitancy so characteristic of the earlier years in the district, a five-stamp mill was erected and worked during part of the summer, with good results in the amount of gold extracted.

Development was not, however, sufficiently forward and it was wisely resolved by the present manager, Mr. Smaile, to close down the mill and give all attention during the winter to sinking a shaft and further proving the property.

MINING LOCATIONS.

Free gold. A little further down the shore, Mr. Symmes was doing development work on a vein that seems to be really a crushed band in the granite-gneiss close to the contract. The vein is generally narrow but swells into large pockets of mineralized quartz seven or eight feet wide. Argentiferous zinc blende and galena, with pyrite and free gold occur in the vein, the narrow more vein-like portions being exceptionally rich.

IRON BELT.

Outcrops. A well marked iron-bearing belt was noted to the north of Sturgeon lake, extending from the lake to the south of Musipomigut for some distance up that lake. No deposit of commercially valuable iron ore was seen, the outcrops being confined to very narrow bands of magnetite in the schist or very fine gneiss.

MINING IN PROGRESS.

Active work is being continued during the winter at the Shore property on King bay, at Sturgeon Lake Mining Co's., and St. Anthony's Reef, as well as, probably, on a few others.

CHAPTER XII.

LAKE OF THE WOODS DIVISION.

Lakes.—Rivers.—Summary.—Character of Country.—Timber.—Minerals.—Soil.
 Dr. G. M. Dawson's Report on the Resources of the Forty-Ninth Parallel.—
 Former Geological Explorers.—Mr. Sanford Fleming's Canadian Pacific Rail-
 way Report for 1877.—Notices of Surveys within the Area of the Divisions.—
 Work Accomplished.—Topography.—Forest Lands.—Mineral Wealth.—Snow-
 fall Less in Woodland Region than in Ottawa.

Lake of the Woods division is partly in the Rainy Lake district of
 Ontario and partly in Nepahwin, Powassin and Mahnomonee districts
 of East Manitoba.

LAKES.	RIVERS.
Lake of the Woods (1,057 feet above sea-level).	Winnipeg.
Manigatogon.	Oiseau.
Wileox.	Black.
Oak.	Wabigoon.
Maynard.	White.
Sandy.	Boggy (S. of C.P.R.)
Lount.	
Gun.	
Separation.	
Red.	
Shoal.	
Medicine Stone.	
Bonnet.	

The Canadian Pacific Railway track crosses the southern portion of
 this division between Summit and Darwin stations, *via* Rat Portage.

SUMMARY OF LAKE OF THE WOODS DIVISION.

Character of the country.—The country is generally rolling and covered with areas of sand, occasionally forming ridges. Lakes abound everywhere and swampy tracts of land. Better country than the Rat Portage section to the south. The valley of the Winnipeg River.

river would form an easy route towards Winnipeg, in which direction the country slopes gently.

Timber.—Spruce and tamarack occur throughout the region.

Minerals.—Prospecting for gold and iron has been carried on vigorously for fifteen years, and considerable mining has resulted in numerous enterprises which bid fair to be of value.

Soil.—The soil throughout wherever present is light and sandy. Numerous swamps or muskegs are present.

SURVEYS AND EXPLORATIONS WITHIN THE LAKE OF THE WOODS DIVISION.

REPORT ON THE GEOLOGY AND RESOURCES OF THE FORTY-NINTH PARALLEL.

From the Lake of the Woods to the Rocky Mountains, &c., by Dr. G. M. Dawson, Geologist, &c.

(Addressed to Major D. R. Cameron, R.A., H.M. Boundary Commissioner.)

Woodland region.

In this report there is embodied a chapter (chap. II.) on the geology of the Lake of the Woods, in which there is a great deal of valuable information as to the nature of the country north-east and west of this body of water, in the extreme westerly portion of the 'Woodland region' of the province of Ontario.

From page 23 to page 55, the author describes the geology and topographical features of the region in question.

Dr. Dawson refers to former explorations undertaken in this district and points out those by the late Dr. Bigsby, Secretary and Medical Officer to H.M. Boundary Commission in 1823.

The following note is inserted :—

FORMER GEOLOGICAL EXPLORERS.

Dr. Bigsby.

The geology of the Lake of the Woods was the first discussed by Dr. J. J. Bigsby, in a paper which appeared in the seventh volume of the *Journal of the Geological Society* (1852), and gave the results of an examination made, I believe, in 1823, during a visit to the lake in his capacity as Medical Officer to the Boundary Commission Survey of

SESSIONAL PAPER No. 143

that date. This paper gives a remarkably clear general account of the geology of the region, and I must express my obligation to it for several facts incorporated in the general map appended to this report. Prof. Keating, associated with Major Long in a United States Government expedition to the source of the St. Peter river and neighbouring country, passed through the Lake of the Woods by canoe route in 1823, and gives a few notes on the lithological character of the rocks observed. Prof. Hind mentioned some facts bearing on the geology, in his reports (1857-1858). Prof. Bell of the Canadian Geological Survey, in his report for 1872, gives a short account of the rocks seen during a canoe voyage from Rat Portage to the North-west Angle, and some conclusions on the general geology. ^{Other explorers.}

**Canadian Pacific Railway—Report by Sandford
Fleming, 1877.**

SURVEYS AND PRELIMINARY OPERATIONS.

Mr. Fleming's Report, 1877, Addressed to the Hon. Alexander Mackenzie.

EXPLORATIONS IN WOODLAND REGION IN 1871.

10. Exploratory survey from Ottawa River to a point near the head of Montreal River. Division VI.
11. Exploratory survey from the great northern bend of the River Montreal to a point half way to Moose River. Division V.
12. Exploratory survey from the west branch of the Moose River, eastward to the point last mentioned. Division VII.
13. Exploratory survey from the Moose River to Small Black River, inland from the north shore of Lake Superior. Division VIII.
14. Exploratory survey from Small Black River to Long Lake.
15. Exploratory survey from the Long Lake to the mouth of the River Nepigon. Divisions VIII and IX.
16. Exploratory survey from the mouth of the River Nepigon to Lac des Isles. Division IX.
17. Exploratory survey from Lac des Isles to the canoe route to Lac Seul. Division XI.
18. Exploratory survey from the canoe route to Whitefish Bay on the Lake of the Woods. Division XII.

20. Exploration northward by the Rivers Ottawa and Abitibi to James Bay, returning by the Rivers Moose and Michipicoten to Lake Superior. Divisions V, VI, VII, VIII.

EXPLORATION IN THE WOODLAND REGION IN 1872.

16. Exploration from Lake of the Woods, directly east to Lake Nepigon and Nepigon Bay, Lake Superior. Divisions X to XII.

19. Exploration from the River Nepigon to the north end of Long Lake. Divisions VIII and IX.

20. Exploratory survey from the north end of Long Lake to a point in the previous year's survey about 65 miles north of Michipicoten. Divisions VIII and IX.

21. Exploratory survey from the north end of Long Lake to the north side of Lake Nepigon. Divisions VIII and IX.

22. Exploratory survey from the north side of Lake Nepigon westward to Sturgeon Lake. Division IX.

23. Exploratory survey between Lakes Sturgeon and Eagle.

24. Exploratory survey of branch line from Nepigon Bay northward. Division IX.

EXPLORATION IN THE WOODLAND REGION IN 1873.

6. Exploration from Lake Nipissing, in a north-westerly direction to Matagami, Moose River. Divisions V and VI.

7. Exploratory survey from the north end of Long Lake via south-east angle of Lake Nepigon to River Nepigon. Divisions VIII and IX.

EXPLORATION IN THE WOODLAND REGION IN 1874.

24. Survey of Portages on the Dawson route between Lake Shebandowan and Lake of the Woods. Division XII.

27. Exploration eastward from Lake Wabigoon to English River. Division XI.

28. Trial location survey from Selkirk (Red River) eastward to Keewatin (Rat Portage). Divisions XI and XII.

EXPLORATIONS AND SURVEYS IN THE WOODLAND REGION IN 1875.

18. Survey with soundings of Lakes Shebandowan, Kashabowie and Lac des Mille Lacs. Division XI.

21. Exploratory survey from Lake Manitou to Sturgeon Falls.

SESSIONAL PAPER No. 143

22. Exploratory survey from Lake Vermillion to Little River Wabigoon. Division XI.
25. Exploratory survey from Sunshine Creek via Rivers Savanne and English, to River Wabigoon, Division XI.

EXPLORATION IN WOODLAND REGION IN 1876.

16. Completion of location survey between Lake Superior and English River. Division XI.
17. Trial location survey between English River and River Wabigoon. Division XI.
18. Trial location survey between Wabigoon river and Vermillion lake. Division XI.
19. Trial location survey between Lake Vermillion and Keewatin, (Rat Portage.) Division XI.
20. Exploration from located line by Dog lake to Nepigon. Division IX.

THE WORK ACCOMPLISHED IN THE WOODLAND REGION.

Topography.—The topographical features and the adaptability to ^{Wooded} railway purposes of a country covered with woods, and imperfectly ^{country.} known, can only be ascertained by patient and persistent efforts. The view is much obstructed by the growth which covers the surface. The axe must generally be used to admit of observations being made for even a few hundred feet. The way must be felt little by little.

FOREST LANDS.

The woodland region is covered by dense forests throughout its length of more than a thousand miles from east to west, and in its breadth from the Great Lakes north to the Arctic waters.

It is entirely without roads of any description. The examination has, consequently, proved difficult and tedious. Exploratory lines have been carried through the forest in every direction where the determination of facts suggested their necessity. Thus at great labour we have acquired valuable information, and the result may be viewed with satisfaction.

The successive operations in each year have been described; the results may now be summarized.

An extremely favourable line has been established from Selkirk, on the Red river, in a course as nearly direct as possible, to the nearest navigable waters of Lake Superior at Fort William.

MINERAL WEALTH OF WOODLAND REGION.

Minerals. The woodland region does not offer any great prospect of becoming an agricultural country, but it may, possibly, contain much mineral wealth. The investigations of the Geological Survey suggest the presence of rich deposits, extending over a large area. Prominently may be mentioned iron, copper, silver and lead, and not improbably, phosphates and plumbago. Even the section of the country east of Lake Superior may prove rich in minerals. This section has not hitherto been held in high estimation, but it has been discovered that a broad belt of metalliferous rocks stretches from the vicinity of the Bruce mines to Lake Mistassini, and between it and the shores of Hudson Bay. Copper lodes have for some time been worked at the Bruce mines, and silver lodes have been discovered at Garden river. It is a reasonable inference that similar lodes will be found repeated in the extensive tract of country of the same geological horizon, and that the day will come when these resources will be developed, and a considerable mining population find employment.

SNOWFALL LESS IN WOODLAND REGION THAN IN OTTAWA.

Percentages. Taking the snowfall at Ottawa as the standard, the depth of snow throughout the whole woodland region is generally less, on an average, than at that city. In the immediate neighbourhood of Lakes Huron and Superior, the fall is about the same: but, east of Lake Nepigon, it is to be found from 90 to 70 per cent, while from Lake Nepigon to Manitoba, the depth ranges from 70 to 50 per cent of the Ottawa snowfall.

CHAPTER XIII.

REPORT OF EXPLORATION IN NORTHERN ONTARIO.

Note—Synopsis—Resources—Arable Land—Climate—Pulpwood Forest—Digest of the ten Surveys and Explorations undertaken by the Ontario Government in 1900: District No. 1, Abitibi Division:—Route of Survey—Clay loam south of Lake Abitibi—Rocky hills—White pine scarce north of the Height of Land District No. 2, Upper Moose or Mattagami Division:—Character of country—Timber—Rock formations—Water power—Climate. District No. 4, Upper Moose or Mattagami Division:—Character of country—Timber—Rock formations. District No. 5, Kabinakagami Division:—Soil—Character of the country—Timber—Rock formations—Climate. District No. 6, Kabinakagami Division:—Agricultural capabilities—Forests—Rock formations—Water power—Fish—Climate. District No. 7, Long Lake Division:—Character of the country—Timber—Rock formations—Game. District No. 8, Nepigon Division:—Character of country—Rock formations—Streams, game, &c. District No. 9, Lake St. Joseph Division:—Character of country—Timber—Rock formations. District No. 10, Lac Seul and Lake of the Woods Divisions:—Character of country—Timber—Minerals—Game, water power, &c.—Notice of Map accompanying Report.

EXTRACTS FROM THE REPORT OF THE SURVEY AND
EXPLORATION OF NORTHERN ONTARIO MADE IN
1900.

(Printed by order of the Legislative Assembly of Ontario, Toronto, 1901.)

NOTE.

In the report of the Commissioner of Crown Lands of the Province of Ontario for the year 1900, a brief sketch is given of the general results obtained by the ten exploration parties sent out to investigate the topography, character and extent of the resources in minerals, timber and agriculture. The following extract is drawn from the said report, which gives a digest of the various chapters embodied in the complete volume which comprises the several reports by the ten explorers. The report contains numerous photographs taken north and

south of, as well as along the Height of Land, which, though small, give an excellent idea of the country traversed by the ten exploring parties.

Synopsis of Exploration of Northern Ontario.

RESOURCES.

Resources.

At the last session of the legislature the sum of \$40,000 was voted for that part of the province lying between the Canadian Pacific Railway and James Bay. The knowledge possessed of this country, its topography and the character and extent of its resources in minerals, timber and agricultural land, was of a general nature and was limited indeed. It was believed from official and other information that there were in this country extensive forests of woods suitable for the making of pulp and paper, and great areas of tillable land. Early in the summer ten exploration parties were organized and sent out by the department, each being assigned a different and distinct section, and while it was not anticipated or hoped that they would succeed in penetrating every corner of so extensive a region, yet it was expected that enough would be learned to show that in the region north of the height of land, dividing the James Bay from the St. Lawrence river waters, there are great areas of fertile country and immense forests of spruce and pulp-woods.

ARABLE LAND.

Clay loam.

The result of the exploration is that a tract of arable land has been found north of the height of land, stretching from Quebec boundary west across the districts of Nipissing, Algoma and Thunder Bay, comprising an area of about 24,500 square miles, or 15,680,000 acres. The soil is a clay or clay loam, nearly all suitable for farming purposes, and the region is watered by the Moose and its tributaries, the Abitibi, Mattagami and Missinaibie, and the Albany and its tributaries, the Kenogami and Ogoké. Along this latter stream alone, about which nothing was known, a tract of good land was found extending on both sides of the river for a distance of over forty miles, and in the district of Rainy river, between the surveyed townships around Dryden and Lac Seul, another extensive area of good land was found, about 600 square miles, or 384,000 acres in extent.

CLIMATE.

Crops.

The climate of this region is reported to have no features which would prevent the ripening of grain or the growing of root crops. It

SESSIONAL PAPER No. 143

lies for the most part south of the 50th parallel of latitude, which crosses the province of Manitoba near Winnipeg, and its climate will not differ much from that of the latter province. Crops of grain, potatoes and other vegetables, and even small fruits were found growing as far north as James Bay.

PULPWOOD FOREST.

A great pulpwood forest has been located north of the height of land extending across the districts of Nipissing, Algoma and Thunder Bay, with a depth in some places of 50 miles. The timber embraces all the common pulpwoods, such as spruce, poplar, jackpine and balsam poplar, as well as tamarack and cedar along the banks of the streams. It is generally of good quality, usually thick on the ground and ranges in size up to three feet in diameter. In the district of Nipissing, south of the height of land, an extensive pine forest was explored and estimated to contain about 3 billions feet, B.M.

On the whole the information brought in by these exploration parties has been extremely gratifying, and the benefit to the province of conducting the exploration of so extensive a country has been abundantly demonstrated.

Digest of the ten Surveys and Explorations Undertaken by the
Ontario Government in 1900.

DISTRICT No. 1, N. ONTARIO.

(Abitibi Division of the Grand Trunk Pacific Railway, Division V.)

ROUTE OF SURVEY.

The exploration has shown that a large portion of this region is of the same general character and equally well suited for agricultural settlement as the townships around the head of Lake Temiscamingue. The section traversed by the base line is clay and clay loam, and the same soil characteristics prevail over the greater part of the territory examined. In general the land back from the rivers, is low-lying and marshy, and the impervious nature of the soil prevents filtration and promotes the growth of moss, with which much of the land is covered. The effect of this is to absorb moisture and retard evaporation, and also to preserve the winter ice through the summer season giving the country the appearance of unproductiveness. Never-

theless the soil is rich and capable of cultivation with proper drainage. The land which is or could be made suitable for farming coming within the area explored, was estimated at one million acres, in addition to which the clay land along the Blanche river above Lake Temiscamingue is stated to extend up to the country covered by the expedition.

CLAY LOAM SOUTH OF LAKE ABITIBI.

South of Lake Abitibi is a fine area of clay loam. The land on the immediate shore of the lake is sandy, but a short distance inland the soil changes to a clay loam, with merely enough sand to render it light and workable. In the eastern portion of the district are extensive deposits of moss peat, the bogs reaching a depth of ten feet in many places. The peat taken from these bogs on analysis shows a high percentage of volatile combustible matter and fixed carbon, no sulphur, and only a trace of phosphorus, with a low percentage of moisture and ash, which render it a valuable fuel.

ROCKY HILLS.

Midway between the base line and Abitibi lake lies a ridge of rocky hills, three hundred to four hundred feet in height at some points, forming a watershed between the lake and James Bay. The rivers on the south side of this watershed are short, and the means of travel correspondingly limited. There are two water powers of considerable magnitude on Abitibi river below the lake, Couchiching falls, with about 6,000 horse power, and Iroquois falls with about half that amount. Upper Abitibi lake covers an area of 190 square miles, of which about 55 square miles lie in Quebec. Lower Abitibi lake has a surface of 145 square miles. A comparatively small expenditure in lowering the brink of Couchiching falls, would reduce these lakes to about one-half their present area, and improve the drainage of an immense tract of surrounding territory, though at the expense of a loss in head and storage for the water power of the falls.

WHITE PINE SCARCE NORTH OF HEIGHT OF LAND.

There is little white pine timber north of the height of land, the trees being scattered and inferior in quality. Some small areas of red pine and some jackpine were met with, nearly all of these varieties being found south of Lake Abitibi. The best areas for pulpwood are on Low Bush and Circle rivers, with their tributaries, where it is estimated that an area of 180 square miles will yield an average of seven cords to the acre, or about 800,000 cords. Along Little Abitibi river

SESSIONAL PAPER No. 143

between Harris lake and the boundary, the pulpwood is estimated at 750,000 cords. A belt reaching from Lower Abitibi lake along the Abitibi river to Long Sault, eighty miles in length, will average seven cords to the acre. There are also considerable pulpwood areas to the west and north of Lower Abitibi lake.

DISTRICT No. 2, N. ONTARIO.

Upper Moose or Mattagami Division of the Grand Trunk Pacific Railway,
Division VI.

CHARACTER OF COUNTRY.

Of an area of 7,800 miles explored, about 1,000 square miles was water and swamp, and of the remaining 6,000 miles 75 per cent was found to be choice farming land, the surface in places rolling and the soil a rich friable clay and clay loam. The good land alternated with muskeg, not more than four feet deep, with a clay bottom. If the country were cleaned up a large proportion of the low, wet land could be made productive as pasturage. Of the territory explored 60 per cent will yield on an average 5 cords of spruce wood to the acre, in addition to other timber.

TIMBER.

The prevailing timber is spruce and poplar, there being no pine or hardwood. The spruce, especially along the river banks, attains a size which renders it valuable for square timber, and the poplar is large and abundant, particularly on the Mattagami river. Special acres examined would yield 20 cords of spruce, other acres would cut 15 cords of spruce and ten of poplar. Some of these, if all the timber growing on them were made into cordwood, would show 60 to 70 cords to the acre. Much of the tamarack seen was dead, as this tree appears frequently to die after having attained a growth of about 20 inches, and owing to the slight hold of its roots on the clay soil, it is liable to be blown down.

ROCK FORMATIONS.

The district is generally flat, with a gradual slope toward the north. Rock exposures are few and of limited area, the prevailing formation being the Laurentian, but isolated outcrops of the Huronian formation were discovered on the Mattagami and Opasatika rivers. The district

appears to be unfavourable to the production of economic minerals, with the exception of some localities where iron pyrites was found, which may be utilized in the manufacture of chemical pulp. The country presents excellent facilities for railway construction. No rock cutting would be necessary after the height of land had been passed, very little cutting and filling would be required, and owing to the level nature of most of the country, the gradient would be easy. Tamarack for ties and sand for ballasting purposes are to be had in abundance.

WATER POWER.

Awaiting
development.

The rivers and streams, more especially the Mattagami and Kapuskasing rivers, furnish numerous valuable water powers with descents of from ten to twenty-five feet, which can be utilized in the development of mechanical industry. The Missinaibie falls could be utilized to furnish the power for an electric railway, and were locks constructed at that point a water route north from Missinaibie station could be secured.

CLIMATE.

Generally speaking, the climate is similar to that of Manitoba, the weather in midsummer being equally hot. No destructive frosts were experienced until September 27th, and rains were frequent but not excessive.

GAME.

The fur-bearing animals and larger game have considerably decreased in number of late years, and the fish in the rivers flowing northward, are not so plentiful as on the southern slope.

DISTRICT No. 4, N. ONTARIO.

Upper Moose or Mattagami Division of the Grand Trunk Pacific Railway, Division VI.

CHARACTER OF COUNTRY.

The land taken as a whole is level, rising slightly along the water-courses, where it is rolling. The soil is clay and sandy loam, covered in the lower levels with boggy peat and moss varying from two to four feet in depth. The country can be easily cleared, and for farming

SESSIONAL PAPER No. 143

purposes, the soil will be equal to the best in the older portions of the province. Much of the area that is at present swampy, will secure Good soil. natural drainage when the country is cleared, owing to the incline of the land. The mixture of the clay, forming the prevailing subsoil, with the surface soil, will prove rich and productive. The district is well watered by numerous rivers and streams, some of which are well stocked with fish.

TIMBER.

The district is heavily timbered with spruce and tamarack inter- Dense growth.perspersed with other varieties. Owing to the density of growth, the spruce and tamarack are for the most part, too small for any other commercial use than pulpwood, their diameter not being proportioned to the height they frequently attain. In some places, however, they are of larger dimensions. The quantity could not be estimated. The spruce will yield in some localities 40, 50, and in one instance 60 cords to the acre, being especially fine in the country along the Kabinakagami river. There is also a heavy growth of spruce along the Mattawishguani river, which will produce from 20 to 35 cords to the acre. The Spruce and tamarack. dense spruce and tamarack forests of the Moose river basin are of great value and cover an immense area. In the southern portion of the district, there are some areas of red pine, but no large pine is found north of Lake Kabinakagami, the main portion of the territory explored being north of the pine limit.

ROCK FORMATIONS.

The rock formations of the district are for the most part Laurentian, with some Huronian exposures, especially on the Kabinakagami river. Near the Missinaibic river were found boulders of fine gray slate which cleaved readily, and which is also known to exist in other localities. The peat found in the lower levels below the moss on the surface is Slate. inferior as fuel, owing to the shallowness of the beds and the amount of moisture it contains. Similar soil to these peaty tracts at Brunswick House on Missinaibic lake has been found capable of raising good crops.

DISTRICT No. 5, N. ONTARIO.

Kabinakagami Division of the Grand Trunk Pacific Railway, Division VII.

SOIL AND CHARACTER OF THE COUNTRY.

About half of this district is good arable soil, which is not found in large continuous areas, but principally in the neighbourhood of the

Muskeg. streams. In the northern part of the district there is a good deal of muskeg, and the flatness of the surface will be an obstacle in the way of drainage. Much of the district has been burned over, so that the timber is not generally of a large size.

TIMBER.

Best district. About one-third of the total area is timbered, making 640,000 acres, half of which will, it is estimated, yield good pulpwood or timber. The trees growing along the river banks have usually attained a fair size. Inland the timber is generally small and scrubby. The best timber district is between the Kawakaska river and Lake Eskeganaga, where extensive groves of spruce and tamarack up to 36 inches in diameter are found. The poplar which grows everywhere along the river is singularly free from 'black heart,' which renders it of value for pulpwood.

ROCK FORMATIONS.

Traces of gold. The rocks of this district belong to the Niagara series of the Laurentian formation obtaining to the north of Long lake and north-west to the Lower Kawakaska river. Huronian rocks appear on the northern portion of that stream on the Little Long Lake river, in the Pic river country and elsewhere. Silurian strata and sedimentary rocks are found in the northern part of the district. No mineral deposits of economic importance were found. Iron pyrites occurs in considerable quantities on Pine lake, but it carries only small traces of gold, nickel and copper. The most promising region is the country on the Kawakaska river below Wawong Portage. Samples from quartz veins here showed traces of gold, which further prospecting may disclose in paying quantities.

CLIMATE.

Vegetables. The climate is similar to that of part of the North-west lying in the same latitude. Frost is unusual during the summer season, and all the ordinary green vegetables are raised without difficulty. Barley and oats can also be matured successfully.

DISTRICT No. 6, N. ONTARIO.

Northerly portion of Kabinakagami Division, the Grand Trunk Pacific Railway,
Division VII.

AGRICULTURAL CAPABILITIES.

Although some portions of the territory explored are unfit for agriculture on account of their rocky or sandy character, there are consi-

SESSIONAL PAPER No. 143

derable areas of fertile land. The valley of the Ogoké river is a wide level tract of good clay soil, but interspersed with smaller areas of sand. The upper portion of this valley is the most extensive and promising stretch of agricultural land met with. The lower section down to the Albany river is wet and contains numerous peat bogs, but as the land lies considerably higher than the river bed it could be easily drained and rendered suitable for cultivation. The total area of arable land, 10 miles inland on each side of the Ogoké river for a distance of 140 miles, is estimated at 1,500,000 acres. There is a comparatively small tract of black alluvial soil along the Ombabika river and some areas of good clay soil down the Kapikotongwa river.

FORESTS.

There are great quantities of excellent pulp wood throughout the district, the principal varieties being spruce and jackpine. From the mouth of the Ombabika River to the Albany River the land, exclusive of brulé, will yield 38 cords to the acre, or a total of 56,346,400 cords. The Ogoké river country will average 44 cords to the acre, making a total estimated output of 78,846,000 cords, being 135,194,400 cords in all from the territory tributary to these two watercourses.

ROCK FORMATIONS.

The geological characteristics of the territory are mainly Laurentian, Gold, but the Ombabika route crosses a belt of the Huronian formation, 10 or 12 miles in width. Silurian limestone, overlaid with beds of drift, prevail near the Albany river, between the Ogoké and Kenogami rivers. Traces of gold were found in the quartz veins in the Huronian rocks about Cross and Summit lakes, the samples taken yielding sufficient gold to encourage further prospecting.

WATER POWER, FISH, &c.

Extensive water powers exist on the leading rivers, and the streams and lakes abound with fish. Pike, pickerel and whitefish are generally distributed, speckled trout are plentiful, and sturgeon were caught in the Ogoké and Albany rivers.

CLIMATE.

The climate is much the same as that of the Temiscauing townships. No frosts were experienced until September 25, and throughout October the weather continued fine and warm. All kinds of vegetables produced in temperate climates flourish at the Hudson Bay posts.

DISTRICT No. 7, N. ONTARIO.

Long Lake Division of the Grand Trunk Pacific, Railway, Division VIII.

CHARACTER OF THE COUNTRY.

Hay. The district is generally rocky and barren, and not adapted for agricultural settlement. Small tracts of arable land exist at the head of Lower Wabinoosh lake and along Highland lake and river. Along Little Mud River the soil is fitted for root crops and fodder, but not for general agriculture. In other parts potatoes and hay are grown. On Little Mud river, near Lake Nepigon, there are deposits of a fibrous peaty character, but of no great depth or area.

TIMBER.

In limited quantity. There is little timber of commercial value, and such tracts as are intrinsically valuable, are practically unavailable on account of location, and the limited quantity of the different areas, except along Mud river, where large spruce and tamarack were found.

ROCK FORMATION.

The prevalent rock formation is Laurentian granite, but the Huronian order occurs at the northern end of Lake Nepigon, and there are indications of the same formations elsewhere, the contact between the two systems being irregular and difficult to follow. The only mineral of value discovered was at Poplar Lodge, on the east shore of Lake Nepigon, where red jasper was found mixed with a silicious iron ore.

GAME.

Small game is fairly plentiful, but the larger animals are scarce, owing to the barrenness of the country. There are some good water powers on the principal rivers.

DISTRICT NO. 8, N. ONTARIO.

Nipigon Division of the Grand Trunk Pacific Railway, Division IX.

CHARACTER OF THE COUNTRY.

Unfit for agriculture. While the country is not generally adapted for agricultural settlement, its principal characteristics being stone, rock and swamp, it

SESSIONAL PAPER No. 143

comprises considerable areas of sandy loam, which would make good farming land. These fertile tracts, are however, isolated by intervening stretches of rough and barren country. The district is largely timbered with spruce and tamarack, but in many parts jackpine is predominant. In most sections where timber exists, the yield is estimated at between 15 and 30 cords, taking all kinds.

ROCK FORMATIONS.

There are indications that the district is capable of developing a mining region. The two principal geological formations are the Keeweenaw series of rocks and the Laurentian gneiss, some forms of the former containing a considerable amount of magnetic iron and iron pyrites. The Huronian areas are small, and occur in strips. There is an extensive iron ore deposit on the east side of Black Sturgeon lake which has not yet been thoroughly examined, and there are known to be other iron deposits elsewhere. A number of brine springs were found which formerly furnished the Indians with their supply of salt.

STREAMS, GAME, &C.

The rivers are all rapid with numerous falls available for water power. The large game and fur-bearing animals are diminishing in numbers, with the exception of moose and red deer, which have only made their appearance in the district of late years, and are plentiful.

DISTRICT No. 9, N. ONTARIO.

Lake St. Joseph Division of the Grand Trunk Pacific Railway.—Division X.

CHARACTER OF COUNTRY.

There are some areas of good land, but they are small and scattered, and most of the district is unsuited for successful agriculture. There is a great deal of rocky, broken country, and the soil in some places is scanty, the underlying rock being covered with sand, sandy loam or clay, the surface soil sufficing for the growth of timber.

TIMBER.

There is no pine except in isolated clumps. Spruce timber is thickly scattered throughout the territory, but much of it is too small to be marketable, though on the higher land it reaches a good size. Jack-pine prevails towards the south, and poplar in the northern portion of

the district, but in low-lying areas the average size is small. If they were accessible these tracts would furnish a large supply of pulpwood and timber.

ROCK FORMATIONS.

The rock formations vary greatly, the lower part of the district being almost entirely Laurentian, but changing to Keewatin near Sturgeon lake, which lies in a narrow belt of these rocks. A number of quartz veins occur on and near Sturgeon lake, some of which carry free gold, and a mine located on King's bay is being actively developed. Gold-bearing veins, the assays of which give encouraging results, have also been discovered at Abram lake, where a good deal of prospecting has been done. Galena is found in the Minnetakie lake region where an attempt to develop it is being made.

DISTRICT No. 10, N. ONTARIO.

Lac Seul and Lake of the Woods Division of the Grand Trunk Pacific Railway.
—Divisions XI and XII.

CHARACTER OF COUNTRY.

Owing to the rocky character of the greater portion of the area embraced in this district, the opportunities for agricultural settlement are limited. There are large tracts of clay soil on the Eagle and Wabigoon rivers, and on the English river above the Mattawa river, which, judging by the natural vegetation they support, will prove available for cultivation.

TIMBER.

The timber on the English river and its tributaries is exceedingly valuable, especially the spruce and poplar, which are sufficiently large in diameter to yield many millions of feet of lumber, in addition to the vast quantity of smaller timber suitable for pulpwood. The logs can be driven to the mouth of the Wabigoon river for manufacture. Large quantities of spruce and poplar are available in the Wabigoon river region, where there is about 3,500,000 feet of red and white pine, which could be taken to the mouth of Canyon river. The timber on the banks of the Winnipeg river and its tributaries, including the waters of the Black Sturgeon, Swan and Sand lake regions, comprises a large quantity of good poplar and spruce, and some red pine.

SESSIONAL PAPER No. 143

MINERALS.

The geological characteristics of the district are mainly Laurentian. ^{Quartz veins.} In the Huronian areas on Linklater lake, and lying between Boulder and Lacousse lakes the outlook is more encouraging. Quartz veins are frequent in these localities, and may be found on close examination to contain gold in paying quantities.

GAME, WATER POWER, &c.

Game is plentiful throughout the district, including moose, caribou and red deer, the latter being a recent arrival, but ^{Protection} against _{needed.} indiscriminate slaughter is urgently required to prevent their extermination. The numerous falls and rapids on the rivers provide valuable water powers.

MAP ACCOMPANYING REPORT OF EXPLORATIONS IN
NORTHERN ONTARIO.

In 1901 the Department of Crown Lands of Ontario issued a map of part of Northern Ontario showing the northern part of the districts of Nipissing, Algoma and Thunder Bay. This map serves both as a ^{Joint map.} topographical and a geological map. It was compiled from surveys and explorations undertaken by the Department of Crown Lands of the Province of Ontario and from surveys carried on by the staff of the Geological Survey of Canada.

The map is on a scale of 8 miles to 1 inch, and indicates the areas covered by the Huronian or mineral-bearing series of rocks, as well as the other formations of the districts in question.

Besides the above the limits of the clay belt, the height of land, ^{Clay belt.} character of the country, together with notes regarding its generally level character, its areas timbered, together with the areas of good agricultural land of clay and sandy loam, are clearly indicated on the map.

CHAPTER XIV.

RESOURCES OF THE HUDSON BAY BASIN.

Extracts from Dr. S. E. Dawson's Work :—The Bay—The Coast—Drainage Basin—Rivers—Churchill—Nelson—Hayes—Severn—Moose—Rupert's—East Main—Geology—Minerals—Climate—Fisheries—Fur-bearing Animals. Mr. A. P. Low's Statement :—Cereals—Soil—Character of Country—Drainage required—Minerals—Fisheries—True Cod—Note. Ogilvie's Report of Exploration to Hudson Bay :—Route—Low Hills—Fine Scenery—Hudson Bay Post—Moose River—Moose Factory—James Bay Distributing Point—Character of the Surface and Agricultural Capabilities—Garden at Abitibi—Climatic Conditions—Extract from H. B. Co.'s Journals—Gardens at Moose and Rupert's House—Indifferent Success—Cattle—Grass—Hay—Timber Resources—Minerals—New Post—Furs—Fish—Porpoise Seals—Fowl. Dr. Bell's Letter :—Hudson Bay Basin—Territory fit for Settlement—Good Land—Temperatures—Snow Fall—Soil—Objection raised—Pine—Other Trees—Minerals—Coal—Fish. Dr. R. Bell's Report on H. B. Basin for 1878-1879 :—Clay Deposits—Timber—Crops—Cattle—Clay Escarpments. Mr. H. O'Sullivan's Report for 1901 :—Railway Lines—Route—Character of Country—Lake Mattagami—Mountain Range—Soil—Swampy Tract—Timber—Dr. Bell quoted—Mr. Low quoted. Mr. Low's Note on the Clay Deposits of Hudson Bay Basin :—Statement. Mr. Wilson's Report for 1902 :—Instructions—Survey—Kapiskau Valley—Clay, Sand and Shells—Physical Features—Kwatabohagan River—Peat Beds—Track Surveys checked—Abitibi—Climate and Game—Fish. Mr. E. B. Borron's Report of 1882 :—Object of Explorations—Divisions—Peat—Laurentian Rocks—Source of Clay—Second Plateau—Drift-covered Region—Soil—Climate—Crops—Temperatures—Mineral Resources—Iron—Gypsum—Rock Exposures few—Timber—Bush Fires—Reforestation—Opening up and Settlement of Country.

EXTRACTS FROM DR. S. E. DAWSON'S WORK, ENTITLED
'NORTH AMERICA, VOL. I., CANADA AND NEW-
FOUNDLAND, WITH MAPS AND ILLUSTRATIONS.'
EDWARD STANFORD, LONDON, ENGLAND, 1897.

The Hudson's Bay Basin.

THE BAY.

Size and
boundaries.

One of the most striking features of the map of British North America is Hudson's bay—an immense navigable inland sea, extend-

SESSIONAL PAPER No. 143

ing half way across the continent at its widest part, and bounding upon the north the settled provinces of the Dominion of Canada through 30° of longitude—a distance as great as from London to St. Petersburg. Although Hudson's bay has been known and continuously navigated since 1610, two years only after the foundation of Quebec, and although for two hundred and thirty years Europeans have resided at points far within its recesses, the nature of the climate and the duration of the season of navigation are still moot questions in Canada, and widely divergent views are confidently advocated concerning them.

Hudson's bay and strait extend from 65° to 95° west longitude, a width of 1,038 miles, and from the extreme head of James bay on the south, to the Fury and Hecla strait on the north, is a distance of 1,300 miles, or 19° of latitude. It is not then a bay of the Atlantic ocean alone, because through Fox channel and Fury and Hecla strait it opens into the Arctic sea, and, in considering the physical conditions of the bay, it is always necessary to bear in mind that there is an opening on the north in latitude 70°, down which the polar ice may pass to find an outlet into the Atlantic in latitude 60° through Hudson's strait. If, however, the name be taken in its narrowest sense and James bay, Fox channel, and Hudson's strait be excluded, Hudson's bay is almost square, being 600 miles from north to south by 500 miles east to west. In most books James bay (350 miles long) is taken into the calculation, and in round numbers the dimensions of Hudson's bay are stated to be 1,000 miles from north to south and 600 miles from east to west. The area is approximately given as 500,000 square miles. In the bay proper the depth of water is very uniform, averaging 70 fathoms, excepting near the strait, where it deepens to 100 fathoms. James bay is, however, very shallow throughout and even small vessels cannot approach the shore. There is a wide channel down the centre leading to Moose Factory, but beyond the central channel, in many places out of sight of land, the bottom may be touched by an oar from a small boat, and even the main bay along the southern shore is also shallow for a long distance out; so that, from cape Jones around the whole southern sweep of the shore, there is not a harbour worthy of the name until the excellent harbour of Churchill is reached upon the western coast. The water of James bay is brackish, for a number of important rivers converge into it from the east and south and west, and the bottom is muddy, whereas in Hudson's bay proper the water is as bright and as salt as in the main ocean. An elevation of 600 feet would convert the whole area into an immense level plain. The tidal wave enters at the strait and first strikes the western shore. It rises 11 to 12 feet at Churchill, and in the converging shores of the estuary of the Nelson river it rises 15 feet, but as the tide passes round the coast to the south and east it becomes lower. It is only 9 feet at Moose Factory, and lower still on the East Main.

Opening to
the north.

Area covered.

Channel to
Moose Fac-
tory.

Tides.

THE COAST.

Islands. The centre and west of the main bay is singularly free from islands, rocks or shoals. From the inner termination of the strait to Churchill navigation is clear and unimpeded by any nautical danger. The whole stretch of the eastern coast is, however, fringed with innumerable islets close to the shore, and farther out at a distance varying from seventy to one hundred miles is a chain of small islands in groups under various names—the Ottawa islands, the Sleepers, the Belchers—extending from the strait to the southernmost point of the whole bay. Among these islands fringing the bolder coast of the East Main there may be harbours, but otherwise, excepting Churchill, there is no harbour in the bay. Though the centre and west is thus clear, the prolongations of the bay contain many islands. The north side of the bay is shut in by an archipelago; there are a number of islands in the strait and also in James Bay.

Harbour. The Hudson's Bay Company have posts at the mouth of all the chief rivers, but as before stated, at Churchill alone is there a harbour which may be connected by rail with the settled parts of Canada and available for large ships. There the Churchill river empties by a deep estuary into the bay with a narrow opening seawards and bold rocky shores. It is an easy harbour for ships to make, being well marked and is sheltered from all winds. The anchorage is good and there is a depth of thirty feet of water within, so that it may be considered in all respects as admirably suited for the largest vessels. Other harbours there no doubt are, at Marble island where the whalers winter and in Chesterfield Inlet, but they are too far north to be of practical commercial use.

Anchorage.

The most important post of the Hudson's Bay Company is and has always been at York Factory, on the Hayes river, near the mouth of the Nelson river, the largest river which falls into the bay. At this point the Winnipeg basin discharges into Hudson's bay, and it is the point of communication with the whole network of waterways to the Rocky mountains and the valley of the Mackenzie river. There is practically no harbour at York, but a roadstead, and about seven miles from the fort there is good anchorage at a place called Five Fathom Hole, where large ships may safely lie; but vessels drawing more than twelve feet cannot go up to the fort, for at low tide there is not more than twelve feet in the channel of the Hayes river. Other chief posts of the company are Fort Albany, Moose Factory and Rupert's House, at the mouth of the rivers of the same name. These are very large rivers and they drain a territory extending from Labrador on the east to Lake Superior on the west, but as they converge into the shallow James bay, no vessels of any size can approach them.

H. B. Co.'s Posts.

SESSIONAL PAPER No. 143

Charlton island is the only roadstead in James bay, and all ships go there ; from thence the navigation is very intricate to Moose Factory, and goods are transhipped into smaller vessels or boats.

DRAINAGE BASIN.

This enormous inland ocean is the basin into which an area of three millions of square miles is drained, for, besides its own immediate tributaries, the whole system of Lake Winnipeg finds its outlet by the Nelson river into Hudson's bay. The Red river, rising in Minnesota south of the source of the Mississippi, flows directly north into Lake Winnipeg, and the Saskatchewan, rising on the eastern slope of the Rocky mountains, flows eastwards into the same lake, so that the drainage basin of Hudson's bay extends 2,100 miles from east to west and 1,500 miles from north to south. This Winnipeg sub-basin is more conveniently considered in connection with the North-west provinces. It is only necessary to allude to it here to show the immense territory drained by this inland ocean. The basin of the bay contracts towards the north. The rivers on the east or Labrador side grow longer and longer towards the south, and the same condition obtains on the west coast. All this dependent territory slopes down gently and gradually to the bay, for the water-partings are not highlands, but are low and inconspicuous, and the upper streams of the contiguous watersheds interlace at their sources.

Of the many important rivers flowing into the bay it will be possible to notice only the chief, and, in noticing them, to indicate the wonderful system of water communication which covers as with a network even the remotest recesses of the Dominion of Canada, and which has rendered possible the extensive operations of the Hudson's Bay Company and its continuous successful existence from the year 1670 down to the present day.

The first important river on the west is the Churchill or English river, sometimes called by its Indian name, the Missinipi river, which, after a course of 1,110 miles, falls into the bay to form the harbour of Churchill. It is a beautiful clear stream of great volume, expanding throughout its course into numerous lakes. It rises in Methy lake, and from the lake by a portage (Methy or La Loche) of $12\frac{1}{4}$ miles, the Clearwater river, a tributary of the Athabasca, is reached. This portage opens up the whole valley of the Mackenzie. At Frog Portage, a distance of only 380 yards separates the Churchill from the headwaters of the Grass river, flowing into the Saskatchewan at Cumberland House and opening up that large river system. Not far from Frog Portage the Deer river falls in from the north, by which Reindeer lake and the head of Athabasca lake may be reached. The

Churchill is well wooded, but its lower course is through a rocky and barren country.

Nelson. South from Churchill is the Nelson river, named after the master of one of Sir Thomas Button's ships, who died and was buried there in 1612. It is the largest and most important river of Hudson's bay, for it is the outlet of the whole Winnipeg and Saskatchewan system. It is a muddy stream of immense volume, flowing in a course of about 360 miles through a flat country. In its upper course it divides into many channels and expands into many lakes; in its lower course it is navigable for river steamers for 40 miles from its mouth. It falls into the bay by an estuary which is flat and muddy. At high tide the estuary is seven miles wide. At low tide the mud-flats and boulders are uncovered and the river shrinks into its own channel. The Nelson is of little value for navigation, for there is no harbour at its mouth. The water of the bay is shallow, and there is no shelter for vessels in the open roadstead, which answers for a harbour, so that vessels lying there prefer to put to sea at the appearance of bad weather. There are ten feet of water on the bar at low tide, but above that point the depth is twenty feet. The width of the river varies from half a mile to a mile and a half, until within ten miles of the tide-water, where it widens to three miles.

Hayes. Eight miles farther south is Hayes river and York—the chief Hudson's Bay post—is upon the western bank. This river and not the Nelson, is the boat route to Winnipeg, for the Nelson is too large a stream to be convenient for boat and canoe navigation. The route passes up Hayes river and by Hill river into Knee lake and thence by way of Oxford house to Norway house and by Sea river into the lake. The Hayes river with two tributaries is navigable for 140 miles for lightdraught steamers.

Severn. The Severn is the next considerable river southwards. It is a shallow stream, difficult for canoes, passing through a well-wooded country. Continuing to the south-east are many small streams until the Albany river is reached, a very important stream which is now the northern boundary of the province of Ontario. By the Albany there is a much frequented route to Lake Nepigon and Lake Superior. The distance is 468 miles and of this 270 miles are available for light-draught steamers.

Moose. Moose river, falling in at the extreme south of James bay, is navigable for 100 miles, and is the channel of a very much used route to Michipicoten on Lake Superior. Since the Canadian Pacific Railway was built, Missinabie station is the point of departure for the bay. At this point the water-parting of the Hudson's bay system is within 30 miles of Lake Superior. The whole distance from the bay to the lake at this point is only about 281 miles. The Abitibi, a tributary of the

SESSIONAL PAPER No. 143

Moose river, is the route by which canoes pass into the Montreal river, which falls into Lake Temiscaming at the head of the Ottawa river. All this country between Lake Superior and James bay is low and flat, sloping gradually down until about a distance of 100 miles from the bay, when it makes a sudden drop of 100 feet. This fall marks a change in the character of the rocks, which pass from the Laurentian into the Silurian, and at some places into the Devonian system. As far up as this drop, many of the rivers might be available for light steamboats.

The rivers which, as far as Moose Factory, flow from the west and south-west thenceforth flow into the bay from the south-east and east, radiating from the southern shore like the spokes of a wheel; so that Rupert's House at the mouth of Rupert's river, the next important Rupert's stream, and only about 100 miles from Moose Factory, is the point of departure for the Saguenay, lower St. Lawrence, and Labrador. Rupert's river flows out of Lake Mistassini, from whence a portage over the height of land leads into water flowing into Lake St. John. On the western side of the estuary of Rupert's river the Noddaway river falls, a shallow but important stream draining a wide area.

Many large rivers flow into the bay on the eastern side. The East East Main Main river approaches by one branch close to the waters flowing into Lake Mistassini, but another branch reaches far into the heart of Labrador and approaches the sources of the Koksoak, flowing into Hudson's strait, and of the Hamilton flowing into the Atlantic; or a canoe may even pass into Manicouagan flowing into the lower St. Lawrence. Great and Little Whale rivers are also important from Great Whale their size, but north of these the rivers grow shorter as the water-parting of the central basin of Labrador gradually approaches the coast.

GEOLOGY.

Hudson's bay lies within a basin of the Laurentian nucleus, on the reverse or inside of the great V-shaped mass of crystalline rocks, which forms the framework of the continent, and which from the earliest formative period has dominated its shape. One arm of this mass of primitive rock reaches from near the delta of the Mackenzie on the Arctic sea on the west, and the other stretches from the north of Labrador on the east. The Laurentian rocks come to the surface on the northern shores of the bay, both on the eastern and western side; but on the southern shore there is a border of Cambro-Silurian rocks of varying width. South and west of James bay this border of later formation is from 100 to 200 miles wide. On the south, from near the water-parting of the St. Lawrence system, the limestones of the later formations slope gradually down to the bay, and the rocks pass in places into the Devonian. On the eastern coast, north of

Cape Jones, there is a narrow strip of Cambrian, and the islands which cluster along on that side of the bay are of that formation.

MINERALS.

Copper, iron,
mica, &c.

The country around the bay possesses considerable mineral wealth, especially upon the eastern coast, where are masses of iron ore, chiefly manganiferous carbonate of iron. Upon the islands on that coast copper ore is abundant. Galena is found in several places, and mica is plentiful, and occurs in sheets a foot square. Plumbago is frequently met with. Lignite coal occurs on the Moose and Abitibi rivers, but no deposit of importance is known. Gypsum occurs on Moose river; and the limestones on Lake Abitibi have been reported to carry petroleum.

CLIMATE.

Subject of
controversy.

The climate of Hudson's bay has also been a subject of controversy, and when it is considered that the bay extends from lat. 51 degrees N. to lat. 70 degrees N., it will be seen that in any statement concerning climate, there is much need to indicate precisely what part of the bay is meant. This stretch of latitude corresponds with the stretch from Land's End in Cornwall to the North Cape in Norway, the most northern part of Europe, and well within the Arctic circle. The country around Hudson's bay can never be an agricultural country, and even though it be true that vegetables have been seen growing in sheltered spots, it may or may not be true, that the same vegetables could be grown in the open on a large scale. The inquiry has no practical bearing while so many millions of acres of rich arable soil are lying vacant all over the vast territory of the Dominion.

Limits of
crops.

Churchill is the northern limit of the cultivated grasses on the west coast of the bay. The line drops on the east side to the northern point of James bay. The line which marks the northern limit of cultivation of barley, rye, oats and the root crops crosses James Bay from east to west about half way up. The northern limit of the growth of wheat passes altogether south of the bay without touching any part of it. In the same way the northern limit of deciduous trees barely touches the extreme south of James bay. Some of the coniferous trees are found on the west coast considerably to the north of Churchill and almost as far north as Chesterfield Inlet. On the east coast the tree line drops to Cape Dufferin, but the growth is stunted at the extreme northern limit. North of that is the region

Caribou and
musk-oxen.

of mosses and lichens, the food of the caribou and musk-oxen. All around the bay trees are small when they come down to the coast, and the ground is covered with spagnum moss, but a little way back, the level is well wooded, and much valuable timber of large size grows

SESSIONAL PAPER No. 143

along the upper waters of the many large rivers which empty into James bay.

FISHERIES.

The resources of the bay as to fisheries are important. Far to the north, up Rowe's Welcome and Fox Channel, is the favourite resort of American whalers, who winter at Marble island, inside the gulf near Chesterfield inlet, so as to commence operations as soon as the ice breaks up. These people are reported to be fast destroying the fishery by their destructive methods, and every year they have to go farther north, for the latest reports go to show that they have destroyed almost all the large marine animals in the upper part of the bay. In the northern seas of Canada is the last retreat of the whale, and some control should be exercised over these strangers. The seal and porpoise fisheries are productive, and salmon abound in the rivers. The cod fishery extends round from Atlantic into the strait as far as Ungava bay.

FUR-BEARING ANIMALS.

The territories surrounding the whole bay are productive in fur-bearing animals. Caribou (reindeer) are abundant, and in the barren grounds of the North-west, as far as the Arctic ocean, are the haunts of musk-oxen. They are met also north of the strait. Throughout all the peninsula of Labrador roam large herds of the barren-ground caribou or reindeer. There is abundance of feathered game in its season.—ducks, geese, loons, ptarmigan. Far in the north at Repulse bay and on the Arctic coast, the Hudson's Bay officers could always maintain themselves. Eskimo live in bands all round the bay. Some of their settlements have existed for 100 years in the same place, and all the Canadian parties of observation which entered the bay were abundantly supplied with fresh meat during the winter by the Eskimo.

STATEMENT MADE BY MR. A. P. LOW, B. Sc., OF THE GEOLOGICAL SURVEY OF CANADA, ON THE RESOURCES OF THE HUDSON BAY BASIN, PREVIOUS TO HIS DEPARTURE ON THE HUDSON BAY EXPEDITION OF 1903.—TRANSCRIBED BY H. M. A., 10TH AUGUST, 1903.

NOTE.

Before leaving Ottawa to undertake an investigation of the fisheries and other resources of Hudson Bay, Mr. A. P. Low, of the Geological Survey, made the following statement regarding the resources of the Hudson Bay Basin :—

Resources important

After spending six seasons employed on Government surveys and explorations in the Hudson Bay basin and Labrador, I am convinced that the resources of the Hudson Bay Basin are of paramount importance to the Dominion of Canada. I insist on the great value of the Hudson Bay resources, he added.

CEREALS AND VEGETABLES.

Clay soil.

Oats and *Barley* can be cultivated on alluvial and marine clay and other drift deposits, which constitute the soil as far north as Fort George.

Wheat can be cultivated as far north as Moose Factory, at Rupert's House, and likely also at Albany.

Vegetables grow freely as far up as Fort George.

Potatoes and other vegetables grow freely on Trout Lake.

SOIL.

There is fine land east of Lake Winnipeg after the first one hundred miles are crossed. All that this section of country needs is draining to enable it to produce abundantly.

From the Height of Land, good agricultural land exists, and the country is also well timbered with big spruce.

CHARACTER OF COUNTRY.

The east side of the Hudson Bay Basin is a pretty flat country, whilst the western side of the bay is very flat.

SESSIONAL PAPER No. 143

There is a belt of from twenty (20) to one hundred and fifty (150) miles inland from the waters of the bay on the east side which carries surface deposits of clay, sand and gravel, good soil, forming a sloping plain of marine submergence or embayment similar in origin to that of the St. Lawrence Basin but much more extensive, especially on the south side.

On the south and west sides we have a strip of 200 miles of excellent flat land, overlying flat-lying beds of limestone and Archæan rocks, clay and forming a zone around the bay.

DRAINING REQUIRED.

When this country is drained and opened up it will produce a fine agricultural country. It will possibly take some time, but it requires drainage and the timber to be cut.

The first settlers will have trouble, as in this portion of Canada (Ottawa) when the forests were being cut, with summer frosts, but these will diminish and cease as the country is opened up and the forests cut, and the land drained.

MINERALS.

As to the mineral resources. Iron occurs in abundance. research will reveal valuable deposits. I have every confidence that minerals of economic value will be discovered throughout this basin which will prove of great value.

FISHERIES OF JAMES BAY.

In James Bay, trout, whitefish and rock or Hudson cod occur. Sturgeon is in all the rivers as far as Fort George on the east side, and as far as York on the west side of the bay.

North of James's Bay, the same fish, trout, whitefish, rock cod and sturgeon occur, along with salmon, (the 'arctic salmon') in large numbers. No true salmon is known in Hudson Bay.

The arctic or Hudson Bay salmon is equal in flavour and flesh to the British Columbia salmon.

It is not at all unlikely that the true cod also occurs in the Hudson Bay. The investigation which we are now about to undertake in that bay will determine.

Mr. Low was very keen on the subject and insisted on the great value of the resources of that great bay and of its surrounding shores, thickly covered for long distances inland with soil capable of supporting abundant vegetation.

EXTRACTS OF EXPLORATORY SURVEY TO HUDSON
BAY BY WILLIAM OGILVIE, D.L.S., 1891, ADDRESSED
TO THE HON. THE MINISTER OF THE INTERIOR,
OTTAWA.

Description of Route from Mattawa to East Main.

ROUTE OF EXPLORATION.

Upper
Ottawa.

Between Mattawa, on the line of the Canadian Pacific Railway, and the foot of Lake Temiscamingue (about thirty-five miles), the Lake Temiscamingue Colonization Railway have a line of boats and a railway. The railway was built in order to pass rapids in the river, and is in four parts:—the first about four miles above Mattawa, somewhat less than half a mile in length; the second about eight and a half miles from Mattawa, about half a mile long; the third about twelve miles from Mattawa, and about one-fourth of a mile long. Over these three sections the cars are drawn by horses. The fourth section is between the head of Seven League lake (which is simply an expansion of the Ottawa river) and the foot of Lake Temiscamingue, and is six miles long. Over this the cars are drawn by a small locomotive engine. From the end of this road steamboats take us without a break to the head of Lake Temiscamingue. On this lake there are half a dozen or more steamboats, of which two are of good size. The time from Mattawa to the head of Lake Temiscamingue, utilizing these means of transport, is two days, one to the foot of Lake Temiscamingue, the other to the head.

The scenery is beautiful, and were it more generally known I think many would make a holiday trip over this route and find it as pleasant as any in Canada.

LOW HILLS.

Summit lake.

We cross this lake in a north-westerly direction about one and a half miles and leave it by a small crooked creek known as Snake creek, which passes through a grassy marsh. The creek is upwards of a mile long, but in a straight line it cannot be more than one-fourth of that distance from the last mentioned lake (or what we may call Summit lake) to a very irregular shaped lake called Island lake, from the large number of islands it contains. Through this lake we pass nearly due north about eight miles, passing numberless and beautiful islands, which are ever presenting new aspects of beauty and revealing views of the distant hills around the lake, which though not grand, are serenely beautiful.

SESSIONAL PAPER No. 143

FINE SCENERY.

Upper lake is very irregularly shaped ; islands are as numerous in Summer it as in Island lake, and the scenery is beautiful. These lakes will ^{resorts.} compare for beauty with any place I have ever seen, and I feel confident, were they easily accessible, they would soon become places of resort in the tourist season.

HUDSON BAY POST.

About two and a half miles from this lake, in a generally north-easterly direction, there is a cataract in the river and a portage of 40 yards to pass it. Here the stream narrows from 200 yards and upwards to less than a tenth of that, and falls through an opening resembling a gateway in a ridge of granitic rock, a height of about twelve feet. Below this the course of the river is nearly north for five miles ^{Abitibi.} to Lake Abitibi, and from the mouth of the river to the Hudson Bay Company's trading post on the lake is about two and three-quarter miles in a north-westerly direction.

The post is situated on a long, flat point projecting into the lake at its extreme east end. Formerly all the supplies for this post were brought from Moose up the Abitibi river, but for some years past they have been taken from Mattawa over the route I have just described, which considerably reduces the labour and expense of furnishing the post.

MOOSE RIVER.

From the mouth of Abitibi to Moose Factory, the Hudson Bay ^{Moose} Company's trading post, is about twenty miles. A history of this ^{Factory.} place would hardly serve any useful purpose in a report such as this, and I will only remark that the post has been in existence about two centuries, and has been for many years, and is now, the port of entry for the whole of James Bay district.

Here the company has several good buildings, a good garden and potato field. A meteorological record is kept by one of the company's officers for the meteorological service of the Dominion. The company also have a small portable sawmill here, made by ^{Sawmill.} Waterous, of Brantford, Ontario. This manufactures all the lumber required by the company here, and some for the other posts on the bay. Here also is the episcopal see of the Church Missionary Society's diocese of Moosence.

The ship which brings out the company's supplies for the district sails to within nine miles of the Factory once every year, arriving in the latter part of August, and departing as soon thereafter as she can

Shipping. be unloaded. This generally takes about three weeks, and is performed by two small schooners and a sloop the company keeps here. One of these afterwards distributes the supplies to the various posts around the bay. Further on I shall make some remarks on the navigability of the bay by large vessels.

MOOSE FACTORY.

Soil. Moose is situated on the east side of an island, the surface of which rises about twenty feet above high tide. The top soil is generally a mixture of silt and vegetable mould. The island is about half a mile in width and about two miles long. Owing to its position, the many islands in the river here, and the fact that the deep water is in the westerly channel, strangers would very likely pass on to the bay, without noticing the factory.

JAMES BAY DISTRIBUTING POST.

Rupert's House is situated on Rupert's river, less than a mile above where it expands into the bay. From it, all the trading outfits for the company's posts, around the waters of Nottawa, Rupert's, and East Main rivers are distributed.

CHARACTER OF THE SURFACE AND AGRICULTURAL CAPABILITIES.

Surface less
rocky.

From Mattawa to Fort Temiscaming the surface is all rocky and hilly, with a few slopes and flats of cultivable land interspersed on the hill sides and in the valleys. Above this point the surface is more level and less rocky. Around the head of lake Temiscaming and Quinze the greater part of the soil, as seen from the lake could be cultivated. At present there are quite a few farmers on both sides of lake Temiscaming who have come in from the earlier settled parts of Ontario and Quebec, and most of them declare themselves satisfied with their venture and state positively that they are not visited by summer frosts and that as good wheat can be grown there as in the settled parts of the provinces.

Farms.

On Quinze lake there are a couple of farms which are cultivated by lumber firms for the benefit of their shanties in the vicinity, on which are raised potatoes, hay and oats. They appear to be fairly successful with these crops, but as there are no grist mills anywhere in the vicinity no attempt is made to grow wheat in quantity. Along Barrier river, lake Barrier river, Lonely river and the southerly end of Long lake, the surface, though not level, is not rough, and the quality of the soil along the shore, as seen and evidenced by the growth of timber, is fairly good. The surface about the middle and upper end of Long lake

SESSIONAL PAPER No. 143

is rocky and hilly, and only a small portion of the soil is fit for cultivation. The surface around the water shed is generally hilly and rocky, but there are many parcels of fairly flat surface, and soil good enough for farming purposes.

Around Island and Upper lakes the above description applies, as it does pretty well to the country between them. Between Upper lake and lake Abitibi, and especially around the latter, the surface soil is generally good enough to admit of a large percentage of it being classed as fair farming land.

GARDEN AT ABITIBI.

The Hudson Bay Company have a garden attached to their post at Lake Abitibi, in which are grown all the potatoes and garden stuff used by the officers there. The potatoes compare well both in quality and size, with those grown in the country around Ottawa, yet the quality of the soil is not favourable to the development of that tuber, being a white clay, impervious to moisture, and very hard when dry. No attempt is made to grow grain here, as no use could be made of it, and whether the season would permit its full development is questionable.

As good as
around
Ottawa.

CLIMATIC CONDITIONS.

The ice becomes pretty thick on the lake, and remains on it rather late in the spring, as will be seen from the following extract from the company's journal at the post :—

1887 : Lake clear of ice May 6 ; planted potatoes May 21 ; took them up September 24 ; first sign of ice on the lake October 23 ; lake closed October 25.

1888 : Lake nearly clear of ice April 27 ; ice gone and navigation open May 15 ; planted potatoes June 5, harvested them October 1 ; thin ice on lake October 11 ; lake closed October 21.

1889 : Ice beginning to break up April 19 ; lake and river quite free May 6 ; commenced farming operations June 6 ; planted potatoes June 12 ; harvested potatoes September 23 ; first ice visible October 21 ; lake closed October 22.

1890 : Ice became unsafe April 23 ; navigation open May 15. Planted potatoes and sowed turnip seed June 14 ; harvested potatoes September 25 ; harvested turnips October 21 ; quality good.

SWAMPY TRACT.

The country all around this post is described as swampy, with many small lakes, so that very probably there is no part of it in which the

spring would be any earlier, and consequently this may be considered a fair test of the agricultural worth of this section. The potatoes and garden vegetables I saw there were of fair size and good quality; yet I would not advise anyone to seek a home there—at least for some time to come.

Vegetables.

SOIL AND PHYSICAL FEATURES.

Along the Abitibi river, the country, judging from what can be seen from the river, is not rough enough to interfere seriously with cultivation. The soil along the river is fair, but on the uplands it appears to be sandy, where ever I had occasion to inspect it there. The valley is not deep until we approach New Post, where we often see terraced hills rising upwards of 100 feet above the water. The soil on these hills is generally a sandy or gravelly loam. At New Post, the company have on the first terrace above the river, several garden patches, in which they grow what vegetables they require, and of very fair quality, the potatoes being good and of medium size. Of the other garden stuff grown there, not very much could be said that would be favourable. The uplands around here were described to me as swampy, with ponds interspersed and some sandy ridges; and this agrees pretty well with the appearance of Little Lake Portage route already described.

New post.

Swampy
uplands.

The officer at present in charge of the post has only been there a little over a year, and his experience is too short to warrant him in saying anything definite about the agricultural value of the district. He was good enough to permit me to make the following extracts from the journal kept at that place. The post has been in existence since 1867, and I went over the whole of the period since then, but going say twelve years back will give as good a general idea as a longer period, so I will begin with 1878.

Records.

EXTRACTS FROM HUDSON BAY COMPANY'S JOURNALS.

1878: River here clear of ice, April 20; first snow, October 18; river set, December 11.

1879: River clear of ice, May 2; first snow, October 18; river set, December 1.

1880: River clear, May 8; first snow, November 12; river set, November 22.

1881: River clear of ice, April 30; first snow, October 15; river set, December 5.

1882: River clear, May 11; first snow, October 30; river set, December 3.

SESSIONAL PAPER No. 143

1883 : River clear, May 12 ; first snow, November 1 ; river set, November 16.

1884 : River clear about May 1 ; first snow, October 18 ; river set December 7.

1885 : River clear, May 4 ; first snow, October 20 ; river set, November 24.

1886 : River clear, April 20 ; first snow, October 15 ; river set (not stated).

1887 : River clear, May 3 ; first snow, October 24 ; river set (not stated).

1888 : River clear, May 11 ; first snow, October 19 ; river set, November 20.

1889 : River clear, April 27 ; first snow, October 23 ; river set, November 10.

1890 : River clear May 9.

GARDEN AT MOOSE AND RUPERT'S HOUSE.

At Moose and Rupert's House, as at other posts I visited, the company have gardens in which all the potatoes required are grown. Garden stuff is also grown to a considerable extent, but such things as melons, tomatoes, cucumbers, &c., will not ripen even with considerable forcing. Last year the tomatoes at Moose got no nearer ripening than to colour slightly.

Currants, both black and red, are grown at both places, are good Small fruits. both in size and quality, and wild strawberries, raspberries and gooseberries are to be found all along the coast as far as East Main to my knowledge. But they ripen much later than in Ontario, the strawberries not being ripe last season until the latter end of August, and the gooseberries a week or two later. Blueberries are plentiful all along the coast, more especially in East Main.

INDIFFERENT SUCCESS.

It appears that attempts have been made at Moose to raise grain but with indifferent success. At East Main potatoes and some garden stuff are grown. The potatoes are fair both in quality and size, and other stuff, principally onions, being small. Pease were planted there Grain. in June and had just blossomed a few days before I left (3rd October). During my stay there was no frost, but a north or north-west wind so lowered the temperature that the thermometer ran down to 45° or 40° and of course during the continuance of that temperature vegetation is almost at a standstill, and there are altogether too many days of that kind.

Climate. If I am to accept my experience of last season as a fair criterion of summer weather on the bay, I should say, from my knowledge of the North-West Territories, that this region is, climatically speaking, only equal to places fully 10° further north in latitude in the North-West, and therefore we cannot look forward to any great agricultural development here.

CATTLE.

Sheep. At all the posts around the bay quite a number of cattle are kept, and all that I saw were of such size and appearance as would be creditable anywhere. East Main post is kept up exclusively for raising cattle, no trading being done there. Cattle and sheep are raised there and distributed to the other posts, either as beef and mutton or as milch and stock cattle. About fifty head of cattle are kept permanently there, and about the same number of sheep. The cattle are very fair in quality, the milch cows giving fair yield, and looking well, though the only pasture they had was on the open grassy spots along the coast.

GRASS.

Nourishing properties. The grass is coarse and rank, but is (if the appearance of these animals is any indication) as nourishing and fattening as the much finer grasses, of the more southerly parts of the country. The sheep, owing to a long term of inbreeding, have deteriorated into a small-bodied, large-headed, and heavy-horned animal, very different from the higher grades of sheep we are accustomed to see. They are quite wild and very active, and roam for many miles around the post, yet there has been no loss from beasts of prey, as far as known to the officer at present in charge of the post, who has been there since 1872.

HAY.

Meadows. The hay for the subsistence of the cattle at all the posts, is cut in meadows along the coast, most of which are submerged at high tide. The meadows from which the supplies for Moose are obtained, are about seven miles down the river. The hay is cut between tides, loaded into boats to the extent of five or six tons each boat, brought up to the post, and there cured and stacked.

At East Main the great part of the hay is cut on an extensive meadow four miles south of the post, and cured and stacked there, and brought in during the winter on ox-sleds. The stacks have to be erected on staging, to prevent their being flooded in very high tides. There are many meadows around the bay which could be utilized in

SESSIONAL PAPER No. 143

the same way, and doubtless there are many other places on the streams flowing into the bay which would serve the same purpose equally well. It is futile for any one to think of embarking in this enterprise at the present time, but the fact of its possibility is worth recording.

TIMBER RESOURCES.

It is needless to say anything of the timber resources of the Upper Ottawa, they being well known, but the country near the watershed we are not so familiar with. Here, there is much red and white pine with some fair spruce available, which will compare well in size and quality with a great deal that is now taken out. Timber on Barrier lake, Lonely river and Long lake and its affluent streams, can be directly floated into the Ottawa. That beyond the watershed around Island lake and its affluents, can, with very little trouble be floated into the waters of the Ottawa as follows. I have already mentioned that in high water the water from Summit lake flows both to the Ottawa and Abitibi. Now it appears to me that a few hundred dollars judiciously applied would make this exit to the Ottawa available for the passage of timber through it and down to Long lake. By deepening and straightening Snake creek, which could be easily done, and placing a tug (such as is now in Quinze lake) on Summit and Island lakes, all the timber around there could readily be placed at this exit, and thence easily brought to the Ottawa by the aid of a tug on Long lake, Lonely river and Lake Barrier. As we approach Lake Abitibi, the pine gradually thins out, until six miles below it on Abitibi river, the last white pine is seen and thenceforward we have only spruce, poplar and some birch and tamarack, of which only the first named is large enough to be of any commercial value and only a small percentage of that is large enough for lumber in the common acceptation of the term. On Moose river there are many spruce trees fifteen inches and upwards in diameter and some balsam and poplar, which could be utilized for many purposes. Very few trees were seen around James bay of large enough size for other use than fuel. In the vicinity of Rupert's House some building timber might be found but not much suitable for any other purposes, and the same remark applies to East Main and all the intervening country.

If the timber on all the other rivers flowing into the bay is no more important than that I saw on the Abitibi, I would hesitate as to the timber resources of that district valuable; for though it is all thickly wooded, only a small percentage of it (along the river at least) is large enough for merchantable lumber. Yet the time is coming when it will have to be resorted to, and when this time comes we shall find ample water power on the ground for the cheap manufacturing of all

the available lumber there, so that the consumer here or elsewhere will not be burdened with the cost of transport of the refuse part of it.

MINERALS.

Rock seldom seen. Very few rock exposures along Abitibi river. All the rock seen on the route from Lake Temiscaming to the foot of the Long portage below New Post was granitic. A noticeable fact in connection with the rock exposures along Abitibi river is that very seldom is rock seen in situ, except at the rapids and falls, and at nearly all such the course of the river is deflected at right angles to its general course, the rock ridges lying about north and south. The river might be called a succession of rapids and pools, there being very little current between the successive ridges.

NEW POST.

Sandstone. At the second rapid below New Post, the rock is a very soft friable sandstone of coarse texture and massive stratification. Just below this, on the east bank of the river, it is not so massive and is coloured red, and appears to be somewhat mixed with clay. In the next rapid the same kind of gray sandstone is exposed; and in the Long Rapids the rock exposed on the west side is a sandy shale, with, near the foot, a black clay shale, which would lead one to suppose from its appearance that lignite might be found not far off.

FURS.

It might be said fur is the only resource of the district around the bay, as with the exception of the feathers and down of wild fowls, the value of which is comparatively small, it is the only one utilized.

Fur-bearing animals. The pelts collected consist principally of beaver, marten, otter, lynx, fox, mink, black bear and a few wolf and white bear. The Hudson Bay Company practically collect all the furs in the district, as the very few collected by the traders who occasionally venture down to the bay are hardly worth mentioning. The total value of the trade, of course, varies with the good or bad conditions of the season, and what its total value was in any particular year I did not learn.

FISH.

Fish are not plentiful in the bay, nor are those I saw of good quality or size. Although many nets are set at Rupert's House and between there and East Main and also at the later point, I did not see a fish that would weigh more than three or four pounds. Pike, pickerel,

SESSIONAL PAPER No. 143

whitefish, trout and a small species of sucker are the only kinds I saw caught, with the exception of one very small sturgeon, at the mouth of Pontax creek.

PORPOISE.

The largest fish (using the word in the popular sense) which frequents the bay in any numbers is the white porpoise. It visits the southern part of the bay in June, immediately after the ice breaks up, but does not remain long, moving northward, or out into deep water in July. During my stay at East Main three of them came up the river past East Main. the post. Their milky-white colour makes a beautiful contrast with the dark water, and as they range from ten or twelve to eighteen feet or more in length, they are easily discernible when they rise to blow. Many years ago the Hudson Bay Company brought out the necessary appliances to extract the oil from their blubber and established works at Great Whale river, where the animals used to resort in great numbers; but the returns do not seem to have ever amounted to much and the project was very soon abandoned.

SEALS.

Seals frequent the south end of the bay, but apparently not in such numbers as to justify one in counting them as an asset to the credit of the district.

From all I could learn, and I made inquiries of all whom I thought likely to know of anything of the matter, it does not appear to me that the value of the fisheries (in James Bay at least) can be held out as an inducement for communication with the district. Of course, if Hudson Bay should prove valuable in this respect, the question of traversing James Bay southward to the terminus of a railway would not be a very serious one for a light draught vessel; but I heard nothing that would justify me in assuming that Hudson Bay was specially rich as a fishing ground, whatever a thorough examination might reveal. ^{Inquiries made.}

FOWL.

Myriads of wild fowl visit the bay in the spring and fall (principally ducks and geese), and great numbers of them are killed and salted in barrels for future use. ^{Ducks and geese.} It is said to be no uncommon thing for some of the natives and old residents of the country to kill as many as a hundred in a day; but I can assure the uninitiated that they might spend several days there and not kill one, and were they dependent on their guns for their living they would often be likely to go hungry

until they had learned much from the natives of the habits of the game.

It is reported that vast herds of caribou wander in the interior near the head waters of Ungava river.

LETTER FROM DR. R. BELL, OF THE GEOLOGICAL SURVEY DEPARTMENT, OTTAWA, DATED MARCH 7, 1887, ADDRESSED TO J. G. SCOTT, ESQ., QUEBEC.

Your favour of the 4th reached me this morning, and I beg to answer your questions seriatim, as follows:—

TERRITORY FIT FOR SETTLEMENT.

1. I consider portion of the territory southward of James bay is fit for settlement.

GOOD LAND.

Extent of good land.

2. My own explorations have not extended eastward of the basin of Moose river. In that basin a great deal of good land is found between the watershed of the great lakes and the commencement of the low level country to the southward of James bay. This would comprise about one-third the region between Lake Superior and James bay. The soil is mostly brownish, gravelly loam and light-coloured clay, with sand in some parts. In the coniferous forests, when the ground is level, the surface is apt to be covered with deep moss, but when this timber has been burned off and replaced with deciduous trees the ground is dry.

TEMPERATURE.

3. The summer and winter temperatures resemble those of the county of Rinouski. The summers not so hot, nor the winters so cold as at Winnipeg.

SNOW-FALL.

4. The average snow-fall is about three feet or a little more, still not quite so great as about the city of Quebec.

CROPS.

5. Potatoes and all other kinds of root crops have been found to do very well. Hay also grows luxuriantly, barley would, I think, be a

SESSIONAL PAPER No. 143

sure crop every year, and rye could also be grown with advantage. Barley is sown every year at Moose Factory and Rupert's House, and it has ripened well every year that I have visited these parts. Still it is said to fail some years. However, these places are much further north than the region I have indicated, and what is worse for them, they are near the sea, which is said to have an unfavourable influence in the autumn. Mr. John MacIntyre (now at Fort William) says he has ripened wheat at Missinabie and New Brunswick House, within the above area. I have had experiments tried at New Brunswick House and at Norfolk, on the Abitibi river, with a great variety of field and garden seeds, and the results proved that this region is capable of growing anything which can be raised, say in the county of Rimouski. I regard the region as well suited for stock raising and dairy farming, and it is not unlikely to prove fit for grain also.

SOIL.

The soil at Moose Factory is heavy and cold, still vegetables, &c., grow successfully here. Among the kinds may be mentioned potatoes, beans, pease, turnips, beets, carrots, cabbage, onions, &c. As showing the absence of summer frost at Moose Factory in 1887, I mention on page 27C of my report for that year that on our return to Moose Factory from the north in the end of September we found that there had been no frost there all summer and the most tender plants, such as beans, balsams, melons, cucumbers, tobacco, the castor oil bean, &c., growing in the open air, were quite green and flourishing. That summer was, however, probably a finer one than usual.

OBJECTION RAISED.

It has been objected to this statement by some Hudson's Bay Company's men that I should have mentioned that some of the above plants had been started in the house, but all I wanted to show was the absence of summer frost that year. These plants are generally started under glass in other parts of Canada as well.

PINE.

6. White and red pine grow in the southern part of the basin of Moose river, but the timber most abundant throughout the whole country, consists of white and black spruce, tamarack, white cedar (as far north as Moose Factory), white birch, aspen, rough-barked poplar, jackpine and bouleau. There is a little elm and black ash in the southern part, but it is not worth counting commercially. Some of the above woods are worth exporting.

MINERALS.

7. Minerals are to be found in this region. Nearly all the metals are to be looked for in the Huronian formation, a belt of which is believed to run all the way from near the Lake Abitibi to the south of Lake Mistassini, and this would be crossed by any railway from Quebec to James bay. Iron and gypsum are abundant to the north-west of Moose Factory.

Iron and
gypsum.

The shores of Hudson bay that would be tributary to the projected railway, afford a variety of useful minerals in paying quantities.

COAL.

Inferior
quality.

8. Coal cannot be said to be found in the region under consideration. I found lignite in various places on the Missinaibi and Moose rivers; also indications of it on the Mattagami and Albany rivers, but the quality was mostly inferior, and in a well wooded country like this would not be in demand for fuel. I also found anthracite on Long Island, on the east coast of Hudson bay, but I do not think the quantity likely to prove great, although the quality was first-class. As far as we are yet aware there is a chance, geologically speaking, of finding coal in the islands of James bay, but we have no evidence as yet of its actual existence there.

FISH.

Fisheries.

9. Among the fish found in James bay and Hudson bay may be mentioned a fine whitefish, lake trout of Lake Superior and some smaller species, sea trout, salmon, rock cod, caplin, &c., besides strictly fresh water fishes in the rivers and lakes, such as speckled trout, Back's grayling and pickerel, pike, &c. The oil producing animals, such as seals and porpoises, may be included under 'the fisheries.' The fisheries of the bay will probably be found to be valuable.

REPORT ON THE EXPLORATIONS ON THE CHURCHILL
AND NELSON RIVERS, AND AROUND GOD'S AND
ISLAND LAKES MADE IN 1879. BY DR. R. BELL.

(Report of Progress of the Geological Survey of Canada for 1878-1879.)

CLAY DEPOSITS.

On page 15, Dr. Bell writes:—

The Recluse lakes lie in the north-eastern part of the valley four miles wide, excavated in the great clay deposit which is everywhere

SESSIONAL PAPER No. 143

spread over this region. Along the north-west side the banks are from 100 to 150 feet high. On leaving the lakes a few rapids occur, but below these, the river, for a long distance, flows in a crooked channel of uniform breadth with a tolerably swift current, between banks of clay, varying from 20 to 150 feet in height, but averaging from 40 to 50 feet. The upper part of this deposit appears to be a modified clay, with occasional layers of gravel, and sometimes a ridge of gravel and sand above it; while the lower part is unstratified and filled with pebbles and some boulders. The latter comprise yellowish-gray magnesian limestone of Silurian age, gneiss and a great variety of rocks belonging to the unaltered and unfossilized series of the east coast of Hudson's bay which resemble the Nepigon group, and which have been described in my report for 1877. Boulders of these rocks are abundant around Was-kai-ow-a-ka lake, and they were also observed along the Nelson river. Limestone gravel became abundant a few miles below Was-kai-ow-a-ka lake.

Character of clay.

Boulders.

In approaching the great Churchill, the river for a number of miles is deep and smooth, and the clay banks have retired to a considerable distance on both sides. The water of this stream has a brownish tinge and forms a striking contrast with that of the great river into which it falls. The latter is bright and clear like the St. Lawrence water, and on August 3 it had a temperature of 62° Fahr. During the few days preceding this date, the temperature of the little Churchill averaged 63° Fahr. Just below the junction or forks the river is nearly a mile wide, and the land on the east side rises from 300 feet to 450 feet above its level. No rock appears in these high banks which are evidently composed of drift. Immediately above the forks the river is much narrower, and the clay banks on both sides rise to a height of about 150 feet.

Clear waters.

I ascended the Churchill for a distance of twenty-three miles (following the stream) from the mouth of the Little Churchill. In this distance it averaged about one-third of a mile in width and had high banks of clay on alternating sides. Numerous rapids were met with and the total rise in the above distance amounted to 173 feet, or at the rate of seven and a-half feet per mile.

High banks of clay.

TIMBER.

Spruce and tamarack timber are found growing near the sea coast in favourable condition as far as Seal River, beyond which their north-eastern limit curves inland. The spruce, although not growing as a continuous forest quite as far north as Fort Churchill, is still found of sufficient size in the neighbourhood of this post to be used for building houses and boats. The balsam poplar is rare and of small

Poplar rare at Churchill.

2-3 EDWARD VII., A. 1903

size at Fort Churchill. White birch, which is found on the main river, eighteen miles above the forks, is said to occur at about sixty or seventy miles west of the mouth of the river.

Along the direct overland route from Fort Churchill to York Factory the timber is reported to be generally small, and large prairie-like openings are said to occur, in which the ground is high and covered with grass and other herbage.

CROPS.

Garden. I saw very good potatoes and turnips growing in the garden at Fort Churchill. Previous to the advent of Mr. and Mrs. Spencer, the cultivation of potatoes was not attempted and the possibility of raising them, when suggested by Mr. and Mrs. Spencer, was ridiculed by the oldest inhabitants. However, in spite of predictions of certain failure, ground was prepared and seed planted, and a good crop harvested. The experiment has been repeated successfully for seven consecutive years, so that the question of the practicability of cultivating the potato on the shores of Hudson's Bay in this latitude has been pretty well solved.

CATTLE.

Grassy land. Hay can be cut in abundance in the neighbourhood of Fort Churchill, and cattle thrive well, yet the same ignorance or obstinacy as that above referred to, formerly prevented any attempt being made to breed stock on the spot, so that every fresh animal required had to be brought from some other post. Now, the small herd which is kept at the Fort is recruited by raising the animals calved at the fort itself. The open grassy land near the sea is practically of unlimited extent. Much of it is dry and undulating, affording abundance of pasture for the cattle. The butter made by Mrs. Spencer could hardly be excelled for quality and fineness of flavour in any country.

CLAY ESCARPMENTS.

Clay continuous to rapids. The high clay escarpments of the lower part of the river continue to the limestone rapids, where they still have an elevation of about a hundred feet, but they have diminished somewhat where the limestone disappears; and the bare banks skirting the river at the foot of a chute with a perpendicular pitch of twelve feet, sixteen miles above Third Limestone Rapid. Beyond this an occasional bank of clay is seen as far as Gull lake, but around this body of water and up to Split lake the country appears to be generally pretty level.

SESSIONAL PAPER No. 143

MR. HENRY O'SULLIVAN'S REPORT ON THE NOTTAWAY
RIVER BASIN FOR 1901.

In 1901 Mr. Henry O'Sullivan, Inspector of Surveys, D.L.S., &c., Quebec, issued his 'Second Report of Progress of Exploration in the country between Lake St. John and James Bay, including the region of Lake Mistassini and the basins of the great Nottaway and Rupert rivers together with a key-plan to accompany remarks on the different proposed railways between Quebec and James Bay, made under his directions, from the Department of Colonization and Mines, Quebec.

RAILWAY LINES.

This report contains sixty-nine pages of text and a map giving the approximate location of different railway lines from the City of Quebec to James Bay, Hannah Bay, where the Ontario and Quebec interprovincial boundary line meets the salt waters of the Bay.

This map indicates on a small scale the various lines of survey known to date and throughout the Province of Quebec.

Report of the River Nottaway from the discharge of Gull lake to its
mouth at tide water on James Bay.

ROUTE.

Starting from Gull lake, 660 feet above sea-level, the discharge draws off north-westward and sweeps round to west in a strong rapid, half a mile in length and giving a fall of six feet, and then it runs in a northerly direction one mile and a half amid rapids and expanses; then turns north-east where it falls off in racy rapids nearly a mile in length, giving a total fall of twenty feet since we left Gull lake; distance three and a half miles. Rapids.

CHARACTER OF COUNTRY.

The country on either side is level or gently sloping clay land timbered mostly with gray and black spruce, bouleau and poplar.

The country around here is level or gently rolling clay land and fairly well timbered with mixed spruce, poplar and bouleau, but south of the lake, hills from two to three hundred feet in elevation are seen not far off. Trees.

LAKE MATAGAMI.

Lake Matagami is a magnificent sheet of water; its extreme length from east to west is twenty-four miles, and from one to three miles wide, Beautiful islands.

excepting at its westerly end where it broadens out to about six miles in width, and encloses several beautiful islands.

Near its southwesterly end the broad majestic Mekiscan river, described in my report of May, 1895, comes in from the south.

MOUNTAIN RANGE.

Level land. South of the lake and east of the Mekiscan a range of mountains parallel to the lake rises from five to six hundred feet above its level; in every other direction the land is level or gently rolling and well timbered with spruce, fir, bouleau and poplar.

SOIL.

Rich clay loam. The soil is a rich brownish clay and outcroppings of Huronian rocks are seen here and there along the shore. On page 52 of his report he writes:—The soil is a good clayey loam and free from stones as far as we could see from occasional runs made inland.

The country on either side all along is level or gently rolling clay land, well timbered with black and gray spruce, bouleau, poplar, larch, with cypres here and there on the drier knolls.

SWAMPY TRACT.

Trees. The country around here is low and swampy and generally covered with black spruce and tamarack. There are no stones and the water is so muddy that even the fish can hardly see through it.

FISH.

Pike and doré. These waters are alive with fish; in going up and down the river the Indians killed several large pike and doré with their paddles; they did not appear to see us or move until touched by the canoe or paddles, and then they jumped clean out of the water as if trying to see what was the matter.

TIMBER.

Trees. The country on either side is level or gently rolling clay land, timbered chiefly with black spruce and tamarack.

Below the island the river rolls rapidly north-westward for five miles falling ten feet in the said distance and then flows placidly three miles on due westerly course.

At the end of the latter distance the whole river passes through a narrow gorge not a hundred yards in width. The fall here is ten feet,

SESSIONAL PAPER No. 143

but by damming the river over thirty feet head can be easily had, which would give over 160,000 available horse power.

DR. BELL QUOTED.

On page 57, Mr. O'Sullivan gives a chapter on the geology of the district traversed and adds notes by Dr. Bell, as follows :—The whole country is overlaid with Archean rocks ; these are divided into the Laurentian and the Huronian which constitute the base of the mineral-bearing rocks in Canada east of the Rocky mountains.

The largest Huronian belt so far known is the one which Dr. Bell has called the 'Great Belt.'

It runs continuously from the eastern side of Lake Superior all the way to the southern extremity of Grand Lake Mistassini.

One of the greatest expansions of this belt lies within the region under description.

If we draw a straight line due north for the northern extremity of Grand Lake Victoria, it will be found to pass over Huronian rocks for a distance of about a hundred miles to a point slightly beyond Lake Matagami.

MR. A. P. LOW QUOTED.

On page 58, Mr. A. P. Low writes :—The eastern extension of the Huronian belt carries copper at Lake Chibougamou and the granites of Lake Obatagoman may carry gold.

MR. A. P. LOW ON THE CLAY DEPOSITS OF THE HUDSON BAY BASIN.

Mr. A. P. Low's Report on the Labrador peninsula, issued by the Geological Survey of Canada: Annual Report, new series, Vol. VIII for 1895, pp. 308 and 309 L.

STATEMENT.

That explorer, writing on the extent of the marine clay deposits of the Hudson Bay Basin says :—

Wherever observations have been made on the coasts of the Labrador peninsula, deposits of marine clays have been found. The breadth of this margin of marine deposits depends upon the height of the country and the amount of subsidence during the period of their deposi-

James Bay. tion. Along the east side of James bay the slight elevation of the land along the coast and the gradual rise inland were favourable to the formation of a large area of marine deposits. As previously stated, continuously beds of clay, overlain by stratified sand, can be traced inland on the Rupert river for more than a 100 miles from its mouth. On the East Main river similar deposits extend for eighty miles, and on the Big river for more than forty miles, from where the line of exploration left the stream.

REPORT OF SURVEYS AND EXPLORATIONS OF 1902.
—RECONNAISSANCE SURVEYS OF FOUR RIVERS
SOUTH-WEST OF JAMES BAY, BY MR. W. J. WILSON.

Summary Report, Geological Survey Department, pp. 222 et seq.

INSTRUCTIONS.

Your instructions directed me to explore and survey the country lying between the Attawaposkat and Albany rivers, and also the country between the Albany and Moose rivers on the west coast of James bay.

Temiscaming to Moose. I left Ottawa on May 24, accompanied by Mr. Owen O'Sullivan of this office as assistant, and proceeded by the ordinary canoe route from Lake Temiscaming to Moose Factory.

SURVEY.

We made a micrometer survey of the Kapiskau river for 200 miles up. At this point the numerous short bends in the river made progress so slow that it was deemed advisable to stop micrometer work and separate into two parties. This we did July 21. I followed the main stream, making a track survey for about 80 miles, and I also explored some of the larger branches as far as I could ascend them with a canoe.

Coast. Having completed the examination of the two principal branches of the Kapiskau, we returned to the mouth of the Otadaonanis river, a large tributary which joins the main stream four miles from James bay. Mr. O'Sullivan making a track survey of the coast between the mouth of the Kapiskau and Fort Albany. Mr. O'Sullivan went up the Albany to the upper end of Big island where a large river, called by the Indians the Kwataboahagan, enters from the south. He explored

SESSIONAL PAPER No. 143

this river to its source. It forms part of a canoe-route between Moose Factory and Fort Albany, used by the Indians only at high water, but no one seemed to know whether it would be possible to go through at this season.

Returning from Fort Albany to Moose Factory, I made a track-survey of part of the coast. On the 16th August I reached the mouth of the Kwataboahegan river on the Moose side, and began a track-survey of it, which I continued for ninety miles up.

We then returned to the Abitibi river and continued the survey up that stream to the intersection of Niven's line, at the 179th mile post, connecting with my survey of last summer. This completes the instrumental survey from Moose Factory to Lake Temiscaming by way of the Abitibi river and lake, and the canoe route to Quinze lake. Completion of surveys.

THE KAPISKAU VALLEY.

The river has no distinct valley, but has cut its way into the thick clay covering that overlies the solid rock, or into the soft rock itself. The banks are generally low, rising from 5 to 20 feet, and usually the land along the river for four or five chains back is higher than that farther away. Low banks.

In speaking of a ridge close to the river, Mr. Wilson writes :—'This narrow ridge is well wooded where not burned, with large spruce, poplar, and at some distance from the coast, canoe-birch, fir, balsam of gilead and an occasional tamarack and cedar. The tamarack here has escaped the ravages of the larva of the imported larch sawfly, that has done so much damage to it farther south, so that where it does occur it is green and healthy. Trees.

CLAY, SANDS AND SHELLS.

For the first 125 miles the banks are composed of bouldery, clayey and stratified clay and sand containing marine shells. At this distance the first rock exposures appear. The rock is very soft, reddish-brown argillaceous limestone, mottled with greenish-gray spots, and some layers are wholly of the latter colour. In places layers of the two colours alternate. The beds as far as observed are horizontal. Character of strata. Near the surface where the rock is exposed to the weather it is broken up into small pieces, and when wet very readily changes into mud, but in digging down much larger and firmer masses are found. The rock, where first seen and for several miles up the river, is so soft that the river banks are worn down just the same as clay banks, and no cliffs are seen.

PHYSICAL FEATURES.

Low coast line. The most noticeable feature of the west coast of James bay is its extreme flatness. Looked at from a distance there is no distinct shore line, but the water and land seem to merge into each other. A strip varying in width from one to three miles and partly covered with grass and low shrubs extends along the coast from the Kapiskau to the Moose river, except for a few miles north and south of Cockispenny point, where the shore is fairly high and dry and the trees come to the water's edge. At this point one can land with canoes almost any time, but elsewhere the water is very shallow at low tide, bare mud flats extend out for miles. Gravelly ridges with numerous boulders are very common and form one of the serious obstacles to canoeing along the coast.

Dark limestone. At Cockispenny point I noted the reddish-brown and grayish limestone that has been already described as occurring on the Kapiskau. Farther south at Pisquochi large masses of a light gray and dark buff limestone were observed.

THE KWATABOAHEGAN RIVER.

This river enters the Moose river by two channels separated by a triangular island. The north channel is the larger, but has two bad rapids. The river is broad, shallow and rapid and flows over flat-lying, fossiliferous limestone for thirty-two miles.

CHARACTER OF THE COUNTRY.

Trees. The land along the whole course is low and swampy, and as on other rivers examined in this country, there is a dry ridge of a few chains width along the banks and then low swampy ground covered with small spruce and dead tamarack. The principal trees are spruce, the largest being from one to two feet in diameter and the average six to eight inches, tamarack mostly dead, poplar, balm of gilead, fir, and an occasional canoe-birch, and on the upper parts cedar is common. Willows and alders and other shrubs line the banks. Some of the spruces are tall and straight and would make good sawlogs or pulp wood, but trees of this kind are only seen close to the rivers. For the most part where the land is at all dry the trees are crowded together as closely as they can stand, and this tends to stunt the growth of all. Patches of second growth ten to twenty years old occur along the river, and there are areas of considerable size burned within one or two years.

PEAT BEDS.

Lignitified wood. Reference has already been made to thick beds of peaty material on the Kwataboahagan river and thin layers of the same kind on the

SESSIONAL PAPER No. 143

Kapiskau river. Similar thin layers of the same kind were also observed along the lower Abitibi river and also a thick stratum of lignified wood. The thin layers seem to be intercalated with stratified clay, while the larger masses are overlaid by a considerable thickness of bouldery clay, which forms the lower part of the surface deposits along the rivers.

TRACK SURVEYS CHECKED.

All the track surveys made were constantly checked by astronomical observations, and in the case of the Kwataboahagan river I was able to make a paced survey of much of the lower part by walking along the banks.

THE ABITIBI RIVER.

From the mouth to the Sextant rapid the Abitibi river is broad, rapid and shallow and studded with numerous islands, some of considerable size and great beauty.

The banks are high in places, reaching 30 or 40 feet, and are composed of clay, sand and gravel, and are well wooded with black and white spruce, poplar, fir, balsam of gilead, cedar and tamarack, with numerous shrubs. Above the Sextant rapid the river is narrower and deeper and has a fairly strong current. The banks are mostly clay, often high, and almost perpendicular, with hills rising behind to a height of 100 to 150 feet. Up to the Otter portage there is much swift water with some rapids.

At this portage the river contracts to about one-quarter its usual width, and for nearly two miles flows through a winding gorge with high rocky walls. Looking down from the portage it presents a wild and picturesque appearance. A large area around this point was over-run by fire in 1901 on both sides of the river. The Otter portage is 152 chains long. From this to the Long portage the river flows between well-wooded high banks and is about 15 chains wide. Numerous gravel terraces occur along this tract. From New Post up, the forest is second growth about fifteen years old.

In going up the river to the Frederick House branch two fair-sized streams are passed, Singed Marten creek and Driftwood creek. Just below the mouth of the Frederick House river a section of the main Abitibi was made, September 22, which showed that at this point it has a volume of approximately 401,000 cubic feet per minute. The width here is thirteen chains and the greatest depth seventeen feet, but the current is slow.

CLIMATE AND GAME.

Temperature. During the months of July and August while working on the Kapiskau and Kwataboahagan rivers the weather was usually fine with warm days and cool nights. The temperature in the early morning averaged about 50 degrees and in the middle of the day 70 to 80 degrees. Thunderstorms preceded by violent gales were rather frequent. Vegetation along the rivers were very rapid and luxuriant.

Animals. Game was not plentiful on the Kapiskau and Kwataboahagan rivers, the few Indians who were there living wholly on fish and rabbits. The only animals we saw in this district were two bears, three deers, a lynx and two otters, although the Indians hunt beaver, fox, marten, mink, muskrat and weasel. A few ruffled grouse and an occasional flock of ducks and geese were seen, and the tracks of one or two moose. The Indians report that this animal is steadily moving farther north.

FISH.

Pike, pickerel and whitefish are found in the rivers in limited quantity, and the last is caught in the bay along the coast. Sturgeon are caught in the Abitibi river, two of which I saw near Singed Marten creek.

EXTRACTS FROM A REPORT OF E. B. BORRON, ESQ.,
STIPENDIARY MAGISTRATE ON THAT PART OF THE
BASIN OF HUDSON'S BAY BELONGING TO THE PRO-
VINCE OF ONTARIO.

Addressed to the Hon. O. Mowat, Attorney General, Toronto, December 31, 1881.
—Printed by order of the Legislative Assembly, Toronto, 1882.

OBJECT OF EXPLORATIONS.

Object. In the explorations which I have made in this territory during the last two seasons, the main object has been to obtain reliable information as to the value and resources of the country. The narrative of this year's work which accompanies the present report records daily the principal events as they occurred, and the leading features of the country as they were presented to me. However tedious and uninteresting as it may be, I am persuaded that a perusal of the narrative will afford a better idea of the character of the country than can be obtained from any formal report it will be in my power to make.

SESSIONAL PAPER No. 143

DIVISIONS.

I may say, generally, that in all relating to the flat country border-^{Available}ing on James bay, my explorations of this year go to confirm the^{land.} statements made in last year's reports. The land in this flat country at all available for agricultural or pastoral purposes, may be comprised in three classes.

The first class consists of a belt from quarter of a mile to three or four miles in depth, on the shore of James bay extending unbroken, save by occasional points and reefs, from the eastern boundary of the province, as fixed by the arbitrators, to Albany river, the western boundary, a distance, following the line of the coast, of at least 150 miles. This belt is chiefly valuable for its fine pasture, and the great quantity of marsh hay that it is capable of affording. When this^{Hay.} part of the territory is opened up, no doubt considerable numbers of cattle may be raised here.

In the second class I include all the low lying bottoms, points and islands of alluvial soil, found at intervals on the rivers in the territory. This land is good, but generally more or less flooded in the spring. Few spots are so high as to be out of danger at that time should the ice become jammed and dam back the water—by no means an uncom-^{Ice jams.}mon occurrence. It would, however, make fine meadows for either hay or pasture, and such of it as would allow seed to^{be sown} be sown before the season was too far advanced would grow good crops of all the grains and roots that are suited to the climate. The area of this alluvial land must in the aggregate be very considerable, but it is so scattered that it is only rarely that enough can be found in one block to form a fair settlement.

The third class of land comprises a narrow strip extending along the margins of the river, sometimes only on one side, but more generally on each side. It is composed partly of the sloping banks leading up from the rivers, or river bottoms, to the level of the great plain above, and partly of the plain or plateau itself. The wheat soil on the sloping banks, and sometimes on the top of the bank, appears to be gravelly or even sandy. This is, I think, alluvial, and has been^{Sub-clay soil.} deposited by the rivers when the beds were more nearly on a level with the plain above. Be this as it may, the subsoil, if not the soil of this great plain, is almost entirely clay. Even at points where a good deal of sand was seen in the banks, the peat, at from half a mile to a mile back nearly always rested on clay. This clay contains a considerable percentage of lime and is really a marl. It may be doubtful if this clay would of itself constitute an easily worked or very fertile soil, but incorporated with sufficient thickness of vegetable mould or even of

Narrow belt. peat and peat ashes, a good, useful and lasting wheat soil would, I think, be obtained. The extreme narrowness of this strip, or belt—rarely exceeding half a mile and often not more than quarter of a mile—detracts much from its value. I am of opinion, however, that very extensive areas in the rear of this belt are frequently, but lightly, covered with peat of, say, from one to six feet in thickness. Now, the height of these plains above the rivers, varying from twenty to thirty to upwards of a hundred feet, is amply sufficient, taken along with its generally northerly slope of some three feet per mile, to admit of a complete and admirable system of artificial drainage being extensively carried out at very moderate cost.

PEAT.

Advantage. Thus drained sphagnum moss and peat would become sufficiently dry during the summer to burn, and if not the first year, by repeating the process would ultimately be completely destroyed; the ashes and a portion of the peat itself might finally with advantage be incorporated with the clay subsoil. It is quite within the range of possibility that many thousand square miles of this peat-covered territory may be reclaimed, and that with such beneficial results in respect of the climate that it is also possible luxuriant crops of wheat and other grain, may yet flourish on these vast plains, where at present nothing but sphagnum moss appears to thrive. I am of opinion, however, that save the general declivity towards James Bay, the surface of the underlying clay is level or nearly so, and that the increasing thickness of the peat as we go back is really due to a rise in the surface of the peat moss itself from the circumference or edge towards the centre.

Boundary of level country. While the obvious boundary of this flat or level clay country is James Bay on the north, that on the south is not determined with any approach to certainty. It has been supposed to extend southward to the Long portages on the Missinaibi and Mattagami branches of Moose river, distant respectively about one hundred and eighty-five miles from Moose Factory, and to be co-extensive or nearly so with the area occupied by the underlying Devonian strata.

LAURENTIAN ROCKS.

Outcrops. The Laurentian rocks are very conspicuous in the gorges and channels of the rivers at and above these portages. On the Mattagami river the water descends over these rocks with a fall of not less than four hundred and twenty-five feet in ten miles, according to the measurement of Dr. Bell, while the fall in the Missinabi branch is nearly three hundred feet in a like distance. One is tempted to imagine that this rocky range, so conspicuous on these routes extended both eastward

SESSIONAL PAPER No. 143

and westward of the rivers encircling as it were with a precipitous wall of rock, the level clay country, and forming a well marked and distinct southern boundary. But I doubt after all if such is really the case. Although this somewhat sudden rise in the underlying rock may circumscribe and limit the area occupied by the limestone and other Devonian strata, or even of the blue clay, yet I am satisfied that the drab and light coloured clays found above the blue clay, in the level country below, overspread a great part of the territory above and to the south of this barrier. My impression is, that the general surface of the plain commences to rise a considerable distance before the Long portages are approached, and excepting where cut through or denuded by the action of the rivers, this supposed rocky margin or rim has no visible existence, but is more or less deeply covered by the clays, sands and gravels of the so-called drift, or Glacial period. Drift covered.

SOURCE OF CLAY.

That a very large proportion of the clay and other loose materials found on this upper plateau must have come from the north and that it has been carried or transported in some mysterious way up hill, partly from the shores of the Hudson Bay, and partly from the lower plateau, admits almost of demonstration. Drift.

SECOND PLATEAU.

The territory included in what may be called the second plateau (although that below is really a plain) commences at the top of the somewhat sudden rise before referred to as taking place in the general surface of the plain, at or about the Long portages of the Abitibi, Mattagami and Missinabi rivers. This rise is not so marked on the Albany river; and while I am safe in placing the boundary not less than ten or fifteen miles above Martin's Falls, it may be considerably more. Nor is its southern limit—namely, where this plateau ends, and that known as the Height of Land begins—at all regular or well defined. So far as I have been able to form an opinion on the subject, I should place it on the east, about the lower end of Lake Abitibi and at or about the lower end of Lake Miminiska, on our western boundary. Limits of plateau.

Immediately between these "Green Hill Portages," on the Missinabi river, Flying Post, and the lower end of Lake Kenogamissac may be mentioned as situated, in my opinion, on or about the southern limits of this plateau. The height of this plateau above the level of the sea (or James Bay) ranges from six or seven hundred feet at its lower or northern edge to from eight hundred and fifty to one thousand feet at the upper or southern edge. Height.

No part of this zone or belt is underlaid, so far as I know, by Devonian limestone or any other rock of that formation. Where seen in place, the rock is exclusively Huronian and Laurentian. It is rarely found projecting or rising above the general surface, even in this plateau, and although often exposed to view both on the rivers and lakes, it is almost always in consequence of the denudation or removal of the overlying clay by the waters of such rivers and lakes.

DRIFT-COVERED REGION.

Character of
drift.

As Dr. Bell very justly remarks, the surface, even in the Height of Land, is almost always covered with loose material of some kind. On this second plateau, the loose material still consists of drab or light-coloured clays, overlaid occasionally by gravel or sand. In these clays, as already remarked, pieces of limestone from the Devonian strata to the north may almost always be found, decreasing, however, in size and number as we recede from James Bay and ascend toward the Height of Land. I am of opinion that careful analysis and microscopic examinations of the gravels, sands and clays found on or about the Height of Land would probably throw some light on their origin.

HILLY COUNTRY SCARCE.

Surface
character.

In the second plateau anything deserving of the name of mountains or hills are rarely met with. The rock in all probability had been pretty well planed down by the ice before the clays, sands and gravels were deposited, or at least allowed finally to rest on this plateau. Still, the inequalities in the underlying Huronian and Laurentian rocks are sufficient to impart, occasionally somewhat of the rolling or ridgy character to the surface. Denudation has been carried out more extensively by the rivers in this than in any lower plateau, and the alluvial or bottom lands are greater in proportion to the whole. Lakes too are occasionally met with in the southern part of this zone or belt which have originated, it seems to me, not so much in any deep natural depressions as the removal of the loose surface material by the rivers flowing through them, and of which these lakes are often mere expansions.

Muskegs.

While, however, there is in the aggregate a larger quantity of arable land such as may be seen at New Brunswick and at Flying Post, and a very much larger area still of land that would form fine pastures and meadows, I am, notwithstanding, strongly of the opinion that muskegs or peat mosses overspread by far the greater part of this belt or plateau also. This is more particularly the case as regards the lower or northern part.

SESSIONAL PAPER No. 143

THIRD PLATEAU.

Of the third plateau, or that which may be said to constitute the height of land, I shall say little. As we approach it from the north, the outline of the country becomes bolder and more rugged; the underlying Laurentian rocks appear more frequently above the surface, forming low ridges or dome-shaped knolls. Viewed from the north they rarely present the appearance of a mountain range, although broken ridges and isolated hills may be seen from two to three hundred feet in height. Only on the height of land, near the head waters of the Abitibi, have I ever seen what might be fairly entitled to be called mountains.

More rugged character.

SOIL.

Sometimes these are covered with a growth of alder, willow, tamarack or grass. Beaver meadows are not uncommon, and wild rice is now and again met with in some of these lakes. The soil on the ridges is generally sandy or gravelly—rarely clay, so far as my experience goes; although on the height of land portage, on the Abitibi route, clay is found at both ends of the portage. The soil generally light and sometimes stony, is usually dry and warm, and although a small proportion of it only may be suitable for grain growing, yet nearly all of it will afford more or less pasture. Peat mosses or muskegs are even to be found on and to the south of the height of land, but the area occupied by peat mosses is relatively small as compared with that which is covered with timber and grass.

Beavers meadows.

CLIMATE.

It is only from observations recorded at the Hudson Bay Company's Posts, from the statements of parties who either live or have lived in the country, and from our limited experience, that we can obtain any knowledge of the climate of the two latter divisions of this territory. As regards the crops which may or may not grow in the territory, much contradictory evidence has been given. Neither is the climate the same in all parts of the territory.

Contradictory evidence.

CROPS.

On suitable soil properly prepared, and with judiciously selected seed, I am of opinion that wheat, oats, barley, and possibly rye, may be grown with more or less success on the second belt or plateau. Barley can be grown on the lower and more northerly plain, even at Moose Factory and at Rupert's House, on the coast of James' Bay. Oats also

Wheat, oats, barley, &c.

Potatoes
successful.

and some of the harder varieties of wheat would, in favourable years also, probably come to maturity, where there was a shelter, and good exposure in the lower belt; for instance, at Old Brunswick, some twenty miles below the Long portage, on the Missinabi branch of Moose river and at New Post on the Abitibi. At Albany Factory, I doubt if even with the best kind of seed and the most careful preparation of the soil, any of the common grains would come to maturity. In exceptional years it is possible that barley might ripen; but in ordinary seasons I think it would not. I may be wrong, but judging from the frosty nights we had in the middle of August this year, I am inclined to think that summer frosts are more frequent and severe on the Albany river, than on the Moose, Abitibi, or even Rupert's river. Potatoes are successfully cultivated at all the Hudson Bay Company's posts, in that part of the territory in which we are specially interested, and turnips also grow well; but even potatoes did not seem to promise a good crop, either at Albany Factory or at Martin's Falls, 212 miles higher up the river. I may candidly state that I was greatly disappointed with the appearance of the country bordering on Albany river, and fear that neither in respect of soil or climate is that portion of it below the Kenogami branch of much value in an agricultural point of view. At Moose Factory potatoes were a poor crop last year, but looking very well this season, as were most of the other crops, both in the garden and the field. Cauliflowers of good size were ready to cut for the table on the last day of July, which is fully as early as I ever knew them to arrive at maturity on the upper lakes.

TEMPERATURES.

Height of
land.

Those who think that the weather is always raw and cold on the coast of James Bay, may be surprised to learn that a few days before my arrival at Moose Factory, the thermometer recorded nearly 92° of heat in the shade. As this is one of the stations for taking meteorological observations, both the instrument and the reading was doubtless correct. At Albany, I was assured by Mr. Broughton that it was 91° in the shade. As regards the climate in the Height of Land, there is, I am persuaded, also a good deal of misconception. Unfortunately, although there are several on the coast of James Bay and one at Martin's Falls, there are no meteorological stations, so far as I know, on or near the Height of Land between the Great Lakes or even the Ottawa Valley and Hudson's Bay, so that it is difficult to obtain reliable information on the subject. I will give, however, a few facts which have come under my own notice this season, calculated to throw a little light on this point. Matawagamingue Post, where I arrived on the 15th of July, is situated, according to the observation of Mr. Austin, C.E. about latitude 47° 53', and longitude 81° 20'. It

Observat-
ions.

SESSIONAL PAPER No. 143

is, according to Dr. Bell, not less than 1,200 feet above the level of the sea, and may be fairly assumed to be on the northern part of the plateau forming the Height of Land. At that date potatoes of a variety called by Mr. Rae 'the blue potato', were just coming into blossom and promised to be a good crop. This is, I think, nearly two weeks earlier than they usually blossom at Moose Factory. Kidney beans were good, and promised an early crop. A plot of Swedish turnips was also very forward and looking well. Even pumpkins had every appearance of attaining maturity.

MINERAL RESOURCES.

Regarding his own observations as to minerals, he writes :—

'Nor am I able to add greatly to our previous knowledge in respect of the beds of lignite coal, peat, gypsum, iron ore and china clay which are known to exist, and believed to abound in this territory. As regards the lignite or coal I may simply say that we did not observe it in situ anywhere, either on the Mattagami or Albany ; but float or loose pieces were met with on both these rivers. As regards peat it abounds everywhere, even on the Height of Land, and while it detracts greatly from the value of the country from an agricultural point of view, burying, as it has done, millions of acres of fertile soil which might otherwise have been easily reclaimed and cultivated, I am notwithstanding, still firmly of opinion that this inexhaustible supply of fuel will at no distant day be turned to account, and prove of inestimable value to the people of Canada, and more particularly of our own province. I stated in my report last year that I believed that not less than 10,000 square miles of territory claimed by Ontario north of the Height of Land, was overlaid by beds of peat. I am persuaded that the area will eventually be found greatly to exceed that estimate. But assuming it to be no more than 10,000 square miles, and the average thickness of the peat to be only about eight feet, and we have there a quantity of fuel equal in heat giving power to not less than 5,000,000,000 tons of bituminous coal.

Iron, gypsum
and lignite.

Peat.

Thickness of
deposit.

IRON.

I saw and examined the deposit of brown hematite and spathic ore at the Grand Rapid on the Mattagami river. This has been previously visited and described by Dr. Bell, and a specimen brought back by him was assayed by Mr. Hoffmann of the Geological Survey and reported to contain upwards of fifty-two per cent of metallic iron. I found this iron ore, as it seemed to me in the form of lenticular masses or beds interposed between the limestone strata of the Devonian rocks, which appear in place here for the first time as we

Large body
of ore.

descend the river. I have no doubt that there is a very large body of ore and that it could be obtained with very little labour. It is true that at present it may not be of any economic value; but in estimating the importance of the various resources of this territory, not only their present but probable future value should be taken into consideration, and such an estimate, based, as it is entitled to be based, on the assumption that the country will sooner or later be opened up and developed by railways, leads me to think, that associated as this iron ore is with all that is necessary for its reduction namely, limestone, peat and lignite, it can hardly fail to prove valuable when that time arrives.

GYPSUM.

Deposits on
coast.

The gypsum beds situated below the junction of the Mattagami and Missinabi rivers have been already described in former reports. I found pieces of gypsum on the coast about half way between Moose Factory and Albany, and was informed by one of my Indians from that part of the country that it could be seen in place at the bottom of a bay not far off when the tide was out. I did not revisit the locality where the kaolin or China clay was found last year, and have therefore nothing further to add to my former report in reference to it.

ROCK EXPOSURES FEW.

Proportion
of rock.

Probably in no part of Canada is there a smaller proportion of rock exposed at the surface than in the low belt of country south of James Bay, and very few parts with so little bare rock as the second plateau or belt. In the third plateau, or that which constitutes the Height of Land, the proportion of rock is greater, and here the possibilities of finding the metallic ores associated with or contained in the Laurentian or Huronian rocks, may be about as good as they are on the north shore of Lake Huron. I can only say that in hurrying across this height of land (as I was obliged to do) I did not happen to see any. I heard reports however, (originating with the Indians) that some such ores may be found in the vicinity of Lac Seul, and I do not think it by any means improbable.

TIMBER.

In what has been called 'the level clay country', which embraces all of the first plain or plateau and most of the second, the forest is restricted in a great measure to the narrow belt of good soil reported as extending along the margin of the rivers and streams, and to the banks of the lakes. The alluvial bottoms on the rivers and islands, both in the rivers and lakes are generally well clothed with timber.

SESSIONAL PAPER No. 143

This timber consists of spruce, aspen, poplar, tamarack and white birch chiefly. Of these, the spruce is the most valuable, being that which is fittest for sawing into boards or scantling, and employed for these purposes at all the Hudson Bay Company's posts on James Bay under the name of 'fir'. The largest trees are about seven feet in circumference, but in clearness and freedom from knots, etc., it compares unfavorably with our white or red pine. It is, and always will be of great importance and value to the inhabitants of the territory, and although offering no inducements to the lumberman at present may take its place in the market when the country is opened up, and other woods become scarce and dear. On the upper or southern margin of the second plateau, and also on that which constitutes the Height of Land itself, there has at one time been a large quantity of both red and white pine. At and near Flying Post I saw fine pine of both varieties, as also good spruce and tamarack. I measured some of the larger trees and found them to be as follows, about three feet from the ground: white pine eight feet; red pine seven feet; spruce six feet; and tamarack six feet in circumference. I was informed by Mr. Thomas Moore, the officer in charge of that post, that some sugar maple and black birch trees might be seen growing a few miles from the post, and that he had noticed and measured a white pine that was two fathoms, or twelve feet, in circumference.

Trees seven feet in circumference.

Spruce and tamarack.

On my subsequent trip from Flying Post to Matawagamingue I saw a few white pine trees (survivors of the ancient forest) two of which measured ten and eleven feet respectively in circumference. The amount of pine left by the fires in the neighbourhood of Flying Post I was unable to ascertain, but am satisfied that the quantity is greater and quality better than anywhere else that I have yet seen on the north side of the Height of Land. But whatever it may be, it bears a very small proportion to the forests of pine which have been temporarily at least, destroyed by fire.

Other measurements.

POPLAR AND TAMARACK.

The quantity of aspen poplar in this territory is very great, and may in view of the employment of the pulp of this wood for the manufacture of paper become extremely valuable. The tamarack too though much less in quantity (unless we include the diminutive ones found in the muskegs), will also be of some value whenever the country is opened up. Tamarack of the size suitable for telegraph poles is very common and more rarely such as would make railroad ties were met with. The largest trees of this kind rarely exceeded six feet in circumference.

Pulpwood.

Rocky
ground.

The other woods are of such a nature or are found in such limited quantities or so scattered as to be of no apparent value, with the exception of the white cedar and the white birch, more or less of both of which are found from the Height of Land to within a few miles of James bay and both are of the greatest value to the natives, as affording them the best possible materials whereof to build their canoes. There is a variety of pine found very generally on poor sandy or rocky ground all over the territory, more particularly in the upper or southern portion. It rarely attains a large size, has a scabby, rough bark, few branches, and those near the top, it yields a good deal of resinous gum and the wood is yellowish and used for nothing that I know of except fuel, for which it answers tolerably well when dry. I have called it in my narrative sometimes pitch-pine and at others rough-barked pine.

BUSH FIRES.

Not an
unmitigated
evil.

The bush fires which have passed over the greater portion of the territory on and beyond the Height of Land within the last twenty or thirty years cannot fail to attract the notice and attention of every traveller—indeed so recent have they often been that the bush or young forest has rarely had anything like the time necessary to attain full growth. Bush fires, looked at broadly, as one of the forces or phenomena of nature, rather than in the light of mere accidental occurrences are, when confined to a wild and uncultivated region, by no means the unmitigated evil they are generally supposed to be. I am quite convinced from what I have seen that, were it not for bush fires there would have been neither grass nor bush, nor trees on millions of acres of land in Canada, which from time immemorial have grown all in turn. The Sphagnum moss, so general in the north, and there only kept in check by fire, would in this climate and country also have gained possession of the soil had it not been for bush fires. Nor would the North-west have fared a bit better, but have been in all probability overrun with muskegs or peat bogs. The Indians knew more than we gave them credit for, when they annually set fire to large tracts of their prairie lands; and it remains to be seen if, when these fires are forbidden or prevented, the muskegs will not spread rapidly over the unoccupied land. I think there can hardly be a doubt that our best timber lands, and those that at this moment support the finest and most valuable growth of pine, have been completely swept by fire, not once but many times in the history of this continent; and the fact that they now bear such timber is a sufficient proof that time is all that is really necessary in order to bring about the perfect restoration of both soil and timber, however apparently destructive such fires may have been. It is when civilized men, able to cultivate the soil and

SESSIONAL PAPER No. 143

utilize the timber and other products, have either entered into possession, or are likely to do so at no very distant day, that bush fires are really a serious public loss or calamity.

REFORESTATION.

It appears to me that in view of the thousands of square miles of territory belonging to the province, capable of growing the finest pine, but which has either been destroyed by fire or cut and removed by the lumberman, it would be desirable to know something of the natural laws in accordance with which, unaided even by us, this wide domain will again be clothed with groves of pine as good, if not better, than those that have been destroyed or removed.

For although the time for planting young trees may not as yet have arrived, it may well be that in view of the rapid exhaustion of their timber limits, that the time has really come when it may be only prudent to nurse and protect the young pine trees which the hand of nature has planted and which are springing up by thousands in many places. The lands of this description, which are contiguous to leading lines of railways and navigable rivers, are specially deserving of this care and attention on the part of the government, and would, I believe, handsomely repay all the expense that might be required to do so.

Preserving
young pine
trees.

OPENING UP AND SETTLEMENT OF THE COUNTRY.

In my judgment, notwithstanding the difficulty of getting in supplies and materials in order to the construction, the railway can be built for little more than one half the money north of the Height of Land that would be necessary to make a line with equally good grades along the north shore of Lake Superior.

Thus opened up, Ontario will have back country extending from her settlements on Lakes Huron and Superior far over the Height of Land, and presenting a field in some respects as inviting to many of her sons as the more distant North-west. The soil may not be nearly so rich or so easily reclaimed, but it possesses many important advantages, compensating in some measure, if not entirely, for that one disadvantage.

Advantages.

CHAPTER XV.

SUMMARY OF NOTES AND CONCLUSIONS.

Height of Land Crossings :—Divide—Nine Crossings enumerated. Geological Survey Map: 1842-1882 :—Huronian Mineral-bearing Belts :—Eastern Belt—Second Belt—Third Belt—Western Belt. Meteorological Observations :—Average Summer Temperature between Quebec and Port Simpson. Moose River Basin by Dr. Bell :—Surveys—Map—Mineral-bearing rocks. Report of Royal Commission, Ontario, 1890 :—Minerals. Altitudes :—Trees found within railway belt. Surveys and explorations for past sixty years :—Geological Surveys—Other Surveys—Reports published—Capabilities—Timber Limits—Ontario reports farming operations—Altitudes.—Hudson Bay Basin—Flora—Mineral Occurrences—Quebec End—North-western Quebec—Mr. Gillies's Statement regarding crops at Fort George—Obstacles few—Laurentide—Axis. Fleming's C.P.R. Surveys for 1877 :—Resources.

Height of Land Crossings.

DIVIDE.

The line marking the Height of Land or 'divide' between the waters which flow into the St. Lawrence river basin and those flowing into the Hudson bay basin crosses the proposed line of the National Transcontinental Railway as projected at the following points :—

NINE CROSSINGS ENUMERATED.

First Crossing.—In Division III or Upper Gatineau Division just south of Lake Matchi Manitou.

Second Crossing.—Takes place a little south-west of Lake Kiemawisk in Division IV or Upper Ottawa Division.

Third Crossing.—About 45 miles west of the second crossing in Division IV (Upper Ottawa river), about 20 miles east of the inter-provincial boundary line between Quebec and Ontario, a little north-east of Lake Mattawa Gosik. The Height of Land then trends in a south-westerly direction for some 200 miles and crosses the Canadian Pacific Railway track between Ramsay and Ridout stations a little east of Chapleau station via way of Fort Mattagami.

Location of
crossings.

SESSIONAL PAPER No. 143

The Canadian Pacific Railway track runs along and close to the Height of Land in the rough country north of Lake Superior as far west as Amyot station, and thence takes an almost due northerly direction along the 85th meridian and crosses the projected line of the Grand Trunk Pacific five times in a distance of 125 miles in the Long Lake district.

Fourth Crossing.—Takes place at a point about 20 miles from the western end of Division VII, Mamattawan Division.

Fifth Crossing.—Takes place just at the junction of Divisions VII and VIII, Mamattawan and Long Lake Divisions.

Sixth Crossing along the projected railway line takes place in Division VIII (Long Lake Division), about 18 miles south-east by east of the Hudson Bay Company's post at the northern extremity of Long lake.

Seventh Crossing is about five miles south of the Hudson Bay post just mentioned and occurs in the centre of the VIIIth or Long Lake Division.

Eighth Crossing.—Occurs at the western extremity of the VIIIth or Long Lake Division, about 15 miles west of Big lake.

The projected railway line and the Height of Land then nearly coincide with each other throughout Division IX or Lake Nepigon Division.

Ninth Crossing.—Takes place on the 89th Meridian at a point about twenty (20) miles east of the extreme westerly portion of the Nepigon Division, and about twenty miles south of the White Water lake.

The Height of Land thence takes a sudden south and south-westerly trend towards Lake Superior, where it is crossed by the Canadian Pacific Railway track at Savanne Station.

Geological Survey Map, 1842-1882, issued in 1884, Ottawa, by Order of Parliament.

HURONIAN MINERAL-BEARING BELTS.

In the map of the Dominion of Canada, geologically coloured from surveys made by the geological corps, 1842 to 1882 (30 miles to the inch), the topographical as well as geological features of the whole country are delineated. This map indicates the position of the different belts of the Huronian mineral-bearing rocks, known to date, four of which would necessarily be crossed by the line of the National Transcontinental railway along the route from Quebec to Winnipeg.

Position
of belts.

EASTERN BELT.

The more easterly of these belts—the *Great Belt*—will be traversed for more than one hundred miles in its trend from the north channel of Lake Huron towards Lakes Abitibi and Mistassini.

SECOND BELT.

The next belt to the west, begins in Minnesota and is traceable from the south-easterly shores of lake Nepigon in a north-east by east direction to the area of flat-lying evenly-bedded limestones of the Albany river basin.

THIRD BELT.

The third belt is almost parallel to the last mentioned, and lies to the north and north-east of Lake Nepigon.

WESTERN BELT.

The most westerly belt is that which crosses the C.P.R. track at Wabigoon, having a breadth of nearly twenty-five miles, and strikes to the north-east in line with the Gloucester House area of similar rocks near Martin's Falls on the Albany.

Fleming's C. P. R. Surveys.

RESOURCES.

Woodland
region.

In Fleming's Canadian Pacific Railway Report for 1877, the operations in the woodland regions for the years 1871 to 1876 have revealed numerous important notes bearing on the topography, river courses, timber, soil, &c., which are of untold value in connection with the present proposed railway route. The exploration to James Bay during the summer and autumn of 1871 as well as that of the Upper Ottawa to its most northern source and of the country along the Moose and Abitibi rivers flowing into the Hudson Bay basin, together with the exploratory surveys made in 1872 along the line north of Lake Nepigon have shown that neither the work nor the gradients were exceptionally heavy for the construction of a railway. In 1873 explorations were made on Lake Nipissing and extended in a north-westerly direction through the lake, through the interior, to the east branch of Moose river, which flows to the north, and ultimately discharges into James Bay.

Meteorological Observations.

AVERAGE SUMMER TEMPERATURE.

Average summer temperature at all the principal points between Quebec and Fort Simpson (from returns kindly furnished by Mr. R. F. Stupart, Director of Meteorological Service at Toronto) :—

	In 1895.
Moose Factory, James Bay.....	61°
Quebec.....	63°
Rimouski.....	55°
Chicoutimi.....	60°
Winnipeg.....	62°
Norway House.....	59°
Oonikup.....	60°
Edmonton.....	60°
Athabasca Landing.....	55°
Dunvegan.....	57°
Port Simpson.....	55°

Report on Moose River Basin, with Map, by Dr. R. Bell, 1883.

SURVEYS.

The report of the Geology of the basin of the Moose River and adjacent country by Dr. R. Bell issued in the Report of Progress of the Geological Survey of Canada for 1880-81-82, contains not only the results of the surveys and explorations made by him in 1881, but also those of 1870, 1875, 1876 and 1877. Together with the results of a geological exploration of the Upper Ottawa and Lake Abitibi region made by the late Walter McQuat of the Geological Survey in 1872.

MAP.

These results are embodied in a coloured map showing the topographical and geological features as known to date.

MINERAL-BEARING ROCKS.

The areas of Huronian rocks which are those which carry the nickel, gold, silver, copper, and other economic minerals are delineated on the map in question so far as the surveys allowed. A large proportion of the area covered by the map is coloured Huronian.

Report of the Royal Commission on the Minerals of Ontario for 1890.

MINERAL OCCURRENCES.

Copper ore. In the report of the Royal Commission on the Mineral Resources of Ontario and measures for their development, presented by order of the Legislative Assembly, Toronto, 1890, reference to the occurrence of iron and copper on Abitibi lake, is given, pp. 23 and 24 respectively, also of the mineral resources of various districts comprised within the Railway Belt in question.

Altitudes.

White's 'Altitudes in Canada.' For altitudes of lakes, rivers and various locations along the proposed line of the Grand Trunk Pacific, see Mr. J. White's recent work entitled: 'Altitudes in Canada,' issued by the Geological Survey of Canada as publication number 745, 1901, pp. 209, 210, 211, 212, 213, 214, 215, 227, 169, 170, 171, 172, 173, 175.

For projected or trial lines and branches of Canadian Pacific Railway, see also, pp. 47-69, including the following:—

- (1).—Lake Manitoba to Lake Nipissing, p. 69.
- (2).—Lake Manitoba to Mattawa, p. 68.
- (3).—Lake Windigoostigwan to Manitou Lake, p. 54.
- (4).—Lake Nepigon to the Height of Land, p. 51.
- (5).—Nepigon River to Long Lake, p. 50.

Trees found along the Line of the National Transcontinental Railway.

Tree-map. In his map showing the limits of various trees in Canada, published by the Scottish Geographical Magazine for 1897, Dr. Bell gives in a graphic form, the areas and districts covered, including the route of the proposed railway from Quebec to Winnipeg, and north-west of this point. From this map it may be seen that the following trees occur within the belt in question:—White cedar, white pine, red pine, mountain maple, black ash, yellow birch, (eastern section), white elm, whilst sugar maple, red oak, ironwood, basswood, hemlock, burr oak, balsam, poplar, banksian pine, black and white spruce, American larch, canoe birch, balsam fir, rowan tree, and aspen poplar abound, and the majority of these find their boreal limit several hundred miles north of the proposed line of the railway.

SESSIONAL PAPER No. 143

**Surveys and Explorations along the line of the Grand Trunk Pacific,
and some of the conclusions derived therefrom.**

GEOLOGICAL SURVEYS.

For the last sixty years the Geological Survey of Canada has been gathering information from all parts of the country, from Atlantic to Pacific, and from the International boundary line northward. In describing the geology of any district surveyed and explored, it is the special function of geologists to describe the '*character of the country, its soil, mineral resources, timber*, as well as its *climatic* and other meteorological characteristics. Geological reports therefore, published by Order of Parliament since 1843, include descriptions of the country in all the particulars just mentioned. Work of survey.

The country to be traversed by the Grand Trunk Pacific Railway from Quebec to Winnipeg has been crossed and recrossed again by surveyors and explorers and constitutes a region or basin of great possibilities.

The reports of Sir Wm. Logan, of Alex. Murray, or Jas. Richardson, Walter McQuat, R. Bell, L. R. Ord, A. E. Barlow, A. P. Low and others of the Geological Survey staff furnish us with abundant material from which to describe much of the country both north and south of the proposed line of the Grand Trunk Pacific. Explorers.

The careful and accurate manner in which the results of the geological surveys and explorations have to be described when made public leave little or no room whatever for speculation or doubt. The concrete and hard facts with which that Department of the Government service deals, as exhibited in the numerous and extensive collections from all parts of Canada in the Museum, including the Grand Trunk Pacific belt, constitute evidence which may be consulted at any time regarding the exactness and accuracy of the reports. Specimens in museum.

OTHER SURVEYS.

Besides the reports of surveys and explorations carried on by the Geological Survey of Canada, there are also available for reference those numerous reports of surveys and explorations carried on by the Crown Lands Department of Ontario and Quebec within the area from Quebec to Winnipeg. Thus we have reports by Messrs. Bouchette, Bignell, O'Sullivan, Symmes, Sullivan, Russell, Wagner, and many others; besides these again special reports of surveys and explorations on both sides of the height of land have been prepared from time to time under special instructions from the Hon. Minister of the Interior. Crown Lands Departments.

These have afforded us a mine or treasury of information in the descriptions given as to the nature of the country traversed, its capabilities for settlement, its water powers, numerous streams, fisheries, timber and other resources.

REPORTS PUBLISHED.

St. Maurice and Ottawa. Special reports dealing with special districts have also been published under the authority of the Imperial Parliament. The reports of the Commissioners appointed to explore the country between the St. Maurice and the Ottawa in the year 1830 contain a vast deal of information. The Commissioners were appointed under the Act, 9th George IV., chap. 29, to explore that part of the province which lies between the Rivers St. Maurice and Ottawa.

CAPABILITIES.

Flora. The construction of the National Transcontinental Railway, crossing the cereal-growing district south of Hudson Bay, between the great lakes and the foot of James Bay, will open up for settlement a generally level tract of country, not only well timbered and well watered, but also producing a dense growth of plants which predicates capabilities of an agricultural nature, dairy, farm and stock-raising products, which can support a mixed population, including agriculturists, manufacturers, lumber merchants and all those varied classes of a community dependent on such natural resources as are found within that basin.

Area fit for agriculture. It is estimated that the marine sediments of the Hudson Bay basin, consisting of clay loam, sandy clays and various other soils and surface deposits, fit for agriculture, is at least twice the area covered by the agricultural lands in Ontario between Ottawa and Lake St. Clair.

TIMBER LIMITS.

Laurentide Hills. The Laurentide Hills which will ever be a source of immense revenue to the country, not only from their valuable timber limits and capabilities for producing more when re-forestation on a large scale is established in this country, but also from their untold mineral resources, forming a comparatively narrow belt of rugged hills, separate two distinct agricultural basins the larger of which lies to the north.

Settlement. The new railroad will widen the eastern belt of habitable land, and as soon as the country realizes the immense wealth which is lying dormant in the great undeveloped basin south of James Bay, where practically all the cereals can be raised successfully which are now raised in the provinces of Quebec and Ontario, so soon will its people

SESSIONAL PAPER No. 143

seize it and inhabit the same. The instant the railway is built, so soon will population crystallize itself along that axis, and inasmuch as the country north and south of the railway, is fit for agriculture and considerable lumbering, its products will supply abundant material for shipment. There is no doubt that the character of the country, soil, climate, mineral resources and general conditions are such as to warrant its settlement.

When we consider that at Fort George (some two hundred and thirty miles north of the foot of James Bay) it has been ascertained after eighteen years experience every crop that grows in Scotland can be grown there, one can realize the great possibilities of the vast and beautiful basin to the south.

ONTARIO REPORTS.

From an examination made of the results obtained by the various officers of the Geological Survey staff since 1843 and a comparison with the results obtained by the various parties sent out by the order of the Ontario Government to investigate northern Ontario, it must be admitted that evidence of a corroborative nature has been obtained, to check the accuracy and reliability of the reports at hand.

There is no fiction regarding the occurrence of clay lands and deposits in a generally flat and level country to the north of the Laurentian axis. For upwards of forty years these clay deposits have been known, and when it is stated that these same clay deposits vary in depth from a few inches and many feet to upwards of one hundred and fifty feet, covering thousands of square miles of territory, such statement is based upon the results of explorations and surveys extending over wide areas.

FARMING OPERATIONS.

The various farms of the different lumber companies carrying on business along the headwaters of the various streams which flow into the St. Lawrence and Ottawa rivers, as well as the gardens and farms scattered throughout the hydrographic basin of Hudson Bay, at the Hudson Bay posts (such as at Abitibi, Brunswick House, Frederick House, Mamattawan, Mattagami, &c.) form excellent criteria from which one can easily ascertain the possibilities of the whole region from an agricultural standpoint, leaving no doubt whatever that the basin can support a vast population.

Altitudes.

From a careful study of the altitudes comprised in the Quebec to Winnipeg region and south as well as north, it can be readily seen and

Ontario Re-
ports
corroborate.

Geological
Survey results

Good criteria.

Laurentide
Hills.

affirmed that the boldest expression of the Laurentide Hills occurs along the southern border of their line of outcrop. All along the St. Lawrence and Ottawa river valleys, these Laurentide Hills present a bold and scarped front, whilst the results of observation in the country to the north have revealed the fact that the hilly character of the country soon passes away, that only occasional hills and narrow ridges are seen to crop out here and there in the generally flat and level country where the sediments of the Hudson Bay basin have filled in the old valleys and covered the country with a mantle of drift materials supporting a luxuriant growth of plant life constituting soil fit for agricultural purposes.

Hudson Bay Basin.

Basins.
compared.

Whereas the country drained by the streams flowing south into Lakes Superior and Huron constitute a narrow and rocky hydrographic basin, for the most part, fit for cultivation and agriculture only in limited areas, the central portion of the hydrographic basin of Hudson Bay, north of the Great Lakes is covered with soil consisting of clay and sand, in which vegetable mould forms a large percentage, thus rendering the land most desirable for the cultivation of crops when ordinary drainage is effected.

Flora.

The evidence afforded by the flora or native plants of the district along the proposed railway line affords an excellent criterion to agriculturists and others in making an estimate of the capabilities of the district in question.

Mineral Possibilities.

Metalliferous
belt.

The metalliferous belt of Huronian rocks which carries nickel, copper, silver, gold, iron and other minerals of economic importance occurs prominently throughout a large section of the line of the proposed railway. After crossing the Canadian Pacific Railway in the Sudbury region this great mineral belt proceeds in a north-easterly direction to Upper and Lower Lake Abitibi north of the height of land. This mineral belt is quite wide in the districts of Algoma and Nipissing, extending close to the boundary of the Thunder Bay district. In the latter district two large areas of similar mineral-bearing rocks occur which lie also close to the height of land.

SESSIONAL PAPER No. 143

Quebec End.

The woodland region as a whole throughout Quebec and Ontario, More hilly. along the height of land varies but little in its general level, some sections of it, more especially in the eastern portion, between the St. Maurice and the city of Quebec, is rocky, hilly and well timbered, while other sections for long stretches consist of rolling clay and sandy loam and well timbered lands.

The more mountainous and hilly section in Quebec is that from the City of Quebec to the headwaters of the St. Maurice river, but here we have in the latter river a great wide valley which affords a natural and remarkably easy highway into the north and interior of the woodland region.

North-western Quebec.

From the surveys made along the northern border of the counties of Champlain, St. Maurice, Maskinongé, Berthier, Joliette and Montcalm, in the vicinity of the height of land it has been ascertained that this region, comprising the sources of the Ottawa, Gatineau and St. Maurice rivers, consists of many comparatively level sections constituting a generally level plateau. Many of the streams flowing into the Hudson Bay basin have their source here also; the higher woodland being more to the east and south-east.

Mr. Gillies's Statement.**COMPARISON BETWEEN HUDSON BAY BASIN AND SCOTLAND.**

Mr. Gillies, who for eighteen years was Hudson Bay factor at Fort George, about 235 miles north of the foot of James Bay, volunteered the following statement regarding the capabilities of that portion of the Hudson Bay basin:—'I have no doubt that any crop that grows in Scotland can be successfully grown at Fort George.'

Obstacles Few.

For a distance of 700 miles, from Lake Kapitachuan (Upper Gatineau division) in a westerly by north-westerly direction as far west as White Earth lake near the confines between Nepigon and Lake St. Joseph divisions (Div. IX. and X. respectively) the line runs through a gen-

erally flat sand and clay country, where hills appear sparingly scattered with occasional ridges protruding through the drift or soil-covered country.

Laurentide Axis.

Trans-Laurentide Basin.

The Laurentide Hills proper do not extend to Hudson Bay. They form a belt of hills varying from 100 to 200 miles in breadth, skirting the St. Lawrence Valley and forming a divide between the great alluvial and marine plain or basin of Hudson Bay from that of the St. Lawrence. It is a comparatively narrow belt. North of this fringe of Laurentide Hills lies the comparatively level and gently sloping country of the Hudson Bay basin.

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SESSIONAL PAPER No. 143

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143—12

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