THESE TERMS GOVERN YOUR USE OF THIS PRODUCT

Your use of this electronic information product ("EIP"), and the digital data files contained on it (the "Content"), is governed by the terms set out on this page ("Terms of Use"). By opening the EIP and viewing the Content , you (the "User") have accepted, and have agreed to be bound by, the Terms of Use.

EIP and Content: This EIP and Content is offered by the Province of Ontario's *Ministry of Northern Development, Mines and Forestry* (MNDMF) as a public service, on an "as-is" basis. Recommendations and statements of opinions expressed are those of the author or authors and are not to be construed as statement of government policy. You are solely responsible for your use of the EIP and its Content. You should not rely on the Content for legal advice nor as authoritative in your particular circumstances. Users should verify the accuracy and applicability of any Content before acting on it. MNDMF does not guarantee, or make any warranty express or implied, that the Content is current, accurate, complete or reliable or that the EIP is free from viruses or other harmful components. MNDMF is not responsible for any damage however caused, which results, directly or indirectly, from your use of the EIP or the Content. MNDMF assumes no legal liability or responsibility for the EIP or the Content whatsoever.

Links to Other Web Sites: This EIP or the Content may contain links, to Web sites that are not operated by MNDMF. Linked Web sites may not be available in French. MNDMF neither endorses nor assumes any responsibility for the safety, accuracy or availability of linked Web sites or the information contained on them. The linked Web sites, their operation and content are the responsibility of the person or entity for which they were created or maintained (the "Owner"). Both your use of a linked Web site, and your right to use or reproduce information or materials from a linked Web site, are subject to the terms of use governing that particular Web site. Any comments or inquiries regarding a linked Web site must be directed to its Owner.

Copyright: Canadian and international intellectual property laws protect the EIP and the Content. Unless otherwise indicated, copyright is held by the Queen's Printer for Ontario.

It is recommended that reference to the Content be made in the following form:

Satterly, J. 1943. Mineral occurrences in Parry Sound District; Ontario Department of Mines, Annual Report 1942, v.51, pt.2, 86p.

Use and Reproduction of Content: The EIP and the Content may be used and reproduced only in accordance with applicable intellectual property laws. *Non-commercial* use of unsubstantial excerpts of the Content is permitted provided that appropriate credit is given and Crown copyright is acknowledged. Any substantial reproduction of the Content or any *commercial* use of all or part of the Content is prohibited without the prior written permission of MNDMF. Substantial reproduction includes the reproduction of any illustration or figure, such as, but not limited to graphs, charts and maps. Commercial use includes commercial distribution of the Content, the reproduction of multiple copies of the Content for any purpose whether or not commercial, use of the Content in commercial publications, and the creation of value-added products using the Content.

Contact:

FOR FURTHER INFORMATION ON	PLEASE CONTACT:	BY TELEPHONE:	BY E-MAIL:
The Reproduction of the EIP or Content	MNDMF Publication Services	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales.ndm@ontario.ca
The Purchase of MNDMF Publications	MNDMF Publication Sales	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales.ndm@ontario.ca
Crown Copyright	Queen's Printer	Local: (416) 326-2678 Toll Free: 1-800-668-9938 (inside Canada, United States)	Copyright@gov.on.ca

FIFTY-FIRST ANNUAL REPORT

OF THE

ONTARIO DEPARTMENT OF MINES

1942

PART I I

PROVINCE OF ONTARIO
DEPARTMENT OF MINES

HON. ROBERT LAURIER, *Minister of Mines* H. C. RICKABY, *Deputy Minister*

FIFTY-FIRST ANNUAL REPORT

OF THE

ONTARIO DEPARTMENT OF MINES

BEING

VOL. LI, PART II, 1942

Mineral Occurrences in Parry Sound District

By

J. SATTERLY

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed and Published by T. E. Bowman, Printer to the King's Most Excellent Majesty
1943


THE HUNTER-ROSE CO. LIMITED TORONTO
PRINTERS—BOOKBINDERS

TABLE OF CONTENTS

Vol. LI, Part II

ILLUSTRATIONS

SKETCH MAPS

COLOURED GEOLOGICAL MAP

(In pocket at back of report)

Map No. 51a—Portions of the Districts of Parry Sound and Muskoka, Province of Ontario. Scale, 2 miles to the inch.

Mineral Occurrences in Parry Sound District

By J. Satterly

INTRODUCTION

Parry Sound district is a rectangular area 4,336 square miles in extent. It is bounded on the west by Georgian bay and on the north by Lake Nipissing and the French river. The discovery of the Wilcox and McGown copper showings in 1893 and 1894 near the town of Parry Sound started a period of active prospecting in the district, during which a large number of pits, trenches, and shafts were opened up in a search for copper ores. Prospecting gradually spread over the whole district, resulting in finds of copper-zinc, copper-nickel, iron, gold, molybdenum, feldspar, mica, and graphite. Few of these were of economic significance, and in many cases work was carried on without justification in a vain search for richer values at depth. The main period of activity for copper was between 1893 and 1900, and for iron between 1901 and 1915. There has been sporadic production of mica and feldspar during the last fifty years. In recent years there has been little activity in the district. During 1941, 190 tons of feldspar was shipped from the operation near Burk's Falls, the only one in production. The war has caused some renewed interest in the district, and it is reported that a few of the old showings were examined in 1941 by some of the larger mining companies. There was some interest shown in alloy-metal minerals near Kearney, and an iron occurrence near Lake Nipissing was being prospected.

In order to make a survey of the mineral possibilities of the district the writer visited, during the 1941 field season, some 150 mineral occurrences and made at the same time a general geological reconnaissance of the area by noting the rock types to be seen on the highways and country roads. Traverses of areas between roads was not attempted, and the geological map showing the mineral occurrences accompanying this report must not be considered as anything more than a sketch map. The base for this map was compiled from the North Bay, Sundridge, Muskoka, Byng Inlet, and Parry Sound sheets of the National Topographical Series on the scale of 2 miles to the inch. The extreme northwestern part of Parry Sound district was not visited, as this area is covered in part by maps Nos. 238A and 239A issued in 1930 by the Geological Survey of Canada. A few mineral occurrences in the adjoining northern part of Muskoka district were also examined and are shown on the map.

Acknowledgments

L. V. Elliott acted as the writer's assistant and by his willing help and cooperation did much to forward the progress of the field work. The writer extends his sincere thanks to the many local residents who acted as guides to the old showings. He also expresses his thanks to Professors M. A. Peacock and F. E. Beamish, of the University of Toronto, for help in the identification of certain minerals. All samples were taken by the writer, and the assays quoted in this report, unless otherwise noted, were made by the Ontario Provincial Assay Office.

Access

The eastern part of Parry Sound district is traversed by No. 11 highway to North Bay and the western part by No. 69 highway to Britt. Except in the northwestern part of the district numerous country roads cross the area, and most

places can be easily reached by car. The district is also crossed by the Canadian National and Canadian Pacific lines to Sudbury, by the Canadian National line to North Bay, and by a branch line of the Canadian National between Parry Sound and Scotia Junction.

Previous Geological Work

No detailed geological map of Parry Sound district has been published, but a large number of reports on the geology and mineral occurrences have appeared from time to time. The earliest geological work was carried out by A. Murray for the Geological Survey of Canada when he traversed Georgian bay in 1848–49[1] and the Magnetawan river and Lake Nipissing in 1854.[2] Robt. Bell[3] reported on the geology of the northeast coast of Georgian bay in 1876–77. Work in the

Knoepfli rapids, Magnetawan river, lot 13, concession VIII, Croft township. The river channel parallels the strike of the granite gneiss, and the falls are in the opposite direction to the dip.

adjacent Muskoka district was carried out by W. A. Parks[4] in 1900 and T. L. Walker[5] in 1905, but no detailed reports on this work were ever published. Some of the rock types on Parry island and vicinity were described by T. L. Walker in Guide Book No. 5 of the International Geological Congress in 1913[6].

Topography and Drainage

Parry Sound district rises gradually from an altitude of 581 feet above sea-level at Georgian bay to an altitude of slightly over 1,500 feet at its east border. About half of the area lies above 1,000 feet. This portion forms the southeastern part of the area and is a part of the central highlands of southern Ontario. Except

[1]A. Murray, Geol. Surv. Can., Rept. of Progress, 1848–49, pp. 7-46 and maps nos. 17 and 18.
[2]Ibid, 1853–56, pp. 101-125 and maps nos. 15, 24, 26-29.
[3]Robt. Bell, Geol. Surv. Can., Rept. of Progress, 1876–77, pp. 198-207.
[4]W. A. Parks, Geol. Surv. Can., Vol. XIII, 1900, pp. 121A-126A.
[5]T. L. Walker, Geol. Surv. Can., Sum. Rept., 1905, pp. 84-86.
[6]T. L. Walker, "The Pre-Cambrian of Parry Island and Vicinity," Geol. Surv. Can., Guide Book No. 5, 1913, pp. 98-100 and map, "Parry Sound and Vicinity" in pocket.

for a very small outlier of Paleozoic sediments near Lake Nipissing the whole district is underlain by pre-Cambrian rocks and exhibits the physiographic features so characteristic of the Grenville subprovince of the pre-Cambrian shield. The surface is dotted with innumerable lakes separated by rock hills, which rise to a maximum height of several hundred feet. The summit elevations of these hills are concordant to a tilted plane rising eastward from Georgian bay. They are mantled in part by glacial debris, and the valley bottoms are floored by deposits of boulders, gravel, sand, silt, or clay, which were left on the retreat of the continental glacier, deposited by streams in front of the glacier, or laid down in post-glacial lakes formed in front of the retreating ice mass. Practically the whole of the district was covered by the waters of glacial Lake Algonquin, as its eastern shore is supposed to have closely parallelled a line between Huntsville and North Bay.

The most important rivers traversing the area are the Seguin, Magnetawan[1], Pickerel, French, and South. Some of these rivers, such as the Seguin and

Abandoned farm in the highlands area, lot 23, concession V, Joly township.

Pickerel, apparently follow pre-glacial joint fractures. The Pickerel river, in particular, and a number of minor streams and lakes follow an intersecting set of joint fractures resulting in V- and Z-shaped drainage patterns as seen in plan. The strongest set is a series of east and west fractures, which are intersected by a series of fractures trending northeast and southwest. This fracture pattern is quite unrelated to the structure of the gneisses and cuts across it.

Natural Resources

Agriculture

Throughout the southern and eastern parts of the district there are numerous farms, but many of these are situated on poor land, and much of the farmland would be more valuable if reforested than used as it is to-day. From the large stumps of white pine seen in many sandy fields it is apparent that such reforestation would lead to the most profitable exploitation of what is, at present, useless land.

[1]The map gives the old spelling "Maganatawan" used on the base maps before the decision of the Geographic Board in 1938 for the spelling "Magnetawan."

Forests

Parry Sound district was actively lumbered between 1860 and 1890. Only the best grades of white pine were removed, mostly as square timber.[1] The lumber industry, although of less importance than formerly, is still one of the mainstays of the population, particularly in the winter season. The big mills disappeared ten years ago, and the industry is now nearing the end of a period of small or portable mills. The commercial lumber[2] may be classified into three groups, with the trees listed in each group in order of decreasing importance: (1) white and red pine; (2) hemlock, black and white spruce, balsam, cedar, and tamarac; (3) hard and soft maple, yellow birch, white birch, balsam poplar, large-toothed aspen, trembling aspen, beech, red oak, basswood, black cherry, and hornbeam (or ironwood).

At South River the Standard Chemical Company make acetone, turpentine, etc., by the destructive distillation of waste wood from their saw-mill.

Water Powers

The numerous rivers and streams in Parry Sound and Muskoka districts have many falls and rapids. At the present time only part of the hydro-electric power available has been harnessed. The following table lists the water powers on these rivers:[3]—

River and power sites	Estimated capacity in h.p. at 80 per cent. efficiency		Installed h.p.
	At ordinary minimum flow	At ordinary six months flow	
Magnetawan river	9,804	25,548	1,134
Seguin river	624	2,165	1,885
South river	1,314	2,419	460
Trout creek	12	23	75
Genesee creek (Powassan)	11	39	40
Elliott's chute (west of Powassan)	316	581	1,800
Bingham's chute (west of Powassan)	397	724	1,300
Nipissing generating station	916	1,694	2,600
Muskoka river	17,530	44,985	22,331

Fish and Game

Fish are an important product of the district as their abundance brings many tourists year after year. The more important varieties of fish caught are the small- and large-mouthed black bass, yellow pickerel, northern pike, maskinonge, speckled trout, and lake trout. All these species, except the pike, are planted every year in large numbers as fry or fingerlings in the many lakes and rivers in Parry Sound district by the Ontario Department of Game and Fisheries.

White-tailed deer are common and bring many hunters to the district during the season. In 1941, owing to the lack of wild berries, black bears are reported to have come south in some numbers and many were trapped because of their attacks on sheep. Muskrat, varying hare, timber wolf, brush wolf, red fox, otter, mink, Bonaparte weasel, ground hog, skunk, chipmunk, and red squirrel are common, while marten, fisher, Canada lynx, bay lynx, and moose are rare.[4]

[1] "The Forest Resources of Ontario," Forestry Branch, Ont. Dept. Lands and Forests, 1931, p. 26.

[2] From information supplied by J. A. Brodie, Forestry Branch, Ont. Dept. Lands and Forests.

[3] Data from "List of Water Powers in the Province of Ontario," Ont. Dept. Surveys, 1931.

[4] S. C. Downing, Royal Ontario Museum of Zoology, personal communication.

Tourists

With its many lakes and rivers and the thousands of islands in Georgian bay, Parry Sound district has long been the summer playground of many thousands of tourists. A large number of hotels, cabins, cottages, and camping grounds have come into existence to accommodate this enormous influx of visitors in the relatively short holiday season of July and August. A few resorts remain open the year round, but most of them close by mid-September.

Falls on the Seguin river in lot 9, concession XI, Christie township. Falls are due to resistance to erosion of hard bands (dark) of hornblende gneiss interbanded with crystalline limestone (light).

GENERAL GEOLOGY

The bed rock of the district, except for a few small outliers of Paleozoic sediments, is entirely pre-Cambrian in age.

The pre-Cambrian rocks are divisible into a number of groups. The oldest is a complex of gneisses, which for convenience is divided into three groups. In one of these groups the gneisses are mainly biotite or garnet-biotite gneisses representing metamorphosed sandy and shaly sediments. Interbands of the next described group occur, and more rarely bands of impure crystalline limestone. The second group consists of hornblende gneiss or amphibolite with or without garnet, and locally with frequent interbeds of impure crystalline limestone. The origin of all the hornblende rocks in this group is not clear. Some are undoubtedly sediments of a sandy, shaly, calcareous type, but others may represent metamorphosed basic intrusives. The third group are hybrid gneisses of sedimentary and igneous origin. This group underlies the greater part of the area. A common type is a grey and pink gneiss with little to much pink feldspathic material present as a *lit par lit* injection or interstitially. This gneiss is composed of quartz and feldspar with biotite or hornblende or both. This type has the appearance of a granite gneiss, but much of the rock represents granitized rocks of the first two groups, although some may be true granite gneiss. In this group pink granite is of frequent occurrence, and may or may not be gneissic. It was not mapped separately. Certain masses cut across the structure of the gneissic complex. The sedimentary

gneisses of this complex have elsewhere been referred to the Grenville, and the hybrid gneisses and granite gneiss to the Laurentian, but these terms will not be used in this report.

Intrusive into the gneissic complex are a variety of basic intrusives, metamorphosed in varying degree. These are disabase, gabbro, norite, anorthosite, and more rarely lamprophyre and peridotite. Some of these rocks are cut by dikes of pegmatite, and it is thought they may be of more than one age, as some (the diabase) are like Keweenawan types. This group of intrusives have been called the Buckingham series in southeastern Ontario by Wilson.[1]

The youngest igneous rocks are dikes of pegmatite, which cut many of the preceding types. The pink granite found in close association with the hybrid gneisses is probably related to the pegmatites.

Just south of Lake Nipissing and west of the village of Nipissing is a small outlier of Paleozoic dolomite of Ordovician age. It is known that other small exposures of Paleozoic sediments occur on the Manitou islands and Iron island in Lake Nipissing and the Limestone islands in Georgian bay.

Overlying the bed rock is a mantle of variable thickness of unconsolidated deposits of sand, gravel, boulders, and clay of Pleistocene age left behind on the retreat of the continental glacier, deposited by glaciofluvial streams, or laid down in glacial lakes.

These relations are summarized in the following table.

Table of Formations

QUATERNARY	
RECENT:	Clay, sand, gravel, boulders; peat, diatomite.
PLEISTOCENE:	Clay, sand, gravel, boulders.
PALEOZOIC	
ORDOVICIAN:	Dolomite.
PRE-CAMBRIAN	
DOMINANTLY IGNEOUS ROCKS:	Granite, granite gneiss, pegmatite. Diabase, gabbro, norite, anorthosite, peridotite, lamprophyre. Hybrid gneisses of sedimentary and igneous origin.
DOMINANTLY METAMORPHOSED SEDIMENTS:	Crystalline limestone. Hornblende gneiss, garnet-hornblende gneiss, amphibolite, garnet amphibolite. Biotite gneiss, garnet-biotite gneiss, garnet gneiss.

Pre-Cambrian Sediments

Biotite Gneiss, Garnet-Biotite Gneiss, Garnet Gneiss

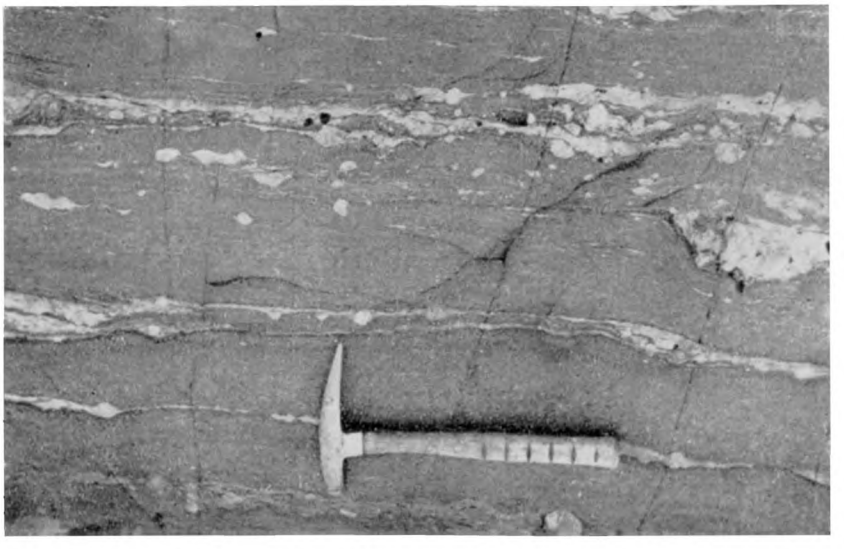
The biotite gneiss and garnet-biotite gneiss are derived through the metamorphism of sandy, shaly sediments. These gneisses range in colour from white to almost black depending on the amount of biotite present. They are usually strongly foliated, and sometimes schistose. Banding due to minor differences in initial composition of different sedimentary beds is locally common. Owing to movements during metamorphism this banding is often discontinuous. The more siliceous types are sugary to the touch.

Pegmatitic material is frequently present in the sedimentary gneisses as white or pink *lit par lit* injection; or feldspar is present as chains or strings of small to large metacrysts arranged parallel to the bedding (see photograph below). The metacrysts average 1 inch but occasionally are as much as 6 inches in diameter. Such metacryst development is well exposed at Rose Point, Parry sound, and on

[1]M. E. Wilson, "The Canadian Shield," Geologie der Erde, Geology of North America, Vol. I, pp. 263, 267.

Isabella island near by. Hornblende is also present as metacrysts at these localities, but the metacrysts are usually much smaller in size than those of the feldspar.

Microscopic study of these gneisses shows a foliated aggregate of quartz, plagioclase, and biotite, with or without garnet. Some varieties contain muscovite in addition to biotite. The plagioclase is either oligoclase or andesine. Where metacrysts of feldspar occur they are either microcline, as at Rose Point, or oligoclase, as on No. 69 highway between Parry Sound and Nobel. Common accessory minerals are apatite, magnetite, and titanite; zircon, graphite, rutile, epidote, pyrite, pyrrhotite, and scapolite are present in some samples. Many gradations between this group and the next are present; and some sugary, light-coloured garnet gneisses with minute grains of hornblende, which should perhaps have been included in the next group, have been mapped here.



Sedimentary biotite gneiss with feldspar stringers and metacrysts (light) and a few hornblende metacrysts (dark), south shore of Isabella island, off Parry island, Georgian bay. The marks on the hammer handle are 1 inch apart.

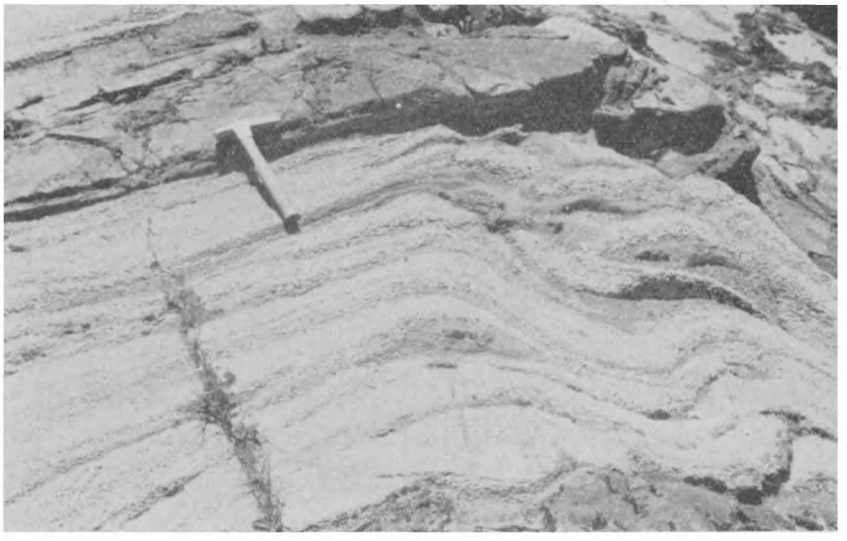
At some of the old mining properties in Cowper (Spider) bay and on Cowper (Spider) lake, medium- to coarse-grained garnet-rich biotite gneisses occur. These seem to represent partially pegmatitized sedimentary garnet-biotite gneiss, as in the same region garnet pegmatites occur and are thought to represent the end product of this pegmatitization. The occurrence of swarms of sillimanite needles, penetrating or included in the garnet, and the presence of green spinel in these garnet gneisses on Cowper lake indicate a high degree of metamorphism.

Hornblende Gneiss, Garnet-Hornblende Gneiss, Amphibolite, Garnet Amphibolite

Dark-green hornblende gneiss or amphibolite with or without garnet form a number of areas in the southwestern part of Parry Sound district. Rocks of this type may be of a number of origins, as (1) recrystallization of shaly, limy, sandy sediments; (2) metasomatic replacement of limestone by emanations from granitic intrusives; or (3) metamorphosed basic intrusives or volcanics. From field evidence it is believed that most of the rocks in the area belong to the first classification.

Interbanded with these rocks in some of the areas are bands of impure crystalline limestone and biotite gneiss or garnet-biotite gneiss (sediments). This interbanding of crystalline limestone is well exposed on the road between McKellar and Dunchurch and also occurs in Spence, Croft, Ferrie, and Lount townships.

The hornblende gneiss or amphibolite is very variable in character, as might be expected if much of it is of sedimentary origin. Owing to the nature of the reconnaissance a detailed study was not possible, but 14 thin sections of representative samples have been studied under the microscope. The rocks are almost all completely recrystallized and consist of an aggregate of hornblende and plagioclase (usually oligoclase or andesine where identifiable) with hypersthene or biotite or both. Where plagioclase is abundant the rock may be termed a feldspar



Well-banded white crystalline limestone containing narrow bands of hornblende rock, Seguin river, lot 9, concession XI, Christie township.

amphibolite. Magnetite and apatite are constant accessories. Other minerals present in varying amounts but not found in all the samples examined are quartz, scapolite, garnet, titanite, carbonate, pyroxene, pyrite, epidote, and orthoclase. From the large size of the grains of apatite and titanite in some of the sections, and the amount of scapolite, it is apparent that some of the rocks have been acted upon by emanations from granite intrusives rich in chlorine, phosphorus, and titanium.

At a few localities in Ferguson township and one in Hagerman township a peculiar hybrid type of hornblende rock occurs, which has been termed a "blotched diorite."[1] As seen on the road north from Waubamik junction to Lorimer lake in concessions II, III, and IV of Ferguson township, the rock is massive, medium- to coarse-grained, and white in colour, with dark green "blotches" or aggregates as much as 3 inches in diameter of hornblende crystals; hence the field term "blotched diorite." A sample from lot 12, concession II, Ferguson township, as seen in thin section under the microscope, consists of a mosaic of labradorite grains with sievelike aggregates of hornblende, epidote, biotite, and chlorite and minor amounts of scapolite, quartz, carbonate, and titanite. This rock appears to belong

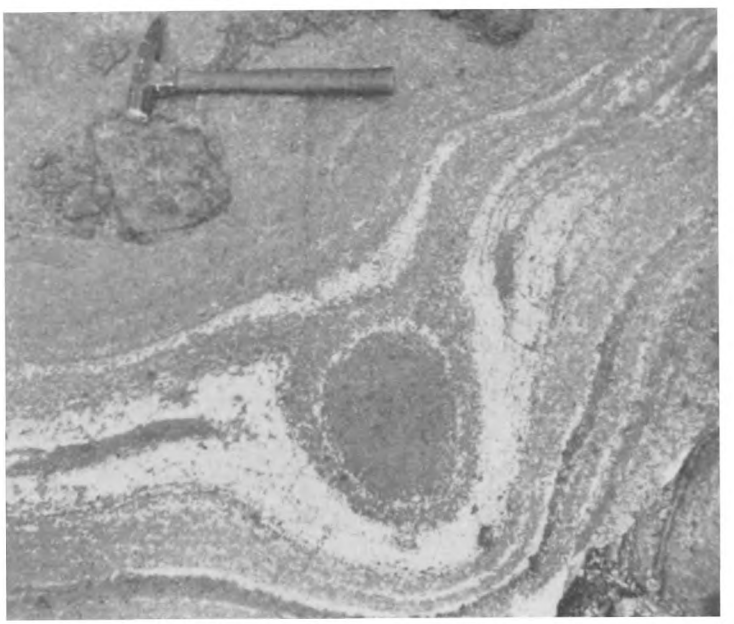
[1]Robt. Bell, op. cit., p. 204.

to origin (2) above, that is by the replacement and metamorphism of an impure magnesian limestone by emanations from some magmatic source. These "blotched diorites" are not widespread and although of hybrid origin are included for mapping purposes in the hornblende gneiss division.

More severely granitized members of this division are described under hybrid gneisses.

Crystalline Limestone

Crystalline limestone occurs as interbeds in both groups of sedimentary gneisses, but is much more common in the hornblende gneisses. The bands of crystalline limestone range from a few to several hundred feet in width. In some



Concretionary structure in impure crystalline limestone, Maple island, Magnetawan river, lot 2, concession II, McKenzie township.

places traces of bedding are present, and many outcrops show a breccia structure with fragments of matrix. In such occurrences the fragments may form 50 per cent. of the rock bulk (see photograph on page 64).

In the hand specimen the crystalline limestone although usually white, may also be pale-blue, pale-green, orange, or pink. Very little pure crystalline limestone occurs, and most of it is speckled with grains of silicate minerals. These are often arranged in lines or concentrated in zones or bands and indicate initial differences of composition between different *laminae* or beds of the limestone. In thin sections under the microscope the rock consists of a mosaic of carbonate grains, in which are embedded rounded grains of serpentinized olivine, and diopside; in some localities purple spinel, phlogopite, tremolite, chondrodite, titanite, and apatite are also present. Where more sandy and shaly material was originally present plagioclase, quartz, biotite, hornblende, epidote, and scapolite are developed.

Six analyses by Goudge[1] suggest that there are two types, as analyses of those

[1]M. F. Goudge, "Limestones of Canada," Part IV, Ontario, Bureau of Mines, Can. Dept. of Mines and Resources, No. 781, 1938, p. 146.

from near Parry Sound have a low magnesium carbonate content of 0.80 to 4.58 per cent. and are classified as calcium limestones, whereas those from the Seguin river, northeast of Edgington, have a magnesium carbonate content of 34.27 and 38.38 per cent. in two samples and are therefore magnesian limestones.

Further details of the limestone occurrences are given in the section of the report dealing with "Non-Metallic Minerals."

Pre-Cambrian Igneous Rocks

Hybrid Gneisses

The hybrid gneisses of sedimentary and igneous origin underlie the greater part of the area. The origin of many of the gneisses included here is doubtful, but

Hybrid gneiss with interbanding of biotite-poor (light), biotite, and hornblende (dark) gneisses, on the road 2 miles east of Dunchurch in lot 28, concession X, Croft township.

most of them are derived from the injection or replacement of sedimentary gneisses by granitic material. As there are two main types of sedimentary gneisses, one rich in biotite and the other in hornblende, so the hybrid gneisses are also rich in one or the other of these two minerals; and as gradations exist between the sedimentary gneisses, so all gradations are found from biotite to biotite-hornblende to hornblende gneisses. These hybrid gneisses have the appearance of granite gneisses, and it will be less confusing if the terms biotite, biotite-hornblende, and hornblende granite gneiss are used so as to distinguish these hybrid gneisses from the sedimentary gneisses, which also contain biotite and hornblende or both.

True granite, granite gneiss, and pegmatite occur throughout the areas of hybrid gneisses and locally may predominate, but it was not found possible to separate these satisfactorily on the map.

In Muskoka district and the adjacent townships of Parry Sound a common type of hybrid gneiss, as may be seen on the Rosseau highway, is a pink and grey, banded biotite granite gneiss. The grey portion is a biotite gneiss, and the pink represents feldspar or pegmatite introduced as *lit par lit* injection. Frequently the

gneissic banding is highly and intricately folded. This may be called the Muskoka type.

Adjacent to the areas underlain by the sedimentary hornblende gneiss the hybrid gneisses are extremely variable. A common type of exposure is a banded complex of pink or grey biotite or hornblende granite gneiss with bands and lenses of partially assimilated sedimentary hornblende gneiss. Another type is that where replacement rather than injection of granitic material has occurred, the rock having the appearance of a medium-grained, light-coloured diorite. Such granitized sedimentary hornblende gneisses are widespread in Ferrie and Mills townships. Still another variety is a medium-grained, pink and black hornblende granite gneiss, frequently having a contorted gneissic structure; this is common in Monteith, McMurrich, and Mills townships.

In the northeastern part of the district a pink colour is characteristic of the hybrid or granite gneisses, and many of them may be true granite gneisses. Along No. 11 highway north and south of Trout Creek, the pink biotite granite gneiss contains red garnet as a constant accessory mineral. This type is interpreted as a true granite gneiss with the assimilated sedimentary material represented by the garnet.

At a number of localities scattered throughout the area porphyritic or augen gneisses occur. These range from light to dark in colour. Some are derived from sedimentary gneisses through the development of numerous feldspar metacrysts, as for example on No. 69 highway north and south of Pointe au Baril Station, but others may be true granite gneisses, which originally had a porphyritic texture now represented by feldspar augen. Augen gneisses of the latter type occur at various localities in Nipissing, Gurd, and Machar townships.

Microscopically, the hybrid gneisses are found to consist of oligoclase or andesine plagioclase, quartz, biotite, and hornblende, with apatite, titanite, magnetite, and garnet as accessory minerals. The introduced feldspar is microcline or microcline microperthite.

Granite, Granite Gneiss

Throughout the district small dikes, sills, and masses of pink granite are found cutting the sedimentary and hybrid gneisses. In the former the sills are to be measured in tens of feet, but are occasionally several hundred feet in width. In the hybrid gneisses the pink granite can be definitely recognized only when present as dikes; elsewhere it is indistinguishable from pink granite gneisses, some of which are probably hybrids. The typical pink granite is a fine- to medium- or, more rarely, coarse-grained rock with a low to negligible percentage of dark minerals. Studied under the microscope it is seen to consist of microcline, a minor amount of plagioclase, and quartz, with accessory biotite, hematite, magnetite, apatite, zircon. The pink granite gneisses have the same minerals, with the addition of biotite and hornblende as essential minerals and titanite as an accessory. These pink granites and granite gneisses are most abundant in McConkey, Hardy, Nipissing, North Himsworth, and Machar townships.

Pegmatite

Pegmatite dikes occur throughout the area, but few of them are of large size. They are mainly granite pegmatites with quartz, microcline, plagioclase, biotite, and muscovite present in varying amounts. In many of the dikes the quartz and microcline are in graphic intergrowth. Some dikes contain radioactive minerals. These have been described by Ellsworth.[1] The following minerals are

[1]H. V. Ellsworth, "Rare-element Minerals of Canada," Geol. Surv. Can., Econ. Geol. Series, No. 11, 1932, pp. 171-187.

reported by him: uraninite (pitchblende), cyrtolite, thucholite, allanite, euxenite, calciosamarskite, and columbite-tantalite. Garnet in well-developed crystals was found in a number of dikes examined by the writer, but except for allanite no other radioactive minerals were seen; it is understood that these were found only in small quantities during operations. Tourmaline was seen in one dike in Bethune township.

Other varieties of pegmatite occur in the sedimentary gneisses. An extremely coarse hornblende pegmatite is common in the hornblende gneisses and has obviously been developed by the interaction of emanations from an igneous source on the hornblende gneiss, the hornblende being reconstituted into large individuals. The walls of such pegmatite dikes are usually gradational. These hornblende pegmatites are frequently mineralized with pyrite, pyrrhotite, chalcopyrite, bornite, and chalcocite and were actively prospected for copper at one time. The minerals in these dikes are hornblende, plagioclase, quartz, and rarely a carbonate.

Diabase

Fresh diabase, lithologically similar to what is known as Keweenawan diabase in other pre-Cambrian areas, was found in a few localities within the area and in one just outside the area in the Muskoka district. Most of these dikes are narrow. On the road in lot 20, concession VII, Machar township, a dike with an approximate width of 150 feet trends east and west. The Muskoka occurrence is on No. 35 highway just east of Lake of Bays in Franklin township. Studied in thin section under the microscope these rocks are seen to consist of labradorite, augite, and quartz in micrographic intergrowths, with ilmenite and apatite as accessory minerals. The rocks are quartz diabases. They cut the hybrid gneisses.

Gabbro, Norite, Anorthosite

At a number of widely scattered localities in the district stocks, dikes, or sills of gabbro, norite, and anorthosite were mapped. These intrusives are possibly equivalent to a group that has been termed the Buckingham series in the original Laurentian area.[1] The more important occurrences are on Parry island; near Bartlett lake, Ryerson township; on Caribou lake, McConkey township; and on Memesagamesing lake, Hardy township.

Anorthosite forms the west shore of Parry island (Indian Reserve No. 16) and also of a number of islands off that shore[2] for a length of 6 miles and extends inland for about a mile. The anorthosite was seen at two localities near the north and south ends of the mass. The rock at the south end of an island just northwest of Bear head is a medium- to almost coarse-grained, pale-grey rock composed almost entirely of labradorite feldspar. An analysis of this rock by the Provincial Assay Office follows:—

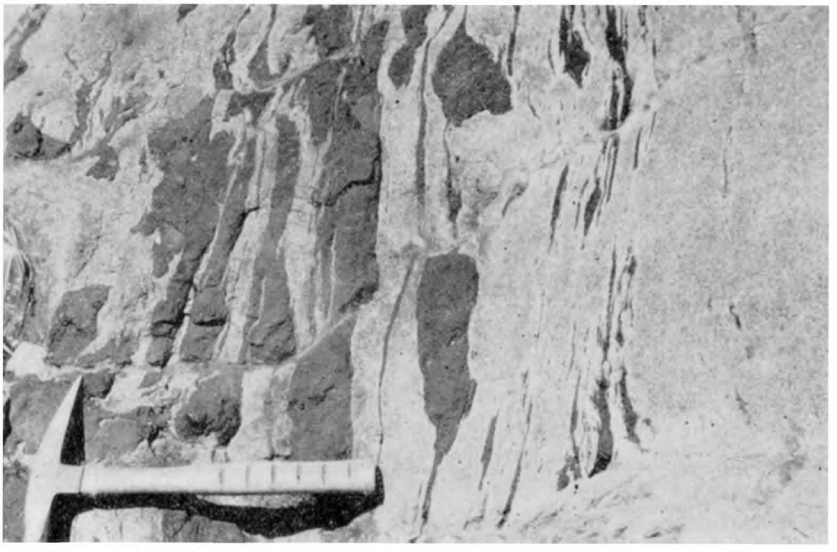
	Per cent.
SiO_2	53.16
Al_2O_3	31.64
Fe_2O_3	.64
CaO	10.14
MgO	trace
K_2O	.47
Na_2O	3.52
TiO_2	.11
Total	99.68

[1] M. E. Wilson, "Pre-Cambrian," Geology, 1888–1938, Fiftieth Anniversary Volume, Geol. Soc. Amer., 1941, p. 289.

[2] T. L. Walker, "The Pre-Cambrian of Parry Island and Vicinity," Geol. Surv. Can., Guide Book No. 5, 1913, pp. 98-100 and map "Parry Sound and Vicinity" in pocket.

In parts of the outcrop at this locality lenses of amphibolite occur. The locality near the north end of the mass is due east of Oak island and northwest of Caswell bay. Here grey and purplish anorthosite contains discontinuous bands or stringers of amphibolite (see photograph below). The anorthosite has been subjected to much movement as indicated by a series of minor intersecting faults and the lenticular character of the fragments forming the amphibolite bands. The possibilities of this anorthosite as a source of aluminium are noted in the section on "Metallic Minerals."

Gabbro occurs along the south shore of Parry island west from Isabella island for 2½ miles. The gabbro forms a complex with a large number of masses of sedimentary gneiss containing feldspar metacrysts. The contact between these two rock types is extremely irregular owing to complex folding. The metamor-



Stretched, broken, and faulted bands of hornblende rock in anorthosite, west shore of Parry island, half a mile north of Caswell bay. The marks on the hammer handle are 1 inch apart.

phism of the gabbro is very variable, the least altered types being at the west end of the occurrence, but even there massive and sheared phases adjoin one another. The rock has a glassy appearance and is grey in colour on a fresh surface. It consists of relic labradorite phenocrysts, which have a maximum diameter of half an inch and irregular borders, in a mosaic of hornblende, andesine, quartz, scapolite, some biotite, and garnet. It is a scapolitized anorthositic gabbro. To the east exposures show residual pyroxene crystals as well as plagioclase, but the rocks have undergone more crushing and recrystallization. Some of the more altered phases are garnet-hornblende gneiss very similar to types described in another section of this report. The frequent repetition of bands of the sedimentary gneiss within the gabbro mass suggests to the writer that the gabbro was intruded as a series of sills or dikes into the sedimentary gneisses.

It is thought that this gabbro and the anorthosite on the west coast of Parry island are related intrusives.

In McConkey and Hardy townships in the northern part of the district, norite outcrops on the shores of Caribou and Memesagamesing lakes. The norite is typically a medium-grained, light-grey, brown-weathering rock, which micro-

scopic study shows to consist of altered plagioclase, altered orthorhombic pyroxene (enstatite or hypersthene), and accessory biotite, hornblende, garnet, magnetite, and quartz, not all of which were present in any one of the three samples examined. A number of other masses of norite are reported to occur in the area between the two lakes but were not visited by the writer. Old pits on copper and nickel prospects occur on Memesagamesing lake.

Southwest of Burk's Falls near Bartlett lake in Ryerson and McMurrich townships a number of sill-like masses of metamorphosed norite occur in the hybrid gneisses. Isolated but related occurrences are found near Magnetawan in lot 90, concession A, Chapman township, and south of Sprucedale in lot 15, concession X, McMurrich township. The least metamorphosed phase may be called a garnet-olivine norite. Microscopically, the rock shows fractured olivine, with or without serpentine in cracks surrounded by a series of reaction rims of hypersthene; biotite or hornblende or both; clusters of garnet grains, which replace in part interstitial plagioclase clouded with grains of green spinel and minute flakes of biotite. Other minerals present are magnetite, pyrrhotite or chalcopyrite, and apatite. In the more metamorphosed types olivine is absent, although some original pyroxene occurs, and the rock consists essentially of altered and fresh plagioclase, fresh hornblende, and garnet, with lesser amounts of magnetite, biotite, scapolite, spinel, and large grains of apatite. The scapolite and apatite indicate the activity of chlorine-rich solutions in the metamorphism and metasomatism of these olivine norites. Similar rock types are described by Buddington[1] in the Adirondacks at the extreme east end of the Grenville subprovince of the pre-Cambrian shield.

At a number of other localities dikes or sills of these diabase, gabbro, or norite rocks occur, but they were not studied in thin section under the microscope. These occurrences are in Lount, Mills, Patterson, and Nipissing townships.

The age of the gabbro and norite is based on the following crosscutting relationships. The sills or dikes occur in the sedimentary or hybrid gneisses, and some were involved in their folding. They are cut by pegmatite dikes at the following localities: (1) lot 12, concession XIV, McMurrich township; (2) in lot 14, concession XIV, McMurrich township, by stringers and lenses of white biotite-hornblende pegmatite; (3) in lots 21 and 22, concession IV, Ryerson township, by a 6-inch pegmatite dike; (4) on Caribou lake in lot 11, concession II, McConkey township, by 10- and 30-foot pegmatite dikes, which have altered the rock to a garnet-hornblende gneiss; (5) on Caribou lake in lot 21, concession V, McConkey township, by a 100-foot coarse pink pegmatite, the norite being represented by a garnet-hornblende gneiss; (6) on Caribou lake in lots 18 and 19, concession III, McConkey township, by three pegmatite dikes; (7) on Caribou lake, in lot 17, concession III, McConkey township, by a sill or dike of pink granite; and (8) on a portage in Memesagamesing lake in lot 28, concession IX, Hardy township, norite is cut by a 5-foot muscovite pegmatite dike, which has altered the pyroxene in the norite to an amphibole in a zone 5 feet in width adjacent to the dike contacts. These occurrences indicate that the pegmatites not only cut the gabbro and norite, but also that they or solutions accompanying their intrusion were the cause, in part at least, of the metamorphism and metasomatism of these rocks.

Lamprophyre

Lamprophyre dikes were seen at only three localities, two of them on Lake Nipissing. At Deepwater point, lot 26, concession XXVIII, North Himsworth

[1]A. F. Buddington, "Adirondack Igneous Rocks and Their Metamorphism," Geol. Soc. Amer., Mem. 7, 1939, pp. 270, 271.

township, a 5-foot dike and an 8-inch dikelet of lamprophyre cut the pink to red biotite granite gneiss. The gneiss shows an increased red coloration for 5 feet adjacent to the dikelet. Microscopic examination of a thin section of the dikelet shows the rock to be greatly altered. It consists of carbonate, biotite, hornblende, and grains of magnetite. The dikelet is a fine-grained, grey rock with biotite books as much as half an inch in diameter, whereas the dike is a fine-grained, dark-green rock. At Wasi falls in lot 6, concession XXIV, North Himsworth township, much fractured, pink biotite granite gneiss is cut by a number of narrow and irregular, dark-green, altered basic dikes. One 14-inch dikelet studied in thin section consists of an aggregate of hornblende, biotite, carbonate, magnetite, apatite, epidote, white mica, sphene, and pyrite. It is a carbonated lamprophyre.

The third occurrence is in lot 10, concession XIX, Gurd township, where a 1-foot fine-grained, dark-green basic dike, carrying small pyrite cubes, cuts a pink biotite granite gneiss. It is highly altered and shows aggregates of carbonate and antigorite in a groundmass of interlocking minute laths of plagioclase, chlorite, and magnetite. It is either an altered basalt dike or lamprophyre.

The dike at Deepwater point was first recorded by Murray[1] and noted as a brownish-red trap. Maps[2] accompanying his report indicate the occurrence of trap dikes on Darling, McDonald, and Iron islands in Lake Nipissing.

The age of these lamprophyre dikes is somewhat uncertain owing to their limited occurrence. Murray's work showed that they are pre-Ordovician, and presumably pre-Cambrian, but their relationship to the later basic intrusives or the pegmatite dikes of the district is not known.

Ultrabasic Rocks

Ultrabasic rocks were found at only a few widely scattered localities. Some are fresh, but others are so metamorphosed as to render difficult a determination of the original rock.

On a road south of Fairy lake in lot 18, concession XIII, Brunel township, Muskoka district, a gravel pit exposes a 30-foot width of a shattered and partially altered ultrabasic rock. The crumbled ultrabasic rock has been used as road metal. Outcrops beside the road on either side of the gravel pit expose pink and black, hybrid biotite gneiss, and the ultrabasic rock appears to form a dikelike mass trending northwest. A thin section of a fresh sample under the microscope shows olivine encased in or rimmed by hypersthene with deep-green hornblende as a granular aggregate interstitial to the olivine-hypersthene coronites. The rock is a slightly altered peridotite of the variety known as harzburgite. Harzburgite is reported by Parks[3] to form Haystack island east of Port Cunnington in Lake of Bays, Muskoka district. This is probably a related mass.

Just south of Caribou lake on Wade's road in lot 11, concession I, McConkey township, a cliff face exposes a brown-weathering, dark brownish-green rock, which microscopic study shows to consist of serpentinized olivine with grains of magnetite, altered enstatite, and accessory plagioclase. This rock is also a peridotite and is apparently an ultrabasic phase of the norite mass forming the shores of Caribou lake.

East of Peters lake in lot 15, concession VII, Bethune township, dark-green amphibolite with streaks and patches of red garnet is the country rock. Interbanded with this garnet-pyroxene amphibolite is a black rock, which has been prospected by the Tiffany Mining Syndicate. It consists of tremolite as pale-

[1]A. Murray, Geol. Surv. Can., Rept. of Progress, 1853–56, map No. 26.
[2]Ibid, maps Nos. 24 and 26.
[3]W. A. Parks, Geol. Surv. Can., Vol. XIII, 1900, p. 123A.

green crystals veined with biotite, scattered red flakes of hematite, and veins of magnetite; and garnet fractured and veined by serpentine, magnetite, and some hematite; both in a groundmass of brown serpentine with an interlocking network of fibrous biotite. The rock may be called a garnet peridotite. Associated with these rocks is a garnet-olivine norite similar to those described previously; accordingly, this garnet peridotite is also believed to be an ultrabasic differentiate of the norite.

Ordovician Dolomite

South of Lake Nipissing and 1½ miles west of the village of Nipissing in lot 16, concession XI, and lot 218, concession A, Nipissing township, are a number of exposures, some due to test-pitting, of a brown-weathering, grey dolomite.

The dolomite underlies an area about half a mile in length and less than a quarter of a mile in width. Heavy sand and boulder drift mask the extent of the deposit, but pre-Cambrian granite gneiss outcrops abundantly to the south and also north of South river, so the outlier must be of small extent.

Locally, the dolomite is very fossiliferous, and a small collection of specimens made by the writer's party was submitted to Dr. V. J. Okulitch of the Department of Geology, University of Toronto. He identified the following:—

Prasopora simulatrix
Pachydictya acuta
Rhynidictya sp.
Dinorthis pectinella
Dalmanella rogata
Doleroides subaequata (?)
Hebertella cf. borealis
Rafinesquina alternata
Strophomena trentonensis
Strophomena sp.
Camerella hemiplicata
Rhyncotrema increbescens
Rhyncotrema subtrigonale (?)
Zygospira recurvirostris
Ceraurus sp.

He reports that these fossils indicate a Lower Trenton age for the dolomite and notes that Bassler[1] in 1911 pointed out the similarity of Lake Nipissing fossils to the Baltic fauna of Russia.

As observed in the test-pits in lot 16, concession XI, the dolomite is somewhat irregularly bedded, the beds being 4 to 6 inches and occasionally as much as 1 foot in thickness. The bedding in these exposures is practically horizontal. Six chains south of the road, in the eastern part of lot 218, concession A, the strike of the bedding is N. 65°–70° E., and the dip 10°–15° S. At about 14 chains south of the road, a 20-foot cliff is formed of dolomite and pre-Cambrian granite gneiss separated by a gully 15 to 20 feet in width. The face of the granite gneiss in the gully strikes N. 75°W., and dips 70°N. The bedding of the dolomite is from 2 to 4 inches thick; the strike is N. 20°W., and the dip 12°E. Small lenses and irregular stringers of white-weathering chert occur along the bedding in the upper part of the dolomite. This exposure suggests a fault between the dolomite and the granite gneiss, but it may also be interpreted as the old shore line in the Ordovician sea.

The above occurrence is the only one seen by the writer. References to the Paleozoic sediments found on the Manitou islands in Lake Nipissing and the Limestone islands in Georgian bay are given by Goudge.[2] Murray[3] noted the occurrences on the Manitou islands and on Iron island in Lake Nipissing.

Analyses of these limestones are given in the section of this report dealing with "Non-Metallic Minerals."

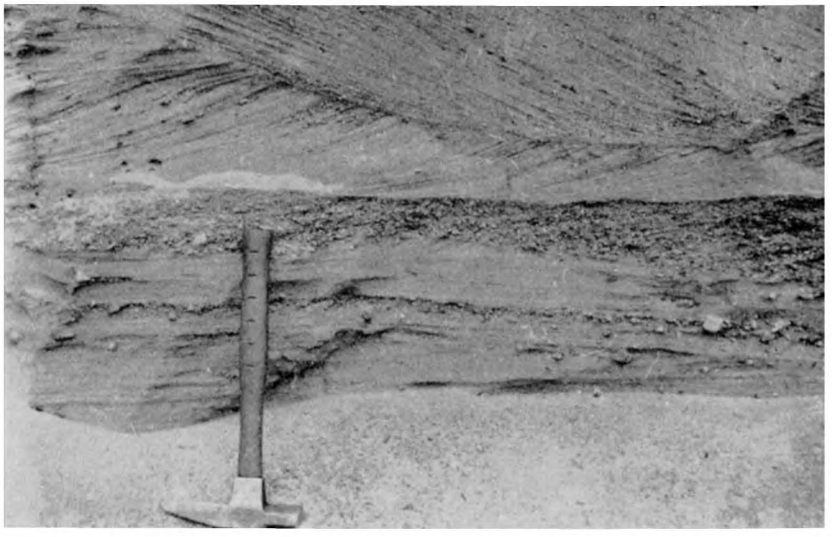
---

[1]R. S. Bassler, U.S. Nat. Mus., Bull. 77, 1911.
[2]M. F. Goudge, op. cit., p. 145.
[3]A. Murray, Geol. Surv. Can., Rept. of Progress, 1853–56, pp. 124, 125.

Pleistocene Deposits

During the Pleistocene period the district was covered by a continental glacier, which left on its retreat moraines of sand, gravel, and boulders and associated glaciofluvial deposits. Parry Sound district falls within the area involved in the development of the Great Lakes and was covered in part by the waters of glacial Lake Algonquin and the Nipissing Great Lakes.[1] Owing to the extremely hummocky nature of the country the shore lines of these lakes have not been worked out in detail, but that of Lake Algonquin is stated to pass through Bracebridge, Huntsville, and Trout Creek, and to the east of Lake Nipissing.[2]

The mantle of drift is very variable in character and thickness. The writer gained the impression that morainic material was thicker in the northern part of Muskoka district than in Parry Sound district. Adjacent to No. 11 highway,



Cross-bedded, glaciofluvial sand at the side of the road between concessions II and III in lot 35, Perry township. The marks on the hammer handle are 1 inch apart.

and therefore paralleling the supposed position of the Lake Algonquin shore line, sand is widespread not only at low levels but even capping or forming hills. There are also extensive deposits of sand around Sand lake in Proudfoot township. Where cleared some fields underlain by sand are now undergoing wind erosion, as northwest of South River and north of Doe lake.

In the eastern part of Joly township the road in concessions IX and X leading east to the sawmills crosses flat sand, then follows an esker-like ridge at Paisley lake, and from there to the east boundary of the township passes through a region of hummocky drift with numerous undrained depressions representing dry kettles in a terminal moraine.

Varved clay is well exposed in the pit of the Gomoll Brick and Tile Works just south of Powassan in South Himsworth township. The section exposed in the pit from top to bottom is: 2 feet of coarsely varved, silty clay; 1½ feet of reddish varved clay; and 3 feet of coarsely varved clay, in which 40 varves occur

[1] F. B. Taylor, "The Glacial and Postglacial Lakes of the Great Lakes Region," Smithsonian Report for 1912, Washington, 1913, pp. 291-327.

[2] J. W. Goldthwait, Geol. Surv. Can., Mem. 10, 1910, pp. 38, 39, Fig. 3, and p. 47.

in 34 inches, 10 of these varves being in the lower 12 inches. The manager reports that below the floor of the pit drilling shows another 12 feet of clay, after which quicksand is reached. The total thickness of clay on the property is approximately 20 feet. Assuming that the rate for deposition was the same as in the lower 12 inches of the pit, that is 1 foot in 10 years, then it is apparent that a glacial lake existed in this locality for 200 years or more.

A bedded (varved?) clay overlain by sand was also observed west of Trout Creek in the road-cutting at the bridge over South river on the boundary between concessions II and III, South Himsworth township.

Recent Deposits

Besides the more obvious deposits in the rivers and lakes of clay, sand, gravel, and boulders derived largely from the Pleistocene mantle, the many small swamps in the district contain peat; and in the swamps in the northern part of the Muskoka district and adjacent townships of Parry Sound district, the accumulation of the cases of diatoms has resulted in the formation of diatomite.

STRUCTURAL GEOLOGY

Folding

The structure of the sedimentary, hybrid, and igneous gneisses which underlie the whole of the area is exceedingly complex. Although a very large number of strikes and dips of the gneissic structure were taken, it is now apparent that a great many more would be necessary for an interpretation of the structure. Owing to the large area covered by the reconnaissance it was not possible to obtain these, and the structure can only be described in general terms. It was hoped that the mapping of the crystalline limestone would allow some bands to be traced across country, but the discontinuity and small size of many of the bands prevented their use as structural horizons.

Viewing the district as a whole the predominant trend of the gneissic structure is found to be north and south, although wide variations from this trend are found locally. The most persistent deviation from the average north and south trend is in the vicinity of Parry Sound. On Parry island and to the south in Cowper township the trend is N. 45°E., with dips from 25° to 60° S.E. Northwest of Parry Sound the trend is N. 45° W., with dips of 45 degrees to vertical, in Carling and Shawanaga townships, swinging to north and N. 35° E. in McDougall and Ferguson townships to the east.

An impression of the close folding in the hybrid gneisses was gained by a series of strikes and dips taken approximately every quarter of a mile or less on the road through Carling in Carling township. These strikes and dips indicate three fold axes about a mile apart trending approximately N. 20°W. Dips as low as 10 degrees were obtained near the crests or bottoms of the folds and as high as 90 degrees on the limbs. If this close folding is indicative of the complexity of the structure in the gneisses, then very detailed work will be necessary to determine the structure.

Shearing

The intense folding of the sedimentary and igneous rocks, accompanied by igneous action, resulted in the formation of gneisses and schists. As this action apparently caused the rocks in many places to reach a quasi-solid condition, the gneisses are minutely crumpled and, in the case of crystalline limestone and attendant hornblende gneiss, so completely mashed that the resulting rock is a

breccia with fragments of hornblende gneiss and other rocks in a matrix of crystalline limestone. In the hybrid gneisses the deformation is well shown by the stretched and broken bands and lenses of one rock type in another. The amount of elongation must be very great and may account for some of the excellent banding seen in the gneisses.

Despite the widespread development of foliated or schistose structures, no highly sheared zones were seen; apparently the pressures involved in developing the gneisses and schists were never confined to narrow zones.

Faulting

No evidence of any major faulting in the area was found, but owing to the nature of the field work, such evidence may have been missed. The contact

Left-handed faulting in anorthosite containing stretched lenticular stringers and bands of hornblende rock, west shore of Parry island, half a mile north of Caswell bay.

between the Paleozoic dolomite outlier and the pre-Cambrian granite 1½ miles west of Nipissing village may possibly be a fault.

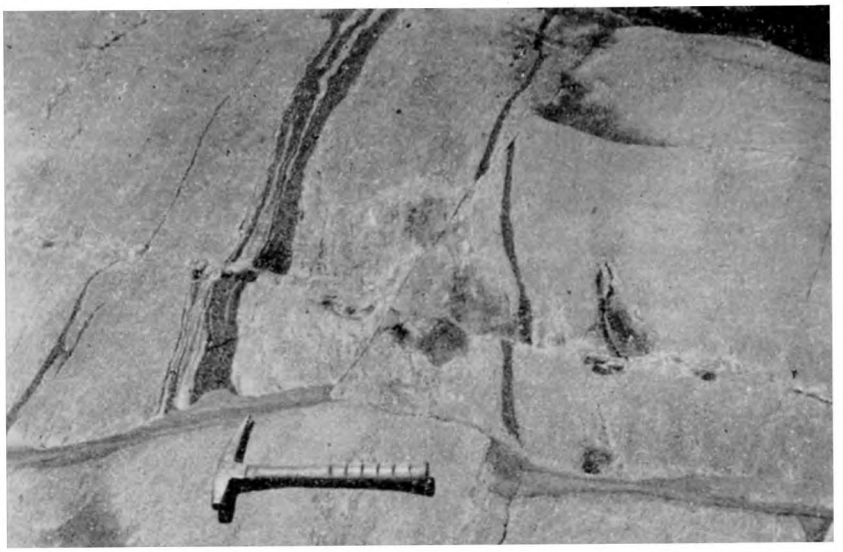
Minor faulting may be abundant. In the anorthosite (see photograph above) on the west shore of Parry island the rock has been fractured in a number of directions, and the angular blocks formed have moved small amounts clearly visible in the photograph on page 20.

On No. 11 highway in lot 17, concession VI, South Himsworth township, a road cut exposes blotchy, pink biotite-hornblende granite gneiss with a series of closely spaced joints. The joint planes are slickensided and show hematite and minute calcite crystals. The amount of movement could not be determined.

Fracturing

As noted in the section on topography a large number of rivers and lakes in the western and northwestern part of the district follow two sets of intersecting courses, presumably joint fractures. The strongest set is a series of approximately east and west fractures, cut by a series trending northeast and southwest. This

fracture pattern is apparently quite independent of the gneissic structure as it cuts right across it. It is not known whether any displacement has occurred along these fractures. Such a fracture could have been developed by forces acting in a direction N. 20°W., or the reverse, and may be related to the mountain-building forces of Killarney time of the late pre-Cambrian.



Detail of complex minor block faulting in anorthosite containing narrow bands of hornblende rock, west shore of Parry island, half a mile north of Caswell bay. The marks on the hammer handle are 1 inch apart.

METALLIC MINERALS

Aluminium

For a number of years now the American Nepheline Corporation has carried out an intensive research on the production of alumina from nepheline syenite. In a statement issued for the annual meeting in May, 1941, it was stated that the results obtained justified the erection of a pilot plant. No details of the process employed have been released, but it is understood that the method is applicable to many other silicate rocks. The corporation expects to use a nepheline syenite grading 30 per cent. alumina.

PARRY ISLAND INDIAN RESERVE

The west shore of Parry island, Indian Reserve No. 16, consists of a mass of anorthosite and associated hornblende rocks described in detail elsewhere in this report.[1] Anorthosite is a rock composed almost entirely of plagioclase feldspar, and the analysis of a grab sample[2] indicates an alumina content of 31.64 per cent. At present anorthosite is not considered as attractive a source of alumina as nepheline syenite, since the soda and potash obtainable as by-products from nepheline syenite may be an important source of income. Such by-products would only be obtained in minor amounts from the Parry Sound anorthosite, as the combined soda and potash content in this rock is only 4 per cent., whereas in nepheline syenite it is 15 per cent.

[1]Page 12.
[2]Page 12.

The size of the mass of anorthosite on Parry island makes it an important potential source of alumina.

Copper, Copper-Zinc

Most of the copper showings occur in the areas underlain by the metamorphosed sediments. There are two main types: In one type disseminated chalcopyrite, pyrite, and pyrrhotite rarely accompanied by sphalerite occur as mineralized zones in garnet-biotite gneiss, as at the old Wilcox mine. The other type consists of chalcocite and bornite with or without pyrite, chalcopyrite, and pyrrhotite occurring as disseminations in pegmatitic quartz veins or in coarse hornblende pegmatite cutting the hornblende gneiss, as at the old McGown and Vankoughnet mines. Most of the old showings are of this type, and a mere splash of sulphides in the hornblende pegmatite and associated hornblende gneiss was apparently sufficient to warrant test-pitting. Examinations of these pits shows that the sulphide mineralization is not only erratic but also, in most cases, negligible in quantity.

It is to be noted that owing to the condition of many of the old workings examination was often unsatisfactory, as in nearly all cases the shafts, pits, or trenches are filled with water and sometimes overgrown with vegetation and, owing to the presence of sulphides, the rocks are so badly weathered as to render determination of the sulphides or the host rock somewhat difficult. In many cases it was necessary to use material from the old dumps as the sole source of information about the deposits.

Sulphide mineralization throughout the townships of Cowper, Foley, and McDougall is widespread, particularly in the hornblende gneisses. Many of the local residents are convinced that a number of the isolated sulphide occurrences are all part of one zone. The writer is not of this opinion. It is true that certain geological formations can be traced for some distance and that similar types of sulphide occurrences are widespread, but this does not indicate a continuous mineralized zone. Moreover, the scattered sulphide occurrences on the surface do not allow one to assert that larger bodies will be found at depth. The lack of favourable structural conditions may account for the disconnected, isolated, small sulphide bodies, none of which is large enough in itself to constitute an ore body.

In the following pages are listed all the copper and copper-zinc showings examined. The list is known to be incomplete, but a sufficient number of occurrences have been seen to allow the above generalizations. It should be borne in mind that, with the possible exception of the old Wilcox mine, all the showings examined must be regarded as purely mineralogical occurrences.

Two reports of Coleman's[1] give much interesting information on the early copper prospects.

CARLING TOWNSHIP

Concession VII, Lots 40 and 41

Two test pits were put down in 1899 on these lots 40 and 41, concession VII, Carling township. On lot 41 hornblende gneiss occurs as a band, 3 chains in width, trending N.35°W. and dipping 30°N.E., in grey granite gneiss. The dump around the test pit, which is near the shore, shows coarse hornblende pegmatite, some carbonate, and traces of disseminated chalcopyrite. On lot 40 just east of the boundary line between lots 40 and 41 a test pit, 10 by 10 feet, has been sunk on a quartz-rich pegmatite in grey granite gneiss. No mineralization was seen.

[1]A. P. Coleman, "Copper in Parry Sound District," Ont. Bur. Mines, Vol. VIII, 1899, pt. 2, pp. 259-262; "Parry Sound Copper Region," Ont. Bur. Mines, Vol. IX, 1900, pp. 164-172.

COWPER TOWNSHIP

Concession IV, Lot 15

On the north shore of Cowper (Spider) lake on lot 15, concession IV, Cowper township, an open cut 6 feet wide, 20 feet long, and 8 feet deep at the north end exposes pegmatitized garnet-biotite gneiss. The more pegmatitic portions are mineralized with pyrrhotite, some chalcopyrite, and rarely molybdenite.

Concession IV, Lot 16

A shaft, 6 by 6 feet in diameter, has been sunk 2 chains east of the Cowper lake end of the portage between Cowper lake and Cowper bay on lot 16, concession IV, Cowper township. The country rocks are garnet pegmatite and granite gneiss with bands of amphibolite. The shaft is sunk on a garnet quartz-rich pegmatite near the footwall of a garnet amphibolite band trending N. 50° E. and dipping 45° S.E. This amphibolite band is 10 feet wide and has an exposed length of 50 feet, being cut off at the northeast end by pegmatite. On the northwest side of the shaft on a face dipping 45° S.E., vuggy, blue-grey quartz containing little to much coarse pyrite and, rarely, chalcopyrite forms a band 3 to 6 inches wide and possibly 15 feet long. A grab sample of this material taken by the writer assayed 0.02 ounces of gold per ton. Grab samples from the dump, also taken by the writer, of rusty garnet pegmatite with minute fractures filled with chalcopyrite and splashes of pyrite showed no gold on assay.

Concession IV, Lots 18, 19, 20, 21, and 22 (Wilcox Mine)

The old Wilcox property is located on the north shore of Cowper (Spider) bay and consists of the southern parts of lots 18, 19, 20, 21, and 22 in concession IV, Cowper township. These part lots are fully patented and owned by Otto Monson, 334 Endicott Building, St. Paul, Minn. There is no road to the property, but it may be easily reached by boat from Parry Sound, which is 12 miles to the northeast.

Waterways Copper Mines, Limited, incorporated in 1939, had an option on the Wilcox property and staked a considerable amount of additional ground, 64 claims in all, on strike to the northeast of the Wilcox property. Most of these claims have been allowed to lapse. The company made a surface examination and put down 9 diamond-drill holes in 1939. A geological sketch of the old workings is given in Fig. 1, and the location of the diamond-drill holes in Fig. 2. The Wilcox property was discovered in 1893 by Henry Harris and Thomas Wilcox.[1] The Parry Sound Copper Mining Company, Limited, was incorporated in 1899 to develop this property, and its holdings were sold in 1917. Active work at the property took place between 1893 and 1904,[2] with some additional work in 1910.

The geological sketch map of the old workings (Fig. 1) shows that a series of mineralized bands or lenses occur in a garnet-rich biotite gneiss at intervals over a length of 2,500 feet in a northeasterly direction from Cowper bay. The garnet-rich biotite gneiss is flanked on the south by a hypersthene-hornblende gneiss.

The mineralization seen in a series of pits will be briefly described. Frank Paradis acted as a guide to these pits.

The open cut extending northeast from Cowper bay for 100 feet is now almost entirely filled with broken rock, mainly a coarse-grained garnet-rich biotite gneiss, some of which shows a little disseminated chalcopyrite. A grab sample

[1]Ont. Bur. Mines, Vol. V, 1895, p. 274.

[2]Ont. Bur. Mines, Vol. V, 1895, p. 274; Vol. VII, 1898, pt. 1, p. 93; Vol. VIII, 1899, pt. 2, pp. 260, 261; Vol. IX, 1900, pp. 100, 167, 180, 181; Vol. X, 1901, pp. 37, 121; Vol. XII, 1903, p. 116; Vol. XIII, 1904, pt. 1, p. 94; Vol. XIV, 1905, pt. 1, p. 80.

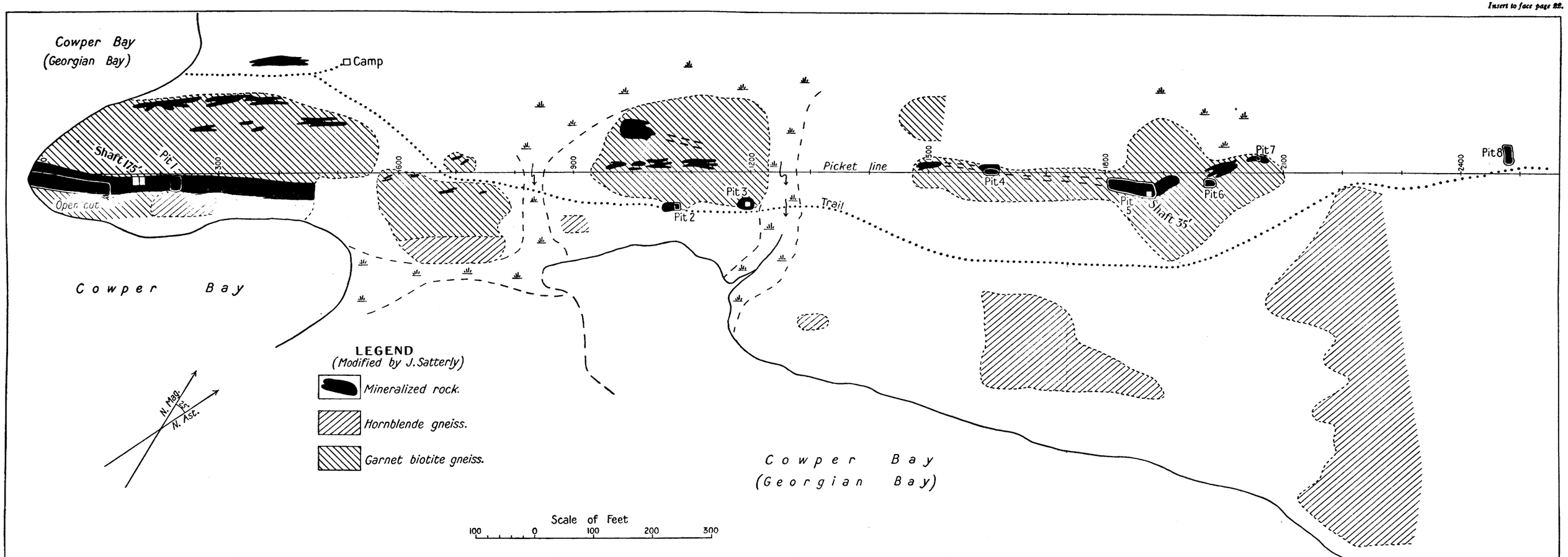


FIG. 1—GEOLOGICAL SKETCH MAP OF THE WILCOX MINE
(By Murray Watts, published with the permission of Waterways Copper Mines, Limited)

taken by the writer showed no gold. The shaft just northeast is reported to be 175 feet deep.

Pit No. 1.—Just northeast of the shaft pit No. 1 exposes biotite-garnet gneiss with disseminated chalcopyrite and pyrite. A chip sample taken by the writer across the width of the zone, 12 feet, assayed 1.09 per cent copper. The hornblende gneiss forms a band 70 feet wide adjoining the mineralized zone on the south.

Pit No. 2.—Grey, glassy quartz and plagioclase with fractures and vugs filled with chalcopyrite and pyrite are exposed in pit No. 2, which is quite shallow. Garnet and hornblende are present. A grab sample taken by the writer assayed no gold. The country rock is the biotite-garnet gneiss.

Pit No. 3.—Garnet gneiss, somewhat rusty, is exposed in pit No. 3, but no sulphides were found. A little sulphide was seen in some blocks of gneiss in the creek just to the northeast.

Pit No. 4.—Rusty garnet gneiss is also exposed in pit No. 4, but very little sulphide was found.

Pit No. 5 and Shaft.—Pit No. 5 is largely filled with waste rock from the 35-foot shaft. Mineralized rock was found on the dump. A grab sample taken by the writer of rusty, medium-grained, pegmatitized biotite gneiss with disseminations and irregular splashes of chalcopyrite, pyrrhotite, and pyrite showed a trace of gold on assay. Some of the chalcopyrite fills fractures. A grab sample taken by the writer of sphalerite-rich material from the dump consisting of reddish-black sphalerite, chalcopyrite, and rarely pyrrhotite gave 0.01 ounces of gold per ton on assay.

Pit No. 6.—Grab samples were taken by the writer of the best material on the dump of pit No. 6, which was full of water. One sample of a dark biotite gneiss with bluish-grey quartz containing splashes and disseminations of chalcopyrite, some sphalerite, and very little pyrite, gave 0.02 ounces of gold per ton. Another grab sample showing pyrrhotite, pyrite, and some chalcopyrite in a dark biotite-hornblende gneiss also assayed 0.02 ounces of gold per ton.

Pits Nos. 7 and 8.—These pits were not examined.

Data on the diamond-drilling by Waterways Copper Mines, Limited, along with the assay results are shown in the table below. Information on some of the holes is not available.

DATA ON THE DIAMOND-DRILLING ON THE WILCOX PROPERTY[1]

Hole	Dip	Direction	Core length	Description
			feet	
No. 1....	45°	N. 23° W. mag.	206	0 to 49 feet, hornblende gneiss; 49 to 52 feet, pegmatite; 52 to 100 feet, hornblende gneiss with a number of narrow pegmatite dikes; 100 feet, contact between hornblende gneiss and biotite-garnet gneiss; 100 to 206 feet, biotite-garnet gneiss with some pegmatite dikes between 100 and 125 feet. Chalcopyrite mineralization from 100 to 206 feet, with better mineralization from 125 to 167 feet.
No. 2....	45°	N. 23° W. mag.	231	0 to 100 feet, hornblende gneiss; 100 to 138.8 feet, rock unclassified owing to alteration; 138.8 to 231 feet, biotite-garnet gneiss. Chalcopyrite mineralization from 138.8 to 231 feet, with main mineralization from 138 to 188.5 feet and most concentration from 150 to 175 feet.

[1]From a report by Murray Watts, published with the permission of Waterways Copper Mines, Limited.

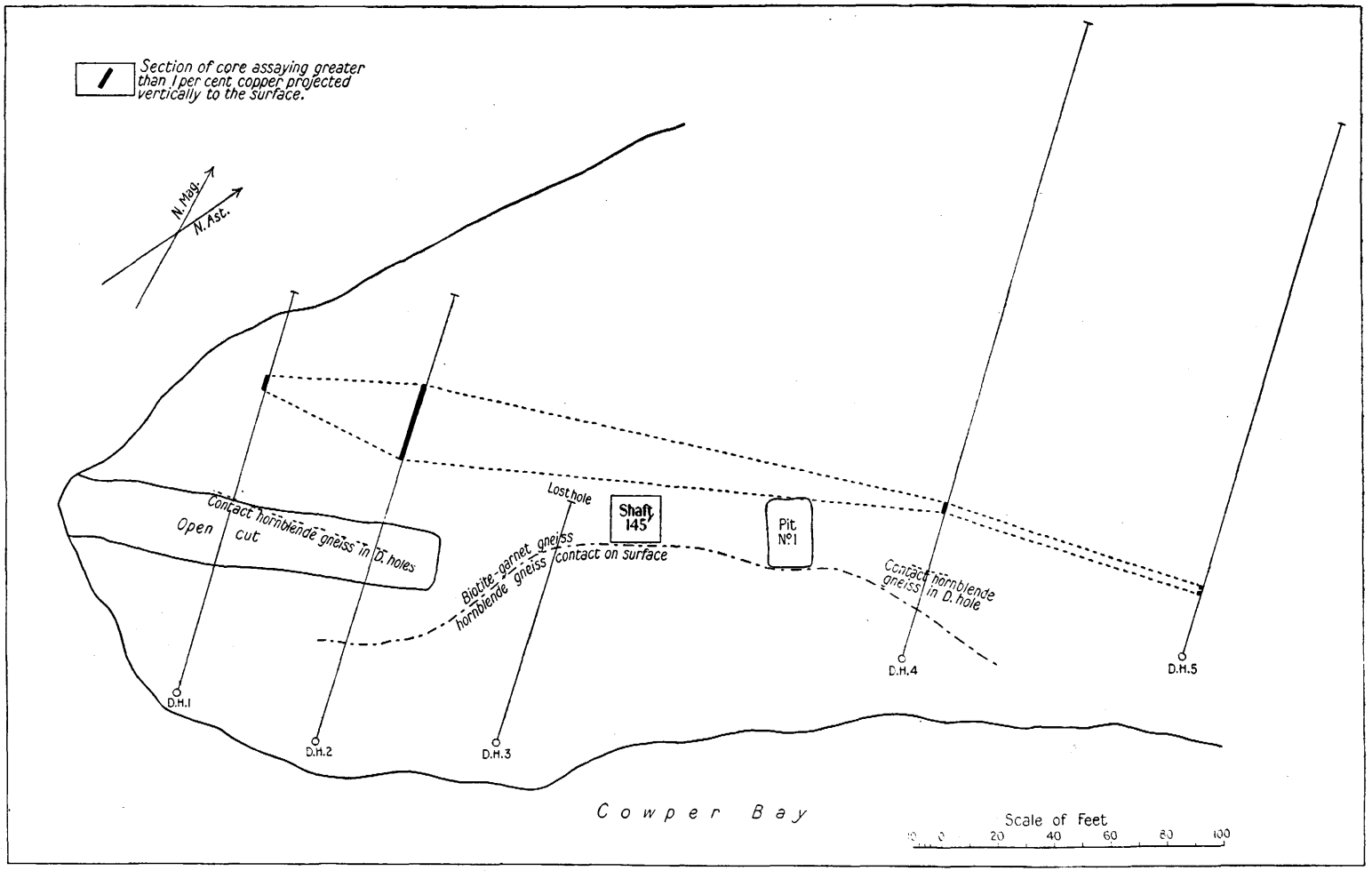


Fig. 2—Sketch map showing the location of diamond-drill holes Nos. 1 to 5 at the Wilcox mine. (From a plan by Murray Watts, and assay results, published with the permission of Waterways Copper Mines, Limited.)

DATA ON THE DIAMOND-DRILLING ON THE WILCOX PROPERTY—*Continued*

Hole	Dip	Direction	Core length	Description
			feet	
No. 3....	.....	.....	.....	Struck old drift at 125 feet and abandoned.
No. 4....	45°	N. 23° W. mag.	300	0 to 42 feet, hornblende gneiss; 42 feet, contact; 42 to 300 feet, biotite-garnet gneiss. Chalcopyrite mineralization from 42 to 73.5 feet, with most mineralization from 42 to 50 feet and from 63.5 to 73.5 feet.
No. 5....	45°	N. 23° W. mag.	275	0 to 275 feet, biotite-garnet gneiss. Two narrow bands mineralized with chalcopyrite from 31.9 to 33.1 feet and from 35.1 to 35.7 feet.
No. 6....	45°	N. 23° W. mag.	208	0 to 208 feet, [biotite-garnet] gneiss with several narrow pegmatite dikes between 150 and 200 feet. Some chalcopyrite and iron pyrite from 26.7 to 28.6 feet.
No. 7....	60°	N. 45° W. mag.	105	0 to 105 feet, [biotite-garnet] gneiss. A narrow band containing chalcopyrite from 37.65 to 38.75 feet.
No. 8....	45°	N. (mag.)	140	0 to 140 feet, [biotite-garnet] gneiss with some narrow dikes of pegmatite between 41.35 and 45 feet. Ten inches of massive sphalerite at 110 feet.

ASSAY RESULTS OF DIAMOND-DRILLING OF THE WILCOX PROPERTY BY WATERWAYS COPPER MINES, LIMITED[1]

Hole	Sample No.	Footage	Length of core	Gold	Silver	Copper
			feet	ozs. per ton	ozs. per ton	per cent.
No. 1.....	No. 1.....	125–130	5	none	0.04	0.09
	No. 2.....	130–135	5	none	.03	.11
	No. 3.....	135–140	5	none	.015	.04
	No. 4.....	140–145	5	none	.06	.31
	No. 5.....	145–150	5	trace	.08	.37
	No. 6.....	150–155	5	trace	.14	.58
	No. 7.....	155–160	5	0.005	.37	2.90
	No. 8.....	160–165	5	.005	.33	2.18
	No. 9.....	165–167	2	.005	.08	.32
No. 2.....	No. 10.....	138–140	2	trace	0.05	0.15
	No. 11.....	140–145	5	0.005	.15	.90
	No. 12.....	145–150	5	.005	.41	2.74
	No. 13.....	150–155	5	.01	.30	2.24
	No. 14.....	155–160	5	.01	.49	3.43
	No. 15.....	160–165	5	.005	.56	3.50
	No. 16.....	165–170	5	.01	.24	1.06
	No. 17.....	170–175	5	.01	.27	1.64
	No. 18.....	175–180	5	.005	.27	1.68
	No. 19.....	180–185	5	.005	.16	1.80
	No. 20.....	185–188.5	3.5	.005	.09	.79
No. 4.....	No. 21.....	42–45	3	trace	0.03	0.22
	No. 22.....	45–50	5	trace	.03	.19
	No. 23.....	63.5–68.5	5	0.005	.19	.55
	No. 24.....	68.5–73.5	5	.005	.32	2.12
No. 5.....	No. 25.....	31.9–33.1	1.2	0.005	0.41	4.11
	No. 26.....	35.1–35.7	.6	.005	.13	1.00
No. 6.....	No. 27.....	26.7–28.6	1.9	trace	0.05	0.68
No. [?].....	No. 28.....	[?]	[?]	trace	0.13	1.49

[1]Published with the permission of Waterway Copper Mines, Limited.

From the above information it is clear that there are several lenses of mineralization, as indicated in pits Nos. 1, 5, and 6, and very lean or no mineralization in the lenses in pits Nos. 2, 3, and 4. Other similar small lenses of mineralized garnet gneiss were mapped by Waterways Copper Mines, Limited.

Summing up, it appears that the copper values in the small lenses or bands of mineralized gneiss are marginal, that gold values are nil or less than $1.00 per ton, that no single lens is large enough to constitute an ore body, and that the lenses are too widely spaced to form an ore body in the aggregate under present conditions or at present prices for copper, zinc, and gold. In the future, some or all these factors may be suddenly changed and a re-examination required.

Concession IV, Lot 23

Eleven chains northeast of a small bay north of Spider point on lot 23, concession IV, Cowper township, a test pit, 6 by 15 feet in diameter, is filled with debris. The country rock is granite gneiss with amphibolite to the northwest. Rock in the test pit and on the dump shows some pyrrhotite and, rarely, chalcopyrite in the amphibolite and *lit par lit* rusty pegmatite stringers.

Concession V, Lot 9

A shallow pit on the shore of Cowper lake on lot 9, concession V, Cowper township, exposes garnet amphibolite and pegmatite. Disseminated pyrrhotite, locally pyrite, and very rarely molybdenite occur in the amphibolite.

Concession V, Lot 13

A pit, 6 feet in diameter and 4 to 5 feet deep, 18 chains north of Cowper lake in lot 13, concession V, Cowper township, has been sunk on a mineralized zone in a sedimentary gneiss band occurring in a fine-grained amphibolite. Some of the sediment is a banded, biotite-poor quartzite. The mineralized zone ranges from 4 to 5 feet in width and can be traced for 2 chains northeastward on the strike. It consists of from 5 to 25 per cent. pyrite or pyrite and pyrrhotite, with biotite and quartz.

Concession V, Lot 14

A shaft, 7 by 8 feet and 23 feet deep, has been put down on the top of a high ridge 12 chains north of Cowper lake on lot 14, concession V, Cowper township. The rock exposed in the shaft is amphibolite containing a band of rusty pegmatite. Disseminated pyrrhotite occurs in the amphibolite, and fine to coarse splashes of pyrrhotite in the pegmatite. Some pyrite and, very rarely, molybdenite are found. A grab sample taken by the writer showed no gold on assay. No trace of sulphide mineralization was found in the outcrop away from the shaft.

Concession V, Lot 20

A considerable amount of stripping and one shallow test pit are found between two small lakes on lot 20, concession V, Cowper township. The rock exposed is a garnet-biotite gneiss with several 6- to 12-inch bands of black or rusty-weathering white garnet gneiss containing disseminated magnetite and some pyrrhotite and pyrite. The bands strike N. 60° E. and dip 55° S.

Concession VI, Lot 9

Operations on lot 9, concession VI, Cowper township, were carried out between 1902 and 1904 by the Consolidated Copper Company of Parry Sound, Limited. The main shaft was reported to be 150 feet deep in 1903.[1] Two other shafts are reported, and the mineralized zone was stated to be 18 feet in width and to dip 45° S.E.[2]

[1]Ont. Bur. Mines, Vol. XIII, 1904, pt. 1, p. 93.
[2]Ibid, Vol. XII, 1903, p. 116.

The main shaft is 15 feet above the level of Cowper lake. The rock on the dump is a garnet-rich to quartz-rich biotite gneiss with an erratic mineralization of disseminated chalcopyrite and pyrrhotite. The ridges north of the shaft expose numerous rusty patches in the garnet-biotite gneiss, which contains pegmatite and bands of amphibolite. These rusty patches sometimes are not sulphide-bearing, the staining coming from the garnets. The sulphides are pyrite, pyrrhotite, and very rarely chalcopyrite. Some magnetite was seen.

On a point in Cowper lake just south of the shaft some shallow test-pitting has been done on a garnet-biotite gneiss and pegmatite carrying minor amounts of pyrite, pyrrhotite, and chalcopyrite.

FERGUSON TOWNSHIP

Concession V, Lot 3

On lot 3, concession V, Ferguson township, exposures of rusty garnet amphibolite and biotite gneiss containing pegmatite stringers rarely carry a little pyrite.

Concession V, Lot 5

Banded pink hybrid gneiss and rusty-weathering garnet amphibolite are exposed in the farmyard on lot 5, concession V, Ferguson township. A pit in the amphibolite shows some coarse disseminated pyrrhotite and, rarely, chalcopyrite.

FOLEY TOWNSHIP

Concession II, Lot 14

Two pits were put down in 1925 on lot 14, concession II, Foley township. The pit 5 chains south of the farmhouse exposes hornblende gneiss mineralized with disseminated chalcopyrite, pyrite, pyrrhotite, and magnetite. A 4-pound grab sample taken by the writer assayed 0.32 per cent. copper. The second pit, 26 chains south of the farmhouse, is sunk in a black, fine- to medium-grained amphibolite and is mineralized with disseminated pyrrhotite and chalcopyrite accompanied by garnets. A 6-pound grab sample taken by the writer contained 0.26 per cent. copper on assay.

Concession III, Lot 10, Southern Part

In the southern part of lot 10, concession III, Foley township, a small pit has been put down in a hornblende gneiss and white hornblende pegmatite and glassy, in part rusty, quartz carrying a few cubes of pyrite.

Concession III, Lot 10, Northern Part

A pit has been sunk on a rusty zone in streaky hornblende gneiss in the northern part of lot 10, concession III, Foley township. No sulphides were found.

Concession IV, Lot 12

A 4-foot drainage ditch in a field in lot 12, concession IV, Foley township, exposes hornblende gneiss containing stringers and irregular bands of quartz-rich white pegmatite slightly mineralized with pyrite, chalcopyrite, and pyrrhotite.

Concession IV, Lot 13

A drainage ditch in lot 13, concession IV, Foley township, exposes biotite gneiss and quartz-rich garnet-biotite gneiss carrying very minor amounts of chalcopyrite, pyrite, and pyrrhotite.

Concession IV, Lot 15

On lot 15, concession IV, Foley township, a pit 10 feet long, 4 feet wide, and from 3 to 5 feet deep, has been put down in a garnet-hornblende gneiss striking

N. 15° E. The gneiss dips 57° W., where it is cut by a 5- to 8-inch vuggy, white to grey quartz vein carrying coarse pyrite. The vein has an exposed length of 5 feet. Seams of chalcopyrite, pyrrhotite, and pyrite occur in minute fractures in the hornblende gneiss. Grab samples of the quartz and the mineralized gneiss gave no gold values on assay.

Concession V, Lot 33

The work on the old Big Four property, lot 33, concession V, Foley township, consists of two pits, sunk in 1899, 7 chains north of the end of the portage at Three-Legged lake. One of the pits is 4 by 4 feet and 4 feet deep. These pits expose hornblende gneiss, bluish quartz-rich pegmatite, and glassy quartz. The quartz is vuggy and carries much pyrite and, rarely, a little chalcopyrite. A grab sample of this quartz taken by the writer showed no gold values on assay.

Concession VI, Lot 23

Near Otter lake on lot 23, concession VI, Foley township, a pit, 25 by 10 feet and 10 feet deep, was put down in 1901 through clay drift to bed rock. The rock on the dump consists of grey biotite granite gneiss, white biotite-poor granite gneiss, and hornblende gneiss. No mineralization was found.

Concession VI, Lot 33

The shaft of the old Mountain mine is situated at the base of a 30-foot cliff, 20 feet above McCoy lake, in lot 33, concession VI, Foley township. No quartz vein can be seen in the hornblende gneiss at the mouth of the shaft, but on the dump quartz-hornblende vein material as much as 6 inches in width, is sparsely mineralized with chalcopyrite, bornite, and, rarely, magnetite.

Concession VII, Lot 25

The 4- by 6-foot shaft of the old McDonald mine in lot 25, concession VII, Foley township, was worked in 1898 and 1899 and is reported to be 106 feet deep. The country rock in the vicinity of the shaft is a hornblende gneiss containing three pink granitized zones, two of which are 4 inches wide and the other 5 inches, which carry disseminated chalcopyrite, some bornite, and secondary malachite. A grab sample of the sulphide-bearing material taken by the writer showed no gold values when assayed.

Concession VII, Lot 25

A pit, 10 by 10 feet and from 3 to 4 feet deep, now overgrown with bushes, is located on the south shore of McDonald lake on lot 25, concession VII, Foley township. The rock exposed is a granite gneiss containing bands of hornblende gneiss. Rarely, a little chalcopyrite fills fractures in the granite gneiss.

Concession VII, Lot 26

A shaft, 8 by 14 feet and reported to be 55 feet deep, was sunk in 1901 two chains east of the road on lot 26, concession VII, Foley township. The rock is a hornblende gneiss containing many minute stringers of pegmatite and cut by a 2-foot dike of pink pegmatite in the shaft. Copper minerals were reported found here, but none was seen on the dump.

Concession VII, Lot 26

A shaft, 10 by 10 feet and reported to be 60 feet deep, was sunk in 1909 nine chains west of the road on lot 26, concession VII, Foley township. The rock is a hornblende gneiss containing stringers and dikes of pink to white biotite pegmatite. Some of the hornblende gneiss shows finely disseminated pyrrhotite and, rarely, chalcopyrite. A little chalcopyrite also occurs as seams filling minute fractures in the pegmatite.

Concession IX, Lot 15

The old Vankoughnet mine on lot 15, concession IX, Foley township, was opened in 1899, and a shaft 5 by 7 feet was sunk 37 feet.[1] Two large dumps will be referred to as the east and west dumps. There is a shallow test pit 2 chains southwest of the shaft.

The country rock is hornblende gneiss and hornblende pegmatite. The east dump shows hornblende gneiss containing bands of hornblende pegmatite sparsely mineralized with bornite and chalcopyrite. The west dump consists of pale-pink granite gneiss, some pink pegmatite, and grey and white biotite-hornblende granite gneiss.

Concession IX, Lot 35

The old Lafex mine in lot 35, concession IX, Foley township, was operated between 1897 and 1899. The development consists of a 10- by 10-foot shaft 65 feet deep,[2] with 20 feet of drifting to the west.[3] At 25 feet west of the shaft there is a 10- by 10-foot pit. These workings are near the top of a high hill.

The shaft is sunk on a rusty-stained hornblende gneiss. Material on the dump shows a rusty-weathering, coarse, grey pegmatite heavily mineralized with pyrrhotite, a little chalcopyrite, and pyrite in fractures. The hornblende gneiss shows a similar mineralization adjacent to the pegmatite. A grab sample of the mineralized pegmatite taken by the writer assayed 0.13 per cent. copper and no gold.

On the northeast wall of the pit 25 feet to the west there is exposed silicified rock from 2 to 4 feet in width mineralized with pyrrhotite. A grab sample taken by the writer showed no gold on assay. This mineralized pegmatite trends N. 30° E., dips 65° S.E., and is exposed on the surface at 60 and 105 feet from this pit where it is 6 and 12 inches wide, respectively. A rusty zone, which includes the pegmatite, is 5 feet in width.

Concession X, Lot 15

A pit, 10 by 10 feet and 5 feet deep, has been sunk in hornblende gneiss on lot 15, 13 chains south of the road on the line between concessions X and XI, Foley township. Very little mineralization was observed. Rarely, disseminated pyrrhotite and chalcopyrite occur in hornblende pegmatite stringers or on joint surfaces.

Concession X, Lot 19

The development on lot 19, concession X, Foley township, consists of a 5- by 5-foot shaft 1 chain south of the concession road and a test pit at the road, 10 by 10 feet and 5 feet deep. The rock on the dump and the outcrop around the shaft is silicified granite gneiss, pegmatite, and hornblende pegmatite carrying a very minor amount of disseminated pyrrhotite, chalcopyrite, and pyrite. The test pit exposes a lens of coarse (1-inch) hornblende pegmatite mineralized with disseminated pyrrhotite and chalcopyrite.

Concession XI, Lot 13

On lot 13, concession XI, Foley township, a shaft, reported to be 90 feet deep and now almost filled with waste rock, has been sunk in amphibolite and garnet amphibolite carrying a little quartz. Some of the glassy white quartz shows a few splashes of chalcopyrite.

---

[1] Ont. Bur. Mines, Vol. IX, 1900, p. 32.
[2] Ibid, Vol. VIII, 1899, p. 261.
[3] Ibid, Vol. IX, 1900, p. 167.

Concession XI, Lot 15

On lot 15, concession XI, Foley township, a shallow pit, now completely overgrown, has been put down in hornblende gneiss containing bands of coarse, white pegmatite. No mineralization was found.

Concession XI, Lot 16

On lot 16, concession XI, Foley township, a pit, 6 by 8 feet and 4 feet deep, is located 13 chains north of the concession road and 1 chain west of the boundary between lots 15 and 16. The rock is a hornblende gneiss cut by hornblende pegmatite carrying purplish quartz. Little mineralization was seen in the pegmatite, but the hornblende gneiss is locally mineralized with finely disseminated pyrrhotite and chalcopyrite.

Concession XI, Lot 17

On lot 17, concession XI, Foley township, a shaft, 8 by 9 feet and reported to be 40 feet deep, has been sunk 7 chains north of the concession road in granitized hornblende gneiss with *lit par lit* hornblende pegmatite. A little chalcopyrite in glassy white quartz was found on the dump.

Concession XI, Lot 27

On lot 27, concession XI, Foley township, a pit, 10 by 10 feet and 10 feet deep, has been sunk on a purplish coarse pegmatite sparsely mineralized with bornite and chalcopyrite; the latter is now altered in part to malachite. The country rock is a hornblende gneiss.

Concession A, Lot 137B

The old Burns shaft, 10 by 10 feet and reported to be over 100 feet deep, is situated just northeast of the Canadian Pacific railway track on lot 137B, concession A, Foley township. It is understood that the work was carried out in 1898–99. At the shaft a 4- to 8-inch band of coarse hornblende pegmatite, trending N. 15° W. and dipping 75° W., cuts hornblende gneiss. At the contacts of the band a little bornite, chalcocite, and chalcopyrite were seen. Rock on the dump indicates that pink pegmatite and a siliceous granite gneiss were encountered in the shaft. In the latter chalcopyrite is present in very minor amount filling fractures.

Concession A, Lot 145

On lot 145, concession A, Foley township, a small pit on the side of a hill just south of No. 69 highway exposes a hornblende-rich pegmatite cutting hornblende gneiss. Associated with large hornblende crystals in the pegmatite are a few grains of bornite and chalcocite.

Concession B, Lot 123

On lot 123, concession B, Foley township, an 8- by 10-foot shaft, reported to be 18 feet deep, was sunk in 1930 on a banded, silicified hornblende gneiss striking N. 20° W. and dipping vertically. No vein or mineralized zone is present in the outcrop adjacent to the shaft, but rock on the dump show some disseminated pyrrhotite in quartz stringers.

On the same lot a ditch on the south side of the Canadian National railway exposes hornblende gneiss containing quartz stringers carrying pyrite and chalcopyrite. There is one vuggy, grey quartz vein, 3 feet in width, carrying coarse pyrite and coarse pink calcite.

Concession B, Lot 145

On a point jutting westward at the east end of McGown lake in lot 145, concession B, Foley township, a shallow pit has been put down in a folded complex of hornblende gneiss and granite gneiss. A few grains of chalcopyrite were observed in the hornblende gneiss. Another pit has been sunk just to the east in a pink pegmatite cutting hornblende gneiss. No sulphide mineralization was seen.

Concession B, Lot 146 (McGown Mine)

The old McGown mine is situated in lot 146, concession B, Foley township, just northeast of No. 69 highway and 1½ miles from Parry Sound.

The original discovery was made in 1894 by Thomas McGown and sons, of Parry Sound,[1] and the mine taken over in 1897 by the McGown Gold Mining

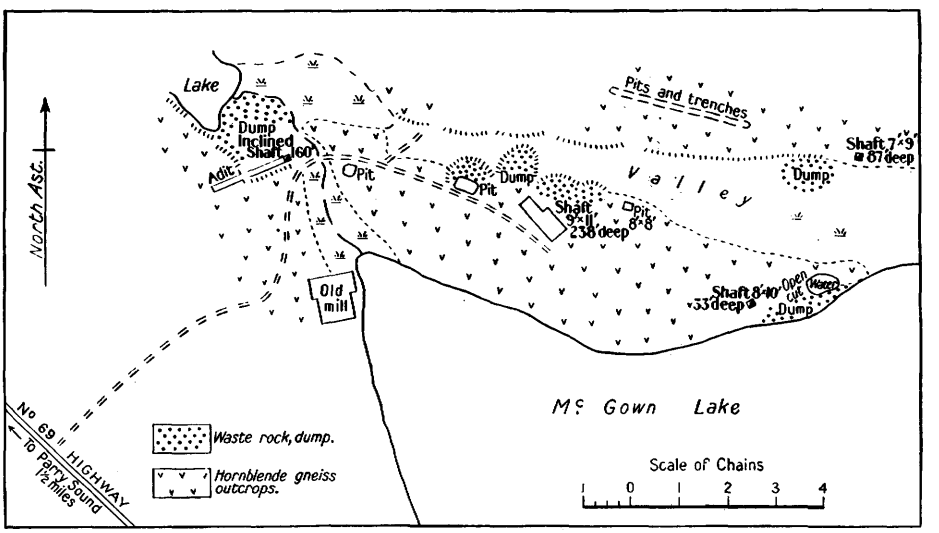


Fig. 3—Sketch map of the old McGown mine, lot 146, concession B, Foley township.

Company of Parry Sound, Limited.[2] A year later it was acquired by the Parry Sound Copper Mining Company, Limited.[3] At the present time the property is owned by the First National Trust Company, Davenport, Iowa.

A sketch map of the old workings is shown in Fig. 3. The earliest work, late in 1894, was the open cut or trench between McGown lake and a lake to the northwest.[4] An inclined shaft was put down at the east end of this trench in 1897,[5] and after reaching 160 feet was abandoned in 1900.[6] A vertical shaft (the shafthouse is now used as a barn), 9 by 11 feet, was started in 1898 and reached a depth of 238 feet with a level at 160 feet and crosscuts 25 feet to the north-northeast and 30 feet to the south-southwest.[7] Southeast of this shaft near McGown lake, a second shaft, 8 by 10 feet, reached a depth of 33 feet in 1900.[8] The open cut on

[1]Ont. Bur. Mines, Vol. IV, 1894, pp. 98-100.
[2]Ibid, Vol. VII, 1898, pt. 1, p. 88.
[3]Ibid, Vol. VIII, 1899, pt. 2, pp. 259, 260.
[4]Ibid, Vol. V, 1895, p.. 265
[5]Ibid, Vol. VII, 1898, pt. 1, p. 88.
[6]Ibid, Vol. VIII, 1899, pt. 2, pp. 259, 260; Vol. IX, 1900, pp. 100, 165, 180; Vol. X, 1901, p. 120.
[7]Ibid.
[8]Ibid, Vol. X, 1901, p. 120.

the shore of McGown lake was started in 1897, being 21 feet deep in 1898.[1] North of this open cut a shaft (No. 3), 7 by 9 feet, was reported in January, 1902,[2] to be 87 feet deep with a level at 77 feet and a crosscut to the south 77 feet in length, later continued to 131 feet. A 3-foot bornite vein was cut at 70 feet in this crosscut and drifted on 12 feet to the northeast and 10 feet to the southwest.[3] Some further underground work was reported for the years 1907 and 1908.[4] Government diamond-drilling was carried out in 1897, 3 holes being put down; but no data as to values, if any, were reported.[5] A 10-ton stamp mill was erected in 1898.[6]

In June, 1899, 6 carloads of ore, weighing 143 tons, were shipped to the Orford Copper Company. This material netted the producers $5,399 after deducting costs of shipping and smelting. This ore came from the open cut on the shore of McGown lake. In July, 1899, another shipment of about 24 tons was made to the same company.

The country rock is a medium-grained hornblende or biotite-hornblende gneiss with much introduced glassy quartz. The gneissic structure near the open cut at McGown lake strikes N. 75° W. and dips 70° S.W.

Little mineralized rock can now be seen in place, but a study of material on the dumps shows a copper mineralization of two types: (1) as disseminated chalcocite and bornite in very glassy, white to bluish-grey quartz vein material with specks of ferromagnesian minerals, and (2) disseminations, lenses, or masses of chalcocite and bornite accompanied by red garnet, epidote, and altered hornblende in silicified hornblende gneiss with quartz or pegmatite stringers. Masses of solid sulphides apparently occurred to a small extent, as in the open cut at McGown lake. Type (1) mineralization apparently came from a series of parallel narrow quartz veins occurring across a width of 3 feet in the trench between the two lakes.[7] A grab sample taken by the writer of this material ran 0.09 ounces of gold per ton. Quartz vein material also occurred in a series of trenches and a shaft north of a valley (see Fig. 3). A grab sample of type (2) material taken by the writer from the dump at the old open cut at the shore of McGown lake assayed 0.08 ounces of gold per ton. Native gold as a scaly aggregate on a seam of chalcocite-bornite in hornblende gneiss was found on this dump.

From the information in the old reports on the direction of drifts in the old shafts it appears that some of the veins do not parallel the gneissic structure, N. 75° W., but angle across it in a northeast-southwest direction. It would also seem from the number of isolated shafts and pits and the lack of mineralization in the outcrop between them that the copper mineralization is very spotty in its distribution and that these workings more than encompassed the mass of any mineralized rock present. In fact, from the information now available, there seems to be little hope of finding an ore body in the area covered by these old workings.

LOUNT TOWNSHIP

Concession B, Lot 124

A shaft, 6 by 9 feet and reported to be 43 feet deep, is situated 2½ chains north of the road in lot 124, concession B, Lount township. The country rock is a garnet amphibolite. The waste rock around the shaft consists of feldspar

[1]Ont. Bur. Mines, Vol. VIII, 1899, pt. 2, p. 260.
[2]Ibid, Vol. XI, 1902, p. 267.
[3]Ibid, Vol. XII, 1903, p. 116.
[4]Ibid, Vol. XVII, 1908, pp. 41, 47; Vol. XVIII, 1909, pt. 1, p. 50.
[5]Ibid, Vol. X, 1901, pp. 51, 56.
[6]Ibid, Vol. VIII, 1899, pt. 2, p. 260.
[7]A. P. Coleman, Ont. Bur. Mines, Vol. IV, 1894, p. 100.

amphibolite, some of which contains epidote or garnet and epidote and crystalline limestone. Also present is a massive red garnet rock carrying much chalcopyrite and pyrrhotite. A grab sample of the latter taken by the writer gave only low gold values on assay.

McDOUGALL TOWNSHIP

Concession I, Lot 18

A pit 10 by 10 feet and 10 feet deep was put down in 1899 two chains south of the road and 2 chains west of a pond on lot 18, concession I, McDougall township. The rock is a medium-grained, dark-green feldspar amphibolite containing irregular areas of coarse hornblende aggregate, cut by a few pegmatite stringers. Magnetite is present in the amphibolite. In the coarse hornblende aggregate a few scattered grains of bornite and chalcopyrite were found, and disseminated chalcopyrite was seen on a joint face.

Concession XII, Lot 13

An open cut on the south slope of a hill, 5½ chains north of a lake in lot 13, concession XII, McDougall township, exposes garnet-hornblende gneiss striking N. 30° W. and dipping 47° E. Interbanded with the gneiss is a deeply weathered mineralized zone. It consists of bands of glassy, rusty quartz containing seams of pyrite, chalcopyrite, and pyrrhotite filling fractures parallel to the strike. A grab sample of this material taken by the writer gave no gold values on assay. To the east is a 1- to 3-foot band of greenish sheared rock heavily mineralized with dark sphalerite and containing some chalcopyrite and, rarely, galena. A grab sample of this aggregate taken by the writer also gave no gold values on assay. The hanging wall of the sphalerite band is a band of sugary garnet-biotite gneiss. The mineralized zone pinches out to the northwest and is probably only a small lens.

MONTEITH TOWNSHIP

Concession IX, Lot 19

A pit, 10 by 10 feet and 4 feet deep, has been put down on a pink, medium-grained hornblende granite gneiss sparsely mineralized with lenticular stringers and disseminations of chalcopyrite.

Copper-Nickel

Seven copper-nickel showings widely scattered over the area were examined. The mineralization is pyrrhotite and chalcopyrite as disseminations or solid sulphide lenses in amphibolite or norite (see photograph on page 34). The occurrences are described in the following pages. Early reports of the Ontario Bureau of Mines note a number of occurrences around Caribou lake in McConkey township. The writer was unable to find anybody who knew of these old occurrences. From Coleman's descriptions,[1] however, they are apparently similar to that seen on Memesagamesing lake.

ARMOUR TOWNSHIP

Concession VIII, Lot 17

The old Nickel Cliff mine on lot 17, concession VIII, Armour township, is approximately 3 miles east of Burk's Falls. In 1900 and 1901 a shaft was put down 32 feet with 20 feet of drifting to the north.[2] The deposit was drilled in 1903–1904, three holes passing through the sulphide-bearing lens into gneiss below.[3]

[1]A. P. Coleman, Ont. Bur. Mines, Vol. IX, 1900, pp. 170, 171.
[2]Ont. Bur. Mines, Vol. XI, 1902, p. 286.
[3]Ibid, Vol. XIII, 1904, pt. 1, p. 44.

The large dump shows amphibolite with sugary quartz and garnet mineralized with pyrrhotite and a minor amount of chalcopyrite. The amount of solid sulphides, chalcopyrite and pyrite, is small. A grab sample of these sulphides taken by the writer assayed 1.37 per cent. copper, 1.40 per cent. nickel, and 0.01 ounces of gold per ton.

Concession VIII, Lot 18

A test pit adjacent to the road on lot 18, concession VIII, Armour township, was put down on coarse amphibolite carrying disseminated pyrrhotite and chalcopyrite. It is now filled with garbage.

Spheroidal weathering of well-jointed norite, open cut and old shaft (covered in the foreground), Kelcey showing, Memesagamesing lake, lot 23, concession VIII, Hardy township.

HARDY TOWNSHIP

Concession VIII, Lot 23

One chain from the shore of Memesagamesing lake on lot 23, concession VIII, Hardy township, a shaft, reported to be 30 feet deep, has been sunk from the floor of an open cut 15 by 40 feet and 10 feet deep. Just northwest of the open cut is a pit 10 by 10 feet and 10 feet deep.

The open cut exposes rusty-weathering norite with a well-developed jointing striking N. 85° W. and dipping 85° S. This jointing is intersected by a flat jointing, which produces a blocky structure. There is a little disseminated sulphide at the east end of the open cut. In the pit just northwest a 3-pound grab sample of disseminated chalcopyrite and pyrrhotite in norite taken by the writer assayed 0.17 per cent. copper and 0.22 per cent. nickel. A 5-pound grab sample of norite containing disseminated sulphides from the dump assayed 0.05 per cent. copper and no nickel; and a 12-pound grab sample of the solid sulphides from the dump taken by the writer assayed 0.68 per cent. copper and 0.71 per cent. nickel. It is presumed that the solid sulphides are of small extent, as none can be seen in place in the present workings.

Concession VIII, Lot 25

On the southeast point of an island in Memesagamesing lake on lot 25, concession VIII, Hardy township, a pit 10 by 10 feet and 6 feet deep has been sunk in rusty-weathering norite sparsely mineralized with pyrrhotite and pyrite. A grab sample taken by the writer was assayed for copper and nickel with negative results.

MILLS TOWNSHIP

Concession II, Lot 10

A pit was being put down in 1941 on the south bank of a creek in lot 10, concession II, Mills township. The rocks exposed are green, impure crystalline limestone with a crumbly-weathering black garnet amphibolite forming a 15-foot interbed. Coarse graphite is erratically distributed on the amphibolite-limestone contact and as small scales in the amphibolite. Pyrrhotite occurs in the amphibolite as a fine dissemination and, rarely, as bunches up to 2 inches in diameter. Films and splashes of pyrite are present on joint faces. This mineralized amphibolite failed to show a trace of gold on assay.

PERRY TOWNSHIP

Concession XIII, Lot 35

A pit 10 by 8 feet and 15 feet deep has been sunk in spheroidally weathering amphibolite mineralized with pyrrhotite on lot 35, concession XIII, Perry township. A grab sample taken by the writer assayed 0.08 per cent. copper and 0.19 per cent. nickel.

PROUDFOOT TOWNSHIP

Concession X, Lot 3

A pit 8 by 8 feet and 6 feet deep on lot 3, concession X, Proudfoot township, exposes amphibolite mineralized with disseminated pyrrhotite and, more rarely, chalcopyrite. A grab sample taken by the writer assayed a trace of nickel and no copper.

Gold

The so-called gold showings are mainly of two types: (1) disseminated sulphides in the sedimentary gneisses and, more rarely, in crystalline limestone; (2) in pegmatites occurring as dikes, as stringers, or *lit par lit* in the hybrid gneisses.

The common sulphides are pyrite and pyrrhotite. Rarely chalcopyrite is found. A large number of grab samples were taken from these deposits and assayed for gold; none was found, except in a few samples that gave a trace. High gold assays have been reported, but the general trend of reported assays is from $1 to $2 of gold per ton. A number of samples from other occurrences were assayed for gold, but most of them have very low gold values or none at all. This information is noted in the sections on Copper and Copper-Zinc and Copper-Nickel.

The mineralized zones in the sedimentary gneisses range from a few to 50 feet in width, but owing to the negligible or low gold values none of the occurrences seen would appear to be even prospects.

ARMOUR TOWNSHIP

Concession IX, Lot 28

A small pit on lot 28, concession IX, Armour township, reported put down in 1910, exposes a rusty-weathering, white quartzite band, carrying a few scattered grains of pyrite, in biotite gneiss.

BETHUNE TOWNSHIP

Concession VIII, Lot 14

In 1939 and 1940 the Tiffany Mining Syndicate put down a number of shallow pits on lot 14, concession VIII, Bethune township, and reports gold values. The rock exposed is a garnet-hornblende gneiss cut by coarse, pink biotite pegmatite. The gneiss is sparsely mineralized with disseminated pyrrhotite.

FOLEY TOWNSHIP

Concession III, Lot 9

On lot 9, concession III, Foley township, a pit, 4 by 4 feet and 4 feet deep, has been put down in a hornblende gneiss cut by grey pegmatitic quartz stringers, a 2-inch stringer on the west side of the pit and a 2- to 6-inch stringer on the east side. The quartz carries a few grains of pyrrhotite and pyrite, and some pyrrhotite occurs in the gneiss next to the stringers.

GURD TOWNSHIP

Concession XIX, Lot 10

On lot 10, concession XIX, Gurd township, a pit, 9 by 7 feet and 5 feet deep, has been sunk in pink biotite granite gneiss cut by a 1-foot green altered basalt dike trending N. 77° W. and dipping 88° N. The south contact of the dike forms the south wall of the pit. Some disseminated pyrite in small cubes in the basalt is the only mineralization. A grab sample taken by the writer gave a trace of gold on assay.

HAGERMAN TOWNSHIP

Concession A, Lot 61

Low gold values are reported from two pits northwest of the road in Dunchurch, lot 61, concession A, Hagerman township. A pit 8 chains from the road exposes pegmatite in biotite granite gneiss carrying a little pyrrhotite and chalcopyrite. Another pit, 12 chains from the road, shows granite gneiss and pegmatite with inclusions of hornblende gneiss and crystalline limestone. The pegmatite carries a little pyrite, pyrrhotite, and chalcopyrite.

Concession B, Lot 37

On lot 37, concession B, Hagerman township, a pit, 6 by 6 feet and 6 feet deep, exposes a medium- to coarse-grained garnet-hornblende gneiss sparsely mineralized with disseminated pyrrhotite.

LAURIER TOWNSHIP

Concession XIII, Lot 21

A pit, 10 by 10 feet and 8 feet deep, on the west side of a point near the west end of Sausage lake in lot 21, concession XIII, Laurier township, exposes rusty-weathering, sugary, fine-grained, grey quartzitic gneiss containing biotite and garnet, some graphite, and disseminated pyrrhotite. Grab samples taken by the writer from the dump and from the bottom of the pit yielded on assay traces of gold. This occurrence was reported to have been found in 1914.

Concession XIII, Lot 22

On lot 22, concession XIII, Laurier township, a pit, 6 by 6 feet and 6 feet high at the face, at the base of a 30-foot slope on the north shore of Sausage lake west of its outlet, exposes rusty-weathering, grey flinty quartzite carrying very finely disseminated pyrrhotite. A grab sample taken by the writer assayed a trace of gold.

Concession XIII, Lot 22

A pit, 8 by 8 feet and from 6 to 9 feet deep, on the north shore of Sausage lake east of its outlet, on lot 22, concession XIII, Laurier township, exposes a very weathered, rusty, sugary quartzite cut by a 1- to 2-foot pink biotite pegmatite slightly mineralized with pyrite. Some of the quartzite on the dump carries disseminated pyrrhotite. A grab sample of this material taken by the writer failed to show a trace of gold on assay.

McCONKEY TOWNSHIP

Concession IV, Lot 18

On the south shore of the west arm of Caribou lake in lot 18, concession IV, McConkey township, an open cut 10 feet wide extends 30 feet into the side of a hill, exposing rusty-weathering biotite gneiss, some garnet-biotite gneiss, and a coarse, pink muscovite pegmatite on the east wall of the open cut. Gold values are reported, but a grab sample of rusty gneiss taken by the writer failed to show a trace of gold on assay.

MACHAR TOWNSHIP

Concession V, Lot 2

An open cut, 20 by 15 feet and 15 feet high at the face, near the top of a hill in lot 2, concession V, Machar township, exposes biotite augen gneiss, in part garnetiferous. In a 15-foot cliff a few chains south of the open cut two small pink pegmatite dikes, one from 2 to 3 feet wide and the other 1 foot wide, cut the gneiss. No sulphide mineralization was observed.

McMURRICH TOWNSHIP

Concession I, Lot 18

In lot 18, concession I, McMurrich township, a pit, 6 by 8 feet and 5 feet deep, in garnet hornblende gneiss containing lenses of white pegmatite shows a few grains of pyrite and pyrrhotite present in both rock types. Low gold values are reported.

Concession XIV, Lot 13

A small pit in a quartz-rich pegmatite on lot 13, concession XIV, McMurrich township, shows no sulphide mineralization. Low gold values are reported.

Concession XIV, Lot 14

On lot 14, concession XIV, McMurrich township, pits have been put down in a garnet gabbro containing stringers and lenses of biotite-hornblende pegmatite.

MONTEITH TOWNSHIP

Concession VIII, Lot 15

Two pits have been sunk in lot 15, concession VIII, Monteith township. The southern pit, 10 by 10 feet and 6 feet deep, exposes biotite gneiss, garnet-biotite gneiss, and hornblende gneiss with pegmatite stringers. No mineralization was seen. The northern pit, 10 by 15 feet and 4 feet deep, shows some disseminated pyrite in a biotite-muscovite gneiss band in biotite gneiss.

Concession IX, Lot 17

A pit at the edge of the Seguin river in lot 17, concession IX, Monteith township, exposes biotite gneiss with disseminated pyrite. Low gold values are reported.

Concession X, Lot 11

In lot 11, concession X, Monteith township, the country rock is a complex of garnet-biotite gneiss, biotite gneiss, and pegmatite, with some hornblende gneiss. A pit 10 by 10 feet and 12 feet deep, has been sunk on a zone trending N. 50°E. and dipping 60° S.E. in a biotite gneiss with pegmatite stringers carrying disseminated pyrite and, rarely, chalcopyrite. A grab sample of mineralized gneiss taken by the writer from the dump showed no gold on assay, although gold values are reported by the owner. Six chains to the northeast of this pit disseminated pyrite is found in a muscovite-biotite gneiss, which may be on the strike of the zone described above.

Concession XI, Lot 8

In lot 8, concession XI, Monteith township, a pit in hornblende gneiss with narrow bands of impure crystalline limestone shows some disseminated pyrite and pyrrhotite in the hornblende gneiss. A grab sample of this material taken by the writer was assayed for gold, but none was found.

NIPISSING TOWNSHIP

Concession I, Lot 20

On lot 20, concession I, Nipissing township, two pits have been put down in the southeast bay of Ruth lake, one 10 feet in diameter at the shore, and the other 3 by 3 feet and 1 foot deep 2 chains from the shore. The rock exposed is a biotite granite gneiss cut by a number of irregular white pegmatite dikes from 1 to 10 feet in width. A few grains of pyrrhotite were found in the pegmatite.

Concession I, Lot 25

The pit of the old Hewitt mine on lot 25, concession I, Nipissing township, extends 15 feet into the face of a cliff 20 feet high. This work was carried out about 1900. Stringers of pyrite or finely disseminated pyrite occur in biotite or garnet-biotite gneiss. A grab sample taken by the writer gave a trace of gold on assay.

Concession X, Lots 28 and 29

W. T. King, Jr., has put down a number of pits on Reserve creek, which flows into Duncan lake, on lots 28 and 29, concession X, Nipissing township.

At 24 chains upstream from Duncan lake on lot 28 a trench 1 chain south of the creek, trends S.10° W. and cuts into the side of a hill for a length of 45 feet. The trench is from 6 to 10 feet wide and has a maximum depth of 9 feet. All but the southern 6 feet is in a much fractured, spheroidally weathered diabase. The last 6 feet is in a red and white, brecciated pegmatite containing varying amounts of white carbonate. The contact between the pegmatite and the diabase is brecciated and filled with a green and red clay gouge. A similar fractured zone with gouge occurs across a width of from 3 to 6 inches at the face of the trench. These contacts trend N. 55° W. and dip 70° S. A little chalcopyrite occurs with the carbonate in the pegmatite. No gold was found on an assay of a grab sample taken by the writer.

An exposure of diabase in the creek indicates a width of at least 150 feet for the diabase dike.

Just northwest of the mouth of the trench a pit 10 by 10 feet and 10 feet deep exposes fractured diabase. Rarely a little chalcopyrite coats minute quartz crystals filling joints. A grab sample taken by the writer failed to show any gold when assayed. The owner reports gold values as much as 0.10 ounces per ton.

On lot 29 on Reserve creek trenching and a pit 10 by 10 feet and 10 feet deep exposes shattered diabase with numerous closely spaced fractures parallel to the

contact of the diabase dike. The dike contact trends N. 55° W. and dips vertically; a pink augen granite gneiss containing streaks of pegmatite lies to the south. It is reported by the owner that silver occurred in a seam in the diabase and that traces of gold were obtained on assay.

Concession XV, Lot 6

In a pit, 5 by 5 feet and 3 feet deep, 3½ chains from the road in lot 6, concession XV, Nipissing township, pink granite gneiss contains a band of biotite schist 5 feet wide with an exposed length of 25 feet. Pegmatite stringers in the biotite schist show a few specks of pyrite.

Another pit, 11 by 4 feet and 4 feet deep, 12 chains west of the road, exposes a band of coarse, black biotite schist in pink biotite granite gneiss with *lit par lit* pegmatite. No sulphide mineralization was found.

Concession XV, Lot 22

A pit, 20 chains west of South bay, Lake Nipissing, in lot 22, concession XV, Nipissing township, has been put down on a 3-foot pegmatite dike cutting pink biotite granite gneiss. The dike strikes N. 70° W. and dips 45° S.W. No mineralization was found.

PERRY TOWNSHIP

Concession X, Lot 13

A gold prospect near Emsdale, was reported in 1900[1] on lot 13, concession X, Perry township. A pegmatite dike, 5 feet wide, trending N. 20° E. and dipping 65° W., is exposed 8 chains south of the concession road. The hanging wall is a banded biotite-hornblende gneiss, and the footwall a black garnet amphibolite. Glassy white quartz forms the hanging wall of the dike and is 2 feet wide. There is no mineralization.

Concession X, Lot 15

A pit, 8 by 8 feet and 6 feet deep, has been put down on the slope of a hill 10 chains southwest of Emsdale cemetery in lot 15, concession X, Perry township. It exposes an 8-foot pegmatite dike cutting garnet-biotite and garnet-biotite-hornblende gneiss. No mineralization was observed.

Concession XII, Lot 4

A pit 3 chains north of the road in lot 4, near the boundary line between lots 3 and 4 and just south of the boundary line between concessions XII and XIII, Perry township, exposes a little disseminated pyrrhotite in a rusty-weathering biotite-graphite gneiss. Low gold values are reported, but a grab sample taken by the writer gave no trace of gold on assay.

PRINGLE TOWNSHIP

Concession VII, Lot 25

At the old Golden Eagle mine a trench, 6 feet wide and from 4 to 6 feet deep, extending north from the road for a length of 17 feet, was put down in 1899.[2] The trench exposes crystalline limestone with bands of hornblende gneiss, one of the latter containing disseminated pyrrhotite. A grab sample taken by the writer showed no gold on assay.

PROUDFOOT TOWNSHIP

Concession I, Lot 6

On lot 6, concession I, Proudfoot township, a pit, 6 by 15 feet and from 2 to 4 feet deep, has been put down on a 5-foot zone carrying disseminated pyrrhotite,

[1]Ont. Bur. Mines, Vol. IX, 1900, p. 172.
[2]Ibid, p. 171.

pyrite, and, very rarely, chalcopyrite in a banded dark-grey and white biotite gneiss. Stringers of sugary quartz and pegmatite occur *lit par lit* but carry little to no sulphides.

Concession III, Lot 6

On the shore of Tank lake in lot 6, concession III, Proudfoot township, pink biotite granite gneiss with inclusions of hornblende gneiss, in part garnetiferous, is cut by several glassy white to grey quartz stringers with a maximum width of 8 inches. No sulphide mineralization was seen.

Concession X, Lot 3

A pit 6 by 7 feet is situated at the base of a 40-foot cliff, 50 feet north of the trail to Tea lake in lot 3, concession X, Proudfoot township. A 1-foot pink pegmatite dike, trending N. 45° W. and dipping 70° W., cuts garnet-hornblende or hornblende gneiss. A few specks of pyrite were seen in the gneiss.

RYERSON TOWNSHIP

Concession V, Lot 30

On lot 30, concession V, Ryerson township, broken rock from overgrown workings consists of impure crystalline limestone containing grains of serpentine, scales of graphite, a few specks of pyrrhotite, and bands of hornblende gneiss. Local inhabitants report some of this rock was teamed to Rosseau about 1890.

SOUTH HIMSWORTH TOWNSHIP

Concession II, Lot 24

On lot 24, concession II, South Himsworth township, a 2-foot glassy, white pegmatitic quartz dike cuts a garnet-biotite granite gneiss. There is no mineralization.

SPENCE TOWNSHIP

Concession XII, Lot 9 or 10

A pit, 2 chains north of the road on lot 9 or 10, concession XII, Spence township, has been sunk on a rusty-weathering hornblende gneiss mineralized with disseminated pyrrhotite across a width of 50 feet.

STRONG TOWNSHIP

Concession X, Lot 20

The workings on lot 20, concession X, Strong township, consist of a pit 6 by 6 feet and 6 feet deep and a shallow pit 40 feet southeast. These workings expose disseminated pyrrhotite and some pyrite and graphite in a rusty-weathering biotite gneiss. A grab sample taken by the writer gave no gold on assay. This deposit was drilled in 1902,[1] two holes being put down 70 and 40 feet in length, but no data is given on gold values, if any.

MUSKOKA DISTRICT

Chaffey Township, Concession V, Lot 32

Grey biotite gneiss with bands of hornblende cut by pegmatite is exposed in a small pit on lot 32, concession V, Chaffey township, Muskoka district. A few splashes of pyrite occur on joint faces. Low gold values are reported by the owner.

Stephenson Township, Concession XIII, Lot 24

Grey biotite granite gneiss with a seam of biotite hornblende gneiss carrying a little pyrite outcrops near the Canadian National railway on lot 24, concession XIII, Stephenson township, Muskoka district. Low gold values are reported by the owner.

[1]Ont. Bur. Mines, Vol. XII, 1903, p. 51.

Iron

Most of the iron occurrences examined are in Lount and Chapman townships. Others occur in Ferrie, Foley, and Nipissing townships. The iron mineral is usually magnetite, except in Nipissing township where it is hematite. Some unconsolidated deposits consist of concretionary limonite in sands or gravels.

As most of the pits visited are old, and many are partly filled with water and covered with vegetation, examination was often limited to material on the dumps. A few pits had been cleaned out for an examination by private interests in June, 1941, and these showed the geological relationships more clearly.

The early prospectors in Lount township apparently confused a dark-red, almost black garnet with magnetite, and nearly half the pits and trenches visited were found to have been put down on such material.

The magnetite occurs as bands in hornblende gneiss, amphibolite, garnet-hornblende gneiss, or garnet amphibolite. Crystalline limestone is present occasionally as interbeds in these rocks at some of the deposits. The bands of magnetite-bearing material may consist of massive magnetite or an aggregate of garnet-hornblende-magnetite. Pyrite is present at a number of the showings.

Analyses of a selected number of representative samples of the iron minerals taken by the writer from old showings are given in the following table.

ANALYSES OF IRON MINERALS, PARRY SOUND DISTRICT

Sample No.	Iron mineral	Location	Type of sample	Fe	SiO_2	TiO_2	S	P
1...	Magnetite....	Lount tp., con. I, lot 16.	Grab.....	55.71	6.70	2.60	0.15	0.05
2...	Magnetite....	Lount tp., con. III, lot 17.	Grab, 21½ lbs...	59.55	4.49	1.20	.12	none
3...	Magnetite....	Lount tp., con. A, lot 136.	Grab.....	43.88	23.28	.36	.06	.06
4...	Magnetite....	Lount tp., con. VIII, lot 22.	Grab.....	50.92	14.12	.78	.08	.05
5...	Magnetite....	Lount tp., con. B, lot 145.	Grab.....	52.74	2.73	11.50	2.28	.004
6...	Magnetite....	Lount tp., con. B, lot 144.	Grab.....	49.62	7.18	10.25	1.28	.008
7...	Magnetite....	Foley tp., con. VIII, lot 29.	Grab, 5½ lbs...	54.14	9.63	5.60	2.13	none
8...	Hematite.....	Nipissing tp., con. A, lot 218.	Grab.....	55.65	18.73	none	.10	none
9...	Limonite (gravel).	McMurrich tp., con. II, lot 15.	Grab, 5½ lbs...	[1]50.36	.....	.....	.....	.....
10...	Limonite (concretions).	McMurrich tp., con. II, lot 15.	Grab, 2½ lbs...	50.95	.....	.....	.....	.....

[1]In addition 0.2 per cent. manganese.

The above analyses show clearly that a number of the iron minerals would not be acceptable as iron ores because of high silica, titanium, or sulphur. No doubt better analyses might be obtained on cleaner magnetite from some of the showings in Lount township, but the samples taken by the writer were considered as representative of the average of the deposit rather than the best available.

From the field work it appears that the bands or bodies of magnetite are of small dimensions, having no great length, width, or depth. It is understood that in many cases exploration of these deposits ceased because the ore body played out and search failed to reveal others in the near vicinity. In some pits little to no magnetite was to be seen on the walls, indicating that the magnetite bodies

were small and had been completely removed. It is likely that detailed prospecting would lead to the discovery of more magnetite bodies in the areas underlain by the hornblende rocks, but judging by the results attained to date the possibility of finding workable deposits of iron in Lount township cannot be considered encouraging.

In the following pages are listed all the iron showings visited and certain garnet occurrences in Lount township which were opened up in error as iron deposits.

Vanadium is present in small quantities in some of the titaniferous magnetites as shown by two analyses given by Robinson:[1]—

	V_2O_5 per cent.
Lot 136, Lount township	0.34
Lot 143-144, Lount township	.23

A sample taken by the writer from lot 17, concession III, Lount township, failed to show a trace of vanadium on assay.

CHAPMAN TOWNSHIP

Concession XIV, Lot 20

On lot 20, concession XIV, Chapman township, near the boundary line between concessions XIII and XIV and 8 chains east of the road, stringers of magnetite, half an inch to 3 inches in width, occur in a garnet-epidote-hornblende rock in hornblende gneiss.

Concession XIV, Lot 20

At the north end of lot 20, concession XIV, Chapman township, near the farmhouse, disseminated magnetite occurs in a garnet-hornblende-feldspar rock. Overburden covers an area with strong magnetic attraction.

FERRIE TOWNSHIP

Concession V, Lot 33

On lot 33, concession V, Ferrie township, a pit was sunk in 1899 on garnet amphibolite with disseminated magnetite occurring as a band 4 chains wide in biotite granite gneiss. This may be the occurrence referred to as being in lots 34 and 35 in Coleman's report.[2]

FOLEY TOWNSHIP

Concession VIII, Lot 29

On lot 29, concession VIII, Foley township, magnetite occurs across a zone 4 feet wide in a pink granite gneiss containing some amphibolite and irregular masses of pink pegmatite. It is doubtful if the magnetite forms more than 50 per cent. of the rock across the 4-foot width, as samples on the dump contain hornblende and granite gneiss. Pyrite and chalcopyrite account for the sulphur in analysis No. 7 in the table on page 41. A shaft, 5 by 5 feet and 17 feet deep, has been sunk on the magnetite zone, which trends approximately north and south and dips 80° E. This shaft is 5 chains east of the telegraph line. About 50 feet south of the shaft a shallow trench intersects the magnetite-pyrite zone, which is here 5 feet in width.

At 10½ chains north of the shaft and 1 chain east of the telegraph line, a pit, 5 by 5 by 10 feet, has been sunk on a coarse purple, pink, and greenish peg-

[1]A. H. A. Robinson, "Titanium", Mines Branch, Can. Dept. Mines, No. 579, 1922, p. 35.
[2]Ont. Bur. Mines, Vol. IX, 1900, p. 170.

matite containing a little magnetite as coarse aggregates and minute veins on the borders of the feldspar crystals. The country rock is a garnet amphibolite. The pit is near the boundary between concessions VIII and IX, in lot 29.

This showing was drilled in 1903 by 9 holes aggregating 582 feet. It is stated that the drilling showed the iron deposit to be lenticular and without sufficient average width or continuity to warrant further mining.[1]

LOUNT TOWNSHIP

Concession I, Lot 16

On lot 16, concession I, Lount township, at 23 chains east of the road corner on the line between lots 17 and 18 on the Chapman-Lount boundary, a curved trench 10 feet wide, 50 feet long, and 10 feet deep trends northeast-southwest and is partially filled with water. The country rock is a dark-green, medium to coarse-grained (2 inches) amphibolite. An examination of the walls of the trench showed a little magnetite at one place. Massive magnetite was seen on the dump (see analysis No. 1 in the table on page 41). It is reported no ore was shipped from this trench. About 100 feet west from the trench an old diamond-drill casing indicates that a hole was put down at an angle of 45° S. It is understood that the hole did not cut any magnetite, and the compass did not show any attraction at this place.

Concession III, Lot 17

The old workings are in lot 17, concession III, Lount township, just north of the road on the boundary between concessions II and III. The main pit, 4½ chains north of the road, is an open cut, 20 by 50 feet in length and is reported to be from 12 to 22 feet deep.[2] It is filled with water. The rock on the dump is a fine- to coarse-grained (2 inches) amphibolite. Blocks of magnetite on the dump are medium- to coarse-grained in texture. An analysis, no. 2, is given in the table on page 41. No sulphides were observed, but Carter[3] reports that they were confined to the walls in small, irregular patches.

One chain north of the main pit 2 pits, 10 by 10 feet and 15 feet apart, are partially filled with water. They expose massive, medium-grained amphibolite. No magnetite is present and there is no obvious magnetic attraction.

Southeast of the main pit on the slope and extending to the bottom of the hill an open cut 20 feet wide extends 70 feet in a direction N. 70° E. The east end of the open cut is 2 chains from the road. No magnetite was found in this open cut, but at one-third of the length from the east end the compass shows a 90-degree deflection.

Mining began on May 8, 1901, and by January 28, 1902, it is reported[4] that an ore pile of about 500 tons had been accumulated, presumably from the main pit. The owners were the Cramp Steel Company of Toronto. It is locally reported that 19 carloads were shipped via South River to Hamilton.

It is believed that the dimensions of the magnetite body were roughly those of the main pit and that all the body was mined out. This is suggested by the fact that at short distances from the pit there is little compass deflection and the fact that no magnetite was seen in place in the openings. Carter states that the body was a lens about 10 feet wide trending north and south.[5]

This showing is referred to as the Magnetawan mine in Carter's reports and

[1]Ont. Bur. Mines, Vol. XIII, 1904, pt. 1, p. 44.
[2]Ibid, Vol. XI, 1902, p. 262.
[3]W. E. H. Carter, Ont. Bur. Mines, Vol. XI, 1902, p. 263.
[4]W. E. H. Carter, op. cit., p. 262.
[5]Ibid.

in the Report of the Ontario Iron Ore Committee, 1923,[1] but is not known by this name locally.

Concession VIII, Lot 22 (Claim P.S. 992)

The occurrence on lot 22 (claim P.S. 992), concession VIII, Lount township, is known locally as the Spring Lake deposit, being 3½ chains west of the road to Fowke (Spring) lake. A pit, 8 by 10 feet and 10 feet deep, has a stripping around the top 3 to 4 feet across, widening to 6 feet on the north side, where an old diamond-drill hole, nearly vertical, has been plugged. It is reported by J. W. Edwards to be 50 feet deep. This pit was cleaned out by United States interests early in June, 1941, but was partially filled with water at the time of the writer's visit on June 22, 1941.

The country rock is a light-coloured, medium-grained hornblende gneiss striking approximately east and west and dipping 30° N. Under the microscope in thin section this rock is seen to be composed of an equigranular aggregate of hornblende, scapolite, and plagioclase and abundant accessory apatite, titanite, epidote, and green spinel. It is a hornblende-scapolite gneiss. Seams of coarse calcite (crystalline limestone ?), 6 to 18 inches thick, dip parallel to the foliation. On the north side of the pit a magnetite band containing garnet and hornblende has a width of 2 feet. Irregular stringers and disseminated magnetite occur across a width of 4 feet at the south side of the pit, and a band of solid magnetite (see analysis No. 4, table on page 41), 3 to 12 inches in width, occurs 2 feet south of the mouth of the pit. A small trench 18 inches wide and 18 inches deep to bed rock extends 13 feet south from the pit mouth and exposes hornblende gneiss but no magnetite.

Concession VIII, Lot 32

A showing on lot 32, concession VIII, Lount township, was not visited by the writer. An early report[2] states that two diamond-drill holes, 51 and 30 feet in length, were put into the deposit and intersected hornblende gneiss and schist. In each hole a narrow band of magnetite was cut. The exposures of magnetite were found to be not very continuous in depth or length.

Concession A, Lot 124

A pit, 5 by 6 feet and 3 feet deep, on lot 124, concession A, Lount township, exposes a dark-red, almost black garnet in amphibolite. The garnet rock has a sugary texture, and weathered samples fall to a powder when struck by the hammer. Five chains from this pit a trench 58 feet long, 2 feet wide at the bottom to 10 at the top and from 4 to 6 feet deep, trends north and south. The material on the dump shows that the trench was put down on a deep-red garnet rock occurring in a massive feldspar amphibolite. A few pink pegmatite stringers, with a maximum width of 1 inch, cut the garnet rock. No magnetite was found in either of the openings.

Concession A, Lot 125

Near the north boundary of lot 125, concession A, Lount township, three excavations were found. A round pit, 10 by 10 feet and 5 feet deep, exposes feldspar amphibolite containing irregular masses of dark-red garnet and lenses, as large as 6 inches by 2 feet, or stringers of pale-pink, coarsely crystalline calcite surrounded by garnet-epidote material. Most of the dump consists of garnet rock, no magnetite being found. There are trenches 1 and 2 chains to the east of this pit. At 1 chain a north-south trench has a length of 70 feet and a depth of from 1 to 3 feet, and at 2 chains a trench trending N. 35° E., also about 70 feet in length, has a depth of from 4 to 10 feet. These two trenches are connected by a

[1]Page 215.
[2]Ont. Bur. Mines, Vol. XII, 1903, p. 51.

40-foot cross-trench joining their south ends. Only garnet rock is found in these trenches and on the dumps from them. Two chains north of the round pit a diamond-drill casing indicates a hole trending N. 40° E. and dipping 45 degrees.

Concession A, Lot 125

An 8- by 10-foot shaft, now filled with water, is situated at the west edge of a swamp on lot 125, concession A, Lount township. Dump material shows disseminated magnetite in feldspar amphibolite. Pyrite occurs sparingly. No massive magnetite was found.

Concession A, Lot 126

Three chains south of the road in lot 126, concession A, Lount township, two pits 10 by 10 feet, 10 feet deep, and 10 feet apart, expose dark-red garnet rock in amphibolite. A little epidote is present. A pegmatite dike occurs on the shallow ledge separating the two pits. On the south side of the road and half a mile east of the Nipissing road a pit, 8 by 6 feet and 3 feet deep, exposes a dark-red garnet rock. No magnetite was seen in these three pits.

Concession A, Lot 129

On lot 129, concession A, Lount township, 7 chains southeast of the Nipissing road, on a trail leading from the road, a 10- by 10-foot pit is filled with water. Material on the dump consists of a dark-red garnet-hornblende rock, cut by pink calcite stringers; a coarse hornblende pegmatite containing a few garnets; and masses of dark-green epidote. No magnetite was observed.

Concession A, Lot 132

A pit, 5 by 5 feet and 3 feet deep, at the east edge of the Nipissing road in lot 132, concession A, Lount township, exposes fine-to medium-grained garnet-hornblende rock. No magnetite was seen.

Concession A, Lot 133

Two pits, 3½ and 4½ chains east from the Nipissing road, on lot 133, concession A, Nipissing township, are 10 by 10 feet and 10 feet deep with a shallow connecting trench. The pits are filled with water and much overgrown. The dump shows amphibolite and magnetite.

Concession A, Lot 136

Two chains east of the Nipissing road on lot 136, concession A, Lount township, a pit, 6 by 15 feet and 4 feet deep, has been sunk in amphibolite. Banded magnetite was found on the dump. An analysis (No. 3) is given in the table on page 41. The high silica content of 23.28 per cent. is due to hornblende, quartz, feldspar, and epidote occurring in the magnetite bands and in the magnetite-free bands between them.

Concession B, Lot 124

On lot 124, concession B, Lount township, on the north side of the road to Many Island lake, two-fifths of a mile west of the Nipissing road, a pit 30 by 10 feet exposes hornblende gneiss. No magnetite was found. On the north side of the same road, seven-tenths of a mile from the Nipissing road, a 5- by 5-foot shallow pit exposes rusty-weathering garnet-hornblende rock containing a little disseminated magnetite and pyrite.

Concession B, Lot 126

On lot 126, concession B, Lount township, 2 chains west of the Nipissing road, at a point a quarter of a mile north of the road that comes in from the east, a 40-foot trench exposes biotite or hornblende granite gneiss containing amphibolite bands cut by pegmatite. No magnetite was found.

Concession B, Lot 129

On lot 129, concession B, Lount township, 8 chains west on a bush road from the Nipissing road and 5½ chains north from the bush road, a 4- by 4-foot test pit 1 foot deep occurs in feldspar amphibolite, which has magnetite thickly disseminated through it. Some massive magnetite is present as coarse aggregates with a maximum width of 6 inches. One chain north of the pit is another 7 by 7 feet and 6 feet to the water level. Dump material shows coarsely aggregated crumbly magnetite containing 10 to 25 per cent. of quartz and feldspar. The magnetite apparently occurs as stringers or bands with a maximum width of 6 inches. Shallow cross-trenches occur north of the pit at 10 and 25 feet.

The magnetite showing here is quite local, as outcrops around the pits show no magnetite.

Concession B, Lot 136

It is reported that three diamond-drill holes, 29, 31, and 92 feet in length, were drilled on this lot in 1902, and that several bands of magnetite, for the most part narrow, were encountered.[1]

Concession B, Lot 137

It is reported by T. R. Russell that many years ago a diamond-drill hole was put down about 1 chain from the northwest end of the small lake on lot 137, concession B, Lount township. There is very strong magnetic attraction between the road and the lake. But it is stated in a report of the Ontario Bureau of Mines for 1902[2] that one hole was drilled to 50 feet, presumably this one, in search for magnetite, but that only hornblende and mica schist were found. A highly weathered biotite schist outcrops just south of the road.

Concession B, Lot 144

A pit at the southwest corner of the east half of lot 144 (claim P.S. 985), concession B, Lount township, is reached by a trail running west from the Nipissing road. At 62 chains along this trail is a pit 11 by 13 feet and 5 feet to the water. The material on the dump is mainly a garnet-magnetite rock (see analysis No. 6, table on page 41), and the country rock is a garnet-hornblende-feldspar rock. There is no rock exposed in place around the pit.

Concession B, Lot 145

Three pits on the east half of lot 145 (claim P.S. 991), concession B, Lount township, are reached by a trail west from the Nipissing road. The first pit cleaned out by J. W. Edwards in June, 1941, is 18 chains by trail from the Nipissing road. This showing consists of a pit 9 by 12 feet, partially filled by water, and stripping, a shallow trench on the strike of the pit, and a 23-foot cross-trench.

The rock in the trenches is a hornblende gneiss and a minor amount of disseminated magnetite. On the old dump, however, massive magnetite containing disseminated red garnet and some pyrite (see analysis No. 5, table on page 41) was found. Also on the dump was a rock made up of approximately equal amounts of hornblende, garnet, feldspar, and magnetite.

At 25½ chains from the road an old pit, 6 by 12 feet and about 10 feet deep, is partially filled with water. Rocks on the dump are a medium-grained amphibolite containing a little disseminated magnetite and a garnet-hornblende-feldspar-magnetite rock. Some of the rock contains 25 per cent. magnetite. No massive magnetite was found.

At 27 chains from the road in the side of an outcrop is an open cut, 8 by 16

[1]Ont. Bur. Mines, Vol. XII, 1903, p. 50.
[2]Ibid, pp. 50. 51.

feet and 12 feet high at its north face. The rock exposed is a hornblende or hornblende-garnet-feldspar rock with some white biotite granite gneiss on the east wall. Weathered rock on the dump shows a magnetite content of as much as 25 per cent., and a minor amount of disseminated pyrite. No massive magnetite was found.

McMURRICH TOWNSHIP

Concession II, Lot 15

Earthy limonite and concretions occur in sand adjacent to the road in lot 15, concession II, McMurrich township. The lens or bed in the sand may be 1 foot thick. Analyses of the limonite are given in analyses Nos. 9 and 10 in the table on page 41.

NIPISSING TOWNSHIP

Concession A, Lot 218

The hematite showing on lot 218, concession A, Nipissing township, is 1.7 miles west of the village of Nipissing by a road that follows an old railway gradient west of Beatty creek. It parallels South river and traverses a flat area underlain by sand. To the south of the road on a gentle slope Paleozoic dolomite is exposed in 5 test pits on lot 16, concession XI, and on lot 218, concession A. The dolomite is cut off to the south by a ridge of granite gneiss. The contact between the granite gneiss and dolomite on lot 218 may be a fault trending N. 80° W. and dipping 70° N. The gap between exposures of the dolomite and gneiss is from 15 to 20 feet at one locality.

The hematite deposit is at the base of a talus slope 12 chains from the road. Between the deposit and the road, Paleozoic dolomite is exposed from 1 to 6 chains south of the road. The talus cliff is 50 feet high, and the talus consists of fragments of granite gneiss stained with a red film of hematite. Examination of the cliff face shows a granite gneiss breccia with a cement of reddish-brown hematite. This cliff peters out westward. As no outcrops east or west of the exposures mentioned were found, it is not known how big an area is underlain by the dolomite.

At the time of the writer's visit on July 26, 1941, no new work had been done on the deposit, and nothing could be seen in a partially caved-in timbered pit at the base of the talus. The only hematite seen was on the dump. This material is a hard, fine-grained, grey and brown hematite containing disseminated glassy quartz. An analysis (No. 8) of a grab sample of this material is given in the table on page 41.

In the autumn of 1941 a syndicate bought the mineral rights from C. H. Mann, of Nipissing, and, it is understood, put down a 300-foot diamond-drill hole, which intersected hematite. There was a very heavy loss of core.

MUSKOKA DISTRICT

Limonite near Vankoughnet

At the request of B. B. Wendover, of Rosseau Road, the writer examined a limonite deposit on the farm of George Chrysler 2½ miles from Vankoughnet P.O.

Old pits put down on the limonite deposit are in a field on lot 27 or 28 in concession III, Oakley township, Muskoka district, 4 chains north of the boundary between concessions II and III and 38 chains west of the farmhouse. As the pits had caved in, a trench was cut down through the wall of one pit for a depth of 6 feet, the upper 1 foot being through previously excavated material. At from 1 to 1½ feet below the original ground surface a zone is reached in which sandy limonite concretions occur in the sand. The upper foot of sand is dark-brown, but below the limonite zone the sand is yellow-brown, changing downwards to

almost white. The limonite concretions occur as layers and break into pieces as much as 4 inches in diameter. They range in thickness from a quarter of an inch to 2 inches. Most of them have such a high sand content that they can be crumbled or broken by the hand. Individual concretions cleaned of sand would probably assay 50 per cent. iron. It is quite obvious, however, that no great quantity of the concretionary limonite exists, and there is no basis for believing that any considerable amount would be found elsewhere under the field.

These deposits are undoubtedly formed through the precipitation of iron from the circulating ground water at or near the ground-water table. The iron is probably derived from iron sulphides or other iron-bearing minerals sparsely disseminated throughout the sand or adjacent bed rock.

Such deposits are of widespread occurrence in areas underlain by sand in the Muskoka and Parry Sound districts where suitable water conditions exist for their formation. They will most likely all be small and contain so much sand or other impurity as to render them of no economic importance.

Molybdenum

Molybdenite was noted at few localities other than the two old workings described below. At a number of the copper showings southwest of Parry Sound a few flakes of molybdenite occur along with pyrrhotite, pyrite, and chalcopyrite.

In 1941, the Quyon Molybdenite Company, Limited, of Quebec, operated the only plant in Canada for the conversion of molybdenite concentrate into suitable addition agents.[1]

An ore of molybdenum must carry at least 1 per cent. molybdenite and where ore widths are narrow, say 1 foot, not less than 10 per cent. molybdenite. A recent publication by Stevenson[2] gives a useful discussion on the commercial aspects of molybdenum occurrences.

CHRISTIE TOWNSHIP

Concession XII, Lot 9

A showing known locally as the Bloor mine is located in lot 9, concession XII, approximately half a mile north and northwest of the road corner at the boundary line between lots 8 and 9, concession XI, Christie township. There are three openings from south to north: (1) a trench 25 by 4 feet and 6 feet deep, now largely caved in; (2) a pit or shaft 10 by 10 feet filled with water; (3) a pit 10 by 16 feet, with water in the deeper west half of the pit.

The country rock is a dark-green hornblende gneiss containing irregular, lenticular bands of red garnet rock, such as seen in Lount township. The pits expose a coarse-grained (one-half inch) greenish crystalline limestone, containing bands of red garnet rock, and a hornblende-garnet-carbonate-quartz-feldspar rock. In the latter a few small clusters or flakes of molybdenite were found.

This occurrence is of no economic importance.

LOUNT TOWNSHIP

Concession II, Lot 18

In a sandy field in lot 18 half a mile south of the boundary line between concessions II and III, seven pits have been put down to explore an occurrence of molybdenite. These pits are scattered over a length of about 140 feet. It is reported that the work was done in 1940. No exposures of rock are to be seen in

[1]Report on Miscellaneous Metals in Canada, 1940, Dom. Bur. Stat., Canada, 1941, p. 19.
[2]J. S. Stevenson, "Molybdenum Deposits of British Columbia," B.C. Dept. Mines, Bull. No. 9, 1940.

the field near the pits, which expose dark-green hornblende gneiss containing bands and irregular masses of red garnet rock and a minor amount of pegmatitic material containing hornblende, garnet, and titanite.

The main pit is 10 by 15 feet and from 4 to 5 feet deep and is sunk in a shallower pit 37 feet in diameter. It exposes hornblende gneiss containing irregular masses of red garnet rock as much as 10 by 20 feet in dimensions and containing coarse (half-inch) aggregates of white calcite and hornblende. Molybdenite in small clusters of scales is irregularly distributed. It occurs disseminated in the garnet rock, or as streaky disseminations in schisted, chloritized hornblende gneiss. Even in this main pit much of both the garnet rock and hornblende gneiss shows no molybdenite. The schisted hornblende gneiss appears to be the more favourable host rock. A very little molybdenite was seen in two of the remaining pits, but in the other four none was found.

The occurrence is apparently just a local dissemination of molybdenite of uneconomic proportions. The lack of any well-defined structure in the occurrence does not lead one to expect that a body of any size of the same grade as the best material to be seen in the main pit would be found near by.

Nevertheless, the association of molybdenite with garnet rock and hornblende gneiss here and also in Christie township would suggest that prospecting of the garnet rock, which is not uncommon in Lount township, might lead to more finds.

Titanium

Although titanium is abundant in the earth's crust, its ores are few in number. The principal commercial sources are the minerals rutile (TiO_2) and ilmenite ($FeO.\ TiO_2$). Titaniferous magnetite is an iron ore containing titanium, usually as ilmenite. Titanium and its compounds are employed chiefly in the manufacture of pigments (paints) and of metallic alloys (principally ferrotitanium) for use in the metallurgy of iron and steel.

Virginia is the leading producer of titanium in the United States. Other important sources are Australia, Brazil, and British India. Norway, the Cameroons, and South Africa have also produced rutile.

It is worth noting that the deposits worked in the Nelson-Amherst district, Virginia, are reported to carry 4 to 5 per cent. rutile and about the same quantity of ilmenite.[1]

Quotations[2] for rutile are as follows: guaranteed 94 per cent. concentrate, 8 to 10 cents per pound (nominal); 88 to 90 per cent., $95 per ton c.i.f. New York.

BETHUNE TOWNSHIP

Concession VII, Lot 15

The Tiffany Mining Syndicate, Welland, Ont., has the mineral rights on lots 12, 13, 14, 15, in concession VIII, and lots 14, 15, and the north half of 16 in concession VII, Bethune township. The gold occurrences have been described elsewhere in this report. The occurrences to be noted here occur southeast and south of Little Peters lake on lot 15, concession VII. Some of these were reported to carry titanium, tantalum, columbium (niobium), and certain rare-earth minerals. Professor F. E. Beamish, Department of Chemistry, University of Toronto, kindly carried out a number of tests on samples collected by the writer from these occurrences.

A considerable amount of test-pitting, trenching, and stripping has been

[1] "Deposits of Titanium-bearing Ores," U.S. Bur. Mines, I.C. 6386, 1930, p. 15.
[2] "Metal and Mineral Markets," Eng. and Min. Jour., Nov. 20, 1941, p. 5.

carried out in the last three years. During the summer of 1941 it was reported that 5 men were employed at this work but that little of interest was found.

The writer visited the occurrences on June 23 and again on September 8, 1941.

On an island ("C" in Fig. 4) in the southeast corner of Little Peters lake, on claim P.S. 896, north half of lot 15, a pit 60 feet long and 4 feet wide has been put down on a 5- to 6-inch glassy white quartz vein, trending N. 75° W. and dipping 70° S., which cuts across garnet-hornblende gneiss striking N. 18° E. and dipping 70° E. The weathering of the hornblende gneiss has resulted in the formation of log-shaped masses of rock as big as a man's arm. The quartz vein carries weathered green crystals of hornblende(?). The owners report that a spectro-

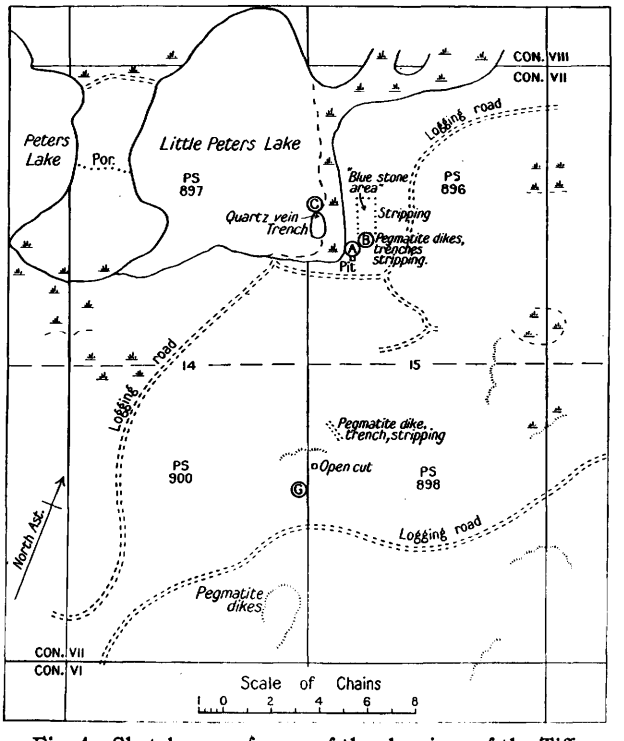


Fig. 4—Sketch map of some of the showings of the Tiffany Mining Syndicate, Limited. (From plans lent by the syndicate with additions by J. Satterly.)

graphic analysis of these green crystals gave 6 per cent. zirconium, yttrium, and cerium. Professor Beamish reports that a spectrographic examination for cerium and zirconium gave negative results.

Just east of the southeast corner of Little Peters lake an old pit ("A" in Fig. 4), 5 by 7 feet and 10 feet deep, has been sunk on a weathered garnet peridotite containing white-weathering seams, as much as a quarter of an inch thick, of pale-green, translucent serpentine with a few grains of magnetite. This rock is supposed to assay silver. It is the same rock type as that seen in the "blue stone area" which is described below.

Location B in Fig. 4, 125 feet northeast of "A," by pits and stripping or shallow trenching exposes two intersecting pegmatite dikes trending N. 30° E. and N. 60° W. The pegmatite consists of plagioclase, biotite, and quartz. The dike trending N. 60° W. consists in part of deeply weathered biotite schist—now

crumbled to a powder—a foot thick on each wall of the dike. The dike trending N. 30° E. also shows a little biotite schist on its walls. A little molybdenite and chalcopyrite are reported to have been found in these dikes.

Just north of "B" is a stripped area, 100 by 200 feet, called the "blue stone area." The stripping has exposed a black garnet peridotite with occasional bands as much as 3 inches in width containing nodules of red garnet. Tension cracks in these bands are filled with hornblende. Occasional masses of red garnet reach 1 foot in diameter. The garnet peridotite is reported by the owners to analyse 5.25 per cent. tantalum and 1.66 per cent. columbium. A fresh sample, taken by the writer and submitted to Professor Beamish, was examined spectrographically and showed no tantalum or niobium (columbium). This result was also confirmed by duplicate wet determinations.

On claim P.S. 898, south half of lot 15, just northeast of "G" in Fig. 4, an open cut on the north side of a hill is 6 feet wide, extends 10 feet into the hill, and is 5 feet deep at the face. The country rock is a medium-grained garnet amphibolite, which has a curved shear zone exposed in the floor of the open cut, in which is an irregular discontinuous band of brittle, fractured, red-brown rutile over a length of 15 inches and a width of 1 to 1½ inches. The shear zone curves from N. 80° E. to S. 70° E.

The open cut was enlarged during the summer of 1941, but the rutile showing in the floor was not touched. No further rutile was found. Professor Beamish made a spectrographic examination of the rutile and found a high proportion of titanium and no tantalum or niobium. A sample of the garnet amphibolite containing rutile was also examined by Professor Beamish. It showed on spectrographic examination only spectrographic traces of tantalum and niobium. Duplicate chemical determinations on this rock showed the absence of tantalum and niobium.

Just east of the boundary between claims P.S. 900 and 898 and just southeast of "G" in Fig. 4, a rock carrying grey crystals was examined. A thin section of this rock was examined under the microscope and it proved to be a garnet-olivine norite. Northeast of "G" a long trench exposes a biotite-plagioclase pegmatite 2 feet in width cutting garnet amphibolite. A few small grains and terraced octahedra of martite occur here and also in a number of other pink pegmatite dikes that were stripped in the summer of 1941.

There is nothing of economic significance in any of these showings. Although further small finds of rutile were reported in 1941, no large body was discovered.

LOUNT TOWNSHIP

Some of the magnetites of Lount township carry small amounts of titanium (see analyses Nos. 5 and 6 in the table on page 41). Robinson[1] has noted the titanium content of these magnetites and gives three analyses. As the known deposits are small, they cannot be regarded at the present time as a potential source of titanium.

NON-METALLIC MINERALS

Clay

Clay deposits large enough to allow for commercial production are few, and as far as the writer is aware only one deposit is being worked at the present time, that of the Gomoll Brick and Tile Works.

[1]A. H. A. Robinson, "Titanium," Mines Branch, Can. Dept. Mines, No. 579, 1922, pp. 80, 81.

Keele[1] has briefly described some clays from the Parry Sound and Muskoka districts. R. J. Montgomery[2] has written a very detailed report on "The Ceramic Industry of Ontario," to which the reader is referred for general information.

SOUTH HIMSWORTH TOWNSHIP

Gomoll Brick and Tile Works

The deposit and plant are situated just south of Powassan and between No. 11 highway and the main line of the Canadian National Railways, on lot 15, concession XI, South Himsworth township.

The varved clay of Pleistocene age has been described on page 17 of this report. The deposit is only worked during the open season of the year. The equipment consists of a cable car, which hauls the clay up an inclined track to a Baird disintegrator, from which it goes to a Baird pug-mill and a Parkhill Martin "A" brick machine. The green bricks are taken on rack cars to 15 dry racks, 130 feet in length, and later by cars to two round down-draft kilns. One kiln is 25 feet inside diameter, carrying about 65,000 bricks, and the other 22 feet inside diameter, with a capacity of 42,000 bricks. The burning is carried out at 1650° to 1800° F. This produces a fine red brick, which sells for $20 a thousand.[3]

MUSKOKA DISTRICT

Stisted Township, Concession IX, Lot 10

A deposit of diatomite and clay in lot 10, concession IX, Stisted township, Muskoka district, underlies an old beaver meadow on Black creek west of Ashworth. The clay was reported to be a fire clay, and a sample was taken and submitted to Professor R. J. Montgomery of the Department of Ceramic Engineering, University of Toronto. His report follows:—

> The sample is a red burning surface clay; a possible use would be building brick or other heavy clay products. The drying shrinkage is 7 per cent. The fusion temperature (P.C.E.) is cone 5 or 1205° C; 2201° F. At a normal burning temperature of cone 06, or 1015° C; 1860° F, the colour is a medium brick red, the burning shrinkage is 1.8 per cent., giving a total shrinkage of 8.8 per cent. This is normal for a brick clay. The material is not a fire clay.

As much cleaner clay deposits are available elsewhere (see preceding occurrences), the deposit cannot be considered of any importance even as a source of brick clay.

Diatomite

Diatomite is a hydrous or opaline form of silica consisting of the siliceous cases of microscopic aquatic plants, known as diatoms, of the order *Bacillaria*. Diatoms live in fresh, marine, and brackish waters. No large economic deposits are of earlier age than the Tertiary.

The main uses in order of importance may be classified broadly as follows: (1) filtration, (2) insulation, (3) fillers and miscellaneous, and (4) admixtures, particularly in the building industry.

At the present time, owing to foreign competition and the small domestic demand, only the highest grade of diatomite can be worked, and the deposit must be large enough to justify the erection of a plant.[4]

Quotations[5] on diatomite are as follows: per ton, f.o.b. Nevada, dried crude,

---

[1]J. Keele, "Preliminary Report on the Clay and Shale Deposits of Ontario," Geol. Surv. Can., Mem. 142, 1924, pp. 78-80.

[2]R. J. Montgomery, Ont. Dept. Mines, Vol. XXXIX, 1930, pt. 4.

[3]The foregoing data were supplied by the manager and owner, F. A. Gomoll.

[4]Ont. Dept. Mines, Vol. XLIX, 1940, pt. 1, p. 35.

[5]"Metal and Mineral Markets," Eng. and Min. Jour., Nov. 20, 1941, p. 6.

in bulk $7 and in bags $12; 40 mesh, $18; 200 mesh, $22.50; low temperature insulation, $19; high temperature, $40.

Diatomite is very light; the apparent density of dry blocks is about 0.45, or 28 pounds per cubic foot. The apparent density of pure, dry loose powder varies from 0.25 to 0.12, or 16 to 8 pounds per cubic foot.[1] These figures should be kept in mind when estimating the tonnage in a deposit.

PERRY TOWNSHIP

Concession I, Lot 3

A diatomite deposit occurs on lot 3, concession I, Perry township, west of Novar, in what is known as Austin swamp. Dominion Diatomite, Limited, was incorporated in August, 1931, to operate this deposit,[2] and a small production was recorded for the years 1932–34.[3] In 1933, Dominion Diatomite, Limited, was succeeded by F. P. Macklem. The property has been idle since 1934.

Year	Tons milled	Tons sold	Value
1932	134	10	$309
1933	96	8	$438
1934	68	6	$320

An analysis of the diatomite was reported to show 84 per cent. silica, but it is not stated what amount of this was diatom silica. Microscopic inspection of the crude diatomite collected by the writer from the old drying racks shows a fair amount of grit, and it is suspected that a high-grade product could not be obtained without a considerable percentage of the inferior grades for which there is little sale.

MUSKOKA DISTRICT

Stisted Township, Concession VIII, Lots 7 and 8

Samples of diatomite were collected from a deposit of diatomite and clay underlying a swamp on Black creek on lots 7 and 8, concession VIII, Stisted township, Muskoka district, southwest of Ashworth. Two samples were taken, one white, the other brown. A microscopic examination showed the presence of the diatoms, *Stauronies phoenicenteron* and *Pinnularia major*,[4] and much silty material in both samples. The swamp is 75 yards wide and about half a mile in length. Only grab samples were taken. The correct procedure for sampling such deposits has been outlined by Eardley-Wilmot.[5] The writer gained the impression in spading over the diatomite that it forms a thin layer and is too intimately associated with sand, silt, or clay to allow for a clean recovery if worked.

Other Deposits

Five other deposits in Muskoka district have been described by Eardley-Wilmot.[6]

[1]V. L. Eardley-Wilmot, "Diatomite, Its Occurrence, Preparation, and Uses," Mines Branch, Can. Dept. Mines, No. 691, 1928, p. 6.
[2]Ont. Dept. Mines, Vol. XLI, 1932, pt. 1, p. 30.
[3]Ont. Dept. Mines, files of the Statistics Branch; Vol. XLII, 1933, pt. 1, p. 29.
[4]V. L. Eardley-Wilmot, op. cit., plate I.
[5]Ibid, pp. 27-33.
[6]Ibid, pp. 76-78.

Feldspar

Pegmatitic material is abundant in the gneisses, but pegmatite dikes of economic significance are apparently not common in Parry Sound and Muskoka districts. Although a number of these dikes have been worked for feldspar (and mica), few of the deposits have operated for long, and the amount produced in the last twenty years does not exceed 10,000 tons.

The dikes range from a few feet to more than 100 feet in width, but many of the commercial dikes have been from 15 to 50 feet in width. They consist of pink microcline microperthite, quartz, and varying amounts of biotite, muscovite, and white plagioclase (oligoclase in a number of samples tested).

The distribution and relative quantities of these minerals have an important bearing on the economic possibilities of any dike. In many of the dikes much of the microcline has graphic intergrowths of quartz (graphic granite) and under present conditions is useless, as clean microcline grading No. 1 is valued at only $6.00 a ton f.o.b. track in Parry Sound district. To be classified as No. 1 grade, one Toronto buyer stated that the feldspar on analysis must run silica less than 65 per cent., potash greater than 14 per cent., alumina greater than 18 per cent., and ferric oxide less than 0.08 per cent. There is practically no sale for No. 2 grade at $4.50 per ton. Sales of soda spar are reported from Parry Sound district at $4.50 per ton.

It might be well to note that the truck rates in the district were reported during 1941 to be from 10 to 12 cents per ton-mile, although some trucking was contracted for as low as 7 cents a ton-mile. It is obvious, therefore, that only feldspar prospects within a few miles of the railway can be considered promising.

One property in Parry Sound district was shipping feldspar in 1941.

Analyses of a number of potash and soda feldspars are given in the table on page 55. These were all made by the Provincial Assay Office, except Nos. 7, 8, 11, and 12, which are taken from Spence's report.[1] Recasts of the potash feldspar analyses indicate a composition of from 75 to 87 per cent. microcline; 8 to 20 per cent. albite, ranging from An_5 to An_{10}; and normative quartz from 1.5 to 3.5 per cent. The presence of water, excess alumina, and silica indicates some slight alteration. This is probably due to the difficulty of getting really fresh samples from deposits that have been idle for some time.

The analyses of the soda feldspars when recast indicate a range of composition from 86 to 89 per cent. oligoclase (An_{20} to An_{30}), from 5 to 8 per cent. potash feldspar, and from 1 to 4 per cent. normative quartz.

The ferric iron content ranges from 0.07 to 0.18 per cent. The higher percentages may in part be due to the difficulty of securing fresh material. If the values obtained are correct, few of the spars would grade No. 1.[2]

In the past only the high-grade feldspar has been removed from the deposits, the remainder going to waste. Such operations have always been on a small scale and short-lived. The future of feldspar mining in the district lies in the utilization of all or a large percentage of the feldspar in the dikes by methods combining cobbing and flotation. There seems little hope of being able to use the flotation method unless much larger deposits than those mined in the past are found.

Many of the old feldspar deposits have been described by Spence, and the writer has little to add to his descriptions.[3] Short descriptions of all the deposits seen by the writer, including some information taken from Spence's report, are given in the following pages.

---

[1]Hugh S. Spence, "Feldspar," Mines Branch, Can. Dept. Mines, No. 731, 1932, p. 103.
[2]R. W. Metcalf, "Marketing Feldspar," U.S. Bur. Mines, I.C. 7184, Nov., 1941, p. 3.
[3]Hugh S. Spence, op. cit., pp. 36, 53-57, 91, 92.

ANALYSES OF FELDSPARS

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
Silica	65.05	64.63	64.54	60.96	64.80	61.06	59.30	64.20	65.31	65.04	63.30	64.82	65.13	62.95	64.71	62.46	64.72	65.25	61.84
Alumina	19.50	19.29	19.39	24.24	19.16	24.55	26.19	18.43	18.93	19.10	24.08	19.33	18.82	23.66	19.47	24.26	19.30	19.15	24.24
Iron (ferric)	.12	.15	.08	.08	.13	.18	.06	.05	.14	.13	.13	.07	.13	.18	.07	.14	.08	.16	.18
Lime	.22	.23	.13	5.13	.22	5.20	6.20	nil	.22	.25	3.60	nil	.09	4.07	.21	3.69	.33	.16	4.63
Magnesia	.17	.20	.24	.15	.05	.12	nil	.72	.19	.08	trace	nil	.19	.09	.23	.14	.18	.05	.28
Potash	13.15	14.18	14.66	1.18	14.46	1.08	1.64	14.48	13.37	13.40	.58	13.70	14.83	.90	12.73	1.07	13.75	13.58	1.36
Soda	1.89	1.34	.94	7.33	1.09	7.09	6.99	1.42	1.77	1.67	8.21	2.02	1.00	8.07	2.30	8.34	1.71	1.52	6.87
Loss on ignition	.06	.15	.10	.76	.11	.78	.....	.....	.16	.14	.....	.....	.06	.17	.11	.18	.22	.15	.59
Phosphorus (P_2O_5)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	none	.....	.....
Titanium (TiO_2)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	none	.....	.....
Total	100.16	100.19	100.08	99.83	100.02	100.06	100.38	99.70	100.09	99.81	99.90	99.94	100.25	100.09	99.83	100.28	100.29	100.02	99.99
Specific gravity	2.559	2.553	2.563	2.646	2.586	2.647	.....	.....	2.553	2.551	.....	.....	2.569	2.645	2.572	2.653	2.571	2.575	2.642

Sample No. 1 —Pink spar, Chapman township, concession IV, lot 18.
Sample No. 2 —Pink spar, Christie township, concession VI, lot 27.
Sample No. 3 —Pink spar, Conger township, concession VIII, lot 5.
Sample No. 4 —White spar, Conger township, concession VIII, lot 5.
Sample No. 5 —Pink spar, Conger township, concession IX, lot 4.
Sample No. 6 —White spar, Conger township, concession IX, lot 4.
Sample No. 7[1]—White spar, Conger township, concession IX, lot 10.
Sample No. 8[2]—Pink spar, Conger township, concession X, lot 7.
Sample No. 9 —Pink spar, Henvey township, concession B, lot 5.
Sample No. 10 —Pink spar, McConkey township, concession V, lot 22.
Sample No. 11[3]—White spar—McDougall township, concession X, lot 5.
Sample No. 12[4]—Pink spar, McDougall township, concession X, lot 5.
Sample No. 13 —Pink spar, McKellar township, concession VI, lot 4.
Sample No. 14 —White spar, McKellar township, concession VI, lot 4.
Sample No. 15 —Buff spar, Ryerson township, concession XIII, lot 18.
Sample No. 16 —White spar, Ryerson township, concession XIII, lot 18.
Sample No. 17 —Pink spar, Muskoka district, Brunel township, concession XIV, lot 16.
Sample No. 18 —Pink spar, Muskoka district, Stephenson township, concession XIV, lot 24.
Sample No. 19 —Brown spar, Muskoka district, Stephenson township, concession XIV, lot 24.

[1]Hugh S. Spence, op. cit., sample No. 49.
[2]Ibid, sample No. 50.
[3]Ibid, sample No. 51.
[4]Ibid, sample No. 52.

CHAPMAN TOWNSHIP

Concession II, Lot 26

Just north of the shore of Cecebe lake in lot 26, concession II, Chapman township, a north and south ridge 100 feet high exposes a medium-grained, pink biotite pegmatite dike, which has occasional coarse-grained areas containing feldspar individuals as much as 1 foot in diameter and quartz masses with a maximum diameter of 2 feet. Some of the feldspar has graphic intergrowths of quartz. A little allanite is also present. An open cut, which faces south and is 75 feet wide and 20 feet deep, is found at the top of the ridge, from which an old inclined roadway leads down to the lake. Two chains north of the open cut, at the base of the east side of the ridge, biotite granite gneiss is exposed. Gneiss is also exposed on the west side of the ridge, and the dike is here about 50 feet wide and trends N. 10° E. The footwall of the dike dips 45° W.

The deposit was worked between 1920 and 1923 by the Wheeling Feldspar Company, of Wheeling, W.Va. Production amounted to about 1,000 tons of stucco spar, which was shipped by scow to Burk's Falls on the Canadian National railway, a distance of 12 miles.

Concession IV, Lot 18

On the north slope of a hill immediately south of Carmen (Hungry) lake, in a patch of burn on lot 18, concession IV, Chapman township, a dike of coarse pegmatite containing pink to white translucent microcline and glassy quartz cuts a biotite augen gneiss. The dike was stripped in a few places by T. B. Tough and associates in 1941. Exposures indicate a gneiss capping between 4 and 5 feet thick. What appears to be the footwall of the dike in one place has a dip of from 10° to 30° N., which would show that the dike is only 4 to 5 feet thick. Further stripping and test-pitting would be necessary to indicate the size of the deposit. It would appear to be quite small. The feldspar is present as crystals as large as 1 by 1½ feet. An analysis (No. 1) is given in the table on page 55.

CHRISTIE TOWNSHIP

Concession VI, Lot 27

This showing is 40 chains southeast of Beatty station (disused) of the Canadian National railway on the north shore of a small lake in lot 27, concession VI, Christie township. Here a pit 15 by 20 feet and 15 feet deep, now partly filled with water, has been put down on a 15-foot coarse, pink biotite pegmatite dike cutting biotite granite gneiss. The waste rock on the dump shows pink microcline with much grey quartz scattered all through it. On the walls of the pit the largest feldspar crystals are 1 foot in diameter. An analysis of the feldspar (No. 2) is given in the table on page 55.

The Industrial Minerals Corporation of Canada, Limited, did a little work in 1923–24 and shipped 200 tons of spar. Apparently the abundance of quartz and biotite was the reason for the cessation of operations.

CONGER TOWNSHIP

Concession VIII, Lot 5

The deposit on lot 5, concession VIII, Conger township, is half a mile northwest by an old road from the Canadian Pacific railway. Here a water-filled pit, 10 by 10 feet and 4 feet deep, exposes a pegmatite dike composed of white and pink feldspars, biotite, and quartz. At the track beside a torn-up railway siding a very small dump consists of pink microcline (see analysis No. 3 in the table on page 55) and white plagioclase (analysis No. 4 in the table on page 55).

The Standard Feldspar and Silica Company worked this deposit in 1911–12, but there was no production, as the deposit is too small and there is very little clean spar present. It cannot be considered of economic importance.

Concession IX, Lot 4

South of Brignall station and just west of the Canadian National railway, or 1 mile west by a poor road from No. 69 highway, a trench, now partly filled with water, was put down on a 12-foot pegmatite dike carrying pink microcline (see analysis No. 5 in the table on page 55),a minor amount of white plagioclase (analysis No. 6 in the table on page 55), glassy white quartz, crumpled biotite, and some allanite. The largest microcline crystal seen was 1 foot in diameter. The dike cuts pink and grey biotite granite gneiss and black hornblende gneiss.

The deposit was worked in 1910 by the Ojaipee Silica Feldspar Company. Production amounted to 1,500 tons of quartz and 100 tons of feldspar. The property has been idle since.

Concession IX, Lot 10

An impure pegmatite composed of pink microcline, white plagioclase, muscovite, and biotite outcrops on lot 10 near the boundary of lot 9, concession IX, Conger township, just south of a narrow channel leading to a bay of Blackstone lake. It may be reached by car and on foot by following an old road for 3 miles west from No. 69 highway. The deposit is rather overgrown now with small maples, etc. A very detailed description of it has been given by Ellsworth.[1] Radium-bearing minerals occurred in small amounts, and the dike was worked for them in 1922 by Messrs. McQuire and Robinson, of Parry Sound. This material went to a number of museums and mineral collectors. An analysis (No. 7) of the white spar in the table on page 55 is taken from Spence's report.

Concession X, Lot 7

A large pegmatite dike on lot 7, concession X, Conger township, half a mile west of the Canadian Pacific railway has been opened up by an open pit about 100 feet in diameter and 57 feet deep.[2] The lower 20 feet of the pit is filled with water. As now exposed on the walls of the pit, and from material on the dump, the dike consists of pink microcline containing irregular glassy white quartz stringers and small books of muscovite. A little red garnet was found in some of the quartz.

The McQuire-Robinson Radium and By-Product Company, Limited, operated this deposit in 1923 and 1924 and in the early part of 1925, shipping in 1924 and 1925, 2,249 and 618 tons, respectively. P. W. and H. R. Checkley operated in 1924, shipping 1,372 tons. Work ceased on this property owing to the abundance of graphic granite.[3] An analysis (No. 8) of the pink spar in the table on page 55 is taken from Spence's report.

FOLEY TOWNSHIP

Concession III, Lot 10

An 8-foot pegmatite dike in lot 10, concession III, Foley township, contains a mass of pink microcline 4 by 4 feet, much quartz, and some white plagioclase. The microcline has been taken out and stock-piled. This deposit is of no economic importance.

---

[1]H. V. Ellsworth, "Rare-element Minerals of Canada," Geol. Surv. Can., Econ. Geol. Series No. 11, 1932, pp. 174-186.

[2]Ont. Dept. Mines, Vol. XXXIV, 1925, pt. 1, p. 159.

[3]Ibid.

HENVEY TOWNSHIP

Concession A, Lot 3

The old Ambeau mine in lot 3, concession A, Henvey township, is situated a quarter of a mile northwest of Britt station on the Canadian Pacific railway. The pegmatite dike was opened up by a trench, which trends N. 50° E. for a length of 140 feet and is from 15 to 20 feet deep and from 10 to 30 feet wide. The widths of the trench closely approximate those of the dike. The country rock is a banded granite gneiss, which has a variable strike and dip, from south to north the strike on the southeast side of the dike changing from N. 45° E. to N. 22° E., and the dip from 80° to 60° S.E. There is strong drag-folding in the gneiss at the southwest end of the trench. The trench opens up the entire length of the dike, and water in the bottom conceals the character of the pegmatite there. The dike consists of pink microcline, some white plagioclase, and glassy white or smoky quartz. Blocks of pink spar as much as 1 foot in diameter may have formed 25 per cent. of the bulk of the dike. As some of the pink spar contains 50 per cent. quartz, not much of it could have graded No. 1.

It was worked in 1926–27 by Wanup Feldspar Mines, Limited, of Lucknow, with a reported production of 1,000 tons.

Concession B, Lot 5

The old Besner mine is situated on lot 5, concession B, Henvey township, 2 miles by road northeast from Britt station on the Canadian Pacific railway. An open pit 150 feet long, 50 feet wide, and 30 feet deep, now filled with water, was put down on a 60-foot dike of pegmatite composed of pink microcline, glassy white quartz, and wedges of graphic granite in the microcline. Judging from present exposures these wedges constitute 25 to 50 per cent. of the feldspar masses, and even more at the southwest end of the pit. Some chloritized biotite and a few crystals of altered allanite were seen. The dike does not appear on strike to the southwest but is represented by outcrops of augen granite gneiss separated from the pit by a few chains of swamp. To the northeast of the pit is swamp. Judging by the size of the pink microcline masses on the dump the feldspar individuals in the dike were probably several feet in diameter. An analysis (No. 9) appears in the table on page 55.

Wanup Feldspar Mines, Limited, worked the property from 1926 to 1929 with a reported production of 2,500 tons.

McCONKEY TOWNSHIP

Concession II, Lot 11

On a point on the south side of Caribou lake in lot 11, concession II, McConkey township, two dikes cutting an altered gabbro are exposed. On the east dike a pit 10 by 10 feet and 4 feet deep has been sunk, and the west dike, which is 30 feet wide, has been blasted in a few places. The dikes consist mainly of an aggregate of glassy grey quartz and pink microcline from half an inch to 2 inches in diameter; and books of muscovite with a diameter up to 1 inch and occasionally 2 inches. Rarely, the feldspar masses reach dimensions of 1 by 4 feet. A little white plagioclase was found on the dump. There is much white quartz, and the percentage of feldspar is so low that even if the deposit were not so far from the track it would be of no economic importance.

Concession V, Lot 20

Coarse pegmatite forms a dome-shaped outcrop on the south shore of the west arm of Caribou lake in lot 20, concession V, McConkey township. The pegmatite has an exposed width of 150 feet and consists of pink feldspar in masses

as large as 4 by 6 feet, but with closely spaced fractures from half an inch to 2 inches apart, which may be due to weathering; white plagioclase with reddish streaks; crushed books of muscovite as much as 1½ feet across, but mostly about 4 inches or less; and glassy white quartz.

The distance from Trout Creek on the Canadian National railway is 45 miles. This fact and the minute fracturing of the feldspar prevents commercial exploitation at the present time. Many years ago some feldspar from this deposit was hauled south across country to the Pickerel river for shipment by water, but is reported to be still at the river.

Concession V, Lot 22

A 100-foot pegmatite dike crosses the narrows on the west arm of Caribou lake in lot 21, concession V, McConkey township. In lot 22, 3 chains south of the narrows, a pit 25 feet square with a maximum depth of 5 feet, has been put down on the west slope of a bald dome of pegmatite, which is apparently a continuation of the dike mentioned. Surrounding this pit there is a stripped area 50 feet in diameter. The pit shows the pegmatite to be an aggregate of pink feldspar and grey quartz, of which 5 per cent. is composed of pink feldspar individuals from 1 to 2 feet in diameter. Some of these have graphic intergrowths of quartz. Biotite occurs as books from 1 to 4 inches in diameter and constitutes in places as much as 5 per cent. of the pegmatite. Red-stained white plagioclase is present in minor amount as individuals from 6 to 12 inches in diameter.

This showing was staked as P.S. 901 by J. W. Keenan of Detroit and prospected in 1940. An analysis (No. 10) of a picked sample of the pink feldspar is given in the table on page 55. The deposit if of no economic importance at present.

Concession VI, Lot 17

On the portage between Caribou lake and Burnt lake, in lot 17, concession VI, McConkey township, is an outcrop 50 by 350 feet of pegmatite composed of a 1-inch aggregate of quartz and feldspar with occasional feldspar masses as much as 1 foot in diameter. At the west end of the outcrop a very old pit 15 by 15 feet and 4 feet deep exposes some first-grade pink microcline up to 2 by 4 feet in size.

Records of the Department would indicate that this showing was staked in 1908 or 1915.

McDOUGALL TOWNSHIP

Concession X, Lot 5

This property has been described by Spence.[1] Two analyses given by him are shown in analyses Nos. 11 and 12 in the table on page 55.

Concession XI, Lot 3

Some development work was carried out on three pegmatite dikes outcropping on a ridge to the south of a swamp in lot 3, concession XI, McDougall township, about 5 miles from Waubamik on the Canadian National railway.

An 18-foot pegmatite dike cuts hornblende gneiss in a direction N. 12° E. The dike consists of pink microcline, much of it graphic; irregular masses of glassy quartz in the centre of the dike; some pinkish-white plagioclase; and accessory allanite. Two openings have been made in the dike, the largest being an open cut at the north end, where the dike is 25 feet wide.

Two chains to the east the second dike has been exposed by stripping and a small pit. The dike is 20 feet wide and consists of green and pink feldspars, quartz, biotite, and allanite. This dike is of no economic value.

[1]Hugh S. Spence, op. cit., pp. 56, 57.

Two chains east of the second dike, the third dike, which is 15 feet wide, has been stripped and trenched for 40 feet. The western two-thirds of this north and south dike is all graphic pink feldspar, and work was confined to the eastern third. Thirty feet south on the same dike another trench, 10 by 45 feet and 10 feet deep has been put down on the east third of the dike. The feldspar removed by these operations amounted to about 40 tons and was stock-piled about 5 years ago, but no shipments were made. This material would probably not grade No. 1.

McKELLAR TOWNSHIP

Concession VI, Lot 4

The north half of lot 4 (P.S. 883), concession VI, McKellar township was staked in 1937 and later patented by C. F. McQuire. A pegmatite dike was opened up by a trench, which trends N. 50°–85° W. and is 220 feet long, 25 feet wide, and 10 to 20 feet deep. Much of the trench is now filled with water, there being a rock bridge 80 feet from the east end. The operators report that the dike was 12 feet wide, widening to 25 feet at the west end, but that at a depth of 20 feet it narrowed to 4 feet. The country rock is a grey biotite hybrid gneiss, with minor amounts of hornblende gneiss. Pink feldspar can be seen in masses as large as 3 by 5 feet. An analysis (No. 13) is given in the table on page 55. Glassy white quartz is abundant at the west end. There is practically no biotite and very few garnets. Some white plagioclase occurs 50 feet from the east end. An analysis (No. 14) of the plagioclase is given in the table on page 55.

The deposit was worked during 1937 and 1938 but closed down at the end of 1938. About 600 tons of No. 1 grade potash feldspar was produced and sold to Bathurst Feldspar Mines, Limited. Some of this was stained with a vegetable oil, and the buyers ultimately paid a penalty for it. A swamp to the south of the deposit no doubt was responsible for this staining.

The occurrence is 12½ miles from Seguin Falls and 13 miles via Broadbent from Edgington station on the Canadian National railway.

NIPISSING TOWNSHIP

Concession X, Lot 30

Pegmatite occurs on a hill of granite gneiss a quarter of a mile west of the southwest end of Duncan lake in lot 30, concession X, Nipissing township. Several strippings expose a coarse pegmatite containing pink microcline masses as much as 1 foot in width, but most of the feldspar seen contains a considerable amount of quartz. Two claims, P.S. 999 and 1,000 were staked for W. Holden and G. Waltenbury in 1941. Unless further work shows the feldspar to be of a better grade, the deposit is of no economic importance. The distance to Powassan on the Canadian National railway is 16 miles.

RYERSON TOWNSHIP

Concession XIII, Lot 18

A pegmatite dike outcrops on the south slope of a steep hill on the north shore of Cecebe lake in lot 18, concession XIII, Ryerson township. The dike trends N. 10°–15° E. and dips, as indicated by the footwall, at 50° W. Feldspar forms a zone from 4 to 20 feet thick on the footwall, followed by 10 to 25 feet of quartz, which forms the centre of the dike, and then again by feldspar. The dike has an exposed width of 50 feet, but the west contact is not exposed. In the footwall zone buff microcline forms masses as large as 1½ by 2 feet; and in the hanging-wall zone, buff microcline (see analysis No. 15 in the table on page 55) and white plagioclase (see analysis No. 16 in the table on page 55) form an aggregate. Some muscovite was seen in books as much as 1 foot in diameter and somewhat

stained and spotty, and also as crushed aggregate as large as 4 by 6 feet. The muscovite seems to be confined to the central part of the dike. The largest book of marketable mica recovered is reported to have measured 2 by 2 feet and 2½ feet thick. A few red garnet crystals were found in the pegmatite near the north end of the workings. A wedge-shaped horse of biotite schist 20 by 15 feet also occurs near the north end of the workings. The footwall rock below the dike is a biotite-rich quartz schist.

This dike was unsuccessfully worked for its muscovite content in 1937–38. It was optioned to T. B. Tough and associates in 1941, and at the time of the writer's visit in June, 1941, preparations were under way for production. The total production for 1941, which consisted of 2 carloads each of potash and soda feldspars, amounted to 190 tons. The property closed down at the end of the year. The feldspar was trucked 9 miles to Burk's Falls on the Canadian National railway.

MUSKOKA DISTRICT

Brunel Township, Concession XIV, Lot 16

About 100 feet above lake level at the ski jump on the west shore of Fairy lake, 1½ miles from Huntsville, old pits expose a pegmatite dike on lot 16, concession XIV, Brunel township, Muskoka district. In one pit pink microcline (see analysis No. 17 in the table on page 55) forms crystals as large as 1½ by 2 feet, and banded grey or white quartz and some small books of muscovite occur interstitially. At the mouth of this pit waste rock consists of a coarse-grained aggregate of pink microcline, yellow-brown plagioclase, quartz, muscovite, and biotite. On the dump partly stained muscovite is found in sheets as much as 3 inches in diameter, and biotite in crushed sheets as much as 2 feet in diameter. Other strippings near the top of the ski jump and much of the waste rock forming a talus slope on the side of hill show abundant graphic granite. It would appear that the abundance of graphic granite prevents any commercial development.

Chaffey Township, Concession X, Lot 13

For a description of a feldspar occurrence in lot 13, concession X, Chaffey township, see the account of a mica deposit on page 74.

Stephenson Township, Concession XIV, Lot 24

At the time of the writer's visit in September, 1941, F. C. Hammond and Allan McKay were developing a feldspar property on lot 24, concession XIV, Stephenson township, Muskoka district, 1½ miles from Martins on the Canadian National railway. A stripping 25 by 50 feet had been cleared on a pegmatite dike on the north slope of a hill just south of the road on the boundary between Stephenson and Stisted townships. Work was in progress in a pit 25 feet square and from 3 to 5 feet deep to obtain a carload of feldspar for a test shipment to the Genesee Feldspar Company, Incorporated, Rochester, N.Y.

The pegmatite dike, which is about 25 feet wide, is composed of pink microcline (analysis No. 18 in the table on page 55), graphic granite, glassy white or grey quartz, odd books of biotite with a maximum diameter of 3 inches, and some magnetite. A very small amount of plagioclase (analysis No. 19 in the table on page 55) was seen on the west wall. Quartz forms a 10-foot width in the centre of the dike flanked by pink microcline with coarse grey quartz. The ratio of feldspar to waste in September, 1941, was reported to be very low, about 1 to 10.

The dike cuts a biotite augen gneiss, which is also exposed in a low cliff 30 feet south of the stripping. The gneissic structure strikes N. 65° W. and dips 45° S.W. There is no trace of the dike here, as would be expected, which suggests that the pegmatite body may be just a small mass.

Garnet

Garnet is a common constituent of many of the gneisses in the district, particularly in some of the sedimentary gneisses, of which garnet-biotite gneiss and garnet-hornblende gneiss are two common varieties. Although the garnets are abundant they are not of commercial grade, and the one attempt to exploit the mineral on Parry island was not successful.

Very few garnet occurrences in Canada have been developed, and the outlook is not very bright. Eardley-Wilmot[1] has drawn attention to this in his annual review, and some of his comments are quoted below:—

> The specifications for garnet for use in the making of high quality abrasives are somewhat exacting. The individual crystals should be clear and free from embedded impurities and from minute fractures. They should be of a deep wine-red colour, and not smaller than pea size, walnut size or larger being preferable. The garnet should be tough, but should yield sharp and angular grains when crushed. The deposit should be extensive and the garnet content should not be less than 25 per cent. It should also be close to rail transportation and industrial centres. Few, if any, of the hundred or more garnet deposits so far examined in Canada fulfill all of these requirements...
>
> Between 90 and 95 per cent. of the world output of garnet comes from the United States, Barton Mines Corporation, North Creek, New York, being by far the largest producer. Its product is regarded as the world standard abrasive garnet and its deposits are large. . . .
>
> Attempts in the past to produce commercial garnet in Canada have failed owing to the small extent to which it is used; to the competition from high quality United States material; and to the fact that garnet possessing abrasive efficiency equal to that obtained in the United States has not as yet been found in sufficient quantities. Consumption in Canada has never been more than 150 tons of graded grain a year, about half of which is supplied by the United States.

PARRY ISLAND

Near Depot Harbour

Garnet-biotite-muscovite gneiss and garnet-hornblende gneiss are interbanded with one another on the north side of Parry Island, near Depot Harbour, outside the Indian reserve.

A detailed description of the deposit has been published[2] and the reader is referred to it for details. Mill tests were made at the Mines Branch, Ottawa.[3] Garnet Abrasive Corporation, Limited, was incorporated in 1925 to develop the deposit, but no work other than the trenches for sampling was ever carried out. The rock averages 15 per cent. garnet.

RYERSON TOWNSHIP

Concession XII, Lot 9

On lot 9, just south of the road on the boundary between concessions XII and XIII, Ryerson township, stripping in 1941 by A. Jeffery revealed a band of coarse garnet-biotite-hornblende gneiss with exposed widths of 30 to 50 feet. The garnets range from a quarter of an inch to 1 inch in diameter and over some areas would average half an inch in diameter. The crystals are rounded and on being broken across have a sugary texture, and exhibit a sieve structure because of the many small included grains and even minute veinlets of quartz and hornblende. This characteristic of the garnet precludes any possibility of commercial exploitation. The rock to the north of the garnet band is a pale-grey to white biotite granite gneiss cut by pegmatite.

Graphite

Disseminated graphite in biotite gneiss was seen at numerous localities in the district. None of these occurrences can be considered of economic interest

[1] V. L. Eardley-Wilmot, "Garnet in 1940," The Canadian Mineral Industry in 1940, Can. Dept. Mines.

[2] V. L. Eardley-Wilmot, Abrasives, Part III, "Garnet," Mines Branch, Can. Dept. Mines, No. 677, 1927, pp. 15-17, 43, 44.

[3] R. K. Carnochan, Mines Branch, Can. Dept. Mines, Sum. Rept. 1921, pp. 169-184.

at the present time. A number of occurrences in crystalline limestone containing bands or inclusions of hornblende gneiss were prospected by T. B. Tough and associates in 1941. A few of these occurrences are briefly described below.

For a discussion of prices and market requirements the interested reader is referred to two recent publications.[1]

"Metal and Mineral Markets" quote prices for graphite in 1941 as follows:[2] flake graphite, 94 per cent. carbon, f.o.b. Georgia, 7 cents per pound; crude amorphous graphite, f.o.b. New York, $14 to $25 per ton, according to grade.

CHAPMAN TOWNSHIP

Concession III, Lot 18

A hill just south of Carmen (Hungry) lake on lot 18, concession III, Chapman township, is composed of a garnet-biotite augen gneiss with a 25-foot band of rusty-weathering, sugary biotite-graphite gneiss carrying 10 per cent. (estimated) graphite in flakes half a millimetre to 1 millimetre in diameter. The trend is N. 45° E., and the dip 80° N.W. The band is reported to be traceable for miles. This showing had been stripped by T. B. Tough and associates and was visited by the writer on June 27, 1941.

LAURIER TOWNSHIP

Concession XIII, Lot 22

A graphite schist is exposed in some old pits north of Sausage lake and south of a road from Trout Creek in lot 22, concession XIII, Laurier township. One pit, 7 by 10 feet and from 10 to 12 feet deep and now practically filled with water, is located at the north end of an outcrop and exposes a wedge-shaped mass of graphite schist. At the north side of the pit the graphite schist is from 4 to 5 feet wide, but at the south side it has pinched to a few inches in width. The country rock is a grey, banded, fine-grained greywacke, rusty-weathering in part and containing bands of coarse-grained biotite gneiss. The rusty part is due to a seam of pyrite, which is from an eighth to a quarter of an inch in width. Bedding and gneissosity trend N. 5° W., and the dip is vertical. In low ground 25 feet to the north, a partially water-filled pit 5 by 7 feet shows a 5-foot width of graphite schist on the north face and 6-inch width of rusty schist on the west wall. This is followed on the outcrop by a coarse biotite gneiss. A swamp lies to the north of this pit.

A sample of fresh graphite schist taken from a small dump adjacent to the main pit analysed 28.66 per cent. carbon.

Joe Timpano of Trout Creek guided the writer to this showing.

SPENCE TOWNSHIP

Concession XI, Lot 15

On lot 15, concession XI, Spence township, north of the road on the boundary between concessions X and XI a number of small test pits and strippings on cleared land expose contorted impure crystalline limestone with abundant, and sometimes predominating, bands and inclusions of hornblende gneiss. Locally, the hornblende gneiss carries large flakes of graphite, but most of the bands or inclusions contain little or no graphite. The contorted nature of the rock structure, and the occurrence of the graphite only with the hornblende gneiss inclusions,

[1] "Prospectors' Guide for Strategic Minerals in Canada," Can. Dept. of Mines and Resources, 1941, pp. 18-23.
P. M. Tyler and C. L. Harness, "Marketing Graphite," U.S. Bur. Mines, I.C. 7177, September, 1941.

[2] "Metal and Mineral Markets," Eng. and Min. Jour., November 20, 1941, p. 6.

which are to be measured in inches rather than feet, leads one to believe that there is little hope of finding a deposit of economic proportions at this locality. The stripping was done in June, 1941, by T. B. Tough and associates.

Concession XIV, Lot 3

Just south of the road in lot 3, concession XIV, Spence township, stripping in June, 1941, by T. B. Tough and associates exposed, over an area 40 by 40 feet, a crystalline limestone with a few altered hornblende schist inclusions, the latter carrying coarse graphite flakes as much as 1 inch but mostly not greater than a quarter of an inch in diameter. The inclusions are few in number, and there is very little graphite in the limestone itself. On the shore of Bilsland lake 16 chains southwest of this stripping a little graphite occurs with hornblende gneiss inclusions in crystalline limestone. Under the water, bands of impure crystalline

Crystalline limestone breccia, Ferrie river, lot 31, concession VII, Ferrie township.

limestone show disseminated graphite. Near the boundary between lots 3 and 4, 5 chains from Bilsland lake, stripping on crystalline limestone containing hornblende gneiss does not show any graphite. A pale-pink, fine-grained granite containing red garnets an eighth of an inch in diameter outcrops on the boundary between lots 3 and 4. These showings are not considered to be of economic importance.

Limestone

CRYSTALLINE LIMESTONE

The economic possibilities of the crystalline limestones of the district appear to be limited. As noted previously few exposures consist of limestone free of hornblende gneiss inclusions or of grains of serpentine or other minerals. Limestones outcrop in fifteen townships, but the most numerous exposures are found in Hagerman, Ferrie, and Lount townships. A brief description of each of the occurrences seen by the writer is given below. It will be apparent from the descriptions that there is practically no clean crystalline limestone, and the only

exposures of any size with a lower percentage of impurities than usual may be listed as follows:—

1. Christie township, concession XI, lot 9, on the Seguin river.
2. Ferrie township, concession III, lot 1, on Many Island lake.
3. Lount township, concession I, lots 28, 29, and 30.
4. Ryerson township, concession V, lots 28, 29, and 30, west of Starrat P.O.

The list of occurrences is by no means complete owing to the nature of the reconnaissance, but previous statements that the limestones occurred as a series of northward-trending bands in the district must be denied. All the field evidence

Small gorge on the Seguin river in white crystalline limestone, lot 9, concession XI, Christie township.

indicates that the limestones occur as relatively narrow interbeds in a hornblende gneiss complex and are so intimately associated with this rock that few exposures of the crystalline limestone are free of inclusions of it. This relationship has an important economic aspect as in any exploitation of most of the limestones there would be considerable waste owing to the presence of these inclusions.

In the past the limestones have been quarried and burnt for lime for local use. The decomposed gravelly limestone has also been used by the farmers on their fields and is still used for surfacing on a number of the township roads. Although a careful watch was kept for any occurrence of brucite in the crystalline limestones none was found, and it would appear that sufficient silica and other impurities were present to form serpentine or other silicate minerals during the metamorphism. Descriptions of some of the limestones and analyses are to be found in reports by Goudge[1] and Miller.[2]

[1]M. F. Goudge, "Limestones of Canada," pt. IV, Ontario, Bur. Mines, Can. Dept. Mines and Resources, No. 781, 1938, pp. 141-146.

[2]W. G. Miller, "The Limestones of Ontario," Ont. Bur. Mines, Vol. XIII, 1904, pt. 2, pp. 92-95.

Crystalline Limestone Occurrences in Parry Sound District

Location	Description
CHAPMAN TOWNSHIP	
Concession A: Lots 119, 120	A quarry in decomposed crystalline limestone is situated on the east side of the road. Numerous inclusions of pegmatite and calc-silicate rocks carrying small crystals of titanite are present. The limestone has a width of 8 chains and is bounded on the north and south by biotite-hornblende gneiss. This band extends into lot 120, concession B, Lount township.
Concession B: Lot 119	West of the road crystalline limestone is exposed for a width of 150 feet and occurs as an interbed in biotite hornblende gneiss. There is an old pit, 7 by 7 feet and 3 feet deep, at the north end of the outcrop. At the roadside the decomposed crystalline limestone is screened and used for road surfacing. This band continues to lot 120, concession B, Lount township.
CHRISTIE TOWNSHIP	
Concession XI: Lot 9	On the Seguin river both east and west of the road bridge, coarsely-crystalline, banded, white, impure limestone occurs as a series of contorted beds with numerous interbeds of hornblende or garnet-hornblende gneiss (see photographs on pages 5 and 8). The banding in the crystalline limestone is due to the alternation of bands carrying varying amounts of serpentinized olivine, diopside, tremolite, chondrodite, phlogopite, garnet, and magnetite. In the gorge below the falls crystalline white to pale-blue or pale-green limestone forms cliffs 30 feet high (see photograph on page 65). The limestone is exposed for approximately 300 yards downstream from the bridge. Just south of the bridge the banding (bedding) of the limestone strikes N. 65° E. and dips 75° S.E.
Concession XII: Lot 9	At the Bloor "mine" there are coarse-grained (half-inch), green crystalline limestone with bands of garnet rock and stringers of hornblende and of orange-and white carbonate. The country rock south of the "mine" is a dark-green hornblende gneiss with irregular lenticular bands of red garnet.
CROFT TOWNSHIP	
Concession VI: Lot 21, south half	Crystalline limestone with bands of hornblende gneiss.
Lot 21, north half	Crystalline limestone with inclusions of hornblende gneiss is found west of the road. Some graphite is present locally as scaly aggregates. There is an old pit, at which it is reported that lime was burnt about sixty years ago.
Concession VII: Lot 20	On the east side of the road there is a 40-foot width of faintly bedded crystalline limestone. The bedding strikes N. 70° E. and dips 25° S.
Concession X: Lot 35	In a field east of the road there is a complex of a white to pinkish biotite gneiss with pegmatite and a hornblende or garnet-hornblende gneiss with lenses of crystalline limestone.
Concession XI: Lot 35	Pink and white crystalline limestone with hornblende gneiss inclusions occurs on the east side of the road.

Location	Description
FERGUSON TOWNSHIP	
Concession II: Lot 10	Three test pits have been put down on impure white crystalline limestone containing serpentine and pyroxene grains and bands and inclusions of hornblende gneiss. The bedding in limestone strikes N. 35° E. and dips 70° S.E.
FERRIE TOWNSHIP	
Concession I: Lots 13, 14	Crystalline limestone extends for 300 yards south of Waubies creek. At 300 yards south a small dry creek parallel to Waubies creek has a short tunnel through the limestone. The buff to pink crystalline limestone contains small fragments of pegmatite and hornblende gneiss. Galena was reported to occur here, but no galena or graphite were seen. The country rock is a granitized hornblende gneiss.
Concession III: Lot 1	On the west shore of Many Island lake faintly bedded crystalline limestone is exposed. The strike of the bedding is N. 30° E., and the dip 70° S.E.
Concession V: Lots 33, 34	Crystalline limestone occurs at the roadside and in fields to the northeast with inclusions of hornblende gneiss.
Lot 34	Four chains west of the road 50 feet of crystalline limestone bounded on the west by pegmatite and on the east by garnet-hornblende gneiss outcrops in a field.
Concession VI: Lot 32	Crystalline limestone with hornblende gneiss inclusions. The three occurrences in lots 32, 33, and 34 may represent one band.
Concession VII: Lot 31	A 50-foot band of crystalline limestone with abundant inclusions of hornblende gneiss occurs on the Ferrie river (see photograph on page 64) and in the field to the northwest.
Concession VIII: Lot 30	Crystalline limestone with inclusions of hornblende and garnet-hornblende gneiss outcrops at an old farm house.
Concession IX: Lots 27, 28	Two narrow bands of crystalline limestone with hornblende gneiss inclusions.
Lot 29	Three bands, 1, 2, and 5 chains in width, of crystalline limestone with hornblende gneiss inclusions outcrop near an old farm house.
Concession X: Lots 26, 27	Crystalline limestone is exposed four times on the old North road.
FOLEY TOWNSHIP	
Concession IX: Lot 35	A 10-foot band of crystalline limestone occurs as an inclusion in granitized hornblende gneiss.

Location	Description
HAGERMAN TOWNSHIP	
Concession I:	
Lots 21, 22	Crystalline limestone with green grains and inclusions of hornblende gneiss outcrops on the east side of the road in lot 22 and in the field north of the road in lot 21.
Concession A:	
Lots 30, 31	White crystalline limestone with grains of serpentine and inclusions of hornblende or garnet-hornblende gneiss is exposed over a width 120 feet.
Lot 34	Crystalline limestone is exposed for 360 feet along the west side of road.
Lot 35	Band of crystalline limestone containing serpentine and pyroxene grains.
Lot 37	Four narrow bands of crystalline limestone outcrop on the west side of the road.
Lot 38	Two exposures of crystalline limestone occur on the west side of the road.
Lot 39	Crystalline limestone outcrops on the west side of the road.
Lot 41	Crystalline limestone outcrops on the west side of the road.
Lot 60	Crystalline limestone outcrops on the west side of the bridge.
Lots 60, 61	Rocky fields northwest of Dunchurch expose a complex of hornblende gneiss, crystalline limestone, granite gneiss, and pegmatite.
Concession B:	
Lot 32	White, medium to coarse-grained crystalline limestone with serpentine grains and some inclusions of hornblende gneiss outcrops on the east side of the road.
Lot 36	A band of crystalline limestone trending north-northeast from the road past the schoolhouse contains serpentine and pyroxene.
Lot 40	Crystalline limestone.
Lot 43	Crystalline limestone outcrops in the fields just north of the cemetery. Just southeast of the cemetery garnet-hornblende gneiss outcrops, followed to the southeast by crystalline limestone with small inclusions of hornblende gneiss. Near the north boundary of the lot, 6 chains from the road, exposures of crystalline limestone contain folded 1- to 4-inch rusty-weathering bands of gneiss with disseminated pyrrhotite.
Lot 49	Crystalline limestone with hornblende gneiss inclusions outcrops on the road.
Lot 61	On the shores of Whitestone lake crystalline limestone with inclusions of hornblende gneiss outcrops east of the road at Dunchurch.
Lot 62	White, pink, and orange, coarse-grained crystalline limestone with interbanded gneiss outcrops on the north side of the road just east of the main road corner north of Dunchurch. Inclusions of hornblende gneiss in the crystalline limestone are not abundant. The bedding strikes N. 30° E. and dips 50° S.E.
LOUNT TOWNSHIP	
Concession I:	
Lots 26, 27	Two exposures of crystalline limestone.
Lots 28, 29, 30	Numerous exposures of crystalline limestone in the fields around the farm of Frank Schmeler and in the bush to the west contain inclusions of hornblende gneiss.

Location	Description
	LOUNT TOWNSHIP—*Continued*
Concession III: Lot 26	At the west side of the bridge on the road to Many Island lake a pit has been sunk on decomposed crystalline limestone containing bands and inclusions of hornblende gneiss. The bands trend N. 30° E. and dip 45° S.E.
Lots 33, 35	Exposures of rusty, white crystalline limestone occur on Many Island lake.
Concession IV: Lots 31, 32	Exposures of rusty, white crystalline limestone occur on Many Island lake.
Concession VIII: Lot 22	Crystalline limestone outcrops just southwest of the road junction.
Concession A: Lot 136	Thirty feet of crystalline limestone with inclusions of hornblende gneiss outcrop on the east side of the Nipissing road.
Concession B: Lot 120	Three exposures of crystalline limestone are found in this lot, two of which extend into lot 119, concessions A and B, Chapman township. South of the road to Frank Schmeler's farm in the western part of the lot a pit has been opened up in the decomposed limestone. This material is used locally for road surfacing.
Lot 124	On the north side of the road to Many Island lake a small pit has been sunk in rusty, decomposed crystalline limestone.
Lots 138, 139	Crystalline limestone outcrops in the fields west of the Nipissing road.
	McDOUGALL TOWNSHIP
Concession I: Lot 28	A cutting on the C.N.R. just east of the school exposes crystalline limestone containing abundant fragments of hornblende gneiss. The limestone has an exposed width in the cut of 120 feet and is exposed both north and south of the tracks. It is reported that this limestone was burnt for lime fifty years ago. The crystalline limestone itself contains grains of serpentine.
Concession III: Lot 17	A small exposure of coarse-grained, pink crystalline limestone with inclusions of hornblende gneiss occurs on the north shore of a small bay on the east side of Mill lake. Although other exposures are reported on this lot and on lot 18, only hornblende or garnet-hornblende gneiss cut by pegmatite was found.
	McKELLAR TOWNSHIP
Concession VI: Lot 1	South of the rapids on the Manitouwabing river and extending to the road there is a complex of an impure crystalline limestone speckled with green minerals and a biotite hornblende or hornblende gneiss and cut by irregular dikelets or bands of coarse hornblende pegmatite containing titanite. A zoned mineral development of orange-red garnet, yellow green epidote with locally some pyrite and pyrrhotite occurs in the limestone adjacent to the hornblende pegmatite. A number of pits have been opened in this mass, supposedly for fluorite, of which there is none.
Concession XIV: Lots 18, 19	Crystalline limestone with inclusions of hornblende gneiss outcrops in a field 1½ chains southeast of the road.

Location	Description
	McKELLAR TOWNSHIP—*Continued*
Concession A: Lot 14.....	A band of impure, white crystalline limestone, 30 feet in width, contains small to large fragments of hornblende gneiss. Eight chains to the east is an 18-inch band of white crystalline limestone in a massive garnet band. In a field on strike to the northeast the limestone band is 60 feet wide.
	McKENZIE TOWNSHIP
Concession I: Lot 1.....	Crystalline limestone occurs as an inclusion in hornblende granite gneiss.
Lot 2.....	Crystalline limestone containing hornblende gneiss inclusions outcrops in a field and appears again on the south bank of the Magnetawan river, in the same lot in concession II.
Lot 3.....	North and south of the road to Whitestone there is 100 feet of crystalline limestone with inclusions.
Concession II: Lot 2.....	White crystalline limestone with grains of serpentine outcrops on Maple island north of the bridge over the Magnetawan river (see photograph on page 9). The bedding strikes S. 10° E. and dips 70° E. The country rock is a granitized biotite gneiss.
	MILLS TOWNSHIP
Concession II: Lot 10.....	South of Stanly lake in the bed of a small creek, coarse, white to pale-green crystalline limestone with associated garnet amphibolite has been exposed by test-pitting. Some graphite is present at the contacts between the limestone and amphibolite.
	PRINGLE TOWNSHIP
Concession IV: Lots 1, 2.....	Crystalline limestone with large inclusions of hornblende gneiss is exposed near the road junction.
Concession VII: Lot 25.....	Banded impure crystalline limestone containing green grains and bands of hornblende gneiss is exposed in an old trench, which runs north from the road and is 6 feet long, 6 feet wide, and from 4 to 6 feet deep. The bedding in the limestone strikes N. 55° E. and dips 45° S.E.
Concession XI: Lot 20.....	Impure crystalline limestone containing bands rich in hornblende crystals with a maximum diameter of 1 inch and bands of hornblende rock outcrop on the north side of the road.
	RYERSON TOWNSHIP
Concession V: Lots 28, 29, 30....	On lot 28, crystalline limestone contains rusty-weathering garnet-hornblende gneiss inclusions as contorted bands. On lots 29 and 30, an exposure of crystalline limestone, which is 8 chains in width and contains hornblende gneiss inclusions, extends north into old cleared fields. On lot 30, 300 feet north of the road, an old test-pit has been sunk on impure crystalline limestone with hornblende gneiss inclusions.

Location	Description
	SPENCE TOWNSHIP
Concession IV: Lot 33	Coarse crystalline limestone with bands of hornblende gneiss is exposed for 8 chains along the south side of the road. In the fields to the south banding in the limestone strikes S. 40° E. and dips vertically.
Concession V: Lot 35	Coarse crystalline limestone with black hornblende gneiss outcrops on the west side of the road for 60 feet.
Concession X: Lot 18	Crystalline limestone outcrops on the east side of the bridge over the Neighick river and south of the road.
Concession XI: Lot 15	An outcrop of impure crystalline limestone containing contorted bands and inclusions of hornblende gneiss with disseminated graphite was test-pitted in 1941.
Concession XIII: Lot 19	Crystalline limestone with contorted bands of hornblende gneiss.
Concession XIV: Lots 2, 3	Stripping and test-pitting was done in 1941 between the road and Bilsland lake on a number of exposures of crystalline limestone containing very few hornblende gneiss inclusions. Disseminated graphite is present in small quantities.

PALEOZOIC LIMESTONES

Nipissing Township

The small outlier of Paleozoic dolomite shown on the map in lot 16, concession XI, and lot 218, concession A, Nipissing township, was visited by the writer and briefly described in previous pages of this report.[1] This occurrence has also been described by Goudge.[2] The chemical composition of the dolomite is given in the table below:—

	No. 1	No. 2	No. 3	No. 4
SiO_2	9.37	.....	.....	.....
Al_2O_3	4.66	0.10	0.95	1.49
Fe_2O_3	2.60	4.93	2.63	2.67
CaO	26.89	29.81	28.89	28.29
MgO	16.38	17.81	18.28	17.66
CO_2	39.02	.....	.....	.....
H_2O	1.20	.....	.....	.....
Loss on ignition	.....	45.71	44.38	42.89
Insoluble	.....	1.59	4.46	6.81
Total	100.12	99.95	99.59	99.81

Sample No. 1—Fresh grey dolomite from the test pit on lot 16, concession XI, Nipissing township. Analysis by the Provincial Assay Office.

Sample No. 2—"Seven feet of medium-grained rock exposed at top of cliff 1,000 feet east of the old lime kilns,"[3] lot 218, concession A, Nipissing township.

Sample No. 3—"Fine-grained rock (exclusive of shaly interbeds) near the lime kilns at the west end of the outlier and about 15 feet above the lowest beds exposed,"[4] lot 218, concession A, Nipissing township.

Sample No. 4—"Fine-grained rock (exclusive of shaly interbeds) in small pit behind the lime kilns at the west end of the outlier, and representative of the lowest beds exposed,"[5] lot 218, concession A, Nipissing township.

[1]Page 16.
[2]M. F. Goudge, op. cit., pp. 141-145.
[3]Ibid, p. 144, analysis No. 1.
[4]Ibid, p. 144, analysis No. 2.
[5]Ibid, analysis No. 3.

The analyses would suggest that the dolomite has only limited economic possibilities. Goudge states that on calcination the dolomite yields a dark-brown lime. Tests made by the Canadian Inspection and Testing Company, Toronto, show that the rock is suitable for use as concrete aggregate and ranks class "C" in the Ontario Department of Highways specifications for road materials.[1]

The mineral rights were held by C. H. Mann but were sold by him in 1941 to a North Bay syndicate headed by W. Holden.

Limestone Islands

The Paleozoic limestone on the Limestone islands in Georgian bay between Parry sound and Franklin inlet has the following composition according to Miller.[2]

	Per cent.
Calcium carbonate	94.48
Magnesium carbonate	4.03
Alumina and ferris oxide	.52
Silica	.76
Total	99.79

Mica

Muscovite (white mica) is the only mica in the district that has any commercial possibilities. No deposits of phlogopite (amber mica) has been found, and there is no sale for biotite (black mica). Muscovite occurs in granite pegmatite dikes at a number of localities, but only a few of these have been worked, and the total production has been very small. It would appear that in some cases feldspar operators might, by careful quarrying methods, stock-pile muscovite for sale as a by-product of their operations. The writer was informed, however, that through ignorance many mica books in the past had been spoilt by improper blasting at the time of extraction.

No new deposits of muscovite have been found in recent years. Although T. B. Tough expected to ship some muscovite as a by-product of feldspar operations on Cecebe lake in 1941, none has been sold to date. A number of old showings were examined and are described below. Spence[3] has briefly commented on a number of occurrences, and general information can be obtained from reports of the Canadian Department of Mines,[4] the United States Bureau of Mines,[5] and Roush's "Strategic Mineral Supplies."[6]

ARMOUR TOWNSHIP

Concession X, Lot 15

On lot 15, concession X, Armour township, 47 chains south of the road on the boundary between concessions X and XI, two trenches have been put down on a pegmatite dike. The trenches are on a north and south line, the south trench being 25 feet and the north trench 105 feet in length with a gap of 15 feet between them. The north trench is from 10 to 20 feet in width and partly filled with water;

[1]M. F. Goudge, op. cit., p. 145.
[2]W. G. Miller, Ont. Bur. Mines, Vol. XIII, 1904, pt. 2, p. 92.
[3]Hugh S. Spence, "Mica," Mines Branch, Can. Dept. Mines, No. 701, 1929, pp. 82, 83, 88.
[4]Prospectors' Guide for Strategic Minerals in Canada, Can. Dept. Mines and Resources, 1941, "Mica," pp. 35-40.
[5]W. M. Myers, "Mica," U.S. Bur. Mines, I.C. 6205, Dec., 1929.
P. M. Tyler, "Marketing Mica," U.S. Bur. Mines, I.C. 6997, March, 1938.
L. G. Houk, "Marketing Strategic Mica," U.S. Bur. Mines, I.C. 7219, Sept., 1942.
[6]G. A. Roush, "Strategic Mineral Supplies," McGraw-Hill, New York, 1939, chapter XII, "Mica," pp. 339-376.

its depth probably averages 6 feet. The country rock is a coarse-grained biotite-hornblende gneiss. On a ridge of rock left at the middle of the north trench the pegmatite dike is seen to be 5 feet wide and dips east at 45 degrees. A few small books of muscovite with a maximum diameter of 3 inches were found.

This deposit was first staked in 1908. It is not known if there was ever any production. The trenches were bailed out for an examination in 1940.

Since so little of the pegmatite dike is exposed, it is quite impossible to form any opinion as to the amount of mica present in the dike below the water in the trenches.

FERGUSON TOWNSHIP

Concession I, Lot 13

On the west side of the road to Lorimer lake on lot 13, concession I, Ferguson township, a small pit has been sunk on a white pegmatite dike, which is about 10 feet wide and cuts hornblende gneiss. Some muscovite is present. This occurrence does not appear to be anything more than a prospect pit put down in a search for mica.

McDOUGALL TOWNSHIP

Concession XII, Lot 8

The old Oak Ridge mine[1] was operated in 1894 by F. P. Leushner. Mr. Leushner, now living on Harris lake, kindly guided the writer to this old showing, which is near the north end of lot 8, concession XII, McDougall township, just northeast of a small lake and half a mile south of the Waubamik-McKellar road. An open cut, which is 40 feet long, 10 feet deep, and 6 feet wide, exposes a 6-foot dike of white and pink pegmatite with a glassy quartz centre 2½ feet wide. The dike trends N. 35° E. and has a vertical to 75° N.W. dip. The dike breaks clean from the walls. The country rock is a black hornblende gneiss. It is stated that the mica occurred with feldspar at the margins of the dike and was 1 foot wide on the north wall. The largest book of muscovite recovered weighed 100 pounds. The small production was sold to Munsell and Company, New York.

Two other pegmatite dikes occur at 1 chain to the northwest and 3 chains to the southeast.

One book of muscovite, 4 inches in diameter, picked up from the old dump shows the mica to be badly stained or spotted.

Concession XII, Lot 12

There is an old pit, which is 15 by 20 feet and 15 feet deep and now filled with water, 19 chains south and 1 chain east of the corner post of the boundary line between lots 12 and 13, concession XII, McDougall township. Little can be seen except the waste rock on the old dump. The country rock is a hornblende gneiss. Most of the dump is a white and pink pegmatite containing muscovite and biotite. Some of the crumpled books of biotite are as much as 12 by 18 inches in dimensions.

RYERSON TOWNSHIP

Concession XIII, Lot 18

The operators of the feldspar deposit on lot 18, concession XIII, Ryerson township (see page 60), expected to market the muscovite obtained as a by-product of their operations. As far as known, however, no sales of muscovite were made in 1941. At the time of the writer's examination of this property no high-grade mica was to be seen, that present being spotted and showing a herringbone structure. Attempts to operate this deposit for mica alone prior to 1941 were not successful.

[1]Ont. Bur. Mines, Vol. V, 1895, pp. 279, 280.

STRONG TOWNSHIP

Concession II, Lot 21

At the request of M. M. McAvoy, the writer examined a pegmatite dike on lot 21, concession II, Strong township.

The dike, which trends N. 65° E. and is approximately 25 feet wide, is exposed on the top of a hill for a length of 200 feet west from a point just north of the centre of the boundary line between lots 21 and 22. Feldspar occurs as masses as much as 1 foot in diameter, but most of it is graphic. At the dike margins there is a concentration of muscovite as small books, usually less than 1 inch in width but occasionally as wide as 2 inches. Some of the muscovite contains small garnets. In places biotite is also present. The dike is again exposed 250 feet west of the lot line but has here a width of only 3 feet and contains a few small books of muscovite, the largest being 1 by 2 inches. About 300 feet west of the boundary the dike appears to finger out into the country rock, which is a pink, biotite granite gneiss.

The mica in this occurrence is of no economic importance.

MUSKOKA DISTRICT

Brunel Township, Concession XIV, Lot 16

For a description of a mica occurrence in lot 16, concession XIV, Brunel township, Muskoka district, see the account of a feldspar occurrence on page 61.

Chaffey Township, Concession X, Lot 13

On lot 13, half a mile south of the road on the boundary between concessions X and XI, Chaffey township, Muskoka district, a curved trench, 120 feet long, from 10 to 20 feet wide, and from 2 to 5 feet deep, trending N. 30° E., exposes biotite granite gneiss cut by a 3- to 4-foot dike of muscovite pegmatite. The muscovite is irregularly distributed, but in places clusters of books form aggregates 1 by 2 feet. The individual books average 2 inches in diameter. Much of the microcline of the dike is graphic. Test shipments of mica and feldspar are reported. The deposit does not appear to be of economic importance.

Sand and Gravel

Sand and gravel are widely distributed throughout the district. A survey of sand and gravel deposits in Ontario was carried out some years ago by Ledoux[1] and includes descriptions of some of the occurrences in Muskoka and Parry Sound districts. No special study was made of these occurrences, but it would appear that there is an adequate supply for all local requirements.

Silt

MUSKOKA DISTRICT

Chaffey Township, Concession X, Lot 19

Eardley-Wilmot reports[2] an occurrence of silt in the Muskoka district. His description follows:—

> In concession X, lot 19, Chaffey township, Muskoka ,Ontario, beds of pale yellow silt occur along both banks of the Little East river, about 8 miles north of Huntsville. In places the deposit has a thickness of 25 feet and extends about 20 feet from the river banks. It is stratified with sand and layers of silt of varying coarseness. Messrs. Tynan and Southby have recently been working this deposit on a small scale and putting the material on the market in the form of scouring powders and cleansers. It is understood that they intend to erect a treating plant in the near future.

[1]A. Ledoux, Ont. Bur. Mines, Vol. XXVII, 1918, pt. 2, pp. 69, 70, 114-117.

[2]V. L. Eardley-Wilmot, Abrasives, Part 1 "Siliceous Abrasives," Mines Branch, Can. Dept. Mines, No. 673, 1927, p. 78.

An analysis of the silt is given in the table below:—

	Per cent.
SiO_2	64.10
Al_2O_3	14.53
Fe_2O_3	7.71
CaO	3.96
MgO	2.50
Na_2O and K_2O	6.32
H_2O at 105° C.	not determined
CO_2 and organic matter	1.10
Total	100.22

It is reported that this material turned out to be quite unsatisfactory for the above-mentioned products.

Stone

The district is almost entirely underlain by gneisses of various kinds, with minor areas of crystalline limestone, and some basic igneous rocks. Little of this stone would be suitable for high-grade building stone, although one operator produces flagstone and a little building stone, mainly for local use near Parry Sound.

The Department of Highways operated three quarries during the construction of No. 69 highway. One quarry southeast of Parry Sound is in a hornblende gneiss, and two northwest of Parry Sound are in a fine-grained biotite granite gneiss.

Some of the diabase and metamorphosed gabbro and norite would make excellent tough road-metal material, but few of the occurrences are large or adjacent to main highways.

McDOUGALL TOWNSHIP

Mill Lake Stone Quarry

The Mill Lake stone quarry, lots 24 and 25, concession III, McDougall township, on Mill lake, 1½ miles from Parry Sound, was formerly operated by R. R. Hall and is now run by his son, J. Hall. The deposit has been described by Parks.[1] The rock is a finely laminated, pink, grey, and white biotite gneiss of sedimentary origin. Strong partings occur from 2 to 4 feet apart, and there are well-developed joints. The rock splits readily parallel to the gneissic structure and makes excellent flagstones. As a building stone it was used in the Court House and Registry Office foundations in Parry Sound. The deposit has been worked intermittently from 1900 (?) to the present time. All operations are carried out by hand. No record of production is available prior to 1923. From 1923 to 1941, inclusive, the total production was valued at $2,073.[2] In 1941 flagstones sold for 6 cents per square foot, and building stone for $6 per cord (4 by 4 by 8 feet).

Miscellaneous

CHRISTIE TOWNSHIP

Concession IV, Lot 24

On lot 24, concession IV, Christie township, an old pit, 4 by 10 feet and from 1 to 2 feet deep, was put down (1900?) on a 4-foot pegmatite dike cutting pink to grey biotite granite gneiss. The dike consists of glassy white quartz, pink

[1]W. A. Parks, "Report on the Building and Ornamental Stones of Canada," Vol. I, Mines Branch, Can. Dept. Mines, No. 100, 1912, pp. 304, 305.

[2]Ont. Dept. Mines, files of the Statistics Branch.

feldspar, a little chloritized biotite, and numerous square prisms from half to three-quarters of an inch across and as long as 6 inches of highly altered scapolite. This is merely an occurrence of the mineral scapolite, which must have been confused with some other mineral by the original prospector; the deposit is of no economic importance whatsoever.

McKELLAR TOWNSHIP

Concession VI, Lot 1

Exploration was done on a property in lot 1, concession VI, McKellar township, in the hope of finding fluorite. More than half a dozen pits, some as big as 10 by 10 feet and 10 feet deep, have been put down around a hill of crystalline limestone just south of some rapids on the Manitouwabing river. The exposures show a complex of crystalline limestone speckled with green silicate minerals, such as diopside, olivine, and epidote, with associated lenses and bands of biotite-hornblende or hornblende gneiss cut by irregular dikelets of coarse hornblende pegmatite carrying titanite. Some zoned mineralization adjacent to the hornblende pegmatite consists of orange garnet, yellow-green epidote, and some local pyrite and pyrrhotite. There is no fluorite present.

APPENDIX I

Reference List by Townships to Mineral Occurrences[1] in Parry Sound District

Township	Concession and lot	Metal or mineral	For description see page
Armour	Con. VIII, lot 17	Copper-nickel	33
	Con. VIII, lot 18	Copper-nickel	34
	Con. IX, lot 28	Gold	35
	Con. X, lot 15	Mica	72
Bethune	Con. VII, lot 15	Titanium	49
	Con. VIII, lot 14	Gold	36
Carling	Con. VII, lots 40, 41	Copper	21
Chapman	Con. II, lot 26	Feldspar	56
	Con. III, lot 18	Graphite	63
	Con. IV, lot 18	Feldspar	56
	Con. XIV, lot 20	Iron	42
Christie	Con. IV, lot 24	Scapolite	75
	Con. VI, lot 27	Feldspar	56
	Con. XII, lot 9	Molybdenum	48
Conger	Con. VIII, lot 5	Feldspar	56
	Con. IX, lot 4	Feldspar	57
	Con. IX, lot 10	Feldspar	57
	Con. X, lot 7	Feldspar	57
Cowper	Con. IV, lot 15	Copper	22
	Con. IV, lot 16	Copper	22
	Con. IV, lots 18-22	Copper-zinc	22
	Con. IV, lot 23	Copper	26
	Con. V, lot 9	Copper	26
	Con. V, lot 13	Copper	26
	Con. V, lot 14	Copper	26
	Con. V, lot 20	Copper	26
	Con. VI, lot 9	Copper	26
Ferguson	Con. I, lot 13	Mica	73
	Con. V, lot 3	Copper	27
	Con. V, lot 5	Copper	27
Ferrie	Con. V, lot 33	Iron	42
Foley	Con. II, lot 14	Copper	27
	Con. III, lot 9	Gold	36
	Con. III, lot 10	Copper; feldspar	27; 57
	Con. IV, lot 12	Copper	27
	Con. IV, lot 13	Copper	27
	Con. IV, lot 15	Copper	27
	Con. V, lot 33	Copper	28
	Con. VI, lot 23	Copper	28
	Con. VI, lot 33	Copper	28
	Con. VII, lot 25	Copper	28
	Con. VII, lot 26	Copper	28
	Con. VIII, lot 29	Iron	42
	Con. IX, lot 15	Copper	29
	Con. IX, lot 35	Copper	29
	Con. X, lot 15	Copper	29
	Con. X, lot 19	Copper	29
	Con. XI, lot 13	Copper	29
	Con. XI, lot 15	Copper	30
	Con. XI, lot 16	Copper	30
	Con. XI, lot 17	Copper	30

[1]Limestone occurrences, which are tabulated on pages 66 to 71, are not included in this table.

Township	Concession and lot	Metal or mineral	For description see page
Foley (*Continued*)	Con. XI, lot 27	Copper	30
	Con. A, lot 137B	Copper	30
	Con. A, lot 145	Copper	30
	Con. B, lot 123	Copper	30
	Con. B, lot 145	Copper	31
	Con. B, lot 146	Copper	31
Gurd	Con. XIX, lot 10	Gold	36
Hagerman	Con. A, lot 61	Gold	36
	Con. B, lot 37	Gold	36
Hardy	Con. VIII, lot 23	Copper-nickel	34
	Con. VIII, lot 25	Copper-nickel	35
Henvey	Con. A, lot 3	Feldspar	58
	Con. B, lot 5	Feldspar	58
Laurier	Con. XIII, lot 21	Gold	36
	Con. XIII, lot 22	Gold; graphite	36, 37; 63
Lount	Con I, lot 16	Iron	43
	Con. II, lot 18	Molybdenum	48
	Con. III, lot 17	Iron	43
	Con. VIII, lot 22	Iron	44
	Con. VIII, lot 32	Iron	44
	Con. A, lot 124	Iron (garnet)	44
	Con. A, lot 125	Iron (garnet)	44, 45
	Con. A, lot 126	Iron (garnet)	45
	Con. A, lot 129	Iron (garnet)	45
	Con. A, lot 132	Iron (garnet)	45
	Con. A, lot 133	Iron	45
	Con. A, lot 136	Iron	45
	Con. B, lot 124	Copper; iron(?)	32; 45
	Con. B, lot 126	Iron (?)	45
	Con. B, lot 129	Iron	46
	Con. B, lot 136	Iron	46
	Con. B, lot 137	Iron (?)	46
	Con. B, lot 144	Iron	46
	Con. B, lot 145	Iron	46
McConkey	Con. II, lot 11	Feldspar	58
	Con. IV, lot 18	Gold	37
	Con. V, lot 20	Feldspar	58
	Con. V, lot 22	Feldspar	59
	Con. VI, lot 17	Feldspar	59
McDougall	Con. I, lot 18	Copper	33
	Con. III, lots 24, 25	Stone	75
	Con. X, lot 5	Feldspar	59
	Con. XI, lot 3	Feldspar	59
	Con. XII, lot 8	Mica	73
	Con. XII, lot 12	Mica	73
	Con. XII, lot 13	Copper-zinc	33
Machar	Con. V, lot 2	Gold	37
McKellar	Con. VI, lot 1	("Fluorite")	76
	Con. VI, lot 4	Feldspar	60
McMurrich	Con. I, lot 18	Gold	37
	Con. II, lot 15	Iron	47
	Con. XIV, lot 13	Gold	37
	Con. XIV, lot 14	Gold	37
Mills	Con. II, lot 10	Copper-nickel	35

Township	Concession and lot	Metal or mineral	For description see page
Monteith	Con. VIII, lot 15	Gold	37
	Con. IX, lot 17	Gold	37
	Con. IX, lot 19	Copper	33
	Con. X, lot 11	Gold	38
	Con. XI, lot 8	Gold	38
Nipissing	Con. I, lot 20	Gold	38
	Con. I, lot 25	Gold	38
	Con. X, lots 28, 29	Gold	38
	Con. X, lot 30	Feldspar	60
	Con. XV, lot 6	Gold	39
	Con. XV, lot 22	Gold	39
	Con. A, lot 218	Iron	47
Parry Island	Near Depot Harbour	Garnet	62
Parry Island Indian Reserve	West Shore	Aluminium	12, 20
Perry	Con. I, lot 3	Diatomite	53
	Con. X, lot 13	Gold	39
	Con. X, lot 15	Gold	39
	Con. XII, lot 4	Gold	39
	Con. XIII, lot 35	Copper-nickel	35
Pringle	Con. VII, lot 25	Gold	39
Proudfoot	Con. I, lot 6	Gold	39
	Con. III, lot 6	Gold	40
	Con. X, lot 3	Copper-nickel; gold	35; 40
Ryerson	Con. V, lot 30	Gold	40
	Con. XII, lot 9	Garnet	62
	Con. XIII, lot 18	Feldspar; mica	60; 73
South Himsworth	Con. II, lot 24	Gold	40
	Con. XI, lot 15	Brick-clay	52
Spence	Con. XI, lot 15	Graphite	63
	Con. XII, lot 9 or 10	Gold	40
	Con. XIV, lot 3	Graphite	64
Strong	Con. II, lot 21	Mica, feldspar	74
	Con. X, lot 20	Gold	40

APPENDIX II

Reference List by Townships to Mineral Occurrences in Muskoka District

Township	Concession and lot	Metal or mineral	For description see page
Brunel	Con. XIV, lot 16	Feldspar, mica	61
Chaffey	Con. V, lot 32	Gold	40
	Con. X, lot 13	Mica, feldspar	74
	Con. X, lot 19	Silt	74
Oakley	Con. III, lot 27 or 28	Iron	47
Stephenson	Con. XIII, lot 24	Gold	40
	Con. XIV, lot 24	Feldspar	67
Stisted	Con. VIII, lots 7, 8	Diatomite, clay	53
	Con. IX, lot 10	Clay, diatomite	52

INDEX, PART II