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ONTARIO
DEPARTMENT OF MINES

SUMMARY OF FIELD WORK, 1962

by the

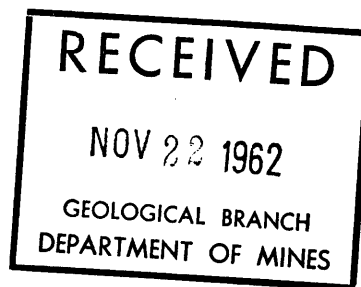
GEOLOGICAL BRANCH

ONTARIO DEPARTMENT OF MINES

Edited by

J.E. THOMSON

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GEOLOGICAL BRANCH



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November, 1962

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SUMMARY OF FIELD WORK, 1962

by the

GEOLOGICAL BRANCH

ONTARIO DEPARTMENT OF MINES

INTRODUCTION

by

J.E. Thomson¹

The Geological Branch had 22 geological survey parties in the field during the summer of 1962; some of these worked on two or more projects. A brief summary of the results of these surveys is given in this report. Emphasis is placed on the economic aspects of the investigations in the hope that the information might be of assistance to those who are engaged in mineral exploration in Ontario. The location of each field party and the name of the party leader is shown on the outline map of the province on page 2.

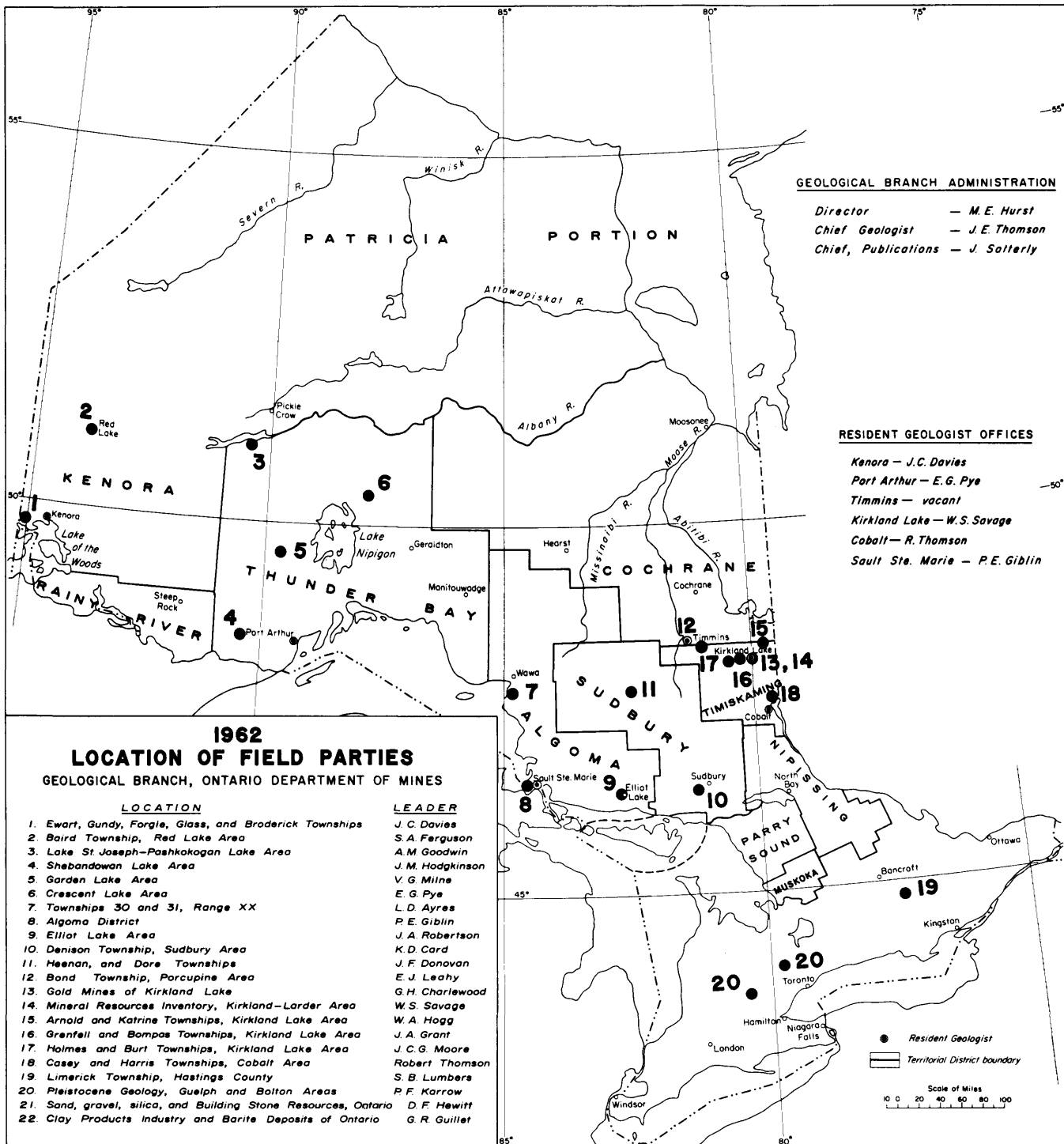
Most of the detailed mapping in Precambrian field areas (Nos. 1, 3, 4, 7, 10, 11, 15, 16, 17, 18, 19) was done at the scale of one inch to $\frac{1}{4}$ mile, for publication at one inch to $\frac{1}{2}$ mile. Geological maps covering reconnaissance surveys (Nos. 5 and 6) will be published at the scale of one inch to one mile. Detailed maps of the Red Lake mining camp will be published at the scale of one inch to 1,000 feet.

Uncoloured preliminary geological maps of most of the areas will be published during the winter of 1962-63; a few preliminary reports will also be issued. Notices of the release of these preliminary maps and reports will be announced by postcards mailed to all persons and organizations on the Department of Mines notification list.

Eventually coloured maps and detailed reports will be published to cover most of these field projects.

Requests for publications, and inquiries about publications, should be addressed to the Publications Office, Ontario Department of Mines, Parliament Buildings, Toronto 2, Ontario, Canada.

¹Chief Geologist, Geological Branch, Ontario Department of Mines, Toronto.



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**1962
 LOCATION OF FIELD PARTIES
 GEOLOGICAL BRANCH, ONTARIO DEPARTMENT OF MINES**

<u>LOCATION</u>	<u>LEADER</u>
1. Ewart, Gundy, Fergie, Glass, and Broderick Townships	J.C. Davies
2. Baird Township, Red Lake Area	S.A. Ferguson
3. Lake St Joseph—Pashkogan Lake Area	A.M. Goodwin
4. Shebandowan Lake Area	J.M. Hodgkinson
5. Garden Lake Area	V.G. Milne
6. Crescent Lake Area	E.G. Pye
7. Townships 30 and 31, Range XX	L.D. Ayres
8. Algoma District	P.E. Giblin
9. Elliot Lake Area	J.A. Robertson
10. Denison Township, Sudbury Area	K.D. Card
11. Heenan, and Dore Townships	J.F. Donovan
12. Bond Township, Porcupine Area	E.J. Leahy
13. Gold Mines of Kirkland Lake	G.H. Charlewood
14. Mineral Resources Inventory, Kirkland—Larder Area	W.S. Savage
15. Arnold and Katrine Townships, Kirkland Lake Area	W.A. Hagg
16. Grenfell and Bompos Townships, Kirkland Lake Area	J.A. Grant
17. Holmes and Burt Townships, Kirkland Lake Area	J.C.G. Moore
18. Casey and Harris Townships, Cobalt Area	Robert Thomson
19. Limerick Township, Hastings County	S.B. Lumbers
20. Pleistocene Geology, Guelph and Balton Areas	P.F. Karrow
21. Sand, gravel, silica, and Building Stone Resources, Ontario	D.F. Hewitt
22. Clay Products Industry and Barite Deposits of Ontario	G.R. Guillet

● Resident Geologist
 — Territorial District boundary

Scale of Miles
 0 20 40 60 80 100

No. 1 GUNDY AND BRODERICK TOWNSHIPS, AND PARTS
OF GLASS AND EWART TOWNSHIPS AND INDIAN RESERVE 39A
DISTRICT OF KENORA

by

J.C. Davies¹

Location - The area mapped during 1962 is part of a block of townships lying north of Shoal Lake, and adjacent to the Manitoba border. The mapping of this unit was begun in 1961. Gundy and Broderick townships form the north part of this block. Sections of Glass and Ewart townships and Indian Reserve 39A are included in a strip about two miles wide which forms the south part of the block.

Mineral Exploration - Within the area mapped during the past two summers, mineral exploration has largely been centred in Ewart township where gold, copper and molybdenum deposits have been discovered. This exploration reached a peak during the early part of 1961 but had subsided by the end of that year. Work is continuing on some of the properties near High Lake.

The southwest part of Gundy township was the site of some activity early in the century. A number of pits were sunk on sulphide-bearing zones near or at the Manitoba boundary, apparently without much encouragement. There is no evidence of any recent interest in either Gundy or Broderick townships.

Interest in the Shoal Lake area during 1962 resulted in claims being staked in part of the area mapped this summer. A number of pits were encountered in this area but all appear to be very old.

General Geology - A broad zone of acid and intermediate intrusive rocks underlies more than three quarters of Gundy township and extends through Broderick township. The oldest of these intrusive rocks is quartz-hornblende diorite. Minor highly altered gabbro, apparently related to the diorite, occurs in the vicinity of Whitefish Lake. White-weathering granodiorite is the most abundant rock type in these two townships, and is cut by pink granite, pegmatite and aplite. The southwest part of Gundy township is underlain by sedimentary and volcanic rocks, part of a band which occurs in northern Ewart and Forgie townships.

The south area mapped during 1962 is almost wholly underlain by volcanic rocks. These include flows, tuff and agglomerate of basaltic to rhyolitic composition. Granite occurs in Indian Reserve 39A and south of Echo Bay, the contacts being approximately as shown on O.D.M. map 39e. Gabbroic dikes occur from Indian Bay of Shoal Lake to the peninsula which lies between Echo and Rush Bays, following the zone of magnetic highs indicated on aeromagnetic maps 1191G and 1186G.

¹Resident Geologist, Ontario Department of Mines, Kenora.

Structural Geology - Strong east-west shear and fault zones, the dominant structural feature of the volcanic and sedimentary rock areas, continue in areas underlain by intrusive rocks. Most of the prominent linear features in Gundy and Broderick townships, however, are surface expressions of a well developed joint system.

The gabbroic dikes near Shoal Lake appear to be associated with shear zones and are likely much younger than the enclosing volcanic rocks. Isoclinal folding of the volcanic rocks together with lensing of individual rock units has created a complex geological picture.

Economic Geology - The large gossan-capped iron-sulphide-bearing zones of southwest Gundy township are probably of sedimentary origin and are not likely to carry gold. Sulphides also occur in small shears south of Tannis (West Gundy) Lake, but gold has not been found in association with them.

The pegmatites of Gundy and Broderick townships are essentially composed of quartz and feldspar, and rare pegmatite minerals were not detected. Some of the pink granite near the Canadian Pacific Railway might be quarried, but the present survey would indicate that small gravel deposits form the only mineral potential of these two townships. The magnetic anomaly in northeastern Broderick township (aeromagnetic map 1187G) coincides with the contact between diorite and granodiorite, and does not appear to be of economic significance.

From a point two miles west of Echo Bay to the bay the interbanded acid and basic volcanic rocks are sheared and in places cut by granitic dikes. This area is considered by the writer to be favourable for gold deposition.

Small amounts of copper and nickel have been reported in association with one of the basic dikes near Crowduck Lake, and it is possible that similar mineralization occurs elsewhere in this zone.

No.2 EAST HALF OF BAIRD TOWNSHIP AND PART OF FAIRLIE TOWNSHIP

RED LAKE AREA

DISTRICT OF KENORA

by

S.A. Ferguson¹

Location - Baird and Fairlie townships are in the Red Lake Area, which is about 180 miles by road east and north of Kenora. The mine town-sites of Madsen and Starratt are the main centres of population. During the 1962 field season the eastern half of Baird township was geologically mapped and some mapping was done in Fairlie township to supplement information obtained from company plans.

¹Geologist, Ontario Department of Mines, Toronto.

Mineral Exploration - Madsen Red Lake Gold Mines, Limited is the only producing gold mine in the area and Starratt Nickel Mines, Limited (formerly Starratt Olsen Gold Mines, Limited) is a past producer. On the properties of New Faulkenham Mines, Limited and on Redaurum Red Lake Gold Mines, Limited shafts have been sunk and underground development work done. Drilling was in progress during 1962 on the property of Parvus Mines, Limited and John Humlin was prospecting a group of claims adjoining the Parvus property on the west. Other companies holding groups of patented claims within the area are Derlak Red Lake Gold Mines, Limited, New Mallen Red Lake Mines, Limited, Redruth Gold Mines, Limited, and Russet Red Lake Gold Mines, Limited.

General Geology - The two main stratigraphic units are a sequence of older basic lavas, and an overlying unit of welded tuff consisting mainly of porphyritic (quartz, feldspar) rhyolite, some fine-grained rhyolite and minor amounts of rhyolite breccia. These rocks have been intruded by dikes and sills of diorite, possibly of several ages, and by ultrabasic rocks which are now altered to serpentinite. Granitic rocks are represented by the Dome stock, the Faulkenham Lake stock, by the batholith in the western part of Baird township as well as by small stocks and dikes. A few dikes of quartz-feldspar porphyry have been mapped.

Structural Geology - In the northwestern part of the map sheet an overturned anticline in the older basic lavas strikes to the northwest and also plunges in that direction. In the southeastern part of Baird township the strike of the welded tuff beds and the adjacent basic volcanic rocks is to the northeast at about right angles to the other trend. Underground workings near the contact of these rock types have shown that the dip is about 70° to the southeast and that the groups of orebodies rake to the northeast at about 45°.

Economic Geology - Gold is the only mineral that is known to exist in economic amounts. At the Madsen and Starratt properties the gold-bearing zones are within tuff-breccia beds which immediately underlie the rhyolitic phase of the welded tuff. These tuff-breccia beds are considered to be the basal beds of the welded tuff unit, and have been traced by drilling and underground workings for a distance of 3 miles southwest of the Baird-Heyson township line. Garnet and biotite are commonly present in the tuff-breccia beds and staurolite and andalusite occur in certain parts of the beds. Metallic minerals consist mainly of pyrite with some pyrrhotite. Arsenopyrite, magnetite, ilmenite, and titanite are common, with chalcopyrite, sphalerite and scheelite less common. Molybdenite, realgar and orpiment are rare. Folding and flowage of the tuff-breccia beds has produced a series of lenses separated by constrictions. The wider parts of the tuff-breccia beds are favourable locations for orebodies, and the individual lenses of an ore zone are inclined to the borders of the tuff-breccia bed both in plan and in section.

No. 3 EAST LAKE ST. JOSEPH - PASHKOKOGAN LAKE AREA

DISTRICT OF THUNDER BAY

by

A.M. Goodwin¹

Location - The map-area is bounded by Long. 90°10' and 90°25'W. and Lat. 50°55' and 51°9'N., in the District of Thunder Bay. It is 23 miles long and 16 miles wide, or 350 square miles in area with its centre 60 miles north of Savant Lake station on the Canadian National Railway.

Mineral Exploration - Steep Rock Iron Mines Limited in 1956-60 explored a large group of claims on the southeast shore of Lake St. Joseph, and proved up large reserves of concentrating magnetite ore. Exploration work by Belcher Mining Corporation Limited at Doran Lake in 1958-60 proved up similar reserves of iron ore.

A spodumene-bearing pegmatite zone at Pashkokogan Lake was recently trenched. Thin, pyritiferous cherty iron formation at Pashkokogan Lake was channel sampled many years ago.

There was no exploration activity in the map-area during the field season, so far as known.

General Geology - The area is underlain by interbanded, sedimentary and volcanic rocks, intruded by granite masses and diabase dikes.

The sedimentary-volcanic sequence is composed of conformable and alternating zones of metasediments including banded iron formation, and assorted, dominantly fragmental metavolcanic rocks.

The main sedimentary band is composed of quartzites, argillites, cherty conglomerate, tuff, banded iron formation, and metamorphic equivalents. Dacitic breccia, tuff, and lava alternate and mingle with dominantly andesitic breccia, tuff and pillow flows.

Younger granite stocks of varying size are present. Granite forms the south boundary of the map-area. A single diabase dike was observed.

Structural Geology - The main structural element is^a northeasterly-trending and plunging anticline. The fold axis extends from the vicinity of Doran Lake on the west, along the southeast shore of Lake St. Joseph, to Eric Lake on the east. Thus, rock units near Lake St. Joseph are situated mainly on the north limb whereas those near Pashkokogan Lake are on the south limb. Secondary folding associated with this structure has locally increased the thickness of iron formation to produce commercial ore deposits.

¹Geologist, Ontario Department of Mines, Toronto.

Economic Geology -

Iron - The main iron formation is an integral part of the sedimentary band in the centre-west part of the map-area. The ore bodies represent portions of the parent iron formation that have been structurally duplicated and thereby concentrated. Magnetite is the principal iron mineral in the proven orebodies. Only traces of other, non-magnetic iron minerals such as hematite, siderite and pyrite were observed. For these reasons magnetic surveys appear to provide the best guide in iron ore search.

Lithium - A spodumene-bearing pegmatite zone roughly 50 feet wide and 150 feet in exposed length within acid volcanic breccia is situated on the northeast shore of the southeast bay of East Pashkokogan Lake 1 mile northeast of the mouth of Savant River. A chip sample taken across the width of 50 feet assayed 1.25 per cent Li_2O . There was evidence of recent trenching and line-cutting in the vicinity.

Sulphides - Narrow zones, lenses and irregular patches of disseminated pyrite and pyrrhotite occur intermittently throughout the volcanic and sedimentary rocks. Grab samples from 16 such zones returned traces only of Au, Ni, Cu, etc., and thus offer little encouragement.

No.4 GREENWATER LAKE - SHEBANDOWAN LAKE AREA

DISTRICT OF THUNDER BAY

by

J.M. Hodgkinson¹

Location - The map-area lies within latitudes $48^{\circ} 30'$ and $48^{\circ} 37' 30''$ N., and longitudes $90^{\circ} 15'$ and $90^{\circ} 30'$ W. This is about 65 miles west of the Lakehead, and adjoins the Burchell Lake Area, which lies to the west. Highway No. 11 passes close to the north part of the map-area.

Mineral Exploration - Early exploration was apparently concentrated near the granite contact to the north. More recently geophysical exploration has been most active further south, investigating numerous magnetic anomalies, which are most frequently caused by banded iron formation or peridotite bodies.

Exploration continued in the map-area last winter, followed by diamond-drilling northeast of Horseshoe Lake during the summer of 1962.

No mines exist in the map-area, although North Coldstream Mines Limited, a copper producer, is located four miles west.

Previous geological work in the area by T.L. Tanton was published by the Geological Survey of Canada in 1938 (map 338A).

¹Graduate student, Department of Geology, University of Manitoba, Winnipeg, Manitoba.

General Geology - Precambrian rocks consist of a metavolcanic-metasedimentary group with small ultrabasic, gabbroic and dioritic bodies, and later intrusions of granite, syenite and a layered pluton of anorthosite and gabbro.

The main geological boundaries shown on Tanton's map were confirmed with minor alterations; more detailed divisions of the large units were made.

The metavolcanics are chiefly altered basic flows, tuffs and agglomerates, with some amphibolite and chlorite schist of uncertain origin. Acid flows and pyroclastics occur in small amounts, and may easily be confused with the sheared arkose.

The metasediments are arkose, greywacke, conglomerate, and cherty banded iron formation. Present evidence suggests that some of the metasediments (eg. iron formation) are interbedded with the metavolcanics, but that others are infolded or infaulted and therefore may not be the same age.

The granite is poorly exposed. It is gneissic, particularly near its contacts, and the gneissosity parallels the contacts in the marginal zone which is commonly syenite. The granites at the south-east of the map-area enclose large blocks of coarse-grained amphibolite measuring several thousand feet across.

Structure - The banding in the metavolcanics and the metasediments is generally east-northeast, but locally follows the granite contact, especially around Greenwater Lake, where it forms an eye-shaped structure. The early minor intrusions generally follow the same strike.

The schistosity is approximately parallel to the lithological banding. Dips are steep.

No faults with displacements greater than a few inches were recognized in the field, but many linear features suggest joints or faults of considerable length.

Economic Geology - Iron, copper, nickel, chromium, lead, gold and silver mineralization and fluorite, chrysotile, and talc have been known to occur in the area for a long time. A nickel deposit at South West Bay, Lower Shebandowan Lake, owned by the International Nickel Company of Canada Ltd., is the most promising occurrence within the map-area.

Iron occurs as magnetite bands in banded cherts, which are lenticular, less than 100 feet wide and seldom over a mile long.

The ultrabasic bodies, chiefly peridotite, have received most attention from prospectors. Most of them occur to the east of Greenwater Lake as lenses and dikes up to a mile long and 1,000 feet wide.

A silicified zone about 100 feet wide containing small amounts of nickel-bearing sulphides was found in a swamp along Harnden Creek at approximately latitude $48^{\circ}35'11''N.$, longitude $90^{\circ}18'41''W.$ An apparently similar zone occurs on a small island at the mouth of the creek, 8,000 feet away, in the southwest end of South West Bay, Lower Shebandowan Lake. The showing in the swamp appeared to be undisturbed and may be a new find.

A pit with small amounts of chalcopyrite in a grey "cherty" rock occurs immediately north of the map-area, near the east shore of a small bay, along the south shore of Upper Shebandowan Lake; approximately at latitude $48^{\circ}37'51''N.$, longitude $90^{\circ}25'00''W.$ This type of mineralization may well recur farther south.

Talc and chrysotile asbestos were noted associated with the altered ultrabasic rocks, but in small amounts.

Finely disseminated pyrite occurs throughout the area.

No.5 GARDEN LAKE AREA

DISTRICT OF THUNDER BAY

by

V.G. Milne¹

Location - The area lies west of Lake Nipigon between longitudes $89^{\circ}20'$ and $90^{\circ}10'W.$, and latitudes $49^{\circ}15'$ and $49^{\circ}42'N.$ The area is accessible by float plane from the Lakehead which is approximately 70 miles south-southeast. Reconnaissance mapping of about 1,000 square miles was completed during the summer.

Mineral Exploration - Between 1938-40 the area received much attention due to the discovery of a small gold showing just north of Garden Lake. The Garden Lake region was mapped and prospected again in 1946 by Little Long Lac Mines Ltd. More recently Ruffo Lake Mines Ltd. carried out airborne and ground geophysical surveys during 1960, and in 1962 the company did some drilling on its properties north and east of Garden Lake, along the Mooseland River.

To the southeast of the area, claims were recorded in 1946 northeast of Heaven Lake and around Moose and Loon Lakes. This general area was again staked in 1958 and 1960. A geological survey was carried out in this locality in 1960 by the Canadian Pacific Railway Company.

¹Part-time geologist, Ontario Department of Mines, Toronto.

General Geology - The rocks in the area are of Precambrian age. Much of it is underlain by granitic, syenitic or coarse-grained gneissic rocks; scattered sheets of coarse-grained diabase are common throughout the area. Volcanic and sedimentary rocks are confined to two main belts. The larger of these is from 3 to 5 miles wide and at least 27 miles long. It extends from Loganberry Lake on the west, through Kearns Lake and Garden Lake and disappears beneath a thick cover of Pleistocene sands east of the Mooseland River-Kaiashk River junction. The smaller belt occupies the southeast corner of the area and is about 3 miles wide and 18 miles long. This belt stretches from West Lacasses Lake, through Heaven and Whistle Lakes, to within 2 miles of Upper Wabikon Lake. Much of this latter belt is overlain by diabase.

The volcanic rocks in both belts are generally similar. The central part of the Garden Lake unit is composed of light green andesitic and dacitic volcanic rocks grading outwards to dark green more basic volcanic rocks on both flanks. This is generally true of the Heaven Lake unit also. Massive and sheared volcanic rocks are equally represented and scattered occurrences of pillow lavas, tuffs and rhyolites were encountered in both belts. A narrow band of sedimentary rocks, $\frac{1}{4}$ mile in width, occupies the medial part of the Garden Lake belt. It can be traced with certainty from the west end as far as Garden Lake. These sedimentary rocks consist of conglomerate, arkose, iron formation and greywacke. In the Heaven Lake unit a narrow band of siliceous schists is associated with intermediate to acid volcanic rocks trending east-west just south of Loon Lake. A gabbroic body about 1 mile in diameter outcrops in the Garden Lake belt of volcanic rocks on the Mooseland River about 4.5 miles east of the Kaiashk River junction.

Structural Geology - The Garden Lake volcanic belt is relatively symmetrical in transverse section which suggests that it may represent a single large scale fold. A zone of shearing in the volcanic and sedimentary rocks appears to strike through Garden Lake and some drag folding was encountered in the schistose volcanic rocks east of Garden Lake in the Mooseland River. It is possible that this is part of an east-west fault indicated by drilling information further east along the river. No other faults were recognised although other linears exist and a carbonatized volcanic breccia was found south and east of Holinshead Lake.

The Heaven Lake volcanic rocks are largely hornblende and chlorite schists, and strikes trend N.E. or E.N.E. with north dips generally. Some drag folding was encountered in the volcanic rocks west of Loon Lake near an area of pyritic gossan in the sedimentary rocks.

Economic Geology - On the southeast shore of Garden Lake sheared, carbonatized and silicified greenstone and rhyolite are cut by scattered pyrite and galena stringers and gold assays have been obtained from these rocks. Gold-bearing float has been reported from the south shore of Garden Lake and visible gold has also been noted on the east shore of Little Joe Lake associated with pyrite and arsenopyrite in quartz veins cutting a sedimentary lens in the volcanic rocks. Several large quartz veins were noted on Garden Lake and quartz lenses are abundant in the Kearns Lake volcanic rocks. Quartz lensing is minor in the Heaven Lake volcanic belt.

Small lenses of pyrite occur in the volcanic rocks on the south shore of Stonehouse Lake and at the east end of the Heaven Lake belt. A large pyritized and silicified gossan occurs in the sedimentary rocks outcropping on the shore of a small lake southwest of Loon Lake. A strongly magnetic tuff on the shore of a small lake west of Kearns Lake contains noticeably pyrrhotite and small pyrrhotite-quartz lenses. Minor spots of galena were noted in a rhyolite on the south shore of Garden Lake, as noted above.

No. 6 RESIDENT GEOLOGIST'S OFFICE

PORT ARTHUR AND CRESCENT LAKE AREA

by

E.G. Pye¹

The principal activities of the Resident Geologist at Port Arthur during the field season of 1962 were in connection with the mapping of the Crescent Lake area. In addition, a display of aeromagnetic maps and ore specimens of local interest was arranged for the Canadian Lakehead Exhibition; samples of chalcopyrite, galena, hematite, and molybdenite were collected for mineral sets and Prospector's classes; and examinations of several mineral occurrences were carried out. The deposits examined included:

- (1) the McKellar, Jarvis, and Spar barite veins;
- (2) the Wabikoba Lake copper-nickel deposits;
- (3) the Miron gold-and copper-bearing quartz vein;
- (4) the Martin-Sturgeon copper deposit; and
- (5) the Nakina molybdenite deposit.

The McKellar, Jarvis and Spar barite deposits outcrop on the Lake Superior islands having these names. They have been described by T. L. Tanton (Geol. Surv. Can., Mem. 167, 1931, pp. 188, 189-191). The most significant one, found on McKellar Island about 16 miles southeast of Port Arthur, occupies a

¹Resident Geologist, Ontario Department of Mines, Port Arthur.

vertical fracture in diabase.. It strikes N.40°-45°W. for about $\frac{1}{4}$ mile and has a maximum thickness of 60 feet. It is made up of alternating ribs, from an inch or less to several feet thick, of barite and calcite. The barite content is about 60 percent.

The Wabikoba Lake copper-nickel deposits lie in the Heron Bay - White Lake area (Ont. Dept. Mines, Vol. XLI, 1932, pt. 6, pp. 34-47), about 8 miles north of highway No.17 and 4 miles west of Theresa Lake. The principal showing is massive amphibolite, mineralized with disseminated pyrite, pyrrhotite, and chalcopyrite. It is exposed over a length of about 50 feet in an east-northeast direction and across widths up to about 15 feet. Contacts are not defined, however, and the dimensions and attitude of the deposit are not known. A chip sample, across a width of 4 feet near the east end of the outcrop, was found by the Laboratories Branch of the Department to contain 0.32 percent copper and 0.29 percent nickel. A second occurrence lies about $\frac{1}{4}$ mile northwest of the first. It is similar, and consists of disseminated pyrite-pyrrhotite-chalcopyrite mineralization in massive amphibolite across exposed widths of 15-20 feet. A grab sample, submitted to the Laboratories Branch, was found to contain 0.42 percent copper and 0.18 percent nickel. In 1962 the two copper-nickel deposits were investigated by McIntyre Porcupine Mines Limited.

The Miron-deposit occurs on ground staked in the southwest part of Elmhirst township in the Sturgeon River area by Fred Miron of Beardmore. It is a lens of quartz, about 100 feet in length and up to 6 feet in thickness, in and along the contact of an inclusion of greenstone in a body of massive diorite. It strikes N.20°E. and dips 70°S.E. It is well mineralized with chalcopyrite and pyrite, and is reported to contain appreciable amounts of native gold. It was tested by diamond-drilling by T. Church in June, 1962, but, because of its limited size, was found to be of little present economic significance.

The Martin-Sturgeon copper deposit also occurs in the southwest part of Elmhirst township, on the property of W.C. Martin and associates. The deposit lies in the bed and along the southeast bank of the Sturgeon River. It is exposed across a width of about 10 feet and consists of sheared metavolcanics with thin, irregular quartz stringers and several percent of fine-grained pyrite and chalcopyrite. It strikes N.55°E. and dips 75°-80°N.W. In 1961 it was tested by diamond-drilling and was intersected in four holes over a strike length of 300 feet. The best section, in hole No.1 drilled southeast at 45°, was found to contain 0.4 percent copper over a core length of 26.0 feet, including one section, along the hanging wall, with 2.88 percent copper over a core length of 4.0 feet.¹

¹Assessment work files, Resident Geologist's Office, Port Arthur.

The Nakina molybdenite deposit occurs on the west shore of the southwest bay of Burrows Lake, about 16 miles northeast of Geraldton. It has been described in detail by R.D. Macdonald (Ont. Dept. Mines, Vol. L, 1941, pt. 3, pp.13-14). Here molybdenite is associated with quartz veins and stringers in or near inclusions of gneiss in granite and porphyritic granite, across widths up to 23 feet. The deposit has been tested by trenching and diamond-drilling, in 1938 by the Consolidated Mining and Smelting Company of Canada Limited, and again in 1940 by Nakina Molybdenite Mines Limited.

CRESCENT LAKE AREA

DISTRICT OF THUNDER BAY

Location - The area lies north of Lake Nipigon. It is bounded by north latitudes 50°15' and 50°35' and by west longitudes 87°45' and 88°30', and covers approximately 650 square miles. The south boundary is crossed near Lamaune by the transcontinental line of the Canadian National Railway.

Mineral Exploration - Except for some prospecting for gold about Toronto and Summit lakes in the east part of the area prior to World War II, there was little activity until 1950. In that year an asbestos occurrence at Toronto Lake was tested by Johnson's Company Limited, and a sulphide deposit, at the south end of Zig Zag Lake, was investigated for the presence of copper and nickel by the International Nickel Company of Canada Limited. Subsequently, in 1955, a copper deposit found at Seymour Creek near the west boundary of the area was tested by diamond-drilling; and, in the same year, several occurrences of lithium pegmatite, west of Seymour Lake and at or near Zig Zag, Falcon, and North Lamaune lakes, were discovered. In 1957 Panther International Mining Company Limited undertook an airborne magnetometer and electromagnetic survey of the area; in 1958, W. Despard and J. Zmudzinski staked a body of magnetic iron formation southeast of North Lamaune Lake; and in 1960 Sogemines Limited tested a gold deposit at Toronto Lake. The most recent activity was in 1962, when Mandarin Mines Limited re-investigated the copper occurrence at Seymour Creek and W. Despard and J. Zmudzinski prospected the area about Horseshoe Lake for base metals.

General Geology - The oldest rocks in the area are Archean metavolcanics and metasediments, which together form a continuous east-west belt from 3-10 miles wide. The metavolcanics include greenstone, hornblende schist, pillow lava, metadiabase, and associated basic tuffs and agglomerates; the metasediments are biotite-quartz-feldspar gneisses, quartzites, and subordinate iron formation. The metasediments form a thick deposit along the north side of the belt, and, in addition, occur as relatively thin, widely separated stratigraphic units in the metavolcanics. They increase in abundance relative to the metavolcanics

eastward, and have been correlated with rocks of the Marshall Lake group in the Gripp Lake area (Ont. Dept. Mines, Vol. LXVII, 1958, pt. 3, 22 pp.)

Intrusive into the metavolcanics and metasediments are gabbro and associated ultrabasic rocks. Except for one occurrence at Crescent Lake, these are uncommon in the west part of the area. They are numerous in the east part, however, and are found south-east of Tape Lake, at and southwest of Juneau Lake, at Toronto Lake, and elsewhere. Large batholithic masses of granite and porphyritic granite flank the metavolcanics and metasediments on the north and south. These are younger than the basic and ultrabasic rocks and are considered tentatively to be of Algonian age. The youngest rocks in the area are diabbases of Keweenawan age. They occur as: (1) steeply dipping dikes that cut transversely or obliquely across the Archean formations; and (2) thin flat sheets (Logan sills), erosional remnants of which form high hills bounded, in places, by steep escarpments.

Structural Geology - The metavolcanics and metasediments strike in a general east-west direction and dip vertically to steeply north or south. Due to lack of outcrops in several localities and to concealment of the Archean rocks by Logan sills in others, little is known about the structural geology. Some isoclinal folding about east-west axes may have occurred. But except in the case of a few minor drag folds, field mapping failed to reveal any significant repetition of stratigraphic units, and the few top determinations that were obtained on pillow lavas indicated, in every case, that the Archean rocks faced northward. At the same time the metavolcanics and metasediments locally exhibit considerable evidence of distortion near their contacts with the granitic rocks. West of Summit Lake, for example, they appear to have been wedged apart by a large stock of granitic rocks, and west of Seymour Lake they have been bent about the nose of a body of granite to form a crude anticline-like structure.

The Archean rocks are cut by several transverse and oblique faults made conspicuous in most places by prominent linear valleys.

Economic Geology - Deposits of asbestos, copper, gold, iron, and lithium occur in the area.

Asbestos occurs in thin (1/32 - 1/16 inch) cross-fibre veinlets in serpentinite associated with metagabbro along the south shore and near the west end of Toronto Lake. The deposit is small and the asbestos content is low.

The copper deposit at Seymour Creek is a narrow zone of hornblende schist, well mineralized with pyrrhotite, pyrite, and a little chalcopyrite. It strikes easterly for 1,200 feet and dips 60°N. It ranges up to about 20 feet in thickness. The sulphides are associated with some quartz mineralization. The copper content is low.

The gold occurrence tested by Sogemines Development Company Limited at Toronto Lake is a 9-foot wide band of massive sulphides (arsenopyrite, pyrite, and minor chalcopyrite) in hornblende schist. It strikes east-west and dips 70°N. One chip sample across it is reported to have assayed 0.42 ounces of gold per ton.¹

¹P.W. Andrews, Unpublished company report, 1960.

The magnetic iron formation at North Lamaune Lake strikes northwest for a known length of 4,500 feet and dips steeply northeast. It has widths up to about 250 feet and is estimated to contain, in three areas, a total of about 25 million tons of beneficiating ore capable of yielding an acceptable magnetic concentrate.²

²R.V. Oja, Unpublished report, 1960.

The lithium deposits are spodumene-bearing pegmatite dikes. They range up to 1,800 feet in length and 60 feet in width, and contain up to 25 percent spodumene. They are variable in attitude. Some are steeply dipping, whereas others are flat-lying and occur as thin, erosional remnants of limited extent. In one deposit, at North Lamaune Lake, the spodumene was found to be highly altered. This has been attributed to hydrothermal effects associated with the intrusion of the Logan sills. One of the largest and richest occurrences, on the property of Dempster Explorations Limited at Zig Zag Lake, has not been tested by diamond-drilling.

No.7 TOWNSHIPS 30 and 31, RANGE XX

DISTRICT OF ALGOMA

by

L.D. Ayres¹

Location - The area is located on the east shore of Lake Superior and is part of Lake Superior Provincial Park. Highway No.17, the Trans-Canada Highway, crosses Township 30, and the centre of this township is about 120 miles north of Sault Ste. Marie.

Mineral Exploration - Intermittent prospecting has occurred in the area since the late 19th century, but since 1956 prospecting has been prohibited by the Provincial Parks Act. At the present time there are no properties in good standing in the map-area.

General Geology - An Early Precambrian sequence, comprising metasedimentary and basic metavolcanic units, underlies most of the map-area. The metavolcanics, which contain intercalations, up to 2,000 feet thick, of acidic and intermediate lava, occur in Township 30 and in the eastern and western parts of Township 31.

¹Part-time geologist, Ontario Department of Mines, Toronto, and graduate student, Department of Geology, Princeton University, Princeton, N.J., U.S.A.

The metasediments are confined to Township 31. Conglomerate commonly occurs at, or near, the contact between the metavolcanic and the metasedimentary units. Banded iron formation is interbedded with both metavolcanics and metasediments. Sill-like bodies of quartz-feldspar porphyry, and of metagabbro, are found in the metavolcanic unit. In part these bodies are lava flows; in part they are sills and dikes which were probably intruded during the volcanism.

The metasediments are intruded by sills, dikes and small stocks of granitic material, and a migmatite complex has formed in the southwest corner of Township 31. The gneissic margin of a large granitic batholith is exposed in the northern part of Township 30. A basic complex, ranging in composition from olivine norite to granite, intrudes the metavolcanics in the southeastern corner of Township 30. This is part of a stock which extends into Townships 29 and 30, Range XIX, and into Township 29, Range XX. A contact metamorphic aureole has developed adjacent to this intrusion.

Diabase dikes, commonly trending either northeast or northwest, intrude the above rock units. Two post-dyabase, dark red, porphyritic, hornblende syenite dikes, which strike N. 60E. and attain a maximum width of 100 feet, can be followed for at least 10 miles across the map-area.

On the north side of Cape Chaillon, Keweenawan, or younger, variegated sandstone and conglomerate occur in fault contact with a metavolcanic sequence.

Structural Geology - A metavolcanic and metasedimentary sequence exposed along the shore of Lake Superior is separated by a major fault trending N.10 E. from a migmatite unit to the east. West of the fault the major structural feature is a steeply east-plunging syncline. The metamorphosed units east of the fault are isoclinally folded; fold axes trend east in Township 30 but become north-northwest in Township 31. All lineations plunge steeply east. At least three other north-trending faults, with horizontal separations up to one mile, are known in the area. Northeast- and east-trending faults also occur.

Economic Geology - A series of quartz veins, containing disseminated chalcopyrite, occur in a shear zone, immediately east of Highway No. 17, near the south boundary of Township 30. The quartz veins were tested by trenches and pits 50 or 60 years ago and have been examined several times since then. The veins can be traced intermittently for 700 feet and have a maximum exposed width of 12 feet. Five grab samples, taken along the strike of the vein, varied from 0.06 to 2.64 per cent copper. The quartz veins occur in the contact zone of the basic complex.

In the centre of Township 30, a banded iron formation, consisting predominantly of chert and magnetite, forms a discontinuous, east-trending unit about three miles long and with a maximum thickness of 300 feet. The maximum iron content is 35 per cent; most of the unit contains much less than 35 per cent iron. Elsewhere in Township 30, small lenses of iron formation occur intercalated in the metavolcanics.

Thinly banded, magnetite-bearing iron formation occurs in a zone up to 500 feet thick in the metasediments in Township 31. The iron formation comprises 20 to 50 per cent of this zone and the maximum iron content is 18 per cent.

Quartz veins commonly occur in the metavolcanics but no gold values have been obtained.

Narrow shear zones commonly contain barren pyrite and pyrrhotite.

No. 8 RESIDENT GEOLOGIST'S OFFICE

SAULT STE MARIE

by

P. E. Giblin¹

Introduction - A new Resident Geologist's office was opened in Sault Ste. Marie in June, 1962. The field season was spent primarily in becoming acquainted with geological features of the District of Algoma.

Mineral Exploration - Exploration activity in the area centred largely on the search for copper.

Tribag Mining Ltd. is currently drilling a copper prospect, formerly known as the Breton property, located in Township 28, Range XIII. Sylvanite Gold Mines Ltd. drilled 22 holes upon the property in 1955, and interests associated with Tribag Mining Company Ltd. drilled 3 holes in 1961. From the results of this previous work, P. S. Broadhurst, consulting engineer, has estimated a total of 225,360 tons, in 4 lenses, grading 2.20 percent copper (Northern Miner, April 19, 1962).

Bridgeland Explorations Ltd. carried out extensive prospecting of the Huronian sedimentary rocks in Parkinson, Montgomery, Patton, and Gladstone townships. Copper mineralization was found in the material of a dump beside an old shaft, located in Montgomery township on the east bank of the Cobden River, about $\frac{1}{2}$ mile west of Corbold Lake.

¹Resident Geologist, Ontario Department of Mines, Sault Ste. Marie.

The shaft is located between outcrops of Bruce limestone to the west, and gabbro to the east. Chalcopyrite and pyrite occur as disseminations and narrow stringers in a dark-coloured, massive, fine- to medium-grained rock, which consists very largely of carbonate and chlorite. The host rock is probably a recrystallized argillaceous limestone. Minor disseminated chalcopyrite has also been found in Bruce limestone at a few localities south of the old shaft, near the Cobden River.

Other Developments - Early in the summer a few small shipments of copper ore were sent for custom-milling to the plant of the Pronto Division, Rio Algom Mines Ltd. The shipments were made from the Glagoma property in Gladstone township by R.F. Fry and Associates Ltd., and from a property in northwestern Cobden township by independent operators. Mining operations at the Gladstone and Cobden township properties have ceased.

No. 9 ELLIOT LAKE AREA

DISTRICT OF ALGOMA

by

J. A. Robertson¹

Introduction - From mid-May to July the writer was in charge of a small field party that worked on a number of projects in the Algoma district. These covered the country between Iron Bridge and Massey and part of the Improvement District of Elliot Lake. A number of copper prospects were examined. The northern part of township 150 was mapped in detail and the area southwest of Dunlop Lake was remapped. A compilation map of the Elliot Lake - Blind River area was prepared on the scale of 1:50,000.

Mineral Exploration - During the Blind River boom most of the area was staked and explored for uranium. Commercial deposits were found and production was achieved from Quirke Lake, Elliot Lake and at the Pronto mine. Ground outside the producing areas was allowed to lapse. A copper deposit (Pater) was found during this exploration and brought into production in 1961. Customs milling of copper ore is available at the Pronto mine and there is active prospecting for copper in the district.

Exploration for trap-rock deposits southwest of Spanish continued during the summer and production from Shoepack Bay is planned.

¹Geologist, Ontario Department of Mines, Toronto.

No. 10 DENISON TOWNSHIP

DISTRICT OF SUDBURY

by

K.D. Card¹

Location - The southwest quarter of Denison township, an area of about 10 square miles, was mapped in detail during August and part of September, 1962. The township is approximately 25 miles west of the city of Sudbury.

Mineral Exploration - The Sudbury nickel irruptive occupies the northern third of the township and the Worthington Offset dike, an associated mineralized body, occurs in the southwest quarter. The township has been and is being actively explored, especially along the nickel irruptive contact and the Worthington Offset. Past producers include the Victoria mine and the Crean Hill mine (International Nickel Company of Canada, Ltd.). Potential future producers include the Aer Nickel mine (Arcadia Nickel Corporation, Limited) and the Crean Hill mine (Inco). Exploration, in the form of diamond-drilling, is being carried out by Falconbridge Nickel Mines Ltd. along the nickel irruptive contact, by International Nickel Company of Canada, Ltd., to the south of the Crean Hill mine on an extensive gossan zone, and by Arcadia Nickel Corp., Ltd., along the Worthington Offset.

General Geology - The bedrock formations of the area are of Precambrian age. An older metavolcanic-metasediment complex (Keewatin-type) is overlain unconformably by, or in fault contact with, a younger sedimentary sequence (Huronian-type) consisting of a lower quartzite, a middle meta-argillite, a middle conglomerate, and an upper quartzite unit.

Sills and dikes of hornblende metagabbro, with remnants of fresh pyroxene gabbro, intrude the metasediments and metavolcanics. These rocks are metamorphosed, in the upper Greenschist facies of regional metamorphism, along with the sediments they intrude. The Sudbury nickel irruptive, and associated bodies such as the Worthington Offset and the small bodies north of Ethel Lake (See Geological Survey Canada Map 292-A, Copper Cliff Sheet) appear to have been emplaced after this period of metamorphism.

Olivine diabase dikes, which are quite abundant, are the youngest rocks in the area.

¹Part-time Geologist, Ontario Department of Mines, and Graduate Student, Department of Geology, Princeton University, Princeton, N.J., U.S.A.

Structural Geology - There is little direct evidence of an unconformity between the metavolcanic complex to the north and the sediments of Huronian (?) age to the south. However, there is an abrupt change in lithology from mixed amphibolitic meta-volcanics and metasediments to coarse-grained feldspathic quartzite and arkose. There may also be an abrupt change in metamorphic grade from the Amphibolite to the Greenschist facies across this contact. Map 292-A (Copper Cliff sheet) shows the Mississagi quartzite ending in a drift-covered area in Denison township and on strike to the east, its place being taken by McKim greywacke. The author finds that the quartzite unit carries through and has traced it as far east as Ethel Lake.

The area is highly faulted, most of the faults trending northeast to east. The more important faults recognized are the Creighton fault, exposed north of Ethel Lake, and the Worthington fault, in the southern part of the township.

From the structural data available it appears that from the metavolcanic complex south, the Huronian (?) sequence dips steeply south and faces south into southern Denison township, where a syncline in the upper quartzite unit is displaced by the Worthington fault.

Breccias are very abundant in the township and have affected rocks at least as young as the metagabbro. The breccias apparently have not seriously interrupted the stratigraphic sequence.

Economic Geology - Nickel and copper sulphide mineralization is abundant in the area, especially along the nickel irruptive contact and in the Worthington Offset dike and other "Offset" bodies.

Interesting amounts of sulphide mineralization occur in and near metagabbro bodies. Several long, persistent gossan zones are found and are associated with metagabbroic intrusions.

Scheelite, in quartz-carbonate veins, is found at one locality in Nairn township. Veins of this type are very abundant throughout the whole area and the possibility of finding other scheelite occurrences appears good.

No.11 HEENAN AND DORE TOWNSHIPS

DISTRICT OF SUDBURY

by

J. F. Donovan¹

Location - The map-area covered, comprises Heenan township, excepting the southeast quarter, and the eastern two-thirds of Dore township. The centre of the map-area lies approximately 115 miles northwest of Sudbury.

Mineral Exploration - Evidence of prospecting and staking dates back to the 1920's when the acid volcanic rocks were prospected for gold. In 1962 limited electro-magnetic work was conducted by Anaconda Mining Corp. in the northeast and southwest portions of Heenan township.

General Geology - All the consolidated rocks of the map-area are Precambrian in age. A large portion of west central Heenan township is covered by sand plain, presumably of glacial origin.

The oldest rocks in the map-area are intermediate to basic volcanic rocks in the southern part, with younger acidic and intermediate to basic volcanic rocks in the northern part. A band of dioritic rocks in the northern portion of Heenan and Dore townships is probably of the same age or slightly younger than the associated intermediate to basic volcanic rocks.

Sedimentary rocks, dominately coarse conglomerates, are intimately associated with acid volcanic rocks south of Crossley Lake, Dore township.

The youngest rocks are diabase dikes which transect all other rock units.

Structural Geology - The major rock units strike east-west and are folded about east-west-trending fold axes. An anticlinal axis in the south part of the area dips steeply north to vertical, plunging steeply to the west. A synclinal axis in the northern part dips steeply south to vertical, its plunge apparently to the east.

Faults are common, however no definite trend to the shearing has been observed.

¹Graduate student, Department of Geology, Cornell University, Ithaca, N. Y., U.S.A.

Economic Geology - A small east-west shear zone along Gowagamak Lake, Heenan township, contains quartz veins with cubic and disseminated pyrite. Minor copper staining was observed, however no actual mineralization was found.

Unmineralized quartz and calcite veins are common in the intermediate to basic volcanic rocks. Pyrite is disseminated through out the map area in both the acid and intermediate to basic volcanic rocks, and dioritic rocks.

No.12 BOND TOWNSHIP

DISTRICT OF COCHRANE

by

E.J. Leahy¹

Introduction - Geological mapping of Bond township was completed during the summer and some work was done in the adjacent township of Currie. A preliminary map of Bond township has recently been published (O.D.M. P.161).

Location - Bond township is located about 25 miles east of Timmins. Highway No.101 is located along the north boundary of the township.

Mineral Exploration - The township is largely drift covered so that opportunities for surface prospecting have been very limited.

General Geology - Rock outcrops are confined to the eastern half of the township and are scarce. They consist of Keewatin-type lavas intruded by feldspar porphyry and gabbro. North-south-trending diabase dikes form the main part of most outcrops.

Economic Geology - In lot 2, concession I the lavas are strongly sheared and contain small quartz veins with traces of gold.

¹Student, Department of Geography, Queens University, Kingston.

No.13 GOLD MINES OF KIRKLAND LAKE

by

G.H. Charlewood¹

The purpose of the project is to record geological information obtained by mining developments in the gold mines of Kirkland Lake since the last Department of Mines report on the camp was published in 1948. (Vol.57, pt.5) In 1948, all seven mines were operating; at present, four are in operation and of these, three have indicated that they are on a salvage basis.

Macassa Gold Mines Limited (Macassa Division) has, during the interim, developed ore on levels from 4,625 to 6,150 feet. Much new information has been revealed and the potential for finding new ore is good.

Teck-Hughes Gold Mines Limited has not gone deeper since 1948 but has found much ore on veins subsidiary to the Main break. However, this source is now dwindling and recent annual reports warn that the mine is on a salvage basis with a very small margin of profit.

Lake Shore Mines Limited, and Wright-Hargreaves Mines Limited, have developed ore to the 8,000-foot level and are the deepest mines in Canada. The vein system continues below this level and while some ore has been indicated by diamond-drilling, it is reported that there is not proven tonnage enough to warrant the expense of further shaft-sinking and development.

Three mines have closed since 1948: Kirkland Minerals Limited (formerly Kirkland Lake Gold Mines Limited), in 1960; Sylvanite Gold Mines Limited in 1961, and Associated Arcadia Nickel Mines Limited, (formerly Toburn Gold Mines Limited) in 1952.

The geological information made available during the past 15 years is being described and also compiled on plans and sections which will accompany the report.

¹Part - time geologist, Ontario Department of Mines, and Vice-President, Heath and Sherwood Drilling, Ltd., 6 Hudson Bay Ave., Kirkland Lake.

No.15 ARNOLD AND KATRINE TOWNSHIPS

DISTRICT OF TIMISKAMING

by

W.A. Hogg¹

Location - Arnold and Katrine townships lie some 15 miles northeast of Kirkland Lake and 11 miles west of the Ontario-Quebec inter-provincial border. The centre of the two townships is located at about longitude 79°46'W. and the latitude 48°13'N. Both townships were mapped during the 1962 field season.

Mineral Exploration - A number of old trenches and test shafts in various parts of the map-area were made in search of gold and copper. A certain amount of interest has been shown in 1962, particularly in Arnold township. A group of 27 contiguous unpatented claims located on the east border of Arnold township between mile post 3 and 4 were optioned in the spring of 1962 by Vitro Chemicals Corp. A limited diamond-drilling program was conducted on this group of claims during the summer of 1962. Surface showings yielded gold assays across a faulted zone and six diamond-drill holes were put down to cut this zone at depth.

Some prospecting was carried out east of Side Lake in the north part of Arnold township, and one claim was staked north of this lake adjacent to the north boundary of the township.

General Geology - Arnold and Katrine townships are largely underlain by intermediate volcanic rocks and are intruded by basic, intermediate and acidic rocks. Several discontinuous diabase dikes strike in a northerly direction.

The volcanic rocks are for the most part made up of dacite with narrow interbedded basaltic and andesitic flows. Pillow structures are common, particularly in the southern parts of the two map sheets. Two narrow rhyolite flows were mapped in Arnold township.

The volcanic complex has been intruded by older diorite, gabbro, syenite and younger diabase dikes.

Structural Geology - The volcanic rocks have been folded about east-west-trending axes. A number of folds have been recognized but few have been traced for any considerable length. A fairly continuous anticlinal structure extends westward through Mulven Lake in Ossian-Katrine townships to Misema Lake in Arnold.

¹Geologist, Ontario Dept. of Mines, Kirkland Lake, (May-Sept.1962);
Geologist, Noranda Mines Ltd. Noranda, Que, (after Sept. 1962).

Dominant structural features are the Murdoch Creek-Kennedy Lake fault trending N.40°E.; the Misema-Mist Lake fault trending N.70°E. and the Mulven Lake fault trending N.85°E.

The reverse S-shape of the Howard-Misema Lake drainage system thought to be related to a folded structure is considered as being formed by the intersection of the Murdoch Creek-Kennedy Lake fault with a fault along the east-west part of Misema Lake. The southwest part of this structure in Arnold township is covered with glacial eolian sands.

Economic Geology - Copper and gold are the most important metals found in Arnold and Katrine townships. The mineralization occurs as (1) gold-bearing quartz veins in intermediate volcanic rocks and syenitic intrusive rocks (2) quartz veins containing chalcopryrite and gold in intermediate volcanic rocks and (3) quartz veins and stockworks in andesite with impressive but erratic amounts of chalcopryrite.

Although this area may have been carefully prospected in past years there still remain areas worthy of careful prospecting. Syenite and syenite porphyry intrusions and zones of strong shearing and faulting are worth prospecting for gold in quartz veins and stockworks. Many of these strong shears and faults trend east-west across the area and are located along low ground. They are often occupied by swamp but occasional low outcrops are worth careful prospecting.

The contact of a diorite-gabbro body with the surrounding volcanic rocks located on the peninsula of Misema Lake may merit further prospecting for copper mineralization.

No.17 BURT, HOLMES, GROSS AND FLAVELLE TOWNSHIPS

DISTRICT OF TIMISKAMING

by

J.C.G. Moore¹

Location - The map-area, about 15 miles west of Kirkland Lake, consists of Burt and Holmes townships, as well as concessions V and VI of Gross and Flavelle townships; these concessions are crossed by Highway No. 66.

¹Department of Geology, Mount Allison University, Sackville,
New Brunswick.

Mineral Exploration - Prospecting, which began in the area before 1914, has been concentrated in the southwestern part of Holmes township, where numerous pits and trenches can be seen within two miles of a syenitic body. Available information on exploration in Holmes township is as follows: in 1946, Loki Mines Limited drilled for gold across the southern boundary of concession III, lot 8; in 1951, Dominion Gulf Company did geological and geophysical work in concession V, lot 12; during 1957, Triana Exploration examined claims along the boundary between concessions II and III, lots 10, 11, and 12; in 1958, a hole was drilled on the Welsh claim MR 26827, concession III, SE $\frac{1}{4}$, S $\frac{1}{2}$, lot 11; in 1959, Voyager Explorations Limited drilled in the area of the strong aeromagnetic anomaly northwest of Holmes Lake.

Several years ago Sylvanite Gold Mines Ltd. examined claims in the north half of lot 1, concession IV, Burt township. A property known as the Veteran Gold Group in northeastern Flavelle township and northwestern Gross township was prospected many years ago and more recently as evidenced by linecutting.

During the field season some prospecting was done by W.H. Brookbank who staked four claims in Holmes township.

General Geology - The area is underlain by Precambrian volcanic, intrusive and sedimentary rocks. The volcanic rocks, Keewatin-type, are mainly basic to intermediate flows and banded tuffs, with lesser amounts of acid flows and fragmental rocks. The intrusive rocks, post-volcanic and presumably Algoman in age, are mainly syenite and granite with lesser amounts of more basic members. The sedimentary rocks, except for small areas of Timiskaming conglomerate, are Cobalt(Gowganda) in age and consist mainly of quartzites and greywackes, with lesser amounts of argillaceous, conglomeratic and arkosic members. Post-granite diabase dikes are common in the volcanic rocks. A single post-Cobalt diabase dike was observed.

Structural Geology - Cobalt sedimentary rocks overlie the possible extension of the Larder Lake fault, which has been projected to the eastern boundary of the map-area (Ont. Dept. Mines, Map 1946-1, Kenogami Lake Area). Air photographs, on a scale of 1 inch to 1 mile show a lineament extending from Kenogami Lake along the interpreted western extension of the Larder Lake fault. Evidence for extending this lineament about three miles into Burt township can be seen on these photographs. If the Larder Lake fault extends into Burt township, and if it underwent post-Cobalt movement, this is not reflected in the rock exposures examined on the scale of mapping. Nevertheless, there were too few exposures to eliminate this possibility. A prominent lineament trending about N.80°E. passes through the westerly bay of Galer Lake. Using air photographs on a scale of 1 inch to 1 mile this lineament can be traced westward for at least 4 miles and eastward for at least two miles to the Cobalt sedimentary rocks. A few other lineaments near Holmes Lake, seen on air photographs,

probably represent fault zones. Other lineaments, some of which have evidence of mineralization, can be seen in the volcanic and intrusive rocks in the southwestern part of Holmes township.

Economic Geology - Evidence of gold, copper, and molybdenum mineralization has been found in the southwestern part of Holmes township and although the showings drilled have not encouraged additional work, the area warrants further prospecting. Attention should be concentrated in the area of lineaments visible on air photographs, especially the Galer Lake lineament. Probably geophysical methods will prove the most useful, possibly followed by geochemical methods.

No.18 RESIDENT GEOLOGIST'S OFFICE, COBALT AND CASEY,
HARRIS AND HENWOOD TOWNSHIPS

by

Robert Thomson¹

In 1962 the writer carried out systematic mapping in Casey and Harris townships (P.162, P.163) in addition to the regular duties of a resident geologist. Also a preliminary map of Henwood township (P.160) was issued.

Prospecting and exploration for silver deposits in the Timiskaming silver-cobalt area has increased markedly in recent months. Recent increases in the price of silver point to a significant betterment in the outlook for silver mining; because of this improved situation, dormant mines, silver occurrences, and favourable areas are being re-appraised.

CASEY AND HARRIS TOWNSHIPS

Casey and Harris townships were mapped on the scale of one inch equals $\frac{1}{4}$ mile. The map-area is located about 20 miles northeast of Cobalt.

Mineral Exploration - The only producing mine, owned by Langis Silver and Cobalt Mining Company, is situated near the boundary line between the two townships; the shafts are in Casey township and underground workings extend into Harris township. It was formerly the Casey mine, which was operated by various companies at intervals, and with long periods of quiescence, between 1906 and 1953. The townships have been thoroughly prospected on surface so that future exploration will have to be for concealed ore deposits. No other exploration has been carried on in 1962 in the two townships.

¹Resident Geologist, Ontario Department of Mines, Box 799, Cobalt.

General Geology - Level clay plains occupy most of the surface of the two townships and attains a thickness of over 200 feet. The consolidated rocks range in age from Paleozoic to Precambrian. The Paleozoic rocks occur in the western parts of the two townships and have a westerly dip of about 2 degrees. The Precambrian includes gently dipping Proterozoic rocks - Cobalt Group sediments and Nipissing diabase in sill-like form - and steeply dipping Archean rocks - hornblende syenite and an assemblage (commonly referred to as Keewatin) of andesitic lavas, interflow sediments, metasediments, and basic intrusives.

Structural Geology - No faults with large displacement are known in the two townships. Certain minor, gently dipping, faults exposed at the Langis mine have economic significance.

Economic Geology - Silver and cobalt are the only metals known to occur in sufficient amount to allow profitable exploitation.

The characteristics of the silver-cobalt veins at the Langis mine are similar to those in the most productive part of the Cobalt camp, that is, the part below the Nipissing diabase sill. The productive parts of the veins are in general restricted to the Cobalt Group sedimentary rocks throughout a vertical range from the contact with the underlying Keewatin rocks to 150 feet above the contact.

The amenability to prospecting for silver and cobalt deposits of those parts of Casey and Harris townships away from underground workings depends to a large extent on the depth of this favourable range below surface. The mapping carried out in 1962 showed that much of the townships were not amenable to surface prospecting due to depth of overburden.

In 1960 and 1961 a diamond-drilling program on the Benner-Harris group in lot 8, concession V, Harris township revealed small silver-cobalt-nickel occurrences; although the size and grade of the veins were far below ore grade, the mere presence of the occurrences shows that metalliferous veins are not restricted to the vicinity of the Langis mine.

In the writer's opinion parts of Casey and Harris townships offer good exploration possibilities. The Casey (now Langis) mine was started in 1906 to explore for ore shoots along a cobalt-bearing vein exposed at surface. As there are no other known surface showings future exploration will have to find buried veins and test them for oreshoots.

HENWOOD TOWNSHIP

Much of the work for the geological map of the township (P.160) was done in 1960, but the project was completed and the map issued in 1962. The township is located 20 miles northwest of Cobalt.

Mineral Exploration - With the exception of a drilling program carried on at intervals during the period 1952 to 1958, no extensive mineral exploration has been done in the township. One hole, the Stone-Eplett No.3, in lot 4, concession III, was put down 4,050 feet at an inclination of approximately 65°. Little, if any, prospecting is presently being done in the township.

Very extensive sand and gravel deposits occur in the township and are being worked from pits situated near Highway No. 65.

General Geology - The rocks exposed at surface and in the Stone-Eplett No.3 drill hole are of Proterozoic age. They include Keweenawan intrusive rocks (diabase dikes and also Nipissing diabase in sill-like form) and Cobalt Group sedimentary rocks. The drillhole intersected a vertical thickness of 2,980 feet of the Cobalt sedimentary rocks. It also disclosed that the Nipissing diabase sill, (intersected from a vertical depth of 1,750 feet to 2,520 feet below the collar) had a thickness of 770 feet at this place.

Structural Geology - The diabase sill in Henwood township has a basin-like shape. It is deeply buried in the central part of the township and outcrops near the township boundaries.

Several linear topographic features are thought to be indicative of faults. A southeasterly-trending lineament can be traced from the township to the vicinity of Cobalt, where it coincides with the Cross Lake fault.

Economic Geology - The township lies in the Timiskaming silver-cobalt area and so may be considered as potential prospecting ground for these metals.

A small chalcopyrite showing is found near the Stone-Eplett No.3 drillhole. In Cane township within a half mile of the west boundary of Henwood, silver-, cobalt-, and uranium-bearing veins, which have been explored by underground work, occur in Nipissing diabase. In Hudson township, within a half mile of the southeast corner of Henwood, uranium-bearing veins occur in Cobalt Group sedimentary rocks below the Nipissing diabase sill; also in Hudson township within 200 feet of the southeast corner of Henwood a chalcopyrite-bearing vein intersects Nipissing diabase.

The potentialities of Henwood township as exploration ground for silver, cobalt, uranium or copper are difficult to appraise. A most important consideration is the empirical relationship in the Timiskaming silver-cobalt area that workable deposits of these metals are very largely restricted to within 500 feet of the Nipissing diabase sill contacts - the deposits may occur either in the diabase or in the intruded rocks. In Henwood township this "favourable" zone is for the most part not easily accessible due to coverage by surficial deposits or overlying formations.

A considerable amount of sand and gravel has been excavated from the glaciofluvial deposits in Henwood township; more than sufficient reserves for the foreseeable future are easily accessible.

No.19 LIMERICK TOWNSHIP
COUNTY OF HASTINGS

by

S.B. Lumbers¹

Location - During the 1962 field season the mapping of Limerick township, Hastings County, was completed. The centre of the map area is 14 miles southeast of Bancroft.

Mineral Exploration - Although no mineral production has been reported, prospecting, staking, and exploration have been carried out periodically in the map-area from the 1860's to the present. Since the early 1880's mineral rights to about 45 per cent of the township have been controlled continuously by the International Nickel Company of Canada Ltd. and its predecessors, Anglo-American Iron Company and Canadian Copper Company. Discovery of nickel near Ormsby Junction by Macassa Mines Limited led to the staking of 107 claims during 1961 and the early part of 1962. Diamond-drilling and geophysical surveys by Macassa Mines Limited, and geophysical surveys by the International Nickel Company of Canada Ltd. were carried out during the 1962 field season. Five claims were staked during the field season.

General Geology - Precambrian rocks consisting of metasediments, metavolcanics, and silicic to ultrabasic intrusive rocks underlie the area.

The metasediments are chiefly medium- to coarse-grained marbles, paragneiss, and para-amphibolite. Arkose and conglomerate occur in the southeast corner of the township. Silicic to basic metavolcanic rocks form three separate units in the central and western parts of the area. Iron formation occurs in one of these metavolcanic units. The metasediments and metavolcanics have been metamorphosed to low or intermediate grades.

¹Part-time geologist, Ontario Department of Mines, Toronto, and Graduate Student, Department of Geology, Princeton University, Princeton, N.J., U.S.A.

The intrusive rocks are mainly gabbro, diorite, and tonalite, with minor associated granite pegmatite, syenite, and pyroxenite. Four main intrusions occur in the area; two on the western border, and a third near the centre of the township. A fourth body of fine- to medium-grained leucotonalite extends about 2 miles south into Limerick township from south-central part of Dungannon township. This fourth body was previously mapped as rhyodacite. Small stocks of gabbro and tonalite, syenite, and gabbro dikes are common in the southeast quarter of the township.

Structural Geology - The structural geology of the area is extremely complex in detail but is generally characterized by cross-folded dome and basin structures. A main northeast-trending set of fold axes has been deformed and refolded by a second set of fold axes that trend northwest. This cross-folding has resulted in rapid reversals of plunge in fold axes. Recumbent folding is present in the eastern part of the township, north of Limerick Lake.

No major faults are apparent in the area, although minor faults are abundant in places, particularly in para-amphibolite and paragneiss. Sheared rusty schists are commonly developed near lithologic contacts in the metasediments and metavolcanics, in areas of abrupt changes in structure, and in the vicinity of intrusions. These rusty schists commonly cause geophysical anomalies owing to the presence of one or all of pyrite, pyrrhotite, magnetite, and graphite.

Economic Geology - Gold, silver, arsenic, lead, iron, copper, and nickel mineralization are present in the area.

Mineralized rusty schists in Limerick township commonly contain from 1 to 15 per cent disseminated pyrrhotite and pyrite. Some rusty schists within and at the margins of metavolcanic units contain up to 30 per cent of disseminated pyrrhotite, pyrite, and rarely chalcopyrite. Qualitative spectrographic analyses by the Provincial Assay Office of 14 selected grab samples of rusty schists throughout the area showed that titanium is the only metallic element besides iron that is present in these rocks over trace amounts. In none of the samples did the titanium content exceed 1 per cent.

A silicified rusty shear zone occurring in basic metavolcanics in the southeast corner of Limerick and adjacent Grimsthorpe township contains up to 50 per cent disseminated arsenopyrite as crystals up to $\frac{1}{2}$ inch across, some pyrrhotite, pyrite, and magnetite, and rarely chalcopyrite. This shear zone has been explored periodically since the turn of the century and is currently being drilled by Macassa Mines Limited. High gold assays are reported from this prospect by its owner, V.A. McMurray of Gilmour.

A calcite-barite vein, containing some galena has been traced for over $\frac{1}{2}$ mile northwest of Little Wadsworth Lake by Bouzan Mines Limited. The lead content of the vein is apparently too low to be of economic value.

Iron occurs as disseminated magnetite in basic intrusives and metavolcanics, and in magnetite iron formation. The iron formation is best developed to the east of Twomile Lake where it occurs in siliceous to basic metavolcanics as lenticular layers up to 100 feet wide and generally less than 300 feet long. Magnetite, commonly concentrated in narrow discontinuous layers, occurs in a quartz gangue. The magnetite content ranges between 1 and 25 per cent and the individual layers of iron formation are generally widely separated in the metavolcanic unit.

Copper and nickel mineralization occurs in a partly silicified and carbonatized metapyroxenite near the northeast border of the complex Thanet gabbro intrusion in the west-central part of Limerick township. Twenty-six drillholes put down by Macassa Mines in late 1961 and early 1962 have indicated 2,000,000 tons grading 1% nickel and 0.25% copper. No further work was performed on the property during the field season.

Metapyroxenite and pyroxenite elsewhere in the Thanet gabbro and in other gabbroic intrusions in the area commonly contain accessory chalcopyrite, pyrite, and pyrrhotite.

No. 20 PLEISTOCENE GEOLOGY

by

P.F. Karrow¹

A. GUELPH AREA

Location - Latitude 43°30' to 43°45'N., Longitude 80°00' to 80°30'W. This is map-sheet 40 P/9 of the National Topographic Series.

Mapping progress - About two-thirds of the map-area was completed, leaving one-third to be completed during the 1963 field season. Sandy Wentworth Till is now believed to be the youngest till throughout the area except possibly in a few square miles north of Salem. Clayey "middle till" (equivalent to Port Stanley Drift?) and sandy "lower till" (equivalent to Catfish Creek Drift?) have been found in numerous lower exposures along the Grand River between Bloomingdale and Invernaugh. Outwash and kame sand and gravel are widely distributed on top of the Wentworth Till. Numerous peat and muck accumulations occur along abandoned melt-water channels and in kettle depressions.

¹Geologist, Ontario Department of Mines, Toronto.

B. BOLTON AREA

Location - Latitude 43°45' to 44°00'N., Longitude 79°30' to 80°00'W. This is map-sheet 30 M/13 of the National Topographic Series.

Mapping progress - The locations of over 400 water and gas wells were checked for determining drift thickness and bedrock topography. A few stratigraphic sections were examined near Woodbridge which revealed the presence of at least three till sheets and an interstadial organic deposit.

No.21 SUMMARY OF FIELD WORK, 1962

by

D.F. Hewitt¹

SAND AND GRAVEL

Examinations were made of 56 sand and gravel deposits in the Toronto and eastern Ontario areas. Sand samples were collected for sieve analysis and samples were supplied to the Ontario Research Foundation for mineralogical study. This work was carried out in connection with preparation of a report on the sand and gravel industry in southern Ontario.

INDUSTRIAL MINERAL INVENTORY

In April a mineral inventory of industrial mineral producers within a radius of 60 miles of Toronto was completed. A report was prepared on urban expansion and its effect on the mineral industry of the Toronto area (I.M.R. No.8).

SILICA

A restudy was made of silica deposits in Ontario. Deposits of Lorrain quartzite, Potsdam sandstone, Medina sandstone and Oriskany sandstone were examined. A revised report on silica in Ontario is being prepared.

BUILDING STONE

In view of the increased interest in Ontario sources of building stone, field work was carried out on the main sources of granite, marble, limestone, and sandstone in Ontario. Seventeen sandstone quarries are operating in the Medina sandstone formation in the Milton-Orangeville area. Five sandstone quarries are operating in the Potsdam sandstone formation near

¹Senior Geologist, Ontario Department of Mines, Toronto.

Kingston. Nine limestone building stone quarries are operating, mainly in the Guelph-Lockport dolomite. Only two granite quarries are operated intermittently in Ontario for building stone. There is greatly increased interest in the production of mineral and rock chips for pre-cast concrete building facings, and six companies are now engaged in producing this material. Seven companies in eastern Ontario are producing marble chips. A considerable amount of exploration and development has been carried out in 1962 by companies interested in developing Ontario marble deposits. Several such deposits were visited.

PARRY SOUND-HUNTSVILLE MAP AREA

Preliminary reconnaissance geological work was begun in the Parry Sound-Huntsville map-area on a map sheet to be published on the scale of 1 inch to two miles. This sheet covers an area of 1,900 square miles west of longitude 79°W. and between latitudes 45° and 45°30'N.

No.22 INDUSTRIAL MINERAL INVESTIGATIONS

by

G.R. Guillet¹

A. CLAYS AND SHALES OF ONTARIO

To compliment last year's review of the structural clay products industry a survey of the clay and shale resources in the province has been partially completed. More than 100 samples were collected for analytical and ceramic testing and for preliminary evaluation for lightweight aggregate use. Examinations have been largely restricted to existing exposures provided by creek banks, rock cuts, escarpments, and abandoned pits and quarries.

Dundas and Queenston shales of Ordovician age are the most attractive raw materials for brick manufacture in southern Ontario. Numerous quarry sites occur in a belt 5 to 25 miles wide along the east side of the Niagara escarpment as far north as Owen Sound. Various shale formations in overlying Silurian and Devonian strata occasionally outcrop in southwestern Ontario. Of these the Hamilton shale has already proven its value for brick and tile in the Parkhill - Thedford area. Ordovician shales also occur on Manitoulin Island, and sparsely in the vicinities of Ottawa and Haileybury. The softer sections of the Precambrian Animikie shale in the Port Arthur area are likely suitable for brick and tile.

¹ Geologist, Ontario Department of Mines, Toronto.

Stoneless clays of glacial and post-glacial origin are used for tile, brick, and sewer pipe manufacture. Most are geographically restricted to a few clay belts such as the Rainy River - Fort Frances, Dryden - Wabigoon, Timmins - Cochrane - Hearst, the Lake Timiskaming area, and the Ottawa valley regions. Others are exposed at scattered locations in broad river valleys near the shores of Lake Huron and Georgian Bay and western Lake Superior. In southwestern Ontario the almost-stonefree top several feet of a glacial till is frequently used for tile. Clays of the James Bay Lowland, including the Cretaceous beds of the Moose River basin, have not been included in the present survey.

B. BARITE

The more important barite occurrences in Ontario were visited during the 1962 field season. All are vein occurrences of relatively small size. Although 95 per cent of the world's production is used as a heavy medium in well-drilling muds, it is possible that the high purity and white colour of many of the Ontario occurrences might favour them for the small but higher-priced chemical, ceramic, and filler markets. Production has been small and sporadic; at present there are no producers in Ontario.

Barite is a significant gangue mineral in many silver veins of the Port Arthur region, notably on the islands of McKellar, Spar, and Jarvis. Other veins of white barite are found in the Matachewan - Elk Lake area, on the Nighthawk River southeast of Timmins, and at Tionaga on the C.N.R. southwest of Timmins. Barite veins of southeastern Ontario are commonly narrow and of poor colour. In the veins of the Noyes and Johnston properties south of Moira Lake in Huntingdon township a significant amount of pink barite is associated with fluorite.

C. FLUORSPAR

A survey of fluorspar occurrences was undertaken during the recent field season. The rapidly expanding use of fluoride chemicals in plastics and other organic compounds, in addition to its established use in the steel and aluminium industries, may result in rapid depletion of known reserves. Fluorspar is not being produced in Ontario at the present time.

Important occurrences are restricted to southeastern Ontario where intermittent production has come from several dozen deposits in Madoc and Huntingdon townships, Hastings county. None of the underground workings are accessible but the area has been re-assessed on the basis of surface observations, available underground plans and sections, and drilling data from

the federal government's emergency assistance program of 1942. The largest production has been from fluorite-calcite vein deposits along a northwest-southeast fault zone over a length of 3 or 4 miles, but important quantities have also come from smaller parallel veins offset several miles to the west. The veins are the youngest rocks in the area and occupy fissures in Grenville granite and marble and Ordovician limestone.

A number of radioactive calcite-fluorite-apatite veins and fluorite-bearing granite and syenite pegmatites occur in Cardiff township, Haliburton county. They have been explored both for fluorspar and uranium, and minor fluorspar production is recorded. Occurrences of fluorspar are known near Port Arthur and Rosspart but deposits of economic interest have not been found.

No.16 GRENFELL AND BOMPAS TOWNSHIPS

DISTRICT OF TIMISKAMING

by

J.A. Grant

Location - Grenfell and Bompas townships lie at the west end of the Kirkland Lake gold belt. Highway No.11 crosses Grenfell township and provides access to the centre of the area. The eastern part of Grenfell township may be reached by way of the Goldthorpe Road from Chaput Hughes, and the Ontario Northland railway crosses the township from southeast to northwest. The northern part of Bompas township may be entered from lumber roads in southern Lee township, and the south of Bompas is accessible from Kenogami Lake and the Matachewan Unit Road. Central and western Bompas is best reached by float plane to Rib or Little Sarsfield lake.

Mineral Exploration - Grenfell township has been prospected over the past half century, largely for gold and base metals. There are several old shafts in the area, but at present no active producers. In eastern Grenfell, in 1961, Magni Mining Corporation Ltd. conducted geological and geophysical examination of a group of claims south of Armer Lake on several base metal showings. In 1962, this company did geophysical work on gold showings at Cook Lake. Prospecting in Bompas township has been limited, probably due to the extensive, and supposedly unfavourable, Gowganda cover. A molybdenum showing in southwestern Bompas, and a gold and base metal prospect in the southeast of the township, have attracted prospectors for several years.

¹Graduate Student, Department of Geology, California Institute of Technology, Pasadena, California, U.S.A.

General Geology - A threefold division of the geology is possible: volcanic rocks and gabbro in the east and granite in the west, overlain by Gowganda sedimentary rocks in the west centre. The volcanic rocks are the oldest in the area. They are slightly metamorphosed intermediate lavas, massive, pillowed, or fragmental, commonly referred to as "Keewatir" in age. Rocks probably equivalent to these outcrop in southwest Bompas. The volcanic rocks are intruded by gabbro and diabase; these intrusions are widespread in northeastern Grenfell. To the southeast the older rocks are overlain by Timiskaming conglomerate, greywacke, tuff and agglomerate. Later granite is extensively exposed in western Bompas and in the northeast corner of Grenfell. Overlying the older rocks unconformably is a series of Gowganda sedimentary rocks: interbedded conglomerate, greywacke, arkose and argillite. A large outlier of Gowganda sedimentary rocks occurs in south-central Grenfell. Diabases of more than one age cut the pre-Gowganda rocks, notably as north-trending dikes in the granite of western Bompas.

Structural Geology - The volcanics trend southeast, with steep dip, and have tops to the northeast, whereas the Timiskaming rocks trend northeast, with steep dip. The Gowganda rocks in Bompas township form a syncline whose axis trends northwards through eastern Bompas. The section thickens markedly in the west. A possible continuation of the Larder Lake break has been noted in southeastern Grenfell (Map No. 1946-1, O.D.M.). A strong shear zone trends northwest from near Goldthorpe, but there is no direct evidence of movement. There is also widespread shearing in the volcanic rocks in the vicinity of Sesekinika Lake.

Economic Geology - Gold is reported from quartz veins, which may carry carbonate or sulphides. Sulphides are also present as disseminations and as veinlets in the lavas, and include pyrite, chalcopyrite, pyrrhotite, sphalerite and galena. It is worthy of note that the quartz veins from which gold has been reported in southeastern Bompas, and the chalcopyrite and galena mineralization at the same locality, outcrop not in the volcanic rocks, but above them, in the Gowganda formation.