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MARGINAL NOTES

INTRODUCTION AND ACCESS

Jacobson Township is centered at Latitude 48°19′15″N and Longitude 84°20′00″E.

Much of the township can be reached by gravel roads. A logging road from Dubreuilville, west of the map area, provides access to the western portion and the northwestern corner. A gravel road extending from Goudreau in Aguonie Township to Lochalsh in Riggs Township provides access to the central portion. A network of abandoned logging roads provides access to the southwestern corner and the central portion. A rough road from Cawdron Lake in Bird Township to the south allows access to the south-central part of the township.

Old Cabin Lake can be reached by lightly loaded, float-equipped aircraft, and access to Trout, Justin and Godin lakes can be gained via canoe and portage. The area southwest of Godin Lake is accessible only by long ground traverse. The northeastern corner of the township can be reached via the Canadian Pacific Railroad.

MINERAL EXPLORATION

Jacobson Township contains numerous gold showings and the largest former gold producer (the Cline Lake gold mine) within the Goudreau–Lochalsh gold district. The gold deposits occur as quartz veins in shear zones. The veins characteristically have an associated carbonate, silica, sulphur and potassium metasomatism. Some of the gold occurrences, including the Cline Lake gold mine, the Edwards gold mine and the Three Mile Post and Markes properties, lie along the trend of the Goudreau Lake shear zone, a major structure defined by geologists working for Canamax Resources Inc. (*The Northern Miner*, April 6, 1987, p.3).

Relatively large diamond-drill programs have been completed on the holdings of Vega Explorations Limited and the Cline Development Corporation. At the time of mapping (1987), relatively large exploration programs for gold had recently been completed or were in progress at the Cline Lake gold mine and the Markes property, both of which were held by the Cline Development Corporation in 1987. The Cline Lake property was under option to Noranda Exploration Company, Limited and the Markes property was under option to Esso Minerals Canada.

In 1987, the Cline Development Corporation completed a program of trenching in northern Jacobson Township to test electromagnetic conductors, identified by airborne geophysics, for gold. The results of this work are unknown.

The presence of a large area of intermediate to felsic metavolcanic rocks has stimulated several attempts to find stratabound massive sulphide deposits. These programs were conducted by Amax Gold Inc. (formerly Amax Exploration Inc.), Can-Ex Resouces Ltd. and Gulf Minerals Canada Limited. The most extensive and complete base metal investigation was by Gulf Minerals Canada Limited, which completed 21 diamond-drill holes, totalling 7900 feet. This work was dominantly located along or near the contact between intermediate to felsic and intermediate to mafic metavolcanic rocks.

Occurrences of iron formation in Jacobson Township have not been explored.

Bruce (1940) gives an early description of the mineralization found in Jacobson Township and the most complete description available for the Cline Lake gold mine.

GEOLOGY

Intermediate to felsic metavolcanic rocks, consisting of sericite schist, tuff, lapilli tuff, feldspar crystal tuff, quartz-feldspar tuff and breccia, are the oldest supracrustal rocks in Jacobson Township. They are widely distributed, but poorly exposed in the southern portion of the township. Outcrops commonly display a well-developed schistosity.

Discontinuous segments of iron formation, composed of chert, graphite, pyrite and pyrrhotite, occur along the contact between the intermediate to felsic metavolcanic rocks and an overlying, thick section of intermediate to mafic metavolcanic rocks. Most of these segments are at the same stratigraphic position as the Michipicoten iron formation found in Finan Township to the west.

The intermediate to mafic metavolcanic rocks, which underlie the central portion of the township, are younger than the intermediate to felsic metavolcanic rocks and the iron formation. They are dominantly massive and pillowed. Thin zones of tuff and lapilli tuff are present locally.

The intermediate to mafic metavolcanic rocks are separated from the external granites, which underlie the northern portion of the township, by a poorly exposed band of metasedimentary rocks approximately 1.2 km in width. These metasedimentary rocks are the youngest supracrustal rocks in the township and consist of wacke, siltstone and rare argillite and Doré-type conglomerate.

The supracrustal rocks are cut by intermediate to mafic intrusions varying from quartz diorite to gabbro in composition and from fine to coarse in grain size. While locally conformable and sill-like in appearance, on a regional scale they cut the stratigraphy at a low angle. One common phase of quartz diorite is fine grained and contains fine-grained, disseminated, blue quartz. A medium- to coarse-grained quartz diorite occurs at the Cline Lake gold mine.

Intermediate to felsic intrusions are present as dikes of trondhjemite, quartz porphyry, feldspar porphyry, quartz- feldspar porphyry, and aphanitic, irregularly shaped masses. Only rarely do these rocks form a mappable unit at this scale of mapping. The intermediate to felsic intusions are abundant in the area between the Cline Lake gold mine and Godin Lake. While many different textural varieties exist, there is a general absence of clear crosscutting relationships between the occurrences, and they may represent only one intrusive event.

Diabase dikes occupy a northwest-trending fault and shear system.

Large areas within the central and northern portions of the township are covered with sand and gravel.

Most of the supracrustal rocks are at the greenschist facies rank of regional metamorphism, with the metamorphic grade increasing to lower amphibolite facies near the contact with external granites.

STRUCTURAL GEOLOGY

Criteria for determining stratigraphic facing directions are absent from the intermediate to felsic metavolcanic rocks. The axis of the Goudreau anticline, a regional fold, lies within the intermediate to felsic metavolcanic rocks, but its precise position cannot be determined because of the lack of facing indicators.

Pillow structures are common within the intermediate to mafic metavolcanic rocks. The shapes of these pillows indicate that the metavolcanic rocks face north.

Primary structures to determine the stratigraphic top are generally absent from the metasedimentary rocks. Poorly developed sedimentary structures, exposed in railroad cuts west of Lochalsh, suggest that the metasedimentary rocks also face north.

Dikes from the external granites cut the supracrustal rocks, indicating that they are younger. The granitic rocks display a well-developed schistosity and a granoblastic, recrystallized texture. The contact between the granites and the supracrustal rocks is one of intrusion overprinted by deformation.

The Maskinonge Lake fault strikes across the southwestern corner of the township, but is poorly exposed due to sand and gravel cover.

RECOMMENDATIONS FOR THE PROSPECTOR

The rocks are favorable for the presence of base metals and consequently, additional testing and prospecting are warranted.

The iron formations are too poorly developed to be economically viable as a source of iron, however, they could offer a target for the gold prospector if suitable structural conditions (e.g., fracturing, brecciation) exist.

The area stretching from Pine Lake to Godin Lake contains essentially all the gold showings within Jacobson Township. The occurrences are within a zone that is approximately 1.5 km wide. Extensive deposits of sand and gravel cover the bedrock within this zone. Previous exploration and gold discoveries in this zone have centered on the limited exposed bedrock. Considering the number of known gold occurrences within an area with such a limited bedrock exposure, many undiscovered zones of gold mineralization likely exist.

The Maskinonge Lake fault, which is poorly exposed at the eastern end of Maskinonge Lake, hosts gold mineralization. Geophysical maps (Assessment Files Research Office, Toronto) indicate that the fault extends both northwest and southeast from the area of known gold mineralization into areas of sand and gravel cover. These extensions warrant testing for gold. The gold occurrences within the fault are somewhat unique in that they lie within a structure that is sharply transverse to the supracrustal rocks. The other gold occurrences in the township are within shears that appear generally to be conformable to stratigraphy.

Airborne geophysical maps (Assessment Files Research Office, Toronto) indicate that a number of conductive horizons occur in northern Jacobson Township. Most of these have not been extensively investigated and warrant additional examination.

The gold deposits of Jacobson Township occur as quartz veins in shear zones. These deposits display an envelope of carbonate, silica, sulphur and potassium metasomatism.

REFERENCE

Bruce, E.L. 1940. Geology of the Goudreau–Lochalsh area; Ontario Department of Mines, Annual Report, 1940, v.49, pt.3, p.1-50.

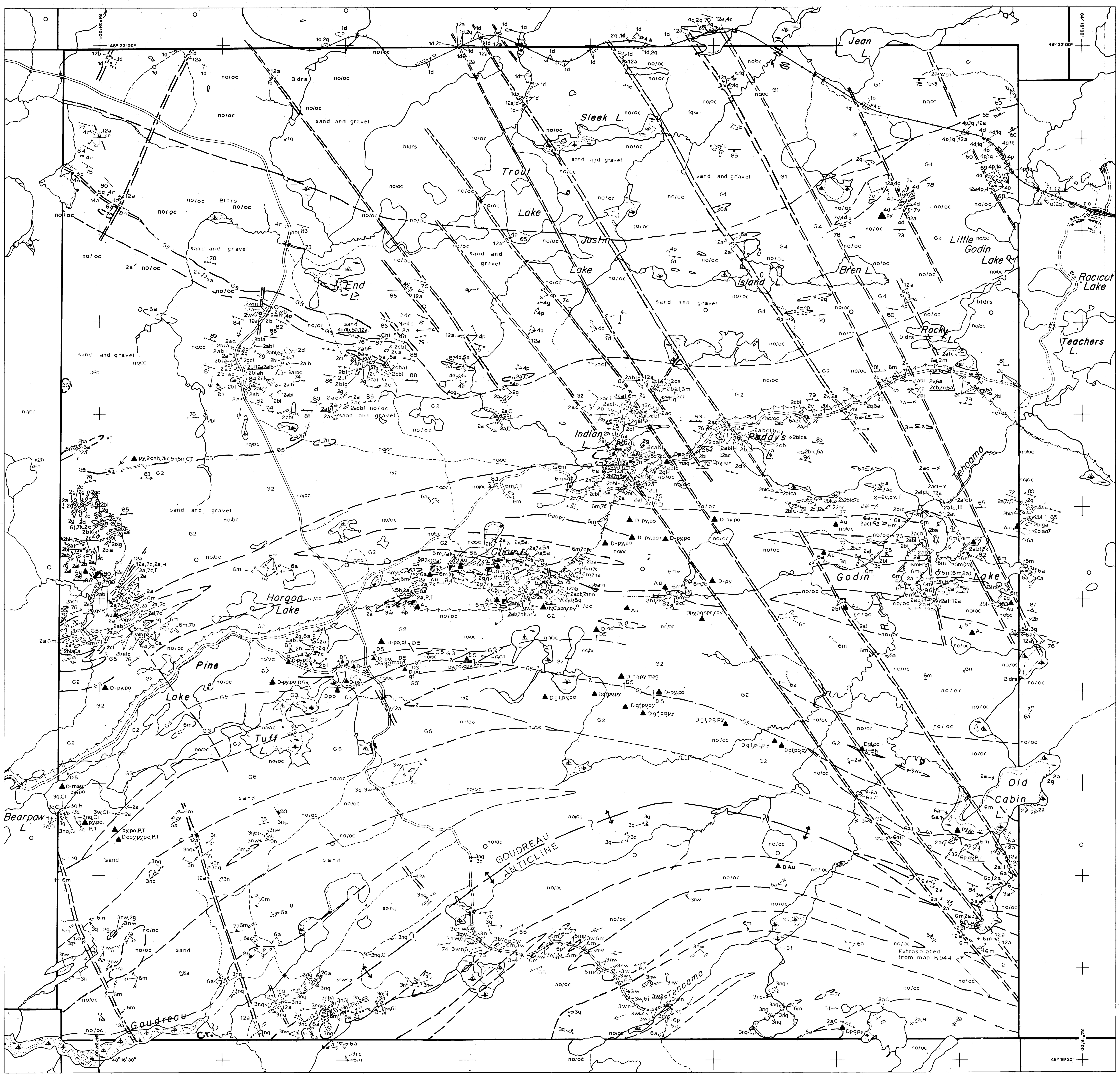
Turek A., Smith, P.E. and Van Schmus, W.R. 1982. Rb-Sr and U-Pb ages of volcanism and granite emplacement in the Michipicoten belt–Wawa; Canadian Journal of Earth Science, v.19, p.1608-1626.

—— 1984. U-Pb Zircon ages and the evolution of the Michipicoten plutonic-volcanic terrain of the Superior Province, Ontario; Canadian Journal of Earth Science, v.21, p.457-464.

ABBREVIATIONS

Ag	Silver	IF	iron formation
Au	Gold	mag	magnetite
cl	chloritoid[a]	po	pyrrhotite
cpy	chalcopyrite[a]	py	pyrite
fl	fluorite	qv	quartz vein
gn	galena	sph	sphalerite
gf	graphite		

[a]*Not a standard abbreviation for the Ontario Geological Survey*



SYMBOLS

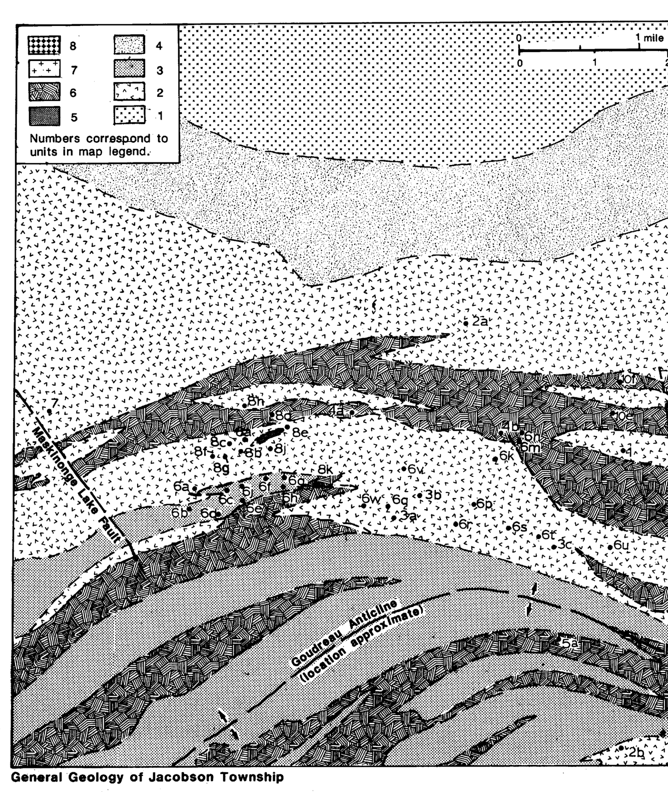
- Glacial striations
- Small bedrock outcrop
- Area of bedrock outcrop
- Bedding, top (arrow) from grain gradation (inclined, vertical, overturned)
- Bedding, top (arrow) from crossbedding (inclined, vertical, overturned)
- Bedding, top (arrow) indicated by flame structures in interbedded sandstone-siltstone (inclined, vertical, overturned)
- Pillow volcanics, dip and facing direction indicated (inclined, overturned)
- Pillow elongation, facing direction unknown (inclined, vertical)
- Paleocurrent direction as suggested by ripple marks
- Schistosity (horizontal, inclined, vertical)
- Lineation, bearing and plunge indicated (m = mullion structure, c = clast, p = pillow, s = slickensides, b = biotite, i = intersection of 2 foliations, F = fold axis of minor fold, Se = stretched spherulites, Sr = sericite streaks, chl = chlorite streaks, a = amphibole elongation)
- Banding (horizontal, inclined, vertical)
- Geological boundary, observed
- Geological boundary, interpreted
- Geological boundary, geophysically inferred
- Geological boundary, assumed
- Minor shear (horizontal, inclined, vertical)
- Major shear (attitude uncertain, attitude indicated)
- Lineament
- Lineament, possibly a fault zone
- Jointing (inclined, vertical)
- Kinkband, plunge of fold and direction of movement indicated (inclined, vertical)
- Minor fold; strike and dip of axial plane, bearing and plunge of fold axis
- Diamond-drill hole
- MA Magnetic anomaly
- Mine
- py Mineral occurrence
- Shaft, depth in feet
- T Trench
- P Pit

Not all symbols may appear on this map sheet.
The position of all boundaries and surveyed lines are approximate.

PROPERTIES AND OCCURRENCES[a]

1. Algoma Steel Corporation Limited gold occurrence
2. Amax Gold Inc.
   - 2a Loughlin Group
   - 2b 48 Group
3. Canex Aerial Exploration Limited
   - 3a Drill hole WV-2
   - 3b Drill hole WV-3
   - 3c Drill hole WV-4
4. Cline Development Corporation
   - 4a Cline Lake gold mine
   - 4b Markes gold occurrence
5. Cymbal Resource Corporation
   - 5a Reid gold occurrence
6. Gulf Minerals Canada Limited
   - 6a Drill hole MC-1
   - 6b Drill hole MC-2
   - 6c Drill hole MC-3
   - 6d Drill hole MC-4
   - 6e Drill hole MC-5
   - 6f Drill hole MC-6
   - 6g Drill hole MC-7
   - 6h Drill hole MC-8
   - 6j Drill hole MC-9
   - 6k Drill hole MD-1
   - 6m Drill hole MD-2
   - 6n Drill hole MD-3
   - 6p Drill hole MD-4
   - 6q Drill hole MD-5
   - 6r Drill hole MD-6
   - 6s Drill hole MD-7
   - 6t Drill hole MD-8
   - 6u Drill hole MD-9
   - 6v Drill hole MD-10
   - 6w Drill hole MD-11
7. Michael Syndicate gold occurrence
8. Potvin - West
   - 8a Anaconda drill hole 83-1
   - 8b Anaconda drill hole 83-2
   - 8c Anaconda drill hole 83-3
   - 8d Anaconda drill hole 83-4
   - 8e Anaconda drill hole 83-5
   - 8f Anaconda drill hole 83-6
   - 8g Anaconda drill hole 83-7
   - 8h Anaconda drill hole 83-8
   - 8j Edwards gold mine
   - 8k Racicot copper showing
9. Old Cabin Lake iron formation
10. Vega Exploration Ltd.
   - 10a Vega drill hole 80-26
   - 10b Vega drill holes 80-7, 8, 9, 20
   - 10c Archibald gold occurrence
   - 10d Anaconda drill hole V-83-5
   - 10e Loughlin claims
   - 10f McColl gold occurrence
   - 10g Three Mile Post gold occurrence

[a] *See inset map for locations.*



General Geology of Jacobson Township

LEGEND[a]

PRECAMBRIAN

PROTEROZOIC

12 Mafic Intrusive Rocks
- 12a Diabase
- 12b Porphyritic (feldspar) diabase
- 12c Glomeroporphyritic (feldspar) diabase
- 12d Diabase with minor biotite
- 12n Carbonatite
- 12p Olivine lamprophyre
- 12q Carbonatite-silicocarbonatite[b]
- 12r Ferruginous carbonate
- 12s Syenite
- 12t Biotite lamprophyre
- 12u Porphyritic (feldspar) lamprophyre
- 12v Lamprophyre with xenoliths

11 Carbonatite Intrusive Rocks

FIRESAND CARBONATITE
- 11a Sovite[b]
- 11b Silicocarbonatite[c]
- 11c Rauhaugite (ferruginous dolomite)

INTRUSIVE CONTACT

ARCHEAN

8 Metamorphosed Alkalic and Felsic Intrusive Rocks

HERMAN LAKE ALKALIC ROCK COMPLEX
- 8a Medium-grained, equigranular amphibole syenite
- 8b Coarse-grained, nepheline-cancrinite syenite
- 8c Nepheline syenite pegmatite
- 8d Melanocratic nepheline syenite to malignite
- 8e Pyroxenite
- 8f Syenite pegmatite
- 8g Fine-grained syenite to nepheline syenite
- 8h Syenite to quartz syenite aplite
- 8j Coarse-grained syenite

INTRUSIVE CONTACT

7 Felsic Intrusive Rocks
- 7a Quartz-feldspar porphyry
- 7b Feldspar porphyry
- 7c Quartz porphyry
- 7d Diorite, quartz diorite[d]
- 7e Granodiorite, granite[e]
- 7f Aplite
- 7g Diorite, granodiorite
- 7i Porphyritic granodiorite to quartz monzonite
- 7k Felsic dikes
- 7m Trondhjemite, granodiorite, quartz- feldspar porphyry[f]
- 7n Fine-grained rhyolite to dacite intrusion (uncommon quartz or feldspar phenocrysts)
- 7p Intrusive breccia
- 7q Equigranular quartz monzonite to granite
- 7r Porphyritic (plagioclase) diorite, granodiorite
- 7s Porphyritic quartz monzonite to granite
- 7t Syenite to quartz syenite
- 7u Monzonite to quartz monzonite
- 7v Massive trondhjemite to quartz diorite
- 7w Granodiorite (fine grained, commonly schistose)

INTRUSIVE CONTACT

6 Metamorphosed Mafic to Ultramafic Intrusive Rocks
- 6a Gabbro, diorite
- 6b Anorthositic gabbro
- 6c Anorthosite
- 6d Metadiabase (dike-like body with diabase texture)
- 6f Hornblende diorite
- 6g Peridotite
- 6h Pyroxenite
- 6i Talc schist
- 6j Mafic dikes
- 6k Quartz diorite, trondhjemite[g]
- 6m Quartz gabbro
- 6n Xenolithic gabbro
- 6q Porphyritic gabbro, diorite
- 6p Carbonatized or carbonate-bearing mafic intrusion
- 6r Hornblendite
- 6s Hornblende-biotite rock with xenoliths (intrusive breccia)[n]
- 6t Biotite-rich intrusive rock
- 6u Intrusive breccia

INTRUSIVE CONTACT

5 Metasedimentary Rocks

CHEMICAL IRON FORMATION[h]
- 5a Magnetite/hematite-chert iron formation
- 5b Carbonate, commonly with minor chert, pyrite, and rarely with arsenopyrite
- 5c Sulphide, commonly with subordinate siderite and chert
- 5d Chert, may contain subordinate siderite and pyrite, locally may be graphitic
- 5e Graphite-argillite, commonly pyritic, argillaceous and associated with iron formation
- 5f Chert and iron oxide in approximately equal proportions
- 5g Chert and carbonate in approximately equal proportions
- 5h Chert and sulphide in approximately equal proportions
- 5i Chert, graphite, argillite (black chert containing graphite)
- 5k Chert, siderite and magnetite
- 5m Chert, wacke or siltstone
- 5n Chert cemented with iron oxides (ie., weathered iron formation)

CLASTIC IRON FORMATION
- 5p Chert, hematite
- 5q Iron oxide (magnetite and/or hematite), chert, wacke
- 5r Iron oxide (magnetite and/or hematite), wacke
- 5s Chert breccia

CONFORMABLE CONTACT

4 Clastic Metasedimentary Rocks
- 4a Massive wacke, biotite may be present
- 4b Chert
- 4c Plagioclase-quartz-biotite schist
- 4d Wacke, lithic wacke
- 4e Argillite
- 4f Interlaminated siltstone and mudstone
- 4g Conglomerate with granite clasts[i]
- 4h Volcanic clast conglomerate
- 4j Siltstone, sandstone, lithic sandstone
- 4k Quartz arenite, arkose, lithic arkose
- 4m Carbonate-rich metasediment[j]
- 4n Lithic arkose
- 4p Thinly bedded wacke, siltstone
- 4q Carbonate, ferruginous limestone
- 4r Wacke, thin-bedded amphibolite, quartz- plagioclase schist
- 4s Wacke with quartz porphyroblasts
- 4t Siltstone, massive

CONFORMABLE CONTACT

3 Intermediate to Felsic Metavolcanic Rocks[p]
- 3a Sericite schist
- 3b Heterolithic breccia
- 3c Monolithic lapilli tuff
- 3d Tuff with occasional quartz and feldspar crystals
- 3e Banded tuff with fiamme
- 3f Massive flow
- 3g Monolithic breccia (felsic matrix, mafic clasts)
- 3h Porphyritic (feldspar) flow
- 3i Feldspar crystal tuff, intermediate
- 3j Porphyritic (quartz) flow
- 3k Spherulitic flow
- 3l Breccia (felsic clasts in chlorite matrix)
- 3m Flow banded lava
- 3n Autoclastic, monolithic breccia
- 3o Intermediate tuff
- 3p Heterolithic lapilli tuff
- 3q Quartz-eye crystal tuff
- 3r Heterolithic quartz-eye crystal tuff, lapilli tuff
- 3s Heterolithic crystal tuff, breccia
- 3t Tuff
- 3u Laminated tuff
- 3v Chlorite-sericite schist
- 3w Feldspar crystal tuff
- 3y Crystal (quartz-feldspar) tuff
- 3z Heterolithic (cataclastic) breccia

CONFORMABLE CONTACT

Ministry of Northern Development and Mines
Ontario

Mines and Minerals Division
Ontario Geological Survey

MAP P.3170

PRECAMBRIAN GEOLOGY

JACOBSON TOWNSHIP

Scale 1:15 840

500 m 0 0.5 1 km
Mile 1/4 0 1/2 Mile

NTS Reference: 42 C/8

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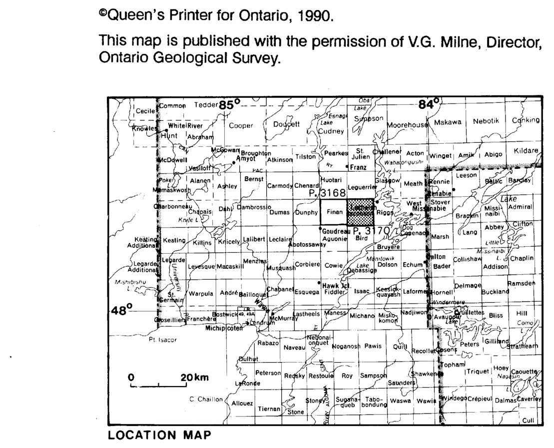

LOCATION MAP

2 Mafic to Intermediate Metavolcanic Rocks
- 2a Massive flows
- 2b Pillowed flows
- 2c Chlorite schist
- 2d Heterolithic breccia
- 2e Monolithic breccia (mafic matrix, felsic clasts)
- 2f Porphyritic (feldspar) flows
- 2g Massive, medium-grained flows[k]
- 2h Magnetite-bearing flows
- 2i Tuffaceous chloritic schist
- 2j Pillowed, porphyritic (feldspar) flows
- 2k Variolitic flows
- 2l Amygdaloidal flows
- 2m Feldspar (quartz) crystal tuff
- 2n Heterolithic breccia, lapilli-size clasts
- 2p Breccia (mafic matrix, intermediate to felsic clasts)
- 2q Amphibolite
- 2r Laminated tuff, lapilli tuff
- 2s Crystal (feldspar) tuff, crystal tuff
- 2t Talc-actinolite rock, actinolite rock
- 2u Monolithic breccia (mafic matrix, mafic clasts)
- 2v Laminated tuff
- 2w Lapilli tuff
- 2y Porphyritic (amphibole) flows
- 2z Tuff, chloritic schist with minor quartz[l]

INTRUSIVE CONTACT

1 Early Felsic Plutonic Rocks

GNEISSIC GRANITIC ROCKS
- 1a Aplite
- 1b Pegmatite
- 1c Diorite, quartz diorite
- 1d Trondhjemite, gneissic
- 1e Trondhjemite, massive to weakly gneissic, commonly dike-like
- 1f Leucocratic trondhjemite
- 1g Porphyritic, biotite trondhjemite dikes

MASSIVE GRANITIC ROCKS[m]
- 1n Aplite, pegmatite dikes
- 1p Diorite, quartz diorite
- 1q Trondhjemite
- 1r Granodiorite, quartz monzonite
- 1s Monzonite, quartz monzonite
- 1t Porphyritic monzonite, quartz monzonite
- 1u Granodiorite, trondhjemite (weakly foliated)
- 1v Porphyritic granodiorite
- 1w Massive quartz monzonite
- 1y Porphyritic quartz monzonite to granite

Δ Δ	Breccia	Fe	Iron staining
My	Mylonite	no/oc	No outcrop
C C	Carbonatized	Bldrs	Boulders
Sil	Silicified	G	Geophysically interpreted (precedes unit number)
H	Hornfels	D	Data from diamond-drill hole
Gos	Gossan		

[a]*This is a field legend and may be changed subsequent to laboratory investigations. Not all units in the legend may be present. Where a rock-unit code is followed on the map face by a second code in brackets, the second unit occurs within the first. Many drill holes, pits, trenches, and all surveyed claims were deleted due to lack of space.*

[b]*Greater than 50% carbonate minerals.*

[c]*Greater than 50% silicate and oxide minerals.*

[d]*Colour index 20 to 40.*

[e]*Colour index 10 to 25.*

[f]*Transitional porphyritic to nonporphyritic.*

[g]*Associated with mafic intrusive rocks.*

[h]*Iron formation is commonly used to designate a chemical sedimentary rock containing at least 15% iron of sedimentary origin. An ironstone is a chemical sedimentary rock which contains 33% or more of the common iron minerals by volume, exclusive of commonly associated interbeds of chert or clastic sedimentary material.*

[i]*Doré-type conglomerate.*

[j]*Green mica may be present.*

[k]*May be intrusive in part.*

[l]*Greater than 5% quartz.*

[m]*Possibly contemporaneous with unit 7.*

[n]*May be of Proterozoic age.*

[p]*This is a lithologic, not a stratigraphic, legend, and unit numbers do not necessarily reflect age relationships. The legend was established in 1979 for a multi-year program to map the Michipicoten greenstone belt, and has been retained for continuity. In Finan Township, the intermediate to mafic metavolcanics (Unit 2) are younger than the intermediate to felsic metavolcanics (Unit 3). Uranium-lead isotopic ages (Turek et al. 1982, 1984) indicate that the external granites are younger than the supracrustal rocks.*

SOURCES OF INFORMATION

Base map derived from maps SMC 15653 and SMC 15654 of the Forest Resources Inventory, Lands and Waters Group, Ontario Ministry of Natural Resources, scale 1:15 840.

Files of the Resident Geologist's office, Sault Ste. Marie.

Records of Algoma Steel Corporation Limited (formerly Algoma Ore Properties Limited), Sault Ste. Marie.

Files of the Assessment Files Office, Algoma Central Railway (ACR), Sault Ste. Marie.

ODM–GSC aeromagnetic map 2207G, scale 1:50 000.

OGS geological compilation Map 2220, scale 1:50 000.

Magnetic declination approximately 7°04′W in 1985.

Geology not tied to surveyed lines.

CREDITS

Geology by R.P. Sage and assistants, 1983 to 1987.

To enable the rapid dissemination of information, this map has received only a cursory edit. Discrepancies may occur for which the Ontario Geological Survey does not assume liability. Users should verify critical information.

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Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:

Sage, R.P. 1990. Precambrian geology, Jacobson Township; Ontario Geological Survey, Preliminary Map P.3170, scale 1:15 840.