Map No. 36a
MICHIPICOTEN AREA

PROVINCE OF ONTARIO
DEPARTMENT OF MINES

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NOTES

INTRODUCTION

The Michipicoten gold area lies at the east end of Lake Superior and a few miles southeast of Michipicoten Harbour. Sault Ste. Marie, by air-line, is 100 miles to the south. Wawa station on the A.C.R. and Michipicoten Mission are the starting points for the principal gold finds, which are easily reached by road.

The gold-bearing series of rocks have been so carved by long erosion that they now form a fairly flat peneplain. Large water powers are located where the Michipicoten and Magpie rivers make their sudden descent from this upland plain to lake level at points a few miles inland from Lake Superior. On the north, west, and south steep, rocky slopes border the level gold area.

The first gold was found on Mackey point on the south shore of Wawa lake in 1897. A wave of prospecting soon followed which resulted in the finding of additional gold-quartz veins, also the Helen and Magpie iron mines, and later the pyrite and gold deposits at Goudreau.

In 1925 and 1926 exploration south of Wawa lake has aroused new interest in this gold field. Many claims have been staked and a large amount of surface work is being done as well as diamond drilling. Attention is being given to gold-bearing shear zones that were overlooked in the earlier days when the mining of large, gold-bearing quartz veins was the practice. Many obstacles in the way of the early miners have been removed by improvements in prospecting, mining and milling. Hydro-electric power is also available.

The Grace and Minto veins are being further explored underground and an ore shoot of good volume has been proved in the Jubilee Lake break. Drilling has shown favourable structure and gold, at a vertical depth of nearly 600 feet, on the Minto vein. A cross-cut from the new Minto shaft has encountered commercial ore at 320 feet.

At present the gold area is chiefly contained in Township 29, Range 23 of the District of Algoma; being bounded by Lake Superior on the west, Wawa lake on the north, and the Michipicoten river on the south. Future prospecting may push the gold discoveries further east and south.

The geology resembles that of other gold camps in Northern Ontario, since basic Keewatin lavas are intruded by massive granitoid rocks of intermediate composition which are accompanied by dikes of quartz porphyry. The gold-quartz veins are closely related to this porphyry.

ACCESS

The principal gold finds can be reached either by road from Wawa station on the Michipicoten Harbour branch of the A.C.R., or by road from Michipicoten Mission where a steamer from Sault Ste. Marie calls weekly for passengers and freight. The numerous roads and trails make the use of canoes unnecessary. These roads are shown on the map. General supplies, mail and express service are available at the Mission and Wawa City.

ROCKS

The rock formations, starting with the oldest, are as follows: Keewatin, Laurentian, Timiskaming, Algoman, and Keweenawan.

The Keewatin consists of old and altered basic volcanic flows, together with a small volume of agglomerate, tuffs and iron formation. The tuff horizons are largely confined to the vicinity of the Helen iron range and the Doré sediments as the north of the area. Several beds of Keewatin agglomerate were found in the gold area, which served to show that the original strike of the Keewatin volcanics was probably N.E.-S.W. In some places the Keewatin lavas have been recrystallized by the Algoman intrusives, so that they resemble diorites, while in other places they have been changed to amphibolites.

Archean rocks have not been positively identified in this area. There is a probability that they are represented by boulders in the Doré or Timiskaming conglomerate.

The Doré or Timiskaming-like rocks are highly folded and altered sediments of a mechanically prepared nature lying northwest of the gold area. They consist of arkose, greywacke and conglomerate beds that strike N.E.-S.W. These sediments resemble in structure and composition the lower Huronian or sp-Archean sediments found about the north shore of Lake Superior. The significance of these sediments in this gold area is that their folding is probably due to the intrusion of a mass of Algoman granite, the gold-bringing rock in Ontario. As proof of this the islands off the mouth of the Doré river, made up of these sediments, are cut by dikes of massive granite.

The Algoman intrusives are important since they are the gold-bringers. In this area they are of intermediate composition, consist of porphyrite, quartz diorite, quartz monzonite and granodiorite. Chemically they contain more soda than potash. No aplite or pegmatite dikes were seen. The youngest acid intrusive is a granodiorite porphyry with opalescent quartz phenocrysts, known locally as "taploca porphyry." The lamprophyre dikes cut the gold-quartz veins, but are older the the diabase dikes. Some of the lamprophyres are rich in biotite while others have more olivine than biotite.

The granodiorite porphyry has a finely crystalline ground mass and consists essentially of acid plagioclase, quartz and biotite. The majority of the gold-quartz veins are closely associated with this rock. The analysis of a quartz porphyry dike that borders a gold-quartz vein is as follows:

SiO_2	Al_2O_3	FeO	Fe_2O_3	TiO_2	CaO	
67.91	14.25	2.12	0.58	0.38	2.52	= 99.92 per cent.
MgO	K_2O	Na_2O	H_2O	CO_2	Fe S.	
1.52	2.35	4.18	1.33	2.67	0.11	

Diabase dikes are not numerous in the gold area, but several appear on the Norwalk, Grace and Minto groups. In general these dikes are narrow and trend N.W. They are mainly quartz-bearing, and have not the usual fresh, olive-green speckled appearance of ordinary Keweenawan diabase. At the Helen iron mine the diabase dikes have played a part in the secondary concentration of iron ores.

DRIFT AND DRAINAGE

The drift cover is thin, excepting in the valleys of Wawa lake and the Magpie and Michipicoten rivers. There are few navigable streams, and canoes are not required because of the numerous roads. Some fine trout fishing can be had in Wawa and Firesand creeks.

STRUCTURE

As in an oil field, the rocks in a gold field are only of commercial importance where favourable structures are found. In a gold field these structures are faults and shears, the existence of which may be shown on the surface by fault scarps or linear cliffs; by linear features in the rocks caused by faulting which has brought rocks of different resistance to erosion together; by streams following fault lines or zones of shear; by direct evidence of shearing or brecciation; by the finding of fault gouge or clay; by striations on fracture surfaces; by displacement of dikes and veins; by the rusting of sulphides in a mineralized break; by the finding of vein quartz or intrusive porphyry dikes, and by erosion along lines of crustal weakness.

The Michipicoten gold area shows two pronounced lines of rock weakness, one set strikes N.W. and the other N.E. Both sets contain gold-bearing veins. The vein fissures, in places, have been localized by roof pendants of Keewatin chlorite schist, which were held in a frame of rigid dioritic rocks. When thrusting and faulting came fissures developed along the junction of these strong and weak rocks. A number of faults, barren of gold, have been formed along lamprophyre dikes.

The intersection line of the two main sets of fissures pitches southward, and this feature probably controls the pitch of the ore shoots.

MINERALIZATION

The gold mineralization is of the deep zone and high temperature type, as shown by the pyrrhotite, tourmaline, arsenopyrite and biotite in the gold-quartz veins and wall rocks.

The quartz in many of the veins is highly granulated, and slivers of schist in the veins have been selectively replaced by vein sulphides which are, in the order of their deposition: arsenopyrite, pyrrhotite, pyrite, sphalerite, galena, and chalcopyrite. The vein quartz in places is of two generations and the vein sulphides are usually fractured. Arsenopyrite is more common from the Grace mine southward.

Tourmaline is found throughout the camp in and near the gold-bearing veins. Biotite shows in the wall rocks of the veins, but where the vein solutions have been more intense the biotite has been bleached to sericite.

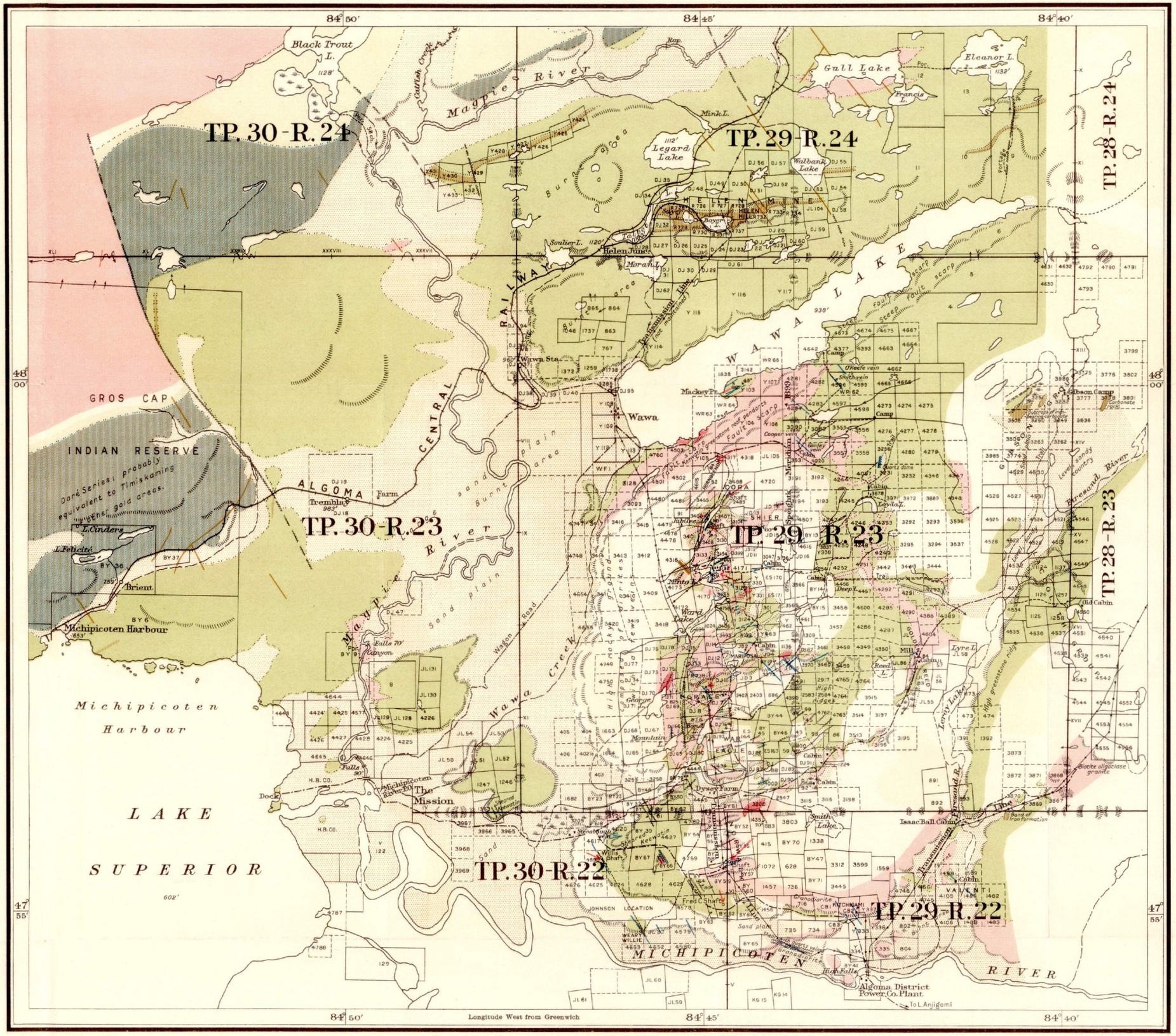
The gold-quartz veins are mostly fissure veins, with steep dips, but small lenticular veins in shear zones may constitute the ore.

Pyrite and chalcopyrite are the best companion minerals to gold, as determined by assay tests on the various sulphides.

The wall rocks of the better veins show the effects of the potash-rich vein solutions; this is reflected in the change of chlorite to the potash-bearing micas, biotite and sericite.

IRON ORE

The largest proved body of siderite iron ore in Ontario is situated in the Helen iron range, east of Boyer lake, and at the north of the area. This ore body is estimated at 100 million tons.



LEGEND

Unexamined.

Overburden.

PRE-CAMBRIAN.

Keweenawan

Diabase dikes.

INTRUSIVE CONTACT

Algoman

Quartz veins.

Acid porphyry related to the gold quartz veins.

Quartz diorite, quartz monzonite, granodiorite, granite, lamprophyre.

INTRUSIVE CONTACT

Doré Series

Clastic sediments, probably equivalent to the Timiskaming of other gold areas in Ontario.

UNCONFORMITY

Keewatin

Iron formation, chiefly iron-rich carbonate.

Sheared volcanics.

Volcanics and basic schists.

Symbols

Hill.

Swamp.

Trail or portage.

Road.

Building.

937′ Elevation in feet above sea level.

Strike and dip.

Geological boundary, defined.

Geological boundary, assumed.

Shaft.

Fault or shear.

NOTE

Township 29, Range 22, and Township 26, Range 24, form part of the Algoma Central and Hudson Bay Railway Land Grant.

SOURCES OF INFORMATION

Plans of Township Outlines and Mining Claims from Surveys Branch, Department of Lands and Forests, Ontario, and from Algoma Central and Hudson Bay Railway.

Map No. 1972, Michipicoten Area, Geological Survey of Canada, by W. H. Collins and E. Thomson.

Geology of the gold area by T. L. Gledhill, 1926.

Drawn for photo-lithography by A. Braidwood.

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DISTRICT OF ALGOMA, ONTARIO

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Scale $\frac{1}{47520}$ or ¾ Mile = 1 Inch

Chains 80 40 0 1 2 3 Miles

Metres 1000 0 1 2 3 4 Kilometres