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BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

**IGNACE SHEET, SOUTHWEST QUARTER,
KENORA DISTRICT, ONTARIO**

BY

T. L. Tanton

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Illustration

Map. Ignace sheet, southwest quarter, Kenora District,
 Ontario.

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By T.L. Tanton

INTRODUCTION

The southwest quarter Ignace map-area is bounded by longitudes $91^{\circ}00'$ and $92^{\circ}00'$ and latitudes $49^{\circ}00'$ and $49^{\circ}30'$ and occupies an area of about 1,550 square miles in Kenora District.

The area is crossed by the main line of the Canadian Pacific Railway and by a highway forming part of the projected Trans-Canada highway. Other parts of the map-area can be reached from the highway and railway over branch roads and canoe routes. The principal settlement and outfitting point is the town of Ignace which lies 147 miles northwest of Fort William.

Field work, during the field season of 1937, was carried on by a party under the charge of L.F. Kindle.

Pioneer geographical and geological work in this area was done by William McInnes of the Geological Survey in 1898 and 1899. The results of his work appear in the reports of the Geological Survey for those years and in the Ignace sheet, a geological map, scale 1 inch to 4 miles, published in 1906.

Brief notes regarding features of geological interest near Ignace are given in reports of the Ontario Bureau of Mines for 1894 and 1902 by A.P. Coleman, and for 1897 by W.A. Parks.

GENERAL GEOLOGY

The area is underlain by Archaean (Early Precambrian) rocks that were classified by McInnes in two main groups, namely, Keewatin, consisting chiefly of altered sediments and lavas, and a younger group of batholithic intrusives composed of granite and related rocks. Proterozoic (Late Precambrian) rocks are represented in the area by a few diabase dykes believed to be of Keweenawan age.

Unconsolidated rocks of Pleistocene and Recent age overlies the solid rocks and form a mantle of variable thickness over a considerable part of the area.

Keewatin

Rocks of the Keewatin group underlie a number of areas having a combined area of somewhat more than 200 square miles. Two of the areas are much larger than the others. One of these appears to be the eastern termination of a belt of Keewatin that extends for over 100 miles easterly from Lake of the Woods; it has a width of about 7 miles at the northwest corner of the map-area, south of Raleigh, and has been traced southeast for 20 miles, beyond which a continuation of the eastern part of the belt, about 1 mile wide, has been traced in an easterly direction for about 10 miles. About 20 miles southeast of this belt another large belt is present and it extends across the southeast part of the map-area with a length of 20 miles and an average width of about $4\frac{1}{2}$ miles. It continues easterly beyond the map-area for 25 miles to the vicinity of Upsala and in a southwesterly direction it extends for 80 miles to Rainy Lake. Between the two, large, belt-like areas are several lenticular areas of Keewatin up to a few square miles in extent. They trend in various directions approximately parallel to the schistosity strike of the component schists. One small belt at the eastern border of the map-area 8 miles northeast of Martin station trends north-northwest; a southeasterly extension of this belt possibly continues through an unexplored area about 6 miles wide to Oscar Station on the Canadian National Railways where hornblende and mica schists occur.

The group of rocks classified as Keewatin comprises greenstones and green schists, believed to be altered lavas of intermediate and basic composition, with at some places identifiable volcanic rocks such as ellipsoidal andesite, tuff, and agglomerate. Interbanded with these are banded mica schists and sediments, including slate, greywacke, impure quartzite, and iron formation. At some places the strata have been replaced or intruded by small bodies of amphibolite and metadiorite, at other places by felsite and quartz porphyry, and at other localities by bodies of ferruginous carbonate. At a few places in the belt south of Raleigh the relative ages of some members have been determined, but no general conclusions can be made as to the stratigraphic sequence. Evidence of intense folding is everywhere manifest by the stratified members and it may be inferred that the assemblage as a whole has been folded.

South of Raleigh altered sedimentary rocks markedly preponderate in several areas. In these areas the assemblage of banded, mica schists and other altered sediments resembles rocks of the Couchiching series of Rainy Lake area; the greenstones that occur in small masses in these areas are not identifiable as lavas and they may be intrusives.

Post-Keewatin

The greater part of the area is underlain by post-Keewatin intrusives. They surround and intrude the areas of Keewatin rocks and range in composition from granite to gabbro. Intimately associated with them are gneissic rocks that vary in texture, composition, and internal structure.

The Keewatin rocks close to the contacts with the larger intrusive bodies have been highly altered, in most places have been changed to hornblende and biotite schists. Farther away from the edges of the larger intrusive bodies and about the smaller intrusive masses, chlorite and sericite schists have developed in many places, and ferruginous carbonate and siliceous replacement bodies have been developed.

The intrusives are, in the main, an assemblage of hornblende and biotite granites and granite-gneisses that vary much in composition and general appearance even within small areas. No large area has been found to consist of a single rock type.

At a few places along the railway, areas of massive, grey, biotite granite have been found. The rock is sufficiently uniform in texture and composition and possesses other properties such as make it suitable for commercial uses.

All the intrusives are later than the Keewatin. It is not known whether they were formed during one, or more than one, period of batholithic invasion.

Keweenawan

Three-quarters of a mile west of Raleigh station a 100-foot vertical diabase dyke strikes northwest and cuts both granite and Keewatin rocks. A diabase dyke 150 feet wide is exposed on a small island near the south shore of Lumby Lake. Other diabase dykes less than 20 feet wide were observed 400 feet north of a point on the Canadian Pacific Railway, 4 miles west of Raleigh cutting Keewatin greenstones and on the shore of Leach Lake cutting granite.

The diabase in these dykes is fresh looking, and lithologically similar to intrusives of Keweenawan age that occur in Lake Superior region.

ECONOMIC GEOLOGY

Granite for structural purposes and ornamental building stone has been produced from quarries adjacent to the railway in this area. Quarrying was carried on by the Canadian Pacific Railway prior to 1900 and the stone was found suitable for bridge piers and other structures along the railway. Subsequent to 1913 quarries have been opened by other interests and stone for a variety of commercial uses has been produced. The quarries now in operation appear to be capable of maintaining the industry at the present rate of production for many years. Massive granite, though less abundant than granite-gneiss in this region, underlies areas of many square miles; and within these areas it is possible that granite suitable for building and ornamental purposes may be found, at localities additional to those now known.

There has been no production of metallic minerals. Occurrences of gold, molybdenite, and copper have been found. Most of the reported mineral occurrences are in the largest Keewatin belt south of Raleigh. Evidence of early prospecting was observed in the Keewatin area extending east from Red Paint Lake. The numerous, small, detached Keewatin areas have not, so far as known, attracted the interest of prospectors. The narrow area at the east boundary of the map-area northeast of Martin may be continuous with sulphide-bearing Keewatin rocks, at Oscar Station, some 14 miles east of the map-area, that were being prospected in 1936 and 1937.

Occurrences of garnet and graphite have been observed in the Keewatin schists and small outcrops of iron formation occur in the Keewatin on Pine and Norway Lakes. The known occurrences do not contain valuable minerals in sufficiently concentrated form to be of economic interest.

Quarries

Horne Granite Quarries

On a group of five mining claims, K 501, 562, 563, 599, 560, adjacent to and south of the Canadian Pacific Railway right of way at Butler, quarrying has been carried on by the owner, Wm. Horne, since 1915. Excavations to depths of 20 feet or less have been made at three places. On the property, in addition to quarrying equipment, there was in 1937 a building adjacent to the railway siding, in

which the stone was dressed. The products from these quarries are marketed in Winnipeg and Fort William as paving blocks, building stone, and monumental and ornamental stone. In 1936, as reported by the Dominion Bureau of Statistics, the company produced monumental and ornamental stone as follows: rough, 143 tons valued at \$1,434 and dressed, 10 tons valued at \$334.

This quarry has been developed on knolls of granite in part covered to a depth of 2 feet or less by sand and gravel. The rock exposed in the quarry is a pale grey, medium-grained biotite granite, for the most part homogeneous and massive. Sparsely distributed through the rock are indefinitely bounded masses, up to a few inches in diameter, of granite richer in biotite than the main mass. A system of nearly horizontal joints occurs in the granite.

Horne Quarry, Ignace

A quarry 2 miles northwest of Ignace, on property lying adjacent to and north of the Canadian Pacific Railway right of way, was operated by Wm. Horne from 1913 to 1915, for the production of paving blocks.

Gummesson Quarry

On mining claim K 3702, one mile north of Butler Station, development work has been carried on since 1935 by the owner, A. Gummesson of Butler, with a view to opening a quarry. On a hill that rises about 40 feet above the adjacent lowland a considerable amount of stripping has been done and test pits have been sunk at two places. Fifty cubic feet of stone valued at \$50 was sold in 1937.

The property is underlain by massive, medium-grained biotite granite, exhibiting pale grey and pink varieties that merge into one another. At test pits the rock consists chiefly of pale grey granite that is traversed by a system of joints dipping at very low angles toward the north.

Bonheur Quarry

The Bonheur quarry is on the southern side of a hill one-quarter mile northwest of Bonheur Station.

Prior to 1932 the quarry was owned and operated by the Canadian Pacific Railway for the production of rock ballast. Excavations were made at three adjacent localities at different

elevations; the lowest of these measures approximately 100 feet long, 66 feet wide, and 30 feet deep; adjoining it at a somewhat higher elevation on the northwest is an excavation 130 feet square and 30 feet deep; and above and west of this is one 200 feet long, 160 feet wide, and 15 feet deep. After 1932 the operation ceased; the railway siding, power house, and two rotary rock crushers were dismantled; in 1937 there were no buildings on the property.

This property is underlain by granite in which there are inclusions of Keewatin schists. The hill on which the quarry was opened is for the most part covered with a thin deposit of till which, adjacent to the workings, is about 2 feet thick. The rock in the quarry consists for the most part of grey, hornblende granite-gneiss; irregularly distributed through it and prominently exposed in the northern part of the workings are platy inclusions of hornblende schist, which locally contain zones rich in garnet. The foliation of these rocks strikes east-northeast and dips 75 degrees south. This assemblage is cut by red pegmatite dykes up to a few inches in width; some of the dykes are parallel to the foliation and others horizontal.

Mineral Properties

McClure Claims

Mining claims K 5349 and K 5350, lying about $7\frac{1}{2}$ miles south of Ignace, are owned by A. McClure of Ignace. Following a discovery in 1924 of sulphides, exploratory work was carried on, and by the end of 1931 seven test pits had been sunk. The largest of these measures 27 feet by 8 feet and is 7 feet deep. The others are relatively small and are between 1 and 3 feet deep. There are no buildings on the property; work was not in progress in 1937.

The property is underlain by Keewatin greenstones and intercalated sediments that strike east and dip south at steep angles. On the eastern half of claim K 5349 narrow dykes of aplite and pegmatite and two quartz veins are exposed cutting the strata and striking north 30 degrees east and dipping vertically. One quartz vein occurs in sediments parallel to the stratification. Mineral deposits, on which gossan has developed at the surface, occur locally in some of the veins and dykes and in the Keewatin rocks adjacent to them.

In the main pit, which is about 70 feet west-southwest from the No. 1 post of claim K 5349, a quartz vein about 1 foot wide strikes east and is exposed for a length of 40 feet, cutting quartzite parallel to its stratification. The vein is well mineralized with disseminated molybdenite, which in the greater part of the exposure makes up about 2 per cent of the volume of the vein material. Small amounts of wolframite and pyrolusite are also said to occur in this vein. Adjacent to the vein in an area about 30 feet long and 15 feet wide, there is a sulphide replacement body altered at the surface to gossan. In this deposit chalcopyrite occurs in small amount intimately associated with pyrite, pyrrhotite, and magnetite.

A sample of the sulphide-bearing rock at this locality was assayed by the Bureau of Mines, Ottawa, for gold and found to contain a trace.

About 500 feet southwesterly from the main pit, a pink pegmatite dyke about 1 foot wide and traceable for 30 feet strikes northeasterly and dips vertically. The dyke contains disseminated flakes of molybdenite in small amount. A similar dyke is exposed 200 feet farther south. In the area between these two dyke exposures are three outcrops each a few yards in diameter, capped with gossan. Test pits and strippings on all of these have exposed amphibolite, locally magnetite-bearing and garnetiferous, and cut by narrow quartz veins striking east-northeast, carrying disseminated grains of pyrite, pyrrhotite, and small amounts of chalcopyrite.

Olson Claims

A group of three mining claims, K 8586, K 8587, and K 8588, lies 8 miles south of Ignace and 1 mile southwest of the McClure prospect. It may be reached from the southern extremity of Second Lake by a trail 1 mile long leading east-southeasterly.

The property was staked in 1937 by the owner, Walter Olson of Ignace. Exploratory work includes some stripping and the sinking of a test pit 8 feet by 4 feet and 2 feet deep.

The claims are underlain by Keewatin schists and dykes of granite and pyroxenite. In the southwest quarter of claim K 8588 there is in an area of greenstones a zone $1\frac{1}{2}$ feet wide of graphitic schist striking north 78 degrees east and dipping vertically. A pyroxenite dyke, a few feet wide, occurs parallel to the graphitic schist along its north side and is terminated at its eastern end by a siliceous replacement body about 10 feet long and 8 feet wide. This body is mineralized with pyrrhotite and small amounts of chalcopyrite.

Mr. Olson reports that gold values up to \$2.75 a ton have been obtained from assays of the siliceous replacement body. A sample of the graphite schist is said to have shown upon analysis a graphite content of 14.2 per cent.

Ryan Claims

A group of four mining claims, K 6775, K 6777, K 8578, and K 8626, embraces an island and an area around the long west bay of Second Lake. The property is about 6 miles south-southwest of Ignace, from which place it is accessible by a canoe route that requires only one portage of 11 chains between Agimak and Second Lakes.

This property is, so far as known, the first in the area on which gold is reported to have been found and reference is made to it in a report by McInnes in 1898. Early workings on the property include three test pits, the principal one having a depth of 12 feet. There are no buildings. The owner in 1937 was M.J. Ryan of Ignace.

The greater part of the property is underlain by Keewatin hornblende and mica schists striking north-northwest and dipping at steep angles westerly. These rocks are cut by narrow dykes of felsite and granite that trend in various different directions. A small area in the northern part of the property is underlain by granite.

Near the northern part of the island the hornblende and biotite schists have been locally deformed with a development of schistosity striking northeast and dipping vertically, and in an area 20 feet long and with a width varying from a few inches up to 6 feet the schists have been brecciated and subsequently cemented with vein material. The latter consists of quartz irregularly mineralized with pyrite, pyrrhotite, and small amounts of chalcopyrite. Assays of this material are said by Mr. Ryan to have yielded low values in gold, thus confirming the early report quoted by Mr. McInnes.

About 3,000 feet south of the above-mentioned locality and on the west shore of the lake there is a test pit 6 feet by 4 feet and 2 feet deep. In, and adjacent to it, biotite schists striking north-northwest and dipping 70 degrees westerly are cut by a few narrow lenses of quartz mineralized with pyrito.

About 225 feet farther south, and close to the shore, there is a pit 20 feet by 8 feet and 12 feet deep. Here, hornblende-chlorite schists, striking north-northwest and dipping 65 degrees westerly, are cut, parallel to the foliation, by a dyke of red felsite. A quartz vein 5 feet wide, carrying disseminated, coarsely crystalline pyrito, occurs adjacent to the felsite dyke along its eastern side; and the schists in a zone 4 feet wide adjoining the vein on the east have been mineralized with pyrite. The quartz vein is said to have yielded low assays in gold. A sample assayed by the Bureau of Mines, Ottawa, contained a trace of gold. The mineralized rock at this locality was tested for platinum with negative results.

Sandford Lake Gold Syndicate

A group of six mining claims, K 6681, K 6899, K 7041, K 8100, K 8102, and K 8103, adjacent to the southwest bay of Agimak Lake and 5 miles southwest of Ignace, was held in 1937 by the Sandford Lake Gold Syndicate, of which H.S. Humphrey of Ignace is president. Exploratory work by test pitting and stripping was carried on in 1937 near the sites of workings made about 1930 by former owners.

The property is underlain by an assemblage of Keewatin greenstones and greenstone schists striking northwesterly and dipping at steep angles, and by a few dykes of felsite, granite, and pegmatite. A granite batholith occupies the adjacent area to the northeast.

Mineral occurrences that appear to lie in two linear zones, both trending west-northwest have been found at several localities. The eastern end of the northern one, which is $\frac{1}{4}$ mile long, is about $\frac{1}{4}$ mile north of the southern zone, which is nearly $\frac{1}{2}$ mile long.

At the most westerly occurrence in the northern zone molybdenite is disseminated in small amount through a pegmatite dyke a few feet wide traceable for 60 feet trending north 80 degrees east. About 300 feet east-southeast from this there

is an outcrop 50 feet long and 20 feet wide composed of rhyolite or felsite mineralized with pyrrhotite and capped at the surface with gossan. About 450 feet east-southeast from the above a test pit has been sunk on a quartz vein 8 feet wide striking east-southeast and dipping 55 degrees southerly, in which there are locally numerous, crystalline aggregates, up to 1 inch in diameter, of zinc blende, and small quantities of galena and molybdenite. A sample from this vein assayed by the Bureau of Mines, Ottawa, yielded a trace of gold and 0.185 ounce silver to the ton. The rhyolite or felsite exposed in the pit is mineralized, for a width of a few feet adjacent to the vein, with disseminated grains of pyrite and pyrrhotite.

About 400 feet east-southeast from the pit there is an outcrop about 30 feet in diameter of silicified schistose greenstone mineralized with pyrite and coated at the surface with gossan.

The areas between the several mineral occurrences are drift-covered.

The most westerly occurrence in the southern mineralized zone is of pyrite and pyrrhotite in a quartz vein about 3 feet wide traceable for 30 feet. Assays showing 0.1 ounce gold to the ton are reported.

About 400 feet east-southeast from this occurrence there is an outcrop 15 feet in diameter capped with gossan.

About 650 feet east-southeast from the above there is a small outcrop of greenstone cut by an intrusive mass of felsite. In the latter adjacent to the contact there is a pyrite-bearing, siliceous replacement body 5 feet wide traceable for 25 feet.

About 1,200 feet east-southeast from the above and in the southeast quarter of claim K 8100 an area 80 feet east and west by 15 feet north and south has been stripped. Near the middle of this, a porphyry dyke 2 feet wide strikes north-northwest and contains disseminated flakes of molybdenite. Adjoining the dyke on the east and west is a mass of felsite carrying disseminated pyrite and pyrrhotite. In a schistose zone a few feet wide striking northwest in the felsite 20 to 30 feet west of the dyke the prevailing sericitic schist contains locally epidote and garnet, and is irregularly mineralized with disseminated grains of pyrrhotite and pyrite and small amounts of zincblende and galena.

Mineral Occurrence at Oscar

Oscar Station on the Canadian National Railways in Thunder Bay District lies a few miles east of the map-area and 19 miles easterly from Martin Station on the Canadian Pacific Railway.

According to Mr. Edward Stinson of Fort William a discovery of mineralized rock was made at this place in 1907. The Grand Trunk Pacific Railway was then under construction, and, in blasting an excavation for a culvert foundation, rock was removed that contained metallic mineral. Some years later this find, then reported as an occurrence of silver, was brought to the attention of Mr. Robert Peck, an official of the railway, who found gossan and other evidences of sulphides in outcrops over an area extending for 500 feet south, and for 2 miles west, of Oscar.

In July 1936 Messrs. Gordon and John Willsie, prospectors, came to be associated with Mr. Peck, Mr. Stinson, and others, and staked the mineralized area, and proceeded with exploratory work.

By September 1937 a test pit 25 feet long, 10 feet wide, and 12 feet deep had been sunk on a mineralized outcrop about 300 feet south of Oscar Station; and some stripping had been done in the vicinity. The mineralized rock was sampled and analysed. Some observations with a dip needle were made over and adjacent to the mineralized area.

The rock in the vicinity of the test pit is capped to a depth of 18 inches with gossan, below which there is a rock assemblage abundantly mineralized with pyrrhotite. The rock assemblage consists of garnetiferous biotite schists traversed by dykes of biotite granite-gneiss and masses of a non-foliated micaceous hybrid rock consisting chiefly of coarsely crystalline biotite with local nodules of quartz and foldspar. These several rocks are irregularly and locally richly mineralized with sulphide minerals, chiefly pyrrhotite and some pyrite and small amounts of chalcopyrite. The rocks, both where mineralized and unmineralized, are traversed by a few irregular veinlets of quartz that contain disseminated grains of the same sulphides.

A local magnetic disturbance is said to have been observed over the exposed pyrrhotite-bearing rocks. A local attraction stronger than that at the pit is reported to exist at a drift-covered locality 500 feet south of the pit.

The results of analyses as reported in 1937 indicate that no body of commercially valuable ore has been encountered. At the several places sampled in the restricted area near Oscar it is said that copper is invariably present, and at some of the places there are also small amounts of nickel, lead, zinc, and silver.

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