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GEOLOGY OF THE LAKE ALBANEL, PLATEAU LAKE AREA

GEOLOGY OF THE LAKE ALBANEL - PLATEAU LAKE AREA

(MAP AREA 1)

Introduction

The map area comprises 60 mining claims staked under Certificates 24946-949, and 25601-608, plus 30 mining claims staked under Certificates 29876, 29880-882, 29896, and 29900; all lying within portions of Townships 1530, 1531, and 1631 in the District of Mistassini, Province of Quebec. It extends from the northeast shore of Lake Albanel to a point approximately midway between that lake and the Temiscamie River.

Access to the area is by air or canoe route. The canoe routes from Oskalaneo or from the Lake St. John district are long and time-consuming so that air travel is the most feasible method of reaching the area at the present time.

The area shown in Map Area 1 was prospected and surveyed in conjunction with adjacent groups of claims to the southwest and southeast during the months of June-September, 1947.

Stripping and trenching were carried out where good rock exposures were seen. Prospecting was done along claim lines and at many intermediate points and contacts between members

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of the iron formation were traced until they disappeared under low-lying ground. A closed picket line was run as shown on the geologic map and located by the government survey markers established on the shore of Lake Albanel. The position of the claim lines was located relative to the picket line and it was noted that the running of the claim lines had been extremely erratic due no doubt to the magnetic deflection of the compass caused by the magnetite-bearing member of the iron formation. Rock exposures are numerous throughout the map area except in the low swampy ground southwest of Plateau Lake.

Physical Features

The northeast shore of Lake Albanel in Map Area 1 is part of the arcuate shoreline of that lake. Within one quarter of a mile of the shore the land rises in a series of westward-facing cliffs with well developed talus slopes, the whole constituting a cuesta whose summit is about 250 feet above the surface of Lake Albanel. From the summit the land surface slopes gently southeast conforming to the dips of the underlying members of the iron formation. At Plateau and Kallio faults westward-facing cliffs 60-100 feet in height were found. West of the Plateau fault the ground is low and generally swampy; this portion contains Plateau Lake, the largest lake of this plateau area.

Glacial features are not numerous in Map Area 1. A few sand ridges and some moraine deposits were noted. A boulder deposit near the shore of Lake Albanel is probably an esker but may have been deposited as crevasse filling. Glacial striae are numerous and show that the ice moved in a direction S.25°W. Striae were seen trending obliquely upward on the cuesta face.

The drainage is subsequent and the course of the streams generally follows the strike of the rock formations.

Bedrock Geology

All the rocks in Map Area 1 are Precambrian in age and the Mistassini Series, of which they form the upper formations, is considered to be Upper Huronian in age.

The oldest rock is the grey crystalline Upper Albanel dolomite. The dolomite is fine grained and well-bedded. The color of the rock is generally light-grey on fresh fracture and it weathers grey to buff. Cherty quartz seams follow bedding planes and weather out as projecting ledges. A few cryptozoon layers occur as well as other convex-upward structures which are interpreted as due to crumpling during contemporaneous deformation. The contact with the overlying formation is marked by a disconformity; minor folds in the dolomite are truncated by the basal quartzite.

The Temiscamie Iron Formation overlies the Upper Albanel dolomite above the disconformity. It is a thick formation divisible into seven easily recognized rock types. The formation as a whole resembles the Animikie of the Lake Superior region and it is tentatively classified as of the same age. Except for the basal member, the formation consists principally of quartz and ferriferous carbonate and a marine origin is suggested. Some repetition of members was noted and in some places certain members were found to be missing. The thickness and the extend of the individual members appears to very and therefore the thickness and distribution was probably affected by local conditions of deposition.

The basal member (1) has a thickness of 15-30 feet and it consists of ferruginous quartzite. In general this rock is grey in color and is massive to well-bedded. The bedding where seen is well preserved and indicates a clastic origin. Angular grains of quartz and feldspar can be seen and the cementing material appears to be limonite. At a few localities a basal conglomerate was seen consisting of fragments of the dolomite and nodular masses of blue chert enclosed within the quartzite. Midway in the member a pebble conglomerate 3 feet thick was observed.

The pebbles are well-rounded quartzite from ½ to 1 inch in diameter. At the top of the member a band of boulder conglomerate several feet thick was seen. This band is probably of local extent as it was seen in only one place. The boulders are of quartzite and are elongated with well-rounded edges. At a few places the quartzite is brecciated and recrystallized.

Massive to laminated ferruginous slate (2) overlies the quartzite, but locally a few feet of chloritic sandstone appears to lie above the quartzite and in a few places the silica-iron carbonates were found at this horizon. As seen under the microscope the ferruginous slate consists of limonite, antigorite, and very minor amounts of colloidal quartz. Laminations are from 1/8 to ½ inch wide. The color is reddish-brown to dark-brown and black. The thickness of the member is variable but averages about 20 feet. At the top it grades into a member composed of quartz and ferruginous carbonate.

The quartz-iron carbonate member (3) is a fine-textured aggregate of approximately equal proportions of quartz and iron carbonate. The rock is light- to dark-brown in color and it has a mottled appearance. It weathers brown with much limonite alteration. As seen in thin section the quartz is in particles from 0.005 to 0.2 mm. in diameter. Most of the siderite is altered to limonite. Northeast of Lac au Bout a member which is believed to be at the same horizon is composed of coarsely crystalline siderite. The thickness of the quartz-iron carbonate member probably nowhere exceeds 40 feet.

The above member grades into a magnetite-bearing rock (4) which appears to be of local distribution. On the cuesta face near the shore of Lake Albanel a thickness of about 30 feet is indicated. Elsewhere in Map Area 1 the thickness is not more than 10 feet. The member is first recognized by the appearance of thin seams of nearly pure magnetite occurring in the quartz-iron carbonate member. The seams are lenticular and vary from ½ inch to 2 feet in thickness. Above this lenticular type the magnetite occurs disseminated through the rock which then has a bluish tinge, but generally the rock is reddish in color due to an abundance of jasper. This latter type is a bedded aggregate of crypto-crystalline cherty quartz and magnetite. It may be described as taconite although in hand specimen the characteristic granule texture of the Animikie taconites is not pronounced and therefore "taconite" is used only to imply the otherwise close resemblance of this bedded jasper-magnetite member to the Animikie taconite formations. In thin section the rock is composed of approximately equal amounts of chert and reddish-brown iron oxide largely altered to magnetite.

The silica forms the groundmass and is probably of colloidal origin. The magnetite masses are irregular in outline and are probably aggregations of granules which can be seen only under high-power. These granules consist of reddish-brown hematite and others which may be iron silicate. A very siliceous iron carbonate type occurs locally and probably is a magnetite-poor facies of this member. In a few localities a black laminated ferruginous slate was found at about the same horizon; its relation to the ferruginous slates mentioned above is unknown.

Occurring above the magnetite-bearing member is one consisting of several transitional types (5). The lowest is composed of interbanded brown ferruginous slate and fine-grained iron carbonate. Above this a greenish to brown ferruginous type appears consisting mainly of siderite which on the surface is altered to limonite and hematite. The siderite in the unaltered portions ranges from a dark-grey massive rock to a coarsely crystalline yellow to brown one. In the massive variety the thickness in places is at least 6 feet. The degree of alteration is variable. A later type is composed of banded chert and hematite; the bands or seams vary from ½ to 2 inches in thickness. In places the chert is leached and the rock is composed of siderite, limonite and hematite. The total thickness of the member is not known as it forms the top of the plateau in the northwest portion of Map Area 1 and consequently much of it has been eroded. In the southeast portion, in the vicinity of Kallio fault, the thickness is at least 40 feet.

A coarse-grained cherty iron carbonate member (6), similar to (3) except in granularity, occurs above the sideritic member. Much of the carbonate appears to be altered to iron oxide which forms peculiar bladed crystals and casts. In places limonitic and hematitic nodules from ½ to 2 inches in diameter occur through the chert.

Isolated outcrops of dark chert (7) with minor amounts of iron carbonate were found in localities which suggest that they overly the above mentioned member although no contacts between the two were found.

The Kallio slate is a thick formation of black ferruginous slate showing little bedding but a well-marked cleavage. The formation is composed of angular fragments attesting to a clastic origin. It appears to be conformable, above the Temiscamie Iron Formation. The greywacke, argillaceous sandstone, granitic, gneissic, dioritic and gabbroidal rocks do not occur within Map Area 1.

Structure

The rocks of the Mistassini Series were deposited without marked unconformity between formations. Deposition in an eroded basin, or post-deposition down-warping, determined the arcuate structure of the Series as a whole. The areal strike of N.40°E. reflects this structure. Dips are low to the east or southeast throughout the greater part of the Series. Within Map Area 1 the Upper Albanel dolomite dips 10° to the southeast and the iron formation dips about 4° to the southeast. In the southeast portion of Map Area 1 dips are greater due to later faulting.

At least two ages of folding are present in the district. East-west folds are believed to be the earlier. An eastward-trending anticline which is a conspicuous feature on the shore of Boulder Bay is considered to belong to the earlier period of folding. Several less conspicuous anticlines were seen further southwest along the shore of Lake Albanel outside of Map Area 1. The latest and most important folding is that associated with faulting in the disturbed contact zone between the Mistassini Series and the granites and gneisses to the east. These folds and faults parallel the contact zone and they are without doubt the result of the disturbance which brought these granitic and gneissic rocks into contact with the sediments. The intensity of the disturbance dies out to the northwest. The folding associated with this disturbance is marked by a northeast-southwest trending anticlinal structure immediately west of the Kallio fault. While not very apparent within Map Area 1, it and an accompanying syncline are well defined at the north end of Kallio Lake just outside the map area.

A series of parallel faults along the same axes as the later folding is clearly distinguished. The Kallio fault in particular can be traced throughout Map Area 1. The movement on this fault is not definitely known but the indicated dip separation is at least 500 feet. The basal quartzite (1) and the Upper Albanel dolomite underlying it are both exposed at the surface by the fault. The crescentic outline of the dolomite outcrop suggests that it is an upthrust segment of the Boulder Bay anticline. A study of the cleavage in the Kallio slate east of Map Area 1 indicates that the east side moved upward and northeastward relative to the west side. Observations on the Plateau fault are insufficient, due to a scarcity of outcrops, to determine with any accuracy the amount or direction of movement. It is believed that a hinge movement developed between the successive fault slices as adjacent slices have well-defined pitches in opposite directions, as shown on the geologic map.

At least one diverging or cross fault occurs just outside Map Area 1; this is a fault striking N.10°W. half a mile southwest of Gwynneth Lake and running into Kallio fault. It is marked by a conspicuous fault breccia and a topographic depression cutting obliquely across the regional structure.

Economic Geology

Within Map Area 1, iron ore is the only mineral of economic importance. The stripping, trenching, prospecting and large scale mapping of the geology has clarified the distribution and structure of the iron formation as a whole and has permitted a division into types which may be differentiated throughout the map area. Of these types or members, two might result in economic deposits; (a) the magnetite-bearing and locally taconitic member, and (b) the banded chert-iron carbonate and massive siderite member.

As described in an earlier part of this report the magnetite-bearing member has a variable thickness and a somewhat local distribution but portions of the member have an average thickness of 30 feet. Assays of representative grab samples from eight different outcrops have given the following average assay:

Fe	40.0 %
Mn	0.15
Ti	0.00
S	0.03
P	0.04
SiO_2	41.0

A 50-lb. sample made up from various parts of the deposit was assayed by the Department of Mines and Resources, Ottawa, and gave the following result:

Fe	50.0 %
Mn	0.10
S	0.02
P	0.01
SiO_2	28.5

Laboratory tests on this sample, by wet magnetic separator, produced a concentrate of 67.3% Fe and 7.5% SiO_2 at 75% - 65 mesh and also a concentrate of 70.1% Fe and 4.1% SiO_2 at 75% - 200 mesh.

Further testing by the Mines Experiment Station at the University of Minnesota of a 10-lb. sample indicates that crushing and grinding to approximately - 80 mesh would produce a concentrate assaying over 66% Fe. and approximately 8% SiO_2. The concentrate would be fine and require agglomeration.

Sampling by hand methods of such a magnetite-bearing member is a difficult task. A series of short drill holes could provide accurate samples and provide information on the true thickness of the member. The feasibility of beneficiating this taconite-type iron ore would also be demonstrated by the quality and tonnage revealed.

The sideritic member could give rise to important deposits of soft hematite ore by alteration of the original pure siderite beds and leaching of the silica content if the proper geologic conditions obtain. This could only be determined by geological mapping in great detail, preferably by plane-table, to accurately locate all outcrops; followed by an interpretation of the structure. With this information a program of diamond drilling could be planned to prove the existence of a hematite ore deposit in the most likely places as indicated by the detailed study of the structure.

The present maps of the area are entirely inadequate. As a preliminary to further detailed geologic mapping and/or drilling, aerial mapping of the area, to be followed by ground surveys, should be done to provide an accurate base map.

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I certify that this report and attached geologic map of Map Area 1 were written and prepared by me and that the assessment work performed on mining claims staked under Certificates 24946-949, 25601-608, 29876, 29880-882, 29896, and 29900 was carried out under my professional supervision.

Sworn before me at Amos
this 24th day
of September 1947.

Officer authorized to receive the oath