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Renseignements :

MARGINAL NOTES

LOCATION: The map-area, bounded by Latitudes 49°00' and 50°04' N and by the Quebec border and Longitude 80°00' W, comprises 4030 sq km in northeastern Ontario That part of the map-area which comprises surveyed townships is in the Larder Lake Mining Division and the unsurveyed part to the north is in the Porcupine Mining District. The map-area is north of Lake Abitibi and its centre is 169 km northeast of Timmins.

ACCESS: The southern part of the map-area is easily accessible by the Abitibi Power and Paper Company Limited's trans-limit road and auxiliary haulage roads. The trans-limit road connects with Highway 652 from Cochrane, 93 km to the west and directly with the mill in Iroquois Falls 95 km away. La Sarre, Quebec is 63 km east via the trans-limit road connecting with the highway through St. Lambert Desmeloizes, Quebec.

The northern part of the map-area can be reached by float-equipped aircraft and helicopters from Timmins and float-equipped aircraft from both Cochrane and La Sarre, Quebec. From Cochrane and La Sarre it is 134 km and 131 km respectively to Detour Lake in the north-central part of the map-area. From Detour Lake to Timmins it is 200 km.

MINERAL EXPLORATION: A gold discovery was reported on the Patten River in 1912 (Tanton 1919). The subsequent rush of prospectors failed to find any valuable deposits. Exploration activity has been sporadic since 1925 with increases in the late 1950s, mid 1960s recommencing in the early 1970s. Exploration has increased since 1974 with the announcement of a gold discovery by Amoco Canada Petroleum Company Limited north of Detour Lake.

The initiation of prospecting activity in 1925 was due to the discovery of copper-zinc mineralization at Normetal, Quebec. The rocks that appeared to be most favourable for prospecting for base metals then were the metavolcanics in Adair Township which are structurally and lithologically similar to those rocks exposed at the Normetal Mine. Exploration on these rocks has failed to discover any mineral deposits. Also examined were the mafic metavolcanics in Steele Township. In the early 1930s Cyril Knight prospected for gold on a group of claims along the Burntbush River in the southwestern quadrant of Noseworthy Township (Thomson 1936).

Much assessment work has been filed with the Assessment Files Research Office, Ontario Geological Survey, Toronto since 1957 (Johns 1978). Recently the exploration for base metals has been concentrated in: a) the isoclinally folded sequence of felsic to intermediate, mafic to intermediate, metavolcanics and iron-rich metasediments in Adair and Abbotsford Townships; b) the felsic to intermediate metavolcanics in Bradette, Noseworthy and Hurtubise Townships; and c) the interbedded felsic to intermediate, mafic to intermediate metavolcanics and metasediments in the vicinity of Vandette and Atkinson Lakes. Three deposits of economic interest have been discovered within the maparea. 1) In Steele Township a spodumene-bearing pegmatite has been assessed for its lithium and is held by Dex Limited (No. 13). 2) a low grade copper, nickel deposit was discovered in St. Laurent Township by Asarco Exploration Company of Canada (No. 6). 3) In the Detour Lake area (No. 4) Amoco Canada Petroleum Company Limited has outlined 10 million tons of 0.2 ounce Au/ton (a value of \$39.78 U.S. per ton as of the price of gold November 1978).

During the field season the following companies and individuals held claims within the map-area: Amoco Canada Petroleum Company Limited, Asarco Exploration Company of Canada Limited, C. Bertrand, G. Brissette, Dex Limited, Dome Exploration (Canada) Limited, Geophysical Engineering Limited, Hollinger Mines Limited, Hudson Bay Exploration and Development Company Limited, D. Maillet, and Noranda Exploration Limited.

GENERAL GEOLOGY: The map-area lies in the northern part of the Early Precambrian Abitibi Belt of the Superior Province. Tanton (1919) mapped the eastern edge of the area in 1914 and 1915. In the fall of 1917, Hopkins (1918) made a track survey of the La Reine (Okikodosik) and Patten Rivers. Thomson (1936) undertook a reconnaissance geological survey of the Burntbush River area in 1934. The townships of Steele, Bonis and Scapa were mapped by Lumbers (1962) at a scale of 1:15 840 in 1959. Hepburn Township and parts of Sargeant, Adair and Abbotsford Townships were mapped by Lumbers (1963) in 1960 at the same scale. In 1966 Bennett et al. (1967) mapped 1,680 km² which included the whole of the Burntbush Detour Lakes Area. The Twopeak Lake area, immediately adjacent to a part of the western boundary of the present map-area, was mapped in 1975 (Wilson et al. 1977).



The rocks in the map-area have undergone regional metamorphism of the almandine-amphibolite facies rank. The supracrustal rocks appear to be parts of two sequences, each with its own stratigraphy, separated by the major batholithic body found north of 49°35' N Latitude. The southern supracrustal belt is found from the southern map-edge to 49°35' N Latitude while the northern supracrustal belt is found from 49°45' N Latitude to the northern map-edge.

The southern belt appears to be part of a single-folded stratigraphic sequence intruded by intermediate to felsic intrusive bodies. This sequence, the base of which is not exposed, commences with mafic flows and mafic pyroclastic rocks and progresses upwards through felsic to intermediate flows, tuffs, lapilli-tuffs and minor interbedded metasediments intercalated with mafic metavolcanics. The top of the metavolcanic portion is capped by more mafic flows. Conformably overlying the metavolcanics is a belt of metasediments called the Scapa Metasediments by Lumbers (1962; 1963). Overlying these metasediments are the Steele Metavolcanics (Lumbers 1962) which are mafic flows with very minor intermediate tuffs. The Steele Metasediments (Lumbers 1962) overlies these metavolcanics. The Steele Metavolcanics and Metasediments are found in the extreme southwestern part of the map-area.

The felsic to intermediate metavolcanics which occur as narrow bands intercalated with mafic to intermediate metaolcanics south of the Mistawak Batholith, thicken north of the Mistawak Batholith where they lose their mafic to intermediate metavolcanic component. Towards the west and in the north the felsic to intermediate metavolcanics grade laterally into metasediments. Wilson et al. (1977) did not find any felsic to intermediate metavolcanics in the Twopeak Lake area. The metasediments are then interpreted to overlie the basal mafic to intermediate metavolcanics in Tomlinson and Hoblitzel Townships and the felsic to intermediate metavolcanics in Noseworthy and Bradette Town ships. The mafic to intermediate metavolcanics are predominantly amphibolitic, massive, flows with the occasional pillow. The felsic to intermediate metavolcanics are predominantly distal facies tuffs. Coarse-grained pyroclastic breccias have been reported south of Joe Lake (Lumbers 1963) and were mapped by the field party along the Burntbush River in Bradette Township. This would indicate coarsening to the east for the pyroclastic rocks. Graphitic tuffs and metasediments, commonly with associated sulphide mineralization, are commonly interbedded with the felsic to intermediate metavolcanics.

The metavolcanic-metasedimentary sequence was intruded by large intermediate to felsic intrusive bodies. The quartz monzonite, pegmatite-rich Case Batholith is found in the southern part of the area and the large granitic batholith is found in the north part. Synchronous with the large batholiths, the intrusion of the granodioritic Bateman Lake Pluton and the quartz monzonitic to granodioritic Mistawak Batholith formed domal features in the "greenstone" assemblage. The intrusion of the quartz monzonitic Hurtubise Stock between the Bateman Lake Pluton and the Mistawak Batholith further complicated the structure.

The northern belt appears to be different stratigraphical ly from the southern belt. The base of the northern sequence consists of felsic to intermediate metavolcanics overlain by fine-grained metasediments with minor interbedded mafic flows. Overlying this, and best exposed, are amphibolitic, massive and pillowed mafic to intermediate metavolcanics. Capping the sequence is a complex unit of interbedded, felsic to intermediate, mafic to intermediate metavolcanics and fine-grained metasediments. This capping sequence grades laterally to the northwest into metasediments with the occasional flow and is seen northwest and north of Hopper Lake. Graphitic tuffs and metasediments, often with large amounts of associated sulphide mineralization, are common in the capping sequence. This metavolcanicmetasedimentary sequence was folded into a series of anticlines and synclines by the emplacement of the large surrounding granitic batholiths. The fold axes were later warped by the intrusion of a quartz dioritic to dioritic pluton near Detour Lake.

The last magmatic event was the emplacement of dia base dikes which cut all rock types and major structures. These unmetamorphosed dikes have been dated by Fahrig et al. (1965) at 2.485 billion years to 1.230 billion years.

STRUCTURAL GEOLOGY: The metavolcanic-metasedimentary rocks in the map-area lie at the noses of two fold structures which extend west from the main body of the Abitibi Metavolcanic Belt in Quebec. The two fold structures were described previously as the southern belt and the northern belt. In both belts the strike of the rock units have been affected by the intermediate to felsic intrusive bodies. The dips are, in all cases, steep. Schistosity and foliation are more or less parallel to the bedding. Since outcrop density is low geophysical data proved invaluable

in interpreting contacts and fold structures.

The Mistawak Batholith and Bateman Lake Pluton form the core of domal features within the southern belt. Complicated folding patterns have resulted from the closely spaced, multiple intermediate to felsic intrusions. The septum of metavolcanics and metasediments between the Case Batholith and Mistawak Batholith is shown with a single anticline axis but folding may be more complex. Structural data is rare within the southern belt and folding was interpreted with the view of keeping the stratigraphy simple.

The northern belt has a series of anticlines and synclines interpreted within it. The northern most anticline, for which there is data, is gently plunging to the northwest. There is a reported flexure on the northern limb of this anticline which is plunging 45 degrees to the west (Paul Brown, Geologist, Amoco Canada Petroleum Company Limited, personal communication, 1978). The other fold axes are interpreted using geophysical data and again, because of the limited information, a simple rather than a complex stratigraphic interpretation was considered desirable. The small pluton near Detour Lake caused secondary folding within the folded sequence around Vandette Lake and southeast of Hopper Lake.

No major faults or lineaments have been proposed for the map-area since poor outcrop exposure precludes detailed interpretation. The glacial fluting also masks any lineament that may otherwise be visible.

ECONOMIC GEOLOGY:

GOLD: Three reported occurrences of gold have been noted within the map-area. Tanton (1919) reported a gold occurrence on the Patten River which was described by Hopkins (1918)(not located on map). The gold was described as occurring in narrow pyrite-bearing quartz-carbonate veins in an altered quartz gabbro found at the 10 m high falls near the mouth of the Patten River. The second reported occurrence was by the Cyril Knight Prospecting Company who stripped and trenched a 1.8 m wide shear zone in felsic metavolcanics containing 0.06 ounce Au/ton (Thomson 1936) on the Burntbush River. The third and most important gold property in the area

is the Amoco Canada Petroleum Company Limited's gold discovery 15 km north of Detour Lake. The deposit was discovered late in 1974 as the result of a diamond drill testing an electromagnetic conductor indicated by an airborne geophysical survey. Since 1974, over 50 000 m of diamond drilling have outlined a deposit of 10 million tons grading approximately 0.2 ounce Au/ton gold (Northern Miner 1976). In 1976 a 758 m decline was sunk to the 120 m level and a 100 ton bulk sample was removed from three cross-cuts into the deposit.

The main zone of mineralization is irregular in width, varying from 1 m to 45 m and incorporates the basal portion of a mafic flow sequence, the upper part of a talccarbonate zone and an intervening intermediate tuff horizon. The mineralized zone is up to 900 m long and has been proven to a depth of 150 m. The deepest diamond drill hole intersected mineralization at a depth of 545 m.

The gold mineralization, associated with chalcopyrite, is found in discontinuous quartz-filled tension fractures, as well as the surrounding host rock. The deposit lies along the hinge line of a flexure on the northern limb of the shallow plunging anticline. The mineralization is interpreted to be of epigenetic origin and the result of leaching of the ultramafic rocks, depositing the gold in the overlying intermediate tuff and subsequent remobilization and redeposition during intrusive activity and tectonism (Paul Brown, personal communication, 1978).

LITHIUM: Although the pegmatites are common within the Case Batholith only one occurrence of spodumenebearing pegmatite is known. This is the Dex Limited deposit in Steele Township. Spodumene crystals, up to 90 cm long and 15.2 cm in cross section, represent an estimated 10-15 percent of the dike and are best developed in the quartz-rich core of the pegmatite (Lumbers 1962). The egmatite is 250 m long and 30 m wide at it's widest point Two ore zones were delineated by trenching and stripping and the company planned to recover the feldspars, mica and quartz (Karvinen et al. 1976).

IRON: Eight occurrences of iron have been reported by Shklanka (1968). Many of these have only been noted in diamond drill hole intersections and are usually thin and interbedded with metavolcanics and metasediments. Two occurrences are of interest but neither appear economic.

The Turgeon River Occurrence is found in the northeastern corner of Bradette Township and occurs in both Ontario and Quebec. The intercalated chert and ironstone have an easterly trend, are traceable for 4200 m and have an estimated width of 120 m to 3600 m (Shklanka 1968). The overall grade is 14 percent soluble iron. The majority of

the exploration work was on the Quebec side of the border.

The Kenning Occurrence (No. 45), in the southeastern corner of Kenning Township, is the best described of the known iron occurrences. It is a highly folded sequence of interbedded magnetite, chert, wacke and minor siltstone. It has a strike length of 727 m and an average width of 61 m. The average iron content of 25 grab samples was 24.5 percent (Assessment Files Research Office, Ontario Geological Survey, Toronto) with an estimated tonnage of approximately 133,000 tons per vertical metre. This was deemed by Cliffs of Canada Limited in 1957 to be too small to be of economic interest.

BASE METALS: Since 1925, the main exploration target within the map-area has been for base metal mineralization. Areas of principal interest are the felsic to intermediate metavolcanics found in Adair and Abbotsford Townships, Bradette, Noseworthy and Hurtubise Townships and the area around Vandette and Atkinson Lakes.

Many companies have done preliminary exploration work and much follow up diamond drilling. The anomalies drilled were caused by both sulphide-bearing graphitic zones and/or massive pyrrhotite-pyrite horizons. Many companies sent samples for Au, Ag, Cu, Zn and Ni assays but the results were uniformly disappointing (Assessment Files Research Office, Ontario Geological Survey, Toronto).

Within the map-area two companies have reported subeconomic concentrations of base metal mineralization. In St. Laurent Township. Asarco Exploration Company of Canada Limited (No. 6) has outlined a low grade-low tonnage copper-nickel deposit. Nickeliferous pyrrhotite and chalcopyrite is concentrated in xenoliths of "dioritized andesite" which has been cemented by dioritic magma.

Gold mineralization within the Amoco Canada Petro leum Company Limited's gold deposit north of Detour Lake is associated with minor chalcopyrite. Copper assays at 0.2-0.3 percent (Paul Brown, personal communication, 1978). The chalcopyrite is associated with pyrrhotite and pyrite both within the quartz veins and surrounding metavolcanics.



Dept. Mines Vol.45, part 6, p.49-63.

Ontario Geological Survey, Prelim. Map P.1234, Geol. Ser., scale 1:31 680 or 1 inch to ½ milé.

49°30'00"

Wilson, B.C., Arenji, J. and Peacock, J.

49°30'00"