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GEOLOGY
MAGUNDY RIVER AREA
YUKON TERRITORY
ATLAS EXPLORATIONS LIMITED

-by-

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SUMMARY

Whereas regional structures trend N.W.-S.E., the Magundy River follows an east-west structure which transects the eastern belt of crystalline rocks of southern Yukon.

Two ages of metamorphosed clastic sediments are recognised, Lower Cambrian or earlier and Mississippian or earlier. Both have limestone members, some of which can be mapped separately, and there are also greenstones of the later age. These formations, while complex, may also be differentiated on the basis of surface expression.

The setting of the known silver-lead-zinc deposit is common along the Magundy valley. Glacial deposits mask much of the bedrock and airborne geophysics provides the most satisfactory method of exploration.

INTRODUCTION

The Magundy River area is one of several selected for exploration by Atlas. The present photogeologic study is based on published data. The area, location and access.

The area of immediate interest lies astride the lower reaches of the Magundy River at about Lat. $62^{\circ}10'N$, Long. $134^{\circ}10'W$. Aerial photographs studied include the east end of Little Salmon Lake.

The Magundy River divides the Glenlyon from the Big Salmon and St. Cyr ranges of the Pelly Mountains, in the eastern part of the cordillera of southern Yukon Territory. Carmacks is about 40 air miles to the west, on the Whitehorse-Dawson road, and Ross River about the same distance to the east on the Carol road.

Previous work

The first detailed description of the area is by W.E. Cockfield in the G.S.C. Summary Report for 1928, part A, under the title "Little Salmon area". Map 227A accompanies this report which is reproduced in Memoir 284. Cockfield notes that although the area had been travelled to a considerable extent, both by white men and Indians, it appeared to have received very little attention from the prospector,

perhaps because the district furnished a winter, rather than a summer route. The silver-lead deposit about 7 miles from the head of Little Salmon Lake had been known for a long time to the Indians who travel through the district, as it lies close to a route used while hunting.

The systematic mapping for publication by the G.S.C. at the 4 mile scale, begun by Bostock during the 1930's was extended to the Glenlyon area (Map 25-1960) by Campbell and Wheeler (mapping 1949 to 1956, published in 1960) and to the adjacent Tay River area (Map 13-1961) by Roddick & Green (mapping 1958 to 1960, published in 1961).

These studies were not available for incorporation in Map 1048A, Geological Map of the Yukon Territory (1957), but were utilised by Gabrielse and Wheeler in their Tectonic Framework of Southern Yukon and N.W. British Columbia (G.S.C. Paper 60-24) published in 1961 and in Map 30-1963, Geology, Yukon Territory and N.W.T.

The aeromagnetic maps of the southern Yukon give coverage between 60° and 62° N, immediately south of the Magundy area.

No record of recent private work is known.

GENERAL GEOLOGY (after Gabrielse & Wheeler)

The part of the Cordilleran region which includes the southern Yukon Territory may be divided into three northwesterly trending belts of relatively unmetamorphosed stratified rocks separated by two zones of crystalline metamorphic and granitic rocks.

The Magundy River area falls within the eastern crystalline zone which is composed of granitic plutons of Mesozoic age including the Cassiar batholith and spatially associated metamorphic rocks ranging in age from Precambrian to Mesozoic.

The eastern crystalline zone shows, though not as clearly as the western zone, a tendency toward periodic plutonic activity, possibly from early Mississippian time and certainly since earliest Triassic time, and periodic emergence since the early Mesozoic.

LOCAL GEOLOGYLithology

The sediments of the Magundy area are metamorphosed, and a comparison of older mapping in the Laberge area to the south and Carmacks area to the west indicates that had the area been mapped thirty rather than ten years ago, they would have been described as Yukon Group, Precambrian or later. Some of the rocks south of the river are classified as Lower

Cambrian (?) and/or earlier (?) and compared with "the general succession of Proterozoic and Cambro-Ordovician strata in Pelly and Cassiar Mountains to the southeast", (Campbell, Map 25-1960) but most are correlated with similar rocks that are at least partly of Mississippian age, in the western part of Pelly and the northern part of Cassiar Mountains (op. cit.) The dating problem in the southern Yukon arises from the paucity of recognisable fossils and lithological changes across major faults, and more particularly perhaps in the Magundy area because of its position across the eastern crystalline zone.

To one such as the writer, who has not seen the rocks in the field, there is ample room for doubt in according different blocks of ground different ages:

Unit 1: micaceous quartzite and quartz-mica schist;
minor limy rocks.

Unit 11: grey crystalline limestone, interbedded with
12 and 13.

Unit 12a meta-graywacke, gray sericitic and chloritic
quartzite, white sericitic quartzite, greenstone,
limestone and lime-silicate rocks.

Unit 12b feldspathic, sericitic quartzite, limy
quartzite, shale, argillite, varicoloured
slate, greenstone and limestone.

Unit 13a meta-volcanics; greenstone and greenschist;

quartz-chlorite schist, argillite, and limestone; 13b, 13a with many small bodies of serpentinite.

The similarity and possibilities of confusion of these units is evident. Campbell notes complexity, poor exposure and interbanding. Further, the nomenclature "13b, 13a" of the legend cannot be seen on the map, and 13b on the map does not appear in the legend. (Map 25-1960).

One may consider units 1 and 12a to be mainly clastic sediments, unit 11 to be limestone, 12b to be clastics and limestone, and 13a volcanics.

Nevertheless, there are differences in surface expression. The main area of unit 1, lower Cambrian (?) and/or earlier (?) clastic sediments is in the southeast of the area. Evenly bedded sediments strike N.E. and dip steeply. Short (tension ?) faults, perpendicular to the bedding, are common. In the northwest of the Magundy area a second area of unit 1 clastics lies on the south flank of the granitic mountains. There is no through going fault such as that shown assumed on Map 25-1960, between units 1 and 12b, although there are several shorter faults. The formations are much less fractured than in the southeastern area, and the writer considers them more likely to be metamorphosed Mississippian, probably comparing with unit 12b.

The Mississippian and/or earlier limestones of unit 11 photograph as light toned. The surface traces tend to be long and sinuous, reflecting thick units and moderate dips.

The clastic sediments of unit 12a have broad, poorly expressed, N.W.-trending surface traces in the S.W. corner of the area. Tension faulting (?) perpendicular to the bedding is exceptionally well-displayed and may reflect control by underlying bedding of unit 1.

Unit 12b has the surface expressions of 11 and 12a, as would be expected from its nature.

Of the volcanic members, 13a, is small in the area, whereas 13b has the ropy aspect common to pahoehoe.

The granites, unit 25, are rugged, massive, and much-jointed.

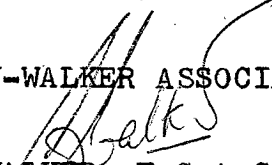
Structure.

The main faults of the southern Yukon trend N.W. and many subsidiary parallel members of the system cross the northeast and southwest of the area. Along the Magundy River, in contrast, E.N.E. and E.S.E. structures, both faulting and folding prevail. The beds seem to have suffered only one set of pressures, i.e., they were not folded on N.W.-S.E. axes before the E.W. ones were initiated, and one must consider therefore that the E-W weakness existed prior to sedimentary deposition.

ECONOMIC GEOLOGY

Cockfield (G.S.C. Sum. Rept. part A, 1928) noted that the silver-lead-zinc deposit about 7 miles from the head of Little Salmon Lake had been known for a long time to the Indians who travel through the district, and Campbell (G.S.C. Map 25-1960) notes it as a lead-zinc deposit. It is located on an E.N.E. trending anticline in limestones of unit 11b, just west of a small body of rhyolite quartz porphyry. Two strong faults, N.W. and N.E. intersect about 1/4 mile west of the property. Subordinate faults in both directions and N.N.W. are common in the vicinity of the deposit. Similar structures and formations occupy the length of the valley.

Glacial deposits in the valley mask much of the bedrock, and airborne geophysics provides the most satisfactory method of exploration.

Respectfully submitted,
 CHEW-WALKER ASSOCIATES,

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