TERRACE - NASS RIVER RECONNAISSANCE

by

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TEXAS GULF SULPHUR

October 1960

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INTRODUCTION

The geological mapping program was undertaken in the Terrace-Nass River region to differentiate the areas of granites from volcanics and sediments and to investigate any mineral occurrences in the region. The area was chosen for examination because of (1) its favourable position in relation to Anyox, (2) it had not been mapped by provincial or government surveys, and (3) the new road between Terrace and Aiyansh would place a mineral deposit in a more favourable economic position.

The area is located about 50 miles east of Prince Rupert and lies between the Skeena and Nass Rivers west of Kitsumkalum Lake and east of the 130th meridian. The Aiyansh-Terrace road borders the eastern boundary and numerous spur roads travel short distances up the creeks and rivers draining the area.

Eleven days between September 24 and October 4, 1960 were spent examining the area and included two days at Anyox and the molybdenum prospects of AMCO and Kennco. The weather was generally excellent and no time was lost until inclement weather arrived on October 5th and 6th.

The heliocopter proved indispensable for this type of reconnaissance mapping. Landings can be made within the near vicinity of any rock exposure.

The field map and notes have been filed in the Vancouver office. They should be referred to if any further exploration is undertaken.

GEOLOGY

Numerous ground traverses were made across the volcanic and sedimentary rocks of the region. The granitic portions of the area were generally mapped from the air since the granites are easily distinguished from the volcanic-sedimentary series. Detailed air traverses other than the ones plotted were made to be sure that no other septa occurred within the granite. At a scale of 1 inch equals 2 miles, the granitic distribution is accurately outlined on the enclosed map.

Upper Jurassic Marine Sediments (Grey Series)

The Jurassic sediments have been mapped by Stan Duffell, G.S.C., from 1953 to 1955 and these rocks cover a large portion of the eastern edge of the map area. They are predominantly sandstones and greywackes exhibiting such features as graded bedding and cross laminations. Near the top of the sequence conglomerates and grits with some argillites grade into the overlying Maroon Series. The lower parts of the series are graphitic shales. The rock sequence represents a gradation from a typical marine shaly environment to a near shore facies of grits and conglomerates.

Upper Jurassic Terrestrial Sediments (Maroon Series)

The sedimentary portion of the Maroon Series consists of ripple marked siltstones, cross-laminated grits, and conglomerates. These beds grade into the underlying Grey Series and are distinguished from them by the occurrence of pyrite and pyrrhotite which colors the rocks red. The sulphide content ranges from 3% to 35% by volume.

A small number of volcanic flows and tuffaceous rocks occur within this unit. The tuffs are commonly slaty and may be argillites in part. Graphite is a common constituent.

This Series of rocks is confined to the southern half of the eastern boundary and exists as a narrow belt separating the granites from the Grey Series.

Upper Jurassic Volcanic Rocks (Maroon Series)

The volcanic segment of the Maroon Series consists of andesite and basalt flow breccia, pillow lava and tuffs with a few rhyolite tuff horizons. These rocks grade imperceptibly into the Maroon sediments in the vicinity of Mt. Conroy between Mayo and Kitsumkalum Rivers. The conformable contact of the volcanic rocks with the Grey Series is easy to observe in the field and is quite accurately defined on the enclosed map.

The sulphide content of the volcanic rocks ranges from 3% to 40% pyrite and pyrrhotite by volume. The heaviest mineralization occurs at the headwaters of the Kitsumkalum River along traverses #14 and #54.

Granitized Sediments

The septa of sediments occurring on the western half of the map sheet are essentially quartz, biotite, granite gneiss. The presence of a layered structure is the only criterion to distinguish these rocks from granites. At traverse point #42 near the headwaters of the Exstew River the gneiss contains about 3% sulphides but generally these rocks are grey in color and barren of sulphides. They appear to be the metamorphic equivalent of the Grey Series.

Recent Volcanic Flow

An andesite lava flow occurs in the northern portion of the map area. The flow is approximately 20 miles long and is essentially a scoriaceous flow breccia. The lava erupted from a fissure, which later became a small cone 50 feet high, northeast of Lava Lake. It is believed by Indians and G. Hanson, G.S.C., that the flow is not older than 300 years.

A small basaltic dike and plug occur in the vicinity of traverse #20 between the Nelson and Mayo Rivers. This eruptive is also of recent times.

Granites

The granitic rocks range in composition from granite to diorite. The massive grey rocks with large vertical joints and sheet fractures are readily distinguished from the volcanic-sedimentary group. Numerous porphyry dikes and sills intrude the clastic rocks near the periphery of the batholith. The distribution of dikes and sills illustrated north of Alder Peak along traverse #57 is prevalent along the granitic contact.

Structure

The deformation of the volcanic-sedimentary group of rocks was largely controlled by the granitic intrusion. Near the contact with the crystalline rocks the layered rocks are contorted into overturned isoclinal folds. Two miles east of the contact an assymetric anticline occurs which trends northward parallel to the crystalline-clastic contact. East of the anticlinal axis drag folds are still present but less numerous.

Metamorphism

The Grey and Maroon Series are essentially unmetamorphosed. Within a few feet of the granite contacts an increase in biotite may be observed but generally the sandstones are still sandstones and not quartzites. The argillitee have develeped into slates within the highly contorted regions near the intrusive, but away from these contacts the slates grade into mudstones.

The layered rocks in the western half of the region have been metamorphosed to granites and quartzites.

SULPHIDE MINERALIZATION

Sulphide minerals are ubiquitous within the Maroon Series. The average concentration of pyrite and pyrrhotite would be 3% to 5% by volume but local zones of 50% sulphide exist throughout the Series. Numerous zones were examined and four sampled for spectroscopic analysis. The results of these assays can follow this report and be attached as a supplement.

The sulphide mineralization appears to be syngenetic to the Maroon Series. The basis for this conclusion is that individual pyritic volcanic or sandstone horizons occur within the Grey Series and are surrounded by unmineralized sediments. It was thonght at first that the pyrite was associated with proximity to granitoid rocks but the Grey Series are in many places in contact with the granite and unmineralized.

To understand the relative importance of the sulphide mineralization within the Maroon Series visits to the Anyox district were made on September 28 and October 3, 1960 and a total of six hours was spent

in examining the rocks of the area. The Anyox massive sulphide deposit consisted of 21 million tons of 1.1% copper with minor amounts of zinc, gold and silver. Eight ore deposits were mined by the Granby Consolidated Mining Co. from 1914 to 1935. The sulphide deposits occur near and at the contact of sediments or tuffs with andesite volcanics. The andesites consist of a large volume of flow breccia with minor amounts of pillow flows and rhyolite fragmentals. The pillow flows exist as 4 to 6 foot wide beds within a flow breccia sequence. The rhyolite fragmentals are interbedded with the flow breccia and are especially abundant in the #6 ore deposit. The contact of these volcanics with sediments or tuffs is sharp. These clastic rocks are fine grained and thinly laminated grey to black beds which do not exhibit any primary sedimentary features. The presence of vesicles suggesting gaseous cavities indicates that the rocks may be tuffs.

The volcanic rocks are conspicuously red due to the oxidation of pyrite. This red coloration is continuous throughout the area and reaches as far as the Bonanza deposit 3 miles to the southwest. Portions of the clastic beds are also red especially within the Bonanza area.

The volcanic-sedimentary group of rocks at Anyox is similar to the Maroon Series described in this report. One difference is that the Maroon Series is more intimately associated with granite between Terrace and the Nass River than the rocks at Anyox.

A visit was made on October 3, 1960 to the AMCO and Kennco molybdenum camps just south of Alice Arm. The AMCO camp was deserted but approximately 2000 feet of drill core was available for examination

and several rocks samples from the outcrop were present. The molybdenum appears to occur within an aplite dike about 20 feet wide within the granite. On the outcrop high grade seams occur which do not continue to depth. The split drill core consists of minute amounts of molybdenite within a quartzose zone. The core is very unimpressive.

The Kennco drill camp is still in operation and Bob Stevenson, Dick Woodcock and Ed Lyons were very cordial and took me on a tour of the surface exposures. The molybdenum deposit occurs within a granitic plug about 2500 feet in diameter. The composition of portions of the plug is alaskite. The intrusive is bounded by greywackes which have a vertical dip around the stock. The granite is pyritized and fractured with the molybdenite occurring as high grade seams, pods and disseminations. The disseminated portions have great continuity around the edge of the plug and present drilling is attempting to discover more molybdenum in the central region. The pyrite concentration ranges from 3% to 15%. This is an important prospect.

No molybdenum was observed in the Terrace-Nass River region; however, just west of Lava Lake along traverse #45 the granite is highly sheared and pyrite alteration is present.

The granitic stocks between Star and Nelson Rivers and between Kitsumkalum and Little Cedar Rivers are massive, unmineralized granites.

A vein of quartz, calcite and arsenopyrite has been prospected between Mayo and Kitsumkalum Rivers at traverse point #38. The vein is about 1000 feet long and 2 feet wide and has been explored by 8 pits and trenches. No economic minerals were observed.

FURTHER EXPLORATION

The only rocks which are favourable for a massive sulphide deposit of the Anyox variety are the Maroon Series. These rocks exist discontinuously between Mt. Kenney in the south to Vetter Peak in the north, a distance of 40 miles. The Series is well exposed except where the rocks cross the major creeks and rivers of the region. The bottoms of these valleys are covered with alluvium and a thin cedar growth extends for 2000 feet up the slopes. In general the Series is 65% exposed.

Many of the numerous dark oxide zones were examined and these areas of traverse are plotted on the enclosed map and described in the field notes left at the Vancouver office. However, the exposed and covered regions have not been adequately prospected. Whether the region warrants further exploration is difficult to ascertain. The region of favourable rocks is small and these rocks have probably been prospected in the past since a road to Kitsumkalum Lake from Terrace has been in existence for a long time. However, it is difficult to turn down any favourable rock sequence for prospecting and if this small area could be coordinated with another program in the near proximity then it should be explored.

Two methods lend themselves for exploration in this type of terrain. One would be to camp two geologists in the Kitsumkalum River area with a heliocopter and for them to prospect the wooded and heather slopes in detail. This prospecting should not require more than 18 continuous working days.

The other exploration method is to conduct an airborne

electromagnetic survey over the region. The area is well suited for this type of program since the Maroon Series strike across the valleys and ridges. The airborne equipment would fly parallel to the 45° slopes at 1000 foot elevation intervals. These slopes are not rugged and would require no rapid manoeuvres by the heliocopter pilot. The navigation would be remarkably simple compared to the Canadian Shield. The elevations of the flight lines would range from about 500 feet above sea level to 5000 feet. It would not be necessary to fly the higher peaks since they are readily available for direct observation. It would require approximately 300 line miles to cover the region or about 2 days of flying. The resultant anomalies could then be quickly prospected by two geologists.

Ground prospecting for molybdenum should be centered west of Lava Lake and would require about 3 days of work.

CONCLUSIONS

The Terrace-Nass River region west of the Kitsumkalum River consists for the most part of the Coast Range batholith. Bounding these granitic rocks to the east is a group of volcanic and sedimentary rocks similar to the Anyox district. The Maroon Series consists of andesite flow breccia, tuffs and terrestrial sediments which are heavily mineralized with sulphides (3 - 50% pyrite-pyrrhotite). Approximately 40 miles of the Series exist in the area. The higher topographic portions have been partially prospected by me, and about 35% of the lower reaches are covered by forest and valley alluvium.

The favourable rocks for the occurrence of massive sulphide are not extensive and are outlined on the enclosed map by apple green and grass green colors. If a prospecting program could be coordinated with another exploration program in the near vicinity then the area warrants further prospecting. It would require approximately 18 working days for two men to thoroughly explore the valleys and slopes of the Maroon Series. If an airborne electromagnetic survey is undertaken it will take approximately 300 line miles to cover the area or about 2 days of flying. This is the more preferable method to explore the region for massive sulphides.

A pyritic and fractured granite occurs just west of Lava Lake and may be a favourable locale for molybdenum. It will require about 3 days of work to prospect this small area. No other favourable areas for the occurrence of molybdenite were observed.

I recommend that if other areas in the Kitimat-Stewart-Hazelton region warrant further prospecting then the Terrace-Nass River area be tied together with these prospecting programs. An airborne electromagnetic survey would be the most thorough and rapid method to explore the region.

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Duffell, S. (1957) Geologic Map of the Terrace District, Geological Survey of Canada, Preliminary Series, Map 11-1956.

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Terrace Sheet (1951) #103-I Scale 1" equals 4 miles.

Nass River Sheet (1953) #103-P & #103-O Scale 1" equals 4 miles.

Index Map to the Interim Forest Cover Series (1957)
103 I/NW, I/SW, I/SE, I/NE, P/NW, P/SW, P/SE, P/NE

Terrace Sheet (1958) Topographic. Scale 1" equals 2 miles.

Interim Forest Cover Series (1951) - 103-I/10 to I/12; 103-I/13 to I/15; 103-P/2 to P/4. Scale 1" equals ½ mile.

Claim Maps 17BM, 50M, 84M, 100M. Scale 1" equals 1 mile.

Geological Map of the Terrace - Nass River Region, B.C.

SKEENA MINING DIVISION

VM — Granite, granodiorite, diorite

Y — Recent lava flows, basalt

Andesite - basalt flow breccia - pillow lava weathers red; Maroon Series

Argillites, grits, sandstones, conglomerates, some tuffs and flows; Maroon Series

TRM — Sandstones, grey wackes, conglomerates, no volcanics; Grey Series

UM — Granitized quartzites and grey wackes, essentially granite.

Glacier outline

Anticline axis

Dip and strike of bedding

58 — Land traverse

Air traverse

20 — Land observation point

Scale: 1 inch = 2 miles

October 5, 1960

Leo J Miller

inches 0 1 2 centimetres
This reference scale bar has been added to the original image. It will be accurate for the image as the image, therefore it can be used as a reference for this original size.

North

OBSERVATORY INLET
Kincolith R.
Iknouk R.
Diskanaeg Cr.
Greenville
Greenville Cr.
Keecoan Cr.
Dullgaw Cr.
Ginduk Cr.
Kwinhek Cr.
Ksedeu Cr.
Ansedagan Cr.
Andol Cr.
NASS RIVER
Burton Cr.
Ishkheenickh River
Lochballach Cr.
Kwinamass River
Kotalen River
Knazgmateen Inlet
Knazgmateen Corm Cr.
Recent Volcano
VETTER PK. 6889'
ALGER PK. 7282'
Mt. POUPARD 7469'
DOLCAR PK. 7500'
Lava L.
Sand Divide
Ingadanschild Cr.
Little Cedar R.
Cedar R.
Cedar Cr.
Sterling Cr.
Kitsumkalum River
Mt. COWDRY 7370'
Mt. ALLARD 7915'
BEAVER BLUFF
TEIN R.
Kitsumkalum Lake
Maroon Cr.
Welson R.
Goat Cr.
Stor Cr.
Glacier Cr.
Lean-to Cr.
Alice Cr.
ALICE TK. 6698'
Erlandson Cr.
MT. KENNEY 6800'
SLEEPING BEAUTY MTN. 6080'
Molybdenum Cr.
Beep Cr.
Zymagotitz R.
Exchamsiks River
MT. REMO 6399'
SKEENA RIVER
Canadian National Railway
Terrace 225'