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GEOLOGICAL REPORT ON THE SWEDE GROUP

Moresby Island, B. C.
Queen Charlotte Islands

by

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Seen Map 1:400' enclosed.

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SWEDE GROUP - Lockeport, Moresby Island.

Queen Charlotte Islands, B. C.

Summary and Conclusions

This property was optioned sight unseen on the basis of old B. C. Minister of Mines Reports and other private reports. A program of mapping and sampling was started on the property on July 15 by the writer with an assistant, Mr. D. G. Pickering. This work consisted of mapping the claims at a scale 1" - 400' with the main showing mapped at 1" - 50'; 19 chip samples were taken on the main showings. Widespread mineralization was found in volcanics but this work did not disclose an ore body; it also did not substantiate the existence of a long zone of mineralization reported by Mandy and others in previous reports. The mineralization was found to be spotty and of too low grade to be of economic interest. Any relationship of the mineralization to structure or other geologic factors is not apparent.

History

This prospect has been known since about 1907 and work has been carried out on it at several periods since that time. There was considerable prospecting activity in the Lockeport area in the period 1905 to 1930 but interest in the area declined until recently. Several open cuts were excavated and three tunnels were driven from 1909 to 1929.

Access, etc.

Access to the Lockeport area is by boat or by air from Queen Charlotte City or Sandspit. The trip by B. C. Airlines Beaver takes just over half an hour; the trip by water is about 60 miles and a fairly substantial boat is required as part of the trip is in exposed waters.

The best camping spot is at the abandoned settlement of Lockeport where one shack is still habitable. Camp can also be made at the head of the inlets on either side of the 'Swede Peninsula'. A small boat is required for access to the property as most of the shoreline is too steep to be traversed and much of it is so steep that it is impossible to get ashore.

Geology

Moresby Island has not been mapped in any detail

and little information is available on the geology. The most extensive description is by Dawson (1). In general the island consists of a thick series of sedimentary and volcanic rocks ranging in age from Upper Triassic to Upper Jurassic and possibly lower Cretaceous. These rocks are folded and are intruded by several small granitic intrusions of Mesozoic age related to the coast range batholith on the mainland about 60 miles to the east.

According to Dawson's work the rocks of the Swede Peninsula are Upper Triassic or Lower Jurassic near the bottom of the section exposed in this area. These rocks are included in the Maude Formation named by MacKenzie after Maude Island further north where the type section occurs. The volcanic flows and tuffs are of unknown thickness and apparently underlie and overlie limestone and limey argillaceous rocks. Dawson measured a well exposed section of the lowermost (?) limestone and argillite at Section Cove on Burnaby Island to the southeast. He gives a thickness of the combined limestone and argillite from underlying volcanics to the overlying volcanics as approximately 1700'.

Dawson's work indicates an anticline following the course of Darwin Sound turning westward into Crescent Inlet. If this structure prevails Swede Peninsula lies on the SW flank of the anticline with tops to the SW.

The mapping shown on the accompanying map was done mostly on a 1" = 400' scale map prepared from air photography by the photographic survey Corp. for this job. Horizontal control could not be obtained for the immediate area but was projected from an area to the north. The scale of the map was not checked by appears to be close. Some of the topographic detail does not show in areas of tall thick timber. An aneroid was carried at all times and often in the thick bush on steep slopes this was an aid in finding the location on the map.

The volcanic rocks have not been broken down into the two main types occurring here, namely flows and tuffs. There was often much uncertainty as to which were flows and which were tuffs. Where the flows are vesicular or amygdaloidal or where the tuffs contain much coarse material there is little difficulty in distinguishing the two, but where the tuffs are fine grained and flows are not vesicular or amygdaloidal they are very similar at least in hand specimen. Fairly numerous dykes and sills, probably andesite, are also very similar to the volcanic rocks. The ash rocks do not usually show bedding but indictinct bedding was seen in a few places. The vesicles were never seen to have any alignment or show flattening along a direction of flow or any other features to indicate the attitude of flows.

(1) Dawson G.M. Geol. Surv. Can. Annual Report.
1878-1879 pp 1B-239B

All the rocks of igneous origin weather to a very dark green especially along the shore. A few excellent exposures were found where large trees had overturned leaving a clean light colored surface. In this type of exposure, lineations, probably contacts between tuffs or flows or both were seen.

Epidote is conspicuous especially in the amygdaloidal flows where many of the amygdules are crystalline epidote. Some epidote may be seen in the tuffs probably alteration of some coarser particles. Many of the amygdules are composed of dark green very soft mineral probably chlorite. Often the amygdules are composed of quartz with a thin outer covering of chlorite. In either case when the rock is broken it breaks around this outer shell of chlorite to give the rock the appearance of having chloritic amygdules when in fact they may be mostly quartz. Several places were seen where the volcanic rocks were bleached and shot through with numerous stringers of epidote and sometimes a pale green cherty quartz. In these places the rocks are bleached to a pale green color.

Volcanic rocks as described above overlie and underlie the sediments described below. They may also contain other interbeds of limestone in this area.

In general there is a thick (probably 1,000' at least) series of limestone and argillaceous limey rocks in the area. No definite evidence of tops was found but the section is believed to consist of several hundred feet of blue-grey, massive, soluble limestone overlain with gradational contact by several hundred feet of thinly bedded fossiliferous calcareous, argillaceous rocks which are intruded by numerous sills and dykes of andesite. The contact of the limestone with underlying volcanics is usually marked by a depression due to solution. A contact believed to be the contact between the main limestone member and underlying tuffs and flows may be seen at Lockeport. It is certainly conformable but presents no evidence of tops. If the section outlined above is correct and the contact is the correct one, the section must be overturned at Lockeport.

The lower limestone is massive, weathering to a blue grey color and is dark grey on fresh break. It is soft, unfossiliferous, and very soluble. Near the bottom there are occasional bands of small cherty concretions. These are believed to follow bedding. Where slopes are not steep as on top of Swede Peninsula the solution of this limestone produces a Karst topography with numerous deep sink holes. The steep slopes have little outcrop of this member except where jointing is strong but are covered with large limestone float.

The overlying calcareous argillaceous beds are often very fossiliferous with numerous flattened impressions

of brachiopods and/or cephalopods. A few fragments of a small ammonite were seen in some limey beds. These rocks seldom outcrop as they have little resistance to weathering. They are intruded by numerous andesitic sills and dykes which are more resistant to weathering and outcrop more often than the softer sediments.

The structure in the vicinity of Swede Peninsula is not clear. The mapping would seem to indicate some kind of folding but lack of information as to the attitude of the rocks over most of the area makes it difficult to obtain a clear picture of the structure.

In general there is little indication of faulting except along the steep creek running north into the head of Anna Inlet where there are indications of shearing. The geology on both sides of this creek also indicates faulting. The limey argillaceous rocks at the lowermost outcrop in the creek are also rather silicified and contain some very fine-grained disseminated pyrite. This faulting seems to cut off the structure of the main part of the Swede Peninsula. The structure may be an open Z type drag fold striking approximately north-south, the north end plunging south and the south end plunging north. A fold of this type would fit in with the anticlinal structure along Darwin Sound proposed by Dawson. The structure on the west side of Anna Inlet is not apparent from the limited mapping which was done there. It is probably separated from Swede Peninsula by faulting along Anna Inlet.

All the rocks in this area, particularly the volcanics, are exceedingly tough and much pounding is required to obtain a fresh break. This condition is reported to prevail throughout the district and is, according to MacKenzie (2) due to regional metamorphism caused by pressure without much hydrothermal activity. The fossiliferous nature of the argillaceous rocks indicates that metamorphism has been rather mild.

Mineral Deposits

Some copper mineralization in the form of chalcopyrite can be found in the flow rocks throughout the area. In the vicinity of the tunnels on the east side of Anna Inlet and to a lesser extent near the old open cut on the east side of the peninsula this mineralization is of better grade than elsewhere. The mineralization consists of fine grained chalcopyrite disseminated or in fine stringers in the volcanic rocks or in the amygdules. When occurring in the amygdules it is found in both the epidote and quartz fillings, often but not always, around the rims. In general the mineralization is widespread but not uniform. The best mineralization seen was in the old tunnel and in the open cuts. (See sampling plan.) The best mineralization

(2) G.S.C. Memoir No. 88 Geology of Graham Island, B.C. by J. D. MacKenzie.

is in the No. 2 adit formerly known as the 'Bornite adit'. Bornite has been reported from this tunnel but none was seen by the writer. A bluish looking mineral was found to be tarnished chalcopyrite.

The only place where the mineralization seemed to have any definite pattern is in the inner end of the No. 1 or main adit where there is vague rusty banding striking along the drift and dipping westerly. This section was sampled by cutting four vertical samples across this banding. It is also possible that this banding could be caused by water moving along joints in mineralized rock.

The mineralization certainly does not seem to be continuous except as traces of chalcopyrite between the various showings. It seems to be confined to flows and possibly tuffs; a dyke in the No. 1 adit is barren. The best mineralization appears to be in the most vesicular flow rock. Some idea of the local character of the mineralization is shown by the change in assay from one sample to the next. The open cut above the upper tunnel (not shown on plan) shows about .5% over its total length of 25 feet while the tunnel which passes directly below it showed so little mineralization that it was not sampled.

The mineralization seen on the east side of the Swede Peninsula is lower grade than on the west side. Traces of chalcopyrite can be found along the slope for several hundred feet. The old open cut on the east side of the peninsula showed extremely low grade mineralization, and was not sampled. Three diamond drill holes were drilled from this cut by Granby in 1918. Only two of these holes were found in the moss covered face of the cut.

Mandy and others suggest that there is a zone of mineralization running east west between the workings on the east and west sides of the peninsula. The present work does not confirm this idea. The area at the crest of Swede Peninsula from the limestone contact down the north face of the hill has much outcrop and was prospected in some detail. Occasional specks of chalcopyrite could be seen but no evidence of a mineralized zone was seen.

In general the mineralization appears to be erratic and any relation to the structure is not apparent although of course neither the extent of the mineralization or the structure are clearly outlined. Sampling indicates that the best mineralization is of too low grade to be of economic interest.

Dr. Gunning discussed this property with the writer and commented on the apparent similarity of stratigraphy of

this area with that of several copper deposits on Vancouver Island and possible of Alaska. He pointed out that these other deposits occur in the lowermost limestone member in the thick section of volcanics, limestones, and other sediments of Upper Triassic age. The volcanics underlying this limestone are generally cupriferous but have not so far made any mines. The interesting deposits occur in the limestone very near or on its lower contact with the volcanics. Dr. Gunning suggested that an area of this type where this lower contact was exposed and folded near the Mesozoic intrusives might be favorable for future prospecting.