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The Granduc Area*

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Introduction

THE GRANDUC copper deposit is 25 miles northwest of the Canadian port of Stewart at the head of Portland Canal, and four miles east of the border of southeastern Alaska. The subject to be discussed is the area in which this deposit is located.

Access is the main problem to be overcome in the successful development of the Granduc. After establishing the probability that the deposit contains a large tonnage of milling ore, Granduc Mines, Limited, carefully considered possible railway routes through Alaskan territory to the Pacific Ocean. In addition to customs regulations, the physical difficulties involved in building and maintaining a railway at least 45 miles in length through mountainous terrain would be quite formidable. As a result, the company abandoned the idea of a railway, deciding in favour of a long tunnel that would provide ready access to Stewart.

Because geologic information was lacking for much of the area surrounding the Granduc, the British Columbia Department of mines was requested by the Company to make a survey that would aid in determining the best possible tunnel route.

As a result, the writer, with two assistants, spent two months of the 1955 field season mapping the 148-square-mile Granduc area.

The following account is based on notes prepared for an illustrated lecture.

History

In 1931 two American prospectors, Wendell Dawson and the late W. Fromholz, ascended the Leduc River, crossed the border into Canadian territory, and located three claims at the head of the valley. From the brief account that appeared in the Annual Report of the Minister of Mines of British Columbia for that year, it seems clear that the Mineral Lode claim covered certain of the copper showings on the property now owned by Granduc Mines Limited.

The showings were rediscovered by another prospector, E. Kvale, in 1946, and subsequently located by Kvale and T. McQuillan in 1951 for Helicopter Exploration Co. Ltd. Additional claims were located in 1952, and in August and September of that year the showings were examined by engineers of The Granby Mining Smelting and Power Company Limited. Later, Granby assumed direction of the property through a newly formed company, Granduc Mines, Limited. In December, 1953, Newmont Mining Corporation joined Granby as an equal partner in financing the development of the Granduc.

In 1953 Granduc Mines, Limited, made an impressive start on exploration of the ore occurrences, and by the fall of 1954 it was clear that, after an interval of 50 years, a fourth* important copper-bearing sulphide deposit had been discovered in the Coast Range.

Physical Features

The Granduc area is more or less typical of the rugged northern Coast Range. An already imposing terrain is rendered more so by the presence of numerous valley glaciers extending in all directions from a central area of ice accumulation. One hundred and fourteen square miles, or 77 per cent, of the Granduc area is covered by ice and minor snowfields. The retreating valley glaciers contribute substantially to the flow of the Moss, Chickamin, Leduc and Unuk Rivers.

During the winter months deep snow covers the rough surface of the glaciers and this has facilitated the transportation of men and equipment by plane and tractor. The snow disappears from the valley glaciers during August and September, but not from the central icefield.

The only vegetation in the area is in the Leduc River valley. It consists of buckbrush, tag alder, alpine fir, heather, and various alpine flowers.

Geology

The Granduc area straddles the eastern contact of the Coast Range batholith which here is composed of various rock types ranging in composition from quartz diorite to granite.

These rocks intrude volcanic and sediments belonging to the Hazelton Group of Jurassic (and Triassic?) age.

The volcanics are mainly dark green to greyish green rocks of intermediate to basic composition. They consist of breccias, which in places appear to grade into pillow lava, greenstone, porphyritic and non-porphyritic lavas, tuff and agglomerate.

The sediments are a heterogeneous assemblage of materials that have been derived, in the main, from a volcanic terrain. In certain places these rocks are so wholly volcanic in appearance that, were it not for the presence of bedding and the intercalation of argillite, they might be taken for such. Greywacke, tuff, impure quartzite and their sheared equivalents are most common in the vicinity of the Granduc; whereas, on the eastern slope of the central icefield, black argillite predominates. Limestone is not common except in the hangingwall of the Granduc ore zone where it occurs in narrow persistent bands separated by bands of argillaceous and quartzitic material.

In general the sediments and volcanics dip steeply. Close folding on a minor scale is fairly common in the sediments.

Some faulting was recognized in the area, on the west shore of Summit Lake and in the hangingwall of the Granduc ore zone. The latter is essentially a bedded fault and, as such, presents the usual difficulties with respect to determining movement. The presence of what are almost certainly segments of the same granitic dyke on either side of this fault, however, establishes it as a right-hand fault of some magnitude. If this fault is projected along strike to the south, across the south fork of Leduc glacier, its assumed prolongation in this direction coincides with a pronounced valley occupied by a hanging glacier.

South of the Granduc fault, another right-hand fault has been assumed to account for the sharp offset in the eastern margin of the granitic rocks.

Although the writer has examined the Granduc in considerable detail, anything but the briefest reference to the deposit itself is beyond the purpose of these notes. The mineralization consists of chalcopyrite, pyrrhotite, pyrite, some magnetite, and a minor amount of sphalerite. Galena and arsenopyrite are very rare. The main zone is in siliceous sediments and is made up of several bands

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* *Published by permission of the Chief, Mineralogical Branch, British Columbia Department of Mines.*

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* The *others*: *Britannia*, 1888; *Bastall River*, 1900; *Hidden Creek* (*Anyox*), 1901.

mineralized material of sufficient grade to constitute a large body of milling ore that has by no means been completely outlined, particularly in depth and to the south, beneath the glacier. The company has recently reported that, at the end of 1955, 25,600,000 tons of ore averaging 1.62 per cent copper had been outlined.

Proposed Tunnel Routes

The company has studied many tunnel routes as a means of access to its deposit. It need hardly be added that, whichever the route, the driving of such a tunnel constitutes an undertaking unique in the mining world.

Route No. 3 has been fairly definitely selected as the probable route for a variety of reasons. The writer intends only to point out that this choice is wise from a geological and engineering standpoint. The distribution of granitic rocks in the southeastern part of the area, immediately west of Salmon glacier, strongly suggests that here the margin of the batholith dips northward. Whether or not this condition persists in depth, there can be no doubt that, from the surface geology, the Route No. 3 tunnel would have the best chance of remaining in granitic rocks for the greatest distance. It is true that, in selecting this route, the company is discounting the remote possibility of encountering at depth another deposit in the geologically favourable rocks of the Hazelton Group. The decision is nevertheless sound, based on the reasonable assumption that the granitic rock will prove to be a superior tunnel rock. Here a logical comparison can be made with the 10-mile Kemano tunnel* for the geological settings are similar. Approximately half this tunnel is in Coast Range "granite" and half in older rocks. In the part of the tunnel driven in "granite" only a minor amount of support was necessary, but, in the part that penetrates the older rocks, steel support during excavation was necessary for nearly 50 per cent of its length and gunite was required for most of the remainder.

The second section of Route No. 3 passes beneath two considerable expanses of ice. Although it is probable that, in places this ice is at least 1,000 feet in thickness, the proposed tunnel would be several thousand feet below the surface in the critical sections. The thickness of the ice in these sections is presently being determined by drilling using a "hot point."

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* *Mapped by R. A. Stuart while employed by the B.C. Dept of Mines (Stuart, R.A. (1955): Geological Setting of the Alcan Tunnel, Kemano, B.C. Proceedings of The Geological Society of Canada, Vol. 7, Pt. 1, pp. 103-112.)*

A Report on Stanleigh Uranium Mining Corp.

Recently given a $72 million contract

STANLEIGH Uranium Mining Corporation Ltd. at the present time owns an area of some 18 square miles in one contiguous block in the Blind River field, bordering upon Algom Uranium, Norsynco, Kamis Copper, Milliken Lake, and Lake Nordic on its southern boundary.

Thus far, by drilling some 35,000 feet, Stanleigh has established an ore reserve of some 12.5 million tons, of which 6,819,500 tons average 0.102 per cent U_3O_8 over an average mining width of 11.2 feet. Taking into consideration the entire tonnage so far blocked out, the average grade would be 0.093 per cent. This drilling represents only a proven strip a thousand feet wide and 8400 feet long, whereas the width across the property, some three miles at this point, could hold roughly eight to ten times this reserve, not counting the possibilities of additional orebodies to the east and west. The drilling program has been continued, with one hole being almost three miles distant, along the projected strike length, presently nearing completion. Successful completion of this hole would give an indicated reserve of close to 90 million tons of possible ore and might make this company the owner of the largest ore reserve in the region held in one contiguous block and to be mined in one single operation.

On the camp site two shafts have been commenced by Dravo Corporation, one four-compartment and one three-compartment shaft, at Lake Penelope, at a distance of 950 feet from each other. Both shafts have been collared, and the sinking advanced to the company's satisfaction. Hoists and headframes are in place.

Additional camps have been built. Permanent camp and mill sites cleared, and arrangements made for railroad siding, water supply, hydroelectric power, tailings disposal, and other planning incidental to the operation.

Dravo Corporation will build the shafts. R. M. Way will do the plant design, with the assistance of Alvin Ross and Associates. Foley Brothers have been invited to bid on construction. Pioneer Consultants, with the assistance of Stanleigh's own staff, will do the geology and underground preparation. British Permutit are prepared to deliver the ion exchange columns. Messrs. Tamplin and Fulmer, of Stanleigh's Toronto staff, will co-ordinate and supervise the various phases of this work.

Stanleigh recently disclosed that it has received a letter of intent from Eldorado Mining and Refining Ltd., covering the purchase of $72,981,000 of uranium precipitates.

President H. S. Strouth stated that all outstanding options on the company's shares will be exercised immediately, adding approximately $900,000 to the treasury. Arrangements are being made for senior financing to place the property into production.

Diamond drill hole No. S-12 has cut approximately 11 feet of commercial grade ore, he added. This increases actual reserves to roughly 8,500,000 tons and possibly doubling indicated reserves to 24,000,000 tons.

It is hoped that negotiations with Eldorado Mining, which were commenced in February of this year with respect to a 3000 ton mill, will be soon finalized. As is apparent from the work done on the property, only the details remain to be adjusted. W. C. Pitfield and Company, who have contributed a considerable amount of money towards this enterprise as underwriters, have been selected as fiscal agents and will at that time finalize the financing of the mill.

The Company is in a good financial position right now, with a substantial capital surplus in its treasury and pledged, surpassing its present requirements.

The property was put together by Mr. Howard Steven Strouth and his resident Canadian engineer, Mr. Constantine de-Leuchtenberg-Beauharnais, in 1953-54, and under the sponsorship of Standard Ore and Alloys Corporation, Lehigh Valley Coal, and John M. Easson and Company formed into Stanleigh Uranium Mining Corporation Limited.

Stanleigh's present board of directors includes: Mr. J. M. Cunningham-Dunlop, 1st vice-president of Ventures Limited; Mr. Leslie E. Blackwell, Queen's Counsel, and for many years Attorney General of Ontario; Mr. John M. Easson, a member of the Toronto Stock Exchange; Mr. Paul Bock, a vice-president of Lehigh Valley Coal, and president of several other coal companies; and, Mr. Howard Steven Strouth, Stanleigh's president, who heads Standard Ore and Alloys' mining division as well as many other active mining companies, including operations in Africa, Australia, Peru, and the United States.