File 93.

The Rocky Mountain Trench.

E Bronlund

Feb 1958

(93)

Feb 1958.

822348

PANEL DISCUSSIO

Miner Rocky Mountain area became active i tboard became available, but seldom reached an advanced stage because of the long term outlook for transportation. It is estimated that more than a million dollars were spent by various mining companies on preliminary exploration of the Trench and its immediate vicinity up to 1939.

GEOLOGY

For the purpose of dealing with the economic geology of this area, I am including a strip of country about 20 miles wide on either side of the trench, which takes in the front ranges bordering the trench on the northeast and southwest. A brief resume of the present information on the general geology shows that the trench is flanked on both sides by belts of highly deformed, metamorphosed, schistose rocks of predominantly sedimentary origin. The southwest belt includes a great thickness of interbedded quartz-chlorite and sericite schists, quartzites, conglomerate, slate, phyllite and limestone and has been mapped by Roots as the Ingenika Group of Lower Cambrian age. This belt varies in width from 40 miles near Ingenika River to less than 10 miles at Sifton Pass. Along certain parts of the belt, such as much of Butler and Kechika Ranges, these rocks have been subject to further metamorphism and granitization. A notable feature of this belt is the remarkably straight topographic depression known as the Pelly Creek lineament which parallels the trench for nearly 300 miles. According to Roots it represents locally at least, a line of faulting and it is of interest to note that the majority of known metallic mineral deposits along the southwesterly belt are situated close to this lineament or along sub-parallel structures.

SYMPOSIUM ON

THE ROCKY MOUNTAIN TRENCH

(93)

Feb 1958.

822348

PANEL DISCUSSION: E. BRONLUND.

Mineral exploration and development in the Northern Rocky Mountain area became active in the late 1920s when aircraft and the modern outboard became available, but seldom reached an advanced stage because of the long term outlook for transportation. It is estimated that more than a million dollars were spent by various mining companies on preliminary exploration of the Trench and its immediate vicinity up to 1939.

GEOLOGY

For the purpose of dealing with the economic geology of this area, I am including a strip of country about 20 miles wide on either side of the trench, which takes in the front ranges bordering the trench on the northeast and southwest. A brief resume of the present information on the general geology shows that the trench is flanked on both sides by belts of highly deformed, metamorphosed, schistose rocks of predominantly sedimentary origin. The southwest belt includes a great thickness of interbedded quartz-chlorite and sericite schists, quartzites, conglomerate, slate, phyllite and limestone and has been mapped by Roots as the Ingenika Group of Lower Cambrian age. This belt varies in width from 40 miles near Ingenika River to less than 10 miles at Sifton Pass. Along certain parts of the belt, such as much of Butler and Kechika Ranges, these rocks have been subject to further metamorphism and granitization. A notable feature of this belt is the remarkably straight topographic depression known as the Pelly Creek lineament which parallels the trench for nearly 300 miles. According to Roots it represents locally at least, a line of faulting and it is of interest to note that the majority of known metallic mineral deposits along the southwesterly belt are situated close to this lineament or along sub-parallel structures.

The northeast metamorphic belt is somewhat narrower and varies in width from perhaps 13 miles at Finlay Forks and east of Fort Grahame, to less than 3 miles at Sifton Pass. It consists of interbedded quartz-chlorite and sericite schists, quartzite, slate, phyllite and quartzitic conglomerate. This belt also contains a topographic depression referred to as the Chowika lineament which however, is not as extensive and well defined as the Pelly Creek lineament. Where observed on Pesika Creek and east of Fort Grahame, the rocks of this belt are in fault contact with the Rocky Mountain Paleozoics to the east.

The floor of the trench is largely covered by glacial and stream deposits and the few known outcrops, such as at Deserter's Canyon and near Sifton Pass are Upper Cretaceous or Paleocene conglomerates which according to Roots, may have been down-faulted into their present position. They also occur at low elevations in the Long Canyon of Finlay River and at the southern end of Pelly Creek lineament on Omineca River where they contain thin lignite seams.

MINERAL DEPOSITS.

The mineral deposits will be dealt with under three headings: Placer deposits, Non-metallics and Metallic deposits.

Placer Deposits.

Placer gold has been recovered at many localities, from McLeod Lake area near Parsnip River in the south to beyond Fox River in the north. The best known deposits are those on McLeod River, on Nation and Parsnip Rivers near their confluence, Pete Toy's Bar on Finlay River, Ingenika River near Pelly Creek and on Finlay River above Long Canyon. Perhaps with the partial exception of McLeod River, these deposits are all secondary and represent re-working by the present streams of glacial drift brought in from the west. The gold is usually very fine and flaky and it may take over a hundred colours to make one cent. Small amounts of platinum are present in many deposits. The best known is that on Pete Toy's Bar which has been worked inter-

mittently since 1862 to recent times and may have yielded a hundred thousand dollars.

Non-metallic Deposits.

The only non-metallic mineral that has had any attention is mica and all the known deposits occur in or near pegmatites and mica schists in Butler Range west of Fort Grahame. The mica is an amber coloured muscovite of good quality but the individual deposits are on the small side and average crystal size seldom over 4 by 6 inches. Most of the known deposits lie above timber line in the Mica Peak area and were developed by an Edmonton company in 1925-26. They found that the pegmatites were lenticular bodies emplaced along minor folds in southeast plunging mica schists and that the largest crystals occurred in the schists outside the pegmatite bodies. Development was by open cuts and one crosscut tunnel. Two open cuts produced mica crystals up to 12 by 16 inches and 5 inches thick but most of the larger crystals were either wavy or contained fractures so that the wastage was very high and the trimmed sheets seldom over 3 by 4 inches. The saleable production was therefore very small.

Metallic Deposits.

Prospecting and exploration in recent years have established the presence of base metal deposits in the Lower Cambrian belts on both sides of the trench. There is however, a marked difference in characteristics and mineral association between deposits to the northeast and those to the southwest of the trench.

The northeasterly belt contains copper deposits of simple mineral composition, most of them quartz veins with pyrite and chalcopyrite. Gold and silver values are low or absent. Their favourite host rock is a black slate at or near shear contacts with competent formations such as certain limestones or quartzites. The best known deposit is at timberline 20 miles up Pesika Creek and is a series of quartz lenses in a lit par lit arrangement with a total strike length of about 6000 feet and widths up to 60 feet. Most of this is barren quartz but at the north end there is an ore shoot 400 feet long and 6 feet wide which may run 2.5 percent copper. A smaller shoot is exposed near the south end. Similar but smaller veins have been found north-

westerly near Akie River, Paul Branch and Gataga River and southeasterly near Davie Creek. A slightly different type of deposit occurs above timberline 20 miles up Chowika Creek and contains narrow stringers of quartz with enargite in limestone.

The deposits along the southwesterly belt show a more complex mineral association. Some of them contain mainly copper, others mainly lead and zinc. Gold values are low, silver values low to intermediate. They are essentially alike and seem to favour schistose bands or minor fold structures in the Lower Cambrian limestones. Most of them are associated with quartz in one form or another and with carbonates, in many places siderite. The deposits may take many forms such as simple quartz veins, silicified breccias or zones of laminated quartz and carbonates. In most cases the copper minerals occur with the quartz gangue while the lead-zinc minerals favour the carbonates. Tourmaline is a minor but common accessory mineral with the quartz and fluorite has been noted. Chalcopyrite, pyrite, galena and sphalerite are present in greatly varying proportions but most of these deposits also contain some pyrrhotite, arsenopyrite and tetrahedrite-tennantite. Pyrargerite, boulangerite, cobaltite and gersdorffite have been noted in some deposits, also magnetite. The best known deposit is the Ferguson Group of Ingenika Mines Ltd. which was explored by surface workings and adit tunnels in the years 1927 to 1931. This work partly proved up a quantity of good ore but the remote location precluded a profitable operation. The Consolidated Mining and Smelting Co. of Canada did a considerable amount of diamond drilling near the old workings in 1957 with disappointing results. The deposits consist of lenticular bodies of fairly massive sulphides replacing a banded quartz-siderite rock deposited in a minor fold structure in schistose limestone and in general follow the bedding. Indicated grade across a width of 8 feet is said to be 15 percent lead, 7.5 percent zinc and 7 ounces silver.

For a distance of 60 miles northwest Ingenika Mines along Russell Range there are many showings of quartz-siderite rock, ferro-dolomite and other alteration zones in the highly sheared, recumbent structures of the folded limestone beds. Many of

showings contain pyrrhotite and small amounts of chalcopyrite, galena and sphalerite. About ten such deposits are known. Some of them are less than 2 feet wide, others up to 30 feet wide but the best grade across mining widths is less than two percent combined base metals. In the northern part a series of large quartz lenses in sericite schist outcrop prominently near timberline and contain chalcopyrite along sheeted zones. Along the shore of Bower Lake is a small quartz vein in slate which contains grey copper with silver values of about 40 ounces.

The B ower Creek deposits were found in 1927 and explored by The Consolidated Mining and Smelting Company. There are perhaps a dozen showings within an area 1000 feet wide and 2 miles long. The southeasterly showings near Bower Creek consist of lensy quartz veins in sericite schist with chalcopyrite, a quartz-carbonate band with galena, sphalerite and chalcopyrite, and a shear zone with pyrrhotite, pyrite, cobaltite - gersdorffite. The grade is fair, up to 3 percent copper or 10 percent combined lead and zinc but ore shoots are small. The northwesterly showings near timberline are laminated quartz-carbonate zones up to 60 feet wide but very low grade, less than 2 percent combined copper, lead and zinc across mining widths.

From Bower Creek northward across Finlay River, there are a number of similar mineral showings in the McConnell Pass area, Long Canyon, Finlay Mountain, Obo and Spinel Creeks and Ludwig Creek. These are mainly quartz veins, some very wide with pyrite and chalcopyrite. Some are stockworks of narrow quartz veins in bodies of ferro-dolomite and siderite and carry mainly the grey copper minerals with minor galena along fractures in the quartz. Similar deposits are also known further northwest on Rainbow River, Frog River, at Dall Lake, Turnagain River and near Deadwood Lake. The Dall Lake showing is low grade chalcopyrite mineralization in a body of silicified, brecciated limestone and was investigated a few years ago by a mining company.

To the southeast of the Ingenika deposits there are a few widely spaced mineral showings along this belt as far south as upper Parsnip River but they are all

small.

It appears therefore that the southwesterly belt contains most of the metallic mineral deposits in the Rocky Mountain trench area and that these occur at regular intervals for at least 200 miles paralleling the trench. With exception of the Ferguson deposit, they are low grade or small. They have remarkably similar characteristics and mineral association. It is probably not a coincidence that they are spatially related to the Pelly Creek lineament. It may also be significant that the areas of most extensive quartz-carbonate deposition and mineralization occur near the intersection of the longitudinal Pelly Creek lineament with major transverse fault zones such as at Ingenika Mines, Bower Creek and elsewhere. It is also well to point out that perhaps 80 percent or more of the favourable area is covered by surface and therefore unexplored.