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BULLETIN 12

PROGRESS REPORT

ON

GEOLOGIC INVESTIGATIONS IN THE KOOTENAI-FLATHEAD AREA, NORTHWEST MONTANA

1. WESTERN LINCOLN COUNTY

By

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A flume was constructed to bring water from upriver. Sections of this flume, sluice boxes, and collapsed buildings still remain at the site. Development consists of a few test pits on the gravel bench and a caved adit at the river bend in Ravalli quartzitic argillite. Higher terraces may have gold-bearing gravel, although placering was confined to the lower bench.

No records of production are available.

China Lake Placer

It has been reported that placers yielded some gold from China Creek and in the vicinity of China Lake during early placer mining operations in the Libby area. No evidence of placering in the vicinity now remains.

NONMETALLIC DEPOSITS

Vermiculite

The largest vermiculite mine in the United States has been developed by the Zonolite Company in the Rainy Creek district 7 miles northeast of Libby. The deposit was discovered in 1915, and small-scale production started in 1925. In 1939, the several different operations were combined into one under the Universal Zonolite and Insulation Company, the name of which was changed to the Zonolite Company in 1948. A 1,000-ton mill, erected in 1948, produced 350 to 400 tons of concentrate per day, and it is presently being enlarged. Although the company has an expanding plant in Libby, the bulk of the concentrate is shipped as crude vermiculite to expanding plants throughout the country. The expanded vermiculite is marketed under the trade-name, Zonolite.

The deposit is an elongated stock composed of pyroxenite and syenite. The stock intrudes strata of both the Wallace and Striped Peak formations in the trough of a northwest-trending syncline. The pyroxenite is very coarse-grained and composed of vermiculite, aegerine-augite, soft fibrous amphibole asbestos (tremolite), magnetite, and locally a little biotite. Fluorine-rich apatite makes up 7 to 10 percent of the rock. The vermiculite has been derived from biotite by hydrothermal alteration, and locally, the quality of the vermiculite probably has been enhanced by weathering. The fibrous amphibole is an alteration product of the aegerine-augite, and the stages of alteration can be seen megascopically in hand specimens. The aegerine-augite is locally vanadiferous (Pardee and Larsen, 1929, p. 17).

The pyroxenite is cut by syenite dikes ranging in width from a few inches to many tens of feet. The dikes are composed of orthoclase, sodic plagioclase, and a little muscovite. Accessory minerals are hornblende, fluorite, apatite, titanite, rutile, biotite, and garnet (Pardee and Larsen, 1929, p. 21).

Quartz veins in the stock are later than the syenite and contain small amounts of chalcopyrite, sphalerite, and galena.

This unusual stock has many minerals of potential value. The vermiculite, of course, is being actively marketed at present. Fibrous amphibole asbestos, because its specific gravity is very near that of vermiculite, causes much trouble in milling the lower grade ores in which the asbestos is abundant. If a process could be perfected to make a clean separation of vermiculite and asbestos, both products would be marketable, and much material now mined and dumped as waste could be milled and made to yield a profit.

Much of the syenite is nearly pure feldspar. Dikes which occur within the pyroxenite ore-body must be mined along with the vermiculite rock. At present the syenite is dumped as waste. It is said that minute inclusions of hornblende in the feldspar render the feldspar unsuitable for ceramic use. Perhaps it could be used as a flux in glass manufacture, or ground to a scouring powder of the Bon Ami class. (The basic ingredient of such powders is ground feldspar.)

The border phase of the pyroxenite intrusive where it comes in contact with Belt sediments is magnetite-rich. A grab sample of the material showed about 16 percent magnetite. An analysis of a magnetic concentrate from this material gave 63.80 percent iron, 0.60 percent titanium dioxide, 2.40 percent silica, and 0.50 percent phosphorus; also, a trace of sulfur. The high phosphorus was probably due to the presence of fluorapatite in the pyroxenite.

The quartz veins of the pyroxenite area, according to Pardee and Larsen (1929, p. 27), contain a variety of minerals, chiefly quartz with scattered grains of galena and chalcopyrite. Along the walls of one vein are zones a few inches wide made up chiefly of vanadium-bearing aegirite, microcline, strontianite, celestite, pyrite, and chalcopyrite, with smaller amounts of quartz, fluorite, galena, and sphalerite. Quartz veins are ignored in mining vermiculite as they are of mineralogical interest only.

Esther May Asbestos

The Esther May claims were staked by Romeo and Virginia Garrison in 1946 and are about one-half mile west of Yaak, in sec. 34, T. 36 N., R. 32 W. The group comprises two unpatented claims, the Esther May Nos. 1 and 2. In 1948 the claims were leased to Messrs. Hough and Loveland of Spokane, Washington, for a period of ten years. The lessees drilled twelve to fifteen holes near a small asbestos vein outcropping on a bluff. All holes were reported to have intercepted amphibole asbestos at depths of twenty to thirty feet. In 1958, Messrs. H. P. Reinshagen, Sr. and Jr., of Libby, Montana, leased, with option to buy, the property for a period of one year. A diamond drill program is planned to check previous churn drill results.