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MIDDLE INLET MOLYBDENITE PROSPECT

by

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This is located in the SE¼ NW¼ section 18, T.33N.,R.20E. Access to this property is by town road from USH 141 (3½ miles) or from CTH "X" (1¼ miles). The workings consist of several pits from which considerable ore and rock has been removed. Minerals Yearbook, 1940, reports the shipment in 1939 of "a small quantity of concentrates." Several buildings, some demolished, are on the property and a power line still remains from work formerly done. Some of the machinery is still remaining. There is ample water available in Middle Inlet Creek, which flows past the workings. There is poplar wood and a little scattered pine on the adjacent hills.

The ore is molybdenite-bearing quartz and quartz-feldspar.

Outcrops in the area consist of one ridge of granite ½ mile long and up to 200 feet wide in outcrop. One-quarter mile north of this is an isolated outcrop of metamorphosed argillite and one-eighth mile southeast of it is an isolated outcrop of highly contaminated granite. No other outcrops were found. The surrounding and intervening ground is sandy drift.

The granite is composed of approximately: orthoclase 55%, oligoclase 15%, quartz 30% biotite ranging from 0% to 10% largely at the expense of the orthoclase. The western end of the granite ridge is the more mafic. Near the workings the granite changes color abruptly, suggesting an area of cognate inclusions. Throughout, the granite shows the influence of contamination by mafic material, which appears in various stages of digestion. The best illustration of this is the isolated outcrop to the southeast. Along the northern border of the granite there is evidence of, at least slight, E-W shearing. The occasional shear planes strike about E-W and dip steeply. They appear as dark, narrow, persistent bands in the granite. The ridge produced by the granite outcrop is about 60-75 feet high, sloping steeply to the north down to a sand plain and sloping more gently to the south.

Four hundred seventy-five feet west from the east end of the granite ridge, a lamprophyre dike cuts the granite completely. The dike strikes N.20°E. and dips vertically. It is 40 feet wide, dark gray-green in color, has a cryptocrystalline matrix and 1 mm. phenocrysts of andesine and a dark amphibole. The dike shows a chilled margin against the granite where it is aphanatic, and here, too, it extends into the granite in short apophyses. The dike shows columnar structure where best exposed by blasting - the columns, of course, being horizontal.

The mineralized part of the granite as revealed by the outcrops and the workings is delimited on the east by the sand overburden, on the west by the lamprophyre, on the north by sand overburden and by barren granite, on the south by barren granite. In general the mineralized zone is thus a little over 400 feet long and is confined to an overall width of 100 feet. In detail the mineralized

portion of the granite is very irregular and at no place has a breadth of more than 20 feet. The mineralized zone extends E-W and appears to be vertical.

The zone which carries molybdenite also carries a high percentage of quartz - in fact those parts which are highest in molybdenite are also highest in quartz. However, much of the granite within the mineralized zone is impregnated with molybdenite.

Origin of the Ore. An understanding of the possible size and continuity of the ore body can be founded only on a knowledge of its mode of origin. It has been described as having originated (1) from the basic dike (lamprophyre), (2) as a hydrothermal quartz vein deposit. Evidence which we consider adequate will be offered here to show that the ore body is pegmatoid in origin.

Within the mineralized zone it is possible to find a complete gradation from normal granite as described above for the area and pure quartz. The intermediate rock material consists of quartz with various amounts of feldspar "floating" in it. Since most of the feldspar is pink or red, the color contrast makes the recognition of the series especially easy. All the quartz is white. Though some quartz veins have relatively sharp walls against the granite, most of these are small and not productive. The larger quartz veins typically show a gradation from quartz to granite, at least in considerable part - some of their walls may be sharp. In other words, the granite was still a relatively soft and none too-well knit crystal mush when the quartz-bearing liquid was introduced - doubtless accompanied by structural disturbance. Therefore the quartz material followed the granite in its emplacement but followed it very closely before the granite was cooled. This is the typical behavior of a pegmatite liquid, and quartz has been recognized repeatedly as a common late pegmatite phase. So-called hydrothermal solutions and deposits may be delimited ordinarily much better than can a pegmatite type of deposit. The very distribution of the molybdenite-bearing quartz - its penetration and blending with the granite, its irregularity of distribution in the granite, its lack of definite shape or form - all are typical pegmatite characteristics. The ore then may be regarded as closely tied in time of formation with the granite. This view, too, alone gives a satisfactory and simple explanation of the occurrence of 1-2 inch flakes of molybdenite well within the granite.

The lamprophyre is definitely much later than the granite, as indicated by its columnar structure, its chilled edges, and its clean-cut apophyses in the granite. We may therefore rule out the lamprophyre as having no genetic connection with the ore.

However, since the lamprophyre is late with respect to the ore, it is reasonable to expect that the ore once extended beyond the lamprophyre. The absence of ore west of the lamprophyre is good reason to believe that the lamprophyre was intruded along a fault.

The presently known ore body is not likely to be commercially profitable both because of the low tenor of the ore and because of the pockety and unpredictable nature of such a pegmatoid type of deposit. The remaining question then is - what additional mineralization may be possible as interpreted from a geologic viewpoint? The following facts are of interest.

The isolated outcrop to the north is composed of siliceous argillite and quartzite generally mineralized with pyrite and locally very heavily mineralized with pyrite. Pit No. 7 is sunk in similar material. It is reasonable to assume a connection or relationship between the rocks of the two occurrences. Further, it has been shown earlier in this report that the present surface truncates a batholithic

body and in this area essentially coincides with the roof. The rocks underlying the intervening sand plain are then quite likely mineralized roof rocks of the granite. What the nature of the mineralization is cannot be told without drilling or further exposure, such as trenching. It is probable that the sand cover is too deep for trenching.

In contrast with the erratic nature of a pegmatite type of deposit, one in which the available igneous solutions have been soaked up by wall or roof rocks offers a relatively consistent ore body. Such a body may even be of low percentage value but by virtue of its assured tonnage is attractive economically. The better known ore bodies of molybdenite are of this type and not of the pegmatite type. Many very spectacular pegmatite occurrences have proved economically unsound.

It is recommended here then that the present workings be abandoned at least tentatively and that the rocks underlying the sand plain be explored to learn the nature of their mineralization. In view of (1) the acute demand for molybdenite at the present time, and (2) the proximity of a molybdenite-bearing intrusive, and (3) the likely occurrence of roof rocks below the sand plain, we believe these rocks should be explored by drilling. Should such drilling reveal the type of mineralization sought, it would not likely be of the pegmatite type. A few exploratory holes to the south of the present workings also offer an attractive gamble.