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NOTES TO ACCOMPANY PRELIMINARY MAPS OF THE REED QUICKSILVER  
MINE, KNOXVILLE DISTRICT, YOLO COUNTY, CALIFORNIA

By Paul Averitt and G. Donald Eberlein

The Reed mine, which was examined in September 1943 by Paul Averitt and G. Donald Eberlein, of the Geological Survey, U. S. Department of the Interior, is in the southeast corner of Yolo County, Cal. in sections 23, 25, and 26, T. 12 N., R. 5 W., Mount Diablo Meridian. The mining property includes the old Fusiyami tunnel, Andalusia mine, and California mine, all of which are now consolidated under the ownership and management of the Bradley Mining Co. of San Francisco. Until the last few years the only significant production from this property was obtained between 1870 and 1880 when nearly 10,000 flasks of quicksilver was produced. The war-time rise in quicksilver prices, however, made possible a new and carefully planned development program, and in the fall of 1943, the Reed mine, with a 40-ton rotary furnace in operation, was the largest producer in the Knoxville district.

The mine lies on a northwest-trending fault between serpentines on the southwest and the Knoxville formation on the northeast. The fault, which dips 80° to 90° SW., in general is marked by a well-defined gouge zone, which locally contains several large, linear greenstone masses of Franciscan age. Silica-carbonate rock, which was formed by the hydrothermal alteration of serpentine, both along the edge of the serpentine mass, and in separate blocks in the fault gouge, is the host rock for the cinnabar deposits. It occurs along the fault in a zone that ranges from a few inches to 100 feet wide, and extends for a horizontal distance of a little more than a mile. The full length of the outcrop of this zone, which is on a steep hillside several hundred feet above creek level, has been explored in part by the early prospectors, and in part by a series of recent power-shovel cuts. In the fall of 1943 stripping operations were still in progress at the extreme northwest end of the zone. Underground development was being carried on by means of two adits at creek level; namely, the Upper Reed tunnel at the northwest end of the mineralized zone, and the Reed mine proper at the southeast end.

The geology of the Reed mine is shown on a plan of the main level and on four cross sections (see sheet 1). At the southeast end of the workings the southwest-dipping silica-carbonate rock lies between two gouge zones. The main foot-wall gouge, which separates the silica-carbonate rock from the Knoxville formation, is 4 to 5 feet thick. It contains fragments of serpentine, veins of calcite and dolomite, nodules of silica-carbonate rock, and a small amount of cinnabar. Most of the ore shoots in the mine occur in the silica-carbonate rock near this gouge contact. The hanging-wall gouge, which lies between silica-carbonate and serpentine, is 1 to 3 feet thick. Typically, it contains sheared serpentine and granular silica-carbonate rock, both heavily mineralized with pyrite and marcasite. This gouge zone cuts diagonally across the silica-carbonate rock and joins

the footwall gouge. The contact between silica-carbonate rock and serpentine continues northwestward as a crushed zone of sulfides, though there is progressively less evidence of movement in that direction. Both the hanging and footwall faults are broken by a main cross fault at the southeast end of the working and the hanging-wall fault is broken in several places by small faults that do not break the footwall fault.

The movement on all faults probably occurred simultaneously with emplacement of the serpentine, and the gouge zones thus formed were factors in controlling silicification. After silicification, minor movements produced systems of fractures in the brittle silica-carbonate rock, and in the crushed zone at the silica-carbonate rock and serpentine contact. Later the mercury-bearing solutions rose along these channels.

The ore is chiefly cinnabar that occurs as small veins and local disseminations in the silica-carbonate rock, and to a limited extent in the gouge. Iron sulfides are very abundant, and bituminous matter in the form of a light-green oil occurs in amounts averaging several gallons per ton of ore. Calcite and dolomite are present in small quantities.

As shown by the distribution of stoped areas, most of the ore shoots in the mine lie in silica-carbonate rock adjoining the footwall gouge. Here ore deposition was controlled by minor reversals in dip of the nearly vertical gouge from the normal southwest direction to the northeast. These reversals produced local hanging walls against which precipitation took place. This kind of structure is illustrated by section A-A' on sheet 1, which shows the relation on the lowest level of the mine below the 223 winze, where good ore occurred. It will be noted that this area is favorable for exploration over a vertical distance of approximately 100 feet and a horizontal distance of 100 to 150 feet. At the southeast end of the workings (see sec. D-D') ore occurred in silica-carbonate rock adjoining the gouge zone on the main cross fault, where the structural control is similar to that in the 223 winze area. Other ore shoots were localized near cross faults in the hanging-wall fault, as in the 217 stope. Still others were controlled by fracture zones that extend between the hanging and footwall faults.

The silica-carbonate rock is thinner and less abundant in the central part of the mineralized zone than at either end. This is well illustrated by the paucity of this material at the northwest end of the workings on the main level of the mine (see sheet 1) and in the Upper Reed tunnel, which lies a short distance from the northwest end of the zone (see sheet 2). Further exploration by power shovel on the surface between these two points was disappointing, and it is unlikely that any better showing will be obtained at depth.

Several areas on the property appear to have better than average possibilities of yielding ore. The best of these is in the structure shown in section A-A', which can be reached from the lowest level in the mine. Equally promising is the ore-bearing outcrop of silica-carbonate rock at the extreme northwest end of the mineralized zone where stripping operations are now in progress. This area might be explored at depth by extending the Upper Reed tunnel a few hundred feet to the northwest. Further development might also be

undertaken in the 202 winze area to test the ore possibilities of the hanging wall gouge at the southeast end of the mine.

Because of the difficulty of obtaining sufficient labor the Reed mine has been unable to carry out more than a minimum amount of development work. It is, therefore, impossible to estimate the reserve tonnage of ore in precise terms. In view of its past performance, and in further consideration of the favorable appearance of the ore in various working places, it can be stated with some confidence that the mine is capable of yielding 1,500 to 2,000 flasks a year for several years.