DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

BULLETIN 640—I

THE GOLD LOG MINE, TALLADEGA COUNTY ALABAMA

BY

EDSON S. BASTIN

Contributions to economic geology, 1916, Part I
(Pages 159–161)

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THE GOLD LOG MINE, TALLADEGA COUNTY, ALABAMA.

By EDSON S. BASTIN.

In June, 1916, the writer made a brief inspection of the Gold Log mine. The visit was made in a few spare hours in an interval between other items of field work, with no intention of collecting data for publication, but as it was found afterward that no description of the mine has been published it appears desirable to record here the few observations made. A summary of existing knowledge regarding the gold deposits of Alabama, by H. D. McCaskey, was published in 1908,[1] but the Gold Log mine was not open for inspection at the time of Mr. McCaskey's visit to the region. The reader is referred to McCaskey's report for a review of the general geologic relations and descriptions of a number of similar gold deposits.

The writer is indebted to Mr. E. A. Thomas and Mr. W. B. Ladd for courtesies during his visit.

The mine is in Talladega County, Ala., about 7½ miles south of Talladega, on the east side of the valley of Talladega Creek. It is operated by the Gold Log Mining Co., E. A. Thomas, president and manager. According to Mr. Thomas, the mine was formerly known as the Story mine and had been operated intermittently for perhaps 70 years before it was taken over by the present owners in June, 1915.

The rocks in the vicinity of the mine are assigned to the Talladega slate, which is regarded as of Lower Cambrian age. The wall rock of the vein is a gray, very fine-grained schist of slightly greenish cast, which strikes N. 60°–65° E. and dips 35°–40° SE. This schist is very finely foliated, and here and there its folia show prominent wavy cross-folding. At some places there are two sets of wavy cross folds, an early and a later set, which run nearly at right angles to each other, the earlier much smaller than the later. The microscope shows that this schist is composed of quartz, sericite, calcite (possibly introduced during mineralization), chlorite, and scattered irregular grains of magnetite, the minerals being here

[1] McCaskey, H. D., Notes on some gold deposits of Alabama: U. S. Geol. Survey Bull. 340, pp. 36–52, 1908.

named in the order of their abundance. The flakes of sericite lie in subparallel positions. They are not evenly distributed but are aggregated into narrow bands, which are composed almost entirely of that mineral. It is these bands that give the rock its finely foliated structure. The other minerals are usually irregular in outline and show little tendency to elongation parallel to the foliation.

The vein has been exploited by a drift tunnel about 250 feet long, from which an incline follows the vein for about 320 feet. Most of the mining in recent years has been done below the tunnel, the greater part of the vein above the tunnel having been stoped out many years ago. The stopes range in width from 5 to 8 feet, the average being about 6 feet.

The ore consists of (1) irregularly interlocking white to light-gray quartz, white to pale-pink calcite, and very minor amounts of sulphides and free gold, and (2) schist partly replaced by some or all of these minerals. The principal sulphide noted was chalcopyrite, much of which shows peacock tarnishes. Enargite (?) also was noted, and magnetite was seen in one specimen. Free gold occurs locally in irregular masses in the quartz. The ore is usually massive and compact, showing no crustification or drusy cavities. It generally forms bands or lenses parallel with the folia of the schist. The contacts between ore and schist are as a rule extremely sharp, in places cutting across the folia of the schist, and sharp fragments of schist are here and there inclosed by ore. Elsewhere there are transitions, parallel to the trend of the folia of the schist, from typical sericite schist wall rock to a grayer rock less finely schistose, and from this rock to a typical assemblage of ore minerals. The microscope shows that the transition rock differs from the typical wall rock only in its larger content of quartz and calcite and in that the sericite bands are narrower and more widely spaced. It is believed to have been formed by the partial replacement of the sericite schist wall rock by calcite and quartz. Locally this replacement preceded the development of the lens-shaped bodies of massive ore, for in some places these cut sharply across the folia of the gray, partly altered schist. Abundant grains of pyrite, most of them less than 1 millimeter in diameter, were noted in some of the schist close to and in sharp contact with the massive ore, but pyrite is entirely absent from other schist similarly situated and was not noted in the gray, partly replaced schist that forms a transition product between ore and unaltered wall rock. As a rule, pyritization of the wall rock is local and inconspicuous.

In general, the relations of ore to wall rock appear to indicate a certain amount of replacement of the sericite schists by ore-forming

solutions penetrating along the folia of the schist in the early stages of the mineralization, followed by an actual prying apart and in places disruption of the folia in the later stages. Whether this disruption was a result of injection of the ore-bearing solutions under pressure or of the forces of crystal growth is uncertain.

The richer parts of the ore are typified by an exposure at the bottom of the incline, where a number of subparallel lenses of quartz, calcite, and metallic minerals together constitute about two-thirds of the 5-foot face. The individual lenses, which range from a few inches to a foot in width, are separated by sericite schist and by quartzose and calcitic schist formed by the partial replacement of the sericite schist. It is characteristic of the deposit that comparatively wide bodies of ore may decrease greatly in width or pinch out completely in very short distances parallel to the trend of the vein. For example, 6 feet along the strike of the vein from the 5-foot exposure just described, which was about two-thirds ore, practically all the vein quartz had pinched out, the entire face being sericite schist.

A mill at the mine is operated by water power obtained by damming Talladega Creek. The mill equipment consists of a jaw crusher, ten 750-pound stamps (2 batteries) dropping 75 to 80 times a minute, two 6-foot amalgamation plates, and tables covered with blankets. The capacity of the mill is about 25 tons in 24 hours. The value of the precious metals recovered is reported to average about $4 to the ton of ore treated. Concentration is not attempted. The bullion recovered from the amalgam is shipped directly to the mint. The mint returns from 32 lots of bullion show that the ratio of gold to silver in the bullion ranges from 0.6 to 1 to 60 to 1; in most shipments the gold is in excess of 10 gold to 1 silver.