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mine  
Lake Mead*

Gold Prospects Adjacent to Lake Mead

Introduction

Five miles from the Nevada shore of Lake Mead, and 55 miles above Boulder Dam, some showings of gold ore were found in 1935 on a claim called the Lake Shore, that has since been operated by the Lake Shore Mining Co., a partnership. It includes Dr. Roy Martin, A. W. Lawson, and Fred D. Gibson, all of Las Vegas, Nev.

A shipment of the ore to the Garfield plant of the A. S. & R. Co. returned 1.55 ozs. gold. Subsequent shipments, towed down the lake on a barge, totaled about 1,000 tons, of which the average value is reported by Mr. Gibson to have been about \$40. This is said to have paid for all expenses to date, including considerable equipment.

Others located the Jumbo, midway between the Lake Shore mine and the lake, and the Belmont at the top of a steep ridge, where a small quantity of very rich rock was found. Someone also made a 50-ton shipment of float picked up from the floor of a little valley, on which the net smelter return was about \$30 a ton.

It appears, furthermore, that a claim called the Eureka had been located long ago and had supported two miners for a number of years, the ore being worked in an arrastra operated by burros.

It is my impression that the area in which showings of gold have been found is probably about 5 miles long by 2 miles wide.

An Appeal by Prospectors to Congressman Scrugham

The occasion of my visit to the place appears to have been an appeal by prospectors of the region to Congressman Scrugham, for aid in understanding the nature of the properties, and, possibly, in securing a small mill that would, of course, greatly assist them in exploration and development. The objective was not the benefit of any individual property but of the properties considered together as a district affair.

Mr. Scrugham accordingly secured the following assignments:

From the U. S. Geological Survey:	Eugene Callaghan, geologist Vincent Kelly, assistant.
From the Bureau of Mines:	C. E. Julihn, mining engineer.
From National Park Service:	Guy D. Edwards, Supervisor, Boulder Dam Recreation Area. Robert H. Rose, Naturalist.

(This service also provided a substantial, gasoline-powered boat, with a crew of three men).

Mr. Scrugham had also arranged for the presence of prospectors interested, including Mr. Gibson, of the Lake Shore, and Jess Mullen, a partner in the Belmont, Leo and Valley View claims, and leaser of the Jumbo.

Two mine operators of Pioche also accompanied the party, Alfred Hunt of Pioche Mines, Cons., and J. H. Beuhler, of the Bristol Silver mine at Pioche. The latter is now having metallurgists of his staff make milling tests on samples of the ore taken under my direction, and has otherwise displayed a friendly interest in the situation.

Messrs. Callaghan and Kelly and Julihn were driven to the Lake Shore mine immediately upon arriving at the landing. They jointly inspected the surface, guided by Mr. Gibson. That night they spent 2 hours underground in the workings of the Lake Shore and then slept at the mine to assure an early start on the following morning, as soon after dawn as practicable, because of the heat in the middle of the day. Their inspection was aided by a hill-climbing vehicle owned by the mine that saved much effort in getting about.

## Geology and Ore Deposits

The cordial attitude of Mr. Callaghan made possible an excellent example of effective cooperation by the Survey and the Bureau. I am greatly indebted to him as he was already familiar with the literature of the region and had some acquaintance with its rocks in the near vicinity. He will make a separate geological report, so the following as to the geology is merely intended to serve as a tentative background for what is to be said of the outlook for mining in the district.

The gold is found in an area of granite identified with pre-Cambrian sedimentaries, possibly as a batholith that invaded them in some later age. Some of the granite is considerably sheared and has a gneissic appearance.

In the Lake Shore mine, the high-grade ore occurs at the contacts of the granite with a chlorite schist, about 15 feet thick, that lies nearly flat, with a dip said to average 6 degrees. The schist has been regarded as a dike but Mr. Callaghan considered also the possibility that it might be of

sedimentary origin, being in that case either a roof pendant or a xenolith stoped into the granitic magma.

In the mine it is apparent that the schist was intruded by the granite. Prof. Longwell of Yale, whom I met a few days later told me that only a few miles distant from the mine there is a great thickness of chlorite schist sedimentaries of identical character, so I assume as a working theory that the schist is in fact a sedimentary in the nature of a roof pendant and not a dike, subject, of course, to final determination of the question by Mr. Callaghan.

If so, the depth and extent of deposits related to individual blocks of the chlorite schist might be expected to be limited; but wherever the schist was found its contacts would be a possible locus of orebodies and should warrant investigation.

#### The Lake Shore Mine

Operations in the Lake Shore mine commenced with stripping of the granite from the upper contact of the chlorite schist inclusion to expose the contact for extraction of its ore. Operations were then extended underground

with flat, stilled or open stopes and an incline to the lower contact.

The contact ore usually contains considerable quartz, some of it massive, but not very thick. Much of the good ore, however, is merely impregnated schist. Associated with the gold there is a little pyrite in very small crystals, no large ones being seen.

A list of samples was furnished me (Docket No. 3281) and I was shown the places from which the cuts were taken. They appear consistent with the showings and are acceptable for descriptive purposes, though a few check samples were taken at the request of Mr. Scrugham. They indicate at least low-grade mineralization in all the rocks about the workings; considerable widths of fair submarginal ore and moderate widths containing substantial values. Most interesting is the fact that appreciable values are shown both in little-shattered granite and in the schist at some distance from the contacts, which suggests possibilities for substantial tonnage of low-grade ore.

The following samples are quoted in illustration:

Sample 38 - Value \$3.80; a cut of 14.3 feet across the entire width of the schist on the west side of the incline.

Sample 38-A - Value \$12.41; the 30 inches next the hanging wall in sample 38.

Sample 60 - Value \$2.80; a cut of 5.5 feet in the face of a crosscut from the incline in schist.

Sample 61 - Value \$21.06; a cut of 3.5 feet from a remnant of the high-grade ore.

Sample 62 - Value \$29.15; a cut of 33 inches including the best looking section of sample 61.

Though these samples are inadequate to establish tonnage, there is no question as to the existence of substantial mineralization.

#### The Jumbo Prospect

In the Jumbo also, mineralization occurs at the contacts of granite with a tabular chlorite schist, that dips at a low angle. The schist can be followed along a hillside for half a mile or more, where its contact has been prospected with occasional pits and small workings.

At a higher elevation there is another similar showing on which less work has been done. There is also a hilltop thickly covered with quartz left by erosion.

Messrs. Beuhler and Scrugham took a number of samples from the Jumbo, some of which showed fair mill-grade values, indicating the similarity of mineralization here to that on the Lake Shore.

#### Belmont Ridge

Extending a mile or two westward from the lake there is a steep ridge, at the top of which, on the end near the lake, is the Belmont where the richest ore of the district is said to have been found, though only in small quantity. The western half of this ridge is said to show quartz float in many places that always contains some gold; but little prospecting has as yet been done there.

#### Discussion

There appear to be two possibilities of interest, (1) that of finding fairly numerous small deposits of moderately rich ore; (2) the possible discovery of low-grade ore in substantial tonnage.



In either case the development of the district would be difficult, if not impossible, without some milling facilities. A number of the showings would warrant some exploration if mill-ore produced could be realized upon to pay for the work, even in part. Upon such exploration would probably depend, in turn, the likelihood of finding any large-tonnage, low-grade ore bodies that may exist in the area.

Though it appeared to me that there should be a considerable amount of ore to be had in the district, no single property seemed to have as yet enough assured ore to support even a small mill; but a district with such widespread mineralization might, as a whole, do so. The small mill proposed, of 25 tons daily capacity, should be regarded merely as a necessary aid to exploration of the region, rather than an enterprise likely to be highly profitable in itself. Likewise the miners benefiting by such a mill should expect to pay relatively high milling charges to permit amortization.

It is my impression, however, that such a pilot mill would serve to make practicable the mining of ore ranging from \$5 to \$8 of which substantial tonnage would probably be found.

Ultimate development of considerable tonnage in these properties would lead, of course, to an entirely different project, permitting the mining of lower grades of ore.

An unshakable popular misconception as to the deadliness of waste waters from cyanide plants would almost certainly prohibit cyanidation on the shore of Lake Mead, from which the drinking water of towns and cities is drawn. Milling must therefore be accomplished by amalgamation and flotation, or possibly flotation alone. The probable effectiveness of such treatment will be known only after flotation tests now in process have been made.

#### Conclusion

It is concluded:

- (1) That there has been substantial mineralization by gold.
- (2) That mineralization is more pronounced at the contacts of granite with chlorite schists that are probably roof pendants of a sedimentary rock.
- (3) That the grade of ore is not high enough to support operations by shipments to a smelter, but that there is probably considerable, though unmeasured, tonnage of ore of milling grades accessible near the surface.

(4) That a 25-ton flotation mill, making possible the exploration of the district, would be logical, if closely integrated with the ownership of all properties that would benefit by such exploration.

C. E. Julihn.