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Platinum Ore in Southern Nevada

By Fred A. Hale, Jr.*

SYNOPSIS—Some recent discoveries, four miles east of the California line and 10 miles west of Goodsprings, Nev., are much richer in platinum than earlier finds in Clark County. The ore in the Boss mine occurs in a crushed fault zone in limestone, which also traverses a batholitic intrusion of acid porphyry. The ore so far developed contains from 0.5 to 1 oz. of platinum per ton, a greater amount of gold, some silver, and small amounts of the base metals.

The presence of platinum and metals of the platinum group in ores from southeastern Nevada was noted by members of the U. S. Geological Survey as early as 1909, the platinum metals occurring with copper, nickel and cobalt in ores from the Key West and Great Eastern mines, near Bunkerville in Clark County. In these properties, the orebodies are associated with pegmatites and very basic intrusions, carrying pyrrhotite and chalcopyrite, the content of platinum metals in the ore varying from 0.1 to 0.2 oz. per ton, so far as data are obtainable.

A deposit of ore, containing the platinum metals in greater quantity and entirely dissimilar in occurrence, has recently been discovered in the western portion of Clark County at the property of the Boss Gold Mining Co. This deposit is 10 miles west of Goodsprings, in the Yellow Pine mining district, and only four miles from the California line. It is easily accessible by team or automobile from Goodsprings, which is connected with the main line of the S. P. L. A. & S. L. R.R. by the narrow-gage railroad of the Yellow Pine Mining Co. at Jean.

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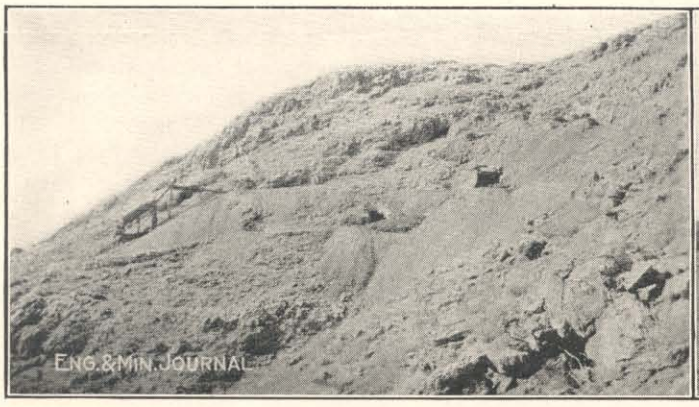
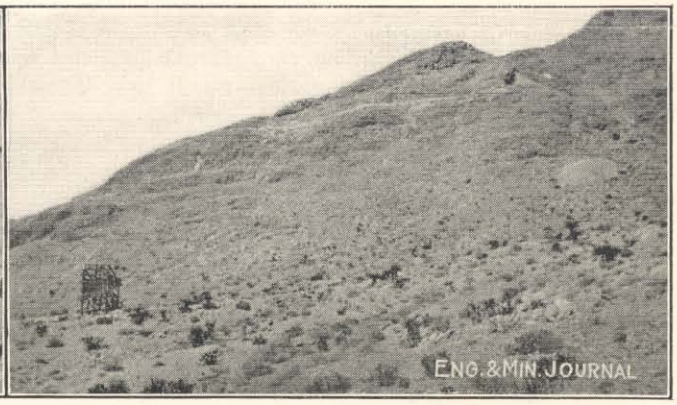
Boss Mine Originally Worked For Copper

The property of the Boss Gold Mining Co., formerly known as the Boss mine, was originally explored in the early '90s on account of the copper content of the ore, there having been a large outcrop of copper-carbonate ore at the surface. A leaching plant was constructed at Goodsprings to treat the ore from this and the Columbia mine. The leaching plant proved a failure, and the mine reverted to the original owners, Yount & White, of Goodsprings. Not recognizing the more valuable constituents of the ore, the property was permitted to remain idle until the spring of 1914, when the Boss Gold Mining Co. was organized for its further development.





Boss Mine Where Rich Platinum Ore Has Been Found, 10 Miles West of Goodsprings, Nevada

Upper workings of Boss mine

Boss Hill, showing workings and tramway of Boss Gold Mining Co.

The country rock in the vicinity of the Boss property consists of thick-bedded limestones, probably of upper Mississippian age, dipping about S 60° W at an angle of 10° to 20° from the horizontal. These limestones are cut by a large batholithic intrusion of acid porphyry, which has been identified as a quartz monzonite, showing large phenocrysts of orthoclase feldspar and occasional quartz crystals in a fine-grained ground mass, the whole presenting a facies almost identical with the numerous porphyry intrusions throughout the Yellow Pine district.

The orebodies so far developed occur entirely in limestone, in a crushed fault zone, striking N 30° E, which traverses both limestone and porphyry. A tunnel has been driven into this fault zone from the point where the

largest outcrop occurred; at lower levels, two other tunnels have been driven, the first of which, about 30 ft. lower than the upper tunnel, has encountered the main ore zone. The lowest tunnel is being driven at an elevation several hundred feet lower than the upper workings, and has not yet reached the main ore zone.

Ore Richer in Platinum Than First Discoveries

The main of upper tunnel followed the ore for a distance of 200 ft. along its strike, in a northeasterly direction. The ore varies in thickness from 2 to 10 ft., the average being about 6 ft., and in appearance is a brownish granular mass, showing occasional streaks of hard quartzose material. Both walls of the ore are shattered limestone, and along these walls occurs an encasement of malachite, varying in thickness from a few inches to several feet. The main body of the ore zone carries little copper. An average of the ore, sampled at 5-ft. intervals for 200 ft. along the upper tunnel gave the following results: Gold, 1.13 oz. per ton; silver, 5.20 oz.; copper, 0.20%. These samples were not analyzed for metals of the platinum group, but H. K. Riddall, chemist for the Yellow Pine Mining Co., who analyzed the samples, reported that metals of the platinum group were present, this being the first report of the presence of these metals. It has since been learned that this ore contains 0.5 to 1 oz. of platinum per ton.

In June, 1914, a winze was started from the upper tunnel following the ore on its dip, and high-grade ore was encountered within a few feet. The appearance of the ore did not change materially except for the occurrence of small masses of a greenish talc within the vein. Some of these masses were sufficiently large to be mined separately, and two small shipments, aggregating about one ton, were forwarded to the American Smelting & Refining Co. at Murray, Utah. Their settlement analysis was as follows, platinum not being determined or paid for: Gold, 124.79 oz. per ton; silver, 23.9 oz.; lead, 1.05%; copper, 0.65%; insoluble, 73.2%; sulphur, 3.1%; iron, 6.7%.

On the same control sample of this shipment, Ledoux & Co., of New York, report the following analysis for metals of the platinum group: Platinum, 99.08 oz. per ton; palladium, 16 oz; iridium, trace.

The winze has been sunk to a depth of about 35 ft., and drifts driven on the ore in both directions, developing a considerable tonnage of ore. A carload shipment of material from this development, without sorting, returned as follows: Gold, 8.752 oz. per ton; silver, 5.02 oz.; copper, 0.97%; insoluble, 80.7%.

On similar material from this location, Ledoux & Co. report as follows: Gold, 11.55 oz. per ton; platinum, 7.38 oz. Several carloads of material of about this class are now broken in the mine, pending negotiations for the satisfactory disposition of the ore.

Ratio of Platinum to Gold

It has been fully determined that metals of the platinum group are present in all of the ore thus far developed. Ledoux & Co. state as their opinion that the metals are in the free state, "being apparently alloys of gold and platinum metals." It would also appear from numerous assays that the platinum metals bear a fixed ratio to the gold content, being in the proportion of about ⅔ oz. platinum to 1 oz. gold. The ore is thoroughly oxidized, no sulphides having as yet been recognized, and the gold alloys have a "rusty" appearance, showing no colors after panning until they have been thoroughly scrubbed or treated with acid.

The occurrence of the ore is especially peculiar in that it occurs entirely in limestone, the nearest known porphyry contact being about 600 ft. distant. The ore apparently follows the stratification of the limestone more or less regularly, indicating replacement, but appears to be confined in a fault zone about 60 ft. in width, following the fault planes along their strike. A gouge occurs along some of these fault planes, which is strongly indicative of porphyry, and metamorphism is noticeable in the adjacent limestone, indicating that an igneous intrusion may be closer to the orebody than is apparent from the present development. It is probable that the porphyry was the original source of the ore, the precious metals having been deposited in the crushed fault zone, with copper and iron sulphides, which since have been thoroughly oxidized. It is a noticeable fact that the malachite above described carries little gold or silver and no platinum metals are evident. A carload shipment of copper ore from the same workings contained 23.4% copper, but only 1.4 oz. silver and 0.16 oz. gold per ton.

From present development it would appear that the district bids fair to become an important producer of platinum. The Boss Gold Mining Co. has erected a tramway from its upper workings to the wagon road, and is in a position to maintain steady shipments as soon as satisfactory terms for the ore have been arranged. Some difficulties have been encountered, as the Western smelteries appear unable to handle this class of ore to advantage, but it is hoped that satisfactory arrangements can be made with Eastern firms. The company is also conducting a series of tests on the lower-grade ore, and expects to erect an experimental plant for treatment of ore on the ground. Numerous other claims have been located in the vicinity, and are now under development. The Azurite Mining Co., whose ground adjoins that of the Boss, has developed some ore, although of somewhat different character from that of the Boss mine.

First-Aid Instruction in California

By Lewis J. Eddy

Mine rescue and first-aid training instructions were given to miners at Grass Valley by U. S. mine rescue car No. 5 on Sept. 16. The car was not sent to Grass Valley on account of the fact that the railroad from Colfax to Grass Valley and Nevada City is narrow-gage. The car remained at Colfax but the equipment was shipped and the full complement of men went with the equipment. The work was in charge of E. Steidel, junior mining engineer, and George W. Riggs, first-aid instructor. Both operators and mine bosses, and the miners as well, showed a great deal of interest in the work as taught by the government men, and it has been planned that a half-shift tri-monthly practice will be inaugurated. Instructions were given miners at the North Star, the Brunswick, the Empire and the Champion. Practical demonstration of rescue training was successfully carried through in an abandoned end-drift on the level 28 of the North Star mine. A fire was kindled and the men under instruction were obliged to work under actual mining and mine-fire conditions. The smoke and gas generated by the timber fire extinguished the carbide lamps. The men