THE LOS BURROS DISTRICT, MONTEREY COUNTY, CALIFORNIA.

By James M. Hill.

INTRODUCTION.

The following notes concerning the metal prospects of the Los Burros district, in the southwestern part of Monterey County, Calif., are based on observations made during a visit of a few days to this section of the Santa Lucia Range in February, 1921. The author is under obligation to the few operators in the region for their many courtesies, particularly to the owners of the Gorda properties and the caretaker at the Buclimo mine.

The district lies on the west side of the rugged Coast Range, near the south line of Monterey County, in Tps. 23 and 24 S., R. 25 E. Mount Diablo meridian. Most of the properties are near the Government mail trail between Jolon, east of San Antonio River, and Gorda, a small ranching settlement on the coast about midway between Monterey and San Luis Obispo. It is reached from King City, a station on the Coast Line of the Southern Pacific Railroad at the south end of Salinas Valley, by 45 miles of road and 14 miles of rough, steep trail. Travel except on the trails is next to impossible, because of the dense tangle of scrub oak, madrona, and manzanita. There is a fair stand of spruce and pine on the upper slopes of the mountains, and redwood is found in the canyon bottoms on the coast side of the range at elevations as great as 2,000 feet. Most of the prospects are confined to the drainage basin of Willow Creek and the headwaters of Alder Creek, a smaller stream south of Willow Creek.

TOPOGRAPHY.

The Coast Range in this region is 12 miles wide and has a rather even sky line approximately 3,300 feet above the sea and 2,000 feet above the low country to the east. The summit of the range is 5 to 6 miles east of the coast line. This narrow mountain wall is intricately cut by deep, narrow gorges, and in consequence the surface is extremely rugged, as is well shown on the Cape San Martin topographic map issued by the United States Geological Survey.

The only flat areas in the mountain region are remnants of old beaches, now found elevated above the sea. The highest remnants noted are at an elevation of 900 feet, but the largest, upon one of which Gorda is located, are about 100 to 200 feet above sea level. South of Cape San Martin, however, there are well-developed beaches which stand 500 feet above sea level.

GEOLOGY.

The whole district is underlain by rocks of the Franciscan formation. No intrusive rocks other than the serpentinized basic dikes so characteristically associated with the Franciscan were noted, though intrusive granite occurs in the mountains at the headwaters of Nacimiento River. No attempt was made to map the irregularly distributed masses of serpentine, but there appear to be two more or less continuous belts or dikes, lying about 2,000 feet apart and trending in a west-northwest direction, which run through the south-central part of the district. The most conspicuous exposures of the southern belt were noted along Spruce Creek, in the vicinity of the Gorda mine, and at the head of Alder Creek, near the Buclimo camp. The northern belt is well exposed along the south wall of the canyon of the South Fork of Willow Creek. The serpentinized rocks are almost completely altered, but a few specimens taken from the center of a particularly large outcrop indicate that the original rock was a peridotite.

The Franciscan formation as exposed here is made up of dark greenish-gray arkosic, micaceous sandstones, in general fine grained but passing into fine conglomerates that are usually noted as lenses rather than as continuous beds. Although sandstone predominates, a large amount of the rock weathers like shale, because of the fineness of the constituent grains and the parallel distribution of the mica. The most abundant constituent of the sandstone is quartz, but orthoclase and plagioclase feldspar is only slightly less abundant. The dark color of the rocks is due to an unusual amount of hornblende and biotite. Near the serpentine areas the sandstone is altered to contorted schist, much crushed and sheared and cut by veinlets of quartz and calcite. In places in the vicinity of the basic dikes considerable bodies of massive sandstone have been thoroughly impregnated with minute crystals of garnet and pyrite.

All the rocks weather rusty brown, but there is a noticeable difference between the colors developed by weathering of the rocks in the deeper canyons and those near the summits of the ridges. The sandstone is massive, with little evidence of bedding, but weathers rapidly in small angular pieces that disintegrate readily into a brown sandy clay. The conglomerate lenses are usually composed of small rounded or egg-shaped pebbles of pinkish feldspar, white quartz, and black slate. In a few places, however, lenses of coarse arkosic sandstone, with small, flat, angular pieces of black slate, were noted.

Only one small lens of radiolarian chert was seen; this lies at the head of Alder Creek a short distance from the New York mine.

There seem to be two rather distinct facies of the Franciscan formation in this district. The rock exposed in the lower parts of the canyon weathers in larger and more angular blocks of darker color than the overlying rocks that are exposed along the mail trail near the Buclimo mine and on the upper part of the ridge north of Willow Creek canyon. So far as known, serpentine does not occur in the overlying rocks. These upper rocks weather in small fragments, more like shales, though fresh exposures show that they are fine-grained sandstones, composed of essentially the same materials as the slightly coarser sandstones of the lower series.

The heavy growth of underbrush and the deep accumulations of broken rock and soil, even on steep slopes, make study of the structure very difficult. Practically all the readings taken on the west side of the summit gave strikes of N. 50°–70° W. and dips of 20°–60° NE. East of the summit the strike is more nearly N. 45° W. and the dip 65°–70° NE. It is judged that this particular part of the Santa Lucia Range is a monoclinal tilted block, lying between a fault whose escarpment forms the northeastward-facing wall along Nacimiento River and another fault represented by the scarp along the coast. These faults trend approximately N. 40° W. The trace of a major fault trending N. 70° W. is indicated by a series of benches and depressions on the south wall of the South Fork of Willow Canyon, about midway between the two larger serpentine dikes. The structure is probably complex in detail, for much evidence of minor movement, both parallel to and across the general structure lines, is seen in every exposure.

HISTORY OF MINING.

The Los Burros district was organized in 1876,[1] though little but placer mining was done in the region until 1887, when the Last Chance (Buclimo) deposit was discovered by W. D. Cruikshank. Before that time a small quantity of gold was produced yearly by Chinese, who washed the gravels of San Antonio River in the vicinity of Jolon, and a little ragged coarse placer gold had been recovered from the ravines of the Santa Lucia Range near the coast. Cruikshank's discovery at the head of Alder Creek caused only a mild excitement, for the region was rugged, and transportation of supplies and equipment was difficult. In four months after the discovery of the Last Chance sufficient free gold had been saved from the surface workings to pay for the installation of a 3-stamp mill and small boiler on the property. The developments, consisting of open cuts, shafts, and drift tunnels that attained no great depth, showed three

[1] Irelan, William, California State Min. Bur. Eighth Ann. Rept., pp. 405–410, 1888.

nearly parallel quartz veinlets, lying parallel to the bedding of sandstones. A group of claims, including the Mars, Manchester, Grand Pacific, and Ophir, was located near the original discovery, and the Stonewall and Brewery, farther west on Willow Creek, were located during the same year.

Apparently little was done in the district after 1888, except at the Last Chance mine, for the next record of the State mineralogist is for the year 1892.[2] By that time the Last Chance had reached a depth of 160 feet.

Practically all the mining in the district was confined to the mines on Alder Creek until 1902, when the discovery of a few very large gold nuggets on Spruce Creek led to the organization of the Gorda Mining Co., which has done some work to locate the veins that were the source of this coarse gold. About the same time placer gold was found in the gravels of Willow Creek, and very rich quartz float was found on the Plaskett property, called the Ocean View. The Bushnell vein, on the point between Willow Creek and its North Fork, at an elevation of 1,600 feet, was discovered about 1904, and more recently croppings showing copper-stained pyritic sandstone have been prospected in the canyon of the South Fork of Willow Creek, about 2 miles north of the Last Chance mine. The Last Chance and several other properties in the vicinity are now controlled by the Buclimo Mining Co., and the original names have been more or less lost. This company found the upper workings in such state that it began to drive a long crosscut from Alder Creek to tap the veins at a depth of about 400 feet, but this project was not completed.

The total production of the Los Burros district is estimated at $90,000.[3] The records of the United States Geological Survey show a production of $4,746 in gold and silver for the period 1905–1908, most of it from siliceous gold ores. During another period of activity from 1912 to 1914 a total of 329 tons of siliceous ore was treated, and the total production of the district, including a small quantity of placer gold, was valued at $14,419. There is no record of production from the district since 1917.

In the winter of 1920–21 a little development work was done on the Bushnell, Gorda, and New York properties and some surface work at the Melville and Hammond prospects, on the south side of Willow Creek.

ORE DEPOSITS.

The principal mineralization of the district is in the vicinity of the serpentine belts, and the greatest amount is at the head of Alder Creek, near the Buclimo, Grizzly, and New York properties. In

[2] California State Mineralogist First Biennial Rept., for the two years ending Sept. 15, 1892, p. 259.
[3] California State Mineralogist Fifteenth Ann. Rept., p. 597, 1916.

this locality relatively narrow quartz stringers, from half an inch to 2 inches in width, that strike N. 70°–85° W. and usually dip 60°–85° N., lie parallel to the major structural features. Calcite and siderite in minor amounts are associated with the quartz in most places. Oxidation is relatively shallow, and in some pits sulphides are found directly at the surface. The oxidized surface ores are largely limonite-stained bodies of crushed sandstone, with more or less quartz, and carry free gold. The sulphide ores, which were visible at only a few places in 1921, consist of sandstone cut by veinlets of quartz and a little calcite, which have been crushed and later mineralized. The sulphides are pyrite, arsenopyrite, and minor amounts of chalcopyrite, sphalerite, and occasionally a speck of galena. The sulphides are usually confined to the immediate vicinity of the quartz veinlets, though in a few places finely disseminated pyrite, with much less chalcopyrite, is diffused through the sandstone for several feet from the veinlets. Practically all the gold produced from the lodes in the district has been extracted from relatively small lenses of oxidized ore, which required only amalgamation for treatment. It is doubtful if the sulphide ores are sufficiently rich to stand the cost of transportation and treatment by smelting.

At the New York property, on Ajax Mountain near the summit, two narrow veinlets, about 18 inches apart, constitute the lode. The crushed, contorted rocks between the veinlets carry pyrite and arsenopyrite, with very minor amounts of chalcopyrite and galena. Complete oxidation on this lode has extended to a depth of 50 feet, and mining to that depth has yielded some fairly good free-gold ore. Two tunnels, a few hundred feet in total length, have been driven in the sulphide zone. The sulphides are in very small crystals and appear to have been deposited subsequently to a period of crushing of the original quartz veins. Arsenopyrite predominates over pyrite.

The Grizzly ledge, in the bottom of the Alder Creek valley, between the New York and Buclimo properties, measures 3 to 4 feet between walls. The ledge matter is crushed sandstone, with stringers of oxidized quartz and a little calcite. The incline on the ledge, which dips 75° N., is said to be 80 feet deep but was partly filled with water at the time of visit.

The Buclimo (Last Chance) workings were not accessible. From the surface work it is judged that at least four nearly parallel lodes exist on the property. These strike N. 80° W., and, to judge from the northerly dips at the surface, the ledges may come together with depth. It is said that from the surface to the tunnel level, 85 feet below, the lode has been stoped for a width of 10 feet and a length of 500 feet. A little ore, presumably from the tunnel level, found in a mill bin showed quartz-calcite veinlets, with pyrite and arsenopyrite in crushed, somewhat mineralized dark-colored sandstone and shale. The upper workings are reported to be abandoned now, and a long crosscut tunnel has been started from the level of Alder Creek, near the Grizzly incline. This crosscut is more than 1,800 feet long but has not reached the vein. It was run in a direction almost parallel to the vein and the strike of the sandstone beds. The first 200 feet of the crosscut is in medium-coarse sandstone; next there is 100 feet of black chert; and the remainder of the tunnel is in nearly black sandstone that is almost fine grained enough to be termed slate. This tunnel shows the formations to be very much broken and faulted, most of the movement being parallel to the bedding in dip as well as in strike, but with many planes of minor movement showing parallel strike but much steeper dip than the bedding.

The Melville claims, on the ridge between Alder and Willow creeks, appear to be a westward continuation of the Buclimo. A large open cut just below the trail exposes a much crushed zone of sandstone about 10 feet wide, with stringers of quartz that strike N. 70° W. and dip 50° N. It is said that all the material from this zone shows some gold.

The Brewery tunnels are north of the trail, about 200 feet down the slope toward Willow Creek from the mail-trail ridge and 1 mile west of Melville's cabin. They were caved at the time of visit but apparently were run on a ledge that strikes N. 80° W. and in the cuts dips 60° S. As exposed in the cuts the ledge matter is 6 feet wide and consists of fine-grained black sandstone, with veinlets of quartz and a little siderite. No sulphides were seen on the dump, but small casts of cubical outline filled with limonite indicate that the mineralization is similar to that at the Buclimo.

In the canyon of the South Fork of Willow Creek F. C. Hammond has several prospects on N. 80° W. zones of mineralization in the slates and sandstones. The metalliferous minerals here consist largely of disseminated pyrite and chalcopyrite in hard dark-colored sandstone along a series of nearly vertical tight fractures. No arsenopyrite was noted. There is practically no oxidation on any of the ledges, though a little iron and copper stain is to be seen directly at the surface. At one of Mr. Hammond's claims, on the ridge between South Fork and Willow Creek, pyrite and a little chalcopyrite are disseminated along a shear zone in garnetized sandstone about 25 feet from a lens of serpentine. Very minor amounts of copper silicate and limonite coat the joints at the surface.

The Gorda property is on Spruce Creek in sec. 4, T. 24 S., R. 5 E. In 1902 several exceptionally large ragged gold nuggets were found in the stream bed near by. Considerable money was spent in equipping the property for hydraulic work, and a little more gold was obtained. The talus and soil cover, however, were so deep that the stream gravels had not been reached except over a short distance. A number of tunnels have also been run in talus to locate the rim of the covered channel, and some work has been done in the sandstone on the north wall of the gulch in the hope of discovering the source of the coarse gold, but this objective had not been reached in 1921. The sandstone cut by this tunnel is peculiar in that it contains small flat fragments of black slate, minute red garnets, and a small amount of finely disseminated pyrite. The mineralization is localized in the sandstone within 150 feet of a considerable outcrop of serpentine.

The Bushnell property is on the point between the Middle and North forks of Willow Creek. The developments consist of an inclined shaft and a crosscut tunnel, 330 feet in all. The incline is sunk 130 feet on the intersection of a north-south fracture that dips 50° E. and a N. 50° E. stringer that dips 50° SE. It is reported that about $9,000 in free gold was milled from the ore obtained in sinking this shaft. At the tunnel level the north-south fracture is barren; the N. 50° E. fissure ranges in thickness from a knife-edge to 8 inches and is filled with white quartz, calcite, and fragments of wall rock, the whole much crushed and shattered. A little free gold is visible in some of the quartz, but no sulphides, limonite, or other indications of the former presence of sulphides were noted in the ore.

The Ocean View (Plaskett) property, on the west slope of the ridge west of the North Fork of Willow Creek, in sec. 30, T. 23 S., R. 5 E., is developed by an 86-foot incline, with short drifts to the northwest at 40 and 80 feet and a 100-foot drift tunnel to the southeast on the 40-foot level. The ledge strikes N. 45° W. and dips 10° NE. at the surface but steepens to 60° at the bottom of the incline. It consists of crushed white quartz, slightly iron stained but with no visible sulphides. It is reported that $18,000 in free gold was recovered from float picked up below the croppings and from ore obtained in sinking the incline. It is judged that the free gold occurred in a small lens, for the quartz exposed in the workings appears to be barren.

The placer gold found in small quantities in practically all the gulches but particularly on Spruce and Willow creeks was derived from the weathering of small veinlets similar to those disclosed in the properties described above. Most of the placer gold is in small ragged particles that have not traveled far from their source. The large nuggets found in Spruce Creek evidently came from a particularly rich pocket in the immediate vicinity.

The mineralization of the district is not particularly strong, and, although there may be further discoveries, near the surface, of pockets containing free gold, it is believed that all that can be expected below relatively shallow depths will be rather small bodies of pyritic ores of relatively low tenor.

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