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from the shaft, has apparently not always been adequate. The mill has not been in operation recently.

ELDORADO CREEK VALLEY.

Little lode prospecting has been done in the Eldorado Creek basin, but the general geologic conditions there appear to be similar to those in regions that contain auriferous veins. On the Rose claim, which lies about a quarter of a mile south of the Newsboy mine, an adit 180 feet long has been driven on a quartz vein about 1 foot wide. Two tons of the ore, milled at one of the custom mills at Fairbanks, are said to have contained a large amount of concentrates, but no statement as to their average gold tenor has been published. The property, not being in operation at the time of the writer's visit, was not examined, so the direction and the character of the vein were not determined.

Prindle reported in 1909 that auriferous quartz had been found in a shallow prospect pit sunk at an elevation of 1,775 feet near the head of Last Chance Creek. No work has been done on this property recently. Farther west, at an elevation of 1,400 feet, near the forks of Little Eldorado Creek, Prindle noted in 1909 a short tunnel trending S. 15° E. Some work has been done at this place more recently, but the claim was not visited by the writer, and details concerning it are lacking. At an indefinitely located point near the head of Spruce Creek a lode said to carry about $12 a ton in gold is reported to have been opened up by a shaft 150 feet deep. This property was not seen by the writer, and no further information concerning it was obtained.

DOME CREEK VALLEY.

RELIANCE MINING CO.'S CLAIMS.

The northern slope at the head of Dome Creek valley is covered by claims belonging to the Reliance Mining Co. and to people interested in that company. These claims form two parallel series. The northern series, named from west to east, comprises the La Rose, Wild Rose, Soo, Waterbury, Carnation, and Inspiration claims; and the southern series, which extends from a point near the middle of the southern line of the Soo to the middle of the southern line of the Carnation, consists of the Waverly and Chief claims (fig. 18). Three main veins have been found on these properties, two trending nearly east and west and dipping north, and the third trending N. 50° E. and dipping 50° NW. The northern of the east-west veins is called the Soo vein and the southern the Wild Rose vein. The two converge toward the east, so that whereas near the west-end line of the Soo claim they are 135 feet apart, at the east-end line of that claim they are 60 feet apart, and at the end line between the Waterbury and Carnation claims they are said to be less than 20 feet apart.

Of these three veins the Wild Rose has been most developed and has yielded the greatest amount of gold. An inclined shaft on the end line between the Wild Rose and Soo claims has been sunk 100 feet and drifts have been turned off to the east at the 50-foot level and at the bottom. Much ore has been stoped from the upper level and milled. The vein followed by the drift at the bottom of the shaft is said to be a spur from the main vein, and the latter is supposed to be in the rock on the footwall side. Twenty-five feet east of the collar of the shaft an open cut has been made on the vein and the ore has been stoped out underhand.

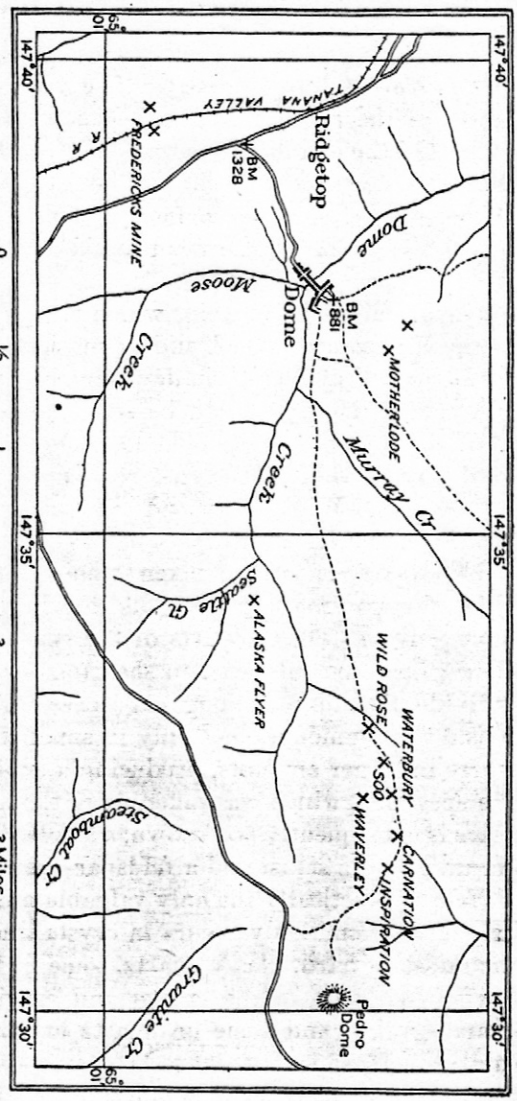

FIGURE 18.—Sketch map showing location of lode prospects in Dome Creek valley and near Ridgetop.

A little southeast of the open cut a tunnel was driven eastward for about 100 feet, to a point where it intersected the vein exposed in the shaft and open cut, and from that point a drift was turned back at an acute angle westward on the vein and the ore stoped out for about 35 feet. The drift was carried eastward from the intersection of the tunnel and the vein for about 100 feet to a cross vein trending about northeast-southwest and dipping 40° SE. Where it was first cut this cross vein was very narrow, but at the bottom of a winze 20 feet deep, sunk near the intersection of the veins, it was 3 feet wide. The east-west vein is sharply cut off

by the cross vein, and its continuation in the rock on the hanging-wall side of the latter has not yet been found. The wall rocks of the cross vein are much slickensided, but the amount of movement can not be determined.

The main openings on the northern vein, the Soo, are on the end line between the Waterbury and Soo claims, near the center of the Soo. At the end line a shaft 100 feet deep has been sunk and a short drift turned off to the west. The vein dips about 68° N. In the center of the Soo claim a tunnel, now caved, crosscuts the northern vein. On the end line between the Waterbury and Carnation claims, near the 1,800-foot saddle on the ridge running west from Pedro Dome, several shallow surface pits have disclosed quartz float that is believed to have come from the vein, but no mining has been done at this place.

The so-called Chief vein, which trends N. 50° E., traverses parts of the Waterbury, Chief, and Carnation claims. It has been opened up at several places by shallow surface pits, but these have caved so badly that the vein could be seen in only one of them—a 20-foot shaft at an elevation of about 1,900 feet. This vein is nearly parallel to the cross vein in the eastern tunnel near the shaft on the line between the Wild Rose and Soo claims, but it dips northwest, whereas the cross vein dips southeast.

The specimens of ore taken from all these claims are strikingly alike, the ore from separate pits showing no greater differences than the ore from different parts of the same pit or drift. Much of the quartz has been subjected to shearing, so that it is "sliced" and its individual plates are elongated lenses. Crystalline quartz occurs in considerable amounts, not only in small drusy cavities, but also elsewhere in larger amounts, producing a typical "comb" structure. In one specimen, which was taken from the dump and whose location in place is consequently not known, a small stringer of crystalline quartz occurs between schist and a feldspar-quartz igneous rock.

Gold is practically the only valuable mineral in the ore. It is very bright and commonly occurs in crystalline aggregates, some of it in the midst of hard, glassy quartz, some in the more porous zones near the schist, some in the cracks and crevices between the fractured quartz grains, and some on quartz crystals that project into drusy cavities. It appears to have been introduced at different times, but there is little question that much of it was deposited contemporaneously with the rest of the vein material as free gold and was not leached from sulphides by surficial processes. At several places where faults occur the gold has been dragged out and forms thin metallic plates on the slickensided surface, showing plainly that it was in the vein prior to the faulting.

The richest gold ore is reported to occur in shoots that pitch eastward. This is the direction of dip of the cross vein in the tunnel noted on page 191, and it is by no means improbable that the shattering incident to the movement parallel to the fault occupied by this vein may have opened up the older vein and permitted the access of new gold-bearing solutions. Whether or not this interpretation is correct, the older vein is said to be much richer near its contact with the northeast-southwest vein. These shoots, of which at least two are known in the present workings on the Soo, are reported to be about 20 feet wide.

Several determinations by local assayers and by the Selby Smelting and Refining Co. of San Francisco show that the gold has a fineness ranging from 0.823 to 0.843. An assay made by the San Francisco firm of a 50-ounce sample of bullion gives 824½ parts of gold and 149 parts of silver. This indicates that the bullion is worth a little more than $17 an ounce.

Sulphides form but a small part of the vein material. A small amount of stibnite occurs in many places and some large masses are reported; none were seen, however, and their relations to the vein were not determined. In addition to the more usual sulphides, the vein contains small quantities of tetrahedrite (sulphide of silver, copper, and antimony), with which some gold is intimately mixed, the two having been deposited contemporaneously. Copper sulphides are extremely rare.

The gold tenor of the ore, estimated from the material now being mined, is very high. Much of the ore treated at the local mills has yielded $50 to $60 or even more to the ton, and mill runs on 8 to 10 tons of ore from the richest portions of the vein have given returns of over $250 a ton in gold.

The ore from this property was formerly treated at one of the custom mills, but in 1912 a small 3-stamp mill of local manufacture was installed. This mill, which is equipped with 250-pound stamps and has a capacity of only about 3 tons of ore a day, is situated near the Wild Rose-Soo shaft. Water is supplied mainly by pumping from a sump at the bottom of the shaft; and at that elevation so little is available that it has not been possible to run the mill more than a few hours a day. The ore as delivered from the mine is cobbed by hand before it is delivered to the hopper for automatic discharge to the battery. It is crushed in the stamps to 30 mesh and is then passed over the plates. No appliance is used for collecting the concentrates, the tailings being discharged directly from the lower end of the plates.

According to the manager, nearly 80 per cent of the gold recovered is caught in the mortar box, the remaining 20 per cent being found

on the plates. All the gold amalgamates readily and little or no base material is present to contaminate the mercury. Though no determination of the amount of gold lost has been made, the amount of free gold lost in the tailings is probably small, for the lower end of the plates is very clean, but a good deal of the gold in the sulphides and other heavy minerals is probably lost

The present site of the mill is so disadvantageous that a new site has been chosen on Dome Creek below the mine, and a new mill, equipped with two Nissen stamps, is expected to be in operation by the close of 1912. Although this situation will necessitate tramming the ore for some distance, the advantage of a continuous supply of water should more than offset this charge.

MISCELLANEOUS PROPERTIES.

On the ridge between Dome Creek and the lower tributary of Seattle Gulch, at an elevation of about 1,200 feet, a 30-foot shaft has been put down on the Alaska Flyer claim. Not enough work has been done to indicate the nature of the ore, but it is reported that auriferous quartz has been found and that further prospecting will be done.

Half a mile northeast of Dome City, at an elevation of about 1,000 feet, some prospecting has been done at two shafts sunk on the Mother Lode and contiguous claims. The western shaft was 147 feet deep, and at its bottom a short crosscut was run eastward. The eastern shaft, 200 paces east of the western, was sunk 215 feet, the first 60 feet through muck and the rest through rock, no gravel intervening. In 1912 both shafts were almost filled with water, so that the underground workings were inaccessible, but the material on the dump indicates that no lodes similar to those now productive in the region have been found. The material is interesting, however, as it shows a somewhat graphitic limestone rather heavily impregnated with disseminated sulphides. The metallic mineral is mainly iron pyrite, but the rock also contains a little copper pyrite and some arsenopyrite. Some faulting has occurred subsequent to the deposition of the sulphides, for well-polished planes with mirror-like surfaces formed by both sulphides and country rock are by no means uncommon.

VAULT CREEK VALLEY.

FREDERICKS MINE

About a mile south of Ridgetop, on the eastern slope of Vault Creek valley, are claims forming what is locally known as the Fredericks mine. (See fig. 18, p. 191.) This property has been developed by two shafts—the western, at an elevation of about 1,225 feet, and the eastern, at an elevation of about 1,350 feet—both sunk