GOLD AND SILVER.

NOTES ON THE PLACER DEPOSITS OF GREATERVILLE, ARIZONA.

By J. M. HILL.

INTRODUCTION.

The information contained in this report was obtained by the author in the latter part of March, 1909, while engaged in a mining reconnaissance of the Patagonia and Nogales quadrangles, Arizona, under the direction of Waldemar Lindgren and F. C. Schrader. The writer is under obligations to Mr. P. J. Coyne, of Greaterville, for much valuable information and assistance in the field, and to Messrs. Joseph Anderson, Daniel Johnson, and Hughes for historical data.

Greaterville is 5,280 feet above sea level. It is east of the Santa Rita Mountains, about 3 miles from the summit of Melendreth Pass, whose elevation is 5,850 feet. The Nogales branch of the Southern Pacific Railroad crosses the head of the Cienega drainage basin about 8½ miles southeast of the town. The wagon road from Greaterville to Sonoita, the nearest station on that road, is 13 miles long, running 7 miles a little south of east to Cienega Creek, thence following south up that valley to the station, a distance of 6 miles. A trail of a little over 9 miles connects the two points. Mail is received three times a week, brought on horseback from Helvetia by way of Rosemont, a distance of 14 miles by trail.

In the early part of 1874 the old Yuba mine at the head of Hughes Gulch was operated in a small way. Some cerusite containing silver and gold values is reported to have been rich enough to send to San Francisco and still net $90 per ton. The St. Louis lead mine was located a short time later and produced some ore. In the latter part of 1874 A. Smith found placer gold.[a] The discovery started a rush to this camp, and in 1878 there were 76 American voters regis-

[a] Raymond, R. W., Mines and mining west of the Rocky Mountains, 1875, p. 390.

tered, besides a population of about 400 Mexicans. The Greaterville mining district, according to Mr. Coyne, was organized March 17, 1875, but was never recorded with the county officials.

In 1876 Raymond[a] reported that the gold was coarse and that nuggets worth from $35 to $50 were brought in to Tucson, the average running from $1 to $5. The gold yielded from $16 to $18 an ounce, and it was not difficult for a man to clean up 1 ounce a day. The largest nugget ever reported from the camp weighed 37 ounces.[b]

The gravels were first worked by rocker, as water was scarce. A number of Mexicans made their living by packing water in goatskin bags from Gardner Canyon, 4 miles to the south, charging 25 cents a burro load of 10 to 16 gallons. Mr. Coyne states that by 1881 all the richer stream gravels had been worked over, and men began to leave the camp. Until 1886 the Indians also were to be reckoned with.

At about this same time (1886) the placers were considered worked out, and the rich gravels unquestionably had been greatly depleted. The camp from 1886 to 1900 was practically "dead." In the latter year a slight revival of activity was brought about by the installation of hydraulic mining in Kentucky Gulch by the Stetson Company. After sluicing for a few months, however, work was stopped, and the camp has been idle since.

In 1909 a few Mexicans made a meager living from some gulch diggings, and an American was operating a dry washing machine on a patch of high gravels without much success. From 25 to 30 cents a day at that time was considered good pay.

PRODUCTION.

In 1883[c] the yearly production since the discovery of the camp was estimated to have been about $12,000, and for 1884[b] the total production was $18,000. Mr. J. P. Coyne estimates the total production of a few of the gulches as follows: Louisiana, $40,000; Graham, $100,000; and Sucker, $500,000. He further states that the total production of the camp to date probably amounts to $7,000,000. This estimate, though much higher than Burchard's, was corroborated by several old-time miners, who have been in a position to watch the production of the district. It is possible that the large figure may include the production of the deep mines as well as that of the placers.

The United States Geological Survey obtains information from bankers, storekeepers, and other purchasers of bullion, from which estimates of the production of the various placer camps are made.

[a] Raymond, R. W., Mines and mining west of the Rocky Mountains, 1876, p. 342.
[b] Burchard, H. C., Production of the precious metals in the United States, 1884, p. 46.
[c] Idem, 1883, p. 80.

According to this information the placer-gold production of the Greaterville district for the period from 1902 to 1908, inclusive, is estimated to be $29,500, or an average of $4,218 a year. The production in 1902 was very high and so raised the average, which is usually about $3,000.

DESCRIPTION.

The Greaterville placer area is a rather flat country cut by deep arroyos and marked near its center by two rounded knobs.

From the summit of the Santa Rita Mountains, which opposite this place are rather low, there is a gentle but deeply eroded slope to the Cienega Valley, 9 miles to the east. A number of major gulches trend a little south of east. These are usually intrenched from 20 to 70 feet below the general level. The banks rise steeply, in places precipitously, so that it is difficult to travel either north or south without wide detours. All the arroyos have numerous branches, and the whole area is one of slopes.

There is almost no surface water, except in the rainy season, when it is found in most of the larger gulches. Shallow wells in Empire, Ophir, Kentucky, and Big gulches are used for local needs, but do not give a large enough supply even for rocker washing.

About 4 miles south of Greaterville, in the first canyon south of Gardner Canyon, there is a permanent stream, fed from springs situated under the crest of Old Baldy Peak, 7½ miles southwest of town in an air line.

GEOLOGY.

The areal geology of the Greaterville district, as shown on the sketch map (fig. 1), may be roughly generalized in the statement that there are three north-south belts (1) of granite, (2) of siliceous shales and sandstones, and (3) of wash materials and gravels, covering the area; that the structure dips eastward at relatively low angles; and that this structure is modified by two intrusions, one of granite porphyry as a stock, the other of narrow rhyolite dikes.

A very coarsely granular to porphyritic granite covers the western quarter of the area shown in figure 1, sending out a long, narrow tongue to the southeast at its southern end, along the south side of Fish Canyon. This granite is probably pre-Cambrian. It is intensely weathered to a dull yellow-brown, and its surface is covered with a coarse sand composed of quartz and pink feldspar particles up to one-half inch in diameter. The constituents in order of their abundance are orthoclase, plagioclase (not determined), quartz, biotite, hornblende. No fresh specimens of this rock were found, so little could be learned from thin sections. The general structure of the granite is a series of joints in a north-northwest

to south-southeast direction, which cuts a sheeting that dips at flat angles eastward. In this granite there are numerous minor faults; one system strikes approximately east-west and the other parallel to the jointing. Some of these fault fissures are filled with quartz; at other places there is little to show their location. A few small rhyolite dikes were noted, their location being shown on the sketch map (fig. 1).

The southern limit of this granite is a fault that brings the granite against Devonian (?) limestone, though here and there a small crop-

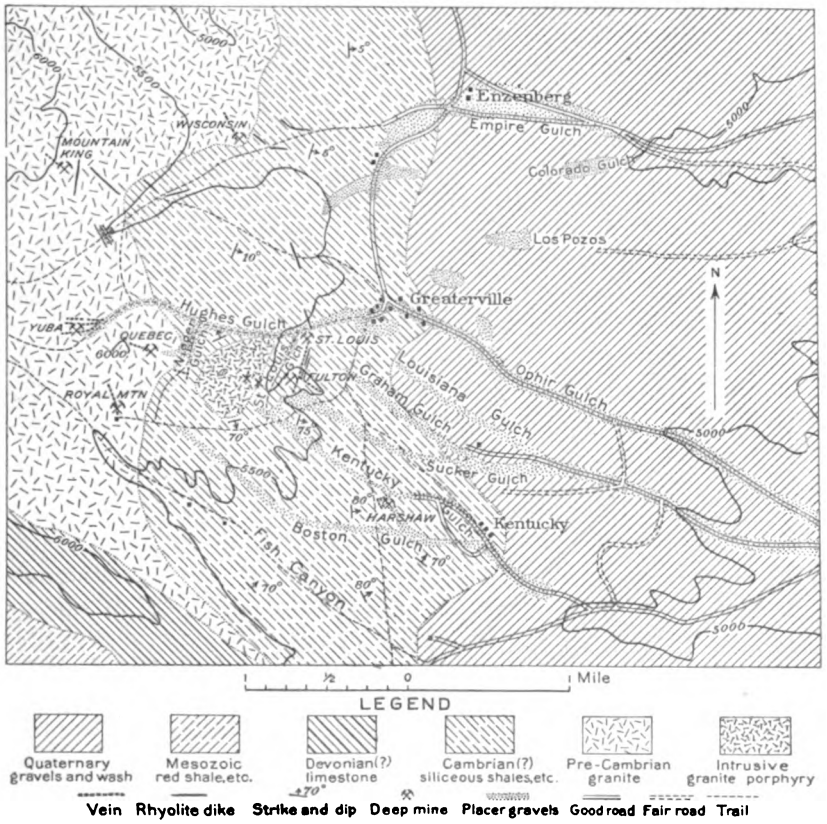

FIGURE 1.—Sketch map of the Greaterville, Ariz., placer camp, showing distribution of dikes, veins, formations, and placer gravels, and the location of deep mines and gulches. Topography enlarged from Patagonia sheet, United States Geological Survey. Contour interval, 500 feet.

ping of what is probably Cambrian quartzite is found between the two. This limestone forms a prominent ridge about a mile south of Fish Canyon (Big Gulch), running southeast for nearly 5 miles, only a small portion of which is shown at the southwest in figure 1. The beds, dark blue-gray, thin and occasionally cherty, dip steeply to the southwest and are not fossiliferous. Their age was suggested by

fossils found in similar limestone about one-half mile south of the center of the area shown.

In the extreme southwest corner of the region covered by the sketch map is a small area of red sandstones and shales of Mesozoic, possibly Cretaceous age. These beds are thin and dip steeply to the southwest.

East of the granite belt is a zone about 2 miles in average width underlain by thin-bedded arkose, sandstone, dolomite, and mud stones or shales. At the north end they dip to the east-southeast at angles of 5° to 10°. At the south end, along the granite tongue, the dip is from 70° to 80° NE. In the central part of the area, about the intrusive mass of Granite Mountain, the general structure is very different, the beds everywhere dipping away from the intrusive dome at high angles. The colors in this belt range from almost black, for the dolomites, through dull greens and reds in the quartzites, sandstones, and shales. North of Granite Mountain, where the beds dip at low angles, there is a covering of soil, supporting grass, scrub oak, and a few pines. South of the mountain, where the bedding is almost vertical and there are many gulches, there is comparatively little soil and many exposures of the rock. Small dikes and sills of a dense white porcelain-like rhyolite cut the sedimentary rocks in many places, a few of which are shown on figure 1. The age of these beds is uncertain, but from their lithologic character and their relation to the granite, being deposited on its eroded surface, they have been referred to the Cambrian.

Eastward from the Cambrian belt and covering nearly half of the area of figure 1 is a broad soil-covered area of gravel and wash material of Quaternary age. The contact with the older rocks dips to the east at about 40° in almost all places. Where this contact is exposed in the gulches no conformity is shown, as the shales are thin bedded and dip at high angles to the east, while the younger deposit shows an imperfect bedding, dipping at very low angles in the same direction. It is composed of pebbles and cobbles of all the rocks exposed in the region, partly cemented by lime. It is rather white in appearance, as the constituent bowlders are coated with lime. Mr. Coyne states that a shaft was sunk through this deposit about a mile east of the contact for a depth of over 100 feet without encountering any other formation.

Covering the formations of the eastern half of the area there is a deposit of finer gravel and soil, probably of recent age. It overlaps on the ridges the tilted beds of the Cambrian (?) as well as the lime-cemented Quaternary, but has been carried away from the gulch sides to be deposited in their bottoms.

Besides the rather small rhyolite dikes and sheets there is one intrusive rock of prominence in the area. This forms "Granite

Mountain," a knob that rises to an elevation of 5,500 feet from the general level of 5,000 feet. This hill is about 1¼ miles west-southwest from Greaterville and is a rather conspicuous topographic feature of the region. The granite in hand specimens is white and appears to be made up of feldspar and quartz with a rather large amount of pyrite and a little chalcopyrite widely disseminated through it. It is in some places porphyritic, but more commonly appears granular In most facies a little biotite is present, but in some of the exposures the dark minerals are absent. The weathered surfaces are yellowish brown and contain casts of pyrite surrounded by brown halos. Under the microscope the texture is seen to be granular to slightly porphyritic. Alteration has gone rather far, chlorite and kaolin being common in all the slides. The minerals in order of their abundance are orthoclase, quartz, plagioclase (usually much altered), and biotite. A little magnetite is present as accessory and pyrite is disseminated throughout the rock.

This knob is entirely surrounded by thin-bedded silicified dolomites and hornfels. The contact is not visible at many points, but where seen in some tunnels on the north side of the hill it was sharp. There was, however, a zone of several feet in which the sedimentary rocks were impregnated with quartz, some calcite, pyrite, and chalcopyrite, the latter two minerals giving a dark-brown cropping stained with malachite and azurite.

DISTRIBUTION OF GOLD-BEARING DEPOSITS.

On the sketch map only the location of the placer channels is shown; no indication of their actual width could be made on such a small scale.

SITUATION OF DIGGINGS.

The principal diggings are in the bottoms of the gulches, though channels of older gravels are found crossing the ridges or on the sides of the present valleys. Just south of Greaterville and about 30 feet above the present valley there is a small area of high gravel, and northeast of the town a similar deposit is seen on the crest of the ridge. Westward up Hughes Gulch a few small remnants of the high gravels are seen 15 feet above the bottom on the north side of the gulch, below the mouth of Nigger Gulch. This old channel apparently followed a depression along the present drainage way to a point just west of Greaterville, then possibly swung north parallel to the road between Greaterville and Enzenberg and about 200 feet west of it, supplying the values of the west head of Chispa Gulch. The connection between the gravels of Chispa and Hughes gulches is not apparent, as the upper part of Ophir Gulch, west of Greaterville, is barren and no gravels seem to cross it. The intervening gravels,

however, could well have been removed during the erosion of Ophir Gulch, which is one of the larger drainage lines. An east arm of Chispa Gulch, just south of Enzenberg, contains placer gold. This gold was evidently derived from a ledge on the divide between this branch and Los Pozos and Colorado gulches.

PRODUCTIVE GULCHES.

The productive gulches were Boston, Kentucky, Harshaw, Sucker, Graham, Louisiana, Hughes, Ophir below its junction with Hughes, the upper parts of Los Pozos and Colorado, Chispa on the road from Enzenberg camp to Greaterville, and Empire below its junction with Chispa.

Boston Gulch.—Boston Gulch heads in the col south and west of Granite Mountain and trends a little south of east. Gold was found in paying quantities in this valley from its head to a point about one-half mile south of its junction with Kentucky Gulch at the Kentucky camp. In the upper 2 miles of its course the gold was found in a channel 5 feet wide on bed rock, 2 to 4 feet below the surface. Below Harshaw Gulch the values were still confined in a 10-foot channel in the valley bottom, being 5 to 10 feet below the surface. Below the mouth of Kentucky Gulch the valley is wide, and for half a mile below this point the values were distributed on bed rock at a depth of 10 to 16 feet for a width of approximately 50 feet.

Harshaw Gulch.—Harshaw is a short tributary of Boston Gulch. It is very precipitous, heading near Kentucky Gulch. Bed rock is exposed all along and the pay channel was confined to the bottom of the narrow V, rarely over 4 feet wide. In this gulch some very rich gravels were found.

Kentucky Gulch.—Kentucky Gulch heads south-southeast of Granite Mountain and joins Boston Gulch at Kentucky Camp. Values were found on bed rock for its entire length in a 6 to 10 foot channel. At the upper end the auriferous gravels were directly on the surface, becoming deeper down the gulch until at its mouth the pay was 6 feet under the surface.

Sucker Gulch.—Sucker Gulch has three small heads southeast of Granite Mountain. The gravels in this gulch were productive to a point a little below its junction with Ophir Gulch. From its head to the mouth of Graham Gulch the pay channel was 6 to 9 feet wide and 3 to 12 feet below the surface. Between Graham and Louisiana gulches the pay channel averaged from 20 to 50 feet in width and the depth was from 12 feet at the former to 25 feet at the latter gulch. Below the mouth of Louisiana Gulch the values were found distributed through the gravels on bed rock for a breadth of 100 feet. The overburden at the lower end was excessive, so not a great deal of work was done.

About 10 feet above the present channel there are in a few places in the upper part of this gulch small "bars" of pay gravels. These were evidently accumulated by the stream at some time previous to its present period of erosion and are simply remnants of its old channel.

Graham Gulch.—Graham Gulch is a short branch of Sucker heading southwest of the St. Louis mine. The bottom is about 100 feet wide at its lower end, and the pay gravel covered the whole width on bed rock 12 feet below the surface. At its upper end the channel was 10 feet wide and was covered by about 6 inches of soil. Some gravels 15 feet above the present channel on the south side of the gulch were productive.

Louisiana Gulch.—Louisiana Gulch heads about one-fourth mile south of Greaterville, is a little over a mile long, and joins Sucker Gulch. At the head values were found almost at the surface, but near the mouth they were 10 to 12 feet below the surface. The channel in this gulch split and reunited, but was generally about 6 feet wide.

Hughes Gulch.—Hughes Gulch runs north of Granite Mountain, heading just south of the Yuba mine, 2 miles west of Greaterville. A narrow channel, rarely over 6 feet wide from its head to its mouth, was found productive at 2 to 6 feet below the surface.

Nigger and St. Louis gulches.—Nigger and St. Louis gulches are small tributaries of Hughes Gulch. The former is west and the latter east of Granite Mountain. Both of them contain small gold-bearing gravel channels.

Ophir Gulch.—Ophir Gulch heads northeast of the Yuba mine but contains no placer deposits above its junction with Hughes Gulch. Below Greaterville a channel 200 feet wide was found to contain values as far as the junction with Sucker Gulch. The bed rock is rather deep and little work has been done here.

Los Pozos and Colorado gulches.—The upper 3,000 feet of Los Pozos Gulch was found to contain placer values. This gulch heads about a mile northeast of Greaterville. Colorado Gulch, about one-half mile north of Los Pozos, is a short branch of Empire Gulch. For 2,000 feet near its head some gold was found at no great depth below the surface.

Chispa Gulch.—Chispa Gulch is a small branch of Empire Gulch heading southwest of Enzenberg. In the main gulch, about three-fourths of a mile south of Empire Gulch, the highest pay gravels were found. A 5 to 10 foot channel on bed rock, about 10 feet below the surface, was productive and was being worked by Mexicans in the latter part of March, 1909. In an east branch gold was obtained from gravels 3 feet under the surface for a quarter of a

mile from Chispa. The western fork of Chispa Gulch is about 1 mile long. At the head pay dirt was directly on the surface. At the mouth a 50-foot channel on bed rock, with 10 feet of overburden, contained values.

Empire Gulch.—Placer gold in Empire Gulch was found only for a mile and a half below the mouth of Chispa Gulch. Near the mouth of the latter gulch the pay gravels were about 300 feet wide, but at the lower end the values were distributed over 1,000 feet. The overburden is 16 feet thick and the pay dirt 2 feet thick on a conglomerate bed rock.

CHARACTER OF GRAVELS AND BED ROCK.

The pay dirt is found on bed rock distributed rather evenly through a 2-foot bed of angular gravels in a fine red-brown, somewhat clayey matrix. Some of the gravels are yellow to gray-brown, but these as a rule were not so rich as the heavily iron-stained beds. The conditions were essentially the same in all the gulches, and the thickness of the pay varied little from place to place.

The constituents of this bed are rather fine, usually less than 1 inch in greatest dimension, though in many places cobbles of 4 to 8 inches are found. In a few places the materials of this bed are roughly stratified and somewhat cemented, usually by lime.

The constituent pebbles are very angular and show almost no water wear. Even the sand consists of angular broken fragments rather than rounded grains. The coarse material is red and yellow sandstone, shales of various colors, pebbles of arkose, a few fragments of dense white rhyolite, and a very minor amount of granite porphyry. In Kentucky and Empire gulches particles of quartz and feldspar showing crystal faces were noted, evidently derived from the granite area where these gulches head. These pebbles are held together by a red-brown clay, not very difficult to handle with water.

The depth of this bed varied in the different localities, being almost at the surface in the heads of the gulches and buried to depths of 10 to 20 feet in the lower eastern ends of the diggings.

The Cambrian (?) sedimentary rocks form a perfect bed rock in the upper parts of the gulches. The beds are standing on edge, and their differences in weathering, due to difference in hardness, have formed natural riffles, behind which the gold has been concentrated. In the lower parts of Kentucky, Sucker, Ophir, and Empire gulches the "cement rock" (the Mesozoic cemented gravels) forms the bed rock and its rough surface has acted as riffles. The bed rock in Colorado, Los Pozos, and Louisiana gulches is entirely "cement rock." This shows that the concentration of the gold has been at least later than early Quaternary.

CHARACTER OF THE GOLD.

Most of the gold from this camp brought from $16 to $19 per ounce, that from Louisiana Gulch being the finest. The gold that was washed in 1909 was in rather small flakes up to 0.1 inch in longest dimension. Some of it is rusty, but the largest part is bright. It is said, however, that in the early days of the camp the gold was very coarse and that pieces whose value was $1 to $5 were commonly found.

Under the microscope the flakes are seen to be very angular, with many projections which would have been worn off if the material had traveled far. One of the large particles contained a small crystal of quartz completely surrounded by gold. Another showed what appeared to be a little galena with the gold. Mr. Coyne states that in the large nuggets it was common to find this association of quartz and galena with gold.

Concentrates from panning consist of about equal parts of magnetite and light-colored minerals that are apparently quartz and a little feldspar. The light-colored grains are somewhat stained with iron. All this material is angular and a few crystal faces (?) of quartz were noted.

ORIGIN OF THE GOLD.

The most productive gulches, Boston, Kentucky, Sucker, Graham, Louisiana, and Hughes, all head about the intrusive mass of Granite Mountain. This intrusion, as already stated, is of granite porphyry containing pyrite and chalcopyrite in appreciable amounts. About its base, in the altered, crumpled sediments of the supposed Cambrian, are found numerous quartz veins carrying galena, pyrite, and chalcopyrite, which are reported to have produced surface ores rich in gold and silver. These veins have been opened at the Yuba, Quebec, and St. Louis mines, as well as in numerous other places. They show very similar characteristics in all exposures. A gangue of quartz, with barite in some places, is banded with argentiferous galena, pyrite, and chalcopyrite. These usually form a stockwork in hornfels, quartzites, sandstones, and shales. The ore is in places wide enough to be called a vein.

The surface ores are much iron-stained quartz with scattered patches of malachite, azurite, or yellow earthy cerusite. It is said that several nuggets of native gold associated with quartz and galena were found in the croppings, particularly in the St. Louis vein.

The weathering of these veins and the attendant transportation of the material by the present streams would adequately account for the concentration of the placer gold in the gulches. The gravels between the gulches, however, contain values which could be accounted for

either by sheet wash or by the transportation of the weathered material before the present drainage lines were well established. Concentration by wash from the ridges into the present valleys would further enrich the gold-bearing channels. The complete concentration on bed rock, however, points to frequent movement along the present channels, shaking the gold to the bottom.

The origin of the gold in Los Pozos and Colorado gulches is not so evident, as no ledges have been found on the divide between them and Chispa Gulch. This area is covered by considerable accumulations of wash material, so that prospecting is difficult; and this fact may account for the lack of discoveries of veins in the vicinity. The gold in the west branch of Chispa Gulch may be accounted for either by supposing that the old Hughes drainage turned north at Greaterville to enter the larger drainage of Empire Gulch, or that there are some gold-bearing ledges, not yet discovered, on the divide between this west branch and Ophir Gulch. The validity of the latter supposition is affected by the fact that no values were found in Ophir Gulch above its junction with Hughes Gulch. It is possible, however, that the veins which supplied Chispa Gulch are so far north that none of the branches of Ophir Gulch touch them. The richness of the gravels of Chispa Gulch indicates a rather long period of concentration or very rich primary deposits, and as no veins have been found at its head the former supposition seems the more tenable.

The theory of the origin of the gold from the veins about Granite Mountain is further supported by the fact that in the upper part of Empire Gulch, to the north, and in Fish Canyon (Big Gulch), to the south, no gravels of value have been found. These gulches, the largest in the region, head in the Granite area. There are some few widely scattered prospects in the granite, but the veins apparently carried little gold, except in the Yuba mine.

Furthermore, the fact that the gravels of the placers are largely derived from sedimentary rocks instead of granite shows that the gold did not come from the region west of Granite Mountain.

METHODS OF WORKING THE DEPOSITS.

Water is extremely scarce in the Greaterville placer district, so the means of working the gravels are limited. Dry washing has not proved a great success, as considerable clay is found in the pay dirt. Rocking has been the chief method employed for the recovery of the values.

Small shafts, usually 2½ by 5 feet in cross section, are sunk through the overburden, where it exceeds 3 or 4 feet in depth, to the bed rock. The gravels next to bed rock and for 2 feet above it are gouged out and hoisted to the surface by crude hand windlasses. In some of the pits seen the gravels for a radius of 20 feet were excavated from one small

shaft. No lagging was used and there was apparently a constant menace of caving.

When there was a sufficient accumulation of the bed-rock gravels to supply the rockers for a few days, water was purchased and the extraction of the gold commenced. Usually two men worked together, but often one man would break down, hoist, and rock his gravels alone.

Two larger undertakings in the way of placer operations failed, possibly because the concentration of the values on bed rock necessitated the handling of so much valueless overburden. One company installed a 1-ton steam shovel, screens, and conical concentrating tank in Empire Gulch just below Enzenberg. After excavating an area 50 by 100 feet to a depth of 20 feet operations were suspended, as the pay dirt was not rich enough to warrant the removal of the 16 feet or more of overburden. The machinery was left in the pit and is fast being buried by slumping from the sides.

In Kentucky Gulch, at its junction with Boston, the Stetson Company tried hydraulic operations. Water was taken from the first canyon south of Gardner Canyon and carried through an 8-mile pipe line giving a head of 125 feet. The company sluiced 1,000 feet of the creek bed for a width of 30 feet. The gravels in the overburden are rather coarse and the pay is reported to have been too low to warrant further work. The pipe line is still in good repair and the company put up very comfortable quarters at Kentucky camp. It is reported that the 3,000 acres of patented land belonging to this company has lately been acquired by G. B. McAvery, of San Jose, Cal.

FUTURE OF THE CAMP.

The richer gulch gravels of the Greaterville district have been worked over to a considerable extent, but it is possible that some pay channels have not yet been found. The ground that has been washed still contains some gold, as is shown by the production of the few Mexicans who are working in localities known to have been productive. The gravels on the sides of the gulch and covering the ridges also contain small quantities of gold. E. Ezekiel, a mining engineer, of Tucson, who has examined the gravel deposits for a company, states that in the 8 square miles covered by placer gravels there are still probably nearer $100,000,000 than $50,000,000 worth of gold.

The deposits can not be made to pay if worked on a small scale. Hydraulic or dredging in the wider and deeper gulches might possibly pay, but it is a question whether the concentration of the values on bed rock, the considerable overburden to be removed, and the scarcity of water will not greatly retard if not prohibit the future development of the Greaterville placer district.