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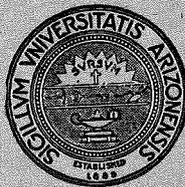
Economic Series No. 18

University of Arizona Bulletin

ARIZONA GOLD PLACERS

BY

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University of Arizona Bulletin

ECONOMIC SERIES No. 18

JANUARY 15, 1922

Arizona Gold Placers

PREFACE

Except for several unsuccessful attempts to use modern dredges, there has been little placer mining activity in the State since Bulletin No. 10 was printed. Nevertheless it has been thought wise to rewrite that bulletin completely, at the same time adding many new data. The present bulletin is, in the main, a compilation of information that was already in print, but scattered and difficult to find, and the aim is to present a concise and fairly complete account of the history, production, location, development, and present status of Arizona's placer deposits in a form readily available for the use of all inquirers, and especially those who think they have developed a process that will enable them to work the deposits profitably.

There are two main obstacles, more or less peculiar to the state of Arizona, that stand in the way of the successful working of these placers: one, lack of water, is a condition common to practically every district in the State; the other, the cementation of the gravel by caliche or lime, is a deterrent in a great number of areas. Many schemes have been devised to overcome these difficulties, but so far none of them has been very successful. These attempts are recounted in the detailed descriptions of the individual placer fields.

HISTORY

Originally the placer gold existed in veins and gold-bearing rocks that were later broken down by the processes of weathering. The disintegrated material was washed away by the torrential rainfall, and was finally collected and concentrated by the same agency in depressions and stream beds. It is in places of this character, scattered widely throughout Arizona, that the gold is now found; and it occurs both in weathered, dry, loose gravels near the surface, and in caliche, or lime-cemented gravels below.

The existence of this gold may have been known previously to Indians and Mexicans, and Raymond¹ states, somewhat indefinitely, that "gold is said to have been discovered on the Gila River in 1858", probably at a point about twenty miles above its junction with the Colorado, but the authentic, recorded history of Arizona placer mining begins with the discoveries of Captain Pauline Weaver. Weaver was a trader and trapper, working from Fort Yuma up and down the Colorado and into the interior, and prospecting as he went. His search was rewarded in 1862 by the discovery of traces of gold in a gulch seven miles east of La Paz, a deposit that later received the name of the La Paz placers.

He did not long have the ground to himself. During a visit to Fort Yuma he displayed the gold he had found, and immediately several Mexicans set out to search for the new placer field. Within less than a mile south of Weaver's camp they panned some rich dirt from which they secured considerable gold. They returned to Yuma for supplies, and the news of the new "diggings" spread so rapidly that within a few months there were 1500² people in La Paz and the surrounding territory. Some very rich ground was found, and a number of remarkably large nuggets were uncovered, while there was hardly a gulch for twenty miles around that did not yield more or less gold.

This successful venture encouraged the prospectors to look for new fields, and a rush east began, which resulted in the discovery of the placers on the west slope of the Dome Rock Mountains, the Plomosa placers, and, still further east, the placers of Yavapai county. In May, 1863,³ a party under Weaver discovered the placers bearing his name. In the same year, a Mexican in the employ of Jack Swilling, during a trip over the mountain to the Weaver camp, discovered the famous Rich Hill placers. Increased prospecting followed these discoveries and resulted in the finding of the Hassayampa and San Domingo placers, and the deposits along Lynx Creek, Granite Creek, and Big Bug Creek; in fact some placer ground was found and worked in practically all the main gulches of the southern and eastern slopes of the Bradshaw Mountains as far east as Camp Creek. It was about this time that Prescott was founded by the prospectors of Granite Creek and the immediate neighborhood.

¹Production of Gold and Silver in the U. S. by R. W. Raymond, Vol. III, T. A. I. M. E., p. 203, 1874-5.

²Mineral Resources of the States and Territories West of the Rocky Mountains, by J. Ross Browne, 1868, pp. 443-482.

³Resources of Arizona, by Hamilton, 1888.

Other placers were discovered from time to time. Those of Quijotoa and Indian Oasis have been worked by the Indians for years, in fact the gold taken from them has been exchanged for supplies with the Tucson merchants for as long as records have been kept. In 1874¹ the Greaterville placers were discovered by A. Smith. In the rush that followed all the richer and more available ground was worked by pan and rocker, with water packed in by Mexicans. These deposits have been the basis of many dredging and hydraulicking schemes, but nothing beyond hand sluicing and rocking has ever been done.

The statement just made is true, in fact, as regards practically all the deposits in the State. Other methods have been proposed, but most of the work has been done by hand. It is in the rainy seasons of the year, when water is available for hand work, and the stream beds have been washed and turned over by the torrential rains and flood waters, that most of the placering is done. In this way all the more important placers of the State have been worked over and over again, yet even now a heavy rain will often reveal banks of gold-bearing gravel that have been overlooked.

PRODUCTION

It is impossible to state accurately the total gold and silver production of the placer deposits of Arizona, because most of the gold was obtained at a time when no records were kept, and all estimates have to be based on information secured later from pioneers of the various districts. At best these appraisals cannot be accurate, since the country was very sparsely settled and subject to the conditions prevailing on a frontier, the deposits were widely distributed, and much of the gold was taken out by individuals; however, they give a good idea of the relative importance of the various districts, and some measure of the total production. The most valuable reports are quoted below.

A letter, from Mr. A. McKay, member of the Territorial legislature from La Paz, to Mr. J. Ross Browne,² published in 1868, gives information on the earlier production of the La Paz district. Mr. McKay writes: "Of the yield of these placers, anything like an approximation to the average daily amount of what was taken out per man would only be guess

¹Mines and Mining West of the Rocky Mountains, by R. W. Raymond, 1875, p. 390.

²Resources of the States and Territories West of the Rocky Mts., by J. Ross Browne, 1868.

work. Hundreds of dollars per day to the man was common, and now and again a thousand or more a day. Don Juan Ferrá took one nugget from his claim that weighed forty-seven ounces and six dollars. Another party found a chispa weighing twenty-seven ounces. Many others found pieces of from one to two ounces up to twenty, and yet it is contended that the greater proportion of the larger nuggets were never shown It is the opinion of those most conversant with the first working of these placers that much the greater proportion of the gold taken out was in nuggets weighing from one dollar up to the size mentioned above As has been said above, the gold was large and generally clear of foreign substances All that was sold or taken here went for \$16 to \$17 per ounce. Since the year 1864 until the present, there have been at various times many men at work in these placers, numbering in the winter months hundreds, but in the summer months not exceeding seventy-five or one hundred; all seem to do sufficiently well not to be willing to work for the wages of the country, which are and have been for some time from \$30 to \$65 per month and found. No inconsiderable amount comes in from these placers now weekly, and only a few days ago I saw, myself, a nugget which weighed \$40, clear and pure from foreign substance”

“Of the total amount of gold taken from these mines, I am as much at a loss to say what it has been as I was to name the average daily wages of the first years, and as I might differ from those who were among the first in these mines, I do not feel justified in setting up an opinion as against them; I shall, therefore, give the substance of the several opinions which I have obtained from those who were the pioneers of these placers. I have failed to find any one of them whose opinion is that less than \$1,000,000 were taken from these diggings within the first year, and in all probability as much was taken out in the following years.”

On information secured from similar sources Heikes¹ estimates that the placers of Yuma County between 1860 and 1880 produced from \$20,000,000 to \$42,000,000 in gold.

Browne states that the gravels of Lynx Creek were worked throughout its entire length, about twelve miles, that those of Big Bug Creek were worked for many miles, that they had paid well, and were still yielding good wages. (1868).

¹Dry Placers in Arizona, by V. C. Heikes. U. S. Geological Survey Mineral Resources for 1912, pp. 255-260.

Hamilton, in writing of Rich Hill, states¹ that gold in the Weaver district was found at bed rock, and pieces of pure metal worth several hundred dollars were picked up. It was also common, he states, to find \$5000 to \$6000 under a single boulder. One acre in this district was said to have yielded \$500,000. Hamilton estimates that up to 1883, \$1,000,000 had been produced by the placers of the Weaver district. He also placed the production of the placers of Lynx Creek at the same figure, and he believes that it was the richest gold bearing stream in Arizona.

Sparks² gives the gold production of Groom Creek as \$3,000,000.

In 1876 Raymond³ reported that the gold from the Greaterville placers was coarse and that nuggets worth from \$35 to \$50 were brought to Tucson, the average being about \$5. The largest nugget ever reported from the camp weighed thirty-seven ounces.⁴

Mr. J. P. Coyne states⁵ that by 1884 all the richer stream gravels of Greaterville had been worked over and that by 1886 the placers were considered worked out. They have, however, been worked in a small way by Mexicans ever since. In 1883⁶ the yearly production of the district since discovery was estimated at \$12,000 and for 1884⁷ the total production was \$18,000. Mr. Coyne states that the total production of the district probably amounts to \$7,000,000 and, according to Hill, "this figure is corroborated by several old time miners who have been in a position to watch the production of the district."

Arizona placers have been worked persistently since discovery and have yielded something every year. Since 1900 the United States Geological Survey has collected and published figures on the placer gold production of the state, and these figures have been brought together in the accompanying table. It will be seen that the total yield of all the placers of the State in the twenty year period 1900 to 1920 is \$785,733.

From the information that the writer has been able to gather from all sources it is estimated that the value of the placer gold production of the State of Arizona is at least \$50,000,000. This figure is conservative.

¹Resources of Arizona, by Patrick Hamilton, 1883.

²Yavapai, The Land of Opportunity, by G. M. Sparkes, Arizona Bureau of Mines bulletin No. 59, 1917.

³Mines and Mining West of the Rocky Mountains, by R. W. Raymond, 1876, p. 342.

⁴Production of Precious Metals in the United States, by H. C. Burchard, 1884, p. 46.

⁵Notes on the Placer Deposits of Greaterville, Arizona, by J. M. Hill. United States Geological Survey Bulletin No. 430, 1909, pp. 11-22.

⁶Production of the Precious Metals in the United States, by H. C. Burchard, 1883, p. 80.

⁷Idem, 1884, p. 46.

A general survey of the dry placer deposits of the State shows extensive areas in the valleys of both the Colorado and Gila rivers and especially in Yuma and Pima Counties. Placer deposits are known along the Colorado from a point south of Yuma to as far north as Ehrenberg. There are some around Quartzsite, La Paz, and twenty miles south of Yucca in the Chemehuevis district of Mohave County. Other areas are situated in Yavapai County in the Weaver, Walker, and Big Bug districts and along the Hassayampa River south into the San Domingo district of Maricopa County. Gold placers are also found at Greaterville, Quijotoa, and north of Arivaca in Pima County, in the Teviston and Dos Cabezas districts in Cochise County, at Oracle in Pinal County, and deposits of minor importance exist in Santa Cruz, Greenlee, and Pima Counties. The locations on the accompanying map are only approximate, but serve to show the districts described in detail later.

PIMA COUNTY

GREATERVILLE PLACERS (9)

The information here given concerning the Greaterville placers has been taken from a complete and detailed description of these deposits given in United States Geological Survey Bulletin No. 430 by J. M. Hill, and from data secured by the writer when he visited the area in 1919 and 1922.

These placers, occurring for the most part in an area with the town of Greaterville at the center, are situated on the eastern slope of the Santa Rita Mountains about thirteen miles northwest by road from the town of Sonoita on the Nogales branch of the Southern Pacific Railroad.

The placer area is flat country deeply and rather precipitously cut by arroyas which drain towards Cienega Creek. There is no surface water except in the rainy seasons, when all the principal gulches are filled. These streams together with wells supply the local need, but there is hardly enough water to carry on rocker work to advantage.

Briefly, the principal rocks of the district may be said to comprise granite, which is intensely weathered, silicified slates, sandstones, and wash material that covers the lower slopes of the mountains and the valley floor. The older granite, slates, and sandstones are intruded by granite porphyry and narrow rhyolite dikes. Vein deposits occur, and are directly

related to these later intrusions, while the gold placers are in turn traceable, in the majority of instances, to these gold-bearing veins. The chief placer gulches all head about the intrusive mass known as "Granite Mountain". The vein deposits of the areas are principally quartz veins carrying galena, pyrite, and chalcopyrite, and at the outcrops they have yielded high values in gold and silver.

The principal placers were found in the bottoms of the gulches, though older channels have been found which cross the ridges or are on the sides of the present valleys, and there is considerable evidence of reconcentration.

The productive gulches are 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 Enzenburg camp to Greaterville, and Empire below its junction with Chispa.

The pay channels vary in width from four to fifty feet, but in Sucker and Empire gulches the widths reached one hundred and one thousand feet, respectively. The gold is found at bedrock at depths varying from two to twenty-five feet. Gold produced in the district has been marketed at \$16 to \$19 per ounce and is mostly fine and flaky. Some of the metal is rusty, but most of it is bright. Under the microscope the particles of gold are rough and angular, and many of the larger nuggets "were associated with quartz and galena."

¹"The pay dirt is found on bedrock distributed rather evenly through a two-foot bed of angular gravels in a fine red-brown, somewhat clayey matrix The conditions were essentially the same in all the gulches, and the thickness of the pay dirt varied little from place to place. The constituents of the bed are rather fine, usually less than an inch in greatest dimension, though in many places cobbles of four to eight inches are found. In a few places the materials of this bed are roughly stratified and somewhat cemented, usually by lime." This latter statement is rather a significant one, and indicates a condition that is frequently met with in Arizona placers. This cemented material is the common desert "caliche", a formation that adds greatly to the difficulty of placer mining in this state. In the Quijotoa district it is so extensive that crushing machinery is necessary to liberate the gold from the richer gravels. This

¹Notes on the Placer Deposits of the Greaterville District, Ariz., by J. M. Hill. United States Geological Survey Bulletin No. 430.

condition also occurs in the placers on the east slope of the Dome Rock Mountains and in the Plomosa placers, both in Yuma County.

Around Greaterville the constituent pebbles are very angular and show almost no water wear. Even the sand consists of angular broken fragments rather than rounded grains. 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 ten to twenty feet in the lower ends of the diggings.

"The Cambrian (?) sedimentary rocks form a perfect bedrock 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' forms the bedrock and its rough surface has acted as riffles. The bedrock 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."

It is stated that later investigations in the Greaterville district below this so-called "cement rock" have proven the existence of gold in and below it.

Water for any kind of placer work in the Greaterville district is scarce. All water for working in the earlier days was packed from Gardner canyon to the diggings by burros. Clay in the pay dirt makes hand methods and rocking difficult. Mexicans who at present work the gravels do so by sinking shallow shafts to bedrock where they mine the gold-bearing gravel around these shafts for a considerable radius, hoist it to the surface, and, when sufficient has been mined to run a rocker for several days, purchase water and treat the dirt.

Hill states that two attempts have been made to work these gravels on a large scale; one, soon abandoned, by means of a small steam shovel in Empire Gulch; the other by hydraulicking the gravels of Kentucky Gulch. This attempt was made by the Stetson Company. In 1900 they constructed an eight-mile pipe line to bring water under a 125-foot head, but ceased work after several months of operation.

In 1905 the Santa Rita Water and Mining Company acquired title to a large tract of the ground and commenced operations with extensive

equipment, including ten miles of ditch and pipe line. The water for the operations was obtained by impounding dams in the canyons. Hydraulic operations were carried on during the winter months and early spring of 1905. Lack of ample storage capacity for water made operation in the dry season impossible, and work was discontinued.

In October, 1914, it was reported that the Greaterville Dredge Gold Mining Company had acquired 1100 acres of placer ground which had been thoroughly prospected. Much of the ground was reported to average 90c per cubic yard, and the proposed dredge was to have a capacity of two thousand cubic yards per day. Water to carry on the dredging operations was to have been obtained from wells on the property. These plans were never consummated.

At the time this Bulletin was prepared an Eastern concern was investigating the possibility of working these placers profitably by hydraulic methods.

The total actual production to date has been estimated at \$7,000,000 by Mr. J. P. Coyne. This figure, according to Hill, was corroborated by several old time miners of the district. Hill further states that E. Ezekial, a mining engineer who had investigated the Greaterville placers, places the quantity of gold still remaining in an area of about eight square miles at \$100,000,000.

THE LAS GUIJAS PLACERS (11)

The Las Guijas placers lie in the northern, northeastern, and southern slopes of the Las Guijas Mountains, a range about sixty miles south of Tucson and twenty miles due west of Amado station on the Nogales branch of the Southern Pacific Railroad. This range is small and low, but rises abruptly from the mesa lands.

On the southern slope the area between Guijas Creek and the Guijas Mountains for a distance of two and a half miles is reported to be covered with gold placer gravel.¹ This gravel extends up the gulches into the mountains themselves. On the southern slopes of the mountains there is no mesa gravel, but placer gravel occurs in the arroyos.

This gold originated in the numerous gold-bearing veins and stringers of the Guijas Mountains from which it has been washed on the mesas and into the arroyos. The mesa gravels vary in thickness from a mere

¹Professional Report of Las Guijas Placers, by I. C. Friend.

layer to sixteen feet. Their gold is evenly disseminated, occurs rough and unpolished, and is frequently still attached to the original gangue minerals. The arroya gold is more rounded and polished. A cemented clay layer occurs between the richer pay dirt and bedrock. There appears to be as much placer gravel on the southern slopes as on the northern, except that on the former the gravel is more patchy, but thicker and richer due to greater concentration.

For the past fifty years these placers have been worked by Mexicans and Indians, who use the rocker in the rainy seasons and the batea in dry periods. There are many evidences that extensive work has been done here, and it is claimed that sufficient gold has been produced to start at least one Mexican revolution. The method at present used is to sink a shaft to bedrock, scrape up the rich two- to four-inch layer there, and treat it for gold.

In 1905 the New Venture Gold Placer Company had taken up forty-two hundred acres, and it was claimed that development work had shown that about 4800 cubic yards of gravel that ran a dollar to the cubic yard existed on each acre of the entire area. The company proposed to pump water for hydraulicking three miles, obtaining it from the Arivaca River, a stream that flows the year round. Water can also be obtained at depths of thirty to forty feet from wells on Guijas Creek.

QUIJOTOA PLACERS (18)

The Quijotoa placer district is located seventy miles almost due west of Tucson, and extends from Quijotoa on the north to the Mexican boundary. The placers carry gold from the surface through the underlying caliche which constitutes the richest part of the deposit. There the gold is coarse, and occurs in the cement that unites the pebbles and rock fragments.

This area has been worked in places by the Indians and Mexicans for hundreds of years, probably by the same methods they now use. They are able to treat only the dirt and the softer patches of caliche, which they handle in a very primitive fashion. The caliche is beaten in rawhide bags, and the gold is recovered from the pulverized cement by crude hand machines. This process is antiquated, yet it is the only one that has been successful, and all attempts made by white miners to work these

placers have failed because of the hardness of the caliche and the scarcity of water.

In 1910¹ a Quinner pulverizer that had been used successfully in the Altar District of Sonora, Mexico, and a Stebbens dry concentrator were installed by the Manhattan Company in the Horseshoe basin area of the Quijotoa district, but the experiment proved unprofitable although the yield for the whole district is said to be in the neighborhood of a dollar a cubic yard.

In 1905 and 1906 the United States Geological Survey Mineral Resource publications stated that most of the productive ground was owned by the Imperial Gold Mining Company, and was leased to placer miners.

ASH CREEK PLACER

A very small placer deposit occurs along Ash Creek in the Papago mining district on the western slope of the Sierrita mountains, about twenty-five miles southwest of Tucson. The creek traverses the Sunshine-Sunrise group of claims and it is there the placer diggings occur.

The area covered by the auriferous gravel is very small, but Mexicans working in the rainy seasons are said to make good wages by the use of rockers. There is ample water in the creek for the use of such apparatus then, and the remains of old diggings indicate that a considerable amount of work has been done there in the past.

YUMA COUNTY

LA PAZ PLACERS (14)

The La Paz placers lie on the west slope of the Dome Rock Mountains, in Yuma County, about nine miles northeast of Ehrenberg. The town of La Paz was situated on part of the present Colorado Indian Reservation. It is now nothing but a ruin in spite of the fact that in 1863 there were 1500 people there. The placers lie in Ferra, Garcia, Ravenna, and Goodman gulches due east of the Colorado River. They are reached by road from Quartzsite, a town twenty-five miles south from Bouse station on the Phoenix-Parker branch of the Santa Fe Railroad.

The topography of the region is not precipitous. The desert bench lands slope gently westward from the mountains to the river where there

¹Dry Placer Mining in the Arizona District, by F. W. Fickett.

is a sudden drop to the river-bottom lands. This area, however, is traversed by fairly wide and deep arroyas, which carry off all flood waters in the so-called rainy seasons. The climate is so arid, however, that there is no surface water during most of the year, but Tyson wash at Quartzsite carries a small underground flow. Indeed, water is so scarce at the La Paz placers that it has to be hauled in for camp purposes.

The geology of the La Paz placer area, according to E. L. Jones, Jr.,¹ consists of a quartz-epidote schist, an altered igneous rock that has been intruded by a very much younger granite. This schist is the rock that contains the gold-bearing quartz veins and stringers from which the gold of the placers has been derived.

The following description of the La Paz placers has been taken from United States Geological Survey bulletin 620-C, Gold Deposits near Quartzsite, Ariz., by E. L. Jones, Jr.

Character of Gold-Bearing Wash. The gold-bearing material consists of sand and clay inclosing angular rock fragments of greatly variable size. Tests indicate that about twenty percent of the wash will pass through a quarter-inch screen, and the largest boulders weigh several hundred pounds. The material near the surface is unsorted and is unconsolidated, being readily worked with pick and shovel. That at depths of fifteen or twenty feet is consolidated, but the cementing substance readily disintegrates on exposure to air. Deposits of wash below the depths of test pits may prove to be similar to the outwash on the east slope of the Dome Rock Mountains and in the Plomosa placers, where the material is firmly cemented with calcium carbonate and requires crushing in order to free the gold. In Goodman Wash below the Goodman tank a deposit of calcareous tufa several feet thick was noted. The ground stands sufficiently well to permit the sinking of shafts without the use of timber. The wash is readily worked in dry-washer machines, the only requirement being that the ground must be dry. The gold is said to be distributed throughout the wash, though in the early workings the richest yield was obtained near bedrock. The size of the gold now recovered from the deposits of the La Paz district probably averages only a few cents, but, as already stated, the gold recovered from the early workings was much coarser. The gold is rough and angular, and particles of iron cling to

¹United States Geological Survey Bulletin 620-C, Gold Deposits near Quartzsite, Arizona, by E. L. Jones, Jr.

some of the nuggets. Magnetite is always found in the concentrates, and boulders of magnetite, the largest weighing several pounds, are frequently found on the surface."

The richer gravels of the La Paz placers were worked over many years ago, but only the coarser gold was extracted then since the miners were handicapped by lack of water, and they used only pans, rockers, and dry washers to treat the gold-bearing ground.

Several years ago the New La Paz Gold Mining Company acquired by location and purchase all the placer ground south of the Colorado Indian Reservation. The dividing line was to follow the Arroya La Paz. This company proposes to wash the placer gravels by pumping water from the Colorado River in sufficient quantity to hydraulic and sluice three thousand cubic yards of gravel a day. The water will be pumped through pipe lines for a distance of four and one-half miles to a reservoir at an elevation of 540 feet above the river bottom. This will give a head of 225 feet for washing the gravels. Engineers, reporting on the property for the company, have estimated, from samples taken in seventy-four shafts, varying in depths from five to forty-five feet, that there are 1,300,000 cubic yards that will average \$1.80 per cubic yard. These engineers also state that the gravel is free from clay, is uncemented, and contains but few boulders. Part of the machinery to carry out this undertaking was installed several years ago, but the work has been held up by litigation with the Interior Department over the true location of the southern boundary of the Colorado Indian Reservation. This dispute has been settled, however.

The consensus of opinion of many of the older miners, who have a knowledge of the earlier day placer operations in the La Paz district, is that the value of production was about \$7,000,000 from 1862 to 1868. Since that date operations and production have been spasmodic for several reasons: the gravels have already been worked over and the coarser gold recovered; without a large investment only dry washers can be used, and such machines are not adapted to the treatment of large quantities of gravel; and, finally, the ground itself varies in richness.

PLOMOSA DISTRICT PLACERS (17)

The following description of the placers on the east slope of the Dome Rock Mountains has been taken from the United States Geological

Survey Mineral Resources for 1912, Arizona Dry Placers, by V. C. Heikes:

"The Plomosa mining district, lying east of the Colorado River in Yuma County, Ariz., is situated in the Posas Valley, a great north and south depression, with the Plomosa Mountains forming the eastern border and the northward extension of the Castle Dome Range on the west. Posas Valley trends northward thirty or forty miles, and is from ten to fifteen miles wide. It slopes to the north and affords a very extensive field In this valley are situated on its eastern side the Plomosa placer ground and on the western side an extended deposit of gold-bearing gravel known as the La Cholla, Oro Fino, and Middle Camps. In some localities pits have been sunk to a depth of twenty, thirty, and fifty feet or more to beds of cement which are richer than the gravel. Near the mountain the gold is coarser, but the gravel is much less. Miles of the great deposit extending westward from the mountains, and from three to four miles in width, have been cut into by floods from the mountains, forming deep ravines, and they afford miles of banks ten to fifteen feet high in which the upper layer of gravel is well exposed. From these banks, as far as investigations could be made, samples gave an average return value of 64c per cubic yard with gold estimated at \$18 per ounce. There were no failures. The results lay between the extremes of 42c and \$1.04 per cubic yard. To get the limit of the deposit it would be necessary to pursue the tests to points where gold failed A dry washer was used, winnowing the sand by means of a rotary fan, which blows under a fine screen over which the sand passes in a thin stream The limit of the gravel actually explored was 2,400 by 1,500 feet and eight yards deep Within this area bedrock was not reached at any time"

DOME ROCK PLACERS (5)

"Across the valley and about twelve miles from the Plomosa placer is another bed of gravel of similar extent and of high quality This western mass of gravel is occupied at various places by three camps, all rich in gold, and all differing materially in character of gravel. Middle Camp, the most northerly of the three, has granite gravel; Oro Fino, in the center, has much porphyritic slate; and La Cholla, at the south, is mostly composed of quartzite and schist pebbles At La Cholla

., which is nearer the mountains, there is a siliceous cement, very rich, but also so very hard that it requires to be broken by powder before going to the dry washer. At Oro Fino the shale bedrock is very near the surface. In Middle Camp there is cement, but of a much softer kind (Here most of the sampling was performed.) The camp (?) occupies the east and west valley crossing the mountain range, a mile wide and four or five miles long This is the chosen locality for the individual dry washer, who takes his machine to some point where the bedrock can be reached quickly. It is here that the rich seams of gravel on the bedrock yield from four to ten times the value of the thicker gravels, and in crevices there have been found nuggets worth \$10 to \$25. La Cholla, south of Middle Camp, lies along the foot of the mountains, like Plomosa, and is three or four miles in length The depth of the gravel is irregular in passing from Middle Camp through Oro Fino to La Cholla. Forty years ago the Colorado River was the main gateway, and freight for many years entered that way. The value of these placers was known to the miners who, in that early day, passed over all the region adjoining the Colorado, but the almost total absence of water in the mountains compelled the miners to pack their rich dirt to the river or to distant tanks to be washed. Oro Fino was the most celebrated camp of that day. There the soft shale bedrock rises to the surface; and when the art of dry washing was learned the rich bedrock was the scene of active work.'"

"Surrounding the post office of Quartzsite, in the Plomosa mining district, and extending in every direction, covering an area of about 7,500 acres, is found dry-placer ground with values to an average depth of fifteen feet and varying from five to fifty feet. The coarse gold content per cubic yard is reported to average from 10c to several dollars. Efforts are being made to get a combination of equipment which will successfully work the desert gravels and gold-carrying cement gravels at a minimum cost per yard. At a point south of Quartzsite and seventeen miles north of Ehrenberg, on Colorado River, a reduction plant capable of handling two thousand cubic yards of gravel every twenty-four hours is reported under construction. The machinery consists of a Barnett dredger, a Quenner disintegrating machine, and a Stebbins concentrator."

RICH HILL AND OTHER WEAVER PLACERS (19)

The Weaver District placers are located along Weaver Creek and at Rich Hill, about 12 miles southeast of Congress Junction. The Weaver Creek deposits were discovered by Captain Pauline Weaver in 1863 and were the first placers worked in Yavapai County. The placers of Rich Hill in the same district were discovered by a Mexican who was on his way to the Weaver camp. They were found in a depression on the summit of a mountain, and the coarse gold was lying bare on the bed-rock in many places. Large pieces of gold worth hundreds of dollars were not uncommon, and metal valued at \$5000 to \$6000 was frequently found under a single boulder. The gulches and ravines running down from the mountains also contained considerable gold. \$500,000 is said to have been taken from an acre of ground, and Hamilton¹ states that \$1,000,000 was yielded by these placers prior to 1883. This figure is probably low. During and following rainy seasons these placers are still worked by numerous miners, and the accompanying table gives the value of the production for the last twenty years.

The placer ground that contains the gold extends over an area of five by eight miles, and is ten feet or more deep. The gold in the stream gravels is coarse, but that in the soils and gravels of the mesa is fine.

GROOM CREEK PLACERS (10)

The placers along Groom Creek, ten to fifteen miles southwest of Prescott, have been worked over for the sixth time according to Sparks,² and have produced \$3,000,000 in gold.

HASSAYAMPA PLACERS

Gold placer gravels occur practically all along Hassayampa Creek from the Yavapai-Maricopa County line north up the stream to its source near Walker, as well as along its many small tributaries, such as Copper Creek, Ash Creek, Slate Creek, East Hassayampa Creek, Cherry Creek, and Oak Creek.

These placers are still worked during and following the rainy seasons, when small amounts of gold are recovered. In the dry seasons dry placer machines are occasionally used. Attempts at large scale operations have

¹Resources of Arizona, by Patrick Hamilton, 1883.

²Yavapai, The Land of Opportunity, by G. M. Sparks, Arizona Bureau of Mines Bulletin No. 59.

been made from time to time, but have invariably met with failure. Jagger and Palache¹ state that "it has been found that some of the gravelly beds in the western belt of volcanic agglomerate are auriferous, and on Slate and Milk Creeks some hydraulic washing is being done on deposits belonging to this formation."

OTHER PLACERS

Other placer areas in Yavapai County are found along Castle Creek, Humberg Creek, Turkey Creek, Granite Creek (8), and Big Bug Creek (1). In 1900-01 a dredging plant was erected near Mayer on Big Bug Creek. This enterprise met with failure, due probably to the fact that the ground was not suitable for dredging, because of the great number of very large boulders. An attempt was made to work the placers on Humberg Creek in the early nineties by an English company. This company spent a considerable amount of money in building a camp, and in constructing pipe lines and dams to carry on hydraulicking. The attempt failed through lack of water and inability to save the gold known to be present.

COCHISE COUNTY

DOS CABEZAS PLACERS (6)

The Dos Cabezas placer field was discovered in 1901 by some Mexican prospectors. They recovered only a small amount of gold, but enough was obtained to create considerable local excitement. All the streams and gulches to the north and south of the town were soon being worked. These gravels are comparatively shallow except at the town of Dos Cabezas itself. At no small distance north into the canyons the amount of gravel becomes negligible. The gold comes from the numerous gold quartz veins and stringers that are present in the six-mile belt of Mesozoic sediments that occur along the south edge of the Dos Cabezas mountains. Water was very plentiful in 1906, so a considerable amount of placer work was then done.

TEVISTON PLACERS (22)

The Teviston placers, located on the north side of the Dos Cabezas

¹United States Geological Survey Bradshaw Mountain Folio, No. 126, by T. A. Jagger and Charles Palache.

Mountains, opposite the Dos Cabezas district, have yielded some gold when they have been worked in the wet season by dry placer methods. According to Heikes¹, "Some three hundred acres have been reported as being valuable to a depth of three to ten feet. Bedrock is fifty to seventy feet deep. Most of the gold is coarse, and the ground by tests has yielded from 3c to \$28 per cubic yard. The largest nugget found was valued at \$375. Some cement or caliche has been found in prospecting the ground, but values have been found in the gravels beneath."

PINAL COUNTY

CANADA DEL ORO OR OLD HAT PLACERS (2)

Captain J. D. Burgess in some communications to Heikes² describes the placers in the Old Hat district and says that in "an area of 25,000 acres, covering nearly the whole of T_p. 10 S., R. 14 E., Gila and Salt River meridian, distant four to ten miles south from Oracle post-office and sixteen to twenty-nine miles north from Tucson, is found valuable dry placer gravel, which has apparently been deposited at intervals by floods from the Santa Catalina Mountains so as to form a deposit of nearly equal value from surface to bedrock, there being no pronounced accumulation of heavy gold at bedrock except in the stream, Canada del Oro Creek, which passes through the region. The bed of dry gravel is from six feet deep at the creek side to 252 feet at the summit, with an average thickness of about 150 feet. The deposit is in general a loose gravel, uncemented. There are, however, alternating strata of deep red, clayey material. These strata are of nearly uniform thickness of three to four inches and probably were formerly surfaces existing between floods, each being covered by a later flow of gravel from rainfall eroded veins farther up the mountain. Shafts sunk on the hillsides from twenty-seven to fifty feet in depth show values from 10c to 42c per cubic yard. The average is difficult to determine, as the gold is not equally distributed. All the gold is found in well rounded nuggets ranging from 50c to \$5.00 in value. There is a tradition that a lump weighing 16 pounds, probably 40% of which was quartz, was once found, but its discoverers were found murdered in their camp sixteen miles north of Tucson. The nugget had

¹United States Geological Survey Mineral Resources for 1912. Arizona Dry Placers, by V. C. Heikes, pp. 255-260.

²Idem.

disappeared. In fineness the gold averages about 0.905. Generally the placer material is dug, screened, and hauled to the creek, and there worked by rockers, or sluiced when there is enough water. Many dry washers have been tried, but most of the gold lies in the red clayey seams which apparently acted as 'bedrock' for each period of deposition. Pulverizing this adherent material gives good results with the common bellows type of 'dry wash'. A boiler and pump were once used to throw water against the creek bank, but the water at that time proved insufficient for extensive operations."

MARICOPA COUNTY

SAN DOMINGO PLACERS (20)

Placer gravels occur along the Hassayampa and its tributaries at a point forty-five to fifty miles northwest of Phoenix and near Morristown on the Santa Fe Railroad. Gold has been known to occur in this district, the San Domingo, for many years. Most of the country is rolling. The gold in the placers is derived from gold quartz veins in schists, gneisses, and granites which have been intruded by Tertiary andesites, rhyolites, etc.

The gold-bearing gravels are found in numerous gulches that lead down from the hills to the northeast of Morristown. During heavy rains these gulches carry the run-off to the Hassayampa, and into them is washed the gold-bearing sand and gravel. The coarse gold is found at bedrock in the upper reaches of the gulches, but here the amount of gravel is small. In the wider washes, according to T. Lane Carter,¹ are found placer gravels that cover areas as much as twelve hundred feet wide and two and one-half miles long. The average depth to bedrock is ten feet, and the average value, as determined from samples taken from test pits to bedrock, is 40c per cubic yard. In the larger deposits, and along the lower reaches of the gulches, the gold is distributed fairly uniformly.

One property in this district, called the Lotowana Mine, and located by John Sanger, covers four thousand acres. One-tenth of this area has been tested by pits. Part of the property, on "Rogers Wash," is said to be covered with a gravel bed that is two and one-half miles long, and one thousand feet wide, and one to twenty feet thick. It is estimated to

¹Mining and Scientific Press, August 10, 1912. Vol. 105, Gold Placers of Arizona, by T. Lane Carter.

contain 4,400,000 cubic yards that will yield 40c per cubic yard. Some of the ground will average 80c per cubic yard, however.

Several engineers have proposed to build storage dams to catch the heavy run-off water, and to use it in hydraulicking this area. It has also been suggested that the underflow of Hassayampa Creek could be caught and diverted by flume and pipe line, and used for hydraulic mining. The particles of gold in these deposits are angular, the material is sandy with few big boulders, and clay and caliche are said to be absent.

The value of the production from this district to date is not known, but the accompanying table gives the amount of gold produced since 1900.

In 1908 material was hauled for the construction of a dredge on the Agua Fria River in Maricopa County, but nothing is known of the results obtained.

MOHAVE COUNTY

In 1909 a suction type dredge to treat the gold sands of the Colorado River was constructed on the Arizona side of the river opposite Eldorado Canyon, Nevada. The capacity of the dredge was seven thousand cubic yards daily. It failed in the first test to extract the fine gold, and was shut down. Subsequently, in the spring of 1910, it was torn from its moorings at high water and wrecked.

Recently there has been considerable excitement over the possibility of the existence of rich placer gravel along Silver Creek below Oatman. Test pits are being sunk to bedrock. What success this new undertaking has met with has not yet been divulged.

Placer gold gravels that have yielded some gold occur in the Cheme-huevis district (4). This district is located twelve miles south of Franconia on the main line of the Santa Fe railroad.

GREENLEE COUNTY

According to Lindgren¹ "placer gold has been found in Gold Gulch(7), as fine flakes in the gravels along the Morenci Canyon about four miles below the town, and in several places in gravels along the San Francisco River (21). The best prospect occurs near Oroville, where work-

¹United States Geological Survey Professional Paper No. 43. The Copper Deposits of the Clifton-Morenci District, Ariz., by Waldemar Lindgren.

ing has been attempted. The gravels lying in front of the hills of the older rocks at Morenci and Clifton are auriferous in places. Placers of some value were worked in Gold Gulch, but are now exhausted. An unsuccessful attempt was made some years ago to mine, by the hydraulic method, the bench gravels of the San Francisco River, which doubtless derived their gold from the veins northeast of Copper Mountain. The Gila conglomerate south of Morenci contains fine gold which is concentrated in shallow gullies. Payable placers have not been found."

DRY PLACER MACHINES

Both hand and power machinery has been devised to treat the dry placer gravels of Arizona. Most of these machines have been operated at one time or another on Arizona placers. For a complete discription of these machines, the reader is referred to the literature on this subject which is listed in the bibliography of this bulletin.

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