

ing one-man power in violently forcing the iron top down into the mortar. The spring pole raises the stamper and the operator continues to repeat his first act till he tires. A circular plate with an iron band some nine inches wider than the thickness of the plate fitted closely, but removable, around it, makes a more convenient battery box when the ore has been triturated to sufficient degree of fineness, the ring can be removed, the material swept off, the ring replaced and the battery box again used. The pulverized ore is screened and coarse particles returned to the battery box.

But the dolly is a slow-crushing machine, and it is not the power. Improvement in capacity and relief to the engine was gained by the construction of a mill. A straight-grained, tough wooden stem some four or five feet long, was prepared. It was made smooth and uniform and one end fitted to a heavy casting, or shoe, of iron. A tappet, or piston, shoulder, was attached to the stem, the construction, near the other end of the stem. A mortar was prepared by fixing a thick iron plate on a block and enclosing it with wooden stanchions to support it as much as a large bowl, or tub with an iron bottom. The mortar was soon improved by cutting a hole in one side of the structure and through which pulp could be discharged by the splashing of the stamper, facilitating crushing greatly. Two posts were secured to the mortar and were framed together by cross-pieces in each of which was an aperture for the stem, which being set up vertically with the shoe in the position of the piston in the mortar, the cross-pieces were ready to be lifted and suddenly dropped. Through holes, made for the purpose, in each post a shaft was passed and secured in place. It was set to work a short time in the longest days, but it was the immediate progenitor of the above-mentioned 200-stamp mill, which is daily crushing 1500 tons of ore.

Standard Quartz Mills of Oregon.
In Oregon the standard quartz mill consists of a battery of five stamps, operated in one mortar, with plates, vanners, etc., designed for crushing the gangue and saving the gold. Larger mills consist of duplications under one roof of the complete five-stamp. The operations of a mill of this kind can be briefly explained. Each stamp is a minor detail, usually adopted to adjust the process to varying characters of ores, do not require mention.

The mills are variously operated by steam, gasoline, water and electric power, requiring no description. In a well-arranged mill nearly all the operations are mechanical. The mill is a simple machine requiring very little manual labor, and the quantities of ore reduced have been greatly increased in proportion to the size of the mill. The use of a mill is no longer a cause for apprehension to miners. When "slitting" by the stamp battery has been reduced to the minimum, as it is in the case of the mill, the attention of the miner is directed to the great advantage of mill men and millwrights. To the present, model mills are discharged into the mill, the ore is grizzly set at the top of the mill. This grizzly consists of a series of iron bars set longitudinally inclined on the side of a stout iron frame. The structure can be obtained by observing the bar gratings, or traps, set in the sidewalks of the city as openings to excavations beneath the walk. From this grizzly the ore falls into a hopper, which is inclined at the top, and the material moves all the unproductive gangue; the values being extracted during its progress.

The fine stuff falls through the grizzly while the coarse pieces of ore slide downward to the rock-breaker, a heavy machine, with huge oscillating jaws, which serve to crush the ore into pieces of the size of walnuts or crabapples. This broken stuff then slides into the ore bin with that which fell through the grizzly. The ore bin is inclined at the top, and the ore falls into a battery in quantities as required, the falling material being supplied with water to that end. The battery consists of an oblong, nearly rectangular iron box, with sides diverging upward and open at the top. It is of heavy cast iron, particularly of flat bottom. A rectangular aperture of suitable size on one side of the mortar admits a screen, through which the pulp is splashed by the opposite side a narrow aperture admits the ore from the feeders, the ore falling upon the dies set in the bottom of the mortar. These dies, some ten inches deep, are in number, made of the best and toughest steel, cylindrical in form at the upper or wearing parts, slightly larger than the shoes of the stamps, and fitted in a line in the bottom of the mortar.

Heavy steel rods or stems, each some ten feet in length, are fitted at the lower ends with cylindrical, solid cast-iron caps, called shoes, which, like the dies, are made of best material to withstand the wear attending the rapid crushing of the flinty gangue of the ore. The stems fall upon the dies and the shoes by impact crush the ore. The stems are set vertically in a heavy framework, each with center above the center of its die. The stems are fitted near the top with tappets to receive the uplift of the frame, set below the line of tappets, rapidly raise and release the stems, which, when the tappet and shoe, being practically one body of metal, drop with great force upon the ore lying on the dies. The weight of a shoe, tappet and stem varies from 50 to 1000 pounds, according to the size and construction of the various mills. The shoes are raised to heights varying from four inches to nine inches, and drop at the rate of from 20 to 30 times per minute. The resulting roar comes from the tremendous concussion of the stems upon the dies, and is often caused by the tremendous concussion of the stems upon the dies, and is often caused by the tremendous concussion of the stems upon the dies, and is often caused by the tremendous concussion of the stems upon the dies.

the plates are relieved thereof by cleaning and prepared anew. Skill, strict attention and care are required to get best results by amalgamation. A considerable percentage of gold remains in the metallic sulphides of nearly all free-milling ores, and resists amalgamation. To save this gold, the pulp is first treated with cyanide of potassium, which dissolves the gold. The solutions are drawn off and passed through boxes containing fine shavings, by which the gold is precipitated from the solution. The shavings are washed in clean water, taken out of the boxes, the precipitates collected, calcined, melted, and the gold is obtained.

opened sufficient for mining. Heavy snowfalls and long winters of the locality deter prospecting, but do not interrupt work in mines when opened. The well equipped mines and mill of the property known as the Express station on the O. R. & N., as a distributing point, Opals are found here. Wagon roads lead to the principal camps of the locality. Here again are placer claims, many interesting prospects and some quartz mines. The group known as the Gold Hill mines has been quite extensively explored and has a 10-stamp mill. A few several veins varying in size and quality of ores; formation granite and slate. This group is four miles southeast from Express.

Range 45: Passing southward on this range 45, to townships 11, 12, and 13, another extensive mining section is reached. Here again are placer claims, many interesting prospects and some quartz mines. Opals are found here. Wagon roads lead to the principal camps of the locality. Here again are placer claims, many interesting prospects and some quartz mines. The group known as the Gold Hill mines has been quite extensively explored and has a 10-stamp mill. A few several veins varying in size and quality of ores; formation granite and slate. This group is four miles southeast from Express.

Range 45: This is but little requiring notice in this range, until Burnt River placer fields are again reached in townships 11 and 12. They cover a large portion of the lower part of the range, and over into Malheur County, and here are a good many quartz claims, some fairly well developed and reported to be paying profits to the owners. The Eldorado district, in the Burnt River valley, is situated in the early years of mining to bring water to the very extensive placer deposits in and about Mormon Basin, a once famous locality. The Eldorado district, in the Burnt River valley, is situated in the early years of mining to bring water to the very extensive placer deposits in and about Mormon Basin, a once famous locality.

Producers Near Baker City.
Range 41: Townships 9 and 10, cover an attractive country, where there is very considerable activity. A great many prospects and some good mines are here. The Virtue is a pioneer quartz mine of Eastern Oregon; has been opened to a depth of some 300 feet, and productive of very large values, reported at considerable intervals. The Colateral, a parallel vein, is being worked through the same shaft. Ore, free-milling gold; elevation, 3000 feet; 20-stamp mill; nine miles east of Baker City, on the Burnt River road. The Flagstaff, six miles easterly from Baker, and on the Virtue mine road, has three parallel veins considerably developed to a depth of 200 feet. The Gold Eagle, a parallel vein, is being worked through the same shaft. Ore, free-milling gold; elevation, 3000 feet; 20-stamp mill; nine miles east of Baker City, on the Burnt River road.

East Oregon Gold Belt
Mineralized Area and the Formation of the Ledges.
In the very early days the placer miners in various sections of the state established, or recognized, certain loosely defined boundaries to the local fields of operation and applied a name to each "district" for local convenience. This practice fell into disuse many years ago, and there remains no legally organized mining district in the state. Men now frequently, and variously, refer to a given locality as being in two, three, and sometimes more, mining districts. According to reports of different men as to the locality of a given mine or a specially good prospect, it will be found reputedly to lie in quite a number of districts. There are no boundaries, save as conceived by each individual, so that a designation of localities by districts or common reports, is impossible.

A review, of necessity, brief and resulting in many omissions, will be attempted, designating localities according to topography, and formation as far as possible. The mining fields are so large, the good mines and splendid prospects so distributed over such broad extent of country, in all exceeding the area of several New England States, that the most brief information cannot be hoped for at this time. To review this vast field it is best to take the area covered in the public reports, and divide it into sections according to the following: Baker County. Beginning at the eastern boundary of the state, in townships 6 and 7, range 48, and at the water line of Snake River, the extreme eastern of the state, lie the famous Siskiyou hills, a series of rugged mountains, broken, fissured with canyons, and leech with quartz veins. It is known as the Cornucopia district. The mountain here, as in other places, of being worked at the end of 90 years, still has less active operations, large areas, still untouched.

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The Sparta Country.
Westward again to Range 44: Townships 5 to 14 cover a continuous series of placer and quartz mines, and gold and copper prospects in various stages of development. Sparta, an ancient town, situated 23 miles northeasterly from Baker, is the distributing point for the upper or north end of this strip of country; elevation, 4000 feet. From Sparta, where a comfortable hotel is maintained, wagon roads and trails radiate to numerous claims and camps. The Sweet Hetsy and the Pinyon Dugman, in Paddy's Paradise, were once famous as producers. Paradise lies northeast some nine miles. Several claims in the Sparta country, including the Pinyon Dugman, are under development. The Pinyon Dugman, in Paddy's Paradise, were once famous as producers. Paradise lies northeast some nine miles. Several claims in the Sparta country, including the Pinyon Dugman, are under development.

Range 38: A most interesting section of country has now been reached and there is a mighty temptation to pause here and explore the country. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west. Very satisfactory hotel accommodations can be had at Baker. Good hotels are great aids in the work of the miner. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.

Range 35: In this range begins a series of quartz prospects, some of which extend westward some 30 miles, far into Grant County. A special feature consists of a strong and apparently uninterrupted mineralized zone, probably 20 miles in length, and in some of the veins, the width of it for a dozen miles or more. It is 60 to 100 feet wide and is paralleled by numerous quartz ledges. Upon this ledge are many small prospects, some of which are being worked. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.

Mineralized Zone Twenty Miles Long
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Cracker Creek lies in townships 8 and 9. The district known as Cable Cove, in the east half of township 8, and in Ibea district, which lies partly in Grant County, in township 8, are also tributary to Sumner. The mine lies on the southeastern slope of the great range of mountains of the locality. The formation of this range chiefly consists of a core or axis of granite, with argillite lying upon it, and veins, almost universally large and carrying good grades of ore, intersect the argillite, or slate, as it is generally designated.

Intrusions of igneous rocks and alterations of the argillite occasionally change conditions locally, and veins occur in the granite, and in some of the argillite, but the granite is generally well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently. The granite is well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently. The granite is well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently.

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Range 40: This range covers important territory in that it contains placers, some of which are reported to be producing. Baker City is located in township 9, range 40, and is the center of this plan of review, and is the general commercial and financial headquarters of the mining industry of this part of the state. It has two solid banking houses, sampling works, several assay offices, a custom quartz mill and three well-conducted daily newspapers. It is on the main line of the Oregonian, and is splendidly equipped passenger trains each way daily; and at this point the Sumpter Valley Railway, also running two passenger trains daily. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.

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Summer a dentist of Prairie City, taking exercise in the foothills near the town, observed a portion of a large tooth, which a heavy rain of that morning had exposed. He extracted it, and found it to be a good water-grade wagon road of six miles reaching the principal mines. The formation is granite and argillite. The area is gold, copper, cobalt and silver, of extent in value in the order named. A postoffice, a store, a general store, a blacksmith shop, a sawmill, a gristmill, a wagon road, a bridge putting out from the main mountain divides the southern water shed into two streams. East Dixie Creek and West Dixie Creek. The bridge is secured with veins of gold quartz. On West Dixie the ore are being mined principally for free gold and reduced in a five-stamp mill, in an arduous and slow manner on the main stream is operated by water power applied to a hardy-quartz wheel. It is better than the orthodox mule power.

Dixie Creek Region.
The ores on East Dixie Creek consist chiefly of copper and cobalt, carrying good grades of silver. They are well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently. The granite is well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently. The granite is well exposed, heavily timbered, and has heavy snowfall in the high reaches, so that prospecting is difficult and operations slow until recently.

Mining to a Depth of 3000 Feet.
Nearly every creek and gulch in the Burnt River district has been and is being worked for placer deposits. The following mines are supplied with mills: May Queen, 10 stamps; Quebec, 10 stamps and 19 being added; Magnolia, 10 stamps; Don Juan, 10 stamps; Pxy, 10 stamps; Little Giant, 10 stamps; a party in the Bonanza district, has a cyanide plant, but no amalgamation. Many of these are equipped with electric lights, and have telephone connections with the world. The Blackhawk, I. X. L. Phoenix and others are placing mills on their properties.

Grant County Properties.
Mineral sections of Grant County are to a great extent a continuation of the great zone of Baker County. Just described. Gold was first discovered in what is now Grant County in 1852 by a party of California miners en route to Auburn and Griffin Gulch, where placers had been discovered late in the previous year. The find was made in Canyon Creek. Canyon City, the present county seat, became famous as the center of a field which produced many millions in dust and nuggets. Placer mining is still in progress at many points, but scarcely any water in many localities and inadequate dumping ground in others have left millions in value untouched. Probably the largest and most complete gold-dredging machine ever constructed will be in operation a few miles below Canyon City, on the John Day River. It is to be an enlarged and improved Pomroy dredger. One of these machines has proved to be successful and is operating on Burnt River, as before mentioned.

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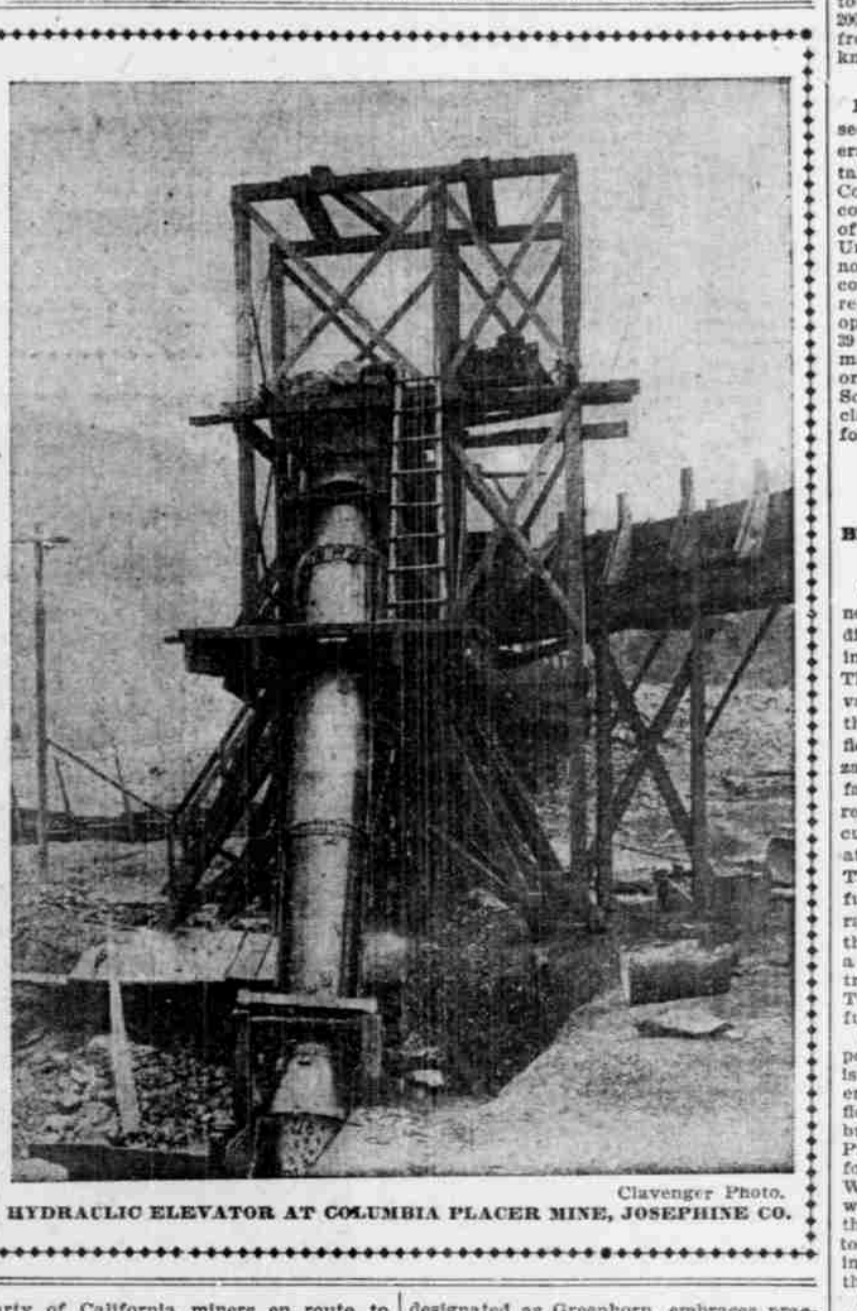
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SMELTER ON DIXIE CREEK, GRANT COUNTY.



HYDRAULIC ELEVATOR AT COLUMBIA PLACER MINE, CLAVENGER PHOTO.

and 12, ranges 34, 35, is an once famous locality—the Quartzburg district. Its placers were extensive. From Prairie City a good water-grade wagon road of six miles reaches the principal mines. The formation is granite and argillite. The area is gold, copper, cobalt and silver, of extent in value in the order named. A postoffice, a store, a general store, a blacksmith shop, a sawmill, a gristmill, a wagon road, a bridge putting out from the main mountain divides the southern water shed into two streams. East Dixie Creek and West Dixie Creek. The bridge is secured with veins of gold quartz. On West Dixie the ore are being mined principally for free gold and reduced in a five-stamp mill, in an arduous and slow manner on the main stream is operated by water power applied to a hardy-quartz wheel. It is better than the orthodox mule power.

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Grant County Properties.
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Range 32: In this range begins a series of quartz prospects, some of which extend westward some 30 miles, far into Grant County. A special feature consists of a strong and apparently uninterrupted mineralized zone, probably 20 miles in length, and in some of the veins, the width of it for a dozen miles or more. It is 60 to 100 feet wide and is paralleled by numerous quartz ledges. Upon this ledge are many small prospects, some of which are being worked. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.

Range 29: In this range begins a series of quartz prospects, some of which extend westward some 30 miles, far into Grant County. A special feature consists of a strong and apparently uninterrupted mineralized zone, probably 20 miles in length, and in some of the veins, the width of it for a dozen miles or more. It is 60 to 100 feet wide and is paralleled by numerous quartz ledges. Upon this ledge are many small prospects, some of which are being worked. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.

Range 26: In this range begins a series of quartz prospects, some of which extend westward some 30 miles, far into Grant County. A special feature consists of a strong and apparently uninterrupted mineralized zone, probably 20 miles in length, and in some of the veins, the width of it for a dozen miles or more. It is 60 to 100 feet wide and is paralleled by numerous quartz ledges. Upon this ledge are many small prospects, some of which are being worked. The section now to be described is that of the coming and doings of the men, who, on what is now designated by the Government as township 9 south, range 38 east, Williams, Merriam and the O. R. & N. was the very extensive mining country lying to the west.