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Railroad to Oregon. Petition of citizens of California, praying for railroad communication with Arizona.

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RAILROAD TO OREGON.

PETITION
OF
CITIZENS OF CALIFORNIA,
PRAYING

For railroad communication with Arizona.

JANUARY 6, 1871.—Referred to the Committee on Public Lands and ordered to be printed.

To the honorable the Senate and the House of Representatives of the United States in Congress assembled :

The projectors and shareholders of the California and Arizona Railroad Company, a corporation formed under the laws of the State of California by citizens of that State, beg, by this memorial, to respectfully set forth to your honorable bodies the purposes and prospects of such association, and some of the public and national benefits to be derived from the successful accomplishments of the undertaking; benefits, it is submitted, of such magnitude as to entitle the company to the favorable consideration and countenance of the Federal Government, and to merit such congressional aid as may suffice to render the work practicable.

The route proposed for this road is from the sea-port of Wilmington, in Los Angeles County, California, to Wickenburg, in Arizona Territory, with a branch from some convenient point on the trunk to Owen's River, striking that stream about fifty miles above Owen's Lake, making an estimated length, inclusive of branch, of about five hundred miles.

This route, as inspection of any recent map will show, connects the regions over and to which it runs, with their natural necessary outlet, high and impracticable mountain ranges intervening to cut them off from any more direct communication with San Francisco. Los Angeles County is geographically their center of supply and export, and of this county Wilmington is the natural and already established sea-port. The road will largely develop the agricultural resources of the counties of Los Angeles, San Bernardino, and Inyo, resources the extent of which are known and recognized as being second to none in the State, embracing a varied list of products, from the cereals of higher latitudes to the fruits of the tropics, and which, even now, with all the present disadvantage of distance from market, are attracting numerous settlers.

The impulse to the prosperity of these counties above, which, to the appreciation of the slowest comprehension, must follow the construction

of this or a like road, would be prodigious to a degree insuring public aid. The urgent calls for railroad facilities in Southern California have already led to the building of the Los Angeles and San Pedro road, a substantial work, some twenty-three miles long, constructed and equipped by private enterprise, aided by Los Angeles city and county, at an expense of six hundred and fifty thousand dollars, and which gives the best of assurance that further public and private assistance in the portions of our route already settled will not be wanting.

Local means are insufficient and private enterprise inadequate to accomplish the whole design. Passing east and north from San Bernardino, the route enters on a region nearly devoid of white population but notoriously rich in metals. Reports of the mining resources in some of the districts we respectfully submit herewith, with such statistical information as the newness of the country and the meagerness of material allow. Large portions of this region are almost made of cheap ores, the working of which, the present expense of transportation, supplemented in some measure by the exposure to Indian outrage on life and property, prevents, even under existing disadvantages, permitting the working of the richest leads only. The trade from Wilmington to Owen's River, via Los Angeles, gives constant employment to fifty ten and twelve mule teams between the last two named points, over a heavy, difficult road, of a length of about 275 miles, and the weight of the bullion transported (for even the richest ore would pay little if transported in its crude state) largely exceeds that of the supplies furnished. This Owen's Lake country the proposed branch will open, while the trunk will redeem from worthlessness to richness the northern parts of Arizona and of San Bernardino County and Southern Nevada.

Although to reach and bring to light the mineral wealth of these regions is the principal object in extending the road thither, they are not without agricultural resources also. They are not a desert without oases, good soil and water appearing in places, not always in sufficient extent and frequency to permit agricultural export, but certainly enough to insure a large source of home supply and greatly reducing the expense of mining, to extensively enlarge thereby the number of profitable leads.

Your honorable bodies need no reminder to consider the national advantages following any increased facilities to the military service in its operations in a region most of which is still virtually in possession of the aborigines.

It is not intended nor required, nor would the expense of material and its transportation warrant that this work should be of the heavy class necessary for the transcontinental road, but is proposed to be a substantial narrow-gauge track, such as have already gained an established reputation for efficiency in Europe and the Atlantic States, and of a capacity ample for the required service, even on the most extravagant estimate. This class of road has of late been frequently noticed with high commendations in scientific prints, and in England especially is coming into extensive use for the carriage of coals and ores, precisely the service for which this project is principally advanced.

This, in brief, is the plan of the undertaking, and such the benefits to be expected from its accomplishment, which, with the subjoined reports, &c., we respectfully submit, praying the careful consideration thereof by your honorable bodies, and such congressional subsidy as on such consideration the beneficial results of the enterprise will, we are assured, abundantly appear to deserve.

And, as in duty bound, your petitioners will ever pray, &c.

The following are some of the mines known to exist that will be accommodated by the completion of the proposed railroad:

I.—GENERAL DESCRIPTION OF THE OWEN'S LAKE AND CERRO GORDO DISTRICT AND ITS VICINITY.

Cerro Gordo mining district is situated in the southeastern portion of Inyo County, State of California, in a range of mountains called Inyo Mountains, the southern extension of the White Mountains. They are bounded by Owen's Valley and Owen's Lake, Lone Pine Valley (formed by the Palisade and Inyo Mountains) on the west, by Salinas Valley (formed by the Panamint and Inyo Mountains) on the east, and by the Caso Mountains (which are the southern extension of the Inyo Mountains) on the south. The Inyo Mountains have a general north and south course, and carry an extension from 7,000 to 8,000 feet above the level of the sea. They are a very rugged chain of mountains, form deep and abrupt cañons, slope more to the westward (about 2,500 feet into Owen's Valley) than they do to the eastward, where high plateaus gradually connect them with the Panamint Mountains.

The general topography of Owen's Valley is too well known to make reference to it necessary; suffice it to say that its soil, for over thirty miles in length, varying from four to six miles in width, furnished by the hills and mountains (on its eastern border) with an abundance of sweet water, offers seldom to be found inducements for agriculture.

That portion of the valley where Owen's River empties itself into Owen's Lake, and immediately northward of the latter, is termed Lone Pine Valley, where Lone Pine City is situated, and which is about two hundred and eighty miles from Wilmington, by wagon road. The nearest town is Fort Independence, (a Government post,) which lies eighteen miles to the northward of Lone Pine, and is connected with it by a stage road.

Lone Pine is but a late settlement, comprising about one hundred houses. In its immediate vicinity are fields, where agriculture has been carried on, on a small scale, and with good results. Close to the city, about one-quarter of a mile distant, lie the company's mill-site and milling property. Within one-quarter to one-half mile east of the city runs Owen's River, which can be made navigable for steamboats of peculiar construction, adapted especially for those waters by improving the channel, which can only be done at great expense.

The mountains which bound Lone Pine Valley on the west, and which descend very abruptly about four miles west of the town into the valley, the most prominent peaks of which are Mount Whitney, 15,000 feet elevation; Mount Williamson, 14,300 feet elevation; Mount Tyndall, 14,000 feet elevation above the level of the ocean, abound in timber lands, and furnish water in sufficient quantities for excellent mill-sites; although, as yet, all timber for building purposes comes from over fifty miles distant, and, consequently, is still high in price.

Cerro Gordo City, the center of the mining district, is situated about 7,200 feet above the ocean level, about nineteen miles by wagon road from Lone Pine City, in a southeast direction. Its elevation above Lone Pine is about 2,000 feet. It lies in a deep ravine, on the western slope of Inyo Mountains, and has, at present, about three hundred inhabitants. The mountains here are naked—almost barren of vegetation—that is, there are no timber lands, and but a limited amount of fuel.

II.—GENERAL DESCRIPTION OF THE MINES.

That portion of the Inyo Mountains in which Cerro Gordo mining

district is situated, consists of one chain, having a general northwest and southeast course. It is not exactly detached from the entire range of Inyo, but has a depression of about 600 feet northward, where it rises again. Southward it falls gradually toward Owen's Lake. Its cañons and ravines have a general southeast direction, descending toward Owen's Valley. They are abrupt, and very steep for about two miles from the mountain's summit; but further southwestward the slope is more gradual, into low undulating hills for about two miles, which connect it with the valley.

The main bulk of this range (called Cerro Gordo) is composed of metamorphic rocks, broken through and intersected by heavy belts of crystalline and granular limestone, and prophyries of various characters. Their lines of contact are promptly discernible by the appearance of slates, mostly ferruginous clay slate and calcareous slate. The lower portion of the southwestern slope (about $1\frac{1}{2}$ miles from Owen's Valley) shows these slate belts to be (siliceous slate) very massive. They are parallel with the mountain chain, dip southwest, and seem to be the division line between the sandstone formation of the low hills and the metalliferous belt of the mountain above. In this metalliferous belt limestone is predominant. It carries the veins embedded in itself, or as contact veins.

In the former cases the foot-wall of a vein is generally discernible by a clayey seam as a division line. The under and over lay, or hanging and foot-walls of a vein and its gangue, (or vein matrix,) are in many instances distinguishable from one another only by the crystalline structure of the limestone; but mostly the walls are granular limestone while the matrix of the vein is a crystalline limestone, often calcspar.

The veins of the district may be divided into two classes, namely: 1st, those which carry mostly argentiferous galena ores; and 2d, those which carry argentiferous copper ores as the main ore bulk. 1. The first class have invariably limestone, while the second class carry quartz and quartzite predominant for vein matter. 2. The second class are the most well defined and the more massive of the two, and consequently are not subject to so many irregularities near the surface as the first class. They carry the larger amount of precious metal, and are in consequence termed silver ores throughout the district, while the first class are known as lead ores.

The great cost of wagon transportation has been the reason that, up to the present time, but a limited amount of work has been done on the veins, hardly sufficient to enable any one to come to any decisive conclusion as to the real merit of many of them. The aim of the work which has been done so far has been always to produce in the shortest possible space of time the largest amount of ore, in order to realize and not to develop, (a circumstance to which every mining district, in its infancy, is subject,) especially if its yield can be made available forthwith, as it is and has been the case here in Cerro Gordo almost ever since its discovery, and which certainly speaks well for the mines.

III.—DESCRIPTION OF THE ORES.

The ores of the district are of various natures and character. The latter is undoubtedly attributable to the character of the rock which forms the main bulk of the vein, matrix mostly, but also to the nature of the rocks which occur in the immediate vicinity of the veins. Predominant are found: 1. Argentiferous galena; 2. Argentiferous copper ore, (as gray copper ore principally); 3. Iron pyrites, (in various stages of decomposition.)

Subordinately: 1. Antimonial silver ore with speiss cobalt; 2. Silver copper glance; 3. Silver-bearing copper malachites and lazur; 4. Sulphurate of silver, (highly oxidized and free from refractory metals;) 5. Native silver.

Gold is found only in traces, and more in the northern portion of the district. The extreme southwesterly situated veins carry some gold.

1. Those veins bearing limestone as vein matrix have galena predominating, accompanied by iron pyrites, which near the surface are naturally decomposed to oxides, coloring the entire vein matter yellow and red, and entirely destroying its texture. The ore in these veins, as far as can be observed from the explorations made in the district, occurs in nests and pockets, and irregularly shaped deposits, which generally run parallel with, and lying very close to, the foot-walls of the vein. They vary from 1 to 15 feet in width, and have in several instances been worked over 40 feet vertically, and over 60 feet in length northward and southward on the strike of the vein. In two instances a depth has been obtained where the iron pyrites are only partially decomposed, (and some have been found in their proper shape, having suffered no decomposition,) and here the silver value of the galena has been found unchanged. The depth attained is limited, (not 100 feet below the surface,) consequently not in the least in proximity to the water level, (where any one would expect to find iron pyrites in their original state,) and it is impossible to say how these galena ores will occur at that depth; but the fact that their silver value has not changed where the accompanying iron ore changed in its entire character, is certainly a very flattering phenomenon, which leads one to expect the silver value of the ore to continue in depth.

The galena occurs in various forms, from fairly crystallized to almost granular, that is, to a very minute crystal; and it was found that the fairer or closer the crystals the richer the ore in silver.

A sample of coarse crystallized galena ore from the "Union mine," 25 feet below the surface, contained \$84 82 in silver per ton, and 67 per cent. lead. A similar sample from the same vein, about 90 feet below the surface, from the Santa Maria tunnel, gave \$91 13 in silver per ton, and 58 per cent. lead per ton. This ore had iron pyrites not decomposed.

The fine crystallized from the "Union mine," about 40 feet below the surface, contained 61 per cent. lead per ton, and \$117 53 per ton in silver.

2. The other class of veins, bearing quartz and quartzite as vein matter, carry galena only subordinately, the argentiferous copper ores in their various combinations predominating. The ores occur generally in from two inches to five feet wide seams, which can be followed with some degree of certainty of duration in depth.

An assay shows these mines to yield—

Silver.....	\$289 05
Gold.....	40 51
	<hr/>
Total per ton.....	329 56
	<hr/> <hr/>

In order to give an idea of the value of the ores of the district some twenty or thirty mines have been visited, and the ores sampled as they occur, regardless of assorting, as will be seen by the description of them:

Value per ton.

I. <i>Galena ores</i> .—1. Sampled 8 feet wide ore; much vein matter; about $\frac{1}{2}$ ore, $\frac{1}{2}$ waste	\$25 12
2. Sampled 3 feet wide ore; about $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; easily assorted; some copper.	12 56
3. Sampled 2 $\frac{1}{2}$ feet wide ore; about $\frac{1}{2}$ ore, $\frac{1}{2}$ waste in copper; no antimony; the galena, in spots, has to be concentrated by washing	25 12
4. Sampled 6 feet wide ore; about $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; some copper; no antimony.	54 97
5. Sampled 2 feet wide ore, (in a vein 15 feet wide;) $\frac{2}{3}$ ore, $\frac{1}{3}$ waste; contains antimony; very little copper ores	91 10
6. Sampled 4 feet wide ore; very ferruginous; hard to assort; traces of copper	58 11
7. Sampled 1 $\frac{1}{2}$ foot wide ore; $\frac{2}{3}$ ore, $\frac{1}{3}$ waste; galena in spots; no copper	36 23
8. Sampled 16 feet wide ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; ferruginous; can be easily assorted	45 55
9. Sampled 17 feet wide ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; no copper; can be easily assorted by running; vein matter very crumbly, from the decomposition of its iron ores	12 56
10. Sampled 6 feet wide ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; oxidized some; no antimony or copper; ore occurs in pocket	43 98
11. Sampled 4 feet wide ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste in a vein 12 feet wide; waste easily assorted	42 41
12. Sampled 14 feet wide ore; an average through all the slope of a mine; is assorted on the dumper, throwing aside one-half the waste	100 53
13. Sampled 1 $\frac{1}{2}$ foot wide ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste in a 7-foot wide vein; can be assorted in extracting ore from the mine	84 82
II. <i>Copper ores</i> .—1. Sampled 8 feet ore, width little developed; only stain of malachite—cannot be called ore—was taken from croppings as a prospect.	6 28
2. Sampled 8 feet ore; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; vein 10 feet wide, mostly copper, lazur, and malachite and antimonial ores, easily assorted	316 14
3. Sampled 7 feet ore; width $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; some galena, not refractory	161 78
4. Sampled 2 $\frac{1}{2}$ feet ore width; vein 8 feet wide; not refractory ore	80 10
5. Sampled 8 feet; width of vein $\frac{2}{3}$; can be easily assorted to $\frac{1}{2}$ ore, $\frac{1}{2}$ waste	31 42
6. Sampled 5 width of vein; sampled it as it would be taken out, before any assorting could be done to it; ore in spots; no galena; can be easily assorted by hand; $\frac{1}{2}$ ore, $\frac{1}{2}$ waste	10 98
7. Sampled 4 feet vein width; docile ore; little lead; will assort $\frac{1}{2}$ ore, $\frac{1}{2}$ waste.	47 13
8. Sampled 2 $\frac{1}{2}$, vein being two separate pay-streaks in a vein 6 feet wide; does not require much care in assorting; contains some antimonial ores	105 39
9. Sampled 3 feet ore width; vein 4 feet wide; contains considerable galena; is assorted to about $\frac{1}{2}$ ore, $\frac{1}{2}$ waste; contains antimonial ores	168 06
10. Sampled a vein 3 feet wide and picked the waste out, forming about $\frac{1}{2}$ ore $\frac{1}{2}$ waste, docile ore; may possibly be amalgamated with good results; contains no galena; may be called an average	106 83
11. Sampled a vein which is 45 feet wide on the croppings, showing the ore only in stains; contains about 10 per cent. galena; mostly copper ores; ores can be easily extracted by themselves; the 45 feet show about 18 inches of ore, not worked any at all	7 85
12. Sampled 3 $\frac{1}{2}$ feet ore width, mostly highly oxidized ores, such as lazur and malachite vein 5 feet wide; can be easily assorted	105 75
13. Sampled several ore-seams of several widths, from two inches to one foot, occurring in a vein 6 to 7 feet wide, containing little galena, showing the ore about as it can be extracted, with little assorting	115 15
14. Sampled an average of all the veins in the southwestern portion of the district. They show little ore; the croppings show only malachite stains; rock was not assorted, but taken as it came. This ore can be very easily assorted, yielding probably only $\frac{1}{2}$ of its bulk in ore fit for beneficiation	42 11

Bandera Mine is a location of 1,600 running feet, on a vein situated about 500 yards from the center of Cerro Gordo City, on the wagon road leading down the southwest slope of the mountain to the valley. The vein represents a width of about 16 feet, has a general southeast direction, dipping southward, is encased in granular limestone, having crystalline limestone for vein matter, and seems to be a very massive vein. It has been opened by irregular cuts on the croppings, and an incline of 10 or 15 feet in depth has been sunk, which, however, at this time, is filled up, preventing a close examination. No further explorations have been made on the vein. The places that have been opened have been

stripped of all their ores, and only traces of the metal can be seen. These traces, however, lead one to detect the similarity of this vein to the San Ignacio vein, with which it runs nearly parallel, and which lies 150 yards lower down the mountain, and on which some work has been done. The mining operations done so far on the San Ignacio vein (in fact, on all the veins, generally speaking) have been on but a small scale, owing to the high price of transportation. The work is seldom carried on without great obstacles, and they have rewarded the owners thus far very poorly.

La Abundancia is situated about $1\frac{1}{2}$ mile northeast from Cerro Gordo City. It is a location of 1,600 running feet, on a massive vein embedded in limestone, running east 20 degrees north; its dip varying from 59 degrees to 65 degrees with the horizon, northwestward. The vein matter, being a very compact quartzite, has withstood all alluvial influences, making the outcrop, which is from 25 to 40 feet wide, very prominent, and traceable for $\frac{1}{4}$ mile. With the exception of the Buena Vista vein, this is the largest in the district. The vein has been opened upon by a cut of 30 feet horizontally, cross-cutting it from the northwestern slope of the mountain, and some very fine ore has been extracted, but it is some time since work has been discontinued.

The ores occur in seams, carry very little lead, and do not contain much refractory metal. This cut showed an ore seam 16 inches wide, and several bunches of ore, all which assayed \$59 83 per ton.

Much débris had fallen into this opening, barring out a careful examination.

The Abundancia runs parallel, or nearly so, with the St. Lucas and the Soledad veins.

All these are very massive veins, have precisely the same characteristics, and are not over one hundred feet apart. The St. Lucas is considered one of the best mines in the district, and sufficient work has been done on it to give an idea of its good and bad qualities.

St. Lucas.—The cropping of this mine (quartzite) stands 65 degrees north, in limestone, and runs east 5 degrees south. Near the surface the vein showed 6 feet width, containing several seams of poor ore, (now still in sight,) and did not look very promising. An incline was opened on the foot-wall for 54 feet deep; and the vein has been followed eastward on its course for 60 feet, where ore has been found (and extracted) in detached bodies from 3 to 6 feet in width and from 10 to 15 feet vertically, and 16 to 20 feet in length; the vein itself having widened to 10 and 11 feet from wall to wall, both of which are very well defined. The lower workings show an improvement in the quantity and quality of the ore. The face of the eastern drift exhibits 5 feet ore width, of \$98 83 assay value. An additional 30 feet were sunk on the vein, below the 54 feet incline, but little work has been done there. The vein shows so far no material change. The ores contain about 8 per cent. of galena and some anti-monial ores, and ores very rich in silver, (nests and bunches were found which will assay \$300 per ton,) and easily assorted from the barren vein matter. The ore, as it is at present extracted for smelting purposes, assayed \$115 30, sampled at the mine from the ore dump, and a batch of 10 to 12 tons at the Wolkill and Cervantes Company's smelting works assayed \$117 65 per ton.

The mine has been worked very irregularly and very slow; but, by sinking the present incline, say 100 feet deeper (or run a tunnel from the mountain side of 500 to 600 feet in length, giving at least 300 feet additional depth in the vein) and operating it by several levels, extracting *all the ore*, not leaving pillars, (as is now done,) it could be made to yield easily 20, if not 25, tons of \$125 ore daily with judicious management.

The greater number of the veins situated in about the center of the district are so called galena ledges: for instance, the Union, Freiburg, Nos. 1, 2, and 3, Front, Santa Maria, San Felipe, and many others, some of which seem to be located on one and the same vein.

Two distinctly separated veins of considerable dimensions were met with on the hillside, where all the above-named claims are located.

The *Union* is located on one of these. The vein has a general north and south course, is imbedded in granular limestone, and carries crystalline limestone for vein matter. Near the surface its width cannot well be established. It resembles a mass of ore thrown together with boulders of country rock, and only the foot-wall is visible in a few places.

The character of the vein matter has been in a great measure destroyed by a high impregnation of oxides of iron. Several mining companies have located on this vein, and have attacked it from the surface downward in places to a depth of over 70 feet. The La Maria tunnel has cut it in 500 feet—200 feet below the surface croppings.

These lower workings show more regularity in the vein than there was near the surface; its average width can be called 20 feet, (in one place it is over 40 feet.) It shows its foot-wall very well defined, carries its ores in bodies of different sizes, all having an inclination from north to south (and improve southward) and are divided by bunches (horses) of vein matter.

The ores are chiefly argentiferous galena. Copper ores occur subordinately, and only near the surface.

The larger portion of the mine owners at Cerro Gordo being in want of sufficient capital to open and explore their mines, fitting them for the extraction of large quantities of ore, has been undoubtedly the main cause that mining has been carried on without a system.

Many mines have only the work done on them which the laws of the district prescribe, in order to make their title good until a railroad is built. Some of the more enterprising mine owners seem to have worked solely with the object to extract a few tons of ore (rich ore) for sale, in order to produce the necessaries of living, while others extract larger amounts of ore, and trying to smelt them under great disadvantages at or near the mines.

MINES SITUATED IN YELLOW PINE DISTRICT.

There is considerable fertile land in the valleys of this district, upon which the Indians have, from time immemorial, been in the habit of raising corn, wheat, and melons. All the cereals, as well as certain kinds of fruit and most vegetables, could also be successfully grown here. The productive character of the soil is further shown by the presence everywhere of a variety of native grasses, furnishing a never-failing pasturage. In many localities the best of hay can be cut in abundance; and for grazing purposes advantages are possessed equal to the most favored portions of California, stock requiring neither fodder nor shelter throughout the year. Ample water-power for the propulsion of machinery can be made available within easy access to the best of timber.

THE CLARK DISTRICT

adjoins Yellow Pine on the south, and lies in the northern part of San Bernardino County; its geographical position being between the 34th and 35th parallels of north latitude.

Pechoca, lying upon the southern flank of Clark Mountain, is near the

southern boundary of the district. At this point a most notable deposit of copper and silver ore exists, viz:

The Copper World.—This mine, 1,600 feet in length, forms a depression in a spur of the mountain, cutting it at right angles. A wash or dry ravine marks either end of the company's location, there being an elevation of 250 feet to the center of the deposit, near which point a body of ore exists 242 feet in width. Samples of this ore, brought to San Francisco, have, by their purity and wonderful richness, excited much inquiry as to the character of the deposit and other particulars connected with the locality. The ore belongs to the red oxide variety, none of which assays less than 40, and a large portion as high as 83 per cent. copper, and about \$60 to the ton in gold and silver. This deposit is clearly traceable at intervals on its line of strike for several thousand feet, the outcrop being in places strongly marked. The Piutes call this the "Iran Spitz Raunacarie grow."

The Cogoneep Cañon is a deep gorge or cut through limestone with elvan courses between greenstone and metamorphic slate. In the latter formation is found the—

Cogoneep Lode, 1,600 feet in location; incasing walls, limestone, gangue, greenstone; showing silver, blue and green carbonate of copper; vein, 25 to 40 feet in width, and traceable 1,000 feet. In

The Bullion Rock of the cañon, on the northeast, at an altitude of 500 feet, a fissure occurs in the limestone, traceable a considerable distance. This vein reveals argentiferous galena in fine crystals, and is 1,000 feet in length.

The Scorpion mine, 1,600 feet in length, is a small lode cutting the Cogoneep at an acute angle. The ore shows galena, with indications of silver.

Ascending the cañon in a northeastern direction two miles, at a point four miles east from the Copper World, in the western slope of the ridge or divide, at an elevation of about 2,000 feet, is found the

Golconda Lode, in length 1,600 feet; course northwest and southeast; traceable 250 feet; width from four to ten feet, incased in talcose slate, with quartz ore gangue, showing antimonial silver, copper, and galena. This is believed to be a valuable mine, and is well known. In a westerly direction is situated

Golconda No. 2; location, 1,000 feet, in limestone, with elvan courses of greenstone, and containing a metalliferous vein of some power, similar to Golconda No. 1. Proceeding thence northwest a distance of eight miles, is reached

Teanpah.—This term, signifying clear water in the Indian tongue, is applied to a section of the district under consideration lying at the mouth of Signaw Cañon, on the easterly slope of Clark Mountain, and comprising a number of valuable metalliferous ores. At this point there exist all the facilities requisite for insuring the economical working of the various ores found in the district, whether treated by mill process or smelted.

This locality, while it is central to the neighboring mines, whence it can only be reached over a sandy road, is well supplied with wood and water.

The town of Ivanpah, with railroad communication to Wilmington, is destined to be the distributing point and principal place of business for the entire district.

The formation here is granitic, overlaid by metamorphic slate.

Industry, situated about one mile southeast of the town, coursing

east and west, six feet wide, incased in slate, with calcspar and quartz gangue; length of mine, 1,400 feet; value of ore, \$108 per ton.

Cañon Lode, showing a width of 10 to 15 feet of copper, galena, and silver ore, incased in slate with quartz gangue; claim 1,600 feet; and

The Ivanpah, a similar vein, 1,600 feet in length, six feet wide; the country rock of metamorphic slate with quartz gangue. On the western slope of the divide is

The Navajo, 1,600 feet in location; lode 10 feet wide, running east and west, with quartz gangue. Parallel to this, and 156 feet distant, is the

Silver Mountain, on the northern slope of Clark Mountain, and immediately under the high vertical limestone cliffs that render this mountain such a marked feature in the landscape. This ridge is about three miles long by two in width. At its eastern extremity lies

The Mequier Lode, 1,600 feet in length, limestone walls, vein 12 to 18 feet wide, and showing copper, galena, iron, and silver, traceable by croppings a distance of 2,500 feet.

The Galena, parallel to the above, is similar in character, and contains 1,600 feet.

The Topeka lies three hundred feet east of the "Micawber," and is about 10 inches in width, incased in limestone, and disclosing the presence of antimonial silver and copper.

The Maranop, the Sapaot, and the Coaquap.—Each contain 2,000 feet, calcspar gangue, veins from 4 to 20 feet wide, and showing galena, silver, and copper.

Fuel in abundance and of good quality can be found within a few miles. Water is obtained in the immediate vicinity of the mine, and if more should be required for milling purposes it can be brought from a large, never-failing spring at the town of Pechoca, 2 miles distant.

Proceeding westwardly, on the line of strike of the Copper World, a distance of 1,200 feet, is found the

Crescent Mine.—Here the calcspar cappings occur almost intact for a width of 4 feet, showing stains of blue and green carbonate and red oxide of copper. Excavations of a few feet in depth expose a large body of ore, similar in character to that of the Copper World. In a southwesterly direction, 1,200 feet from the latter, is located

The Tabascita.—It is 1,600 feet in length, and rests upon the western flank of the same spur, at an elevation of 250 feet above the western ravine or wash, and 50 feet below the summit of the divide. This deposit is from 4 to 6 feet in width, and discloses the presence of galena, chlorides, and native silver.

The croppings are visible for 75 feet, being regular and well defined, with a clay seam or gangue.

The ores of this mine will not require roasting, and can be easily reduced by the ordinary mill process.

The Pechoca Lode, located nearly opposite the Tabascita, is from 7 to 10 feet in width, showing galena, copper, and silver; the first named in excess, with a large percentage of silver, assaying from \$56 to \$460 per ton. The outcrop is traceable for a short distance only, but the side of the hill is covered with débris charged with ore.

Mineral Hill, situated on the eastern flank of Clark Mountain, includes the Cogoneep and Cañon lodes.

On the east lies a wide valley of arable land, covered with bunch grass and the cactus tree, which latter, when dry, is good fuel for generating steam or for smelting purposes. Water can be had here by sinking a few feet, constituting this an advantageous point for melting

or smelting. Mineral Hill is characterized in a manner that would at once arrest the attention of the experierence of miner and prospector. It can be seen from the opposite range, (the Providence,) distant some eight miles, standing in bold relief against a dark background of fossiliferous limestone, which caps the country for many miles. A long, narrow, mineralized belt of yellow and reddish ocher-colored country appears coursing northerly and southerly on the eastern flank of the range. The center of this metallic belt (composed of metamorphic slate with a white line drawn through it) resembles a monster quartz lode, which on near approach proves to be a strong dike of porphyry, similar to that of the Comstock lode.

Though water can be obtained in this vicinity, there is but little timber, for which reason it would be advisable to erect reduction works at a point in the valley about 2 miles distant, where both wood and water are abundant. These mines are not more than 40 miles from Cottonwood Island, on the Colorado River. The gradients between these points are favorable, the road leading down a broad, smooth, dry ravine. The mineral-bearing lodes of this locality all appear to course at nearly right angles with the dike mentioned, and to terminate in it in a northerly direction. They are traceable, however, for a considerable distance without diminution of strength or mineral character, proving them to be something more than mere spurs of the dike, which is of great strength, and presents a bold outcrop. Though it does not carry mineral at the surface, it is reasonable to suppose that, like the Comstock, it will become mineralized in depth.

The following description of one of those lodes will serve to illustrate the character of the whole:

The London, 1,800 feet in location, with a vein from 2 to 4 feet wide, traceable for 1,000 feet, inclosed in metamorphic slate walls and a quartz gangue, is highly charged with galena, copper sulphurets, and silver glance, giving an assay value of \$560 per ton. The London lies between the Cronise and Blue Horse, both of which it is thought will unite with it at no great depth.

The John Hunt.—Location, 1,000 feet; lode, from 3 to 6 inches in width; assaying \$148 96 in silver per ton.

Gray Mule.—Location, 1,000 feet; lode, 18 inches in width; assaying \$227 per ton in silver.

Billy Purse.—Location, 1,000 feet; width of lode, 6 inches.

Belmont.—Location, 1,000 feet; lode, 12 inches wide.

Bull Cactus.—Location, 1,000 feet; lode, from 4 to 6 feet in width.

Thom Hunt.—Location, 1,000 feet; width of lode, 12 inches.

Compromise.—Location, 1,000 feet; lode, from 6 to 13 inches wide.

Billy Clark.—Location, 1,200 feet; width of lode, 2 to 8 feet.

Ketchum.—Location, 1,200 feet; lode, from 12 to 13 inches wide.

Crosman.—Location, 1,000 feet; width of lode, 12 to 18 inches.

The Mary Delaney.—Location, 1,200 feet; lode, 15 inches wide; assaying \$99 86 in silver per ton.

Cronise.—Location, 1,800 feet; width of lode, 6 to 24 inches.

Blue Horse.—Location, 1,000 feet; lode, 4 inches wide; assaying \$119 37 per ton in silver.

Emigrant.—Location, 1,000 feet; width of lode, 4 inches; assaying \$368 per ton in silver.

Tharsum.—Location, 1,800 feet; lode, 24 inches wide.

Monumental.—Location, 1,800 feet; width of lode, 4 inches.

Thunderbolt.—Location, 1,600 feet; lode, from 16 to 24 inches wide.

Cross Course.—Location, 400 feet; width of lode, 10 inches.

Colonel Price.—Location, 1,400 feet; lode, 24 inches wide.

Galena.—Location, 1,600 feet; width of lode, 8 inches.

Brooklyn.—Location, 1,200 feet; lode, 12 inches wide.

Parana.—Location, 1,800 feet; lode, 18 inches wide.

Eagle.—Location, 1,000 feet; width of lode, 6 inches.

Cave City.—Location, 1,000 feet; lode, 12 to 16 inches wide.

Nightingale.—Location, 1,000 feet; width of lode, 18 inches.

Hornet.—Location, 1,000 feet; lode, 12 inches wide.

Lion.—Location, 2,000 feet; lode, from 30 to 50 feet wide.

Indian Queen.—Location, 1,000 feet; 8 to 10 inches in width.

J. C. Breckinridge.—Location, 1,000 feet; lode, 4 to 12 inches wide.

Joe Johnston.—Location, 1,000 feet; lode, 4 to 8 inches in width.

Beauregard.—Location, 1,000 feet; lode, 10 inches wide.

Leaving Mineral Hill and proceeding along the same flank of Clark range, a distance of about two miles in a southerly direction,

The Potoochaway, 2,000 feet in length, has a north and south strike; vein 20 feet wide, gangue talcose; metals, bromide of silver and carbonate of copper.

The Nungiputz is 2,000 feet in length, gangue talcose; vein 8 feet wide, and showing bromide and chloride of silver, copper, and galena.

The Toynabbie, with an east and west strike, discloses a calcespar and talcose slate gangue, and the presence of the same metals as in the last described.

The X. I. L. D. mine, 2,000 feet in length, and 14 feet wide at the point of its greatest development, is incased in walls of dolomite and carbonate of lime, with a gangue of calcespar; the entire vein is thoroughly impregnated with metalliferous ore, showing on the surface the presence of galena, carbonate of copper, and chloride of silver. It dips 45° westerly, cutting the stratification of the country. The ore on the outcrop is not refractory, and can be worked readily by milling process and simple amalgamation.

Water can be had within a mile of the main wagon road, and wood is abundant on this slope or flank of Clark Mountain. Ivanpah, the central point of the whole district, is two and one-half miles distant.

The evident value and favorable situation of this property render it very attractive as a mining investment. Easterly, 800 feet is located.

The Anelag, 1,000 feet in length, coursing north and south; vein two feet wide, in limestone walls, exhibiting galena, silver, and copper.

The Narragaenip, 2,000 feet in location, the strike being east and west; width of lode, 40 feet, disclosing copper, galena, gold, and silver; gangue calcespar traceable a long distance, and indicating the existence of a valuable mine at no great depth.

The Mereopits has an east and west strike, the lode being two feet wide; gangue talcose, and the country rock limestone; carbonate of copper and silver bromides are met with. Location 1,000 feet.

The Cliff, 2,000 feet in length, courses northwest and southwest, and shows a width of 150 feet; limestone gangue and country rock. The value of this location is not visible on the surface. From the fact, however, that the "Mequiquier," "Micawber," "Galena," "Topeka," "X. I. L. D.," "Anelag," and several other lodes terminate in this fissure at right angles, and do not extend beyond it, there is reason to believe it metalliferous in depth, and valuable property.

The Ingaputz, located for 2,000 feet on float, the lode not being visible; ores rich, and show galena and silver.

The Ochanoche, a similar location, disclosing copper, galena, and silver.

The Mungisi has a length of 1,600 feet, with a northeast and southwest strike; gangue spar, country rock limestone, showing galena and silver.

The Algonquin is a location of trap dyke, 1,600 feet by 200 feet, impregnated with argentiferous galena, and assays made give 65 per cent. of lead.

Eight miles northeast of "Ivanpah," down the valley, in a spur striking easterly from the main range, at an elevation of 1,000 feet, is found the

Umbahceti.—Width of lode $17\frac{1}{2}$ feet, in limestone walls, disclosing galena and antimonial silver, and may be traced 2,000 feet. The ores of this mine should be hauled about 4 miles, to the "Mesquite Valley," where wood and water are abundant, and in close proximity to the surveyed line of the projected railroad.

Here the ores of other mines in the vicinity could also be profitably reduced, and the product, by rail, landed in Wilmington at a cost not to exceed \$15 per ton, covering all the expenses of mining and milling. The ore of the Umbahceti assays \$40 per ton in silver, and 70 per cent. lead. Lying about 5 miles from the above, in a northerly direction, is

The Josephus, coursing northeast and southwest, and showing a vein of solid mineral $7\frac{1}{2}$ feet in width, a distance of 300 feet. It lies vertically, and is incased in limestone walls, traceable for 1,500 feet by the capping.

This is believed to be a mine of undoubted value, the ores being rich in both gold and silver, with a large percentage of galena.

It is located within two miles of a point in Mesquite Valley, where reduction works can be advantageously established, and is sufficiently elevated to admit the tapping of the lode by a dike.

Wood and water are found in the vicinity. The ores of the Josephus give, by assay, \$24 in silver per ton, \$63 in gold, and 82 per cent. lead. In a northerly direction lies

The Amargosa, which can be traced a distance of 1,500 feet on the line of the croppings, showing spar and carbonate of copper. The lode is about 10 inches wide, the gangue being limestone, running north and south.

The Ione runs north and south, with a greenstone gangue, and limestone walls. This vein is 10 feet wide, and shows a mass of mineral for 100 feet, the remaining distance on the line of strike being covered with débris.

The ore discloses red oxide and blue and green carbonate of copper.

The Sumter is a blind ledge, recently discovered by the Indians, 2,000 feet in length, within a few yards of the town of Ivanpah. The surface exploration reveals a body of ore 4 to 6 feet wide, assaying \$1,200 per ton in silver, and which can be successfully treated by the ordinary mill process.

Yellow Pine mining district.—This district, having an area of 25 by 60 miles, adjoins Clark district on the north. The mountains here attain a great elevation; Charleston Peak, the highest point in the vicinity, reaches an altitude of 10,000 feet, and forms a prominent landmark for many miles around.

So great is its elevation that snow lies continually upon its northern and western slopes, and, in melting, keeps the streams in the cañons replenished, and the waters of the valleys cool throughout the summer. As before mentioned, the greater portion of this district is covered with several species of pine found in the Sierra Nevada range at the same

altitude. The mountains here are capped with fossiliferous limestone, with dikes of igneous rock intersecting the metalliferous lodes, and cutting them at intervals.

On the eastern slope of the range, in Plum Canon, in a heavily timbered country, is located

The Asparqua-miah.—This vein is 1,600 feet in length, 3 to 8 feet wide, with a northeast and southwest strike, showing gold and silver and quartz calcespar gangue.

The Snow-squall Lode is from 3 to 4 feet wide, and discloses the presence of copper, silver, and gold, the gangue being greenstone; location 1,600 feet in length; strike east and west.

The Piute Chief, situated 10 miles south of the old "Potosi" mine, is a strong vein 1,600 feet in length, averaging 20 feet wide, and assaying over 50 per cent. in copper, and \$50 per ton of silver.

The Tersharrum, located about 20 miles northeast of the Potosi, is a small but promising lode, about three feet in width, containing fully 75 per cent. of galena, with some silver, the latter assaying \$40 per ton.

The Piute Joe, a claim of 1,600 feet, is in the same group as the "Piute Chief," and is very similar in many respects, showing copper and silver. Assays made gave 41 per cent. copper.

The Tecopah, in the vicinity of the above, has an east and west strike, and a greenstone gangue. This vein is about 10 feet in width, the location covering 1,600 feet, disclosing copper which assays 24 per cent.

The Pine Nut and Little Giant are two claims, each 1,600 feet, and show copper, gold, and silver; both lodes averaging about 5 feet in width.

The Fair View, located 20 miles east of the "Potosi" and 5 miles south of the "Tersharrum," is a vein of argentiferous galena, 4 feet in width, and assaying about \$1,200 per ton in silver. Wood and water are abundant in close proximity to this mine, as well as to the group of claims just described.

The Lone Star and Northern Light are found in the vicinity of the "Piute Chief," both veins averaging 5 feet in width, and bearing gold, silver, and copper.

The Mesquite Toano and Promontory are copper-bearing lodes, 1,600 feet in length each.

Salt deposits.—Twenty-five miles west of the town of Ivanpah occurs a stratum of pure rock salt, 8 feet in thickness, which may be traced for some distance. This salt is chemically pure, highly crystalline, and as transparent as glass. It can be quarried in large blocks.

Town sites.—The town of Ivanpah, in Clark district, embraces an area of 160 acres, and is located at the mouth of Sequaw Cañon, on the main road from Walker's Pass to the Colorado River. This road intersects the Wilmington and Salt Lake road at Coyote Springs, 28 miles west of Ivanpah. Aside from the natural trade resulting from the mineral resources of the district the Salt Lake trade could be diverted to this locality, furnishing return freight for trains employed in transporting ores to Cottonwood Island, which would materially reduce the expense of ore transportation to that point. From its central locality, and the mineral wealth of the neighborhood, this town cannot fail to become a place of some importance.

Pechoca.—This town site consists of 160 acres upon the southern flank of Clark Mountain. A large flowing spring of pure soft water is found here. Pechoca derives its importance mainly from the number of mines in the immediate vicinity.

Cave City.—At Mineral Hill, embracing an area of 8 acres in the

center of the mining locality of that name, is located upon the eastern flank of Clark Mountain.

Good Spring, another town site in Tecopah Valley, is situated at the initial point of Clark district, elsewhere referred to. It is well supplied with both wood and water.

Clay.—There are several localities, both in Clark and Yellow Pine districts, where clay of good quality, suitable for fire-brick, as well as pottery, can be obtained in any quantity. Very large deposits are met with between Mescal Springs and the Golconda Mine in Clark district.

Labor.—White labor can be obtained in this region at about \$60 per month of 26 days, not including board, which costs \$1 per day. Indian labor can be had at \$15 per month, with rations costing 50 cents per day. The Southern Putes have of late shown a disposition to identify themselves with the whites, and now are anxious to find employment as laborers.

The agricultural resources of Yellow Pine district have been noted in the foregoing pages of this report. The valleys of Clark district are highly productive also, and cover a wide range. Thousands of acres of bunch and other wild grass are found in the vicinity of Ivanpah and other mining centers. On Clark's Fork at least two thousand tons of hay could have been cut in the summer of 1869. The soil here, wherever cultivated by the Indians, produces good crops.

Roads.—From Ivanpah to Walker's Pass and Visalia the gradients are very light. The road crosses the following mountain ranges, but passes through so low that the ascent and descent are scarcely perceptible, viz: The Burned Mountain Range, the Granite, the Amargosa, and the Clark.

From Ivanpah to the intersection of the old Salt Lake and Fort Mohave route, thence to Point of Rocks, San Bernardino, and Wilmington the road for the most part is well worn and level, with stations at convenient intervals. Although there is another route to San Bernardino and Wilmington by way of Soda Lake, the Caves, and Camp Cady, the former is believed to be the shortest and best.

DISTANCES.

From Ivanpah to San Francisco via Cayote Springs, on Salt Lake road, to San Bernardino and Wilmington—

	Miles.
To Cayote Springs	22
To Butter Springs.....	62
To Junction	97
To Fish Ponds.....	105
To Mormon Grocery	127
To Point of Rocks	133
To Laim's Upper Crossing.....	148
To Toll Gate.....	170
To Martin's.....	180
To San Bernardino	195
To Los Angeles	257
To Wilmington	278

From Martin to Los Angeles direct the distance is 62 miles.

From Ivanpah to Wilmington by way of Soda Lake and Camp Cady—

	Miles.
To Copper World Mine	6
To Wagon Road	24

	Miles.
To Valley Wells.....	30
To Rancheria.....	40
To Point of Mountain.....	46
To Soda Lake.....	63
To Cañon Springs.....	81
To Camp Cady.....	91
To Junction.....	101
To Los Angeles.....	261
To Wilmington.....	282