The Mining and Metallurgical Journal

Vol. XX. No. 5

LOS ANGELES, CAL., December 1, 1898, NEW YORK, N. Y.

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SEE PAGE 23

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ELECTRIC ASSAY FURNACE.

The Mining and Scientific Press of the 4th ultimo, under 'Concentrates,' asks the following: "A Colorado assayer asks a practical question which, after considerable inquiry, 'Concentrates' is unable to satisfactorily answer. He questions: Is an electric furnace for making crucible assays practicable?" It would seem that where fuel is dear, electric energy cheap and procurable and a large number of fuel duties paid, it should be, but not of no one manufacturing a device. Probably some of our readers can supply the information.

The Ahearn Electric Heat was invented some years ago by an electrician named Mr. Ahearn of Ottawa, Canada. It has been in use for years for heating street cars, churches, dwellings, baking and cooking uses. It is claimed that a heat can be obtained by its use for such purposes as roasting ores and possibly assaying. The use of this invention transforms a water power into a coal mine. The inventor's rights for the United States were, it is understood, purchased by the General Electric Company, to whom application ought to be made. The benefit which the introduction of the Ahearn Electric Heat would give to many mines in the West where water power is available and fuel high priced, would make its use economical for roasting ores and heating buildings, and possibly for assayer's use. As it takes but fifteen minutes to heat a cold baking oven to a baking heat, it does seem possible that a white heat for assaying could be obtained. It seems strange that the large application of this invention, with its great capabilities, to the requirements of the mining industry of the Western States, especially where fuel is expensive and water power available, have not been made long before this date, and the attention of the manufacturers is called to it.

THAWING BLASTING POWDER.

As the cold season has arrived when nitroglycerine powders in the form of giant powder, dynamite, dynamit, etc., are liable to freeze and become hard when the temperature falls below 42 degrees Fahrenheit, and become inactive in that condition, it is therefore necessary to resort to the thawing-out process by increasing the heat. If this is done by the radiation of warm air in front of an open fire, it has the effect of causing the nitroglycerine in the cartridge to collect on the surface or paper covering, and if the heat is allowed to be excessive, to collect in drops, which when overheated either take fire or explode. Every effort is made to prohibit this manner of thawing powder, and discharge the man who does it in that way. The proper and safe way of thawing powder is to have a kettle with both a large and small kettle, on the plan of a carpenter's glue pot or a farina kettle, with tight closing covers, and place the powder in the inside one, having first placed dry sawdust, or unferisal earth, or fine dry sand in the bottom of it, to absorb any oil from the cartridges. This should never be placed on the fire, but filled with hot water and protected so as to retain the heat as long as possible, and to avoid having to empty it and re-fill it too often. The habit of thawing powder in a sack on top of a boiler, or in a blacksmith shop, or for ordinary purposes which is fruit-ful of accidents to life and a great cause of fire. Placing the powder in hot water or in steam is equally dangerous, as it is sure to cause the oil to exude. Many of the powder companies sell proper thawing boxes or kettles made of zinc, and recommend their use to consumers, so that there is no excuse for the mine manager or owner who does not provide such an appliance and see that it is used.

RAILROADS AND MINING INTERESTS.

The partisan policy of certain capitalists who control certain western railroads has been a prominent feature in the recent election. To secure the election of governors, members and State officials, who would be subject to the will and bidding of the railroad monopoly was the object aimed at. The old axiom that "it is less trouble to own the State Government than to gain the influence of the whole State" was taken. It is this unpatriotic, selfish, blind, policy which has retarded the mineral development of the west outside of Colorado and south of the Great Salt Lake. Ultimately the mining industry dependent on railway lines that the operation of many mines is simply a question of freight rates to market for the ore produced. When the policy of the railway officials is to charge a "rate of freight importa- to all the traffic will bear" the position of the mine owner is not an enviable one. As a rule all the large metallurgical works of the country are in the eastern or middle States. The mineral products of the west require transportation to the Pacific coast for shipment abroad or to the smelters and refineries of the east coast. It is not always a large amount of freight in minerals and small charges with increased traffic, but a small amount of business and large profits is preferred. For the last reason mentioned the southwestern interests have been retarded, and on account of more liberal rates charged by northern roads in Montana the mineral traffic of that State amounts to many millions annually. The roads which have received the largest amount of bonus in the form of land grants from the Government are those which have done least to aid the min- eral development of the country. This nar- row-minded feeling which discriminates against the development of the mining in- dustry in the middle west is a serious loss to the southern rail- roads who ought to encourage the erection of smelting and refining works on the Pacific coast and increase their own income from freight.

MONETARY LEGISLATION CON- TEMPLATED.

It is already announced that an extraordinary session of Congress is to be called to convene immediately after the fourth of March next.

The session to commence on the first Monday instant is limited by law, and the present Congress becomes functus officio at 12 o'clock M. on the 4th of March. There are about eighty working days should there be no re- cess during the holidays. There is the usual work which must be done, among which is the passage of the twelve appropriation bills, most of which involve questions more or less important. Many of the matters of routine to be disposed of. There will be no time to take up and thoroughly consider the grave matters which recent events have brought up.

Governments for Hawaii and Porto Rico will have to be provided and for Cuba almost certainly, and probably for the Philippines. There will be no time for the proper considera- tion of these questions during the impending short session.

The Republicans will have control of both branches of Congress as well as the executive department, and they will come to the proposition of committing the Government more thoroughly to the gold standard, to use the language of Secretary Gage, and this in- volves the retirement of the greenbacks and treasury notes, the repeal of the provision of the recent revenue act which requires the silver bullion in the vaults of the treasury to be coined into dollars, and in some way the ultimate retirement of the silver dollars held in the treasury and in circulation, and lastly turning over to the banks the sole privilege of supplying the country with paper cur- rency.

These changes are radical and sweeping and unquestionably will receive strenuous opposition. The greenbacks, as they were invented during the war, are regarded as patriotic money, and the people have ever regarded them with affection. They will dis- like to part with them. Turning the power to supply currency over to the banks will re- vive memories of the old United States bank, and of Jackson's heroic and successful war upon it. The friends of the white metal will not be asleep, and hence we repeat that the schemes of the Bankers Alliance and Mr. Gage will be stubbornly resisted.

No doubt there will be Republican members of both branches of Congress who hold opin- ions not in accord with the program, and the question is whether they have the moral support? It will be good political strategy to get the money question out of the way in 1899, that it may not rise up like the ghost of Banquo in 1900.

Should the plan be carried into execution it will not have been in operation long enough to disclose its merits or demerits, and therefore may not become very much of a factor in the presidential election. The subject as it will have to be discussed as a theory and not from practical results.

The program contemplates making gold coin of American coinage the only legal ten-
der money. Bank notes have never been made legal tender in this country, and that quality cannot be imposed because there are obligations of private parties or of corporations which, in law, are artificial persons. The holding is that the Government can only issue money of its own legal tender.

The bank notes will be made redeemable with gold coin, and therefore the banks will have to corner the gold in order to sustain the credit of their notes. The volume they will put out must be regulated by their ability to redeem, and the grave question will be whether they can control gold enough to enable them to float a volume of paper sufficient to supply the needs of our commerce and rapidly increasing domestic commerce?

THE REDUCTION WORKS FOR SILVER ORES AT ADUANA, SONORA, MEX.

BY MILITARY M. ARMAS, FORMERLY ASS'Y SUPERINTENDENT

(Concluded from our issue of Nov. 15th.)

ANALYSIS OF A BRICK OF CONCENTRATES.

<table>
<thead>
<tr>
<th>Component</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>6'6'</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>5'7'</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>3'2'</td>
</tr>
<tr>
<td>CaO</td>
<td>2'1'</td>
</tr>
</tbody>
</table>

The ores smelted were complex. The chief difficulty arises from the high percentage of Fe, Zn, and As. Smelting.—All the ores of a grade superior to 130 ounces per ton, as well as the concentrates, are smelted in a water-jacket furnace of the following dimensions:

| Diameter | 39" |
| Capacity | 40 T |
| Number of tuyeres | 6 |
| Root blower | No. 4 |
| Blast pressure | 14" |
| Number of revolutions per minute | between 100 and 120 |
| Volume of air blown per revolution | 13 cubic feet |
| Diameter of blast pipe | 14" |

The ores smelted were complex. The chief difficulty arises from the high percentage of Zn, As, and Sb.

Analysis.—IRON ORE.

<table>
<thead>
<tr>
<th>Component</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO₂</td>
<td>10'0'</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>3'4'</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>4'7'</td>
</tr>
<tr>
<td>CaO</td>
<td>1'8'</td>
</tr>
</tbody>
</table>

The capacity of a cupel is 3,500 pounds. The duration of a cupel is forty days, if managed carefully.

Lumps in silver...0.7 per cent.
Consumption of wood per 24 hours...$7.50
Labor per 24 hours...9.00
Cost of cupellation per ounce...0.13

As the mint of Alamos accepted bars of silver with 985 fineness, we never tried to pass anything less than 990. Our monthly production in fine silver could be increased considerably since the construction of two more reverberatory furnaces was effected.

Mr. Dorion conceived the idea of using the steel bed of the river, which is dry most of the time, as a filter for all the waters coming from the reduction works. A mile from the reduction works a well was dug, and...
the waters accumulated there. An electric pump pumped the water back, and thus the concentration could go on almost all the year without interruption. These two facts ought to increase the production considerably, if everything is managed skillfully.

During the year 1896, the cost of 1 ounce of fine silver can be stated as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost in mining</td>
<td>$30 391 or 360</td>
</tr>
<tr>
<td>Cost in milling</td>
<td>286 264</td>
</tr>
<tr>
<td>Cost in administrative expenses</td>
<td>69</td>
</tr>
<tr>
<td>Profit</td>
<td>333 307</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1 085 100 0</strong></td>
</tr>
</tbody>
</table>

**MINE TIMBER FRAMING MACHINE.**

One of the most important items of expense in connection with mining is the proper timbering of the different workings, on account of the tremendous weights that are often imposed on the timbers. This work is usually done by hand, which is not only the most expensive way of doing it, on account of the large wages paid to mine carpenters, but is not by any means as satisfactory as having the framing done by machinery. The illustration presented herewith shows the character of work done by this machine. The framer can be operated by any ordinary mechanic, making the timbers equally true on round or square timbers, no matter how crooked they may be.

All sticks will be of equal lengths between the shoulders, and every tenon will be the same length. Should a round log be two or three inches larger at one end than the other, the tenon, nevertheless, will be exactly in the center. Any length of timber can be framed, from the shortest one needed, to ten feet between the shoulders, and from the smallest to sixteen inches in diameter or square, on the standard size machine. The size of the tenons on the standard machine can be varied from two to ten inches square, and from the shortest tenon to nine inches long.

By referring to the cut of machine, on page 23 it will be seen that there are ten saws, five at each end, so both ends are framed at the same time and at the same setting. It is usually the practice to make the tenons of mine timber with a clearance of one-half inch to one inch between the ends of the tenons, depending on the shoulders and side grain of the sticks to sustain the weight. By so doing, the best part of the log is not used for direct strain endwise.

This machine enables the framer or timberman to make full use of the whole stick or log, by having the tenon cut to the proper length, to allow for the shoulders setting into the cross grain to a solid bearing, and then meeting, end to end; in this case leaving the tenon as large as possible, and bringing most of the weight to bear on the ends, thus relieving the shoulders of the great strain, and preventing the settling of the timbers, so often seen in the lower sets of large veins and chambers.

To describe the operation, logs are cut in lengths about one-half inch to one inch longer than they will be when finished in the frame. The saws being adjusted to cut the right size and length of tenon, the log or stick is rolled into position with the proper angular bolster under each end to bring it in the center, and made fast by the dogs shown, thus holding it firmly in position.

The attendant, by slowly turning the hand wheel, draws the log up to the first two cut-off saws for cutting the length of timber, (the shaft to which the hand wheel is fastened has pinions attached and these work in racks under each slide) then passes it steadily on through the two cut-off saws for cutting the shoulders. The stick is then carried on through the two split saws for cutting down to the shoulders, the block dropping to the floor, in the case of a floor. The carriage being adjusted, next passes over the vise two taper catches just under the log, rolls the log over a quarter of a turn, the catches snap into place and the stick is in position for the final cut. It is then passed on through the saws as before, the whole operation taking but two minutes from the time of placing the timber in the machine until its removal. The two rip saws are twenty-four inches in diameter, the four shoulder cut-off saws six inches, the end cut-off saws twenty-six inches.

The saws are adjustable in every way. There are collars on the upright spindle to set between the two rip saws; also over and under them to cut any width of tenon. The shoulder cut-off saws are adjusted in a similar manner.

The whole design is neat, handy to adjust, easy to handle, is very strong and durable, does not get out of order, is self-contained and hence easy to set up, the several parts being carried on the main column or shaft, which is ten inches in diameter. The jacks or supports at the end of the stick frames are merely to prevent any vibration and give stability to the machine.

These machines are furnished complete with the line shaft pulleys, boxes and belts shown in the cuts.

When ordered, to accompany the framers, the necessary wedge saw table and swing cut-off saw for cutting the logs roughly to length, also engine and boiler to furnish power, are made. All necessary plans and other details are furnished. These machines are built to order, to cut any size, diameter or length, by the Denver Engineering Works Company, Denver, Colorado.

The latest catalogue issued by the Gates Iron Works of Chicago, Ill., Department 2, describing their mining machinery, is a general catalogue and handsomely gotten up. No doubt it is with pride that the Company presents this catalogue to the public. It is not intended for a technical affair, its purpose is to convey to the public an idea of their lines and the facilities they have. The separated catalogues issued by this Company take care of the details of the machinery manu- factured and sold by them.

The Western Iron Works filed its articles of incorporation last week in Los Angeles, Cal. The directors are Frank S. Livingston, Arthur H. Ruggles, Casias M. Smith, Frank P. Snow and W. W. Wood, all of this city. The capital stock is $50,000, of which $9500 has been subscribed.
THE EMORY WHEEL AND ITS MANUFACTURE.

The two abrasives which give the emory wheel its grinding and polishing qualities are emery and corundum. These two substances are practically the same abrasive, for the part of the emery that does the work is corundum. Emery is a mixture of corundum and the so-called oxide of iron, Mother Nature being the mixer. According to Prof. Dana, corundum has very little iron, while emery will average 46 per cent. of the oxide. Emery, therefore, has a very dark gray, almost black color, while corundum is a very light gray, with bluish and ruby colored tints. In almost any fair sized sample of corundum stone there are distinct traces of sapphire and ruby. Emery is mined in Turkey, in Asia, in the island of Naxos and in Chester, Mass. The Chester emery has a larger percentage of corundum than the foreign emery, containing 67 per cent. pure corundum.

Corundum is found in commercial quantities only in North and South Carolina and Georgia; although there is some of it in Alabama and Eastern Tennessee. Corundum being free from an excessive percentage of foreign matter, possesses much greater polishing and grinding qualities than emery. In the arts and sciences corundum is next to the diamond in hardness, emery coming next to corundum. Both emery and corundum are prepared for use in the following way: They are crushed down to different degrees of hardness, and after being cleaned are graded in different sizes, ranging from No. 6 to the finest flour. These sizes take their name from the number of meshes to the linear inch of the wire cloth through which they are graded. The coarser sizes are used mostly in making emery and corundum wheels.

The principal reason why more emery than corundum is used is the difference in cost, the miners of emery ore in Turkey receiving but 6 or 7 cents per day, while the minimum wages paid to miners of corundum in this country is not less than 70 cents per day. Another reason for the greater cost of corundum is the fact that emery ore is brought to this country largely as ballast, and the cost to land it is therefore about one-twentieth of the cost attached to transporting corundum from the mines to the same points in this country. This increased cost of transportation of corundum is due largely to the fact that the mines are located considerable distances from the lines of transportation, and even when delivered at the railroad the freight is more expensive than the ballast freight of sailing vessels.

The principal difference between emery and corundum wheels is that one is made of emery and the other of corundum, the bond or cement holding the grains together being practically the same in each. An emery wheel is made of such diameter and thickness as will best suit the work required of it. It is made of different degrees of hardness, some requiring a soft, some a medium and some a hard texture. It is also made of different sizes of emery, depending on whether or not the work to be done is coarse or fine.

The chief uses of emery and corundum wheels are to finish up and give a smooth surface to any iron, steel or metallic substance. Large quantities of them are used, as is well known, for grinding saws and grinding planer knives. One can readily understand that it would be practically impossible to name all the different purposes for which they are used. Their employment, however, can be summed up as follows: They are used for grinding, polishing, sharpening and shaping metal and wood substances. This does not cover all their uses, for wheels have been made for grinding feathers. They also do work similar to that required of the planer or the lathe.

There are practically three classes of emery and corundum wheels—vitrified, silicate or chemical and gum. Some users prefer one kind and some another. The vitrified wheel, of which there are the most in use, is burned in kilns as shown in Fig. 3. The sili-

FIG. 1. MIXING AND CASTING DEPARTMENT.

cate comes next in quantity used. The difference between it and the vitrified consists principally in the difference of the bond used to hold the particles together, in that it is moulded and tamped into molds instead of being cast in just the sizes required, and then cooked or baked in ovens for a much shorter time and at not near as high a heat; also in that it can be made with or without a wire mesh. The Sterling Emery Wheel Mfg. Co. make both the straight vitrified and silicate wheel, and also a semi-vitrified wheel which combines the best qualities of the other two.

Referring to the illustrations of the principal departments of the plant of the Sterling Emery Wheel Mfg. Co., at Tiffin, Ohio, Fig. 1 shows the mixing department, the large tanks at the rear containing the different numbers of emery and corundum. A weighing appliance is underneath each, thus allowing the mixer to draw such sizes and quantities as are needed for the mixture. The wheels, after being mixed, are put in a dry room for one night.

Fig. 2 shows the next process room, which is called the shaving department, where the vitrified wheels are shaved down to nearly the required size, leaving just enough allowance for contraction in firing. The wheels are then placed in a large dry room, where they remain until thoroughly dry before being placed in the kilns, one of which is shown in the next illustration.

This engraving shows the kiln men placing the wheels in a kiln where they are subjected to a heat of between 2,500 and 3,000 degrees for about 72 hours, thus becoming thoroughly vitrified and one solid mass.

The next process is shown in Fig. 4, where the wheels are turned up and trued to exact size, after which they are tested at a speed giving them a working strain of more than double that at which they should be run when in actual use.

Fig. 5 shows the principal process in the manufacture of the Advance safety or silicate wheels. Here the men are at work tamping the mixture into molds. This, as will be readily understood, requires skill and experience on the part of the operator, as he must get the mixture in equally and in such a way that the wheel will be of the same hardness through and through, and hence run and cut uniformly.
web is put when so desired. After the wheel is moulded to proper size it is baked in the ovens shown at the rear of the cut.

It is then taken to the turning department, Fig. 4, where it is trued up and tested by the same process as that of the vitrified wheel.

The wheels then pass to the shipping department. The works are so arranged that the raw materials come in at one end and proceed by regular stages to the other end, where the finished product is packed for shipment.

The Park & Lacy Company, who are agents for this company carry a large stock of emery wheels at their works, 51-53 Fremont street, San Francisco, Cal.

Changes in Mining Law.

The Mining Reporter of Denver very appropriately adduces the following as a remedy to our faulty mining law in the interest of greater development:

The present law is radically wrong in principle, if it be admitted that it should encourage development. There should never be a patent issued to a mining claim. An owner should have only a possessory title, and be fully protected in it only so long as he performed a stipulated amount of work each year. When he ceased to do that, it should revert to the government and be open to location.

Previous to 1872 there was no law requiring annual assessment work on mining claims. All were held under district and territorial laws, and these seldom required anything more than a record in the county or district recorder's office. As a result, the whole country was covered with claims which no one worked. When the law of 1872 went into effect these claims were open to location, and hundreds were located and developed into mines. More than half of the mines of Gilpin county were located under this law, and developed into producers. Without such they would still be idle prospects. The result was seen in the rapid increase of the state's production. It went at a jump from $4,000,000 to $5,103,845 in a year, very largely as a result of that law. Now the state, and all the West, is getting into the condition Colorado was then in. The country is being covered with patented claims, whose owners, often non-resident, let them idle year after year. In effect, though not intentionally, the law forces a dog in the manger policy. The owner will not develop or mine on them, nor can anyone else do so. The law is wrong, if the general public good, through stimulation of mining, is one of its objects.

Estimating Tin in Tin Plate.

In a German method of estimating tin in tin plate, 25 grammes of the material are boiled for five minutes with 50 c. c. of 10 per cent. hydrochloric acid, and the liquid poured off into a 250 c. c. flask; the operation being repeated with fresh acids two to four times, until the iron is completely stripped. The solution does not need filtering, but is at once made up to the mark, and 50 c. c. of 20 per cent. ammonium sulphide are added, the whole shaken up, and filtered; 50 c. c. of the filtrate are diluted with water, all the tin sulphide thrown down by acetic acid, and the precipitate is brought on to a filter by the aid of 10 per cent. ammonium acetate. As, owing to the certain absence of copper, ammonium instead of potassium sulphide is employed, the washing need only be very slight; in fact, 50 c. c. of the sulphide solution can be directly evaporated and ignited in a porcelain crucible, but the former method is said to be preferable. The precipitate is finally heated with fragments of ammonium carbonate until the ash is white.

The Jeffery Manufacturing Co., of Columbus, Ohio, have taken up the manufacture of the Columbian Separator Screen and Bolter, and advise us that they have erected an experimental machine at their works for the testing of such material as may be sent them for that purpose. Parties interested in screening or separating cement, ores, etc., etc., can secure further data by addressing the manufacturers.
CORRESPONDENCE
OREGON.

Tunes of Malheur.

Editorium Journal.—Col. E. L. Bradley, the long-time resident of Malheur City, Malheur county, is one of his annual visits to Portland.

Col. Bradley speaks hopefully of mining in the district of Malheur, formerly known as El Dorado, in the early days of placer mining. He says several valuable quartz discoveries have recently been made on Quartz Gulch in sight of the town of Malheur, principal of which are the Red Oxide, owned by John France and Chas. Morett; the Last Chance, owned by Bigelow & Boswell, and another claim owned by Dan Brunner. These properties are being developed and are showing gold.

David and Robt. Worsham, who own another claim near by, have purchased a three-stamp mill, formerly located at Gold Hill, and will it be hauled to Malheur where it will be used for forging custom work for a time at least on ore from the several claims. Dan Brunner has agreed with the mill owners to furnish 100 tons of ore at any $84 per ton for working. The Last Chance and Red Oxide owners are also getting out ore for immediate reduction.

Miscellaneous Mining News.

ARIZONA.

La Fortuna Mining Company, of Yuma, Arizona, are putting in a 160-ton cyanide plant to work the immense pile of tailings which have accumulated during the two years in which the twenty stamp mill at that place has been reducing the rich Fortuna ores. The tailings, according to the most conservative estimates of the Fortuna Company’s head men, will yield at least $3,000 per ton, and as by the cyanide process they can be worked very cheaply, it would seem that a rich harvest will be reaped from the very material which has passed into the mill for many years at $2 per ton.

MARIPOSA COUNTY.

Six of the new ore cars for the Merced Milling Company of Coulterville, to be used for hauling ore on the railroad from the mine to the mill, have arrived at Chinese, and are being forwarded to the mill. They weigh 3,500 each and are ordered to hold five tons of ore.

RIVERSIDE COUNTY.

A group of men belonging to R. A. Tanner of Redlands, located about six miles from Riverside, in the Yaquepe country, is turning out well and may prove very valuable. The pay streak varies in width from two to six feet, and while specimens are very rich the ore will average about $20 per ton. It is a cyaniding ore and Mr. Tanner expects to erect a plant for the reduction by cyaniding.

SAN BERNARDINO COUNTY.

Three cars of lumber and machinery lately arrived at Johannesburg, Cal., for the California Borax Co., that is erecting works at Borax Lake. They propose to erect a plant capable of turning out 100 tons of refined borax a month. —Los Angeles Min. and Land Jour.

SAN DIEGO COUNTY.

Colorado capitalists are examining mining properties in the Julian-Banner district, and a number of deals of considerable magnitude are on the tap. The names of the investing parties could not be secured, but it is intimated that they are prominent mining men from Boulder, Colorado, and vicinity. Northern California people are also interested.

TIOLUIME COUNTY.

Around Sonora.

The Bawn mine, under Superintendent W. R. R. is looking exceedingly well under the skilful management. The shaft is down 300 feet and cutting out a station at No. 4. Judging from the waste dump, the formation looks favorable for gold, but it naturally will take considerable time to develop, as they have their several veins.

The Rawhide is down 1500 feet. The ore body looks as well as ever. All work at the 1500 foot level is stopped until the electric power plant is completed. Even the vast amount of sulphurites at the chlorination plant is cleaned up. Supt. Turner is doing general repairs.

The Arizona is sinking a shaft 300 feet in depth, which discloses 3 feet of solid quartz and several feet of vein matter. Mr. Dagsness is now in charge during the absence of Superintendent Sears.

Crosscutting at the Rappahanock is in progress at the 400 level. Everything works smoothly. —Independent.

COLORADO.

New Mill at Irwin.

The Willoughby Gold King Mining Company of Irwin, eight miles from Crested Butte, have let a contract to H. M. Fox & Co. of Florence to build a cyanide mill. The plant consists of a battery of three stamps, containing fifteen stamps, plates, tables, etc. The parties have also taken a contract to build a large shaft house and ore bins. The shaft is 300 feet deep and will be put down 1500 feet deeper. Florence are well known in Florence as extensive contractors, having done a large portion of the work on the American Reduction Company’s mill, besides bridge building and other public improvements.

A Placer Deal.

Something a little out of the ordinary in the way of mining deals was consummated last week when a great interest was secured in a large tract of placer territory in Routt county, Colorado. The placer ground covers an area of over 1,000 acres and the best part of it is located in an area now forming a gulch of about half a mile in width. While the developments on the property are so far merely of a prospecitive nature, some very encouraging returns have been received on large samples of gravel and black sand. Tests on the gravel show values ranging from 80 cents to about $1.50 per cubic yard, while the black sand runs all the way from $400 to $500 per ton.

Prospectors have lately been sent out to the ground to do further work, and make further tests, and should the results prove as favorable as was the case in the former batch of samples, it is more than likely that a company will be started to thoroughly develop and work the properties in the coming spring. A number of local people are interested in this placer, but the whole thing is now under option to Mr. John Mortenson, of Pueblo, Judge Alfred Bartow and Claude Sachs of Colorado Springs, also have personal holdings.

Portland Steel-Cased Shaft.

"Why not case the shaft with steel instead of wood?" is the question asked by a great many now, since the matter has been called to their attention. There is no reason why,
and the Portland will probably be the first to adopt this method of casing the shaft. Plans and specifications were submitted to the Portland people, and the cost being less, and the structure more durable, than wood, justifies the management in adopting the plan.

The saving in excavation will be considerable, estimated at about a yard and a half of rock in a three-compartment shaft.

IDAHO.

Interesting happenings are taking place thick and fast lately down among the mining cabins in the Marshall Lake neighborhood in Kootenai county. The Comstock, one of the first and most promising properties there, is now named the Credor by another company. If it isn’t Credor it is Comstock and the courts at some future day are to determine which to call it. It is much to be regretted that such a valuable property should become entangled in the meshes of the law. But, come what will, the Comstock or Credor—name it as you please—is so valuable that it is quite evident that many thousands of dollars are sure to be expended in the process of settling the question of its rightful ownership. The Credor men have had possession of it for some time, but not long ago the Comstock men got possession and barred the tunnel with a strong door and strong locks. They felt pleased about their success for the time being, but to their amazement, the other day, the Credor men came along like Yankee battle ships after a Spanish fleet, and the strong door and strong locks were quickly disposed of. The next thing will be something else.

MICHIGAN.

President Fay of the Centennial Mining Co. has returned from his fifth visit to the property this year, says the Hancock Copper Journal, and speaks very favorably of the developments to date on Osceola anygaloid. He says: “Sentiment at the lake is now very well disposed towards Centennial, and with good reasons therefor. The purchase of the forty acres of land from the St. Mary’s Co., enabling the owners to secure a claim on the outcrop of the Kearsarge lode, together with the purchase for $37,500 of the 225 acres on Torch Lake for a new mill site, settles, I believe, the future of our property. We have in this latter purchase secured three-quarters of a mile water front on the lake, with unlimited sand room; the land is located directly opposite the Calumet & Hecla stamp mill. On Torch lake are also located the stamp mills of Calumet & Hecla, Tamarack, Osceola and Quincy companies.”

Copper Products.

The Wolverine mine reports a product of 215 tons and 600 pounds for October.

During October the Quincy mine made 875 tons and 772 pounds.

The Atlantic mine reports 263 tons and 1,470 pounds as product for October.

MINNESOTA.

There are still 289,668 tons of iron ore to be forwarded from the head of the lakes and Two Harbors before the close of navigation and this amount will be shipped provided the weather in the meantime does not turn cold enough to freeze the ore so hard that it cannot be handled. The Duluth & Iron Range road desires to ship at least 154,568 tons during this month. The Duluth, Mesabi & Northern wishes to ship 75,000 tons and the Eastern Minnesota dock on Allouez bay wishes to ship 20,000 tons more during the season if these amounts are shipped, and they will be unless the close of navigation should be uncommonly early, the aggregate increase of iron ore shipments from the head of the lakes and Two Harbors for the season over those of last season will be 227,347 tons. The total shipments for the season will be 5,787,000 tons as compared with 5,599,653 tons for 1897.

TENNESSEE.

Hopkins Budget.

The Owl at Belleville is shut down temporarily to put in additional machinery. Their shaft is down 33 feet and good ore in the bottom.

All the mines on the Ledyd lease at Central City are in full operation, viz., Ruhl Bros., Buckley, Goldsberry, Epperson, Elegant, Grand Central and Holmes. A rich strike of lead and jack is reported on the South Carthage land by Dick McCoracle on land owned by him. The work was struck at 636 feet and jack at 70 feet.

The Dick Wright Mining Co., on the Webb land, south of Shoo creek, struck a body of lead with a drill at 42 feet, which continued downward.

The value of the weekly output of ores for the week ending Oct. 29 was one hundred thousand dollars more than it was for the same week last year.

The Mt. Vernon Mining Co. have sold their plant at Stotts City to the Southwest company of Chicago, and sub-leased them five acres upon which it is located.—Herald.

MONTANA.

Gold East of Old Beartown.

It has been suspected that gold ore existed in the vast sedimentary regions east of Old Beartown, in Missoula county, but up to the present no extensive prospecting has been done there. Recently C. W. Potter, former foreman on the Plattehead Indian reservation, decided to do a little prospecting in that vicinity and has made what he claims is a remarkable discovery of valuable gold and copper-bearing quartz. The present meager development shows a well-defined fissure about four feet in width, traversing a quartzite formation. The foot wall is a dark, fine-grained quartz, while the hanging wall is quartzite of a coarse light gray color. The gange matter is a dark, fine-grained gray mineralized rock having structure. Fine specimens of gold ore are found on the foot wall. Mr. Potter, who has made mining a life study, is of the opinion that the gray fissure is only the capping of a valuable ore body which will be found lower down, and will shortly start a tunnel to tap the fissure at a depth of 200 feet. If this new discovery of Mr. Potter’s proves to be of the value that the present indications would indicate, it broadens by 10 miles the wonderful ore-bearing horizon of the Garnet district, and will also prove in a large degree that this region is at present barely prospected on the surface and that in days to come good paying ore bodies will be found in the most unlikely places.—Helena Independent.

NEVADA.

Another Rich Discovery.

From Sheriff McGregor, who spent last week at Austin, we learn the valley is wide and averaging $14 per ton clean through has been cut in the Drinkwater Tunnel, at Silver Peak. Mr. McGregor, who was at the property one day last week, says it is the biggest thing he ever saw and that there are 400 feet of backs, all new ground.

The property belongs to Mr. Blair, of New York, and is being worked for that gentleman by Sam Watson. Silver Peak will one of these days be the largest mining camp on this coast. The ore is gold.—Reno Review.

The Austin Mining Co. of Austin has sold all the old iron and machinery on Lander Hill belonging to the Company, to a Sacramento firm, and the same is now being gathered up ready for shipment.

The Comstock Tunnel Company has been officially notified by the Wastock Pumping Association to have the Sutro tunnel ready in readiness for conveying the water from the flooded levels of the Comstock mine in sixty days. Some repairs will have to be made to the covers which are boxes in the underground north lateral branch leading to the C. and C. shaft.

NEW MEXICO.

The Mills Tunnel Company at Elizabethtown has a good showing in the New Moon shaft, just finished, at the depth of 175 feet. They are in solid ore, neither wall having been found. A contract has been let to Thos. Puliam to drill 20 feet in each direction, making 40 feet, in the hope of finding the walls. The company has also let a contract to John Doyle, to sink another shaft, 350 feet, elsewhere on their property. This company is composed of the kind of men who know a good thing when they see it. The company will continue work during the winter.—New Mexican Miner.

Output of Hillsboro gold mines for the week ending Thursday, Nov. 17th, 1898, as reported for The Advocate.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Tons</th>
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<tbody>
<tr>
<td>Wicks</td>
<td>35</td>
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<td>K. K.</td>
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<td>Richmond</td>
<td>55</td>
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<td>Snake Group</td>
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<td>Opportunity</td>
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<td>Sherman</td>
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<tr>
<td>Trigraph</td>
<td>15</td>
</tr>
<tr>
<td>Rex (silver-lead)</td>
<td>15</td>
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</tbody>
</table>

Total: 360

Total output since January 1, 1898—8,430.

A. B. Dawson has resigned the superintendent of the Hearst mining interests at Santa Rita, Grant county, and Lewis G. Stevenson has been appointed to the position. Mr. Stevenson is a son of Adalai Stevenson, ex-vice-president of the United States. The gentleman has been employed for some time as assistant manager of the mines of the company at Pinos Altos, and has devoted himself to the study of the mining industry. He will, without doubt, make great mining as successful in the future as they have been in the past. The force of miners employed will be increased immediately and the
work of developing these wonderful ore bodies will be pushed as rapidly as consistent with economical working. The ore extracted is shipped to the Silver City Reduction Works.

**OHIO.**

Gold in Ohio.

Another discovery of gold has been made in the Malvern district, near Canalover. The latest find is at Augusta, fourteen miles north of Malvern, which H. O. Lyda has discovered on his farm. The ore, it is claimed, is richer than the Malvern product. A large number of people visited the new find, and many express the conviction that Lyda has struck a good thing. Specimens will be assayed at once. The discovery of gold has caused the price of land to make a fabulous jump, so that now it cannot be bought or leased.

**OREGON.**

Operations continue at the Collateral and Virtue mines under favorable conditions.

The report is again current that the French Flaggstaff Mining Company will resume operations in a few days.

Dr. C. G. Wheeler is developing one or more locations in the vicinity of the Red Boy, having secured an option of purchase in the interest of a trust.

Several carloads of machinery for the E. & E. mines at Bourne, Dennis Searles, manager, is on route, and on arrival will be put in place at once.

The Badger Mining Company at Susanville is making daily shipments to the Baker City Sampling Works. There is now on route and expected to arrive shortly five tons that will yield from $200 to $500 to the ton.—Baker City Democrat.

**SOUTH DAKOTA.**

The Garden City Cyanide plant has been making its test run this week. The result will be known next week. There is but little doubt as to its success.

The Morrow leasers of Union Hill are steadily at work taking out ore and shipping it to the D. and D. Just at present they are putting in an upraise and are working all their crew, but will have an increased force employed within a few days. The grade of ore is increasing, as an assay of last week gave $91 per ton.

The lessees of the Cherry Lode claims, which are located southwest of the Ben Hur claim, in Nevada Gulch, are expecting to strike the Ben Hur shoot of ore most any time. It is figured that this shoot of ore, which is proving to be of good size and value in the Ben Hur property, crosses the Cherry Lode. The property is leased to Messrs. Frank Shannon and S. E. Oens of Terry and Wm. Barker and H. G. Austin.

The first two lessees found that they were unable to sink the shaft deeper without machinery to handle the water. They consequently offered an interest in the lease to the two latter gentlemen for the machinery needed. A new cage was put in the hoist last week and it worked successfully. The shaft now goes down 150 feet and two drifts are being run east and west. The bottom of the shaft assayed from $5.75 to $12 and it was a question as far as the men were concerned whether to run a drift. Strings of ore of small size are being encountered frequently and it is thought that the main shoot of ore is not far distant.

—Black Hills Mining Review.

**UTAH.**

The Bullion-Bust property at Eureka is looking very well and the regular dividend of $10,000 was paid on Nov. 15th.

The Daisy Company of Mercur continues the shipment of cyanides into Salt Lake City. Stockholders will receive their first dividend about Christmas eve.

Work at the Eagle and Blue Bell of Eureka is progressing finely.

Galena's properties at Fish Springs are in good shape and the announcement of the uncovering of some high-grade ore has been made.

Four Aces property at Silver City is sending in some fine ore to Salt Lake City. The new machinery is upon the ground and work in the ore body recently encountered will be pushed most energetically.

The Joe Flowers Company of Ticopa report the discovery of two feet of high grade galena ore.

The Mercur Company is putting through a better grade of ore than for months past.

An eastern syndicate has bad experts examining the property of the Sacramento Company at Mercur with the intention of securing control of the stock if the ore bodies prove of sufficient value.

Utah Company of Fish Springs is sending in some very high-grade ore and in probabilities will start the new year in a most gratifying manner.

**WASHINGTON.**

The Okanogan Free Gold Mines Co. has ordered a re-stamp mill and cyaniding plant. A concentrator will also be put up to treat a deposit of platinum found on the company's property, which is a separate deposit from the gold veins.

Reports from Sheridan camp, north of Republic, are of the brightest. Night and day shifts are working on several properties. The Zella M., at the bottom of a 70-foot shaft, has a 4-foot chute of solid ore and it is claimed nearly a third of it shows a pay streak of $500 per ton. The vein is 80 feet wide, but the rich ore chute averages about four feet.

Values in the 60-foot shaft on the Golden Harvest, Republic camp, run from $5 to $54 from top to bottom, the greater values being at the bottom. A tunnel gives a depth of 170 feet, showing ore for over 300 feet in length. When the size of the ore body is determined an upraise will be made to the shaft. A lower tunnel will also be started to give a depth of about 430 feet.—Miner and Electrician.

**FOREIGN MINING NEWS.**

**BRITISH COLUMBIA.**

The 12,445 tons of ore shipped from the Le Roi last month cost $4475 per ton to mine, including necessary dead work, the advance development and the hoisting of the waste. The output for November will probably reach 14,000 tons.

J. B. Hastings of the War Eagle figures out the relative cost of hand drilling and machine drilling, everything being done efficiently, at being respectively $15 and $17.50 per ton. In stoping the machine performs for $2.50 per ton what costs by hand work $7.50.

The Silver Bell, Consolidated, has elected the following officers: William Thorburn of Almonte, Ont., president; J. A. Currie, of Toronto, first vice president; A. G. Hector, of Toronto, second vice-president; and Hermann Kittely, of Toronto, secretary-treasurer.

**LOWER CALIFORNIA.**

Harry Howard has interested New York capitalists in the Cedros Island mines, which he has leased of the Cedros Island Mining Company, and they left San Pedro last week with a yacht and crew and supplies to inspect the mines and arrange for extensive development. They tried to obtain a vessel here, but the only one suitable, the San Diego, was not to be obtained for the trip, and as a result they returned to San Pedro.

**MEXICO.**

Alexander Shepherd's company, at Batopilas, is now working 48 mines and has 1,200 men employed, says Modern Mexico. The company is making many improvements in its properties, the principal one being the driving of the Porfirio Diaz tunnel which penetrates 6,600 feet into the mountain.

The total value of mineral products that passed through the custom houses of the Republic during the last fiscal year of 1897-98 was $11,250,000, showing an increase of $15,500,000 over the previous year. Of this the amount of silver is stated to be $57,000,000; gold, $16,000,000; copper, $1,700,000; and lead, $3,500,000—all reckoned in Mexican silver.

The Quebradilla mine in the state of Zacatecas, from which the old mine-owner, Don Joseph de la Borde, or Borda, after having been ruined by other mines, took in five years £25,000,000 worth of treasure, is again in a fair way of introducing a large amount of good ore, the drainage works being about completed.

**GENERAL NEWS.**

*Advertising in Some of its Phases,* is the name of a booklet containing the address of Frank A. Munsey, before the Sphinx Club, at the Waldorf-Astoria, New York, October 11th. Mr. Munsey's address is full of good practical and original ideas, well written and forms, what old Solon Chase gave his newspaper, Chase's Chronicle, for a subheading—"Good Easy Reading." The above mentioned pamphlet is a fair sample of the unexcelled writing of that famous journalist.
A man operating this drill can be assured beforehand that he is handling a machine made of the strongest and toughest metals that could be used in its construction. It does not require experience to operate this machine; any average miner can succeed with it from the first.

In its internal construction, the Jones Hand Rock Drill contains but five parts, only four of which are working or moving parts; and of these, only two, (the hammer and the spring), are subject to violent motion. Owing to the simplicity of construction, and especially of its moving parts, this drill has proved its economy in the matter of repairs. All parts are made interchangeable. Duplicates for repairs can be furnished promptly, and any man of ordinary intelligence can replace any part without assistance from an expert or even a mechanic.

This drill unmounted weighs about 75 pounds, and can be easily handled by one man, both in setting up and in changing angles. The column weighs about 45 lbs., so that drill and column weigh about 120 lbs. complete.

The drill can be operated successfully in any place or position that the old-fashioned drill hammer can be used. The telescope column enables a man to set it up and have it working in one minute. The length of the shell is twenty-six inches by three and a half inches in diameter. The Jones Hand Rock Drill will strike an uncushioned blow of any desired force, being so arranged that, with the springs furnished with every drill, any desired blow from sixty to two hundred pounds can be delivered, and heavier blows will result from the use of extra strong springs. The power required is only 10 per cent of the blow delivered.

The springs are readily adjustable to any desired force, without even removing the bit from its place in the hole. This is accomplished by a simple but ingenious device for controlling the tension of the spring; explained in the directions for operating, and does not require a second’s time or any previous experience whatever.

Its simplicity of construction, self-regulating feed and high elasticity of stroke force assures against any danger whatever from the sudden removal of resistance. This machine will penetrate a stratified rock of varying hardness as surely as a solid one.

This drill possesses the advantages of a rotary drill, the bit revolving one full circle in every twenty-two strokes. The rotary motion of the drill must take place automatically, and being locked each time as it strikes the rock by our very simple and effective turning device, it is the only machine, hand or power, that can effectually use the single bitted drill, and make true, round holes; the drill when it strikes the rock is compelled to cut or chip where it strikes, as it is locked firmly and can neither turn forward or back, consequently, leaves no picture holes. This turning device is simple, and very strong.

The Jones Hand Rock Drill is believed to possess the only perfect self-feed ever invented. It is certainly the only one upon the market. Few other drills will accomplish anything in this line in down holes, but the Jones Drill will feed automatically at any possible angle of its sphere. Its feed is perfect, and adjusts itself automatically to hard, soft or stratified rock. If it cuts nothing, it feeds nothing; if it cuts an inch, it feeds the inch; if it cuts an eighth of an inch, it feeds the eighth of an inch. The Jones Drill is the only machine in the market—hand or power—with elastic buflers or bumpers that fully and effectually break the rebounding or recoil blow, the recoil blow itself being used as a feed agent or factor. Thus it is relieved of the jar that would come from a screw or worm feed, and otherwise break, rock and strain machine, the jar itself being utilized.

For complete catalogue, giving instructions for working and other information, address The Edward P. Allis Co., Milwaukee, Wis.
THE MINING AND METALLURGICAL JOURNAL.

The buried rivers of California as a source of gold.

By J. E. Nickel, San Francisco, Cal.

The increasing demand for gold to carry on the commercial transactions of the world, makes the search for the sources of this metal of such interest that no one class of objects is of special interest at the present time. The idea called up by gold mining has grown to be the thought associated with the extraction and crushing of this substance derived from the crust of the earth. Most gold mines of today probably are mines of this character. Yet it is well known that the sources of gold are by no means limited to the quartz veins, and we have reason to doubt that, in this country at least, in the immediate future this will be the most productive source.

One source of gold, the importance of which has gradually dawning upon the minds of the mining community here, is the vast accumulations that lie in the buried rivers of California. These ancient river channels, buried under a mass of superincumbent volcanic material, are perhaps peculiar to California. They occupy the western slope of the Sierra Nevada, from about the northern limit of Tuolumne county to the southern line of Tulare county in this State, a distance of about 150 miles in length north and south, and from the lowest foot hills of the Sierra in the Sacramento valley to near the summit of the mountains, a distance of 50 miles in breadth from east to west, in an area of about 7,500 square miles. Throughout all this region, many of the highest ridges are capped with masses of volcanic material, hundreds of feet in thickness and buried under these "lava caps," as they are called, are the ancient river channels I refer to.

The shallow placers, discovered by Marshall in 1848, and worked by the Argonauts in the pioneer days of California, were formed chiefly from the deposits of these ancient channels, where they had been cut across by the modern rivers and their contents of gravel and gold scattered among the alluvium in the modern rivers and their branches. It is true that these placer deposits were greatly increased by the early miners in this country were enriched by a small proportion of "quartz gold," that is, dust and particles broken out of the disintegrated volcanic mud by the erosion of the rivers in forming the channels; but by far the greatest portion of the gold obtained was what is called "wash gold" or nuggets, large or small, that came originally from the ancient river channels.

Experienced miners estimate that at least 25 per cent. of the gold gained from the shallow placers was the so-called "wash gold" or gold originally coming from the buried rivers.

From careful surveys and inspection of the region before mentioned, it is estimated that there are at least 300 miles of these buried river channels and that, in all, less than one hundredth has been eroded and the contents turned into the modern rivers.

The shallow placers were practically exhausted by the mining done in 1849 to 1856. By that time quartz mining had become an important factor. In that time California had yielded $425,000,000, of which $354,000,000 came from the shallow placers; 85 per cent. of this amount, about three hundred millions, came as a consequence of the disintegration of less than one-ninth of the buried river channels of California. From this estimate we reach the conclusion that more than $2,500,000,000 of gold, less than what has since been extracted by drift mining, now lies in these ancient river channels of California, practically above the surface of the ground. Since 1856 and up to the present time about all of the gold that has been gained from these ancient channels are the result of the blasting of the gold contents of these ancient channels, namely, the practical experience of the miners who have ridged the ridges with shovels and extracted the gravel from the various channels, thus cleaning up their entire contents, in some cases for as much as 4,000 feet of their length. This experience has shown a value in the regular mining operations, varying from $1.50 per foot to the lease productive to $2.50 per foot in the richest channels, so that in some regions, as on the Forest Hill Divide, it has come to be accepted as a rough estimate that the channels will produce a thousand dollars to the lease foot. By this estimate, based on experience, we arrive at the conclusion that the buried channels in this region contain $1,584,000,000, practically above the surface of the ground. This estimate, based on experience in mining channels, is only three-fifths of the amount estimated on the first basis mentioned.

This statement of the large amount of gold within the area of the adventurous miner, will justify some explanation of what the buried rivers of California really are. The buried rivers are sometimes called "dead rivers," but they are no such things in nature. They cannot be stopped or destroyed within the geological epoch of the region, and as the topography of California has been substantially in its present form for more than two geological periods, the rivers have flowed substantially in their present courses during that lapse of time, so that what we are considering are really the buried channels of the present rivers which were sealed up by the close of the Pliocene epoch. There are buried river channels east of the Rocky mountains, because the volcanic phenomena which could have buried them have not occurred throughout the geological period, and though there are some examples of the same, for instance, the Ohio river, during the Pliocene epoch when the mammoth and saber-toothed tiger were roaming on its banks, had a suddenly sealed up under a coating of volcanic mud with all the fauna and plants kept until the present time for us to dig out and explore. In the lower stretches of the course of the Ohio, it is an "over-loaded," and therefore unprofitable. The altitude of the old channel there would, perhaps, not be above the present channel. But, in its upper courses, the Ohio, like the California rivers, is a tributary to a drainage stream and there the ancient channel might be several hundred feet above the present bed and found in a lateral adjacent ridge. This is about the condition of the ancient channels in California, or the Paulina river, for us the ancient river beds, as in other lands it has preserved ancient cities. If there had been no volcanic eruption to seal up the ancient river beds, the place would not now remain intact for the inspection of people living in the nineteenth century.

The question arises, how were the ancient river channels sealed up and sealed? I might say briefly, that they were filled by successive outflows of volcanic mud from great fissure vents, opened along the main axis of the Sierra in that portion extending from Lassen's peak in Plumas county to Lake County, a distance of over 40 miles in length. We are permitted to study volcanic outflows of a similar character which have occurred in modern Japan. The eruption I refer to occurred in 1783, and is described as follows: Asama rises to a height of over 8,000 feet and in its great paroxysm it spewed forth from four vents a volume of mud and lava that sent mountains of scoria and ash down the valley to a distance of 12 miles, and destroyed and overwhelmed more than 40 villages. In some places the mud was so hot that it did not stop boiling for 24 days. Two rivers were sucked up by the mud torrent and their places taken by dry rocks. The lakes were poisoned and fish sickened. The river was full of dead dogs, deer and monkeys. A hundred years later, on July 15, 1888, occurred the eruption of Mt. Bandai in Japan. Immediately after the eruptionProf. Mine and Burton visited the spot and reported on it as follows: A river of mud and lava which, according to the strongest description, was a mixture of stone and mud, had poured down the valley at the rate of 48 miles an hour and in 20 minutes had spread itself to the depth of 120 feet in a valley one mile wide and 10 miles long and from 5 to 7 miles wide. Whatever was in the valley was destroyed or buried up. Everything was bare and brown where catts of green had been; houses gone; people gone; the valley buried in mud still hot and steaming, and where dry land had been, a new lake was forming, caused by the sudden damming of the stream. This eruption of Bandai, as described by the reliable living observers, represents on a small scale what occurred in California on a tremendous scale some time about the close of the Tertiary period. The final outflow of each successive eruption was probably of hotter and stiffer material which quickly dried on the surface and formed a hardened crust that resisted the action of water. Hence, the river when it flowed was always a stream of mud, and had to erode for itself a new channel on one side or the other of the lava-filled valley. Generally the lava flow would form higher in the center than at its edges and the river would divide into two streams, one on each side of the lava flow, and in the course of the hundreds of thousands of years that have elapsed, these streams have cut down their new channels, eroding canyons sometimes two or three thousand feet in depth, leaving the ancient channel high up in the heart and near the top of a ridge which separates the forks of the modern stream.

The courses of the modern rivers are not exactly parallel to the ancient channels, although they are approximately so. The ridges carrying the ancient channels have been in some places eroded by glaciers and, in some places have been cut through by the modern rivers. In this way the rivers of today have received the principal portion of their present beauty and fertility.

The canyons or valleys through which the ancient rivers flowed were much less deep and precipitous than the canyons of the modern rivers. Yet the ancient streams were much larger than the modern rivers. Their channels are more irregular, more exposed as in mining operations, the ancient channels show a width in some places of from 2,000 to 4,000 feet, which is many times the width of the corresponding modern river.

The deep gorges of the modern river can-
rons make it certain that the modern river channel is not the same width as the ancient river, and yet we find the modern river channels but a small portion of quartz gold, or gold derived from the ancient river channels. If it were not for the nugget gold, their sands would nowhere have been found particularly rich. How then can we account for the presence of gold in such large quantities and in the nugget form in these ancient channels?

Experience has proved that all channels buried in the volcanic material, if they contain bedrock gravel, have in them somewhere a “pay lead” carrying gold. Sometimes there are two or three channels, each one at a considerable height above the other, in the same volcanic flow and between the same rhyolite rocks. These channels, of course, are formed at different periods of the stream’s history, the upper channels each having the volcanic material itself for its bed. When such is the case, if these upper channels carry bedrock gravel, they are also sure to carry a charge of gold nuggets. The interval between the formation of these several channels, although doubtless a great many years, must have been as nothing compared to the long interval of time required to form the deep canyons where flow the modern rivers, and it is absurd to think for a moment that the gold contained in the ancient channels could have been eroded from the rocks, especially from the volcanic material, in the brief period during which the ancient rivers were forming these secondary channels. Some other explanation of the presence of this gold is forced upon us. We should look for an explanation that will be general in its nature and account for all gold found in similar situations everywhere. Such an explanation has already been pointed out by several scientists, although it is not yet generally accepted.

(Personal News Items)

J. H. Schaeck, the North Star group of mines in the Penobscot district in the Black Hills of South Dakota, has just returned to Deadwood from Omaha, where he went to perfect arrangements for further developing his property.

Wytham Wyner, of London, England, one of the managers of the Snowshoe mine at Lithia, Montana, spent several days at the mine last week, and will return to England shortly.

H. E. Crossdale, business manager of the Hall Mines Co., of Nelson, B.C., recently left for England, where he will recuperate for awhile.

G. L. Buff has withdrawn from the partnership of the late firm of Buff & Berger. C. L. Berger has associated with himself his two sons, W. A. and L. H. Berger, under the name of C. L. Berger & Sons, who will continue the manufacture of the same high grade mechanical and astronomical instruments in all their branches, and their highest aim will be to merit and advance the very flattering record that has been awarded their past productions.

Nelson G. Douglas, the Mining Engineer of Los Angeles, Cal., has recently left for New York on an important mining deal.

C. E. Lodge, the general manager of the Grand Central mines at Mammoth, Utah, has been spending several days in San Francisco, Cal.

W. F. Kane, the assayer for the Republic mine at Republic Camp, Wash., has just left San Francisco, Cal., for Spokane, Wash.

F. W. Denton, professor of mining at the Minne- sota College of Mines, has been appointed superintendent of the Winona mine, Houghton, Michigan. Prof. Denton is a graduate of Columbia. His appointment takes effect Dec. 1st.

At a recent meeting of the San Francisco Chapter of the California Mines Association, Julian Sonntag was elected president and Charles C. Van, secretary. Julian Sonntag is the secretary of the California State Mines Association.

S. C. Hornbrook, the Toledo, O., mining expert, has recently left Denver, Col., for Wyoming, where he will investigate some copper properties.

Byron N. White of Spokane, Wash., is in Ashland, Oregon, on important mining business.

F. M. Jeffrey of Cripple Creek, Colo., the mining lawyer who located in Los Angeles, Cal., some time ago to practice his profession, has since opened an office in the Mohawk Block, Spokane, Washington.

W. H. Knapton, who has been examining the Climax mine at Salome, Idaho, has gone on a trip to Portland, Oregon, to make some examination near that city.

Lew E. Auburn, the assayer of Los Angeles, Cal., has returned from an extensive examination of mining property in Ventura, Cal., and has just received a new and improved mining deal.

Thomas D. West has suggested a plan to establish a national agency for the manufacture of standardized iron drillings, which was endorsed by the American Institute of Mining Engineers, New York City.

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RECENT IMPORTANT IMPROVEMENTS

The Handled, Simplest and Most Efficient Pulsmometer Steam Pump for General Mining, Quarrying, Railroad, Industrial, Transportation, Coal Washing, Tankfilling and for Furnace Work, for use in mining and allied trades, in which heavy stock or gritty materials are handled without injury to the Pump.

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THE MARKETS.

THE MINOR METALS.

Quotations are given below for New York delivery:
- Tin: 34.75 per lb
- Lead: 90 cents per lb
- Copper: 30 cents per lb
- Aluminum: 75 cents per lb
- Nickel: 1.25 dollars per lb
- Silver: 4 dollars per oz

Variations in price depend chiefly on the size of the order.

CHEMICALS.

Deliveries on contract are good. No contracts have been taken, particularly for alkali. The market has been doing domestic caustic soda, and as low as 80 cents per lb. Works are reported as the price contract.

CARBONIC SODA.

Quotations for carbonic soda domestic high test are $1.40 @ $1.45 per hundred lbs.

ALKALI.

Domestic, 68 percent, 55c. @ 60c. Foreign, 55c. @ 60c. From dock to style of package.

CARBONATED SODA ASH.

58 percent, 90c. and 90c. per 100 lbs. basis 48 per cent.

BI-CARBONATE OF SODA.

English, 92.9% @ $2.25 per 100 lbs. American, bulk $1.25 and $1.50 per 100 lbs. According to brand.

For domestic, 50c. per 100 lbs, less usual discounts; English, 65c/66c. Concentrated carbonated soda, $1.00 @ $1.55 per 100 lbs.

CHLORATE OF POTASH.

Chlorate of potash is quoted at $9.50 and $9.75 per 100 lbs.

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This advertisement shows the gigantic pumps of the Hercules Gasoline Works, shown at the Panama-Pacific World's Exposition. The pumps are of the highest grade and are used for pumping gasoline and oil on the Pacific coast. The pumps are 120 ft. high and 30 ft. in diameter, and are capable of pumping 75,000 gallons per minute. The plant is located at the Packing House, Colma, Cal., and is owned and operated by the Hercules Gasoline Works Company.
ORE TESTING

Complete mill for testing ores on a practical scale by all processes to determine the best process adapted to treating ore and submitting. Processes investigated to overcome unnecessary losses, etc.

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MINING AND PUMPS MACHINERY,
COMPRESSORS AND PUMPING MACHINERY,

Bridge 3-Stamp Tripod, Discharge Quarter T.H., of Latest Improved Pattern, Rock Breaker, Ore Feeders, Concentrators, Engineers and Stamps to be operated by Horse, Steam or any other power. Ore Car and Ore Buckets, Cranes and Jib Bucket Pulleys, Discharge Pulley, Conveyor, Wash Box, Gravel Pumps, Wooden Tubs and Pump for the Cylinder Process, Pipe and Cylinder Valves, Link Chain Elevators for conveying all kinds of material. Estimates made of machinery and erection and quotations upon application. Write for Catalogue and Prices.

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MINES AT VICTOR, COLORADO.

THE INGERSOLL-SERGEANT DRIFT CO.
Graham, Colo. - We bought two years ago one of the largest mines of that type in the Cripple Creek district, which we are now mining profitably, and we are now working a large number of manes, with the result that our production is increasing daily. We are now mining the main vein, and the resultant economy of operation is very apparent.

The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this is well worth the extra cost on account of the great permanent economy of operation.

Our mine is equipped exclusively with your drills and we have only the highest regard for your works. Yours truly.

The Portland Gold Mining Co.
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The Improved WONDER Irrigation Pump

We also Build Vertical Style for Mining Purposes. Write for full particulars and Catalogue.

Wonder Pump Mfg Co., KANSAS CITY, Missouri

ALL THE MINING CAMPS OF UTAH AND COLORADO ARE LOCATED ON OR REACHED BY

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THE SHORTEST, QUICKEST AND MOST DIRECT ROUTH TO

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WHY

Spend your money to buy new machinery to put on Unproved Mines which may not be a Success when you can buy Pumps, Hoists, Shafting, Pulleys, Air-Compressors, Engines, Boilers, and in fact any Machinery you need for a Mine or Mill, as good as new, at the Denver Variety Machine Shops,

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Sulphuric Acid

THOMAS PRICE & SON
Analytical Metallurgical and Physical Testing Laboratory
624 SACRAMENTO STREET, SAN FRANCISCO, CAL.
## Incorporation of Mines Paying Dividends.

### NAMES OF MINES

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*Note: Companies not listed have not paid a dividend for the last twelve months.*

**S.** Silver, **G.** Gold, **L.** Lead, **Q.** Copper, **Q.** Quicksilver, **I.** Iron, **Z.** Zinc.
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