The Mining and Metallurgical Journal

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WATER STORAGE AND FORESTRY.

The meetings of the American Forestry Association were held in Los Angeles, on 18th and 20th last, Abbot Kinney, president, was present along with Secretaries George W. Whittlesey and W. H. Knight.

Among the delegates present according to the registration of names were: Lucius A. Booth, Oakland; W. Forline Jones Temple, Tex.; Charles A. Keffer, Mesilla Park, N. M.; Samuel B. Green, University of Minnesota, Minneapolis; George W. Whitley, Washington, William S. Lyon, Los Angeles; A. J. McClatchie, University of Arizona; W. W. Everett, San Francisco; Chas. H. Shinn, Berkeley; Clarence L. Cory, Berkeley; W. S. Mellick, Pasadena; N. H. Bell, Washington; Charles C. Swisher, Washington; Gifford Pinchot, Washington; Adolph Wood, San Bernardino; Nathan W. Blanchard, Santa Paula; George H. Maxwell, San Francisco; H. A. Barclay, Los Angeles; C. H. Van Epps, Whittier; William N. Campbell, Pasadena; O. S. Breese, Los Angeles; James Boyd, Riverside; Thomas G. Lawson, Los Angeles; J. A. Lippincott, Philadelphia; J. B. Lippincott, Los Angeles; M. M. Ross, Nashville, Tenn.; Harvey C. Stiles, Redlands; C. G. Baldwin, Claremont; C. A. Colemore, Santa Monica; George D. Peck, El Monte; Fred L. Ailes, Los Angeles; H. W. Dunw, W. F. Burbank, A. R. Sprague, T. S. Van Dyke, C. M. Heintz, Los Angeles; S. M. Woodbury, South Pasadena.

The meeting on Wednesday evening, 18th July, was somewhat changed from what had been intended by the committee. The illustrated lecture of F. H. Newell was postponed until the next evening, to allow Gifford Pinchot, who desired to leave the city Thursday evening, to present his illustrated lecture.

J. B. Lippincott concluded the session with an illustrated lecture on "The BITTER Root Range of Wyoming."

Gov. H. T. Gage, Senator Stephen M. White and Congressman R. J. Waters were not in attendance, having been detained elsewhere on business. Assemblyman W. S. Mellick, of Pasadena, was the first to address the conventions on the proposition of the experiment station, was read by Secretary Whitley, of the American Association. The author of this paper urged the establishment of experiment stations and a systematic planting of trees.

H. Hawgood, the well known civil engineer, followed with a paper, entitled "Engineering Problems in Forestry and Water Storage."

The paper of S. H. Woodbridge, Ph. D., on "Water Conservation in Soils," followed. The speaker related the result of his own experiments to show that some varieties of soil absorb moisture much more rapidly than others, and the natural mould of an old forest is the best in every respect, being naturally more moist and consequently more ready to take in by capillary attraction the rain that falls upon it. The object of the paper, like that of the one that preceded it, was to show the absolute necessity of preserving the forests that protect soil which serves such useful purpose in storing water for the use of man.

Elwood Mead, formerly state engineer of Wyoming, recently appointed irrigation expert for the department of agriculture at Washington, delivered an excellent paper on "The Future Policy for Irrigation in the West." He prefaced his remarks by saying that he has given his address applicable to local conditions here, but finds that he can do that only after making a personal investigation. Conditions that apply to other regions could not be adapted to the needs of this country; and on this subject he will be more specific at some future time.

The tenor of his address was an unqualified indorsement of a proposal to lease for grazing purposes all the public lands, and to use the net proceeds in the construction of storage reservoirs and irrigating canals. He argued that in regions where high freight rates prevail and production is scanty, it is folly to expect the farmers to engage in great works of storage reservoirs and irrigation systems. For the state to undertake a way must be found to raise the money taxation would be objectionable. The necessary money could be raised by leasing the public lands—a proposition that would be objected to by no person, not even those that would be the tenants. In some arid states, Mr. Mead said, the income that would be derived from the rental of the public lands for grazing purposes would far exceed the total taxation. The receipts from the rental could be used to build the needed storage reservoirs and systems of canals, and no additional burden would be put upon the people.

Because of the nature of a rental system the occupants of public lands feel that they have no tenure of possession. They will not even plant a tree or dig a ditch. They hold the land for what they can get off of it, expecting the land to work for them. The few attempts at growing anything has disappeared from it. Under a rental system, the speaker said, all this would be changed, and there would be an income that could be converted into a paying good.

Wallace W. Everett, associate editor of Wood and Iron, a San Francisco publication, next presented a paper on "The Practical in Forestry." It was an exposition of the subject viewed from the money-making standpoint of the sawmill men, against whose interest the forests are doing battle. It seemed like a discordant note sounded in the harmony of the meeting, but it was an able paper on the subject. Mr. Everett admitted that the lumber men are opposed to the policy of the association which hopes to save the mountain forests. The speaker made some suggestions as to how the association should proceed. The address was listened to with attention.

The concluding paper of the morning session was by G. S. Breed, "The Mining and Metallurgical Journal," on the relation of the mining industry to the preservation of forests.

The most interesting part of the afternoon session was the consideration of those questions that are of strictly local application, by F. H. Oldsmead, Los Angeles, City Engineer, and Mayor Fred Eaton, formerly City Engineer.

Chairman Kinney here introduced F. H. Oldsmead, City Engineer, who, with a large map of the country surrounding Los Angeles, showing the source of the Los Angeles River, spoke on "Forest Preservation and the watershed of the Los Angeles River."

T. S. Van Dyke spoke on "Irrigation Problems."

After reviewing at length the experience of land owners and co-operative associations in running irrigation systems, Mr. Van Dyke concluded by expressing his entire approval of the system proposed by Elwood Mead.

A paper on "The Future Policy for Irrigation of the University of Southern California," by George W. White, president of the institution, was read by Prof. Laird J. Stabler, and the exercises of the afternoon closed with an address on "Nature's Natural Witness of the Importance.

The closing hours of the convention were occupied with some of the most interesting speeches of the day. The attendance was larger than at the previous sessions, and the audience seemed to take a great interest in what the speakers had to say.

Abbot Kinney closed the session by mentioning with an address on "The Forest Problem in the West."

At the conclusion of the speech the Committee on Resolutions presented its report, and resolutions were adopted.

Numerous amusements had been arranged to entertain the delegates in Southern California.
The value of Miners' Associations in protecting the interests of the industry has hardly ever been felt more than in the last few years. These Associations have been formed in many parts of California, and they are working towards the improvement of the mining laws. One of the objects of the Associations is to oppose and resist all attempts to make a change in the mining laws, which would be detrimental to the mining districts. The Associations are purely local in character, and each district has formed its own Association. The Associations are composed of miners, merchants, and others interested in the mining industry. They are working to secure the enforcement of the mining laws and to prevent any changes that would be harmful to the mining industry.

FUEL SUPPLY OF THE PACIFIC SLOPE

The coal supply of the Pacific Slope is derived from the soft, inferior lignites of cretaceous age, and amounts to so little that it can hardly be in direct competition with the imported coal from foreign ports or with coal from New Mexico. It is not produced in sufficient amount to be classified as a competitor with foreign coal or with the local supply of asphaltum base crude oil for manufacturing purposes. On account of the small size of the beds, there is no hope of future discoveries of large supplies. The local fuel oil, which has great heating power, is a more important factor in competition with coal in the Pacific Slope than with coal from foreign ports or with coal from New Mexico. The present market value of the oil has increased from 25 to 75c. per barrel, and on account of the advance in the price of iron and steel, which is needed for the manufacture of the oil, the cost of production has increased.

The iron and steel industry is one of the most important industries in the United States, and its growth is largely due to the use of coal. The iron and steel industry is also important in the Pacific Slope, and the increase in the price of coal is a matter of concern to the manufacturers of iron and steel in the Pacific Slope. The increase in the price of coal is due to the increased demand for coal by the iron and steel industry, which is using more coal than ever before.

THE MINING AND METALLURGICAL JOURNAL

The claims made for the invention of the peat process are based on the assumption that the peat process can produce coke without the use of coal. The claims are based on the fact that the peat process is said to produce coke with a lower heating value than coal, and that the peat process is said to be more economical than the coal process. The claims are based on the fact that the peat process is said to be more economical than the coal process, and that the peat process is said to be more economical than the coal process, and that the peat process is said to be more economical than the coal process.

THE PNEUMATIC CYANIDE PROCESS

The pneumatic cyanide process was invented by Jean Web as the inventor of the improvement in operating a cyanide plant in the United States. The process involves the introduction of oxygen from the atmosphere into the cyanide solution by the introduction of compressed air into the vats. The process is based on the assumption that the cyanide solution will react with the oxygen from the atmosphere to produce a more effective cyanide solution. The process is said to be more economical than the traditional cyanide process, and it is said to be more effective in producing a more effective cyanide solution. The process is said to be more economical than the traditional cyanide process, and it is said to be more effective in producing a more effective cyanide solution.
compressor which they added to their plant as an experiment, which proved a success, as the mechanical action of the air circulating through the solution added the chemical properties of the solution to the water, thus increasing the amount of gold in the ore by keeping it agitated at no extra expense, except for the first cost of the compressor and fittings. These operations were continued on the laboratory amount of a ten-pound sample, as the Colorado experiments have been, but were in daily use in large vats holding several tons of ore. As soon as the work was notating this information from Mears, Dean and Brand, the exact capacity of the plant cannot be given correctly.

CORRESPONDENCE

IDAHO

Boise, Idaho, July 8, 1899.

Here is a very little town of some seven to nine thousand population, resting against the foothills of the mountains that bound the Snake River Valley on the north. It is 20 miles off the route of the railroad, and few transcontinental travelers know of its existence; but those who do make the side trip on the stub railroad running from Nampa to Wellsville, line, and long enough to learn something of the place and the surroundings, do not consider the time lost. Just as the city the Boise river emerges from black, lava-capped buttes from the mountains, and flowing westward fifty miles through a very fertile valley, empties into the Snake.

No one seems to know exactly when the first French voyageurs or Jesuit Fathers arrived from the north at the mouth of this fine stream, and attracted by its clear water and the wealth of timber, began the trade and covering its bottoms—presenting such a contrast to the majority of water courses in Southern Idaho—called it the 'Riviere Boise,' or Wooded Stream. But as early as 1830 at least, and probably years before, the Hudson Bay Company had a small trading post at its mouth. In 1830, when what is now called the Pacific northwest, and being a part of America, the purchase, from the sovereignty of France to that of the United States, the government seems to have established a little military post at or very near the site of the old fort, which probably had for its main purpose the protection of emigrants who were traveling by the Snake River route to the Pacific coast.

In 1860, the overflow of miners and prospectors from California and Oregon poured over into Idaho and made the first discovery of gold within its present borders on one of the branches of the Clearwater, about 200 miles west of the Fort Boise. During 1861 and 1862, the miners rapidly worked their way southward through the mountains until, in the fall of the latter year, the wonderful placer deposits in the Boise Basin were discovered. This caused such a rush into Southern Idaho that the government moved its small post at the mouth of the river up to the base of the hills from which the gold was emerging, and President determined the location of the town. It became at once of course the supply point for the newly-discovered gold mines.

Situated on gentle, sloping plain between the river and the hills, where the soil is rich and deep from the disintegration of the lava-capped ridges close by; abundantly supplied with water for irrigation; provided with plenty of business in furnishing supplies to the army post and the miners, the little town prospered from the start; but like all individuals they first try to do their work as easily and as early as possible, and lost her senses completely. So when the railroad in 1884 came along through the Snake River Valley, the people were asked what they would do for it in the way of depot facilities and rights of way, of the self-satisfied property holders, believing that the railroad had to come to them, looked important and said they had land to sell, etc. If the company's pie was large enough—if it were, they were sorry, etc., etc. Thereupon the representative of the company shook the dust of the town from his hands and went and located his line 15 miles south over a low ridge and passed on to the Pacific. Since which time the live citizens of the place have been representing their case at the capital and are now hoping to live till the day when some new transcontinental line will come along this way and give them another chance.

The Boise cemetery, however, shows healthy signs of growth of late. There are indications that the old town is acquiring its second wind. A new set of men are coming in and seizing control of its business. There is a decided revival of mining in the Basin (of which more anon) and of railroad talk in the hotel lobbies. A single car does duty on the electric tramway line running from one end of the city to the other. Cement sidewalks are being laid in many places. The town itself is really such a pretty one, and so deeply embowered in trees, that but little in the way of cement improvement is needed to make a showing. Of course it has an electric light and power plant, and a telephone exchange, and the latter extends up into the Basin and across the Snake Valley to the Owyhee, where there is great quartz mining interests, and is also connected with the general telephone system building eastward from the Pacific Coast.

Boise is on the map of the world is American, San Francisco, Portland, Seattle, Spokane and Helena; and before the year is out will be in connection with Salt Lake.

The Boise Valley appears to be better, adapted to fruit raising than to any other branch of agriculture, and of the fruits, the countryside seems to have become more violently addicted to prunes than to anything else. At any rate, the largest prune orchards in the United States—and perhaps in the world—is a few miles below the town. Idaho prunes are thought to be full equal if not superior to any raised, and evidences are lacking to show that the hands of the each year masquerade successfully in the Eastern States under the brand of 'Imported Turkish.' Thus does home industry flourish, and at the expense of the foreign European and in spite of the efforts of the European American.

Artesian hot water is the specialty of the place. Boise has two, on a snow-capped mountain range to boast of; San Francisco calls the seal rocks its especial attraction; Los Angeles the beautiful San Jacinto range, to name a few. The City of Angels, however, points to its inland ocean bathing as its particular charm; but Boise mentions copper as its monopoly; Boise in its turn is the one place in the Union where newer business blocks and residences are heated and supplied with natural hot water. The fluid was encountered 300 feet from the surface at a point about one and one half miles east of the town. It is believed that is the very old pipe axioms the largest on the continent, with a stone and cement plunge 60x120 feet, surrounded by a beautiful building, will be the home of the proprietors of such an institution; and then the overflow, conducted in iron pipes to the heart of the town, is passed through all the finer recently erected buildings. The streets are sprinkled with the same water, wasted with a manure; and the year round—but particularly in summer—an unmixed blessing to laundresses, housekeepers and hotels. Being quite free from mineral and quite hot (150° Fahr.) it finds its way through the community leaving no unpleasant trace or trail behind, a blessing to all.

The only weak point in the institution so far seems to be that there is not as yet enough to go around. But in the new life that is coming to Boise, new wells will be sunk, and more hot water developed. The town is a natural one to be in contact with its own countrymen and to whose internal needs scientific and persistent probing to produce an unlimited, or at least, a greatly increased yield.

Pennsylvania.

Iron Castings Advance in Price.

At a special meeting of the jobbing foundries of Philadelphia and vicinity, at the Manufacturers' Club, under the auspices of the Foundrymen's Association, Thursday evening, June 7, '99, the following was unanimously adopted:

Resolved: That, on account of "the rapid rise in price of pig iron, scrap iron, and other raw material," it is the sense of this meeting that the present price for iron castings is too low," therefore be it

Resolved: That the price of iron castings be increased 1/2c. to 1c. per pound, to take effect immediately.

Resolved: "That should there be another rise in pig iron, scrap iron or raw material, that the price of iron castings shall be advanced at least in proportion."

Howard Evans, Sec'y.

The Mystic Rotary Quartz Crusher Company, of Sayreville, N. J., sole owners of the Mystic Quartz Crusher, a machine for crushing all kinds of ores, wet or dry, has issued a pamphlet descriptive of the machine. This crusher is built on entirely new principles and will crush tons in 24 hours, through a 30-mesh screen, costs $1,200. Ex-Governor H. H. Markham had one mill on his American Girl mine, at Hedges, in San Diego County, Cal.; and has ordered another. For further particulars, address the makers, 132 South Broadway, Los Angeles, Cal.

The American Diamond Rock Drill Co., of 120 Liberty Street, New York, report as among recent sales one diamond drill for South Africa, and two for Southern States, one for Pennsylvania, and two for Central America. The supply trade is also keeping the shops busy, and the outlook seems good for increased business.
The Two Republic Mines.

Princess Maude.

The toughest kind of figuring upon the showing in the Princess Maude mine at present indicates that there is 40,000 tons of ore practically in sight and there is little reason to doubt that this will average $15 per ton. It is certain that the average of the ore thus far encountered in the drift in which work is at present being prosecuted is better than $15 per ton. The ore chute on the Princess Maude is practically demonstrated to extend 400 feet through the claim. The present workings are at a depth of 262 feet. It is certainly safe to say that there is a round half million dollars' worth of ore in sight and it is more than probable that the actual value of the ore is nearer twice that sum.

A shaft on the Princess Maude ledge near the south end line of the claim is down 104 feet. In this is four and a half feet of quartz showing in the bottom. Assays of this made from samples taken in the presence of the correspondent of the Spokesman-Review last summer went over $15. There were indications that the shaft had struck on the edge of a pay chute, as the ore on the south side of the bottom of the shaft went about $18 and on the north side it went as high as $25. The deposit was so satisfactory that it was decided to drive a tunnel to catch the ledge at a depth of 200 to 270 feet. About the time this was started a shaft was sunk on the Duke fraction, a narrow wedge of ground lying between the Princess Maude and the Jim Blaine. This shaft prospected the Princess Maude ledge to a depth of ten feet and showed ore which assayed as high as $18 across four feet of quartz. It was this showing which led the Jim Blaine company to start a tunnel which is now being run to catch the Princess Maude vein where it runs through the Duke fraction into the Jim Blaine and thence on into the Republic claim.

The distance between the shaft at the south end of the Princess Maude and the one on the Duke fraction near the east side line of the Princess Maude is about 480 feet. The development indicated that the pay chute of pay ore existed in the ledge at both ends where it passed out of the claim. As many it was deemed the height of folly when the management started a tunnel to catch the ledge at a point about midway between the two shafts. It was argued that ore chutes are rarely over 200 feet long and that the ledge was almost sure to be encountered in a barren place.

The tunnel was started last October, and the work was carried forward with out a pause, three shifts being employed most of the time, until at a point of 400 feet from the portal, the ledge was encountered. Those who had expected barrenness were surprised, and even the most sanguine were astonished when it was shown that the deposit was of the highest grade. Doubters were satisfied, and there is not a mining man in camp today, who knows his business, who does not regard the Princess Maude as one of the proved mines of the camp.

There is a favorable feature in the drift at this time that should not be overlooked in placing an estimate on the value of the property. As it goes south in the direction of the shaft the quartz has become of a uniform appearance throughout and cannot be distinguished from that in the Republic mine. There seems no question as to the future of the Princess. It is no longer a prospect but a mine. When the ore chute that is such a prominent feature in the history of the Republic passes out of its own ground into the Jim Blaine it is but reasonable to believe that it will continue from the latter into the Princess Maude ground. The pitch of the chute will preclude any other result.

The company was incorporated with a capitalization of 1,000,000 shares, having a par value of $1 each. There were subscribers at the low figure of one cent a share, and within five days all the promoters' stock that had been taken and active development was begun on the claim.

Since July 15, 1898, at which date the shaft was begun, there has been no cessation of work on the property. The shaft was sunk to a depth of 104 feet, and it then became apparent to the management that machinery would have to be put in and some new plan of operating the claim devised. It was decided that the cheapest plan was to run a tunnel which would drain the mine to a depth exceeding 200 feet, and would save a large expense in hoisting the rock to the surface. In October the work of excavation for a site for the proposed tunnel was begun, and in a few days thereafter the actual work of constructing the tunnel was inaugurated. After the ledge had been cut and crossed a drift was started along the ledge in a southerly direction. This drift will be continued until a point is reached directly beneath the shaft, when a raise will be made until the shaft is reached. This course becomes necessary in order to ventilate the mine and also to open it up ready for stopping.

The ledge, which has an average width of about seven feet, passes out of the Jim Blaine ground through the point of the Duke Fraction into the Princess Maude and thence into the Butte and Benson. The ledge will shortly be cut again near its southern boundary line by the Jim Blaine tunnel at a depth of about 175 feet. Within the prospect it is quite probable that the Princess Maude will be among the best developed claims in the district, and will be in condition to be a shipper.

Jim Blaine.

'Jim Blaine', one of the principal properties of the Republic Camp is
destined to make a great mine. Owing to the fact that this property has been until recently under the same management as the Republic, development work has not been pushed, the property being to a great extent developed through and by the workings of the now famous Republic. The south drift of the Republic on the No. 3 level is now but a few feet from the Jim Blaine north end line. The ledge at this point is about 50 feet wide showing its strength to be undiminished, and it has in the middle of it a pure white almost crystalline quartz which is assaying as high as $225 per ton in gold. The solid clean ore is about four feet wide.

From the accompanying map it will be seen that the Jim Blaine is heir to all the Republic veins at a little greater depth and with the same amount of development as on the Republic will become equal to and in all probability show even greater values than the Republic.

From a mining standpoint the Jim Blaine is as yet an undeveloped prospect, nevertheless when the workings of the Republic are considered and the immense importance appreciated that the pitch of the big ore bodies in the Republic mine are to the south taking them directly into the Blaine ground at a depth of only a few hundred feet, it becomes apparent that the property is of immense value and with active development capable of producing dividends equal to if not surpassing the much heralded Republic.

The company has a very able directorate, all mining men, standing at the head and in charge is Mr. Patrick Clark, the president, who has acquired through his vast capabilities and success as a mining operator a world-wide reputation and at the same time amassed fortunes for his associates and followers (stockholders). Spokane is now adorned by residences valued at sums ranging from $10,000 to $50,000, owned by men who but for Patrick Clark would today be occupying but humble cottages.

Large business blocks are a monument to his success and energy, while the town of Republic owes its birth to his wonderful foresight. Yours truly,

BRITISH-CANADIAN INVESTMENT AND MINING SYNDICATE.

Cananea Mines Sold.

A controlling interest in what George Mitchell claims to be the richest copper prospect on the American continent was sold to a syndicate of New York capitalists.

Mr. Mitchell was for four years the Superintendent of Senator W. A. Clark's United Verde mines at Jerome, Ariz.

"Our deal was finally closed up at Phoenix," said Mr. Mitchell to an Express reporter. "The new purchasers took only control in the mines, which I'll guarantee to be the greatest copper property in America. Our location is in Cananea, District of Arispie, State of Sonora, where we have a smelter of 200 tons capacity as part of our works. The mines cover 3/4 miles of territory and are at present netting a good sum per day. Some of the stuff taken out shows up 98 per cent pure copper."

The new owners of the controlling interest in the mine are to improve it thoroughly, and will greatly increase its production. About 200 men are now employed.

Mr. Mitchell was adverse to disclosing the exact amount of the purchase price paid by the New Yorkers. He volunteered after some persuasion the information, that $1,500,000 might be put down as having been about the right figure.

When Mitchell left the Clark mines at Jerome, the employees clubbed together and presented him with a beautiful gold watch, a chain and locket made, made of pure native gold, and a large solitaire diamond ring, all of which he wears, of course, with considerable pride. He has for years had a reputation as one of the most noted copper experts in the world.

"Marcus Daly and W. A. Clark both had experts examine the Sonora mines, controlling interest in which has just been sold," he said, "and the experts always walked past the big mineral deposits which our people have since uncovered. Most of the stuff has been uncovered during the past two years."

In Skinkyou county there are 225 stamps and two Huntington mills. Of the stamps 150 are in continuous operation. Some run full shifts, some do not, this being governed by the water supply. About 40 stamps are idle from various causes and 35 are worked occasionally.
AUTOMATIC CUT OFF ENGINE.

Accompanying illustrations represent the Class "B" Standard Center Crank Automatic Cut Off Engine being put on the market by James Leffel & Co., Springfield, Ohio. They are intended to meet the demand for a thoroughly good, simple and easily cared for line of Automatic Engines in the smaller sizes up to 50 h. p., that will prove durable and economical in operation. Fig. 1 is view showing steam chest side, while fig. 2 illustrates the governor in the band fly wheel and fig. 3 shows cylinder side.

The main bed or frame is of substantial proportions, and of a design affording extra strength and stiffness. The cylinder and steam chest are of overhanging type, cast together, and firmly bolted to bed, bored out, and have very generous surface. Cross head is of improved mechanical design, having pin about mid-center, and provided with gun metal wedge shaped shoes above and below, arranged for convenient adjustment. Manner of fitting cross head pin enables easily keeping same absolutely tight at all times. Piston rod is of steel, and turned to a tight force fit in piston, with suitable shoulder, against which piston is forced on rod, and end of latter is then securely riveted over, tightly and firmly holding piston in place. The connecting rod is provided with extra heavy brass boxes at each end, easily adjustable for taking up wear and keeping distance between centers same at all times. Main shaft is extra large and strong, forged in one solid piece, from best quality hammered iron or steel, and is provided with suitable counter balance discs, securely attached. The rectangular form of skeleton slide valve is used, balanced by being fitted with a pressure-relieving plate on back between valve and steam chest lid, and is arranged to afford necessary relief in case of water in cylinder, and also made adjustable for wear. This gives, a simple, efficient, and well balanced valve, that is easily understood, and no more trouble to cure for than the ordinary type of plain slide valve. A simple and convenient device (not shown in cut) is provided for draining cylinder, same being operated by one lever, and having outlet from each cylinder cock suitably connected to exhaust pipe.

These Engines are equipped with the Kite’s Governing System, which is the sum of simplicity, as shown in fig. 3. The governor consists of one piece, comprising the arms and weights, with one spring connection, and is pivoted on one hardened steel pin, nothing complicated, no links, no numerous joints or complicated parts. This governor, with the balanced valve used, affords a regulation that is practically perfect, speed being constant, and the same with engine loaded or running empty.

The manufacturers will be pleased to quote prices and furnish prospective users with any additional information desired regarding these engines.

The famous Mariposa estate, territorially one of the largest gold mining properties in the United States and the finest quartz property developed in California, is to be reopened and worked after a suspension of operations for nearly thirty-five years. The gigantic nature of the undertaking makes the news of the first importance, and promises to have great influence on the mineral development of California.

The Mariposa grant, as it is often called, is located in Mariposa county and covers an area of 44,387 acres, or about seventy square miles, being a strip of land fifteen miles in length and of an average width of five miles. The principal developments in this great territory are the Princeton, Josephine and Pine Tree mines. In addition, there are also the Elizabeth, Green Gulch, Mariposa, Mount Ophir and Mexican, but although the tract is intersected by a network of veins they are scarcely more than prospects.

From about 1858 to 1865 the property was extensively worked, the Princess mine yielding $2,000,000 down to the 500 foot level. Since then operations have been conducted in a tentative fashion, mostly in the way of tunnels. Not giving results hoped for, they have been allowed to lie idle.
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MISCELLANEOUS MINING NEWS.

ARIZONA.

S. P. Creasinger of Los Angeles has bought a group of copper mines in Lost Gulch, near Globe, from W. T. McNelly, W. F. Westbrook and Dory Harris. A company is to be formed with $1,000,000 capital, and called the Creasinger Mining Company to work the mines. In the purchase the former owners of the mine receive 40 per cent of the stock. It is said that $2,500 in stock has been set aside for improvements. The consideration of the sale is said to be $60,000 in cash and 473,000 shares of the stock. The claims in the sale are as yet only prospects, but it is said that good copper ore has been disclosed.

The Equator mine, on which work has been suspended for a long time on account of litigation, will soon be reopened. A compromise has been effected by which the property is divided in two, W. A. Clark, who got one-half in the division, calls his property the Copper Chief of Jerome.

But the greatest interest is felt in the Dillon mine, located by Ralph Dillon, who is now backed by Scott capital. About $64,000 of machinery has already been put up, and more is being ordered where it shows up well enough to justify it. A great deal of development has been done in this mine. The Dillon lies in sight of Jerome and near the United Verde mine.

A bulkhead is being built by the Copper Queen mining company in Arizona, to the rear of the fire station as a precaution against floods.

A strike of 1200 ounce silver has been made on the American Flag in the Wallace mountains. The mine is one of the old producers that made Mohave county men rich.

CALIFORNIA.

AMADOR COUNTY.

Gibson & Horn have started their big clay and gravel washer at Jackson. For the past month they have been making repairs on the machine, putting in a new holst, etc. This machine is a perfect success in washing clay, and mining men are greatly interested in it.

Frank A. Stewart and Charles Lavala, owners of the Katherine mine in the Pioneer district which is located near the Defender, are shipping some high-grade sulphurite ore. At present the sulphurite lead is sixteen inches wide, and as it sinks it is widening. The quartz vein is two feet wide and assays about $70 per ton. The owners are rapidly developing this mine, and it bids fair to be of considerable value.

Some of the directors of the Bellwether at Jackson are in the East, and are having good success in the matter of disposing of the stock of the company. They expect to get in condition to resume operations on the mine about the first of August.—Amador Ledger.

CALIFORNIA COUNTIES.

There has been encountered in the Gwin mine a ledge at the lowest depth of the shaft, which gives promise of putting that mine in the list of high-grade gold producers. The ledge, where encountered, is two feet thick and assays $70 per ton.

The Thorpe mine at Angels has closed down. It has been reported that the mill would be the only department closed, and the sinking terminated, but a statement made by one who is in a position to know says the shut-down will be complete.

EL DORADO COUNTY.

The Bowler mine, on Webker creek, seven miles from Placerville, was closed last week on account of a shortage of water to run the mill. The water supply on the Gold Hill branch of the El Dorado canal will be needed for the next three months by the farmers and horticulturists in that vicinity.

The Crystal Gold Mining Company is the name of a new corporation organized to mine in El Dorado county, the company's principal place of business being at Sacramento. The directors are Henry S. and William E. Klein, of Sacramento, F. L. Simpson of Grizzly Flat, S. C. and Charles Boorman of Canyon. The capital stock is $100,000, of which one-half is subscribed.

FRESNO COUNTY.

W. R. Brown of Pine Ridge found a ledge of iron sulphurites near the road about ten miles from Fresno. He procured a pick and shovels and soon discovered the ledge was fully ten feet wide and running northwest by southeast, parallel with the railroad. Mr. Brown took a chunk of the ore to town. It is very heavy and appears to be iron sulphurite in which is imbedded gold-bearing quartz. Mr. Brown will have the ore assayed at once, but as the ledge is on patented land, he will not divulge its exact location until he is advised of his rights in the premises. This is the first ledge of iron-bearing rock ever discovered on the open plains.

SAN BERNARDINO COUNTY.

It is announced that H. C. Steele and E. F. Zumbo of San Bernardino have banded the Los Angeles mine in the Dale mining district for $40,000, and will commence development work on a large scale.

SAN DIEGO COUNTY.

The sixteenth report of Receiver C. W. Patly of the Golden Cross mines, covering the month of May, has been filed in the Superior Court of San Diego. The cleanup for the month amounted to $18,394.01. The receiver paid out during May, for the benefit of the property in his possession, claims aggregating $3,156.75. After making all payments $24,442.47 remained in the hands of the receiver. The payroll for the month was $700, and $500 was paid for fuel.

There is a mystery over the Ranchita mine, which Gail Borden and associates recently bought for a price said to be $150,000. A miner recently from Banner, San Diego county, reports that the Ranchita has been shut down by its new owner and the miners have been paid off and discharged, leaving only two men in charge to take care of the property. It is said that the cause of the shut-down is a disagreement between the new proprietors and the former owner, Cave J. Couts, but the exact nature of it is not known. There were eighteen miners employed in the mine before the shut-down took place, which was about two weeks ago. A five-stamp mill had been added to the place, and everything was in readiness to begin work with the new mill. A test was ordered and the machinery was started. Twenty minutes later orders were issued to close the mill, shut down the mine and pay off the men.

The interests of the company are said to be connected in the mine, as everything has been running smoothly and preparations had just been completed for developing the mine on a large scale than had ever before been attempted. There is no reason for shutting down the property, and further than the unconfirmed rumors which are abroad in the camp, and the statement that there had been a disagreement between the present and the former owners, nothing is known by the people of Banner concerning the shut down. The miners employed in the Ranchita were offered places in a mine at Randsburg owned by M. Borden, and all took advantage of the offer and have gone to that camp.

Mrs. E. H. Henshead, dressed in male attire and under the name of E. H. Harding, an alleged mine expert, attempted to get into the mine but was not permitted to do so by Cave J. Couts, who was in charge of the property. The cause of this procedure has not as yet been made apparent.

The American Girl.

The American Girl Mining Company just incorporated with H. H. Markham as President; Thomas Johnson Vice President; G. H. Coffin, Secretary; F. S. Daggett, Treasurer, has just purchased a mining property at Randsburg, and work will begin August 1st. A plant will be established.

The Grapevine District.

Aside from the interested parties the reports of the disinterested practical miners who have visited this new district southwest of Banner, in San Diego county, who report that it is doubtless a very promising field of favorable prospects that will be good for one-half of the next century. The mines are easy of access from Los Angeles via Temescal per rail, then stage to Julian, or from San Diego via Posters per rail and stage to Ramona and Julian. It is an easy route for the construction of a railroad from Seven Palms or Dos Pescados on the S. P. R. Y. Alluvium of water and wood are procurable in close proximity to the mines, while the climate is perfect. All the necessary of life and even such luxuries as fresh vegetables and fruits, are also to be had. The veins of ore run north and south. They are of immense length and widen out in going down. In all probability they are a continuation of the Mother Lode that skirts the eastern and western foothills of the Sierra Nevada range. It is a sulphuric ore that carries a great deal of silver and copper. It is reported that one of the purchasers of some of these mining properties, a Mr. Clark of British Columbia and Washington State, intends to erect a large cyanide plant there, which will be good for some time in transporting the ores. From all indications a great mining camp will eventually be established in the Grapevine district. The natural conditions are such that there is little risk to take and as to the richness of the ores and its immensity. It and the adjacent country south and west is practically a new country, unexplored and undeveloped, and when once brought forward to the attention of mining men and capitalists some surprising results will be shown.

SISKIYOU COUNTY.

The Schroeder quartz mine, in Siskiyou county, has just been sold to the Canada Mining Company. The price is reported to be
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be $1,000,000. This is one of the largest sales of quartz properties ever made in Idaho. The Schroeder mine has an excellent reputation as a paying property, and the purchasers will reap handsome profits from their investment. The property is situated in the Deadwood mining district, about seven miles from Yreka, and is finely developed, Mr. Schroeder having tapped the ledge at a depth of about 1200 feet. Just over the divide from the Schroeder mine is the Humbug mining district, where some excellent prospects have been discovered.

TULUMNE COUNTY.
The Bell mine, Tuttletown, is being watered preparatory to the resumption of the work of sinking the shaft.

The break in the main flume above Sugar Pine caused a partial shut down at about all the leading mines north of the Tuolumne river last week and put a stop to road sprinkling as well.

The mill on the Mountain Lily mine on the Mother Lode, which has been running steadily for the past six weeks with flattering results to its owners, shut down for a few days July 1st to make a cleanup.

Prof. J. F. Von Dussel has struck rich ore on the Stanislaus, near Robinson's Ferry. A company of Illinois capitalists has taken hold of the property and is developing it.

TULARE COUNTY.
A temporary closing down of the Minnie-Ellen mine in Tulare county, pending arrangements for an extension of time on the bonds is reported. The time was up on the 22nd of July, at which date the whole of the purchase money was due, or in default of payment the mines revert to the owners. F. Cook, one of the owners, offered an extension of time if MacDonald, who gave the bond, would augment the price. This, it is understood, MacDonald has refused to do.

COLORADO.
Findley's new strike at Cripple Creek is important. It opens entirely new ground. The vein is claimed to be very strong and seven feet wide. The ore reported as running— or rather assaying—only an ounce and a half. The strike is on the north block. It was made in a south crosscut from the shaft at a depth of 480 feet. The strike is close to the west line of the claim, and is generally conceded to prove beyond question that the Findley contains the big Hull City-Atlanta vein, and at least 500 feet of it. The Steel-smith lease will have a good stretch of it. It lies over 100 feet north of the Carpenter vein.

Rich ore has been encountered in the Tilley lease on the Ozraba. There is a pay streak ten inches wide and very rich in sylvinite, running in the neighborhood of $5000 per ton.

The Galena mine is running the 400 and 550-foot drifts from its shaft. They also have a number of leasers at work and about twelve men in all find work underground on this property. Several shipments of silver ore have been made recently, and a considerable amount of mill dirt has been sent to the mills at Black Hawk.

IDAHO.
Manager Hunter has received instructions from the London office to begin work on the mill level tunnel, at the DeLamar mine, and preliminary work has already been commenced in making the necessary changes to begin the actual work. The compressor now up at the mine will be moved down to the mill, to be placed so that it may be run either by steam or water power, and power drills will be put in place. This means a two years undertaking, employing a force sufficient to keep the work going continuously. The tunnel will cut the veins in the sandstone below the lowest present depth attained; will do away with all the pumping plant, and eventually do away with the use of the present tramway and bring all the miners down town.

It seems that a dredging process has at last been found that saves the gold of Snake river. The gold in the Snake river is so fine that it takes from 900 to 1000 colors to make one cent, and it is so light that when dry it floats on the top of the water like so much bran. The difficulty of saving a profitable percentage of this gold is therefore apparent, but this dredger seems to do this without trouble. The machine is in operation at Bridge Island, near Payette, where it runs day and night.

MICHIGAN.
Michigan Mining Notes.
The Lake Erie Asphalt Block Co. has abstracted all the ore from the mineral storage bins on the Tannarack sand pile. The conveyors and dock are partly finished and will be completed soon. In a few days the work of filling the bins will begin.

Attention will soon be given the old Goodrich mine, which has lain idle so many years. Arrangements are now under way for a resumption of operations at this property. There is known to be a 12-foot vein of hematite of bessemer grade, and besides this there is a large body of silicious ore which will yield about 45 per cent iron.

The Oliver Mining Company has secured an option on the Hartfort property, Neganoee, and will immediately proceed to give it a systematic test. The Hartfort lies immediately east of the Cambria, and the Cambria is pitching in that direction. The Hartford will probably have to sink to a depth of more than 700 feet to make any extension of the fine deposit now being worked by the Cambria. A diamond drill boring will be made. It will be vertical and located near the old pit at the Hartford.

MISSOURI.
Joplin's Lead and Zinc.
The official figures for the Joplin district show an output of lead and zinc valued in 1898 at $7,000,000. For the first twelve weeks of 1898 the output amounted to $2,274,522, and for the first eight weeks to May 6, it amounted to $3,880,269. This proportion, if maintained, would bring the value of the 1899 output to $12,000,000.

MONTANA.
The Philadelphia Company, that has been working since May 1, digging ditches on More creek, ten miles below Idaho City, has the work completed and is now at work on the bedrock flume. The company has placer ground extending along the creek a distance of four miles, and it will give big returns next year and some big clean-ups may be made in the coming fall.

Work is progressing rapidly on the new dredge on More creek.

Thomas Barry has put a force of men at work on the Olympia gold quartz mine on Summit Fist.

Considerable development is going on in the ledges at Miller diggings, ten miles north of Banner. The veins are from 20 to 30 feet wide, but the ore is not usually high grade. Mining men however, say that they are just as rich in ores as any others. With good sized mills they will pay handsome. The district is large and some of the ledges crop for three and four miles in length.

The Moriarty brothers are getting ore out of the Boulder, on Elk creek, and will start up their 30 stamp mill shortly.

John Kinkaid has a force of men at work in the Elkhorn. They are searching by crosscuts at a depth of 500 feet for the ore chutes that yielded more than half a million dollars from the upper works.

The New England Dredging Company, which is operating on More creek, has sent a drilling machine to Stanley basin to prospect a group of claims owned by it.

William R. Byrne is getting some exceedingly rich free gold ore out of a claim at the head of Deer creek, located by him a few weeks ago.

The drift run from the bottom of the Washington shaft has cut into a body of ore eight feet wide. The rock is all good milling ore. It is very gratifying that the discovery is made that the ore goes down, as the chutes was lost eight years ago when work was suspended, since which time the mine has laid idle.—Arizona Standard.

NEVADA.
The sale of the Vina C. group of copper and gold-bearing claims at Contact, Nev., for $5,000,000 has just been accomplished by Mr. W. T. Matter, the claim holder, and J. R. Bolles of Colorado Springs. He was one of the original owners of the Mollie Gibson mine of Colorado, from which nearly $5,000,000 in dividends was derived in about three years, and has been one of the most successful miners in that state.

The new mines discovered by T. J. Bell and J. G. Court, south of San Antonio last spring have been bonded for $100,000 to H. A. Cohen of DeLamar. There are eight men working on the claims and a fine ledge of rich ore has been struck in the tunnel at a depth of 65 feet. Water has been obtained in the well sunk about three miles from the claims, and everything points toward a steady and successful development of the mines.

NEW MEXICO.
The Last Chance mill, near Mogollon, has been started again and is running ten stamps and good grade ore on the Last Chance mine. It is reported that ten new stamps and a lot of other new machinery has been ordered for the mill.

On the Confidence mine near Mogollon the work is confined to development which is being done by sinking shaft No. 2, located about 600 feet from the mouth of the main
adit level. This shaft has attained a depth of 40 feet and it is intended to sink it to a depth of 600 feet, when connections will be made with the motor-working shaft, which is equipped with the big electric hoisting machinery. When the connections are made there will be large ore reserves opened which will insure a very long mill run. There are several thousand tons of ore in the bins at the mine and mill now, but the management proposes to develop large reserves before starting the mill.

Thomas Cooney and George Schaible have a lease upon the old Silver Bar mine near Cooney. They have repaired the pipe line which feeds the water motor at the mill, and have put all the machinery in perfect order for economical working. The mill has been started and is turning out rich concentrates. The ore is being mined from a winze 90 feet in depth at a point about 450 feet from the mouth of the main adit level. The ore is rich in gold and silver and the concentrates run high in copper.

A 30-ton shipment of gold and silver ore valued at $3,500 per ton was made from the famous lookout to the El Paso smelter during the past week.—Albuquerque Journal-Democrat.

OREGON

The Twin Springs Mining Company of Idaho, which owns the Deer Lodge mine at the head of Rock creek, about 16 miles west of Baker City, will resume shortly, after a shut down since last February on account of deep snow.

The Deer Lodge mine is situated on the North Pole and E. & E. lead, crossing the mountains at the head of Rock creek and was purchased last year by the Twin Springs Company from Andy Hansen for $100,000, $75,000 of which amount was paid down. Work done last year made a good showing and the Deer Lodge is considered to be one of the big mines of Baker county.

SOUTH DAKOTA.

Mr. J. Morgan and James Rogers, of Deadwood, are taking out rich copper ore from their mine almost within the city limits of Deadwood on the south side. Two shafts have been put through, one of them 45 feet. The ore runs as high as 60 per cent copper, and the lowest grade is good enough to ship to the smelter. The mine is located directly on the copper belt.

The best cyaniding ore in the country is thought to be found in the low-grade belt at Ragged Top. It is a lime ore and a very high per cent of extraction is given by the process. The ore does not contain much fine, chunks as large as a person’s hand going through with a high extraction. The ore is porous and the cyanide solution enters freely. The ore in the district is found from the grass roots down to a depth of 4 to 6 feet and it is easily mined.

The successful operation in Lawrence county, which will have a combined capacity of treating 200 tons of ore per day, is in great favor of the process is the cheapness with which a plant can be constructed. Another point in its favor is the small amount of water needed.—Black Hills Mining Review.

UTAH.

Work is being pushed on the Coe property, Dugway district, and fifteen to twenty tons of ore is stacked up now ready for shipment.

At the Buckham, Dugway district, the working shaft is following down a streak of high grade ore, running 80 ounces and over in silver per ton.

On the Nellie, Dugway district, some very fine copper ore is being mined, with increasing quantities and values. Some very fine grade ore, which it is thought will assay very high in gold on the Saddle group.

Owing to the over supply of the Highland Boy smelter, the mill will be able to be operated the longer or two. The mine is supplying ore faster than the smelter can handle it.

At the Black Warrior, the ledge is being crosscut 225 feet from the surface with most gratifying results showing very good looking quartz and iron yielding good assays.

A large force of men are at work on the north and south inclines of the Helvetia. The values continue to improve, and large bodies of good milling ore are being blocked out.

The Crown Point is looking fine. The tunnel is in 500 feet. They have stringers of ore coming in, and it looks as if they will break into bodies of ore at any minute.

WASHINGTON.

The Insurgent.

Big news comes from Republic concerning the recent development of the Insurgent. Since the first of July the value of the property has doubled by the development in following the vein from the Lone Pine side line in the Insurgent. The vein turns towards the north, and is running parallel with the Black Tail vein, where the latter courses through the Insurgent. July 14th, the Spokane office of the company was advised by Superintendent Ryan that the mine showed five feet of ore, carrying higher average values than those yet been found at similar depth for so great a distance in the camp. “It will be remembered,” said President Dennis, of the Insurgent Company, “that the east drift of the Lone Pine, on one of its cross veins, was driven 30 feet beyond the west line of the Insurgent and into the Insurgent ground. The Insurgent company continued this drift in an easterly direction for a distance of about 50 feet, when about July 1 the vein began turning sharply to the north, just as it approached near to the Black Tail vein, which runs in a northwesterly and southerly direction for a distance of 1,000 feet across the Insurgent ground. Instead of intersecting the Black Tail vein, as it was supposed the cross vein would do, it turned to the north and is now running due parallel with the Black Tail vein, both of these veins thus splitting right out.”

The news telephoned by Superintendent Ryan was to the effect that the drift had been driven for 30 feet, following the parallel vein beyond the point where the vein turned, and that its width the entire distance was a clean five feet between clearly defined walls.”

STEADY HIGH VALUES.

In the course of the 30-foot run since July 1, eight sample assays across the full width of the vein have been taken with the following results:

July 1: Silver, $4.05; gold, $75.23; total, $79.28.

July 3: Silver, $4.05; gold, $75.23; total, $80.25.

July 4: Silver, $4.05; gold, $75.23; total, $80.25.

July 5: Silver, $4.05; gold, $75.23; total, $80.25.

July 6: Silver, $4.05; gold, $75.23; total, $80.25.

July 7: Silver, $4.05; gold, $75.23; total, $80.25.

July 8: Silver, $4.05; gold, $75.23; total, $80.25.

July 9: Silver, $4.05; gold, $75.23; total, $80.25.

July 10: Silver, $4.05; gold, $75.23; total, $80.25.

July 11: Silver, $4.05; gold, $75.23; total, $80.25.

July 12: Silver, $4.05; gold, $75.23; total, $80.25.

The average of the eight assays is $57.00, and each assay is reported by the superintendent to be an average of five feet of ore.

WISCONSIN.

North Wisconsin Company Merged Into Chippewa Copper Mining Company.

Secretary Woodward has forwarded a copy of a statement of the plan of transfer of the North Wisconsin Mining Company to the reorganized company, the Chippewa Mining Company. It gives all the details of the transfer, and holders of stock in the old company will soon receive certificates in the new. The new company is to pay all the debts of the North Wisconsin Company and the latter is allotted 1,875 shares in the new company. Walter Fowler made the deal, and is authorized, according to the statement, to issue the vouchers for which stock in the new company will be exchanged as soon as they can be prepared for delivery. The ratio has been decided and Mr. Fowler will make out vouchers at any time. Certificates may be sent to F. E. Woodward, at Boston, if so desired, and the new stock will be sent direct from the Boston office.

FOREIGN MINING NEWS

CANADA.

The most important mining deal that has ever taken place in Ontario has just been closed. The Graham-McKellar group of iron properties on the Atikwan range, consisting of sixteen locations containing 1,200 acres and covering four and one-half miles of the range, has been sold to Ronald Hunter, representing American capitalists, for $325,000 for eighteen months, that the parties may test the properties. The sum of $10,000 was paid in cash for this privilege.

LOWER CALIFORNIA.

It is said, on the authority of Capt. W. M. Freeman of San Diego that negotiations for the sale of four copper mines in Lower California for a half million dollars to Martin, White & Co., of London, England, have been
Wireless telegraphy will perhaps have its first great holding of the National Exposition Exposition, to be held in Philadelphia during the fall. No effort will be made to duplicate the Eiffel Tower, but a structure of some kind is being considered that will hold up a copper wire 1000 feet in the air.

It is claimed by Marconi, the inventor of wireless telegraphy, that if this is done by the Exposition people, he will telegraph by flashes of electricity from the top of Eiffel Tower, in Paris. A feat of this kind successfully performed, will be the wonder of the world and north crossing the ocean from Europe to see.

The Cling Surface Manufacturing Co., of 167-172 Virginia Street, Buffalo, New York, report rapidly increasing sales, not only in this country, but many orders are being received from European, South American, and fast-growing businesses in Mexico, all seeming to prove that "the days of tight belts are over." Having tried Cling Surfaced belts, I have been able to carry full load with 27% sag on belt, with no perceptible slip. It surpasses my expectations and I can cheerfully recommend it to do all that is claimed for it if directions are followed.

**ELECTRICITY IN COAL MINING.**

**BY JOHN FRICK AND FRANK F. THOMPSON.**

The Davis Coal and Coke Company—The Davis Coal and Coke Company's plant at Thomas, West Virginia, is so efficiently equipped with this compound electric service as to be worthy of a short description. The company operates two miles at Thomas, the Thomas drift and the Davis shaft, and one at Cokeston, a drift.

The power station is a roomy brick building containing an Ames 200 hp. engine direct connected to a 150 kw. 500-volt direct-current generator; two Atlas cycloidal heavy duty engines of 150 hp., one of which is belted to a 100 kw. 550-volt three-phase alternator, and the other to a 75 kw. 550-volt direct-current generator. The last mentioned generator has been installed temporarily in the place of one 75 kw. three-phase 550-volt alternator which is driven in parallel with the other three-phase alternator. This 75 kw. machine is used to help the haulage generator.

The coal is brought down from the "rooms" to convenient points where it is collected into "trips" of from six to twelve "wagons." The inside haulage motor, a 15-ton Q. T. M. 35, takes these "trips" and hauls them to a central point of the breast, and there they are combined into larger "trips" of about 15 to 35 wagons and hauled to the mouth of the mine by another similar motor. Each of the haulage motors gives 3,500 lbs. draw-bar pull. At Cokeston, two miles away, another 14-ton haulage motor is installed.

The alternating three-phase generator is used for operating three 10 hp. induction motors for driving small pumps, one 3 hp., one 10 hp., two 20 hp., and eight 32 kw. induction motors for driving elevators; one 5 hp. induction motor for a car lift; and three G. E. chain coal cutters. The induction motors for driving the pumps are located at the foot of the side entry at Thomas and Cokeston. One 10 hp. induction motor connected to a pump having a 5 inch suction 20 feet long, and a 4-inch discharge pipe, 750 feet long, with a total elevation of 96 feet, pumping 106 gallons per minute, was tested and found to take 11,000 watts. Induction motors are also used for driving fans and conveyors which carry the slack coal from beneath the screens to the bins, which is stored until needed to charge the coke ovens.

**Haulage.**—Electric haulage equipments have been so long in use as to be now in a thoroughly good state of development. Even yet, however, the following faults may be observed in some of the machinery: Poorly acting brakes, unwieldy arrangements of the various controlling apparatus, and poles, brake rods or oil projections too close to the track, and unsatisfactory speed and power regulation. Although some of these seem of small importance, any one of them is apt to seriously interfere with efficient work. The brakes on a mining locomotive should be very powerful and quick acting, likewise the arrangement of the motorman's seat, brake handle, controller and switch-box lever should be such that the motorman can control his machine with the greatest possible dispatch and ease. Locomotives have been placed in mines with absolutely no provisions for the motorman, and others where the lever arrangements are so unwieldy as to make the quick control necessary to safe operation impossible.

In large coal operations economy is often to a large extent dependent upon the rapidity with which the wagon trains can be moved. Heavy grades both in favor of and against the locomotive were employed by one company to draw a large load and make quick time. The design and control of the motor should be such as to give an unusually great draw-bar pull at low speed, and at the same time have points for control. This condition is not properly met at present by all of the mining locomotives in operation. In one mine, which has come recently under the writer's observation, a slightly different design and arrangement of control in the locomotive would permit the handling of much larger loads at a great saving.

The power house load curves of haulage are very similar to those of other electric railway work.

**Coal Cutting.**—Under suitable conditions, under-cut coal cutters will permit a great saving of labor, and the money saved, if soft coal mining. But in a large number of cases such cutters have been thrown out as unsatisfactory, and have been replaced by compressed air, jacks, and drags. In mines where curve veins abound, they have ordinarily given much trouble. The cutter strikes the clay vein and sticks, or, worse, bends and breaks. This necessitates digging out with the pickaxe and expensive repairs. The most serious difficulty arises from poor mechanical design and construction, combined sometimes with electrical faults. It should be possible to overcome these difficulties. In one mine where great trouble of this kind was previously experienced a new set of machines is now giving great satisfaction.

In cases where under-cutters cannot be made to work, there seems no valid reason why electric drills could not be employed, which would give as good service as compressed air, while at the same time preserving the valuable advantage of all electric power.

**Electric Pumps.**—Electric pumps run by induction motors give very satisfactory service. The conditions met with in mining often necessitate frequent re-location of the pumps and in this electric pump is by far the most satisfactory. The attention required is certainly a minimum. A particular pump tested ran about ten hours per day, and the only attention required was that necessary for starting, stopping and lubrication. Some mine owners have objected seriously to the electric pumps. In most cases these objections have been due to the absence of a generator or motor.

The discussion of the movement in the mine pump which came under our observation, a 10 hp., pump, which was bought with the motor, was replaced by the water engineers to improve the movement in the service. If electric motors were made to suit the pumps, and not the pumps to suit the motors, it would go far toward obviating the objection. When the pump must be of large capacity, and when it can be located within a reasonable distance of the steam plant, a steam pump would probably show greater economy.

**Hiring and Paying.**—Wages in mines are subject to certain restrictions which do not apply in ordinary wielding. There is no doubt that the 550 volts used for haulage is dangerous for horses. It is therefore customary for many mines to shut off the trolley current while mules are being taken in or out of the mines. If a polyphase system is installed for operating cutters, pumps, etc., in the mine, it should be run through the air courses and not through the main gangway. A pressure of 550 volts alternating is much more dangerous than the same direct current pressure. The polyphase system is employed in the soft coal fields of a low grade of intelligence, and many instances are recorded of serious personal injury or loss of life from accidental or intentional contact with the current. Although the mine laborers may have been repeatedly warned of the danger, they continue careless about the wires. When the mine roof is low enough to be reached by the men, the common practice is to run trolley wire along one side, supported by the usual hangers. When feeders are necessary, they should be run along the same side. The other side of the roof should be kept clear.

Ordinary bare wire is preferable in mine work. The best insulation, rubber compounds, deteriorate rapidly under the action of fire. The shooting brake, if any, has been almost entirely given up. Undercutting by power is in full use in one mine, and the regulation soon becomes inefficient, owing to the moisture which is always present in a mine.

In large operations such as those at Windber, etc., numerous miles of cutting are carried on in one mine. In that case, it is undoubtedly advisable to use at least 500 volts pressure for haulage. The polyphase power should preferably be used at a lower pressure for the sake of safety to employees. This order can be done without an undue expenditure of copper, by carrying high-pressure lines overhead to air ducts, or through unused passages to suitable points for distribution, where the pressure could be
lowered by transformers. When it is necessary to run wires down a shaft through which coal is to be hoisted, the best practice would be to use lead-covered cable, or wire which has been insulated with rubber, heavily braided, and drawn into an iron conduit having the ends hermetically sealed. In many instances steel conduit have been installed without such protection; in old shafts, trouble has resulted from the breaking of the wires, caused by lumps of coal falling down the shafts, etc.

Skilled Employees.—Too much pains cannot be taken to employ careful men as motor men for the haulage motors. The mine track is far from being up to the strictest railway standard. To haul a long trip of wagons on a bad track requires careful handling of the motor. The motor man should be trained to study his track and his load, and know when and where to let his trip run slack and where to keep the couplings taut. A case came under the writer's observation where a careful motor man handled a trip of 13 loaded wagons, while another motor man stalled with 10 wagons on the same stretch of track. This matter is very important from the mine owner's point of view. The cost of driving gangs ways and the overhead cable, or wire road which will allow of an increase in the quantity of coal which can be taken from a single opening in a given time adds very materially to the owners' profits.

Lighting and Signals.—As the lighting of a mine is a comparatively simple matter, it is scarcely necessary to consider it here. The universal method is to light up all switch points and places of expected importance. In large mines using a number of locomotives, an efficient system of signals should be used in the main headings. This should be an automatic block system, A. S. McAlister of Windber, Penn., has worked out such a system, using incandescent lamps between trolley and rails, which is working admirably.

Efficiency.—The question of efficiency, from a fuel standpoint, is of comparatively small relative value, as the difference in actual cost in fuel in the different systems is insufficient when compared with other expenses. Data available seem to indicate, however, that the all-electric systems lead in this respect. As regards the total commercial efficiency, including motive power, labor interest and depreciation, there can be no doubt that the compound electrical system, using polyphase and direct currents, will give the best results.

General.—The data and statements presented in this short paper are gathered from personal experience in the mines, from mine superintendents, and from student work carried on under the supervision of the Pennsylvania State College. In writing the paper it was not intended to give a complete detailed treatise on the use of electricity in mines, but to outline the most important conditions and facts bearing upon such utilizations.

THE SELF-COOLING CONDENSER.

(By Thomas L. Wilkinson.)

The idea of the condenser was to apply currents of air to the heated discharge water of the condenser, and so, in this cooling process, the air becomes the means of condensation, and is actually employed. For this purpose a chamber was built of wood, in such a way the discharge from the condenser should cover large surfaces, allowing ample contact with the current of air supplied by an exhaust fan. As the water in a heated state flows over the surfaces, the air absorbs the heat of the water, and so evaporates. A few feet of air and a small amount of water usually required for condensing purposes. This was the first of the trials which showed that a pound of water condensed a pound of steam. An approximate analysis of the transfer of heat in these experiments, with table of results, are as follows:

<table>
<thead>
<tr>
<th>TABLE OF AVERAGE RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler pressure in lbs. per sq. in. as gauge...... 65</td>
</tr>
<tr>
<td>Temperature in Fahrenheit degrees...... 311</td>
</tr>
<tr>
<td>Steam...... 311</td>
</tr>
<tr>
<td>Cooling water—mild...... 60</td>
</tr>
<tr>
<td>Water in pans above diaphragm...... 140</td>
</tr>
<tr>
<td>Water in pans below diaphragm...... 116</td>
</tr>
<tr>
<td>Air...... 60</td>
</tr>
<tr>
<td>Rev. of exhaust fan per minute...... 740</td>
</tr>
<tr>
<td>Velocity of air in feet per minute...... 2300</td>
</tr>
<tr>
<td>Steam condenser is in feet per min....... 900</td>
</tr>
<tr>
<td>H. P. expended in driving fan...... 1/4</td>
</tr>
<tr>
<td>Barometer in inches...... 28</td>
</tr>
<tr>
<td>Cooling water supplied in lbs...... 1350</td>
</tr>
<tr>
<td>Steam condensed per hour in lbs...... 900</td>
</tr>
<tr>
<td>Vacuum in inches...... 0.6</td>
</tr>
<tr>
<td>Vacuum reduced to Barometer at 30...... 189</td>
</tr>
</tbody>
</table>

APPROXIMATE ANALYSIS.

Heat in 1 lb. steam at 311—1208 B. T. U.

Heat in 1 lb. steam at 190—1490

Heat rejected by 1 lb. steam...... 1208.5—149

If each pound of water evaporated in condenser probably 5.7 lbs. at 140° and 2.7 at 115°.

Heat absorbed by 5.7 lbs. of water in being warmed from 60° to 115°...... 275.5

Heat absorbed by 2.7 lbs. of water being warmed from 60° to 115°...... 15.7

Heat of vaporization of 5.7 lbs...... 290.7

Total heat absorbed by 1 lb. water...... 275.5; 15.7; 290.7; 1095

Thus showing the cooling water to be practically equal to the steam used by the engine. These tests show that the application of methods of this or similar kind to be very economical and at a very small cost.

The floor space required for the cooling apparatus was

Enough was shown by these experiments that this method of cooling was commercially practicable. Two companies have gone into this line, and many power and electric light plants are now using the self-cooling condenser. See issue of July 1st.

The apparatus consists of two parts—the condenser—jet or surface—and the cooling tower.

The cooling tower is now made of sheet iron or boiler plate, and cylindrical in form. The size of the condenser and tower depends upon the size of the plant it is operated with.

The upper three-fourths of the tower is filled with cylindrical tiling, 3 to 6 inches in diameter, and the remaining four-fourths with tiling, 12 to 12 inches long. The tiling is so arranged that the water running down will cover all the exposed surface. At the bottom of the tower is a tank or well, to collect the water from the bottom of the tower, and on the side of the tank is a fan which blows air up through the tower and tiling. The exhaust from the engine passes into the condenser, enter with the injection water, it is condensed. This condensed steam and injection water then enters the tower, at the side and above the fan, and passes up through a central pipe, to a revolving distributor, near the top of the tank, just above the tiling. This distributor is mounted on ball bearings, and has four arms of piping, perforated, and swings or revolves in a manner similar to the water distributor, as the flow of water being on the tiling and are uniformly distributed. As the heated water runs down through the tiling the fan is blowing air up through the tower, and depriving the water of its heat and evaporating some.

Three factors enter into the cooling of the water:

I. Radiation from the sides of the tower.

II. Contact of the cool air blown through the tower.

III. Evaporation.

Evaporation is the most important of the three, as the evaporation of one pound of water in this way carries off 1,000 heat units, and condenses one pound of steam in the condenser.

Considerable cooling is done by radiation and contact of the cool air blown through the tower, so that the evaporation will be less in the condenser, and so the supply of extra water is not needed.

The cooled water is collected at the bottom of the tower, and ready once more to serve as injection water to the condenser. An overflow pipe is provided to carry off oil that collects.

The floor space occupied by the tower is not excessive. A 1,000 horse-power plant will require a tower 17 feet in diameter by 30 feet high. The collecting tank at the bottom of the tower is about 8 feet in diameter by 7 feet deep, and holds about 2,000 gallons of water, which is sufficient to start the plant.

The power to run the fan will be 2 per cent and under of the power of the electric light and may be operated by electricity, shaft and belting, or a small independent steam engine, as may be most desirable.

In some experiments made by Mr. Albegov, the temperature of the cooled water, observed under different ranges of temperature of the air are as follows:

<table>
<thead>
<tr>
<th>Difference Between</th>
<th>Temp. of Air</th>
<th>Cooled Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° F.</td>
<td>45° F.</td>
<td>25° F.</td>
</tr>
<tr>
<td>30°</td>
<td>60°</td>
<td>30°</td>
</tr>
<tr>
<td>40°</td>
<td>66°</td>
<td>40°</td>
</tr>
<tr>
<td>50°</td>
<td>72°</td>
<td>50°</td>
</tr>
<tr>
<td>60°</td>
<td>78°</td>
<td>60°</td>
</tr>
<tr>
<td>70°</td>
<td>85°</td>
<td>70°</td>
</tr>
<tr>
<td>80°</td>
<td>97°</td>
<td>80°</td>
</tr>
<tr>
<td>90°</td>
<td>105°</td>
<td>90°</td>
</tr>
<tr>
<td>95°</td>
<td>110°</td>
<td>95°</td>
</tr>
</tbody>
</table>

It will be noticed that, as the temperature of the air increases, the temperature of the cooled water becomes nearer that of the former. With the temperature at 20 degrees Fahren, there is a difference of 25 degrees, and at 95 degrees Fahren, the difference is only 5 degrees, when circulating practically the same volume of air, and carrying off the same amount of heat, the circulation of the water being reduced as the temperature is lowered. This shows plainly the activeness of the evaporation at the higher temperatures, when the air has a largely increased capacity for moisture.

In this high altitude, (Colorado) where the air is almost always very dry, its capacity for absorbing moisture is extremely large. The result would indicate a better showing than indicated by the above table.

Of a large plant, in which this system of using the water over and over again has been in constant use since 1895, some figures will be given:

The cooling tower was placed in the yard...
back of the plant, about 60 feet from the condenser. Compound engines, with a total of 750 H. P., were employed, and during the hot months a vacuum of 25 and 26 inches was easily maintained. The cooling tower is 15 feet in diameter by 33 feet high. The cir-
culating water amounts to 1,000 gallons per minute, and the fan circulates about 100,000 cubic feet of air per minute. The whole sys-
tem consumes about 1,000 gallons of water per hour. The tempera-
ture of the tank varies from 50° to 72° Fahr. The water to be distributed in the cooling tower comes in at 110° to 115° Fahr.

I have worked up some data, given by Mr. Alberger, in reference to this system, em-
ployed by an eastern manufacturing concern.

The engine is a cross compound, Harris Corliss, having a 16x36-inch high-pressure steam cylinder and a 30x36-inch low-pressure steam cylinder, making 80 revolutions per minute, with 100 pounds boiler pressure.

The engine running non-condensing gave the cards showing the following:
The power horse of the high-pressure cylin-
der was 209.06 and that of the low-pressure cylinder was a total of 175.2 H. P., when running non-condensing.

The average mean effective pressure of the high-pressure cylinder was 36 pounds, and that of the low-pressure cylinder was 6,755 pounds.

In '95 this engine was changed from run-
ning non-condensing to condensing. A con-
denser was put in, and the cooling tower was placed some 150 feet from the condenser, the circulating fan being run by an extension of the shifting from the factory. The speed of the fan should be regulated to suit the conditions of the weather, or could be stopped at any time.

In running non-condensing the steam was admitted for 15 inches of the stroke, while condensing it was admitted but 9 inches, showing a saving of 6 inches, or a saving of 40 per cent, roughly. Cylinder condensation was slightly increased on account of terminal pressures on.

The fan consumed about 2 per cent of the power under the most severe conditions. The air-pump consumed 4.7 H. P., or less than 3 per cent of the total H. P. of the main engine. The total saving in the cost of power is through the adoption of the condenser, which also saves 35 per cent, or an extremely good showing for condensation by this system.

The data, taken while the engine was running non-condensing, show that the high-pressure cylinder developed 105.28 indicated horse-
power, and the low pressure cylinder 90.6 in-
dicated horse-power, or a total of 195.88, as 175.20 indicated horse-power non-condensing.

In both cases, the engine, aside from condensing, was operated under the same conditions of pressure and speed.

The difference, then, of 50.88 horse-power, in favor of condensing, shows an advantage of nearly 12 per cent in power. As the number of cards were limited, and more and better cards might be obtained, an equation of gain and loss percentage by this condensing system. Even 12 per cent would, in my judgment, warrant the introduction of this condensing system.

The gain of 35 per cent, as shown by Mr. Alberger, relates, of course, to the steam saving, while the 12 per cent saving in power, as shown by my figures, results in more power on less steam.

Mr. J. H. Vail, Engineer in Chief of the Penn. Light, Heat & Power Co., of Philadel-
phia, in his paper on "Cooling Tower and Condenser Installation," describes the instal-
lalion of this system of condensation.

The plant in question was equipped with 27 boilers, each 48 inches in diameter, 20 feet long, with 5-inch tubes. The en-
gine capacity, and the load on the station, taxed all the boilers to the limit of their steam capacity.

It was first proposed to enlarge the building and increase the number of boilers, but after an investigation by Mr. Vail, it was de-
cided to put in a cooling tower and condensers, leaving the plant as it was, thus saving the cost of additional boilers, be-
side the building, and obtaining a better economy, and, at the same time, greater capa-
city for production.

(Two Continued.)

Latest Mining Decisions.


A temporary injunction against the re-
move of ore from the mining land of a com-
plainant will not be dissolved because of de-

A mine owner is liable for the death of an employee caused by the superintendent's failure to do what due diligence required of him, be-
cause he was acting under exciement. Bessemer Land and Improvement Co. v. Campbell, 25 So. Rep. (Ala.) 753.

A mine superintendent will be presumed to have authority to purchase all appliances necessary to extinguish a fire to save the life of an employe, in the absence of evidence to the contrary. Bessemer Land and Improvement Co. v. Campbell, 25 So. Rep. (Ala.) 753.

Absent an employer's failure to use due diligence in rescuing an employe while in a mine in which a fire is started is not excused by his acting pursuant to the unanimous opinion of other operatives. Bessemer Land and Improvement Co. v. Campbell, 25 So. Rep. (Ala.) 753.

An employe, placed in imminent peril, is not guilty of contributory negligence, pre-
cluding a recovery for his employe's neglig-
ently causing a fire. Mettler v. K scaffolding, 47 C. C. 753.

A fire originated in the middle of a mine, and volumes of smoke rose from the air shaft. A short time thereafter men passed up a shaft filled with live steam, with much difficulty with smoke, until they reached a point opposite the fire. There were no appli-
cances at hand for extinguishing the fire by water, but they could have been obtained in a short time. One at the bot-
tom of the mine, 400 feet below the fire, could have lived several days while the fire was raging, if it had originated in the air shaft, instead of on the slope, and the air shaft was large enough to carry the smoke and gases as rapidly as they were generated. The mine superintendent smothered the fire by scaling up the air shaft and slope, and an employe who was below the fire was suffocated. Held, a question for the jury whether the superintendent was guilty of negligence justifying a recovery. Bessemer Land and Improvement Co. v. Campbell, 25 So. Rep. (Ala.) 753.

PERSONAL NEWS ITEMS

Don Manuel Tamberiel of Sierra Pinta mine in the early days of Sonora, Mexico, has gone to Guatemala, to attend to the shipping of a consignment of machinery to the mine, which is about eleven leagues from the coast.

Hon. R. C. Chambers, of Salt Lake City, Utah, has recently returned from San Francisco, Cal.

R. H. Postlethwaite of San Francisco, Cal, re-
cently left for Breckenridge, Colo., to install the third dredger in the placer mine of the North American Gold Dredging Co. Last year the Rylon Iron Works of San Francisco, Cal., placed two of these dredgers in position.

J. J. Poole of Altar, Sonora, Mex., has recently sold old gold property in the vicinity of that place for $17,000.

Jas. Donohue has been appointed superintendent of the Mammoth mine under the new management.

Major J. E. Jackson, who for some time past has been associated with the Brumit Kansas Mining and Refining Co., at Salt Lake City, Utah, has recently been appointed manager of the San Juan Ore Co., with headquarters in the City of Mexico.

W. H. Hampton and C. T. Stevenson of Grants Pass, Oregon, recently left that place for a business trip through California.

Capt. Delamar and John Hays Hammond are expected in California next week.
The Markets.

**LEAD.**
There is an accumulation of lead in New York City, and free offerings at 4.82¢ to 4.45¢. The London market is unchanged. Spanish lead being quoted at £1.83, 9d., £1.84, and £1.86.

**SPOONER.**
Under free offerings, prices declined further. Spooner is quoted at 6¢, 6¢, 6¢, 5¢, and 5¢ in New York, and 5¢. St. Louis ordnance in London being quoted at £2.7, with specials £2.5¢.

**ANTIMONY.**
Antimony continues in demand, with prices unchanged at 10½¢. Oxidum is 10¢ for Hallett’s, “C.U.S.” and Hungarian.

**NICKEL.**
Nickel continues unchanged and no alteration of prices can be reported. We quote for tons lots 35¢ to 36¢ per lb., and for smaller orders 34¢ to 35¢.

**TIN.**
The market has moved but sluggishly, and prices have changed little. The London market is quoted in closing at £1.16 2d., 6d., £1.15 6d., for spot and £1.16 6d. higher for three months.

**POTASSIUM CHLORIDE.**
Purified, 80¢ per cent, in cases of 120 lbs. at 80¢, 10¢ per lb., 90¢, 10¢ per lb., 80¢ to 90¢ per lb.

**Quicksilver.**
The New York quotation remains 42¢ per flask. The London price has advanced to £5.56, with 6¢, 8¢, quoted for second hands.

**Wood.**
F. O. B., San Francisco: No. 1, 70 per cent, in carload lots, 1.25¢; less than one ton, 1.15¢.

**Chlorate of Potash.**
For crystal, domestic, §8¢ to $9.25, and for powdered, $9.50 to $9.75.

**Salts.**
Quoted at 50c, per 100 lbs., 60¢ to 80¢, in New York for foreign. Bicarbonate of soda is quoted at $1.12 to $1.25, and for 100 lbs., 80¢ to 90¢. We quote for foreign (exclusive), $2.25 to $2.50, and for domestic, $8.25 to $8.50.

**Chlorides.**
The British market is firm. Bicarbonate of soda is quoted at $1.12 to $1.25, and for foreign, $2.25 to $2.50.

The Silver market has ruled dull, but the reports of the slumping in the Colorado market, on account of the labor strikes, silver prices higher and stronger, and the possibility of reduced supplies may affect the London market.

The copper market continues quiet. The buyers are consulted and not inclined to purchase, while no pressure to sell is observable. Lake copper is quoted at 12c., but a few transactions are reported at 11¾c. Very little is doing in electrolytic copper, the quotation is still 11¾c. for cables, wire, and bar copper, and 12½c. for cathodes, while casting copper is nominal at 12½c. and 13½c.

**ACIDS.**
Sulphuric acid is in better request, owing to the warm weather, but blue vitriol is quiet. The other acids are featureless.

**Bismuth.**
Bismuth is quiet, with no arrivals. High grade high purity is quoted $2.40 to $2.50, and for ordinary grade, $2.10 to $2.20 per ton.

**Nitrate of Soda.**
Spot is quoted at $1.05 to $1.10 per 100 lbs., and futures at $1.20.

**ALUMINUM.**
In cans, in 100 lbs. at 50¢, 60¢, 70¢ per lb., 80¢, 90¢ per lb., 90¢, 100¢ per lb., 100¢, 110¢ per lb., 110¢, and 120¢ per lb.

**COPPER.**
In cans, in 100 lbs. at 50¢, 60¢, 70¢ per lb., 80¢, 90¢ per lb., 90¢, 100¢ per lb., 100¢, 110¢ per lb., 110¢, and 120¢ per lb.

**Boron.**
The San Francisco market in Borax is firm with a good demand, powdered refined in car lots 75¢.

**The Minor Metals.**
These are quoted below for New York delivery:
- Aluminium: $1.00 per cent, ingots, per lb., 10¢, 9¢, 8¢
- Rolled sheets, per lb., 10¢, 9¢, 8¢
- Aluminium, pack, per lb., 10¢, 9¢, 8¢
- Copper, per lb., 10¢, 9¢, 8¢
- Zinc, per lb., 10¢, 9¢, 8¢
- Lead, per lb., 10¢, 9¢, 8¢
- Tin, per lb., 10¢, 9¢, 8¢

**Potassium Chlorate.**
Purified, 80¢ per cent, in cases of 120 lbs. at 80¢, 10¢ per lb., 90¢, 10¢ per lb., 80¢ to 90¢ per lb.

**Quick Silver.**
The New York quotation remains 42¢ per flask. The London price has advanced to £5.56, with 6¢, 8¢, quoted for second hands.

**Wood.**
F. O. B., San Francisco: No. 1, 70 per cent, in carload lots, 1.25¢; less than one ton, 1.15¢.

**Chlorate of Potash.**
For crystal, domestic, §8¢ to $9.25, and for powdered, $9.50 to $9.75.

**Salts.**
Quoted at 50c, per 100 lbs., 60¢ to 80¢, in New York for foreign. Bicarbonate of soda is quoted at $1.12 to $1.25, and for foreign, $2.25 to $2.50. We quote for domestic, $8.25 to $8.50, and for powdered, $9.00 to $9.25.

**Chlorides.**
The British market is firm. Bicarbonate of soda is quoted at $1.12 to $1.25, and for foreign, $2.25 to $2.50.
The Cleveland Mining and Stock Exchange Co.
New England Building, Cleveland, Ohio.
A reliable Information Bureau for Miners and Investors to obtain FACTS Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Norgren-Watson Mining and Construction Co.
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We Buy, Sell, and Negotiate sales of mining and other stocks.
We Furnish Capital to work good mines under special arrangement.

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MERCU:
The Johannesburg of America, New and Wonderful Camp only 45 miles from Salt Lake City, Utah.

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The Greatest Gold Camp in the World, only six years old and two hundred shipping mines in the district.

R. M. BURKLEIGH, GENERAL PASSENGER AGENT,
Salt Lake City, Utah.

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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works, in the Parker Ranch, Santa Fe, N. M., for the largest oil field in the world. It pumps 150,000 barrels of oil per day. The engines work at a speed of 1,400 revolutions per minute, 33 feet high. Burn Gasoline or Distillate oil. Chas. G. Parker, owner. Hercules, Gasoline and Oil Engines, 2 to 600 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 200 Bay St., San Francisco.

COPPER MINE. State full particulars in regard to development work in- motion, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 5000 feet of development work. Send full information possible. Address, JAMES HOWARD, CARE OF JOURNAL, 150 Nassau St., New York, N. Y.

GOLD mine anywhere in United States, must have at least 1000 feet of development; where coal is not over $6.00 per ton or wood 44 per cent delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working hand; no property considered unless owners are prepared to deposit for cash in proportion to amount paid out of pocket money. Address, H. E. Roberts, 205 S. Main St., Denver, Colo.

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Prospects very fair location of this nature and willing to sell upon cash terms, full or 1/2 down, 1/2 balance in 2 years. Address, J. D. C., Imperial City, Mo.

BISMUTH.
Prospects very fair location of this nature and willing to sell on cash terms, full or 1/2 down, 1/2 balance to be paid in 2 years. Address, J. D. C., Imperial City, Mo.

FOR SALE:
A 100-ton copper smelting plant, containing a 50-ton furnace, one of which has new lining and an 8-ton furnace. Each is equipped with all necessary auxiliaries and machinery. Also a 50-ton sulfur furnace, recently erected. Also two new 50-ton furnaces. Address, J. D. C., Imperial City, Mo.

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Complete mill for testing ores on practical scale by all processes. Determinate best process adopted after any ore submitted. Send for free estimate. Price from $100 to $500. Address, Ricketts & Banks, Metallurgists & Chemists, New York City.

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HOISTING MACHINERY
Ore Cars, Ore Buckets and Steel Rails
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# INCORPORATED MINES PAYING DIVIDENDS.

<table>
<thead>
<tr>
<th>Names of Mines</th>
<th>Location</th>
<th>No. of Shares</th>
<th>Capital Stock</th>
<th>Par Value</th>
<th>Amount of Dividend</th>
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*S. Silver; G. Gold; L. Lead; Q. Copper; Z. Quicksilver; I. Iron; Z. Zinc.*

Note: Paid since consolidation, 1,065,000; Republic paid $120,000 under old management.
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Patented

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29 Hay St., LOS ANGELES

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Twenty-six Medals Awarded.
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E. G. DENNISTON, Proprietor

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Manager of the Bi-Metallic Assay Office and Chemical Laboratory
Analyzing of Ore, Farm Products, Etc.
Analyses of Gems and Jewelry Carefully Made
Formerly Underground and surface surveyor for the Cominco and Almo Coal Co.,
Nelson, B.C., and a mining and chemical engineer for the mining and smelting interests of different British Columbia.
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The JACKSON DRILL and M'F'G. CO.

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The Jackson Drill & Mfg. Co., Denver, Colo.,

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Jackson Hand Power Rock Drills for ten days in the
Humbolt mine, at Lambertie, Colo., and find the mach
ine equal to all you claim for it. We drilled thirty-six
inches per hour in blue granite and spar, and that with
poor steel. The machine will beat this under ordinary
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Yours respectfully,
(Signed) F. J. Hughes.

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Highest Premium at World's Fair
800,000 HORSE POWER IN USE

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