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We have to apologize for some delays in the filling of orders for *The Mineral Industry*, Volume IV. The fact is that the demand for the book has been so great and the orders for copies have come in so fast that our binders have for the time been unable to keep up with the calls upon them. The delay, however, will now be short, and we have made arrangements to avoid it in future and to fill all orders promptly.

We may be permitted here to acknowledge the very enthusiastic reception which the book has met with, and to return our thanks for the many appreciative letters we have received concerning it and the kind expressions with regard to the value of the contributions of the many able experts whose papers appear in it. These testimonials have given us very great satisfaction, and have encouraged us in the determination to make Volume V.—and we hope each succeeding volume also—an advance over all its predecessors in the value and interest of its contents.

We give up a good deal of space this week to a description of the great electrolytic copper refinery of the Anaconda Company in Montana. In this new plant, no account of which has heretofore been published, Mr. Hermann Thofehn, the engineer who designed it, superintended its construction and managed it in operation, has introduced all the latest improvements in copper refining, including many of his own devising. It is of great interest, not only because it is far the largest plant of the kind in existence, but also because it is one of the best and most economical in its workings, due allowance being made for the comparatively high rates which must be paid for wages, fuel and supplies in Montana.

The situation at Leadville, Colo., continues apparently almost hopeless. In response to the attempts made to negotiate a compromise, the Miners' Union has this week issued a card offering to lease all of what are known as the "down-town" mines, drain and work them, paying the owners 25 per cent. royalty and paying at the rate of \$3 per day for all labor. Probably it was not expected that this proposition would be accepted. Nothing is said about responsibility for damage or loss, in case such should come. The worst point at present is the tendency to violence, several small outbreaks having occurred, while the local authorities are much disturbed over the prospect. Some dissension has been reported in the Miners' Union itself, but the majority is still in favor of holding out; and seems strong enough to suppress all opposition to this course.

Prophecy and event, estimate and result, are so often very far apart, especially in mining matters, that an instance of the other kind is well worth recording when it happens. When Dr. E. D. Peters, Jr., the well-known copper metallurgist, made an examination of the Mt. Lyell mines in Tasmania in the spring of 1893, his estimate of the yield to be obtained from the ores was 4½ per cent. copper, 3 ounces silver and 2½ pennyweights gold to the ton. Now, three years later, we have reports of the results from the furnaces in actual working, and they give 4½ per cent. copper, 3½ ounces silver and 2 pennyweights gold to the ton. So close an agreement is extraordinary and shows the care and accuracy of Dr. Peters' work in a remarkable way. Credit is due also to Mr. Sticht, the manager, for the success with which he has carried on the working operations at Mt. Lyell.

The copper production of the United States in August, as reported by Mr. John Stanton for the producers, showed only a comparatively small increase over that of last year, indicating some diminution in activity at the mines. For the eight months ending with August, the total production of copper in this country has been, according to the same authority, 134,775 long tons, an increase of no less than 26,049 tons, or 24 per cent. over the corresponding period of last year. So great a comparative gain shows the capacity of our producers.

Large as this increase has been, it has not kept pace with that in exports. These have amounted this year to 98,322 tons, or 58 per cent. of the total production, these figures showing an excess over last year's of 34,301 tons, or 78 per cent. The increase in exports was greater by 8,252 tons than that in production. The foreign output this year shows only a very slight change—a gain of 1 per cent.—but the consumption in Europe has evidently grown in an extraordinary way, since the stocks reported on hand have not increased since the beginning of the year, notwithstanding our heavy shipments.

The fact that the British Association for the Advancement of Science will hold its summer meeting for 1897 in Toronto has called out from Canada a proposal that a joint meeting or meetings shall be held in the Dominion in which the American Institute of Mining Engineers, the British Iron and Steel Institute, the different associations of mining engineers in Canada and the Federated Institution of Mining Engineers of Great Britain are to be asked to join. In case the proposition is accepted arrangements will be made for a number of trips and excursions which will enable the visitors from abroad to study for themselves the mineral resources of the Dominion.

The British Iron and Steel Institute, by the way, is given to excur-

sions into foreign countries. Last year the members "invaded the enemy's territory" by holding a meeting in Belgium, where the iron-masters are very active rivals for trade with their English brethren; and this year the Institute has just completed a meeting in Spain, where the members have been visiting the mines from which they draw a very considerable proportion of their iron-ore supply.

#### Coal Mining Wages in the West.

Coal mining in the Pittsburg District of Pennsylvania is not as prosperous as it might be, and a meeting of miners held this week took the somewhat unusual action of voting by a large majority to accept a reduction in the wages for mining to 54 cents a ton. This is a drop of 16 cents from the 70-cent rate which has generally prevailed throughout the district nearly all this year. The avowed object of the vote is to permit the operators of the union mines to compete with certain outside mines, which have been cutting the wage-scale agreed upon by the miners and operators. In addition to this, the miners announced their willingness to accept a further reduction in case the New York & Cleveland Gas Coal Company—which operates the principal non-union mines—attempts to go below the 54-cent rate. That is, the men agree to join with the operators in any reduction needed to meet this competition.

The effect of this action will be felt all through the West. With Pittsburg working on a 54-cent scale it will be impossible for the Ohio and Indiana operators to continue paying the present rates. The Laketrade for the season is nearly over, but the competition for the winter trade to Chicago and Upper Mississippi River points is usually very keen, and a small difference will enable Pittsburg coal to come into those markets. It remains to be seen whether the Ohio and Indiana miners will follow the example of their Pittsburg brethren, or whether they will hold out for present mining rates, which have already lost them much trade. West Virginia is now taking the trade from Pennsylvania as well as from Illinois, Ohio and Indiana. West Virginia coal long since captured the orders for nearly every public building in Chicago, and is at the present time closing contracts with school boards even in Minnesota. With the rate for mining and loading coal in many West Virginia mines at least as low as 25 cents per long ton, and the quality of the coal unsurpassed, it is no wonder the mine-owners of Illinois, Ohio and Western Pennsylvania are finding it impossible to meet the market, and the miners show rare wisdom in coming to their aid.

#### The Institute Meeting in Denver.

The meeting of the American Institute of Mining Engineers, to occur in Denver September 21st, will be the third which that organization has held in Colorado. The first was in 1882 and the second in 1889. The mining development and the metallurgical progress marking these intervening periods of seven years have been worthy of the most energetic of the great States of the West. Colorado has won a first place amid the mineral empires of the new world, not only by the value of her production and the variety of her products, but also by reason of the skillful methods employed in the winning of the wealth which seams the snowy-crested mountains of her magnificent domain.

In 1882 Colorado's silver yield was 13,600,000 ounces and her gold product was valued at \$3,360,000; in 1889 the silver output was 18,375,551 ounces and the gold amounted to \$3,883,859. In 1895 the silver fell to 17,891,626 ounces and the gold had risen to \$13,559,954. No rhetoric can be more forceful than these eloquent figures.

The captains who direct the movements of the complex industrial machinery which is instrumental in the winning and reduction of the ores of the mines that stretch in an unbroken chain from the borders of Wyoming to the frontier of New Mexico will welcome the visit of an institute of which most of them are members. The opportunity offered to meet fellow workers in the same field of useful activity and the chance of interchanging their experiences with those of other regions will be no less welcome than profitable. There is assuredly no waste more deplorable than the waste of experience, which in mining is expensive, because so often only to be won at much cost of time and money. That afforded by profitless effort is not the least valuable, because it points out lines of action which lead to eventual success.

There is no more useful method of aiding the industry than the interchange of ideas among men who have the direction of enterprises of much moment and the spending of that capital which seeks an avenue of investment in business-like ventures of sound merit.

In the great work of disseminating accurate knowledge the Institute has taken a noble part. In its multitudinous papers there is to be found a record of the conquest of man over matter, of lessening costs in ore winning and of more skillful ways in their reduction. The keynote of the life of the great Huxley—to endeavor to spread accurate knowledge—has been likewise the dominant note of the work which Dr. Raymond, as the secretary of the Institute, has directed.

Nor does the Institute limit its utility to those who are technically

trained. Its spirit is more catholic than that of the younger societies in England and Australia, which have paid it the flattery of imitating its general plan. All who are actually engaged in mining and metallurgical work are eligible, whether graduated by the school or graduated by the furnace and the mine. Science to-day knows no hierophants to whom only its archives are to be accessible. Its mission is as broad as humanity and as generous as the sun. Mining is a business and an industry founded on facts, although carried on in a veritable fog of suppositions. The more it is based on properly determined facts the more successful it will be, and in the determination of these facts the observer underground can be no less helpful than the student in the laboratory. The Institute welcomes one as much as the other and enables them to meet so as to promote that interchange of ideas which is not the least of the many gifts of our modern civilization.

#### The Uses of Meetings.

No engineer will be found at the present day who will seriously question the great usefulness of technical societies. The advantages which they afford for the exchange of experiences, for mutual acquaintance and consultation cannot be over-rated. Mining, civil and mechanical engineers alike fully appreciate these advantages, though many of them do not use them to as full an extent as they might. Among these technical associations the American Institute of Mining Engineers has always maintained a leading position. The strong interest felt and shown in the society by a large proportion of its members, and the ability and devotion of its secretary, have both aided in maintaining a high standard of performance, so that the volumes of its *Proceedings* contain a body of technical and practical information of the very highest professional value.

Nevertheless, it seems to us that, admitting the excellence of the work done by the Institute, there is room for some improvement, and there are certain tendencies which might be checked, or at least controlled, with advantage. These tendencies are most apparent at the half-yearly meetings, and are not peculiar to the Institute, but are, in a greater or less degree, apparent in its sister societies as well.

The meetings of the Institute are usually held at some mining or industrial center, and a large part of the time is always spent in visiting mines, mills or furnaces, leaving comparatively a small share for the sessions in which the business is transacted. We do not question at all the usefulness or attractiveness of such visits and inspections, which may enable many members to compare methods and obtain hints for their future guidance, but they do seriously reduce the actual working time. The duration of a meeting is necessarily limited to about five days, since very few of the members can give up more than a week to their attendance, including the time spent in coming and in returning to their posts. During the week not more than five or six sessions are usually held, and one of these must be given up to the transaction of the necessary routine business, leaving only four or five for the technical work. Very often, also, these sessions are held in the evening, when most of the members are tired out by a long day's excursion, and are really unable to give full attention to the work in hand.

The second point to which we refer is the increase in the number of papers presented. The written paper may be valuable in itself, and it has also the advantage that it enables the member who cannot attend in person to present his experiences and the conclusions he may draw from them to his brethren. In very many cases, however, the paper itself is valuable only or chiefly in calling out discussion. Now a written discussion, which is the form chiefly used, is apt to be slow and somewhat tedious and to excite little attention and interest. A sharp verbal debate, either on a paper or report, or on a technical question submitted, often brings out more valuable information and more records of experience than can be obtained in any other way.

The Mechanical Engineers have, we believe, found that the submission of what they call "topical questions," or selected subjects for discussion, has added much to the interest of the meetings. A less severely technical society, the Railroad Master Mechanics' Association, has done its best work in discussion; and other instances might be given.

The objection to this is that comparatively few of the members are able to attend such meetings; but there are very few—if any—meetings at which there are not enough present to make an interesting discussion on any point of interest. Under the present system there is really no opportunity or time to do this, although under the excellent plan adopted of supplying copies of papers in advance, it is possible for any member to prepare himself for discussion or criticism.

We may be also, perhaps, permitted to ask whether a part, at least, of the work which now goes into the papers, which meet, after all, with but little attention, would not be of more service to the profession and to the mining public if they appeared in the columns of the technical journal, which is a prompt and regular visitor, is more sure of a reading than the volumes of *Transactions*, and presents the best and freshest record of progress. The true object of the Institute is not simply to increase the

bulk of these volumes; it is to promote intercourse and that friction of mind against mind which brings out so often the best of which each is capable. Under the present arrangement of the meetings the opportunity for this is reduced to a minimum, and a change, we believe, is greatly to be desired in this direction.

We do not desire in any way even to suggest an antagonism between the work of the Institute and that of the *Engineering and Mining Journal* as the representative journal of the mining industry. Each can most effectively aid and supplement the work of the other. The suggestions above made are in a spirit of the most friendly criticism, and we trust that they will be so accepted and considered by all concerned.

NEW PUBLICATIONS.

UNIVERSAL BIMETALLISM AND AN INTERNATIONAL MONETARY CLEARING HOUSE. Second Edition. By Richard P. Rothwell. New York and London. The Scientific Publishing Company. Pages 64. Price, 50 cents.

In the battle of the standards which is now raging we have been deluged with literature of all sorts and conditions—chiefly bad. The advocates of gold and silver both have written and continue to write books, large and small, the reading of which, if a man seeks after knowledge and tries them all, may leave him at the end in a state of mind seven times more muddled than before. The reason of this is easy to see, since neither goldite or silverite can, in the nature of things write—nor perhaps see—a clear and full statement of his side. There must be a certain amount of suppression and of misrepresentation on one side or the other; not, perhaps, willful, but existing rather in the mind or ideas of the writer, who cannot see or comprehend both sides of the question, or fully appreciate how strong are the arguments which make for the other side to that which he may have adopted.

In all this din of argument, spoken and written, we are in great danger of losing sight of the true solution of the great question, which, as a follower of many close students and acute thinkers I believe to be neither in a gold nor a silver standard, but in a true and intelligent bimetalism; in the use of both the metals which many centuries of custom and tradition have established in men's minds as precious metals and representatives of value. The problem must be solved, not by rejecting one nor the other, but by the proper and orderly use of both; and until we can agree upon this we shall have no lasting settlement.

Believing this, both because it appears to me right and reasonable, and likewise because I know it to be the conviction of a number of able and earnest men, I am much pleased to note the appearance of a new edition of this book, and to understand that its timely publication was due to a demand upon the publishers so extraordinary that it could not be supplied without a new issue, and also to the desire of the author to bring the facts given as the basis of his argument up to the present date.

The adoption of international bimetalism has been delayed, and the various conferences heretofore held to consider it have failed, partly because of unreasoning opposition from certain quarters, but more, perhaps, because at none of these conferences has anyone presented a comprehensive and practicable plan for carrying the reform into effect. We have had balances and compromises suggested, but none which could be adopted. They all failed to meet the case, either because they were inherently unfair to one party or another, or because they were merely temporary expedients, which long-headed financiers could see were sure to break down in practical use. No arbitrary adjustment of ratios, nor patched-up compromise can last in this case; the successful plan must be simple and must also carry in itself the means of adjustment to the varying conditions which may arise hereafter.

When the first edition of this book appeared it seemed to me that it presented a thoroughly practical working plan, under which international bimetalism could be made a working system, not only without disturbing the commercial and financial affairs of the world—both national and international—but to their great and lasting benefit. The international monetary clearing-house plan which it outlines is certainly simple, practical and most clearly self-adjusting and able to meet all possible contingencies. It follows the lines of all successful reforms in working upward from the less to the greater, and applies to international business the plan which has worked so well between banks and business men. This plan is supported by solid arguments, and the author has not been afraid to give us the fullest possible statement of facts. Such an assembly of information, indeed, is not to be found in any of the books on the financial question which I have yet found, and for this reason alone the present one should be in the hands of every one who is interested; and that means nearly all of us this year.

I most certainly hope that the demand for this book will not only keep up, but increase, for it is one that everybody ought to read and then to keep by him for reference. The facts are given by themselves, so that the reader can study them apart from the discussion, if he wishes. It is pretty good testimony to the soundness of the application that the many events of the three years which have passed since the first edition was published have shown no reason for changing its terms, and it stands now as it did then. Time has only proved its soundness and increased the urgency of the reasons for the adoption of the plan. C. T.

BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review on another page of the Journal.

- Fortschritte der Elektrotechnik*, 1894. Edited by Dr. Karl Kahle. Berlin, Germany; Julius Springer. Pages, 155.
- Poor's Manual of the Railroads of the United States. Twenty-Ninth Annual Number*, 1896. New York; H. V. & H. W. Poor. Pages, 1,670. Price, \$5.
- Geological Survey of Alabama, Bulletin No. 5. Preliminary Report on the Mineral Resources of the Upper Gold Belt*. By Eugene Allen Smith, State Geologist. Montgomery, Ala.; State Printer. Pages 198; illustrated.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

National Ore and Reduction Company.

Sir: We observe in the number of the *Engineering and Mining Journal* for August 22d a notice with reference to the National Ore and Reduction Company. As a wrong impression in relation to our connection with said company would naturally be inferred, we beg to explain the matter, and ask you to kindly correct the same in a future issue. Since the National Ore and Reduction Company appointed us its agents and sent out circulars with our name on them, we have made every endeavor to find out fully their standing and absolutely declined to recommend their furnaces, or in any way to do business for them until satisfied. We have, of course, now resigned the agency. MACFARLANE & CO. VANCOUVER, B. C., Aug. 27, 1896.

COLORADO, 1889-1896.

Written for the *Engineering and Mining Journal* by T. A. Rickard.

The meeting of the American Institute of Mining Engineers recalls the fact that it is seven years since that eminently useful organization has held a session in Colorado.

The anticipation of this interesting gathering provokes a retrospect of the years which have lapsed and a consideration of the features which will be of the most interest to our visitors.

In the unresting march of development seven years is sufficient to cover some startling changes in the conditions governing the mining industry of such a State as Colorado. In 1889 Creede was undiscovered and Cripple Creek unknown. Leadville and Aspen were splendidly prosperous. The mines of Clear Creek were being developed with a cheerful activity unsuspecting of the silver collapse to come and old Gilpin was still quietly holding the first place as a gold-producing district.

Other times, other prices.—During the year 1889 silver sold for 93¢. Last year the price averaged 65¢. This brutal fact more than aught else explains the changed conditions marking the mining industry of today as compared with that of seven years ago. To it is traceable the diminution of exploration in our silver-producing regions and the transference of activity from the mines producing the discredited metal to those whose output is chiefly gold. Aspen wanes as Cripple Creek grows and Gilpin awakens, while Clear Creek declines.

It may seem an easy matter to obtain comparative statistics of the precious metal yield for the two periods, but owing to the vagaries of the director of the Mint and the frequent guesses at our production which that official makes, this is a more difficult matter than it ought to be. However, 1889 was the year of the census, and the figures given by its agents were compiled with more than ordinary care and are altogether trustworthy. For 1895 I refer to the statistics of the *Mineral Industry*, which are the most authoritative. The comparison is as follows:

	Gold.	Ounces.	Silver Market value.
1889 .....	\$3,883,859	18,375,551	\$17,199,515
1895 .....	13,559,951	17,891,626	11,687,150

The increase in our gold production has been uninterrupted and promises to continue. In 1895 the value of the gold product for the first time exceeded that of the silver. After 1889 the silver output increased until in 1892 it reached its maximum of 26,350,000 oz. Since then it has steadily declined and will further decline with increasing rapidity unless conditions alter.

The uncertain history of mining camps is made evident when we inquire into the sources of the yield of these two periods.

Name of County.	1889.		1895.	
	Gold.	Silver.	Gold.	Silver.
Boulder.....	\$322,537	\$252,177	\$413,527	\$54,034
Clear Creek.....	488,631	2,559,598	720,776	2,045,666
Gilpin.....	986,856	452,546	1,309,923	252,678
Lake.....	177,321	8,890,305	1,524,363	12,487,284
El Paso.....			6,879,137	90,875
San Juan region.....	886,473	4,024,838	2,989,291	6,301,157
Pitkin.....		8,696,611	1,565	6,775,488
Mineral.....			129,181	1,849,924

The silver is figured at coinage value.

These are the figures of the Mint reports, which usually err in giving amounts higher than ultimate statistics justify. However, such as they are, they give room for very obvious deductions.

In Boulder the falling off in silver mining is obvious, and it is not yet compensated for by the increased gold yield. Clear Creek holds its own very fairly with an obvious tendency to shift the balance of production from one metal to another.

Gilpin, the oldest gold district, whose discoveries in May, 1859, heralded the very beginnings of Colorado's mining industry, has added to its former yield more largely than the statistics for last year indicate. Owing to severe floods and several serious mine accidents, 1895 was a bad year and does not represent the average of a very steady production, approximating \$2,000,000 per annum.

Lake County means Leadville. The gold yield has sprung up owing to the discoveries in the Little Johnny mine and the silver output is maintained by the development of the ore measures underlying the eastern outskirts of the city. It is a fine tribute to the energy and skill of the Leadville mine managers that in the face of a calamitous decline in the prices of lead and silver, and in spite of the rapid exhaustion of the big bonanzas, the output should be maintained at so high a figure. El Paso means Cripple Creek, unknown in 1889, discovered in 1891, and to-day the largest gold producer of all the mining camps of America.

The six counties comprising the San Juan region are lumped together, since they form what is practically one district. The increase in the gold output is mainly traceable to Telluride, in San Miguel County, and to Silverton, in San Juan County. The latter, with Hinsdale County, helped

also largely to build up the silver increase. Pitkin is the county where Aspen is situated. The Aspen, the Aspen Compromise and the Compromise were the mines which in 1889 yielded the bulk of the output. In 1891 the bonanza of the Mollie Gibson was uncovered, and in the following year the Argentum-Juniata became a large producer. In 1892 Aspen produced 8,275,000 oz., valued at \$10,674,000. Creede lies in the newly formed county of Mineral, at the headwaters of the Rio Grande. Its discovery in the summer of 1891 led to a silver output which culminated with \$3,100,000 in 1892.

The bare facts told by this glance over the statistical tables are full of a telling suggestiveness to those who are familiar with the conditions obtaining in Colorado during the past few years. At the time of the last meeting of the Institute the gold-mining industry was less important than the silver—one yielded \$3,883,859 and the other \$5,344,860. At that time silver mining was in the ascendant, and its importance far overshadowed the search for the other useful metals. The rapid uncovering of ore deposits of extraordinary richness at Aspen, the discovery of the Amethyst lode at Creede, the reckless exploitation of the Rico ore measures and the extension of the known productive territory at Leadville were all factors in giving a remarkable impetus to the production of the white metal, culminating in 1892 with a yield of 26,350,000 oz. In the summer of that year the silver market collapsed, some of the mines shut down, others ceased exploratory work and began the gradual gutting of their ore reserves. The full effect of the altered conditions did not become reflected in the statistics of production until a couple of years later. Creede fell off quickly. Aspen's big bonanzas enabled the maintenance of a respectable output; low wages and cheap freights prevented Clear Creek from succumbing suddenly. Rico had already been depleted by reckless mining and Leadville gave up activity in California gulch for the development of the higher grade ores which had been proved to follow the extension of the regular geological horizon under the streets of the city. Then, at a time of severe depression aggravated by the hysterical vaporings of demagogues, there were made a series of gold discoveries which gave a new outlet to the undaunted energies of a very resourceful community.

As the Leadville ore zone had been followed eastward toward the Mosquito ranges some unimportant discoveries of gold had been made. In the pyriticiferous porphyry of Brece Hill several shafts had been started, and in the fall of 1893 one of these, the Little Johnny, encountered a large body of rich gold-bearing ore. The development of this, added to other mines already productive, such as the Antioch and Lilian, brought Leadville's production for that year to \$897,456, growing to \$1,657,000 in 1894. This caused a very cheerful renewal of activity in that part of the district, and although it has as yet led to little more than the determination of the narrow boundaries of the gold-bearing territory it was of incalculable benefit in the restoration of confidence which it induced at a most trying period.

So also with Cripple Creek. Although discovered in 1891 the prospect holes on the further slope of Pike's Peak were at first pooh-poohed because of a queer fiasco which in 1889 had occurred at Mount Pisgah in the same neighborhood. But when the silver mining industry became paralyzed every gold discovery gained in importance, and there occurred an exodus of disappointed silver miners to the new gold region. It was almost the energy of despair which changed an uncertain discovery into a recognized mining camp, and started a development which is amply reflected in the statistics of production. In 1892 Cripple Creek yielded \$583,010; in 1893, \$2,215,000; in 1894, \$3,900,000, and in 1895, \$6,879,137. These figures tell an eloquent story.

Gilpin was least affected by recent economic changes. Nevertheless, overlooked as it had been during the years when silver mining had attracted so much capital, it was bound to gain by a diversion of some of that capital to gold seeking. It is a noteworthy instance of the vicissitudes of mining that of the several properties which in 1889 yielded more than three-quarters of the output, not one is to-day producing, although in several instances a large yield is now coming from mines adjacent to them and previously idle. Seven years is longer than the productive period of an average mine. One can extend the field of inquiry over the whole State only to confirm the deduction just suggested. Of the properties which yielded over \$500,000 in 1889, more than half are to-day producing less than \$50,000; others have taken their place. Nor is this characteristic of Colorado only; on the contrary, it is particularly worthy of note in discussing the history of a State whose ore deposits are notably more persistent than those of most mining regions.

It is due to the hurry to realize upon the wealth uncovered by the pick of the mines; it is aided by the rapidity of exploitation rendered possible by a magnificently elaborate industrial machinery; it is also traceable largely to the imprudence of mine managers who are forgetful of the necessity of doing an amount of exploratory work which shall keep pace with the removal of ore.

In parenthesis it may be pointed out, what no retrospect of Colorado history will fail to emphasize, namely, the resourcefulness of the State. Individual mines are discovered, and, having had their day, become impoverished; particular districts rise and wane; silver mining is in fashion for a time, and then yields in importance to gold, the lead production wilts while copper is in the ascendant, but throughout these changes the mining industry holds its own, because built upon a basis wider than the price of any one metal or the prosperity of any single camp.

Now let us turn to the consideration of the production of lead and copper. In 1889 the price of lead averaged \$3.93; last year it was \$3.23, and as I write it has tumbled down to the lowest on record, \$2.60. The State produced 68,000 tons of lead, valued at \$7,344,800 in 1889, but in 1895 there was a material decrease from this amount. The principal falling off is at Leadville, whose early discoveries warranted the name which the pioneers gave it. In 1889 Lake County yielded lead valued at \$3,309,795. The carbonates which started the smelting industry of Leadville are a thug of the past, and the drop in silver has rendered unavailable bodies of low-grade sulphides in the mines at the back of Iron Hill. The district, however, has again become a great resource to the smelting industry by reason of the production of a large tonnage of fluxing iron ores which have enabled it to repair some of the injury following a heavy diminution in the supply of lead.

In 1889 Hinsdale hardly figured as a lead-producing district, but the large production of concentrates by the Ute and Ulay mines has brought

it into prominence in this regard. These mines have averaged a monthly output of 900 tons of concentrates, carrying 60% lead. Further south, also, in the San Juan region, the Silver Lake ships monthly to the Pueblo smelters 400 tons of 40% concentrates. The operation of other low-grade mines carrying the precious metals associated with lead ores will, through intelligent methods of concentration, help to build up a stable industry and prove of great benefit to our smelting establishments.

Turning to copper: In 1889 the copper production of Colorado was 3,100,000 lbs., valued at \$426,250. In 1895 this has grown to 6,125,000 lbs., worth \$659,050. The price fell from 13.75c. per pound to 10.76c. At the present time a favorable reaction is in progress, and copper is worth 11c. per pound.

Seven years ago Lake and Ouray counties were responsible for two-thirds of the whole output. They yield the same total proportion now, but the output of Ouray has declined owing to the shutting down of the Yankee Girl mine, and that of Lake County is greater on account of the production of the Henriette and Maid of Erin mines, at Leadville. The Red Mountain mines, in Ouray County, are to-day represented by the Guston and National Belle, whose copper sulphides undergo matte smelting at Silverton, while those of the Leadville mine are similarly treated at the Bimetallic smelter. With an upward tendency in the price of copper the next few years ought to see a larger and more systematic exploration of the copper belt of the San Juan, which, in the past, has been too much regarded only as a prolific producer of high-grade silver ores.

So much for the mining. The changes which are imprinted on these records are strikingly reflected in the pages which tell of the progress of the sister industry. Notable departures have been made in the metallurgical field: as might be expected, they are in their nature essentially evolutionary and not revolutionary. Pyritic smelting, in its ideal form, remains yet an iridescent dream, but the work done by Austin and others has been of great benefit to the lead smelters in proving that desulphurization can take place in the ordinary blast furnace to a degree previously unsuspected. This has been a great aid in overcoming the very serious diminution in the supply of oxidized ores and in permitting of the utilization of low-grade iron sulphides too poor to bear the cost of roasting. The causes just referred to have also given a marked impetus to the invention of efficient roasting furnaces and has led to the introduction of several new forms, of which the Pearce turret and the Ropp straight-line furnaces are the most noteworthy. At Argo the capacity of the old Welsh reverberatory has been steadily augmented until it is now 70 tons and exceeds that of the older forms of the lead blast furnace.

The recent discoveries of large bodies of rich telluride ores has incited metallurgical ingenuity to the discovery of methods of treatment previously untried with material of this difficult class. In 1889 chlorination had scarcely got a footing in Colorado and the cyanide process was unknown. The cyanide process, amid its many disastrous failures in other parts of the West, is able to claim a successful application to Cripple Creek ores and at the reduction works at Florence is believed to be doing most excellent work.

Chlorination, introduced at Grass Valley, Cal., as early as 1857, had not been successfully adopted on a large scale to our Colorado ores until within the last three years. In the treatment of telluride ores it shares the field with the cyanide process and is credited with a very high extraction of values.

Leaching processes have therefore in this State lately won a success rare in their Western history. But the old stamp mill rumbles on. The encroachments of newer leaching methods on the one hand, and of concentration, whether by water or by fire, on the other, have been amply compensated by the winning of new supplies in the domain of gold ores too poor to meet the costs of any other process. The old slow-drop, deep-discharge mill of Gilpin County still holds its own in its particular habitat, but elsewhere in the State ores of a different class have called for the employment of stamps of the California type. It is a good sign and characteristic of our mining engineers that no narrow conservatism prevents the utilization of methods which others have proved successful, but that, on the contrary, the wide world is ransacked to yield ideas which can be applied to the utilization of the extraordinary variety of our ores.

In concentration there have been no notable departures, but there is a growing recognition of the necessity for using more of the sizing apparatus which is so marked a feature of European mills. Other aspects of our industrial activity call for comment, but space forbids. One more only may be referred to because its mention befits the present occasion. In the few years which have passed there has come throughout the West a change in the status of the technical man. Time was when the graduate of a school of mines did well not to refer to his training lest it should accentuate the possession of more theory than practice. Low prices, the exhaustion of easily worked ores and the utilization of refractory material have demanded that the knowledge of the laboratory and the library be wedded to practical experience. The muscular amalgamator and the rule-of-thumb smelter have given place to those whose practical training is founded on the sure basis of a thorough knowledge of scientific principles. The captains of industry to-day are with rare exceptions the larger growth of the schools of mines, and the operations which they direct have gained incalculably through that dissemination of accurate knowledge which the American Institute has done so much to promote.

**Coal Deposits in Hungary.**—Some important coal deposits have recently been discovered near Szent-Marton-Blatnicza, Hungary, and arrangements have, it is stated, already been made for the opening out of the same.

**Examination for Draftsmen.**—The Civil Service Commission will hold an examination, commencing at 9 a. m., on October 1st, to fill a vacancy in the position of architectural draftsman, War Department, at a salary of \$1,200 per annum. Applicants should be capable of drawing plans and specifications for the construction of hospital buildings and for the heating and ventilating of the same. Arrangements will be made to examine applicants at the nearest point to their place of residence at which the commission has competent boards of examiners. Those desiring to compete should file their applications with the Civil Service Commission, Washington, D. C., at the earliest date possible.

THE COLORADO MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The fall meeting of the American Institute of Mining Engineers will begin in Denver, Colo., on Monday, September 21st. The programme for the meeting has been prepared by the local committee of arrangements, and is substantially as noted below.

Monday, September 21st, and Tuesday, 22d, will be passed in Denver, and it is expected that at least two sessions for business, and the reading of papers and discussions will be held there. The usual opening business of the meeting will be transacted.

On Wednesday, September 23d, the members will leave Denver by special train, reaching Cripple Creek in the afternoon. The rest of Wednesday and all of Thursday will be passed at Cripple Creek, giving full opportunity to inspect the workings of the famous gold camp. Two sessions of the Institute will be held there.

On Friday, 25th, a visit will be paid to Colorado Springs, and from that place members will proceed to Florence. On Saturday, after visiting the reduction works at Florence, they will be taken to Pueblo. Leaving Pueblo in the evening, the members can either proceed to Denver directly, or may, if they prefer, spend Sunday at Colorado Springs or Manitou, or pay a visit to the new chlorination works at Colorado City.

On Monday morning the members will pay a visit to Central City, and from that place will go to Golden. The closing business session of the meeting will be held at the State School of Mines at Golden. The members will return at night to Denver and thence to their homes.

The programme is a well arranged and varied one, giving opportunities to visit many interesting places.

Many papers and discussions have been submitted by members for this meeting. We give below brief abstracts of a number of these papers, and will present others at an early date.

ACTUAL ACCURACY OF CHEMICAL ASSAYS.

BY F. P. DEWEY.

This paper gives a comparison of a large number of assays made by different chemists and by different methods. They include determinations of manganese in steel and of phosphorus in steel; analyses of copper and matte; determinations of gold and silver in copper, and analyses of soils. The object of the paper is not to suggest uniformity in methods, but to point out discrepancies.

TRACES OF ORGANIC REMAINS FROM IRON MOUNTAIN, MICHIGAN.

BY W. S. GRESLEY.

In this paper the author describes and illustrates traces of fossils discovered in heaps of iron ore at Erie, Pa. The ore was chiefly from the Onapin mine at Iron Mountain, Mich. They are of interest, as no fossil remains have heretofore been discovered in the iron ores of the Lake Superior region, and these imperfect specimens rank among the oldest forms of which man has any knowledge. Great care was exercised to exclude any markings on the ore, which might possibly be the result of handling or friction. No trace of carbonaceous matter was observed, the remains being merely casts or moulds. Nearly all the markings occur upon planes of lamination and upon flat or undulating surfaces. The important fact that these remains came from the Lake Superior iron-field clears the ground for further investigation. The importance geologically of these discoveries consists in their bearing upon existing theories of the formation of the iron ores and also in the possibility of correlating the different ore-bearing series, extending west of the Chapin mine as far as the Mesabi Range and even into Canada. The practical value consists in showing that it may not be useless to search for iron ore in other fields, the rocks of which contain similar fossils. At any rate an interesting field for observation and discussion is opened up to geologists.

HEAT-CONDUCTIVITY, EXPANSION AND FUSIBILITY OF FIRE-BRICK.

BY J. D. PENNOCK.

This paper gives notes of experiments made on bricks made of Greek and of American magnesite, silica brick and coke-oven tiling made in Belgium. The analyses of the respective materials were as follows:

	Greek magnesite.	American magnesite.	Silica brick.	Coke oven tiling.
Silica.....	2.16	3.10	94.07	69.89
Iron oxides and alumina.....	0.72	6.64	3.66	27.75
Calcium oxide.....	4.29	3.76	1.39	0.27
Magnesium oxide.....	93.03	86.50	0.19	0.17

The weights per cubic foot were for the Greek magnesite, 170.2 lbs.; American magnesite, 160.9 lbs.; silica brick, 111.4 lbs.; coke oven tiling, 109.9 lbs. In experimenting on heat conductivity the different brick showed after exposure in the furnace for five hours, starting at 25°, the following temperatures: Greek magnesite, 337°; American magnesite, 297°; silica brick, 177°; coke oven tiling, 154°. This shows the superior conducting power of the magnesite. The degree of expansion per foot under high heat was for the Greek magnesite, 0.11 in.; American magnesite, 0.088 to 0.10 in.; coke oven tiling, 0.076 in. No heat high enough to fuse any of the brick could be obtained; under a temperature of 127° C., none of them showed any signs of softening.

ADDITIONS TO THE POWER PLANT OF THE STANDARD CONSOLIDATED MINING COMPANY, BODIE, CAL.

BY ROBERT GILMAN BROWN.

This paper describes the additions recently made to the electric power plant of the Standard, including a new dam at the head of the water supply, new motors, new hoists, pumps and other work. The description cannot be properly condensed, but it is of interest to give the following, showing the salient points of the administration of the plant.

All the machinery is under the care of a competent electrical engineer. At the power-house there are two men and a cook; at the motor-room, two men, and at the hoist two men—a total of six men and one boy (cook) for 24 hours' work; in addition to which a pump-man is taken from other work in the mine for about half a shift daily. About once in three weeks the whole plant is stopped for a couple of hours to change oil in the boxes, examine belts, look over the machines, test for grounds, etc.; but several continuous runs of over four weeks have been made. An hourly record is kept at both power-house and motor-

room of the readings of the various instruments, which serves to keep the men up to their duty as well as to furnish tolerably accurate data of the work of the machines. At the pump a similar record is kept of hours run, strokes of pump and gallons of water raised, and in the office, as a final check on work at all parts of the plant, there is a recording Bristol voltmeter on the high-tension circuit.

GOLD IN GRANITE AND PLUTONIC ROCKS.

BY WILLIAM P. BLAKE.

This paper refers to a recent description (by Prof. George P. Merrill) of the occurrence of gold in the substance of granite of normal composition from Sonora, Mex., and says that we thus have another link in the chain of evidence showing that gold is a constituent of granite and of plutonic rocks, and that such crystalline rocks may be the primal source of the gold which is concentrated in veins. We do not, however, overlook the fact that the oceans may have contributed a portion of their dissolved gold to the sedimentary rocks, such as the slates, magnesian or otherwise, of different geological epochs; such slates being generally known to us as the country or wall-rocks of most of the auriferous quartz-veins, especially of the central gold-region of California. As investigation progresses, and our knowledge is increased, it becomes more and more evident that such pyritous sediments derived their metallic contents from the waters of the ocean at the time of their sedimentation, through the reducing agency of organic matters or the exhalation of sulphuretted or carburetted gases, as for example, from the petroleum shales.

Within a few years instances of the occurrence of gold in the crystalline rocks have multiplied so that they can no longer be regarded as exceptional. Among such instances are mentioned those at the Amargosa mine in San Bernardino County, California; at Butte and Walkerville, Mont.; at several mines in Northern Sonora, Mexico. Gold-bearing veins are found traversing crystalline rocks of the granite family at many places in California. In the Black Hills in South Dakota the mines of the Homestake group are an example of the occurrence of gold in ancient crystalline gneiss or granitic schists. In Central and Northern Arizona gold-bearing veins are found in granite. Many instances of this kind are noted from Australia also. The author thinks that a careful chemical investigation for gold of the basalt of Ovisak, Greenland, which contains the large and small masses of metallic iron, and which is believed to come from great depths in the earth's crust, would be exceedingly interesting. Examples of the presence of gold in granitic and plutonic rocks might be multiplied, but those given are sufficient to show that we must recognize such rocks as truly gold-bearing.

A SHAFT FIRE AND ITS LESSON.

BY ROBERT GILMAN BROWN.

This paper describes a fire in the Standard Mine at Bodie, Cal., which started after the departure of the night force, and was discovered when the day force went to work; by that time it had gained considerable headway. In this shaft all hoisting is done to the 320-ft. level, where the material is dropped 30 ft. by chutes to the tunnel level, through which it is run to the mill. The hoist and sheaves are all underground, the upper portion of the shaft being open, but unused. The tunnel is 1,800 ft. long, and attempts were made at once to reach the shaft through it, but increasing smoke and gas drove the men back 100 ft. and more.

The natural course in such a case is to bulkhead everything as tightly as possible, with the hope that the fire may be smothered, but in this instance the element of uncertainty was too large. There was a nest of old timbers in ore chutes and shaft, above tunnel-level, where fire would lurk for months; and, more than that, there were a dozen connections to neighboring mines through caved stopes that could not be bulkheaded, as well as through openings that perhaps could. The shaft must, therefore be approached at the ore-chutes on the tunnel-level, if possible; and this might be made possible by leaving the tunnel as the sole free intake. All other openings, to the surface direct and through other mines, were at once sealed, with the hoped-for result. In the course of two hours the chutes could be reached, and a hand-to-hand fight with the fire could be begun. In this struggle important aid was furnished, absurd as it may seem, by hand-extinguishers, and the drug-stores of the town were ransacked for bottles suitable to hold acid, while the assay-office furnished the soda for numberless charges. At first water was brought in in barrels, and a hand force-pump was used. Later, connections were made from the outside to the mine pipe which passed out of the tunnel, and water was pumped in, to be thrown upon the fire, through a 2-in. hose, by a small centrifugal pump, driven by electricity. The latter arrangement was put into operation on the second day of the fire. By this time the chutes and shaft at tunnel level had caved down, and the fire in the half-buried timbers had to be fought for a day or two more, the fear being that it would work down the shaft. Meanwhile water was being pumped from a neighboring mine through fire hose into the collar of the shaft, which spattering and spraying down finally saved the upper 200 ft. of it. The damage was ultimately found to extend upward from tunnel level, where the cage had wedged, and to include the chutes and hoist station. This must be regarded, in view of the much greater disaster threatened, as a most fortunate and satisfactory result.

ORE CONCENTRATION IN THE BUTTE DISTRICT, MONTANA.

BY CHARLES W. GOODALE.

This paper gives a very careful and elaborate account of the methods of concentration adopted at the Butte mines. The great amount of detail in description makes it impossible to summarize the paper fully, but the introduction sums up the subject by saying that the ores of the Butte district present a variety of combinations, and their treatment by concentration is an interesting study. They may be classified in general as follows:

1. Copper-silver ores, which are produced by the mines of the Anaconda group, and by the Mountain View, Colusa, Silver Bow and Parrot. The high-grade ores from these properties are roasted and then smelted; but a large proportion of the output is low-grade and siliceous, and hence requires concentration. The copper-bearing minerals are chalcocite, bornite, enargite and chalcopyrite, in varying proportions in the different mines, the gangue, which breaks readily into grains, being quartz and feldspar.

2. Silver-copper ores, of which the Gagnon vein is the largest producer. The grade of the ores from this mine is such that nine-tenths of the output requires concentration. The silver and copper-bearing minerals of this vein are massive wurtzite, sphalerite, bornite, chalcopyrite, pyrite, tetrahedrite, enargite, tennantite and galenite, with a quartz gangue associated with feldspar and small quantities of barite and fluorite. The gangue is very hard and not at all granular.

3. Silver ores containing a small amount of gold, such as those of the Alice and other mines on the Rainbow lode, the Lexington, the Blue Bird and others. The gangue is quartz, carrying pyrite, sphalerite, galenite, tetrahedrite and argentite, with manganese in the form of rhodocrosite and rhodonite. Good results on ores of this class cannot be obtained by concentration, because a large part of the silver-bearing minerals are disseminated through the gangue in such minute grains that even the finest practicable crushing does not liberate them from the quartz so that a good saving can be effected. Furthermore, a great loss is sustained from the floating away of the rich silver-glance in the form of a greasy scum upon the surface of the water. Nearly all of these ores are therefore treated by chloridizing-roasting and amalgamation, at a cost of from \$5.50 to \$7.50 per ton, and with a saving of about 85 to 90% of the silver and 40% of the gold; the fineness of the resulting bullion being from .400 to .700.

There are two general systems in use in the Butte district. At Anaconda and at the Butte Reduction Works steam-stamps, hydraulic separators or classifiers, Collom jigs and revolving slime-tables are employed; while at the Butte & Boston, the Boston & Montana, the Parrot and the Colorado concentrating-works, Blake rock-breakers, Cornish rolls, revolving screens, Harz jigs and vanners are in use. Hydraulic sizing is also practised in the last-named mills for the separation from the slimes of material which 10 and 12-mesh jigs can treat. At the Butte Reduction Works vanners are used for the overflow-slimes from the tanks which supply the round tables.

#### RAPID SECTION WORK IN HORIZONTAL ROCKS.

BY MARIUS R. CAMPBELL.

This paper describes a method devised and put into practice by the author in the survey of the middle and southern portions of the Appalachian coal-field. The object was to put on record graphically all the evidence collected in the field. In the case especially referred to in the paper, the rocks over most of the field are essentially horizontal, but when considered in detail they are found to be very irregular. The general geologic structure is necessarily simple, and yet the minor irregularities are so numerous and apparently so devoid of system that the question becomes at times very complex.

Since the rocks are nearly horizontal, the vertical element in the section is the most important. Time will not permit the use of the Y-level, consequently we are limited to the aneroid barometer and hand-level. The aneroid barometer is generally regarded as unsatisfactory; but in order to do rapid work the use of this instrument is a necessity. The hand-level should be used to supplement the aneroid on steep slopes and where horizons are well marked. The note-book should be as large as the geologist can conveniently carry. The book in use was  $7\frac{1}{2} \times 10$  in. in size, and made of cross-section paper. The size of the book is not important; each engineer must determine that question for himself. The method here presented presupposes a good base-map of the region to be studied, upon which are represented all of the roads and, if in an uninhabited, or but thinly settled, region, all of the more important bridle-paths. If such a map cannot be obtained, the geologist will perforce prepare his own map at the same time that he constructs his section.

The method of procedure which is applicable to ridge-sections will not always apply to sections along streams. In the latter case, if the observations are confined to the rocks exposed in the bed of the stream, the possibilities are that the section will have but little value. Rock-surfaces, when fresh, are very different in appearance from the same surfaces when deeply weathered; consequently the interpretation of creek-sections is liable to be very different from the interpretation of ridge-sections. Moreover, along streams the shales and softer beds are liable to be worn away by mechanical action, leaving the sandstones as the most prominent, if not the only visible, geologic feature along the stream-valley. Good sections can usually be made along streams, if there are hills bordering the valley, up which the observer can climb to rocks exposed on their slopes. Manifestly the best results can be obtained where the hills are very abrupt and composed of well-defined beds of shale and sandstone, or other material equally well differentiated.

The rough sketch of the field-section can best be gone over in the office. This method has been employed by the writer for two years in quite accurate mapping of the coal-measures in an area of over 3,000 square miles in Southern West Virginia, and by another party belonging to the same organization in Central West Virginia. Wherever tried it has been adopted, and is apparently susceptible of application wherever the rocks are approximately horizontal. In inclined rocks its limit of usefulness is soon reached. Where dips of  $5^\circ$  prevail, the horizontal element of the section becomes so important that the results are not always satisfactory; and when the dips reach  $10^\circ$  the system is entirely inadequate.

#### FAULTING IN GLACIAL GRAVEL AND SAND.

BY CARL HENRICH.

This paper notes some interesting features observed in a deep cut on the Jackson & Cincinnati Railroad in Lenawee County, Michigan. The surface deposits are of glacial origin, and are composed of sand, gravel and clay in varying proportions. In the cut referred to, known as Kelly's cut, the section made exhibited an almost horizontal arrangement of layers of finer or coarser gravel, alternating with layers of fine, siliceous sand. This regular horizontal division or stratification of the materials would in itself have been remarkable, as it formed a notable exception to the irregular arrangement of the various materials composing the ridges, exhibited by the cuts of the railway further south. But still more remarkable appeared a regular and well-defined system of fissures, which, under angles of approximately  $60^\circ$  to  $70^\circ$  from the horizontal, and in two or three directions, traversed the horizontally stratified sand and gravel-layers, and everywhere faulted these layers. There are two well-defined systems of these parallel fault-planes, which intersect each other, probably under an angle of about  $60^\circ$  in the horizontal plane.

The alternating deposits of gravel and fine sand in horizontal layers bring out the vertical throws caused by these faults. These parallel fault-planes are from 5 to 12 ft. apart; and there was not one which did not show a very marked throw, of certainly not less than 7 in., of the gravel and sand-layers on either side. The multitude of the fault-planes; the presence of at least two, and probably three, systems of them, intersecting each other not only horizontally, but also vertically, the comparative thinness and frequent alternation of the sand and gravel-layers, the uniform color and similarity of the various sand-layers rendered it impracticable to measure precisely the actual throw caused by each fault-plane, but in no case was any throw observed less than 7 in. vertically. Besides throwing and faulting the layers of sand and gravel, these systems of intersecting fissures were further characterized and brought out prominently by carrying, if not being actually filled with, nodules and ramifying tubules. Each of these contained a central cavity, around which a whitish powdery substance gradually but quickly passed into a reddish, ferruginous, cemented outer shell. The siliceous sand seemed to have been decomposed and powdered by the moisture or solution evidently circulating at times through the central cavity.

The explanation of the cause of these systems of fault-fissures which seems most plausible, is that the two masses of ice, or glaciers, which in converging directions scooped out the valleys of Silver Creek and of Goose Creek, exerted from both sides on the intervening ridge of sand and gravel a lateral pressure nearly horizontal, or possibly slightly downward toward the axis of the ridge from both flanks. This horizontal (or nearly horizontal) pressure from both sides, exerted on the stratified sand-and-gravel layers of the ridge (which at the same time may have been covered by a thinner sheet of ice), may have resulted in the development of these intersecting systems of parallel fault-fissures, their angle of intersection being approximately the same as the angle of intersection of the two glaciers exerting the pressure.

This occurrence illustrates, further, that the systems of fault-fissures which we find in stratified rocks may have been formed, and even the vein materials filling such fissures may have been deposited, before the materials forming these stratified rocks had been really solidified or cemented into rock, and before these rocks were overlaid by other rock-forming sediments. It suggests, also, a very natural explanation of a hitherto puzzling phenomenon, where a faulted stratified rock or series of such faulted strata of rocks, are found between non-faulted masses or strata.

#### THE BERTRAND-THIEL OPEN-HEARTH PROCESS.

BY JOSEPH HARTSHORNE.

This paper describes a new development of the open-hearth steel process devised by Ernst Bertrand and Otto Thiel and in use at the works of the Präger Eisenindustrie Gesellschaft in Kladno, Bohemia. The plant consists of one 12-ton and one 20-ton furnace, the smaller furnace being at some distance behind the larger one and some 10 ft. above it. The process, as at present carried out, consists essentially in dividing the charge between the two furnaces, tapping the metal from the upper into the lower one and removing the slag from this metal during its progress from one furnace to the other. Both furnaces are at work on the basic system, although this is not an essential feature. Pig iron high in phosphorus and silicon is charged into the upper furnace with a small portion of the scrap, if desired, and also a certain quantity of ore and limestone. The remainder of the scrap is charged into the lower furnace, together with pig iron and a small quantity of limestone. A little ore is also added, if necessary. The upper furnace is first charged and the metal is melted and made hot. This takes about three hours. By the end of this time the metal is hot and fluid, the silicon is all in the slag and the carbon and phosphorus are to a considerable degree eliminated. It is then ready for tapping. The lower furnace is charged about two hours later than the upper one. By the time the heat in the upper furnace is ready for tapping the metal in the lower one is also fluid. The primary furnace is then tapped, the slag being carefully skimmed off the metal as it passes down the trough and prevented from entering the secondary furnace. As soon as the two metals mix together a very lively reaction ensues, which quiets down in about a quarter of an hour. The phosphorus is then below 0.03% in the bath. The heat is finished by addition of ferro-manganese or spiegel, and is ready to be tapped, if no further improvement in quality be desired. Fifteen minutes longer in the furnace brings the phosphorus below 0.02%. The charge at present in use, after many experiments, is, for the upper furnace 7.50 (metric) tons basic pig iron, 5.50 tons steel scrap, 0.15 ton limestone and 0.20 ton magnetic iron ore; for the lower furnace it is 1 ton basic pig, 8 tons steel scrap and 0.80 ton limestone. The arrangement of furnace and charges can be modified to suit local requirements.

The lower furnace is charged about two hours after the upper one. The metal in the upper furnace contains 0.6 to 0.9% of phosphorus when tapped into the lower one, while the metal contained in the lower furnace is already highly oxidized and very low in phosphorus. After uniting the two metals it takes 15 to 20 minutes to reduce the phosphorus to 0.02%. At present from 5 to 6 heats, of 22 tons of metal charged, are made at Kladno in 24 hours. The lower furnace is empty more than half of the time. It is quite evident, therefore, that with two primary furnaces at least 10 heats could be made in the 24 hours. The present capacity is from 110 to 132 tons (charged weight) in 24 hours; and this will be doubled by the use of another primary furnace which is now being erected. Careful tests, extending over a period of five months, showed a reduction in fuel, flux and refractories, the total saving in cost of conversion over the former practice being 27.5%. The quantities of deoxidizers and recarburizers used are reduced, and the loss in metal is smaller, though very slightly so. The control of the quality of the finished product is very complete. Steel is made to specifications within a range of from 0.06 to 1.25% of carbon. The phosphorus can be run down below 0.02% with ease; the sulphur is kept below 0.03%, and the manganese can be regulated very closely. As an instance, it may be stated that a large amount of steel has been made containing 0.80 to 0.90 carbon. This steel was used for bayonets for the Italian army and the results were very satisfactory. The work of the past year has shown that from 65 to 75% of the sulphur is removed by this process.

## THE ANACONDA ELECTROLYTIC COPPER REFINERY.

Specially Reported for the Engineering and Mining Journal.

This refinery, which was constructed by Mr. Hermann Thofehrn, was built in the most improved style, and is undoubtedly the best now in operation. It is built in two parts, separated by a free space of 100 ft. for security in case of fire. The buildings cover a space of about 14,100 sq. yds., and have wooden framing covered with corrugated iron.

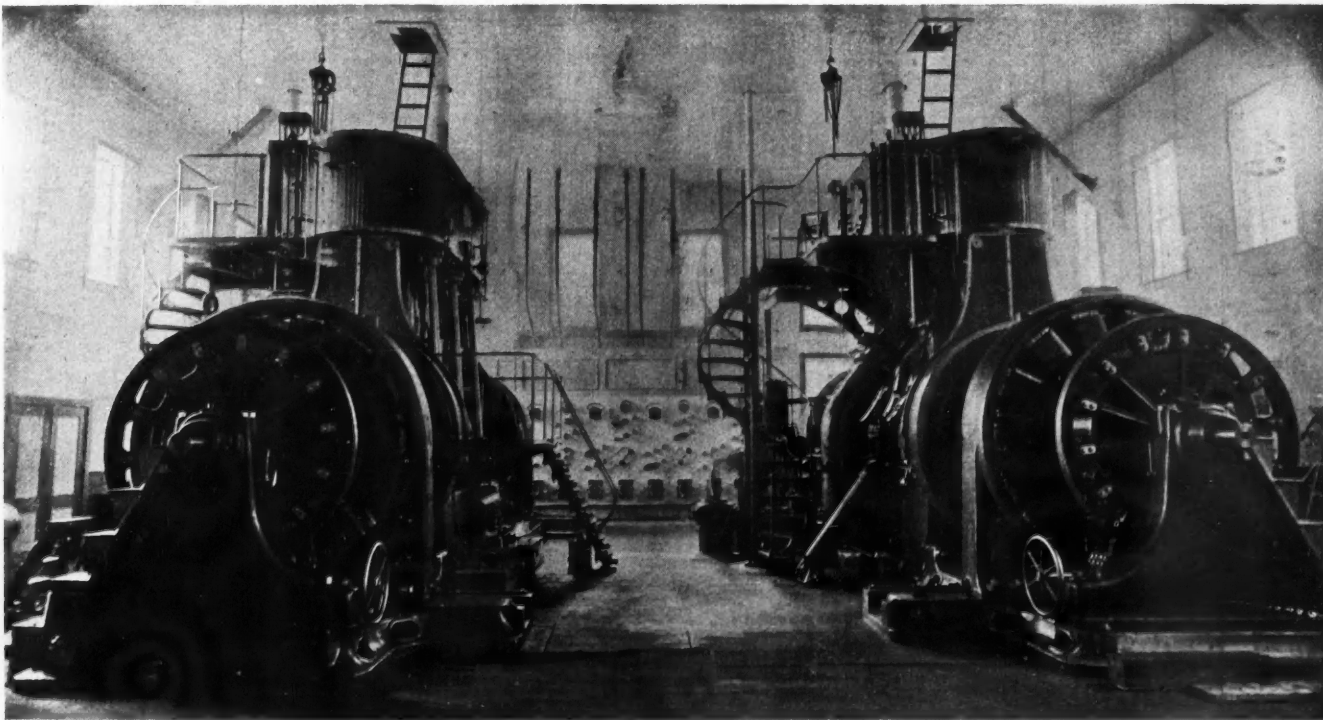
In connection with the refinery is the boiler-house, at about 200 ft. distance, and the silver mill, at about 300 ft. distance. These buildings, as well as the dynamo room which adjoins the refinery, are entirely covered with corrugated iron. A large number of fire hydrants are distributed through the building, each one having hose and nozzle attached to it. Special watchmen constantly keep all fire protection in good working order. The buildings are described below in detail.

## THE POWER PLANT.

*A—Boiler-House.*—The old boiler-house, which is now replaced by the new one, contains eight sets of two each of common tubular boilers, having altogether a capacity of 36,000 lbs. of water evaporated per hour. Each set of boilers is provided with an individual stack of sheet iron, and all are connected together by a steam pipe and a double feed-water line. These connections are made in such a way that any of the boilers can be connected or separated at will from and with the rest of the boilers. The grates of these boilers are of a common type, designed to burn equally wood or coal. An ash-hoist takes the ashes out of the room and dumps them upon a railroad car in front of

the Anaconda coal. Each one of the grate-bars swings on its own axis. These grates also have not proved satisfactory for the burning of Belt coal containing up to 20% ash, and have been finally replaced by underfed stokers of the American Stoker Company make, which have been very successful so far. The ash is conveyed to an elevator by means of a sluice and water and is finally dumped on the prairie adjoining the boiler-house. The supply of fuel is taken from a railroad track in front of the boiler-house. From the cars the coal is dumped into large bins, and from there a bucket elevator dumps it into the supply bins hanging in front of the boilers. From these bins the coal sinks to the grate-hoppers and is then taken by the grates automatically, the operation being continuous. The feed-water is handled by two large Knowles pumps, each of sufficient capacity to insure the entire supply of the boilers. The water is taken from the hot well of the condenser and is delivered by the pumps through the Green heater to the boilers, acquiring on its way a temperature of about 200° Fahr. The service of this boiler-house is attended to by 12 men, who are distributed as in the old boiler-house, thus obtaining twice the amount of work with the same amount of labor.

*C—The Power-House and Dynamo Room.*—The power-house contains one double engine of about 800 H. P., one Westinghouse compound engine of 400 H. P., and two triple-expansion engines of 900 H. P. each. The two last-named engines are directly coupled to two dynamos each. This makes a total of about 3,000 H. P. in all, including the reserve. The first-named engine is of the Corliss type and runs the dynamos of the old section of the refinery at present by means of belting and shafting. To supply the refinery with the required current for the electrolytic work there are two Westinghouse generators of 220 K. W. each, belt driven; one Westinghouse generator of 270 K. W., belt



ENGINES AND DYNAMOS AT THE ANACONDA ELECTROLYTIC REFINERY.

the building. The supply of fuel is taken from the railroad track in front of the building and conveyed on a 20-in. spur track directly in front of the boilers. The feed-water is handled by two Knowles pumps, each able to insure the total service. The water is taken from the hot well of the condenser and by means of the pumps is delivered to the boilers after passing through a Berryman heater, acquiring on its way a temperature of about 170° Fahr. The Berryman heater receives the steam from the engines before it passes through the acid-heaters in the refinery on its way to the condenser. Ample facilities are provided to supply the water from the hot well, from the lower flume and from the upper flume. Any change of supply from any of the three sources can be made in a moment's notice. The service of the boiler-house is insured by two firemen, two helpers and two fuel passers on each shift, altogether 12 men under the supervision of the mechanic and the foreman of the refinery. All of the boilers, pumps, fittings and other implements are in first-class condition.

*B—The New Boiler-House.*—The construction of the new boiler-house was made necessary by the extension of the refining plant, which doubles its capacity. This plant being of some importance has been designed to obtain the highest possible economy and efficiency. It contains three sets of two boilers, each of the Heine pattern, having altogether an evaporating capacity of 62,200 lbs. of water per hour. Another set of two boilers of the same capacity is in course of erection and will serve as a reserve. All the boilers are connected together by a large iron flue which carries the smoke and gases to a feed-water heater of the Green pattern, from which they are carried off by a brick stack 140 ft. high. The steam and feed-water lines are common to all the boilers, and the connections are so made as to connect or disconnect any one of the boilers. The grates of these boilers were of the Brightman type, are automatic feeders and shakers, and are designed to burn slag or nut coal. The Brightman stokers proved to be a failure with the coal that is usually handled in Anaconda and were later taken out and replaced by horizontal hand-shaking grates of a pattern adapted to

driven, while further on there are four Westinghouse generators of 270 K. W. each, directly connected to the triple-expansion steam engines. This makes altogether 1,790 K. W., corresponding to 2,942 H. P. Out of this total one generator, together with the small steam engine form the reserve, being a complete unit of 220 K. W., equal to 315 H. P. This reserve unit can be switched over to any of six circuits in case of an accident or repairs of any of six generators. The switching of the leads of these generators is controlled by a central switchboard, from which all but two of the conductors are supplied. The boiler capacity is now 62,200 lbs. of water evaporated per hour. Of this amount the two triple-expansion engines, while producing at the normal rate 1,080 K. W., or what is equal to it, 1,544 H. P., consume at the rate of 15 lbs. per horse power per hour, 23,160 lbs. The double Corliss engine, while producing in the normal run 490 K. W., equal to 700 H. P. plus belting loss, etc., together, 750 H. P. consumes at the rate of 30 lbs. of water per horse power, 22,500 lbs. per hour.

Besides the generators for electrolytic work there are two dynamos for light and power, one of which is in reserve. On this about 50 H. P., equal to 1,500 lbs. of steam, are spent. Then there is a 30-H. P. air compressor which runs the acid pumps and requires about 900 lbs. of steam. The condensers for the Corliss and for the triple-expansion machines take another 1,500 lbs. of steam per hour. All this machinery consumes 49,560 lbs., plus about 1,500 lbs. for heating; in all, 51,060 lbs. of water evaporated in the boilers, against 62,200 lbs., the maximum capacity of the boiler plant excluding the reserve boilers. This amount of power corresponds to a maximum production of 150 tons of electrolytic copper per 24 hours, or to about 17½ H. P. per ton produced. This includes the lifting, the transporting and handling of the copper, which is done by electric appliances, the manufacture of the cathodes, heat and light, etc., together with the operation of the silver mill. As labor here is more expensive than power, all work which can possibly be done by machinery is devised that way.

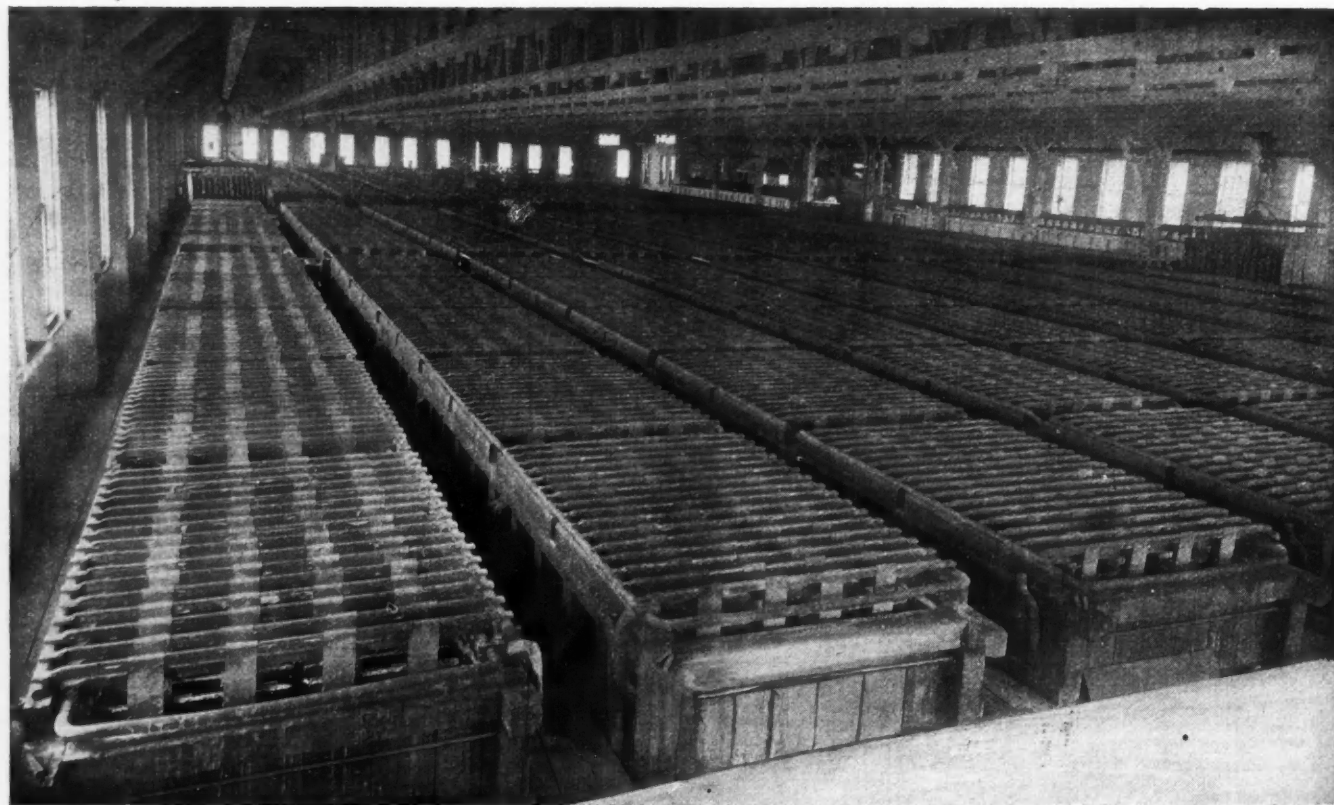
*D—The Refinery Tank-House.*—The two parts of the refinery are built of wood covered with iron as stated. Each building covers a space of

about 6,500 sq. yds., and contains 600 electrolytic tanks. Each tank is 2.50 m. long, 1.50 m. wide and 1.00 m. deep. These tanks are built on the self-insulating plant, the air having access to all parts. A wooden frame-work in the shape of a regular girder is covered on the inside with common planks, and is cut up into compartments by partitions of the same material, 10 of which form a row. Each row of 10 tanks is set on its own foundation, entirely separated from the others and from the working floor. A large air space is between each compartment forming a tank between the working floor and the rows, and all parts of the tanks, at the side as well as below, are of easy access for the air and for the men. Each joint in the woodwork from top of the tanks to the bottom of the foundation is insulated by soaking with insulating material before being put together. The inside of the tanks is lined with lead, and proper protection is provided to preserve it against waste from the copper plates (anodes). On the sides of the tanks the conductors are placed for the electric current, serving at the same time as a support for the electrodes. The bars are of solid copper and are bent in the middle, each reaching over two tanks, being positive on one and negative on the other tank. By means of this bend in the bars all screw connections are avoided between the tanks, leaving only the connections between the different rows to be fixed in the usual way. This effects an important saving of labor and power, as it is very difficult to maintain good joints for so heavy a current in an atmosphere charged with acid, steam or moisture. To support the electrodes flat iron bars are laid across the tanks, resting on the conductors. Copper hooks sustain the plates in the liquid and are hooked on these bars. Ten tanks built together make a row. Ten rows make a set of 100 tanks, and two sets make a system of 200. Each system fills a hall, and each hall is provided

means of which all material is conveyed from the railroad in the buildings to the tanks, the scales, etc., and back. The locomotives are of Mr. Thofehn's design, and were built by the General Electric Company. Underneath the tanks runs another 20-in. road, which communicates with the silver mill, and is used to convey nothing but the refinery slimes, which contain, besides the impurities of the crude copper, the gold and silver in large amount.

#### OPERATION OF THE REFINERY.

The work which is going on in the refinery, so far as the mechanical part is concerned, is extremely simple. The men take the anodes from the railroad cars, transport them by the tank-load over the scales and place them on a rack. Here the supporting bars and hooks are laid over the anodes, the crane is brought along, picks up the charge, conveys it to the tank it belongs to and lets it down therein, placing at the same time all the plates in the proper position. In the meantime another crew has prepared on a second rack one load of cathodes, hooked on the supporting bars, and ready for use. These the crane takes up and brings them like the anodes right on the place where they belong. After this the liquid is turned on and as soon as the tank is filled the electric current is started again and the refining work begins. Here it is to be observed that the liquid and the electric current are stopped only in the tanks which are under way of being reloaded and only for the strictly needed time for this operation. This time, which includes unloading, cleaning and reloading, bringing of fresh material, its preparation, etc., hardly exceeds one hour for each tank. The unloading of the tanks goes on in about the same manner as the loading. The electric current and the liquid are stopped in this tank. The crane takes out at once the full



THE ANACONDA ELECTROLYTIC REFINERY.

with a complete outfit of machinery, tools and appliances, making it entirely independent of the other halls; in fact, forming a complete plant by itself. As the composition of the crude copper changes in regard to its impurities and as the electrolyte has to be modified according to the amount of such impurities, it is absolutely necessary to be able to separate each system from the others. There are six systems of like capacity of 200 tanks, each being able to turn out about 35 tons of electrolytic copper per 24 hours as a maximum. All the tanks of each system are connected in series for the passage of the electric current produced by one generator. Each row of 10 tanks has its individual supply tank for the circulation of the liquid. The circulation is established by having the rows built on an inclined plane. The liquid runs by gravity from one tank to the next until it reaches the last one, from which it falls to the collector. The collector conveys the liquid to the acid pumps, working by air pressure, which deliver it anew to the distributor and from there to the small supply tanks to begin the same course over again. The three first systems are provided with overhead trolleys, one above each double row, and by means of these the tanks are loaded with copper and also unloaded after it is refined. The full charge of a tank, weighing about four tons of copper, is loaded up and unloaded in one operation. In the three new systems each hall has one single electric crane spanning the whole width of the hall. These cranes are also designed to charge at once a full tank load. The reason why the first three systems have not been provided with electric cranes is that the old buildings were not suitable for their establishment, and the time given for the construction of the plant was too short to make the modifications of the buildings and to await the construction of the cranes. On the working floor of all the halls runs an electric road of 20-in. gauge, by

charge of cathodes, which during the time of the refining received the fine copper of the anodes, and brings this charge down on a small 20-in. gauge car which, pulled by a motor, conveys it to a railroad car. After this the remnants of the anodes are handled in the same way. The tank is washed to take out the refining slimes and is then ready to be loaded up again.

The crude material upon which the refinery works is blister copper, containing 98% copper on the average, and the balance in arsenic, antimony, iron, lead, tellurium, selenium, besides about 110 oz. of silver and  $\frac{1}{4}$  oz. of gold to the ton.

The large number of tanks and the high cost price of labor at Anaconda necessitated a special means of control in this direction. This has been obtained by an automatic device, looking very much like a regular double commutator of a dynamo, to which all tanks are connected by series of five tanks each. A yoke carrying two brushes slides over the different sections of these commutators, making one complete turn in an hour, and these brushes bring into contact the terminals of each series of five tanks to register the volt meters. In this way all the tanks are controlled once an hour and the readings registered on paper automatically. This enables the man in charge to see at a glance the condition of all the tanks in the refinery. He can see at once if any trouble is in any one of the tanks; of what nature the trouble is; when it started and how it developed. He is able then to point out to the foreman the tank in question and this instrument keeps on recording when the man started to correct the trouble; how much time it took him to do it, and also how completely the work was done.

*Copper.*—The Anaconda Copper Mining Company's refinery has been running in full since January 1st of this year, and is turning out between



100 and 130 tons of copper daily according to the output of the mines. The balance of the company's product, from 80 to 100 tons, is refined in Baltimore. The total daily production of the Anaconda Company is about 200 tons of copper. The refinery is built in such a way that in case of an emergency it can easily handle the total product of 200 tons daily with the use of additional dynamos only.

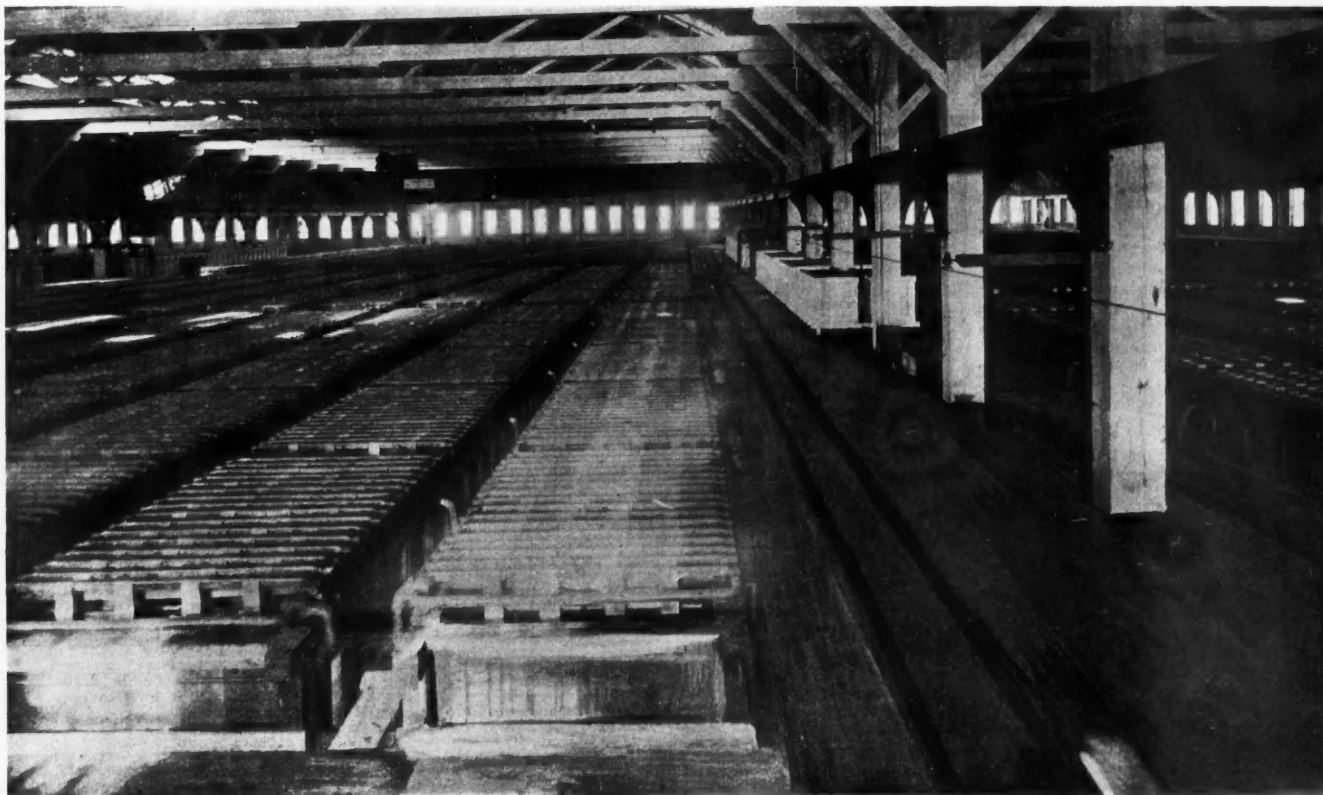
In referring to the cost price of refined copper in Anaconda we have to consider the high price of labor, which amounts to nearly \$3 on an average per day per man. The cost of fuel so far has been \$5.50 per ton, but this expense will be reduced to \$2 per ton when Belt coal is used by means of underfed stokers.

Sulphuric acid costs 2½¢ per pound in Anaconda, while the other supplies cost accordingly. We can say generally that all expenses in Anaconda are more than twice those at Eastern industrial centers. The refining work at Anaconda costs no less than \$14 per ton of copper produced, including the saving of gold and silver contained in the anodes.

The total number of men employed in the Anaconda Copper Mining Company's plant is 120, inclusive of foreman, assayers and clerks. The saving of labor in the refinery is best illustrated by the difference between the old building and the new one. We make this distinction because the old building already existed and a plant had to be adapted to it. It was, however, too weak to allow of the installation of all the modern improvements and conveniences which Mr. Thofehrn has since employed in the erection of refineries. The new building was constructed on the advice of Mr. Thofehrn and was built according to his designs. Both the old and the new structure turn out the same amount of product; that is to say, about 50 tons each day in actual practice, although the buildings have a capacity to double the product by increasing the

filter on which it is thoroughly washed with water. It is then put into the second set of boiling tanks from which the other impurities, notably arsenic and antimony, are taken out. From here the silver mud is again placed on filters, thoroughly washed with water and dried on large cast-iron pans. A consequent melting in the reverberatory furnace reduces the silver mud to ingots ready for the parting kettles. The silver mud when it goes into the first melting furnace contains only a small amount of impurities. The operation of the furnace consists in a mere melting of the slimes, which is carried on as rapidly as a wood fire will permit without refining the same. The furnace is charged with about two tons of the dried silver mud at a time, and after this is melted it is tapped into molds which move on a small train in front of the furnace. This method is similar to that employed at Thofehrn's European refineries for the casting of anodes. The ingots are placed in the parting kettles, where they are boiled with sulphuric acid and the silver dissolved, making sulphate of silver, which later on is diluted with water and precipitated by copper plates, thus obtaining pure cement silver. This is thoroughly washed and dried and then melted again into ingots by furnace charges of two tons each. The ingots are now ready for the market and weigh about 1,200 oz. a piece. They are assayed, stamped, numbered, weighed and shipped as fine bullion of .999 fine. Most of this bullion goes directly to England. The gold is allowed to accumulate in the parting kettles for a month, when it is taken out, washed and dried and melted in a crucible together with convenient fluxing material to produce ingots, which are assayed, stamped, weighed and shipped as before.

*Thofehrn's New Refining Process.*—The density of current generally employed in Thofehrn's refineries for the production of cathodes is about 10 to 20 amperes to the square foot. The product is melted in order to



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electric current. The number of men employed in the old building is 50, while there are but 25 in the new structure.

The average quality of copper produced in these plants is: Conductivity, 98%; Matthieson standard; tensile strength, 64,000 to 65,000 lbs. per sq. in.; number of twists in 6 in. of No. 12 wire, 80; elongation, 1½%. All these measurements were taken on hard drawn wire.

*Eparation of the Electrolyte.*—The anodes are delivered to the refinery containing as aforesaid about 2% impurities which, during the process of refining, go partly into the liquid and partly into the slimes. The impurities which go into the electrolyte are partially taken out on each turn of the electrolyte through the tanks. A certain amount of impurities is allowed to stay in the liquid, however, while the eparation process is regulated so as to limit the accumulation of these impurities only. The eparation process used at Anaconda is extremely simple, requires little attention and necessitates the use of air and cheap chemicals only. This method is preferable to the voluminous and bulky old process of crystallizing which is used almost in all Eastern refineries for the eparation of the electrolyte.

*Silver and Gold.*—The Anaconda Copper Mining Company's refinery produces about 350,000 oz. of silver, and about 1,500 oz. of gold per month. This product is delivered to the market in fine bullion. The silver is .999 fine, and the gold .950 fine. The bullion is reduced at a very low expense, the cost being almost nominal. The process for the refining of slimes is as follows: The silver mud (this name is given the slimes) is sent from the refinery in lead-lined tank-cars to the silver mill. Arriving there, it is hoisted up to the screens, where it is washed with water and all chips of copper, etc., are taken out. The clean silver mud is then run out into boiling tanks, where it is freed from its copper contents by boiling with acid and steam. From this first set of boiling tanks the silver mud is passed over a

produce ingots or wirebars, according to the demand of the customers. During the process of melting a certain amount of cuprous oxide cannot be prevented from entering into the copper, which decreases forcibly the quality of the copper. The melting costs about \$4 per ton. The inconvenience met with at these refineries is that copper is produced with a low density of current, requiring a large stock of the metal on hand. The melting decreases the quality of the copper and at the same time the expense attached to it. For more than six years Mr. Thofehrn has been experimenting for a process which will avoid this inconvenience, in competition with Elmore and others. All known devices and apparatus have been tried in order to ascertain their advantages and disadvantages. In building up his process Mr. Thofehrn has made it his aim to avoid as far as possible all those details that have proved unsatisfactory. He finally succeeded in devising a process which joins the utmost simplicity with rapid work and good quality of product, being at the same time economical. The process operates as follows: A hollow cylinder about 8 ft. long and 3 ft. in diameter is immersed in the electrolyte and forms the cathode on which is taken the precipitate of copper with a density of 50 amperes up to 100 amperes per square foot. The anodes in Mr. Thofehrn's tanks are common converter pigs; ingots, shot or scrap, or whatever is at the disposal of the refiner, and white metal containing 75% to 80% copper, have all been used satisfactorily. It is an advantage that this copper in its crude market shape can be used without transforming it previously by melting into plates for anodes, and it is a saving of about \$3 per ton. The cylinder which is used as a cathode revolves in a tank at slow speed, and the copper that precipitates upon it is in the shape of extremely fine crystals, assuming the form of octagonal needles or hairs, which can only be seen through a powerful microscope. In order to produce a good and dense deposit of copper

these microscopic needles or hairs must be interwoven, felted and compressed. This is attained by the action of numerous small jets of electrolyte directed under pressure against the revolving cylinder. While, apparently, to the naked eye no action whatever seems to follow from the jets, the final result is remarkable. The copper deposited is to the full extent of its thickness, thoroughly dense, even after continuous annealing and hammering no foliation whatever can be obtained. The foliation is one of the main drawbacks of the Elmore process, rendering its use for the manufacture of tubes, etc., unsafe. The method of directing a stream of fresh electrolyte on the surface of the cathode has another advantage. The whole cylinder is surrounded by the fresh liquid coming from the epuration tanks and no matter how impure the anodes are and how large the amount of impurities in the liquid the cathodes are fully surrounded by clean electrolyte only. The course of the liquid is as follows: From the epuration tanks it is directed against the cathode surrounding it with a layer of about  $\frac{1}{4}$ -in. thickness. It goes from there to the anodes and then to the collecting tanks previous to its return to the epuration tanks. As the density of current employed is very high and in consequence the process very active, a special method for the epuration had to be devised. This was done, and the one now being employed fills its duties very well. The method of working is almost purely automatic. After 1-in. thickness of copper is deposited upon the cathode, the precipitate is taken off by opening the cylinder by means of a small hydraulic jack, especially devised for this purpose. The plates of the deposit on the cylinder are not continuous. A small seam is left in the cylinder for the attachment of the hydraulic jack. After opening the plates sufficiently to slide out the cylinder, the latter is placed on a cast-iron bed plate held on one side. A heavy roller is inserted and rulled forward by a hydraulic ram, thus transforming the plate into a flat sheet, having dimensions according to the size of the cylinder used. The plates so produced are ready to go to the rolling mill without previous melting or annealing. In case wirebars are to be produced a full cylinder of copper is deposited on the cathode. This cylinder, after obtaining sufficient thickness, generally 1 in., is taken off the mandril, placed on a lathe and cut by means of a circular saw into a strip having a width conforming to the demand. As the cylinders are about 8 ft. in length and about 3 ft. in diameter, the length and weight of these strips are considerable. Generally, the strips produced are 1 in. square in section, and after passing through a roughing die, which cuts away the sharp angles, the strips are directly brought to the regular draw-benches, and can then be drawn down to any desired size without annealing. The quality of the copper produced in this way is higher than that produced in the usual way by melting, etc. The conductivity is generally 100%, Matthieson standard. The tensile strength is about 75,000 lbs.; elongation about 2%; number of twists in 6 in. of No. 12 wire, about 100. All tests were made on hard-drawn wire. The expense of refining copper by this process is estimated to be about \$16 per ton, including all the processes of transforming the crude copper into the finished product, ready for the rolling mill and for the wire-drawing mill.

**Petroleum in Sumatra.**—An English exchange says that Dr. Muir, a little over four years ago, established an oil refinery for a Dutch company that had discovered oil fields in the far interior of Sumatra. Since that time he has been constantly employed managing the refinery and perfecting the plant. He has now orders to begin the construction of two more refineries, so extensive is the business becoming. The oil region is on the bank of a navigable river, and practically in the heart of the jungle. The Dutch own the island and control the wells, refineries and all business connected with their development.

**Iron Ore in Sweden.**—A strong syndicate has been formed in Sweden for the construction of the railway from Gellivara to the Ofoton Fjord in North Norway. Recently the route of the line has been surveyed by a party of engineers, which reports favorably upon it. The line would run from Gellivara past the enormous iron deposits of Kirunavara and Luossavara, in Lapland, and connect the Baltic and Russia with the North Atlantic Ocean. It is stated that five Scandinavian banks have undertaken to find the money necessary for the construction of the line, which would be completed in two years.

**Big Lake Cargoes.**—Chicago advices mention an extraordinary cargo taken out of South Chicago by the steamer *Queen City* one day recently. That boat, now the holder of the big-cargo record, eclipsed all previous efforts by taking 207,000 bu. of corn. She drew 16 ft. 3 in. forward, and 17 ft. 1 in. aft. Some record-breaking was done also in handling her cargoes. The *Queen City* arrived at South Chicago Monday evening at 5:30 o'clock with 4,109 gross tons of iron ore. Twenty-seven hours later she was being towed down the Calumet with 5,796 tons of grain aboard. The handling nearly 10,000 tons of freight in less than 24 working hours is said to be without precedent.

**Quartz Slate.**—Quartz slate, a highly refractory natural stone, is quarried at Crummendorf, near Strehlen, Silesia. It is, according to a recent German report, a cheap substitute for the best fire-brick. Quartz slate is a mineral of grayish white color, and is of rare occurrence, the Crummendorf quarry being the only one in Germany. Examined by means of a microscope, it shows a fine texture of sharp quartz molecules, which can only have by the pressure of an enormously high water column been brought into connection. The slate is found in layers from 2 to 10 in. in thickness. Its high contents of silica (91.4%) make it extraordinarily fireproof, and it can be worked easily on account of its softness. Quartz slate will, it is stated, last three times as long as the best fire-brick, even if subjected to the highest temperatures. Since 1854 it has been extensively used in Eastern Germany, especially in the manufacturing district of Upper Silesia, in Austria-Hungary, and in Russia, and has recently been used the Rhine province and Westphalia for cupola, welding and puddling furnaces, Bessemer converters, etc.

**Coal Production in Prussia.**—For the six months ending June 30th, the production of coal in Prussia was 37,735,084 metric tons, showing an increase of 3,262,240 tons, or 9.5% over the first half of 1895. The output of lignite (brown coal) for the half year was 10,429,322 tons, an increase of 959,401 tons, or 10.1% over last year.

**Steam Engines in Germany.**—Official estimates for 1895 place the steam power used in the German Empire as follows: Stationary steam boilers, 88,332; stationary steam engines, 89,932, producing 3,312,357 H. P.; traction boilers, 25,884; engines, 25,322; producing 242,338 H. P., marine boilers, 4,269; engines, 3,235, producing 902,793 H. P.; or a total of 115,000 stationary and traction steam engines, producing 3,500,000 H. P. This does not include the steam power used in the military shops, naval yards and railway service, the figures of which are not published.

**Effect of Electricity on the Flight of Projectiles.**—The effect of electricity on projectiles while in flight has been illustrated by some recent trials of the Swiss army rifle. The *Journal de Genève* states that during this trial strange deflections of the bullets were noticed that could not be accounted for until it was discovered that an electric line paralleled the range. Experiments were made by building a line of four steel cables the full length of the range, 780 ft., and about 120 ft. from it. When these cables carried a heavy current of electricity the lateral deflection for this distance was about 70 ft. For a longer range the deflection was much increased; with artillery, and a range of 9,000 ft., the deflection from the true line is claimed to reach the enormous amount of 14°. It is not stated whether the deviation is toward or away from the electrical cables.

#### PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING SEPTEMBER 8TH, 1896.

- 567,140. **CLEANING-ROLLER FOR ORE-CONCENTRATORS.** William H. Hooper, Angel's Camp, Cal. The combination of a cleaning roller supported in contact with the belt to have lateral movement to correspond thereto, the roller having a guide adjustable on the bearing thereof to engage the edge of the belt and thus maintain its position in relation thereto.
- 567,141. **APPARATUS FOR LEACHING ORES.** Story B. Ladd, Washington, D. C., Assignor of one-half to George B. Chittenden, same place. The combination of two or more troughs or trough sections, with a conveyor adapted to feed the pulp in a continuous flow successively through the same, each of the troughs having an independent fluid-supply pipe for the inflow of a solution independent of and different from that of the others, and a discharge for the charged solution from each of the troughs.
- 567,187. **CRUSHING ROLL.** Thomas A. Edison, Llewellyn Park, N. J. The combination of the inner cylinder, the outer wearing surface composed of a number of separate shoes or plates, integral depending lugs on the plates entering sockets in the inner cylinder, and the interposed lining of comparatively soft but inelastic material, having openings therein through which the lugs extend.
- 567,312. **APPARATUS FOR TREATING MINE-WATERS.** Charles W. Goodale, Butte and Hiram W. Hixon, Anaconda, Mont. The combination with a sump located a suitable depth within a mine and collecting the waters from different levels of the mine, of a tank having a feed-pipe delivering into the sump, a feeder for the tank, a pump connected with the sump and provided with a discharge leading to the top of the mine, and a pipe leading from the discharge and delivering water to the tank.
- 567,371. **BRASS-SMELTING FURNACE.** Rudolf Baumann, Seebach, Switzerland. Patented in Switzerland February 18th, 1895, No. 9,538, and in France February 18th, 1895, No. 245,205. The combination with a crucible furnace, a crucible located therein an intercepting crucible arranged over the escape passage thereof, adapted to utilize the heat escaping from the furnace comprising an inner receptacle of graphite and the like and an inclosing shell with a free draft space between it and the inner receptacle, the crucible being placed over the main crucible furnace, to align with the crucible thereof with the free draft space connecting with the space around the main crucible.
- 567,381, 567,382. **MAGNETIC SEPARATOR.**—Rudolf Eickemeyer, Yonkers, N. Y.; Rudolf Eickemeyer, Jr., executor of said Rudolf Eickemeyer, deceased. The combination of a rotative drum provided with longitudinal separating bars of iron, and an interior stationary electromagnet, having a series of ribs or cores, segmental in form and each inclosed longitudinally by its own winding or field coil.
- 567,411. **BLAST-FURNACE OFFTAKE.**—William Rothhoff and Marvin A. Neeland, Duquesne, Pa. A blast furnace, having an inclined annular pipe about its upper portion, a down-comer connected to the pipe, and an annular series of gas outlets provided with branch pipes leading to the annular pipe.
- 567,448. **ORE FEEDER.**—James M. Bible, Denver, Colo., Assignor to the Colorado Iron Works Company, same place. The combination with the feed table, the shaft for operating the same, and the clutch mechanism for giving the shaft intermittent movement operated through the tappet, the clutch mechanism comprising a flanged wheel fixed to the shaft, a lever pivoted on the shaft, a split ring fitted to the interior periphery of the flange, and a rod pivoted directly to the lever and depending therefrom, the rod being adapted to spread the ring to grip the flange and to move the wheel partly around on each downward movement of the lever.
- 567,503. **PROCESS OF EXTRACTING GOLD AND SILVER FROM THEIR ORES.** Louis Pelatan, Paris, France, and Fabrizio Clerici, Milan, Italy. The process consists of in submitting the ores to the action of a comparatively weak cyanide solution, rapidly revolving an anode in the solution over a fixed cathode passing a current of electricity from the anode to the cathode, adding sodium chloride to the solution to enable a current of low electro-motive force to flow from the anode to the cathode, maintaining the potential of the current below the point at which electro-decomposition of sodium chlorides takes place, and retaining the sodium chlorides in solution unchanged.
- 567,513. **APPARATUS FOR DRYING PHOSPHATES.** Emile Ruelle, Blanc Meseron, France. Patented in France, January 28, 1887, No. 181,103, and January 14, 1893, No. 218,608, and in Belgium, February 18, 1887, No. 76,391, July 11, 1890, No. 91,226, October 23, 1891, No. 96,924, December 6, 1892, No. 102,436, and July 22, 1893, No. 105,665. The combination of a drying apparatus comprising two rotary concentric truncated cones having their inclinations reversed, crushing-balls between the two cones, angle-irons secured to one of the cones to guide the crushing-balls, the two cones communicating with each other at one end only, this end of the apparatus being provided with a furnace having a flue opening into the inner cone, and means for forcing air into the inner cone, the other end of the inner cone being provided with a charging hopper, and a chimney leading therefrom and having a damper.
- 567,551. **PROCESS OF MAKING CYANIDES.** Julius Raschen, Liverpool, England. Assignor to the United Alkali Company, Limited, same place. The process consists in mixing the sulfocyanide with water and heating it in presence of an excess of oxidizing agent, such as specified, to nearly the boiling point of water, and passing the evolved gaseous mixture in contact with a solution of caustic alkali, or alkali earth, so that the hydrocyanic acid is absorbed thereby.

## PERSONAL.

CAPT. WILLIAM BLICK, superintendent of the Brashears Coal Company, Cincinnati, O., has resigned his position.

MR. W. H. CASE has removed from Charlotte, N. C., to New York, where he has established his office at No. 203 Broadway.

MR. T. A. RICKARD, Mining Engineer and State Geologist of Colorado, has gone to Silver City, Idaho. He expects to return to Denver by September 20th.

MR. GEORGE H. MYERS, of Bethlehem, Pa., a well known anthracite coal operator, has returned from a three months' tour of Norway, Sweden, Germany and France.

MR. JOHN MOYNAHAN has resigned the superintendency of the Le Roi (B. C.) mine and will direct operations at the Iron Colt mine, which will be worked at once.

HON. F. P. CLUTE, Tennessee State Commissioner of Labor, has resigned to take the position of general manager of the Glen Mary Coal and Coke Company, of Scott County.

MR. ROBERT H. SAYRE, Sr., general manager of the Bethlehem Iron Company, accompanied by MR. JAMES K. MOSSER, of Allentown, has returned from a ten weeks' visit to Northern Europe.

MR. MAUNSEL WHITE, of Bethlehem, Pa., has gone to St. Petersburg, Russia, to witness an armor-plate test, as a representative of the Bethlehem Iron Company. He will be absent about six months.

MR. H. D. CONANT, of Great Falls, Mont., for several years connected with the local smelter, left last week for Ecuador to assume the management of the Paza de Ore Mining Company, which is composed of American capitalists.

MR. HENRY M. HOWE has, we regret to say, had an attack of typhoid fever, but is now recovering his health. A report in circulation that Mr. Howe had been suffering from nervous prostration had no foundation whatever in fact.

MR. THEODORE E. SCHWARZ, mining engineer, of Denver, Colo., has gone to the Salmon River District of Idaho to examine and report upon some properties for Boston and New York parties. He will probably be absent three or four weeks.

MR. WILLIAM H. DAVIS, of Nesquehoning, Pa., who was recommended by the mine examiners for the position of mine inspector of the Hazleton District, vice JAMES RODERICK, resigned, has had the recommendation confirmed by Governor Hastings.

MR. NEWTON DUNYAN has resigned his position with the Centennial-Eureka Mining Company in Juab County, Utah, with which he has been actively connected for the past seven years, and will for the present devote his time to the development of properties in Deep Creek District, in which he is interested.

MR. C. E. PALMER, the well-known manager of the Argonaut-Juniata Mining Company, in Pitkin County, Colo., has been engaged as consulting engineer for the Union Mining Company's properties. Mr. Palmer is also manager for the Mollie Gibson Company, of Aspen, and consulting engineer for the C. O. D. and the Moose Companies of Cripple Creek.

CAPT. W. E. HALL, formerly of the Alice and Paulin mines near Butte, Mont., has taken charge of the Le Roi mine at Roseland, B. C., as superintendent, in place of Mr. John Moynahan. Capt. Hall is one of the best known mining men of the West and for 15 years was superintendent of the Alice. Before going to Butte he held a similar position at the Prince of Wales mine in Utah.

HON. A. F. PARKER, a well-known mining man of Grangeville, Idaho, and one of the owners of the Relief Mining and Milling Company, operating a valuable group of gold quartz mines in Idaho County, was a candidate for governor before the State Democratic Convention of Idaho. Had he been successful the mining interests of the State would have largely benefited by the occupation of the executive office by a practical mining man.

## OBITUARY.

NELSON WESCOATT died at Bellevue, September 7th, aged 75 years. He came to the Pacific coast in the year 1850 and first settled at Marysville, Cal. Removing to Nevada, he made a reputation as a mining expert. After serving several years in the Nevada State Senate, he amassed a large fortune in mines in Colorado and other States.

JOSEPH GRIFFITHS died at his home at East Elizabeth, Pa., on August 30th, aged 63 years. In early life he was connected with various iron firms in the vicinity of Pittsburg, and then entered the employ of the Lysie Coal Company and remained with them 18 years. In 1893 he formed the Mingo Gas Coal Company and was the sole owner of it.

COL. NORMAN WIARD died in Reading, Pa., on September 11th, aged about 70 years. Col. Wiard was a well-known expert on heavy ordnance and an inventor of guns and projectiles. During the war he was employed by the government in the manufacture of guns and projectiles. Since the

war he has frequently appeared before committees of Congress as an expert, and has devoted his time to invention and experiments in his specialty. Some years ago he conducted the famous Nut Island experiments in gunnery, near Boston, which attracted the attention of artillery experts the world over. For some years he has resided in Reading, superintending the manufacture of guns at the Scott foundry. Some years ago he was engaged by the government of Japan as an artillery expert, and remained in that country for three years.

## SOCIETIES AND TECHNICAL SCHOOLS.

NORTHWEST MINING ASSOCIATION.—This association will hold its second annual convention, October 5th, 7th and 8th, in the city of Spokane, Wash. The association has grown in strength and usefulness during the past year, 225 vice-presidents having been appointed in the new mining districts, all of them within the States of Washington, Montana, Idaho, Oregon and the Province of British Columbia, each being the local head of a branch organization auxiliary to the main body. To this convention each branch body will send a delegate, one to each of its five members. The request that each district, as well as individual owners of mines, send ores is being respected, and a fine display will be afforded. There will be present geologists, scientists, mining engineers and practical miners, who will address the convention. The evening of the third day will be closed with a banquet.

## INDUSTRIAL NOTES.

The Illinois Steel Company's branch works at Joliet started up September 15th after an idleness of two months, giving employment to 2,000 men.

Plumb, Benedict & Barnard, proprietors of the nut and bolt works at North Tonawanda, N. Y., resumed work August 31st, with a full force of 400 men.

Randolph Brandt, New York, manufacturer of the Selden patent packings, recently shipped a large order of the Selden packing to the gold fields of South Africa.

The National Tube Works Company, McKeesport, Pa., in its annual report, shows a profit of \$900,000 for the year, making the present surplus of the company \$1,300,000.

The Jencks Machine Company, Sherbrooke, Que., have orders for five plants of mining machinery for British Columbia mines, the total amount aggregating over \$100,000.

The Taylor Iron & Steel Company, of High Bridge, N. J., has commenced work on a large pattern shop. When completed, a number of additional men will be employed.

The Buffalo Forge Company of Buffalo, N. Y., has opened an office in New York City at No. 26 Cortlandt street, in consequence of the increased demand for its high-class high speed engines.

The Duncannon (Pa.) Brass Works, in Dauphin County, have been leased by M. Abrahams, of Cincinnati, O., and the plant will be improved and put in operation within a few weeks. The name will be changed to the Standard Brass Works.

The Bethlehem (Pa.) Iron Company has shipped a retort cylinder, and a half sleeve for a gun weighing over six tons, to the Washington Navy Yard. Seven hoops for 13-in. and 4-in. guns, weighing 26½ tons, were also shipped to the same destination.

The New York Chemical and Electrical Company of New York City has been incorporated with a capital of \$50,000. The directors are James H. Mason, W. A. Montignani, Edward C. Reiss, Maryland, and Charles H. Ridgway, of Brooklyn.

The Cambria Iron Works resumed work September 14th with 3,000 men, after a shut-down of nine days. General Manager Price states that the steel works, open hearth, blooming mill No. 1, rail mill and three blast furnaces, are the departments which have resumed.

Spang, Chalfant & Company's puddling department and pipe mill at Etna, Pa., were started last week on full turn, after a shut-down of three weeks, caused by the flood, which devastated the Pine Creek valley a month since. Over 500 men were given employment.

The Dunham, Carrigan & Hayden Company, of San Francisco, Cal., have contracted to furnish material to the government for laying a line of submerged pipe across the channel from Vallejo to Mare Island to supply the Navy Yard with water. The line is 6 in. diameter wrought-iron galvanized pipe; the total length is about 3,000 ft. Thirty ball and socket joints will be used and sixty National reinforcing joints.

The Thomas Iron Company held its annual meeting of stockholders at the company's office in Hokenau, Pa., September 8th, at which the following officers and directors were chosen: President, B. F. Fackenthal, Easton; secretary and treasurer, James W. Weaver; directors, Samuel Thomas and J. W. Fuller, Catawauqua; W. H. Hulick, Charles Stewart, Frederick R. Drake, Easton, and W. P. Hardenburgh, Newark, N. J.

The La Belle Iron Works Company, Wheeling, W. Va., held a meeting of stockholders last week and heard the annual report of Secretary Wright. The following directors were elected: Cecil Robinson, W. E. Elliott, J. E. Wright, Thomas Prince, A. J. Clarke, Harry Franzheim and W. T. Burt. The cold roll department of the tin mill will be increased at once by the erection of a new mill and the extension of the cold rolls.

The Air Pressure Cylinder Company, of New York City, has been incorporated, with a capital of \$1,000,000. The directors are Charles E. Warren, of Noroton, Conn.; Henry A. Robinson, of Yonkers; John T. Little, Jr.; Henry L. Stimson, of New York City; George E. P. Howard, of South Orange, N. J.; Michael Sandford, of Hackensack, N. J., and William B. Dorman, of Brooklyn. The company is incorporated to manufacture high-class material and appliances for the transmission or use of gas, air or other substances at high pressure, and the making, using, developing, leasing and selling such materials and appliances, manufactured or unmanufactured, and using the same for power or other purposes.

## MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the *Engineering and Mining Journal* of what he needs he will be put in communication with the best manufacturers of the same.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the *Engineering and Mining Journal* are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

## GENERAL MINING NEWS.

OIL EXPORTS.—Exports of mineral oils from the United States in August were 88,045,592 gals.; for the eight months ending August 31st they were as follows: Crude, 75,757,153 gals.; naphtha, 6,041,036; illuminating oils, 485,802,136; lubricating and paraffin, 33,170,614; residuum, 159,810; total, 600,929,859 gals., an increase of 58,727,517 gals. over the corresponding period of last year.

## ALASKA.

ALASKA TREADWELL GOLD MINING COMPANY.—This company reports its clean-up for the month of August as follows: Period since last return, 31 days; bullion shipment, \$88,817; ore milled, 22,475 tons; sulphurets treated, 388 tons; of bullion there came from sulphurets, \$27,732; unable to state gross expenses for period. The average yield was \$3.95 per ton of ore milled.

## ARIZONA.

## GILA COUNTY.

(From Our Special Correspondent.)

BLACK COPPER GROUP.—These claims, bonded by Messrs. Ford & Fleming, of Phoenix, are looking fine. Superintendent Hill is sinking a shaft now down 100 ft., all in ore and a crosscut is just started to find the width, which is believed to be 30 ft. The ore is entirely of the mineral species chrysocolla and is at a contact. What little water comes into the shaft is charged with copper sulphate and coats iron tools with copper, which is regarded as a favorable indication for large deposit of sulphide ores below necessary for smelting the silicate ores, now in sight, which otherwise will have to be leached.

BREEMAN MINE.—Mr. Breeman, formerly of Silver City, N. Mex., has just completed a five-stamp mill on the southeast side of Penal Mountain, nine miles south of Globe, and will run it on the ores taken from his various prospect tunnels there.

LOST GULCH.—John Kasser has returned from the East and is preparing to add 10 stamps to the 10 dropping last Spring at the Kasser mine. He will also put up a 10-stamp mill at the Gerard mine, which is under his management. Mr. Sultan and other local owners of promising claims in this gold basin six miles west of Globe are pushing work.

OLD DOMINION COPPER COMPANY.—The hoisting shaft of this company is now down 75 ft. below the eighth level, or 475 ft. from the surface. Contrary to the expectations of the former owners and well-informed mining men here, ore is being found at this depth. Ore was struck 70 ft. below the eighth level, and, while lumpy, is high-grade carbonate of copper in iron. It is not being explored and shaft sinking continues. In the west drift about 300 ft. from shaft a crosscut northerly toward the foot-wall has cut about 30 ft. of iron and copper, which is being stoped and sent direct to smelter. In the east drift, somewhere about 400 ft. from the shaft, a cave of the back exposed a body of ore, but continued caves and heavy ground have prevented examination. One 40-ton smelter is now in operation. It is reported that one of the new 100-ton jackets is now nearly here and a second ordered. It is said that relations between men and management are not yet entirely pleasant since the strike.

UNITED GLOBE MINES.—This property will shut down by September 1st, except for development work. The new 120-ton water-jacket furnace is nearly here and will be put up at once. The wire bucket-train is all up but bins and mounting cable.

Grading for the new hoisting plant on the Hoosier is about finished. It is impossible to learn the condition of the various mines owned by this company, but the deadwork is certainly producing some fine ore from the lower levels, at the Hoosier particularly.

## YUMA COUNTY.

**HARQUAHALA GOLD MINING COMPANY.**—The following is from the report of Assistant Manager Thomas D. Murphy for the month of July, 1896:

The cyanide department was in operation 28 days. The amount of pulp treated was 4,329 tons; average assay of pulp, \$3.49 per ton; average assay of tailings, \$1.17 per ton; percentage extracted, according to assays, 66%; bullion, estimated to yield \$5,493.

In the milling department 10 stamps were run 12 hours per day for 28 days on Bonanza lessees' ore. Amount of ore crushed, 280 tons; average assay of ore, \$16.12 per ton; average assay of tailings, \$3.98 per ton; percentage extracted, according to assays, 74%; bullion, estimated to yield \$5,237.

The total revenue was \$7,771, and the total expenses \$6,610, leaving a profit of \$1,161.

## ARKANSAS.

## PULASKI COUNTY.

Fine samples of bauxite have been found near Little Maumelle, about 15 miles west of Little Rock. According to reports there is a large supply of bauxite in the Little Maumelle country.

## CALIFORNIA.

## AMADOR COUNTY.

(From Our Special Correspondent.)

**ALMA.**—The shaft at this mine, in the town of Jackson, has reached a depth of 815 ft. When the 1,000-ft. level is reached a station is to be cut and the mine opened up.

**HOWARD.**—At this mine, near Pine Grove, G. P. Rixford, the new owner, is grading for a new mill site, as he intends to erect a 10-stamp mill at once. It is reported that a 6-ft. ledge has been discovered on this property and that work has been commenced by drifting.

**POCOHONTAS.**—This mine, near Drytown, is being opened up by Eastern people, who have incorporated under the name of the Pochontas Improvement Company of Charleston, W. Va. Allan W. McWayne is superintendent. There are two veins on the property, and it is said a contract has been let to sink a double-compartment shaft 600 ft.

**POTAZUBA MINING COMPANY.**—This company was recently incorporated with a capital stock of \$100,000. Place of business, Sutter Creek. Directors, T. T. Lane, of Angels Camp; J. Nichols, Jackson; E. S. Barney, Drytown; E. C. Voorhees, Sutter Creek, and Wm. J. McGee, Alameda.

## MARIPOSA COUNTY.

**MERCED GOLD MINING COMPANY.**—Delinquent stockholders of this company are in receipt of a circular from the company demanding payment of the \$2 per share installment called and levied by the directors June 18th, 1896. Notice is given that unless the installment is paid at once, the stock, together with all previous payments thereon, will be advertised and become forfeited to and be the property of the Merced Gold Mining Company in accordance with the statutes of the State of Montana.

(From Our Special Correspondent.)

**MARIPOSA ELECTRIC POWER COMPANY.**—This company has been incorporated with a capital of \$1,000,000, all subscribed, and \$100,000 paid in. The incorporators are Capt. Augustus H. Ward, Charles T. Lindner, George L. Ecker, Wallace B. Taylor and Harold C. Ward. A dam 85 ft. in height is to be built on the site of the Old Broadhead Dam on Merced River, eight miles above Benton Mills. Engineer C. E. Allerdt and a corps of assistants have already completed the survey of the flume line, which will convey the water eight miles and give a 225-ft. fall. If the present plans of the company are carried out, this power plant will aid materially the development of many valuable mining properties in Mariposa and Tuolumne counties, which have remained idle for want of cheap power and water. The power station will be located near the Mariposa Grant, the property of Jno. W. Mackay, Senator Jones and others, for which it is said \$10,000,000 was refused a few months ago.

## PLACER COUNTY.

(From Our Special Correspondent.)

**CEDAR CREEK.**—These placer mines are near Dutch Flat, about a mile south of Shady Run. The new bed-rock tunnel is now in about 250 ft. This tunnel is located 60 ft. lower than the first one, and will be run in 800 ft., being low enough to work the channel to advantage. It will be completed in about four months. The gravel goes \$2.40 per carload, and plenty of water to work with.

**HIDDEN TREASURE.**—This mine, at Sunny South, in the Michigan Bluff District, is doing well, the last cleanup being the best it has had for years. About 100 men are at work. The company is opening up an air shaft at the old Mountain Gate mine.

**MORNING STAR MINING COMPANY.**—At a meeting of the directors, August 31st, a \$5 per share dividend was declared.

## SIERRA COUNTY.

**THISTLE SHAFT.**—It is reported that last week rich gravel was opened up in this mine. The mine is in Gibsonville Ridge, through which extends a river channel, filled with rich gold-bearing gravels.

## TUOLUMNE COUNTY.

**WONDER MINING AND MILLING COMPANY.**—This company was incorporated recently for the purpose of buying and selling land and engaging generally in a mining and milling business. The directors are: J. C. Linderman, Hubert W. Linderman, Fred Linderman, John M. Haskell and J. N. Barstow, all of Alameda. The place of business will be at Big Oak Flat.

(From Our Special Correspondent.)

**JUNCTION MINING COMPANY.**—This company has been incorporated with a capital of \$100,000. Directors: W. H. Storms, Charles G. Yale, H. S. Durden, W. A. Hall and R. S. Clark. The property of the company is located near Soulsbyville, the claim being on patented land alongside of the Soulsby mine. A telegram from the superintendent, W. H. Storms, received September 7th, says a 2-ft. ledge has been struck, which shows rich ore, and is undoubtedly an offshoot from the Soulsby Ledge.

**SAN YSABEL.**—At this mine a full force of men is again at work. The machinery for the new electric plant is nearly all in position and will soon be turned over to the company by the contractors.

## COLORADO.

## BOULDER COUNTY.

**ORPHAN BOY EXTENSION GOLD MINING AND MILLING COMPANY.**—This company has elected the following officers for the ensuing year: W. P. Daniels, president, Ward; C. H. West, vice-president, Kansas City; N. C. Merrill, secretary and treasurer, Denver; W. E. Forker, Burlington, Ia.; H. N. Richmond, Bradford, Pa.; Edward Lange, Topeka, Kan.; J. N. Ives, Boulder; H. L. Mayer, Denver; E. E. Ives, Kansas City. W. P. Daniels is resident manager. The directors decided to push the long tunnel in the Dew Drop property, which has now attained a depth of 1,000 ft., and also to work night and day with air drills on the Adit Company's tunnel, which is on the same lode as the Dew Drop, and when this tunnel reaches the east end lines of the Orphan Boy Extension property a back of 300 ft. will be attained below the long tunnel level.

**RUBY.**—This mine, at Sunnyside, is shipping considerable smelting ore to the Argo smelter which gives good returns, while 52 tons of mill stuff treated in the Boston mill, now owned by the Gulf Gold Mining Company, netted over \$10 per ton after deducting all expenses. Development work is being pushed with two shifts.

## CHAFFEE COUNTY.

**DOLOMITE MINING AND LEASING COMPANY.**—This company, owning a group of claims 12 miles east of Buena Vista, has struck good values. The claims lie on a continuation of the Leadville belt in a quartzite, lime and porphyry contact. The ores are dry and show no lead. They carry about 20% of copper.

**MADONNA.**—Don Valdez, the manager of this mine, at Monarch, is arranging matters preparatory to resuming work. For the past three years the property has produced no ore, but has been kept in constant repair. A force of four men has done considerable prospecting and other work, so that the property has at all times been in readiness to go to work. The Madonna was once a famous producer and employed 150 men.

**MIDNIGHT.**—This property, owned by citizens of Buena Vista and several Kansas City people, has a 110-ft. shaft down on a true fissure vein from which two 40-ft. drifts have been run. The vein is 18 in. wide at the bottom of the shaft, and carries from 3 to 12 oz. in gold per ton. This property is in the Crooked Creek District, three miles south of Buena Vista.

**SALVATOR MINING AND MILLING COMPANY.**—This company is developing a group of claims on the north slope of Princeton Mountain. All the claims carry separate veins between granite walls. They are now running a tunnel which is expected to cut each of the three veins, the first at a depth of 50 ft., the second at 75 ft. and the third at 100 ft. The tunnel will ultimately connect with an air shaft sunk on an incline on the upper vein and a large body of stopeing ground opened up. The ore is said to mill on an average 50 oz. in silver, 40 to 50% lead, and considerable gray copper. The silver lies in a sulphide ore.

## EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

**ABE LINCOLN.**—At this property, owned by the Marinette Company, and situated in Poverty Gulch, the shaft is being sunk below the 250-ft. level and they are driving an east drift at the 200-ft. level. A No. 7 Cameron pump forces 50 gals. of water per minute from the 250-ft. level. The lawsuit between the Arcadia and the Abe Lincoln is set for trial the coming week. It involves a point of law which has not been heretofore argued in the camp and from the number of lawyers and mining experts on both sides promises to be an interesting case.

**CHRISTMAS.**—This property, on Bull Hill, is fast coming to the front. The shaft has been sunk 235 ft., and this week, while a winze was being sunk from the 175-ft. level to connect with the 235-ft. level at a point 50 ft. north of the shaft, a 12-in. seam of ore was found, which yields free gold in abundance. The ore here during the last 100 ft. has been largely a telluride, in an unoxidized condition, and now at the depth of 215 ft. it is wholly oxidized.

**DEAD PINE.**—This is one of the two properties owned by the Ophir Mining Company, situated on the south slope of Battle Mountain, and is worked

under lease and bond by Messrs. Tom Maloney and Dennis Sullivan for 21 months at an expense of nearly \$7,000. The shaft has been sunk 400-ft. and the lessees are now preparing to erect ore bins, as they are sanguine that the present appearance of the mine warrants such an expenditure. The first shipments made from the now famous Battle Mountain was made from this property in April and May of 1892, and the first wagon road on the mountain was made by the Ophir Company. At that time, when the shaft was less than 40 ft. deep, the company refused \$60,000 cash for the property and almost uninterruptedly from that time to the present the property has been at work under lease; first by the Matoa Mining Company, next by Mr. Joe Watson and friends, and for nearly two years by the present lessees.

**E. PORTER GOLD KING.**—This mine, on Gold Hill, is being actively developed by the owner, Mr. E. Porter, of Joliet, Ill. The shaft is being sunk below the 300-ft. level, and a drift is being extended north from the 300-ft. level. For 50 ft. the pay streak is about 12 in. wide, of ore which averages \$100 per ton. The machinery and buildings are of the best.

**GRANITE HILL.**—This mine, in Poverty Gulch, has a shaft sunk 30 ft. The rate of progress will be faster, as nine men are now employed. A 10-ton shipment was recently made, three tons of which sampled \$412 per ton and seven tons yielded \$191 per ton. The samples of the purchasers and sellers were very close: 20'58, 20'6, 9'52 and 9'58 oz. At the depth of 27 ft. a drift was extended north 13 ft. in order to decide the course of the vein. In spite of the prospecting surrounding this fractional claim no one has yet found the extension.

**HILLSIDE.**—One day recently this mine sampled 18 tons of a good grade, which came from its 60-ft. shaft. This prospect yields some high-grade ore.

**INDEPENDENCE.**—The Peck Mill is now being thoroughly renovated, and will be at work, or at least it is so reported, in three weeks, and this time we hope with genuine success.

**JEFFERSON MINING COMPANY.**—The Mattie L., owned by this company and situated on Gold Hill, has a shaft 500 ft. deep. At that point drifting is being done both north and south. The company employs 14 miners. The lease on the upper part of the working terminates on October 1st, when the mine will be worked by the company. The lessees have done well.

**MAY BELLE.**—This claim, on the Lawrence Town site, to which reference was made last week, is being worked by seven men. The telluride is scattered through the rock, the latter being the finest-grained telluride bearing rock that can be found in the camp. The deepest point that the present lessees can strike the vein above the tunnel level is about 100 ft. Within two days after the announcement of the reported strike there were 37 applications for leases on blocks of ground 500 x 100 ft. The ore is being carefully assorted for shipment.

**MCGINTY.**—This claim, in Poverty Gulch, is not the richest prospect in camp, is certainly the most compact and unique. It is located within the limits of the Midland Terminal Trackage yard. The shaft and the steam plant are located between two lines of track; the hoist is about 6 ft. from the shaft and the waste rock is trammed over two lines of track. The shaft has been sunk 106 ft. deep and a steam pump is constantly at work. On this claim real estate is valuable.

**MOON ANCHOR.**—This mine, on Gold Hill, is still being vigorously worked by 42 men. The water has fallen off lately and one boiler can easily supply steam for hoisting and for pumping purposes. The management was rather surprised to find 12 in. of oxidized ore fully 100 ft. below the line of "permanent saturation." The shaft has been sunk 400 ft.

**PRINCE ALBERT.**—This property is being actively worked by several sets of lessees, some of whom are shipping. The Babbit lease recently shipped 25 tons of ore which sampled \$65, and now has 50 tons for shipment and has other ore in sight. The Doyle lease has a shipment ready for market.

**REBECCA COMPANY, LIMITED.**—The C. O. D. property, owned by this company, of Paris, has, for the past few months, in fact during 1896, had hard pulling "against the stream." But very little ore has been shipped. Doubtless the vein is passing through a barren zone, which several other mines have also had. The pumps are lifting the water with ease, about 750 gals. of water per minute through a 10-in. column (Cornish style), and using 6-in. steam pipe. It is the intention of the manager to dam the water back, if possible.

**TRAIL.**—This mine, on Bull Hill, worked under lease and bond by Mr. Perry, of Denver, last month shipped 300 tons of ore, varying from 2 to 2½ oz. per ton. The shaft has been sunk 280 ft. and the drift north from the shaft looks well.

## FREMONT COUNTY.

**COLORADO FUEL AND IRON COMPANY.**—This company resumed operations at its Florence mine, on September 8th, after an idleness of three months. This will give employment to 500 men. Other mines in the district are expected to open soon.

(From Our Special Correspondent.)

**ALGER-KANSAS.**—Messrs. Morris and Gaines have taken a 90-day option on this mine, which they are testing with a view to purchase. The property comprises some 750 ft. on the eastern end of the

Kansas vein and has for some months been worked on a small scale by a party of leasers.

**CLIMAX MILL.**—The Kansas-Burroughs Company have terminated their lease of this mill, finding, doubtless, that it is cheaper and more satisfactory to rent a section in a good custom mill than to run a 25-stamp mill on their own account. Meantime the owners are grading for the purpose of bringing the tramway into the mill.

**EAST CENTENNIAL.**—A new 25-H. P. engine and boiler have been placed in this mine, in Russell District, near the Saratoga.

**GETTYSBURG.**—At this mine, in Russell Gulch, the manager states that they have struck a large body of good ore in the shaft. The Gilpin Tramway is being extended into the mine.

**GOLD COIN.**—It is reported that the Kansas mine is to be unwatered to the bottom, 200 or 300 ft. below the present level. Little or no active work has hitherto been done by the present company on this vein, the past record of which, however, is good enough to warrant vigorous development. The Kansas vein, in fact, has been one of the steadiest and largest producers in the county. Developments in the lowest level on the Indiana are disappointing, yielding only mill dirt of low grade, and the same may be said of the stopes above. The portion of the pocket within the leased Hidden Treasure ground is at present producing the best ore. The total production of the group remains fairly steady.

**GOLDEN DOLLAR.**—This property, near the Delaware, in Russell District, is being worked on lease by a party of tributers.

**INGRAM.**—The last shipment of nine tons from this mine, on Pine Creek, netted \$80 per ton. The shaft is now down 60 ft., and the mine really seems a good "prospect," although valued much too high by the owners. This is, however, the only producer worth mentioning at Pine Creek, and it should not be necessary to point out that one small shipper is altogether insufficient to justify the boom which interested parties have for months been trying to work up. A great deal of prospecting has recently been done throughout the county, and a few promising claims have been located, notably at Moon Gulch and Elk Park, but it is a stretch of language to even speak of these as in the Pine Creek area.

**SLEEPY HOLLOW.**—Work on company account has been entirely suspended throughout the mine, the unworked ground being let out to tributers. Outside of the known payshoot no development or other work has been done, and all the payground has been taken away as fast as it was opened up.

#### HILLSDALE COUNTY.

**SUPERIOR.**—An important strike is reported to have been made in Carson Camp. A. G. Woods and his associates, while doing the assessment work on the Superior and World Beater claims, opened up a body of ore carrying silver, copper and gold.

#### LAKE COUNTY.

(From Our Special Correspondent.)

**THE LEADVILLE STRIKE.**—Since my telegram of last week there has been but little change in the situation. On Friday a number of the men working at the Coronado were badly beaten while going to their homes. Otherwise, there has been no move up to this time.

The water situation is being watched very carefully by mining men. There is not a gallon of water being raised to the surface west of Carbonate Hill, a condition of affairs which has not existed in this camp for nearly seven years. Since 1890 there has been a tremendous drain of the vast subterranean water courses, and the water level has been very perceptibly lowered; but there is a hidden pressure somewhere which forces the water up all the time, so that now, since the pumping has ceased, it rises to the level of the drifts and gradually fills up miles of workings which it has cost much money to put in the present condition.

Fryer Hill is at present more seriously affected than any other part of the camp; the Union Leasing and Mining Company had very thoroughly drained that basin and taken out much ore. Shortly before the strike came on the company was making active preparations to explore the second contact, but it is learned that the entire Fryer Hill basin has been abandoned, and it would now cost over \$200,000 to drain it.

The Weldon is still working, as is also the Coronado property. It cannot be very long, however, before the water will drive out these people.

**CATALPA-CRESCENT.**—This property is being operated by J. F. Horner, who is handling 150 tons per day of manganese iron ore. It is not expected that the water will bother these people.

**GOLDEN EAGLE MINING COMPANY.**—Secretary Allison has notified the stockholders that the company will pay a dividend of 1c. per share on September 15th. Transfer books closed on September 12th.

**PRINTER GIRL.**—McAllister & Company will in a few days begin operations on this property, located on Printer Boy Hill. No work has been done there for a number of years. The shaft was originally sunk to the depth of 100 ft. to contract. Rich ore was found, and the lessees at that time made considerable money.

**P. T. LODGE.**—Lessees on this property, located on Rock Hill, have uncovered some stuff which assays 1½ oz. gold and 68 oz. silver. Operations will be pushed to locate the main ore body.

**SEDALIA.**—This property is still operating, having not yet been affected by the water from the Resurrection mine. The latter's pumps were working at a distance of 700 ft., which was below the bottom of the Sedalia, so that this property is certain to feel the effects of the rising water very soon.

**STARS.**—The Morning and Evening Star mines closed a contract last week for 200 tons a day of their iron ore, to go to the Philadelphia Smelting and Refining Company at Pueblo.

#### SAN MIGUEL COUNTY.

**SILVER PICK.**—This mine has closed down, throwing 121 men out of employment. No reasons have been given for the suspension of work.

#### GEORGIA.

##### WALKER COUNTY.

**CHICKAMAUGA COAL AND IRON COMPANY.**—This company, of Chickamauga, has decided, so it is announced, to expend about \$100,000 upon the construction of a battery of 200 coke ovens at its mines, and also a washing plant and other facilities. The company intends to coke its entire output of coal, which is reported to be 1,000 tons daily. The company employs 250 men in its mines, and will add 100 to its force at once; 60 are at work on the erection of the new coking plant.

#### IDAHO.

##### BLAINE COUNTY.

**INDEPENDENCE.**—This mine, four miles east of Ketchum, has been purchased by B. R. Towndrow. Several expert reports which have been made upon the property agree, it is said, in placing an average value upon the crude ore found throughout the mine from 3 ft. in width at one point to 6, 7 and 8 throughout most of the claim, at about 25 oz. silver per ton and 5% lead. There is ore on the hanging wall in many places from 3 to 12 in. in width which can be shipped without milling, and which contains 175 oz. silver per ton and 65% lead.

##### BOISE COUNTY.

**SUMMIT.**—The shaft of this mine, five miles north of Idaho City, has reached the vein at a depth of 115 ft., and it is expected the ore will mill about \$75 per ton in free gold. The mine was worked at a depth of 80 ft. and the ore yielded well two years ago.

##### LATAH COUNTY.

**MUSCOVITE.**—This mine is located in Robinson Mining District, in a spur of the Coeur d'Alene or Bitter Root Mountains, six miles north of the town of Moscow. The mine is developed in four levels, by tunnels, and all upon the vein. The vertical depth attained is 225 ft., and the total number of feet driven is now 4,265. This vein has attained a width of 10 ft. in the lowest level. Another vein, 12 ft. wide, parallel to this vein, was also discovered. The hanging and foot walls are granite and mica slate, while the vein itself is a feldspar, in which lies the blocks of mica.

**WHY NOT GOLD MINING COMPANY.**—This company has decided to continue development work and will contract for the extension of the tunnel in the Black Bear mine, which is already in 50 ft.

##### OWYBEE COUNTY.

**CUMBERLAND.**—A body of good ore has been opened up in this mine at Silver City. A streak 18 in. in width is said to assay \$250 per ton. This discovery is 150 ft. below the surface.

**DE LAMAR MINING COMPANY, LIMITED.**—The following is the return reported for the month of August: Crushed during the month 4,357 tons of ore; bullion produced in the mill, \$65,098; estimated value of ore shipped to smelters, \$4,300; miscellaneous revenue, \$300; total produce, \$69,698; total expenses, \$43,990; profit for the month of August, \$25,708.

**OLD GLORY MINING AND SMELTING COMPANY.**—This company, of Boston, now has the Henrietta mine at Wagontown, and is pumping it out and putting it in shape for production.

##### SHOSHONE COUNTY.

**BANNER.**—Mr. Glidden, who purchased this property some months ago, recently struck the ore body 100 ft. from the surface and found 4 ft. of gold-bearing quartz.

**HECLA.**—The leasers of this mine have also leased the Gem mill and have nine cars of ore ready to concentrate. In the mine a shaft was sunk 100 ft. and drifting both ways commenced near the bottom, a few feet being left for a sump. The ledge there shows about 5 ft. of ore. Average assays on the concentrates are said to be about 70% lead and 55 to 60 oz. of silver to the ton.

**RED CLOUD MINING COMPANY.**—This company was incorporated recently with a capital stock of \$500,000, and the following board of directors and officers were elected: A. E. Carlson, president; Will E. Finch, vice-president; Harry R. Allen, secretary-treasurer; A. N. Gilbert and J. E. Gyde, of Wardner. The home office is at Wallace. The mine is located on Pine Creek, about three miles below Wardner. The claim has been located for seven or eight years. There had been a tunnel run in for 50 ft. At a depth of 15 ft. in the shaft a body of concentrating ore 4 ft. across has been struck.

#### ILLINOIS.

##### BUREAU COUNTY.

**SPRING VALLEY COAL COMPANY.**—A new coal mine has been opened up by this company which is situated 200 ft. east of the shaft destroyed by fire two years ago, and the work on it is so near completion that in a few weeks coal will be hoisted. The bottom, where the coal is hoisted from, is 100 ft. long by 14 ft. wide. The side walls are of brick, 2 ft. thick, resting on a stone foundation, roofed by iron girders, 6 x 15 in., resting on a heavy capstone.

##### ST. CLAIR COUNTY.

The miners and operators of the East St. Louis district reached an agreement September 14th to return to the scale of January 1st, which is 12½% above present figures. The men wanted a raise of 20% and the result is a compromise.

#### KANSAS.

##### CHEROKEE COUNTY.

(From Our Special Correspondent.)

**REN BUTLER COMPANY.**—Last week this company started to drift at 118 ft. on a large face of zinc ore in shooting ground, and will make a good output of ore this week.

**BRINDLE STEER COMPANY.**—They are drifting at 118 ft. on a large face of lead and zinc ore in shooting ground, with a good cap rock. Last week they were taking up an 8-ft. stope that is very rich in ore. When they get back to the head of their drift they will have a 24-ft. face of ore to work. They are producing weekly about 27 tons of zinc ore and 20,000 lbs. of lead. The lead lies above the zinc ore.

**EZELL, YOUNG, BEIRUS & COMPANY.**—On the Purcell lease this company has opened up a rich zinc prospect and is drifting at 95 ft. on a 26-ft. face of zinc ore in shooting ground with a good cap rock. Last week they turned in 19 tons of zinc ore from the dirt taken out in sinking the shaft. They put up a steam hoister and built a wash place, and will turn in 25 tons of jack this week. This same company owns the Keystone mine, on the North Empire lease, which is a very large producer of both lead and zinc ore. At 73 ft. they have a large body of ore in open ground and enough water to wash the dirt.

**GRAY EAGLE COMPANY.**—This company is drifting at 90 ft. on a large face of lead and jack in open ground, with enough water to wash the ore. They are producing weekly more than 5 tons of zinc ore and 50,000 lbs. of lead. The ore is cleaned on hand jigs.

**HUFF & O'NEIL.**—On their 40 acre lease of the Gauder land they have opened a good lead prospect at 60 ft. in flint ground. Several prospect shafts are going down on this lease.

**JONES, PHOENIX & COMPANY.**—This company, on the Noble-Shriner lease, is sinking in good pay dirt, which was struck at 34 ft., and continued to 65 ft. They will go through it before commencing to drift.

**J. R. HOLMES.**—The Columbia plant is running steadily on his 15-acre lease on rich dirt, and is producing every week from 75 to 90 tons of high-grade zinc ore, and 30,000 to 50,000 lbs. of lead. Drifting is being done at 110 ft. on a large face of ore in flint ground and enough water to run the plant.

**LANDRETH & MILLER.**—They are drifting at 115 ft. on a large face of zinc ore in shooting ground. They have just opened up the drift, and are obtaining more than 15 tons of high-grade zinc ore each week.

**M. QUAD COMPANY.**—Last week they were building a high derrick and wash place, and will start to hoist pay dirt this week. They are drifting at 115 ft. on an 18 ft. face of zinc ore in open ground, and producing about 28 tons of high-grade zinc ore each week.

**PAGE & STOUGH.**—Harry C. Stough and John Page have made the richest strike so far in the year 1896. They have leased nine acres of the Bloomington land near the old Stanley diggings, and last Tuesday broke through a cap rock at 12 ft., from under which they have been shoveling out large quantities of zinc ore. A drill was pushed down 8 ft. farther, showing at least that much more open ground. The first dirt taken out was about three-fourths zinc ore. It is creating a great deal of excitement in the camp. The land is owned by a company of Bloomington capitalists and Vice-President Adlai Stevenson is a large stockholder in the company.

**RAINS & NATHAN LEASE.**—This company has bought the Harrison Steam Concentrating plant at Spring City, and will rebuild it at their pump shaft. It will be running in two weeks. They have now on top over 500 tons of crush ore ready to run through the plant. They have a large face of ore at 90 ft. in shooting ground on which they are drifting.

**RUBY COMPANY.**—This company has leased 40 acres of the Bonanza land, and last week at 25 ft. struck rich zinc ore. They are still sinking through pay dirt, and are down 49 ft. with good ore in the bottom of the shaft.

**SPRING RIVER MINING COMPANY.**—This company has leased 40 acres of M. Carter, across Spring River two miles west of the Bonanza land, with an option for 80 acres more. In a shaft, now going down, a fine vein of porphyry and flint rock carrying seams of lead was reached at 46 ft. which has the characteristics that indicate richness when depth is attained. They are now down 65 ft. and are getting good zinc ore in flint ground.

## MISSOURI.

## BUCHANAN COUNTY.

At Hall's Station, near St. Joseph, Burdick & Rollar believe they have struck a 14-in. vein of bituminous coal. They have leased 200 acres of the land on which it was discovered and will commence to develop it at once. The mine opening is less than three-quarters of a mile from the crossing of the Rock Island, Santa Fe., Hannibal, and the Kansas City systems.

## JASPER COUNTY.

(From Our Special Correspondent.)

**JOPLIN ORE MARKET.**—The output of ore last week was the same as the week before, but the sales were considerably larger, although the prices were about the same. The top price paid for zinc ore was \$20 per ton, with an average of over \$18 per ton. There are about 1,000 tons of zinc ore on hand. The smelters are shipping their spelter to Europe, and Vivian & Son, of Swansea, Wales, bought about 10 car loads of zinc ore, which were shipped to Wales to be smelted there. The price of lead was \$13.75 all week, until Saturday, when the buyers raised 25c. per 1,000 lbs., with the usual 50c. added for hauling. The following was turned in from the different camps in the district: Joplin zinc, 1,207,370 lbs.; lead, 223,460 lbs.; value, \$15,314; Webb City zinc, 369,890 lbs.; lead, 47,010 lbs.; value, \$4,010. Cartersville zinc, 1,004,200 lbs.; lead, 127,000 lbs.; value, \$10,858. Galena, Kan., zinc, 2,520,000 lbs.; lead, 421,000 lbs.; value, \$26,054. Aurora zinc, 1,050,000 lbs.; lead, 126,000 lbs.; value, \$8,851. Alba zinc, 93,720 lbs.; value, \$937. Oronogo zinc, 42,000 lbs.; lead, 14,910 lbs.; value, \$559. Totals for the district: Zinc, 6,288,280 lbs.; lead, 959,380 lbs.; value, \$66,613.

**COLONEL STEERS.**—This plant is running steadily on dirt taken from the Phoenix shaft and yielded 30 tons of zinc ore and 20,000 lbs. lead last week. This week they will hoist dirt from the Orchard City shaft, where they have a large face of zinc ore at 150 ft. in hard ground and no water.

**DIXON & COMPANY.**—This company is running its plant steadily on rich dirt and producing 40 tons of high-grade zinc ore and 10,000 lbs. of lead every week. They are opening a large body of ore at 135 ft. in open ground, and will run double shifts as soon as the price of ore increases.

## LAWRENCE COUNTY.

(From Our Special Correspondent.)

**AURORA DISTRICT.**—All the mines in this district made good turn-ins last week, and there is more work being done in this camp than there has been for years.

**BABER, LOWRY & SONS.**—They are getting into fine lead at their shaft on the Old Banister lease, on the Hall land, at a depth of 25 ft. It is a good prospect for a big body of ore in shallow ground.

**BLACK CROOK.**—An output of over 15 tons of high-grade zinc ore was made from this mine on the Kentucky land.

**JOHN SCHMOOK LAND.**—This land made a large output of silicate last week and several new prospects are being opened up.

**LITTLE NUGGET.**—This mine, on the Kentucky land, now shows good promise. They are shooting into a large body of ore at 152 ft., the deepest run ever struck in the camp.

**MINOR & ROGERS LAND.**—Last week the Scott & Seburn mines got out a large amount of zinc and silicate, while Galbraith & Company made a good showing for their second output from that shaft.

**REED LAND.**—There are a large number of prospectors getting ready to begin work on this land. Besides the big strike made last week by Joe Hughes, there are also several other shallow prospects from which good lead is being hoisted, while others are getting down to good pay dirt.

**THOS. HACKMAN & COMPANY.**—An output of ore will be made the present week from a rich run of silicate on which they are drifting at 60 ft. on the Dayton land.

## MONTANA.

## GRANITE COUNTY.

**GOLDEN SCEPTRE MINING AND MILLING COMPANY.**—The 100-stamp mill which is being placed at this company's mine is nearly completed and most of the machinery is placed.

## LEWIS AND CLARKE COUNTY.

**ESLER GROUP.**—The failure of the First National Bank at Helena has caused the shutting down of four mines in and near Rimini, besides a concentrator, also in Rimini. The mill and mines are leased by A. M. Esler, who has his money tied up in the defunct institution. The mines are in the Lee mountain, which is in Rimini—Lady Meagher, Lady Washington, MacCumber and Morrison, above Rimini, on the side of Red Mountain. The mill is the Lee Mountain concentrator. The shut-down throws not less than 50 men out of employment.

## SILVER BOW COUNTY.

**BOSTON & MONTANA MINING COMPANY.**—The miners engaged in cross-cutting at the 600-ft. level of the Atlantic property east of Meaderville, belonging to this company, have cut into the ledge, but tapped such a large body of water that it has been impossible to ascertain its width or degree of richness. The great volume of water encountered since the ledge was cut has retarded operations and the efforts of the workmen have since been directed to keeping the mine from being flooded. Arrange-

ments are now being made for the installation of suitable pumping machinery, after which work will be resumed.

## NEVADA.

## ELKO COUNTY.

**BOURNE COPPER MINING COMPANY.**—This company, just incorporated by Salt Lake City parties, owns six copper claims in the Salmon River mining district, 60 miles north of Wells.

## LANDER COUNTY.

**AUSTIN MILL.**—It is reported that through General Manager P. T. Farnsworth it has been learned that plans and specifications have been drawn and laid out for the building of a new mill near the Clifton tunnel at Austin. The mill will be of 30 stamps, to commence with, concentrators, and a general reduction works.

## LINCOLN COUNTY.

**DE LAMAR GOLD MINING COMPANY.**—This company's cyanide mill, at De Lamar, is said to be handling 200 tons a day.

## STOREY COUNTY.

**VIRGINIA MINERS' UNION.**—At the semi-annual election on September 4th, the following officers were elected without opposition: President, J. J. Quinlan; vice president, P. F. Brannan; recording and financial secretary, J. F. McDonell; treasurer, J. L. Finnegan; conductor, E. A. Holmes; warden, W. J. Bolen; finance committee, Jacob Baumann, James Kennedy, E. P. A. Pyne; board of library directors, J. B. Bendy, R. J. Ivey, T. F. O'Connell, John Young, Thomas Maguire; board of trustees, John S. Gallagher, P. J. McNamara, M. P. McDonald, B. Connolly, M. James.

## WHITE PINE COUNTY.

**CLEMENTS BROTHERS.**—A large and rich vein of gold ore is reported to have been struck on the south side of Egan Canyon, three miles south of Ely, by the Clements Brothers.

**SAN JOSE MINING COMPANY.**—Hemrich, Hedges & Brown have bought the property of this company, Egan Canyon, Cherry Creek, for \$30,000, and will put in a cyanide plant. This property was formerly superintended by Gen. W. S. Rosecrans, when owned and worked by the Donohoe-Kelly bank of San Francisco.

**SHALLENBERGER.**—It is reported that these placer mines, at Osceola, recently cleaned up \$12,030 from 24 days' work. There is much rich gravel, but no water in that vicinity.

## NEW HAMPSHIRE.

## HILLSBORO COUNTY.

**NEW ENGLAND & WESTERN GRANITE COMPANY.**—Negotiations have just been completed whereby the large granite plant at Marion, about five miles from Greenville, owned by this company, will pass into the hands of James F. Dolan, one of the largest granite cutters in the country. The plant was destroyed by fire on June 23d and a loss of \$50,000 was entailed, but the work of reconstruction will commence at once.

## NEW MEXICO.

## COLFAX COUNTY.

**GOLDEN AJAX.**—Returns recently from a 100-ton mill run of free gold ore taken from this mine above Elizabethtown, yielded 58.13 oz. and melted over \$1,000. This is comparatively a new mine. The development consists of 75-ft tunnel, which has shown a vein to be fully 300 ft. wide. The Golden Ajax is owned by a company of five people, Jacob King, of Elizabethtown, being president and C. R. Slusser, of Salt Lake City, secretary.

## NEW YORK.

## ONEIDA COUNTY.

**WHITE LAKE GRANITE COMPANY.**—This company has been organized to quarry granite and other stone at Forestport. The directors are: John A. Cole, James Cole, Northville, N. Y.; L. N. Littauer, Gloversville, N. Y.

## NORTH CAROLINA.

## MOORE COUNTY.

**COLUMBIAN MINING COMPANY.**—This company, at Carter's Mills, has discontinued its gold-mining business.

## OHIO.

## BELMONT COUNTY.

**ROCK HILL.**—These mines, employing 300 men, near Bridgeport, were closed by the state mine inspector, being unsafe.

## JEFFERSON COUNTY.

**KNOX OIL AND GAS COMPANY.**—Last week this company struck a small well on the McClain farm, west of Toronto, producing five or six barrels, although only a few feet in the sand. The well will be drilled through and shot.

## LUCAS COUNTY.

**G. H. & L. C. VAN VLECK.**—These parties have completed their No. 1 well on the E. S. Wynn farm, located in section 25, Oregon Township. The well produced 60 bbls. in the first 24 hours.

## SANDUSKY COUNTY.

**FT. ORANGE OIL COMPANY.**—This company has completed its No. 10 well on the J. F. Wichman farm, located in Section 10, Madison Township. The well produced 120 bbls. in the first 24 hours.

**MASTERMAN & COMPANY.**—This company has completed No. 1 well on the C. Taylor farm, located in Section 23, Madison Township. The well produced 120 bbls. in the first 24 hours.

## SENECA COUNTY.

**J. D. DOWNING.**—No. 7, well, on the W. Snider farm, located in section 8, Jackson Township, has been completed. The well produced 90 bbls. in the first 24 hours.

## STARK COUNTY.

Coal 6 ft. in thickness has been discovered under the farm of David Teeple, one mile north of Wilnot, near Massillon, at a depth of 60 ft. The vein is a foot thicker than the average in this valley, and lies much nearer the surface than is common.

## OKLAHOMA.

## LOGAN COUNTY.

Silas Gammon, living on a claim a mile and a half from Orlando, has found rich deposits of zinc on his farm, and now has a force of men taking out the ore, and will ship a carload of it to the Argentine smelter, to make a thorough test of the find.

## OREGON.

## BAKER COUNTY.

**GOLD RIDGE MINING COMPANY.**—At present an average of 16 tons a day is being put through a 10-stamp mill. The ore is free milling and yields \$11 to \$25 per ton. A tunnel is being run to intercept the vein at a depth of 275 ft. from the surface, while the company has recently decided to sink the shaft 300 ft. below the present level, which will give it a total depth of over 500 ft.

## PENNSYLVANIA.

## ANTHRACITE COAL.

**A. PARDEE & COMPANY.**—This company's Cranberry colliery near Hazleton, started up September 11th for the first time since last January, when the breaker was destroyed by fire. Eight hundred men are given employment.

**DELAWARE & HUDSON CANAL COMPANY.**—Preparations are being made to sink a new shaft for the Leggett's Creek colliery, at Scranton, the property of this company. This new shaft will be about 700 ft. deep, and will reach the two lower veins, which have heretofore not been worked, thus adding a new lease of life to the Leggett's Creek mine, one of the oldest in the North End.

**MT. CARMEL COAL LANDS.**—A deal has been consummated whereby J. H. Foy and M. W. O'Boyle, of Pittston, and H. J. Brennan, a resident of Carbondale, have secured control of about 200 acres of valuable coal land, near Mt. Carmel. The tract of land is considered valuable, inasmuch as it is known that there are at least three large veins of coal which have not yet been touched, namely, the Buck Mountain, Mammoth and the Lykens Valley. The gentlemen interested secured control of 100 acres of this land a few months ago, and last week made arrangements whereby the other 100 acres will pass into their control. Sinking of the slope has been commenced.

**PHILADELPHIA & READING COAL AND IRON COMPANY.**—It is said this company is flushing portions of its old Indian Ridge mine in order to reclaim 500,000 tons of good coal which has been allowed to stand as pillars.

## BITUMINOUS COAL.

**CONVENTION OF UNITED MINE WORKERS.**—The morning session on September 15th was devoted to the discussion of a resolution reported by a committee, favoring a 50c. rate for mining to enable employers of union miners to compete with others. National President Penna addressed the convention, advising the adoption of the 50c. rate, provided it would not endanger the integrity of the organization. A motion to maintain the existing seventy-cent rate was voted down. In the afternoon session it was decided by a practically unanimous vote to reduce the rate to 54c. per ton, and the district officers were authorized to announce further reductions, from time to time, as the rate paid by the New York & Cleveland Gas Coal Company may be reduced.

**WAMPUM RUN COAL COMPANY.**—The engine-house of this company, situated near Wampum, was destroyed by fire a few days ago, the contents being consumed by the flames. It is not known how the fire started, but it is thought to be of incendiary origin. The loss will be about \$25,000 partially covered by insurance.

## CHESTER COUNTY.

A discovery of gold on the Bauman farm, near Hoffmansville, is reported. Mr. Bauman took some samples of the ore to a Philadelphia assayer which were free-milling, rich in both silver and gold, yielding about \$20 per 1,000 lbs.

## MERCER COUNTY.

**NEW LEBANON OIL COMPANY.**—This company has been incorporated and will drill on leased ground near Sandy Lake.

## WARREN COUNTY.

**CITIZENS' GAS COMPANY.**—This company's new oil well, on Queen Creek, situated 4½ miles south of Tidioute, on warrant 5,207, is making 150 bbls. through the casing. This well opens up a large streak of new territory. It is a black oil and comes

from a sand that appears to be something new from anything that has been struck heretofore.

**SOUTH DAKOTA.**  
**WESTER COUNTY.**

**GRAY COPPER.**—At this mine the main shaft, under the superintendence of Mr. Frank Pettibone, is making rapid headway and a depth of 35 ft. has been attained. The ore thus far encountered is in the form of a white talc, mingled with a bluish-purple quartz, the whole conglomerated and cemented together. Assays from this ore have been obtained running high, but the results thus far have not been in anywise uniform. The indications are that the quartz (which contains the gold) is becoming more condensed and banded as depth is attained.

**TENNESSEE.**

**CANNON COUNTY.**

**STANDARD OIL COMPANY.**—This company is making extensive preparations to bore for oil in this county. Options have been secured on large tracts of land, and ten wagon loads of machinery were recently carried to the region where signs of oil have been discovered.

**JEFFERSON COUNTY.**

**BERTHA MINING COMPANY.**—This company, of Knoxville, has opened mines near Mossy Creek, and is preparing to build smelting works. The deposits of zinc ore have already been considerably developed.

**MAURY COUNTY.**

The phosphate deposits recently discovered at Mount Pleasant are being worked and several car loads of the phosphate are shipped daily.

**ROANE COUNTY.**

**JOHN J. CRAIG COMPANY.**—This company, of Knoxville, has leased the sandstone quarries on White Oak mountain, near Kingston, owned by James H. Welcker, of Knoxville. The sandstone is of a fine quality and of a reddish-brown color, not unlike in character to the famous brown sandstones of Long Meadow, Conn. These deposits are near the Tennessee river, to which the stone can be transported by a tram road at but little cost.

**UTAH.**

**BEAVER COUNTY.**

**MONTE CARLO MINING AND MILLING COMPANY.**—At present four men are employed at the Monte Carlo mine under the superintendency of Mr. Dupaux, who has a large amount of ore blocked out. It is the intention of the company to move the mill from Beaver Canyon to Hay Springs, and in the meantime consignments of ore will be made to Salt Lake City.

**GARFIELD COUNTY.**

A reported discovery of tin on the hills west of Panguitch has caused considerable excitement in that section, and the ground thereabouts is being quickly located and staked off.

**IRON COUNTY.**

**UTAH SPUR.**—It is reported that A. Murphy and Otto Will, both well known Mercur mining operators, have secured a \$20,000 bond and lease on this mine, which was the first silver discovery to be made in State Line District, and on which rich ore was discovered at the grass roots.

**IRON COUNTY—STATE LINE DISTRICT.**

(From Our Special Correspondent.)

**CREOLE.**—There are 100 ft. of workings on this prospect, and a vein 3 ft. thick, averaging \$50 in gold, has been encountered. A streak 10 in. thick assays well in gold.

**OPHIR.**—The incline shaft, on this prospect, is down 110 ft. from the croppings, and is in ore all the way. No stopping is being done, but 64 tons of ore have been extracted in the sinking of the incline, 10 tons of which sold for \$3,200 per ton. The ore resembles trachyte in appearance and is high-grade in silver and gold.

**SHOEBRIDGE-BONANZA.**—A vein 18 in. wide has been discovered near the surface on this property. The bottom of the main shaft was only 12 ft. from the vein on its dip, and a drift that length developed the ore, which carries silver and some gold.

**SULPHIDE.**—This is so far nothing but a prospect, but has been bonded to a Mr. Lennaux, of Wisconsin, for \$50,000. It has a strong ledge carrying free gold in rich quantities.

**JUAB COUNTY.**

(From Our Special Correspondent.)

**BUCKEYE.**—A new strike is reported on the 200-ft. level of this property, the ore assaying 88 oz. silver, \$18 in gold and 65% lead to the ton.

**MAY DAY.**—The management of this property, in the Tintic District, will put in a power plant to operate machine drills in development. A tunnel is now being driven to intersect the main ore belt that has been exposed in the Sioux-Utah on one side and the Godiva on the other of the May Day.

**NORTH STAR.**—This company has started a new double compartment vertical shaft to intercept the vein on its dip below the present depth of the old workings.

**PINTE COUNTY.**

**GOLDEN STAR MINING COMPANY.**—A shipment of 2,022 lbs. of ore from the Blue Bird mine, one of the properties of this company, near Marysvale, has been made. It was an assorted lot picked from a

20-in. streak in the vein, and assayed after sampling 33 oz. silver and 8.92 oz. gold, bringing \$170 per ton in the market. The ore body in the main vein, where the lot was mined, is 4 ft. thick. The company is building a tunnel house and ore bins for the output of the mine.

On the Grasshopper, another mine in the group, a tunnel has been run 285 ft. and a second tunnel 100 ft. A contract has been let to drive the latter tunnel 60 ft., where it is expected to intersect on its dip a strong ledge that crops out well on the surface, and at a depth of 130 ft. The recent assessment of 1c. per share has become delinquent, and as a result over 17,000 shares were sold to pay the assessments. The remainder of the 300,000 shares paid up.

**SALT LAKE COUNTY.**

**ANTELOPE GROUP.**—This group of four claims, at Bingham, has been purchased by George W. Keel. The erection of a complete plant is to be begun at once. It is said Mr. Keel is associated with a syndicate.

**WINNAMUCK.**—A discovery has been made on the 200 ft. level of a body of galena ore 4 ft. thick, lying directly under what was supposed to be the foot-wall. While widening the level on the east of the main shaft for additional tunnel tracks this new ore body was encountered. It has been stripped along and up the vein so far that, according to Colonel Sowers, there is now a large amount of ore in sight. The main incline has passed the 300-ft. level, where a station has been cut and a drift started to the east to reach this ore body on its dip.

The discovery is explained by the finding of an immense "horse" of quartzite, the same material as the foot-wall, which has been exposed for 200 ft. up and down the vein.

(From Our Special Correspondent.)

**OPHIR.**—This Bingham property is now making regular shipments of two cars a week of a highly silicious ore that carries a good deal of gold. The vein is 2 ft. thick and the ledge is well defined on the surface.

**TOOELE COUNTY.**

(From Our Special Correspondent.)

**GREAT EASTERN.**—Work has been resumed on the sinking of the shaft which, it is expected, will reach the ore at a depth of 300 ft. The property is in the Mercur district.

**SONG BIRDS.**—It is announced that a half interest in this group, which embraces 40 acres in the Mercur district and adjacent to Captain de Lamar's Golden Gate, has been sold by W. S. Fugate to Simon Bamberger, of Salt Lake. The purchasers will stock the property for \$1,500,000, and will put a shaft down 400 ft. where the theoretical dip of the vein should reveal ore.

**UINTAH COUNTY.**

(From Our Special Correspondent.)

**VERNAL.**—Samples of copper ore from a vein said to be 5 ft. thick, near Vernal, have yielded well in copper with small values in gold and silver. The discovery is near the northern line of the Uintah reservation.

**WASHINGTON.**

**KING COUNTY.**

**APEX.**—This mine, near Skykomish, is operated by McCartney & Proctor. They have three tunnels in, the longest being 230 ft. They have taken out and shipped to the smelter two carloads this year and two more are ready for shipment. The ore is said to return \$50 per ton.

**WESTERN SLOPE MINING COMPANY.**—The mine now being developed by this company is known as the Coney, and has a tunnel 185 ft. in length. Several thousand dollars' worth of machinery, consisting of a diamond drill, together with piping, cars, track and other fixtures, is being put in.

**KITTITAS COUNTY.**

(From an Occasional Correspondent.)

**ROSLYN COPPER DEPOSITS.**—A late copper discovery is attracting much attention in this district and promises to be one of the richest strikes in these parts. Fifteen locations have been made on this lode. Parties bring in fine specimens assaying high in copper and carrying silver and some gold also. Specimens of native copper have also been found. In some places the ledge shows 8 to 10 ft. thick and stands up very prominently.

**LYNCH BROTHERS.**—The first stamp mill in this district, owned and operated by these parties, has just made its first clean up showing \$43 in pure gold per ton, besides concentrates.

**PIERCE COUNTY.**

**TACOMA SMELTING AND REFINING COMPANY.**—This company's product for July was 5,200 bars bullion, weighing 535,692 lbs., containing 2,301 oz. gold, valued at \$47,579; 45,848 oz. silver at 67c. per ounce, or \$30,718; 532,357 lbs. lead at 26c. per pound, or \$13,842, a total of \$92,139. There were 78 men employed, and the pay roll was \$5,650, and for woodchoppers and teams, \$610, a total of \$6,260.

**SKAGIT COUNTY.**

The first shipment of asbestos has been made from the mine in the vicinity of Lyman.

**WEST VIRGINIA.**

**JACKSON COUNTY.**

**SPRAGG OIL AND GAS COMPANY.**—This company, which has under lease 2,000 acres of land at Elk

Fork, while developing their first well for oil struck a gas well with 1,200 lbs. pressure.

**MARION COUNTY.**

**SOUTH PENN OIL COMPANY.**—In the Gordon sand territory on Flat Run, north of Mannington, this company drilled in a test well last week on the Price farm that started to flow from the Gordon at the rate of 15 bbls. an hour.

**MINGO COUNTY.**

**CAMP BRANCH COAL AND COKE COMPANY.**—This company, of Dingess, was incorporated recently with a capital of \$25,000. The incorporators are James H. Boyd, Edward Thomas and W. H. Thomas, of Dingess; Claude L. Gaufot, of Williams-town, and H. T. Wilson, of Fairmont.

**TYLER COUNTY.**

**SPRAGG & COMPANY.**—The latest report from this company's well on the Mayfield farm at Conway is that it had produced 90 bbls. in 12 hours. This shows a decline over the yield of the previous day, when the well was credited with 10 bbls. an hour.

**WYOMING.**

**CARBON COUNTY.**

**DOUGLAS.**—A tunnel 250 ft. in length has been driven on the vein, which for that distance has averaged about 4 ft. in width. About 85% of the ore is free milling and it is said to average high. A shaft is now being sunk on the vein from the tunnel.

**CONVERSE COUNTY.**

**COPPER KING.**—The owners of this mine struck ore in their tunnel recently, which, when assayed, was found to yield well in copper and a little gold. They have 23 in. of this ore at the point where it was found.

**FREMONT COUNTY.**

It is reported that Captain Charles O'Connell and Tom Sun have transferred 3,000 acres of gold placer land in the vicinity of Oregon Buttes, in the South Pass district, to E. A. Green, of New York, the consideration being \$150,000. Mr. Green is also largely interested in the West Side Placer Company, in the Four Mile District.

**LARAMIE COUNTY.**

The Grant smelter in Denver is said to be negotiating with Hartville mine owners for a trial shipment of iron ore to be used for fluxing purposes. This is rendered necessary by the Leadville strike shutting off the supply of fluxing ores from that place.

**SHERIDAN COUNTY.**

**OMAHA SMELTING AND MINING COMPANY.**—This company is going to work a force of men all winter in the Wood River silver-mining camp, and has started on a tunnel which will be 600 ft. long. This property is in the Big Horn country.

**FOREIGN MINING NEWS.**

**BRAZIL.**

**OURO PRETO GOLD MINING COMPANY.**—The July return of this company shows that from the Raposos mine 130 tons of ore were worked, yielding 25 oz. gold, or an average of 0.19 oz. per ton. From the Passagem mine 3,881 tons of ore were treated, the result being 1,439 oz. gold, or an average of 0.37 oz. per ton. The total product was 1,464 oz. gold.

For the full fiscal year, ending June 30th last, the company reports a total of 47,198 tons crushed, the total yield being 18,403 oz. gold, or an average of 0.39 oz. per ton. This shows some improvement over the preceding year, when 16,063 oz. gold were obtained from 46,139 tons of ore, giving an average of 0.34 oz. per ton.

**BRITISH COLUMBIA.**

**OLIVE MINING COMPANY.**—This company was recently incorporated with a capital stock of \$20,000,000. The officers are: President, S. P. Shope, Chicago; vice-president, John A. Manning, Grand Forks, B. C.; secretary, Harry W. Treat, Chicago; treasurer, Edward Blewett, Seattle. The trustees in addition to the above are Mr. McCall, Midway, B. C., and Nells Larsen, Grand Forks, B. C. This company will operate the Volcanic group of five claims, located about eight miles from Grand Forks.

(From Our Special Correspondent.)

**BLUEBIRD.**—This property is situated in the south belt on Deer Park Mountain. There is a shaft 30 ft. deep and it is all on ore, assays of which have run as high as \$4 in gold and \$53 in silver. The Bluebird has been capitalized for \$600,000. The improvements consist of a log cabin. There is plenty of timber for development work.

The president of the company is L. Carter; vice-president, W. R. Newport; secretary, Ed. Bosquet, all of Spokane, Washington.

**CALIFORNIA.**—The diamond drill under the management of Mr. Kelly, with a force of four or five men, has so far penetrated a distance of about 40 ft. from the end of the tunnel, which makes nearly 100 ft. into the ledge. The drill is working well. The full extent of Mr. Kelly's contract has not been made known, but it is understood that a thorough exploration will be made before the completion of the contract.

**CURLEW.**—This property adjoins the Bluebird and Hattie. It is owned by John Earl and Joseph Vogel. There are two distinct ledges on this property. Assays have been made of the ore and they

have run from \$4 to \$25 in gold, and from 47 to 90 oz. in silver. The shaft is sunk 43 ft. and there are two cuts from 8 to 12 ft. in length. The other improvements consist of two log buildings. The Curlew was recently bonded to parties in London, England. The mine is within a few hundred feet of the line of the Columbia & Western Railway. The Hattie, which adjoins the Curlew and is owned by the same parties, is not included in the bond. There has been a small amount of development work done. The surface showing is stated to be as good as the Curlew.

**DEER PARK.**—The shaft on this property, which is situated in Deer Park Mountain, in the South Belt, is now down about 65 ft. Four or five men are at work in the shaft, under contract. The shaft is on ore all the way down, and the grade of the ore is improving with depth. The amount of development work already done on the Deer Park is not, all things considered, very much. The management are confident that depth will verify their anticipations of a rich strike.

The progress made in that portion of the South Belt, of which the Lillie May is the center, is best appreciated in comparison with the condition last fall. There is now twice as much tunneling and shafting, and at least double the number of buildings, with a considerable quantity of shipping ore. The circumference of this circle may be described as the Deer Park, Homestake and Mayflower mines, while in the center are the Lillie May, Bluebird, Curlew, Hattie Brown, Josie Mac, Occidental, Dufferin, and several other propositions which have made more or less advancement since May last.

**EVENING STAR.**—Mr. James Serafford, the manager of this property, has moved into the dwelling and office recently erected on the property, near the lower shaft. A boarding house has also been erected. Development work immediately under Mr. Serafford's supervision is steadily going on. Mr. Serafford is conservative and guarded in his views about the growing prospects of the mine, but is affable and is not afraid to communicate what he considers facts which the public have a right to know.

**TORONTO SYNDICATE.**—This syndicate, headed by Mr. George Gooderham, has purchased three-quarters of the Crown Point group of mines for \$140,000 and taken a working bond on the Tiger and Uncle Sam, extensions of the Crown Point for \$60,000, paying \$5,000 down. The sum of \$75,000 has been arranged for as working capital for the Crown Point. A seven-drill compressor has been ordered from the Rand Drill Company. The syndicate has also purchased the owner's interest in the R. E. Lee and Maid of Erin for \$28,000, but these properties are now under bond. Volney Williamson, one of the vendors of the Crown Point, will remain in charge of the mines.

**SLOCAN DISTRICT.**

On the North Fork, near Gilliam, a new strike has been made of peacock and black oxide of copper. The ledges are 20 ft. wide, and surface assays are reported as high in copper and silver.

**GALENA FARM.**—At a depth of 50 ft. ore has been found, assaying well in lead and silver.

**MEXICO.**

**NATIONAL MEXICAN MINING AND DEVELOPING COMPANY.**—The new mill of this company, at El Pomo, in the Alta District, has just started up. It has a capacity of 30 tons of ore daily, producing from \$180 to \$300 per ton in gold. The plant consists of Cornish rolls, jigs, Huntington mills and Frue concentrators. A Chicago company in which the Armours are interested own and operate this property.

**ONTARIO.**

**RAT PORTAGE DISTRICT.**

**REGINA.**—Another large body of ore is reported to have been struck at this mine recently. The mill made three clean-ups week before last that, it is said, were worth nearly \$1,000.

**SULTANA.**—It is reported that this mine is turning out about \$1,200 monthly from its free-milling ore. It has a large amount of concentrates on hand, and is erecting a \$25,000 chlorination plant for their treatment.

**WILEY'S MINE.**—This new mine, at Lake Harold, is said to be producing about \$1,500 a month with a five-stamp mill.

**QUEBEC.**

Large quantities of asbestos are now being shipped from the Thetford mine to England.

**WESTERN AUSTRALIA.**

**COOLGARDIE WATER SUPPLY.**—A good deal of discussion is taking place in Western Australia with respect to the plans for conveying water to the Coolgardie Goldfields. Under the scheme which has received most consideration at the hands of the government, it is proposed to obtain the water from the Swan River; to pump it up 1,500 ft. high into reservoirs upon the Darling Ranges; and as this elevation is 3,000 ft. short of being sufficient to allow the water to flow along the 340 miles of main by mere gravitation, 22 pumping stations will have to be erected to solve this difficulty. The cost is estimated by the government engineer at \$4,000,000 for a 13-in. main service, of 1,000,000 gals. per day, or \$19,000,000 for a 42-in. main, supplying 10,000,000 gals. The objections to this are, first, that the cost, already great, would be much more than the estimate, and by the

time the water was delivered at the mines would be almost prohibitive; and, secondly, that the construction would occupy a very long time, during which the mining district would be checked in its development for want of the supply. Moreover, the government, it is said, has favored this scheme on inadequate engineering advice, and the opposition to it is so strong that it seems probable it will have to be abandoned in favor of some more feasible proposal.

**LATE NEWS.**

The largest lump of gold bullion ever received at the New York Assay Office—with one exception—came in this week. It is from the Caribou Hydraulic Mining Company, of British Columbia, and weighed 4,740 oz. Though not yet assayed, it is estimated to be nearly .900 fine, and worth consequently about \$85,320.

**ALASKA MINERS.**—The latest advices from Alaska, just received, are rather contradictory. One account says that there are at least 800 miners at Cook's Inlet and elsewhere who are in danger of starvation unless immediate aid is sent them; while another says that there are none except those who intend to winter there and go to work in the spring. The truth seems to be that many miners went to Alaska last spring poorly supplied and not provided for a long Alaska winter; and many of these may be in trouble and need aid.

**BUTTE & BOSTON.**—This company brought out its new proposition for reorganization in Boston, September 18th. The plan provides that the present 7% first mortgage bonds shall be exchanged for new 6% bonds; that the 7% second mortgage bonds shall be exchanged for one-half their amount or face value in new 6% bonds; and that stockholders shall be assessed \$10 per share. Nothing has been heard yet from the 90,000 shares held by the Davis estate, and the plan has been issued without reference to those shares. It is stated that recently an offer of the market price \$1.25 per share, was made for this Davis stock and refused.

**COAL TRADE REVIEW.**

**NEW YORK, Friday Evening, Sept. 12.**  
Statement of shipments of anthracite coal (approximate) in tons of 2,240 lbs., for the week ending September 12th, 1896, compared with the corresponding period last year:

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	81,052	2,452,850	2,566,301

**PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs. for week ending September 12th, and for years from January 1st, 1896 and 1895:**

	1896.		1895.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	36,902	1,615,869	2,319,863
Barclay, Pa.....	1,213	30,248	.....
Beech Creek, Pa.....	52,029	2,071,398	2,634,516
Broad Top, Pa.....	.....	125,964	241,352
Clearfield, Pa.....	72,301	3,251,896	3,239,849
Cumberland, Md.....	73,230	2,311,418	1,976,685
Kanawha, W. Va.....	163,520	2,100,061	1,926,707
Phila. & Erie.....	836	54,527	35,294
Pocahontas Flat Top.....	64,582	2,421,255	1,663,102
Totals.....	370,613	11,112,636	13,440,368

\* For week ending September 5th.  
† For week ending September 7th.  
‡ For year ending August 29th.

	1896.		1895.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	17,157	888,301	510,650
Pittsburg, Pa.....	24,880	1,335,314	1,153,567
Westmoreland, Pa.....	28,765	1,328,634	1,159,759
Totals.....	70,802	3,552,748	2,823,976

**Grand totals.....** 441,415 17,665,384 16,264,264  
Production of coke on line of Pennsylvania Railroad for the week ending September 12th, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 45,291 tons; year, 2,924,061; to corresponding date in 1895, 3,960,213 tons.

**Anthracite.**

The opinion, expressed as to the condition of the anthracite coal trade are rather conflicting, it being variously represented as "dead," "poor," "fair" and "better." There does not seem to have been any marked improvement during the past week. Trade in the smaller sizes is reported as being particularly dull. The retailers are doing a fair business now, yet indications are that the usual fall business will come later this year. As yet the stocks of coal in the retailers' yards have not been greatly diminished. Rail trade to inland points is better now, and all consignments are moving promptly. Lehigh coal is scarce just at present, and one company reports a shortage of egg and stove coal for prompt delivery. Freight rates continue low, but do not seem to have any influence on the volume of coal moving to market.

The September schedule of prices is as follows: \$4 for broken, \$4.25 for egg and chestnut and \$4.50 for stove.

**Bituminous.**

The Atlantic seaboard soft-coal trade is flat and unchanged. Consumers are buying coal from day to day instead of placing contracts for delivery at stated periods, and the contracts made earlier in

the season are for smaller amounts than usual. Shipments are only about one-half of what they usually are.

There continues to be complaints about cutting prices in some quarters, and it is hard to reconcile the cut figures without an allowance of some kind from the main-line railroads, as the decreased production brings the first cost of coal up to a higher figure than usual.

The territory east of Cape Cod continues to be the most active, and there seems to be a slightly increased demand from Sound ports for cargoes at the lowest ocean freight limit.

New York Harbor trade is quiet, but such trade as is doing is of a regular kind that permits of some judgment being formed about its wants.

All-rail trade is quiet and shipments continue to be about the same as for the last month or six weeks. There are some signs that competition is slightly increased in this line of trade.

Transportation from mines is excellent and the same can be said of the car supply. No blockades are reported on any of the lines. Shipments at most of the shipping ports are made promptly and vessels are generally taken in at once on arrival at the loading piers.

There is a slight inquiry from the export trade, though vessels still object to going to South America or the West Indies on account of the quarantine restrictions.

In the coastwise trade vessels are not in good supply. Baltimore has made some offers above current rates of a week ago to secure vessels of desired tonnage at that port.

We quote current rates of freight from Philadelphia as follows: To Boston, Salem and Portland, 50@60c.; Providence, New Bedford and the Sound 50c.; Wareham, 75c.; Lynn, 70@80c.; Newburyport and Bangor, 70@75c.; Portsmouth, 55@60c.; Dover, 80c. alongside and towage; Saco, 75c. alongside and towage; Bath, 60c.; Gardiner, 60c. and towage. Five and 10 cents above these rates are asked from Norfolk, Newport News and Baltimore.

The Association prices remain as follows: F. o. b. Philadelphia, Norfolk and Newport News, \$2.35; Baltimore, \$2.28; New York Harbor shipping ports, \$2.50, alongside; New York Harbor, \$3. There is a 20c. differential in favor of Clearfield and Beech Creek coals.

**Buffalo.** Sept. 16.

(From Our Special Correspondent.)

The fall business for anthracite coal has opened very quiet. Prices are a stumbling block, and parties buy only for immediate requirements. The nominal quotations are \$5 for grate, \$5.75 for egg, stove and chestnut, and \$4 for pea per net ton delivered.

Bituminous coal is dull with no change reported in quotations. Stocks ample for all trade requirements.

Coke is dull and unchanged.

Lake freights on coal continue to rule at low figures. Many vessels have been laid up and more may follow. The fact is the tonnage is overdone.

The shipments of coal westward by lake from Buffalo, from August 6th to 12th, both days inclusive, were large, aggregating 107,140 net tons, distributed as follows: 38,430 tons to Chicago, 32,750 tons to Milwaukee, 6,900 tons to Duluth, 2,000 tons to Ft. William, 550 tons to Racine, 7,010 tons to Toledo, 12,900 tons to Superior, 1,500 tons to Gladstone, 600 tons to Detroit, 1,950 tons to Bay City, 400 tons to Portage, 450 tons to Algonac and 2,600 tons to miscellaneous ports via Tonawanda vessels. The rates of freight were: 20c. to Chicago, Milwaukee, Duluth, W. Superior, Gladstone, Racine, Toledo, Detroit; 25c. to Bay City, Portage and Fort William, and 35c. to Algonac. Closing steady.

The "Soo" Railroad Company is building extensive coal sheds at Amery, Wis. They will be completed in about 10 days.

From the opening of navigation to September 1st, 1896, 224,688 net tons of anthracite and 1,727,001 net tons of bituminous coal passed through the Sault Ste. Marie canals. For corresponding period in 1895, 196,638 net tons of anthracite and 1,063,476 net tons of bituminous.

The Erie Railroad has contracted for the erection of a 150,000-ton storage plant to be erected at East Buffalo. It will contain nine divisions of about 17,000 tons each. The Dodge system will be employed in storing and reloading. A complete hauling system will encircle the plant.

**Chicago.** Sept. 16.

(From Our Special Correspondent.)

**Anthracite.**—There is no difference in the situation as regards the anthracite coal trade at this center. The buying is very limited and promises to continue so until cold weather drives people to buying coal. The out-of-town supply remains small and dealers see no prospect of any immediate change as regards that trade. The high price of hard coal has killed a great deal of expected trade, for it is a fact that soft coal is taking the place of anthracite in a good many instances. At present the freight rate on coal by lake from Buffalo to Chicago is 20c. per ton, the lowest it has ever been, yet there is but little coal coming that way in comparison with other years. Dealers here assert that there will be no reduction in present circulation rates and that the prices now quoted will remain in force. It is, however, already observed considerable concessions are made. The Chicago-Missouri River railroad lines, it is said, will soon make a reduction on the hard coal carrying rate to \$2.50 per ton, a reduction of 50c. Anthracite coal prices are \$5.60



for grate and \$5.85 for egg, stove and chestnut f. o. b. Chicago. Retail price is \$6.75@7.

**Bituminous Coal.**—Demand is better because of the abandonment of anthracite by a great many who find that they can tolerate the use of soft coal until money is more plentiful or there is a decrease in the price of the other. For manufacturing purposes soft coal is not in very large demand and those who are buying merely make their purchase to include enough only for immediate wants. The prices obtained on soft coal are low, brought about by the limited demand and the large amount of that material being shipped to this point.

**Coke** is quiet, a little more activity being noticed over the preceding week. Prices are for Connellsville foundry or crushed, \$4.55; West Virginia, \$4; Pocahontas, \$3.90.

C. J. Devlin, manager of the coal properties of the Acheson, Topeka & Santa Fe Railway Company, has bought all of the company's coal mines in Kansas and will take immediate possession of same. The Santa Fe Company has been gradually disposing of all its coal properties, having leased a number and sold others.

Natural gas has proven a failure in the Chicago public schools for heating purposes, and it will therefore be abandoned and hard coal take its place. During very cold weather the gas failed absolutely to heat the schools, though in ordinary winter weather it served its purpose admirably. It cost \$1.80 to heat one of the largest school buildings here last winter by gas.

**Pittsburg.** Sept. 17.

(From Our Special Correspondent.)

**Coal.**—The mining situation remains in a very unsatisfactory condition. Miners continue to hold meetings and pass resolutions, but later make the discovery that it takes two parties to make a contract. There are a number of miners who have gone to work at the 60-cent rate, among them 250 men employed at the Banksville mines of Roger & Hartley. The men are among the best union men in the district; they decline to wait for the action of conventions. The fact is the men have been without work so long that something must be done.

Three more mines are working at the 60c. rate; they are the Morgan mine, of the Miller's Run Coal Company; Hosack Brothers mine, and the Nixon Mines, of the Alexander Black Coal Company; all are union mines, and located on the Panhandle field. A number of mines on the Monongahela River have been in operation during the week, and the price paid is \$2.25 per 100 bu., which is equivalent to a 60c. rate. The agreement just reached to accept the 54c. rate settles the question for the present.

**Connellsville Coke.**—The week has shown another fall in coke production and the active list of ovens is smaller than for a long time. The Cambria Iron Company, which has been the only company running full time, was obliged to close down two of its plants. The Mahoning and Wheeling plants were both shut down, throwing 225 more men out of employment. During the week 40 ovens were fired up, and as no ovens are reported to go out this week there is hope that the bottom has been reached.

The W. I. Rainey Coke Company is making extensive repairs and erecting new ovens at Mt. Braddock at a large cost. In all 170 ovens have been repaired and 250 new ovens built. When the ovens now building are completed, the number in the region will exceed 18,000. The week's production amounted to 57,749 tons; decrease from the previous week, 12,250 tons. In the running order of the ovens in blast about 1,097 ovens made six days, 4,230 ovens five days, and 250 ovens four days.

The shipments of coke from the region were 3,147 cars against 4,000 cars the week previous, distributed as follows: To Pittsburg and River points, 1,480 cars; to points west of Pittsburg, 950 cars; to points east, 717 cars; total, 3,147 cars. Prices are nominal; the old rates are asked, but coke can be bought below these figures. Rumors of a coming reduction in prices are once more current; what it will amount to will be learned later.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Sept. 18, 1896.

**Pig Iron Production and Furnaces in Blast.**

Fuel used.	Week ending		From		From	
	Sept. 20, 1895.	Sept. 18, 1896.	Jan., '95.	Jan., '96.	Jan., '95.	Jan., '96.
Anthracite.	49	31,050	31	18,050	782,918	930,699
Coke.....	149	167,700	95	108,189	5,315,494	5,703,144
Charcoal...	21	4,650	23	6,420	154,015	212,225
<b>Totals</b>	<b>219</b>	<b>203,400</b>	<b>149</b>	<b>132,659</b>	<b>6,252,427</b>	<b>6,846,029</b>

The iron market continues quiet, and business is very light. We hear of greater confidence in the future, but the great majority of people prefer certainty and continue to hold off. Very little can be expected in the way of improvement until after election. Stocks of finished products and raw materials are being drawn down to a very low point, and when there is an improvement it will come with a rush.

There is still talk of speculation in pig iron, but no more actual sales are reported. It is understood that about 20,000 tons of Alabama pig iron have been taken for export, and it is expected that more will follow. At the reported price of 38s., Liverpool delivery, this cannot bring over \$6 per ton at furnace here.

Some business will come from the new contracts for battle-ships. The final award is not made, but it is understood that Cramp, Newport News and the Union Works at San Francisco will get one ship each. There will be lively competition for the material, and the builders will probably get it at pretty low prices.

As usual at a slack time there are all sorts of reports flying about. The latest is of the sale of the Lorain, Ohio, steel plant to the Rockefeller interest which has so much invested in Mesabi mines. This has been denied and reasserted; it looks probable, but the principal parties in interest refuse to talk, so that we must wait to find out the truth.

**NOTES OF THE WEEK.**

The board of managers of the Joint Traffic Association has decided to continue present railroad rates on iron and steel in car-loads in force until November 30th. Joint lake and rail rates will also be continued until the same date.

The annual meeting of the Thomas Iron Company was held at the company's office, Hokendauqua, Pa., last week. The following officers and directors were chosen: President, B. F. Fackenthal, Easton, Pa.; secretary and treasurer, James S. Weaver; directors, Samuel Thomas and J. W. Fuller, Catawauqua, Pa.; W. H. Hulick, Charles Stewart, Frederick B. Drake, Easton, Pa., and W. P. Hardenburgh, Newark, N. J.

**New York.** Sept. 18.

The local market continues dull, and there is very little news. There are more inquiries and some other signs of confidence, but the feeling is not strong enough yet to result in actual business. The market now is a waiting one, and will continue in that state for a month to come.

**Pig Iron.**—A few sales are reported, and there is more inquiry from foundrymen whose stocks are getting low. There is still hesitation about buying ahead. While there is no quotable change, the sales of Southern pig for speculation and for export have eased the pressure on the market, and there is less disposition to make concessions. No. 1 foundry is a little scarce.

We quote for Northern iron: No. 1 foundry, \$12@ \$12.75; No. 2, \$11.25@ \$11.75; gray forge, \$10.50@ \$11. For Southern iron we quote: No. 1 foundry, \$10.75@ \$11.25; No. 2 foundry, \$10.25@ \$10.75; No. 1 soft, \$10.25@ \$10.75; No. 2 soft, \$10@ \$10.25; forge, \$9.50@ \$10. Basic pig is quoted \$10.50@ \$11. All prices are for tidewater delivery.

**Cast-iron Pipe.**—One or two small contracts are yet to be let, but the season for ordering pipe is nearly over. Makers talk of holding out for better prices; but it is doubtful if this talk would not stop in face of a big order to be bid for.

**Spiegeleisen and Ferro-Manganese.**—No business of consequence is reported. Ferro-manganese is quoted at \$46.50@ \$47 for imported 80%, New York. No sales of spiegeleisen here.

**Steel Billets and Rods.**—The pool prices are \$21.75, New York, for Bessemer billets, and \$23.75 New York, for open-hearth billets. No business is noted. Rods are \$28@ \$29, with no sales.

**Merchant Iron and Steel.**—There is some inquiry but very few sales. For bars we quote: Common, 1'10@1'15c.; refined, 1'20@1'45c.; soft steel bars, 1'20@1'30c. Other quotations are: Steel hoops, 1'50@1'60c.; steel axles, 1'60@1'75c.; links and pins, 1'60@1'70c.; tire steel, 1'80@1'90c.; spring steel, 1'95@2'15c. All prices are for delivery on dock, New York.

**Plates.**—Sales are small. There is no change, except that universals are lower. We quote for universal mill plates, 1'30@1'40c. For steel plates we quote: Tank, 1'35@1'45c.; boiler shell, 1'45@1'55c.; good flange, 1'60@1'75c.; firebox, 2@2'40c. Charcoal iron plates are quoted 2'25c. for shell, 2'75c. for flange, and 3'25c. for firebox. Rivets are 2'15@2'25c. for steel and 3@3'25c. for iron.

**Structural Iron and Steel.**—No new contracts or large orders are noted, and no change in prices. A little bridge-work is on the market. We quote for angles, 1'35@1'40c.; channels, 1'70@1'75c.; tees, 1'65@1'70c.; beams, 1'70@1'75c. for large orders, and 1'80@1'90c. for small lots.

**Wrought-Iron Pipe.**—There is nothing but the usual retail business. Discounts are unchanged, as follows, out of store: For black, large, 67, 10, 10, 10 and 10; for 1 1/2 in. and smaller, 57, 10, 10, 10 and 10. For galvanized, large, 55, 10, 10, 10 and 10; for 1 1/2 in. and smaller, 52, 10, 10, 10 and 10.

**Nails.**—The pool price continues \$2.55 per keg f. o. b. Pittsburg for steel wire nails, and \$2.30 per keg f. o. b. Pittsburg for cut nails. Business is limited to small lots out of store to retailers.

**Steel Rails and Rail Fastenings.**—The combination price is still \$23.75 per ton at tidewater or \$28 at mill, for heavy sections. Girder rails are \$29@ \$31, tidewater. No business is reported here.

Little is doing in rail fastenings. Angle-bars are 1'15@1'25c. and spikes 1'60@1'85c., tidewater delivery. Bolts are 1'85@1'95c. for square nuts, and 1'95@2'05c. for hexagon nuts.

**Old Rails.**—For old iron rails we quote \$12.50@ \$13.50, with no business done. Old steel rails show a little business at \$10@ \$11, New York, sellers having lowered their limit a little. One lot of old steel rails, 56 lbs., fit to relay, is reported sold at \$19, Sound port delivery.

**Scrap Iron.**—Demand is not heavy and it is hard to place poor or mixed lots. Prices, as usual, depend very much on size or nature of lots. We continue to quote \$10@ \$11.50 for good machinery; \$8.50 @ \$9.50 for ordinary cast scrap; \$6@ \$7.50 for stove-plate and mixed.

**Buffalo.** Sept. 16.

(Special Report of Rogers, Brown & Co.)

The further stiffening in Southern iron has created a firmer feeling among sellers in this market, and buyers have stopped trying to force down prices. Although few large contracts have been made, the orders placed amount to considerable in the aggregate. Neither sellers nor consumers are anxious for contracts covering future requirements and the market seems to be settling down to a steady flow of small immediate delivery transactions. Buyers, however, manifest a great interest in the situation and it is evident they are only waiting for the first sign of improvement to cover their wants at the low prices prevailing. We quote below on a cash basis f. o. b. cars Buffalo: No. 1 strong coke iron, Lake Superior ore, \$12.50; No. 2 foundry strong coke iron, Lake Superior ore, \$12; Ohio strong softener No. 1, \$12.50; Ohio strong softener No. 2, \$12; Jackson County silvery No. 1, \$15.25; Southern soft No. 1, \$11.40; Southern soft No. 2, \$11.40; Lake Superior charcoal, \$14@ \$14.50.

**Chicago.** Sept. 16.

(From Our Special Correspondent.)

The conditions governing this iron market during the week are better than for some time. Since September 1st there has been a gradual increase in confidence, though not to such an extent as to warrant consumers in contracting ahead for any large quantity. Still there has been a gradual betterment in most lines since the opening of the month. The steel mill of the Illinois Steel Company at Joliet opened again this week after a close-down of seven weeks; 2,000 men are again given employment. The situation is in every respect a waiting one.

**Pig Iron.**—The sales of pig iron, both Northern and Southern, will aggregate 7,000 or 8,000 tons for the week. The sales made were in 100-ton to car-load lots and from there up to 2,000 tons. Local iron has had the greatest amount of the business transacted. Southern iron is selling quite well considering the situation, its low price probably helping matters. In Northern iron prices are very low, but it is understood that those quoted are being maintained. Inquiries are more numerous and are leading to business with much more frequency than has been noticed for some time. We quote: Lake Superior charcoal, \$13.50@ \$14; local coke foundry No. 1, \$11.25@ \$11.75; No. 2, \$10.75@ \$11.25; No. 3, \$10.25@ \$10.75; local Scotch foundry No. 1, \$11.25@ \$11.75; No. 2, \$10.75@ \$11.25; Southern coke No. 1, \$10.85@ \$11.10; No. 2, \$10.35@ \$10.85; Southern No. 1, soft, \$10.35@ \$10.85; No. 2, soft, \$10.25@ \$10.35; Southern silveries No. 1, \$11.35@ \$11.85; No. 2, \$11.10 @ \$11.35; Jackson County silveries, \$14@ \$16; Ohio strong softeners, \$14@ \$14.25; Alabama car-wheel, \$16.25@ \$16.75; malleable Bessemer, \$12.25@ \$12.50.

**Bar Iron.**—There has been a better business in bars during the past week. The sales have mostly been for limited quantities, but in the aggregate they have amounted to a fair week's total. Quotations are quite firm and are for common iron 1'30@ 1'35c. and guaranteed 1'35@1'40c.

**Steel Rails.**—The market has not shown any decided improvement. There is a run of small orders just sufficient to keep the mills of the company here running. Rails are yet quoted \$29 and upward, according to specification.

**Billets and Rods.**—The Joliet mills of the Illinois Company opened up this week and will run for a time on rods. There has been but little improvement in the situation and it is understood that an offer to supply material at cost basis just to keep a mill running did not bring a contract.

**Structural Material.**—But little new business has been transacted, though the week has shown up a trifle better than the preceding one. Sales are confined to a few small bridges and buildings going up throughout the West and Northwest. Quotations are as follows: Beams and channels, 1'70@ 1'75c.; angles, 1'30@1'35c.; plates, 1'35@1'40c.; tees, 1'50@1'55c.

**Old Rails and Wheels.**—But little business is observed and such as is going is being transacted at prices rather below those quoted. Old iron rails are quoted about \$11, and old wheels, \$12.

**Cleveland.** Sept. 16.

(From Our Special Correspondent.)

**Iron Ore.**—Greater confidence prevails in the iron ore market this week, than last week, but on the whole there is no practical improvement in the business. Pickands, Mather & Company report a number of inquiries for both ore and pig iron, and some small sales, but they were for immediate consumption. The reports at the offices of the other dealers were the same. The general tone of the market seems to be better this week, and the dealers are hopeful that it will continue and resolve itself into practical betterment. The iron ore quotations remain the same as last week, as follows: Standard Bessemer, \$4; non-Bessemer hematites, \$3@ \$3.25; Mesabi non-Bessemer, \$2.45@ \$2.60.

There has been little, if any, change in the lake freight rates. No ore vessels have been tied up at the Cleveland docks this week, it is reported, but as the close of navigation approaches the with-

drawal of commissions will become more frequent, and the vessel-owners are hopeful that they will then be able to secure better rates.

**Pig Iron.**—While the market is still slow, the dealers are encouraged by the number of inquiries made. Lake Superior charcoal is quoted at \$13.50 @ \$14; bituminous coke, No. 1 foundry iron, \$12.25; No. 2, \$11.75; Ohio Scotch No. 1, \$12.25; No. 2, \$11.75; Bessemer pig, \$12.25.

**Pittsburg.** Sept. 17.  
(From Our Special Correspondent.)

**Raw Iron and Steel.**—This great industry has been going through a series of violent fluctuations in the past two years that make it seem more like speculation than like one of the largest producing interests in the country.

The market for iron and steel has now reached the stage of depression where furnaces and mills are compelled to go out of operation. There is not enough business to go round even among the establishments that are thoroughly modern and are well located. As no concessions in prices would induce orders, the other alternative of suspending operations is being resorted to. There have been several speculative purchases of pig iron at certain points, more particularly in the South, but makers having eased themselves financially, are not disposed to press their product at present prices, which are surely down to cost. Better reports from the West are being received; the outlook is certainly very encouraging.

**Latest.**—The market showed increasing firmness; confidence is slowly but steadily returning. There was an increased demand for Bessemer, and holders generally are asking an advance. For steel billets the demand was larger than for some time past, and pool prices maintained, though with some sales made below pool rates. Gray forge is firm with an upward tendency. Taken as a whole, the outlook is brighter.

COKE, SMELTED, LAKE AND NATIVE ORK.	Tons.	Cash.
2,000 Bessemer, Sept., Oct., Pitts.	500 Billets, Sept., at mill	\$11.75
1,500 Bessemer, Sept., Oct., Pitts.	500 Billets, Sept., at mill	11.80
1,000 Bessemer, Sept., Oct., Pitts.	300 Billets, Sept., at mill	11.60
1,000 Bessemer, Sept., Oct., Pitts.	50 Cold Blast, Pitts.	11.75
600 Gray Forge, spot, Pitts.	50 Cold Blast, Pitts.	9.75
600 Gray Forge, Sept., Oct., Pitts.	50 No. 2 Foundry, Pitts.	9.75
500 Gray Forge, Sept., Oct., Pitts.	25 No. 2 Foundry, Pitts.	9.75
500 Bessemer, Sept., Oct., Pitts.	25 No. 2 Foundry, Pitts.	11.85
500 Gray Forge, Sept., Oct., Valley.	800 Wide groov'd, Pitts.	8.85
300 Gray Forge, Sept., Oct., Pitts.	360 Narrow groov'd, Pitts.	10.00
300 Gray Forge, Sept., Oct., Pitts.	300 Shear'd, Pitts.	9.50
300 Gray Forge, Sept., Oct., Valley.		8.95
200 Gray Forge, spot, Pitts.		8.75
100 Gray Forge, spot, Pitts.		9.60
50 No. 1 Silvery, spot, Pitts.		14.50
50 No. 2 Foundry, spot, Pitts.		11.60
50 No. 2 Foundry, Sept., Pitts.		11.50
28 No. 1 Foundry, spot, Pitts.		12.25
28 No. 2 Foundry, Sept., Pitts.		11.60
28 No. 2 Foundry, Sept., Pitts.		11.50
BLOOMS, BILLETS AND SLABS AT MILL.		
2,000 Billets, Sept. and Oct., at mill.		\$20.25
1,000 Billets, Sept. and Oct., at mill.		20.25

**Philadelphia.** Sept. 18.  
(From Our Special Correspondent.)

**Pig Iron.**—The tumble in production has awakened curiosity among buyers as to what it may mean during the next few weeks. The buying in some other markets is causing large consumers here to consult brokers, and brokers in turn are writing and asking producers about prices. Something unexpected may happen. Big buying may break out, not to cover present, but prospective requirements to discount possibilities. The foundries and mills are getting very little new business just yet, and hence actual sales are unimportant. Quotations are \$12.50 @ \$12.75 for No. 1; \$11.75 for No. 2, and \$10.25 @ \$11 for mill irons.

**Steel Billets.**—Buyers have not done anything more than to meet current demands at \$21.50.

**Merchant Bars.**—The same conditions continue and nothing can be added. Manufacturers await a movement among railroad managers to increase rolling stock, but as the season slips by the prospects of aid from that source grows less. Refined bars are 1-2c.

**Sheets.**—Orders for common sheet iron for early winter delivery were placed this week at three-tenths off standard sheet. Manufacturers thought to-day there would be some large covering of winter requirements done in a short time, the idea of purchasers being to anticipate stronger November prices. There are three or four inquiries for galvanized iron under consideration.

**Skeip.**—No new business to report.

**Pipes and Tubes.**—Some concerns have managed during the past week or two to gather up a few orders and better things may be expected soon.

**Plates.**—We are waiting for a chance at warship work. There is very little doing in general lines. The small shops and yards are buying in a desultory way, and mill workmen have more holidays than they can make use of contentedly. Tank is 1'38 @ 1'45c.; universals, 1'45 @ 1'50c.; shell, 1'55c.; flanges, 1'60c.; firebox, 1'75 @ 2'00c.

**Structural Material.**—The little run of business this week was most acceptable, but it was not a fourth of what was promised. Angles, 1'40c.; beams, channels and ties, 1'70c. and upward.

**Steel Rails.**—The office people have no facts to make known.

**Old Rails.**—Railroad people would sell old rails on more favorable terms, but there are no buyers.

**Scrap.**—The only kind of scrap wanted just now is boiler clippings, heavy steel and axles stuff.

**Cartagena, Spain.** Aug. 28.  
(Special Report of Barrington & Holt.)

**Iron Ores.**—There is still considerable firmness and steadiness in the iron-ore demand, and business all round is very brisk, especially with regard to manganese ores of all descriptions, the price of which has been generally advanced in all the mines. The shipments of iron ore during the past four weeks show a large falling off in the shipments during the previous month as follows: July, 66,970 tons; August, 33,200 tons. Notwithstanding these figures, it is generally understood that orders and contracts on hand are sufficient to assure a period of activity in this sierra which will run well into next year.

We quote: For ordinary 50% Portman ore, 5s. 6d. @ 6s. per ton; special low phosphorus (guaranteed not over 0.03%), 5s. 8d. @ 6s. 2d.; extra quality low phosphorus ore (guaranteed not over 0.015%), 6s. 6d.; special iron ore, 6s. 10d.; specular ore, 6s. iron, 9s.; Almeria ore, 56% iron, 3% manganese and 7% silicon, 8s. 6d.

For manganese ores quotations are: No. 1, 20% iron and 20% manganese, 14s. per ton; No. 1 B, 25% iron and 17% manganese, 11s.; No. 2, 30% iron and 15% manganese, 10s. 9d.; No. 3, 35% iron and 13% manganese, 8s. 9d. All prices are f. o. b. shipping part.

**Other Metals.**—Quotations for copper ore are 7s. 6d. per unit. Iron pyrites, 40% iron and 45% sulphur are quoted 10s. 6d. per ton, f. o. b.

**METAL MARKET.**

**NEW YORK, Friday Evening, September 18, 1896.**  
**Gold and Silver.**

**Prices of Silver per Ounce Troy.**

September	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$	September	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$
12	4'83 3/4	39 1/2	65	.503	16	4'83 3/4	39 1/2	65 1/2	.504
14	4'83 3/4	30	64 1/2	.501	17	4'83 3/4	30 1/2	65 1/2	.508
15	4'83 3/4	30	64 1/2	.501	18	4'83 3/4	30 1/2	65 1/2	.509

The completion of French and Russian orders, in combination with holidays in Bombay, resulted in almost entire withdrawal of buying orders in London the first of the week and the decline of silver to 30d. Later, with India again buying and a fresh tender to the French government in prospect, the market reacted sharply to 30 1/2 d., but closes weak at that figure.

**Gold and Silver Exports and Imports.**

At all United States ports, August, 1896, and years from January 1st, 1896 and 1895:

	Coin and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
<b>GOLD</b>					
Aug.	\$1,972,544	\$4,645,885	\$231,227	\$1,230,458	E. \$2,304,568
1896	55,511,811	30,718,510	\$79,256	1,171,201	E. 23,701,356
1895	55,766,217	26,090,463	\$20,769	1,132,177	E. 26,864,336
<b>SILV.</b>					
Aug.	5,311,434	929,422	1,359,168	E. 3,021,946	
1896	40,932,418	7,712,959	370,575	12,033,963	E. 21,586,071
1895	33,265,216	6,193,471	61,920	8,145,486	E. 18,982,179

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

**Gold and Silver Exports and Imports, New York**  
For the week ending September 10th, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

We'k	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1896	\$4,379,248	\$2,493,377	\$753,936	\$93,951	E. \$1,853,332
1895	40,379,248	39,565,402	28,033,679	2,133,432	E. 26,814,043
1894	56,656,035	25,839,765	29,167,149	1,324,543	E. 58,658,796
1893	82,432,600	14,378,411	26,673,694	1,249,190	E. 92,878,694
1892	69,633,143	67,277,185	23,633,967	2,838,542	E. 33,171,383
1891	38,698,619	6,563,489	16,329,544	1,843,686	E. 66,621,018

There was no gold exported during the week; of the silver, \$95,363 went to France, \$1,055 to South America, \$628 to Spain and the balance to London. The specie imported came chiefly from Europe.

**Average Monthly Prices of Silver**

in New York and London, per ounce Troy, from January 1st, 1896, and for corresponding months, 1895 and 1894.

Month.	1896.		1895.		1894.	
	Lon-don, Pence.	New York, Cents.	Lon-don, Pence.	New York, Cents.	Lon-don, Pence.	New York, Cents.
January	30 69	67 13	27 36	59 69	30 81	66 63
February	31 01	67 67	27 47	59 90	29 18	63 43
March	31 34	68 40	28 33	61 98	27 28	59 49
April	31 10	67 92	30 39	66 61	28 95	62 92
May	31 08	67 85	30 61	66 75	28 69	62 96
June	31 46	68 69	30 47	66 61	28 65	62 39
July	31 45	68 75	30 48	66 75	29 82	62 45
August	30 93	67 34	30 40	66 61	28 29	61 83

**FINANCIAL NOTES OF THE WEEK.**

The general business situation has changed very little during the week. While the continued gold imports have combined with other causes to increase confidence, there is still a good deal of doubt and hesitation and unwillingness to enter into new enterprises or into any engagements for the future. Rates for call loans are lower, but there is still difficulty in negotiating business paper except at very high rates, and credits continue to be very closely scrutinized.

The total amount of gold reported taken for import into the United States so far, since the present movement began, is \$36,850,000. About \$12,000,000 has been added this week. A considerable amount of the gold coming in at New York has been exchanged at the sub-treasury for currency for shipment to interior points. The treasury gold reserve shows a gain, chiefly made in this way, of \$7,311,615 during the week. The New York banks show an increase of only \$2,764,903 in their specie holding; but only a part of the gold ordered has yet arrived.

It is now pretty well established that these imports are the legitimate result of trade movements. The total balance of exports of merchandise shown by the August Treasury statement, given below, was for this year \$96,760,010, and the net balance of gold and silver exported brings the total up to \$145,047,416. In addition, there is the higher interest rates just now obtainable here, and there is no doubt that these would induce much heavier gold imports were it not for the foreign lack of confidence.

The foreign merchandise trade of the United States for the eight months ending August 31st is reported by the Bureau of Statistics of the Treasury Department as below:

	1895.	1894.
Exports.....	\$499,387,493	\$70,982,453
Imports.....	535,737,819	471,222,434
Excess .....	Imp. \$36,350,416	Exp. \$99,760,019
Add net excess of exports, silver.....		\$1,546,171
gold.....		23,701,336

Total balance of exports..... \$145,047,416  
The details of the gold and silver movement will be found in the usual place at the head of this column.

The statement of the United States Treasury on Thursday, September 17th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Sept. 10.	Sept. 17.	Changes.
Gold.....	\$107,294,133	\$114,605,611	E. \$7,311,615
Silver.....	21,012,125	17,621,227	D. 3,390,898
Legal tenders.....	76,492,529	73,189,727	D. 3,302,802
Treasury notes, etc.,	34,342,856	34,839,461	E. 496,605

Totals..... \$238,741,543 \$240,256,666 E. \$1,515,123  
Treasury deposits with national banks amounted on September 12th to \$16,361,581, showing a decrease of \$273,894 during the week.

Total United States Treasury notes issued under act of July 14th, 1890, in general circulation and in the Treasury, \$126,110,280. Against these are held in the Treasury 11,061,780 coined standard silver dollars, and silver bullion purchased at a cost of \$115,048,491, making a total of \$126,110,280.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending September 12th, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1896.	1895.	1894.
Loans and discounts.....	\$195,087,100	\$22,638,900	\$12,698,800
Deposits.....	586,634,400	571,756,260	445,654,300
Circulation.....	10,070,800	13,963,500	18,711,700
Reserve:			
Specie.....	91,288,300	62,515,500	51,961,800
Legal tenders.....	115,324,000	107,108,800	68,219,600
Total reserve.....	\$206,612,300	\$169,624,300	\$120,181,400
Legal requirement.....	146,658,600	142,939,050	111,413,575
Surplus reserve.....	\$59,953,700	\$26,685,250	\$8,767,825

Changes for the week this year were increases of \$732,200 in circulation and \$2,764,900 in specie, and \$539,275 in surplus reserve; decreases were \$371,300 in loans, \$1,417,500 in deposits, and \$2,580,000 in legal tender.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding dates last year:

	Gold.	Silver.	Total.
Asso. Banks of New York			\$51,961,800
1895.....			62,515,500
Bank of England.....	\$210,732,065		210,732,065
1895.....	214,370,180		214,370,180
Bank of France.....	403,155,560	\$249,555,400	652,710,960
1895.....	400,504,770	250,410,079	650,914,849
Imp. Bank of Germany.....		222,700,000	222,700,000
1895.....		245,850,000	245,850,000
Austro-Hungarian Bank	130,614,000	64,322,000	194,936,000
1895.....	105,490,000	65,840,000	171,330,000
Netherlands Bank.....	13,169,000	34,182,000	47,351,000
1895.....	21,426,000	34,449,000	55,875,000
Belgian National Bank.....		26,096,000	26,096,000
1895.....		21,426,000	21,426,000
Bank of Spain.....	42,641,000	52,005,000	94,646,000
1895.....	40,022,000	59,137,000	99,159,000
Bank of Italy.....	61,440,000	11,125,000	72,565,000
1895.....	60,615,000	10,960,000	71,575,000
Imp. Bank of Russia.....	475,300,000		475,300,000
1895.....	3,727,000		3,727,000

The return for the Associated Banks of New York is of date September 12th; all the others are of September 17th, except the Bank of Italy, August 30th, and the Bank of Russia, August 1st-13th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England and the Bank of Russia report gold only. The Imperial Bank of Germany and the Belgian National Bank do not report gold and silver separately, but their reserves are mainly gold, the silver being chiefly subsidiary coin.

Shipments of silver from London to the East for the year up to September 3d are reported by Messrs. Pixley & Abell's circular as below:

	1895.	1896.	Changes.
India.....	£2,565,780	£2,607,278	I. £41,498
China.....	1,378,206	574,413	D. 803,793
The Straits.....	546,503	545,686	D. 817
Totals.....	£4,490,489	£3,727,377	D. £763,112

Arrivals for the week this year were £205,000 in bar silver from New York, and £11,000 from the West; also £49,000 in Mexican dollars from New York, a total of £265,000. Shipments for the week were £124,000 in bar silver to Bombay.

The demand for Indian exchange has increased and the price has again risen, notwithstanding the slight decline in silver. The 40 lakhs of Council bills offered in London were all taken at an average price of 14'19d. per rupee, an increase of 0'13d. over the preceding week. Exports from India continue large, while only small amounts of silver have been taken for that country.

**Domestic and Foreign Coins.**

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars.....	\$0.51	\$0.53
Peruvian soles and Chilean pesos.....	.46 1/4	.48
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.85	3.90
Twenty marks.....	4.73	4.80
Spanish 25 pesetas.....	4.78	4.85

The United States Assay Office in New York reports the total receipts of silver at 89,000 oz. for the week.

**Other Metals.**

**Copper.**—The market remains firm, but very dull, and if any copper were pressed for sale the probability is that prices would ease off somewhat. The demand for Lake copper continues rather dull. We have still to quote, from first hands, 10'75c., but from second hands this price may be slightly shaded for ingot copper. For electrolytic copper the demand is also very dull, and we have still to quote 10'3/4@10'1/2 for cakes, wire bars or ingots, and 10'3/4@10'1/2 for cathodes. The market for casting copper is almost entirely nominal at 10'3/4@10'1/2. Very little is being offered, as the larger producers are out of the market. Foreigners are constantly trying to buy copper, but of late their limits appear not to have been high enough to secure it in large quantities.

The London market for copper has been somewhat irregular. During the week prices touched £47 1/2s., but the loss was made up again, and the closing quotations are £47 17s. 6d. @ £48 2s. 6d. for spot, and the same price for three months prompt. Prices for fine copper in comparison with the speculative sorts appear to be cheap, and we have to quote: English tough, £48 10s. @ £50 6s.; best selected, £49 5s. @ £50 12s. 6d.; strong sheets, £56 15s. @ £57 10s.; India sheets, £54 @ £55; yellow metal, 4'4d.

The mail advices received are unanimous in the report that consumption abroad is excellent, and that a great many of the larger works are so crowded with orders that they cannot take new business for nearby shipment. The demand for India, however, is said to be rather poor. Statistics for the first half of the month show an increase of 900 tons, and

this is evidently the result of the heavy quantities of late pushed forward from this side.

The following figures give the production (in tons of 2,240 lbs.) of copper in the United States and also by the chief foreign mines, with the exports from the United States, for August and the eight months ending August 31st:

Production, fine copper, long tons.	Eight months.		
	August, 1896.	1895.	1896.
Reporting mines, U. S.....	15,600	97,426	125,175
Pyrites and outside sources, U. S.....	1,200	11,300	9,600
Reporting foreign mines.....	7,022	56,601	57,124
Total production, tons.....	23,822	165,327	191,899
Exports from U. S., fine copper.....	9,119	44,021	78,322

The total United States production shows an increase this year of 16,049 tons, or 24%, while the exports from the United States increased no less than 34,301 tons, or 77.9%. The foreign production shows little change.

**Tin.**—The good consumptive demand continues and there has all along been a scarcity of spot metal. With the larger quantities afloat, the probability is that this will now change and that sufficient stocks will accumulate here to prevent spot from commanding a slight premium. We have still to quote for spot and September 13'3/4@13'1/2c. and later months at 13@13'10c.

The London market has been active. Early in the week tin touched £58, at which price a great demand sprang up, which caused values to rise 10s., and the market closes firmly at £58 10s. @ £58 12s. 6d. for spot and £60 @ £59 2s. 6d. for three months prompt. The statistical position of the article becomes worse from month to month.

Exports of tin from the Straits Settlements for the seven months to July 31st were as follows, in tons of 2,240 lbs.:

	1894.	1895.	1896.
To United States.....	1,827	4,411	9,048
To Europe.....	22,276	22,580	17,945
To China.....	1,330	1,229	2,132
To India.....	956	1,096	1,412
Totals.....	29,389	29,316	30,537

The total increase this year over 1895 was 1,221 tons, or 4'2%, but the exports to the United States direct more than doubled in quantity. There has been a very considerable increase this year in shipments to China.

**Lead.**—After a few days of firmness, the article has again become rather dull and is offered at slightly easier prices. We have to quote September and October delivery at 2'80@2'82 1/2, while the St. Louis market is comparatively higher, and nothing is obtainable there below 2'57 1/2 @ 2'62 1/2. According to advices received from the West, production of lead ores in some of the more important camps seems to have fallen off considerably, on account of the low prices now prevailing. On the other hand, consumption is not exactly what it ought to be.

The foreign market remains firm at £11 3s. 9d. for Spanish and £11 7s. 6d. @ £11 10s. for English lead, but at the higher prices asked, buyers are keeping back.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: Lead is strong, but rather quiet. Common lead is obtainable at 2'57 1/2c. and argentiferous at 2'80c. Demand is rather light; quite a number of buyers appear to be non-believers in higher prices, and on this account take hold very sparingly.

**Spelter** remains rather firm and is in fairly good demand. Prime Western spelter has advanced in St. Louis to 3'40@3'45, and in New York 3'65@3'70. Large shipments of spelter have of late been made to Europe, and stocks at the smelters are now quite depleted.

Values in Europe show a very large decline. The scarcity noticeable there for a long time appears to have been overcome, and plenty of metal is to be had. Good ordinaries have declined to £16 7s. 6d. and specials to £16 10s.

**Antimony** remains very dull, and quotations are unchanged: Cookson's, 7c.; United States Star 6 1/2c.; Hallett's, 6 1/2 @ 6 3/4c.

**Nickel.**—A little more demand is noted, but prices are unchanged and we continue to quote 35@36c. per lb. for ton lots and 37@39c. for smaller orders. London prices are 14d. @ 15d. for large orders and 15d. @ 16 1/2d. for small lots. The New York price is on a parity with London, allowing for the United States duty of 6c. per lb. on the metal.

**Platinum.**—Demand is steady and prices are firm at \$14.50 @ \$15.50 per oz., New York. London quotations are 57s. 6d. @ 59s. per oz.

For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotation, the prices given being respectively for orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 50c., 51c. and 52c. per gram. Wire and foil are 47c., 48c. and 49c., per gram. The current retail price for crucibles is 60c. per gram.

**Quicksilver.**—The New York quotation is unchanged this week at \$36 per flask. The London price is £6 10s. per flask, with the same quotation from second hands.

Quicksilver receipts at San Francisco in August were very light, 974 flasks only. For the eight months to August 31st they were 21,163 flasks, against 20,534 flasks for the corresponding period last year, and 18,044 flasks in 1894. Exports by sea

for the eight months were: China, 3,000 flasks; New Zealand, 20; Central America, 920; Mexico, 3,402; British Columbia, 17; New York, 2,500; total, 9,859 flasks, against 9,416 flasks in 1895. A considerable line has also been shipped direct by rail from San Francisco and other points in the interior.

**The Minor Metals.**—Quotations for these metals are given in the table below, the prices being for New York delivery:

<b>Aluminum:</b>	
No. 1, 98% pure rolling ingots, per lb.....	50@55c.
No. 1, ingots for re-melting, per lb.....	48@53c.
No. 2, 94% pure.....	35@42c.
Ingots from scrap, per lb.....	35@40c.
Aluminum-nickel casting metal, per lb.....	40@45c.
Bismuth, per lb.....	\$1.30@1.75
Phosphorus, per lb.....	50@55c.
Platinum, per oz.....	\$14.50@15.50
Tungsten, pure, powder per lb.....	70c.
Tungstic acid, per lb.....	45c.
Ferro-tungsten, 60% in ton lots, per lb.....	60c.

**Average Monthly Prices of Metals**

In New York since January 1st, 1896, and for the corresponding periods in 1895, 1894, 1893 and 1892, in cents per pound.

Month.	1896.	1895.	1894.	1893.	1892.
<b>Copper:</b>					
January.....	9'87	10'00	10'13	12'13	11'00
February.....	10'64	10'90	9'83	12'00	10'00
March.....	11'03	9'75	9'81	11'88	10'38
April.....	10'98	9'75	9'50	11'38	11'50
May.....	11'15	10'25	9'80	11'00	11'63
June.....	11'67	10'63	8'91	11'00	11'96
July.....	11'40	11'25	9'00	10'88	11'50
August.....	10'98	12'00	9'13	10'00	11'50
<b>Tin:</b>					
January.....	13'02	13'25	20'16	19'59	20'50
February.....	13'44	13'35	19'60	20'30	20'00
March.....	13'30	13'20	19'09	20'71	20'25
April.....	13'34	14'00	19'75	20'81	20'50
May.....	13'54	14'65	20'21	19'96	20'80
June.....	13'59	14'15	19'75	19'76	22'00
July.....	13'63	14'40	19'22	19'15	21'00
August.....	13'49	14'35	19'22	18'81	20'50
<b>Lead:</b>					
January.....	3'08	3'10	3'19	3'87	4'20
February.....	3'19	3'12	3'31	4'22	4'12
March.....	3'14	3'12	3'37	3'96	4'21
April.....	3'07	3'08	3'43	4'08	4'15
May.....	3'03	3'16	3'39	3'89	4'22
June.....	3'13	3'25	2'31	3'77	4'16
July.....	2'96	3'25	3'50	3'8	4'13
August.....	2'73	3'50	3'41	3'41	4'11
<b>Spelter:</b>					
January.....	3'75	3'28	3'56	4'30	4'65
February.....	4'03	3'20	3'85	4'39	4'69
March.....	4'20	3'23	3'89	4'28	4'89
April.....	4'19	3'30	3'62	4'38	4'88
May.....	3'98	3'50	3'47	4'41	4'79
June.....	4'10	3'65	3'40	4'27	4'71
July.....	3'97	3'75	3'43	4'13	4'78
August.....	3'76	4'15	3'38	3'80	4'69

**Imports and Exports of Metals.**

New York.*	Week, Sept. 10.		Year, 1896.	
	Expts.	Impts.	Expts.	Impts.
Aluminum..... lbs.	10,000	2,010	10,000	2,343
Antimony ore..... short tons				1,521
" regulus, casks.....			193	
Brass, old..... short tons			50,116	2,586
Copper, fine..... long tons	11,417	39	11,774	1,281
" matte..... "	1259			4,582
" sulphate..... "			1,431	
Iron ore..... "				2,769
" pigs, bars, rods..... "		95	1,274	50,432
Iron pyrites..... "				4,060
" sulphate..... "				610
Ferro-manganese..... "				650
Ferro-silicon..... "				70
Manganese ore..... "				5,525
Spiegeleisen..... "		369		24,239
Lead ore..... "				
" pigs and bars..... "	11,350	853	9,348	29,304
Magnolia metal..... "				42
Nickel..... "				624
Steel, billets, rods..... "		457		19,379
Tin..... "	120	360	511	10,525
Tin and black plates, boxes..... "		13,538		635,549
Zinc (spelter)..... long tons	120	1,259		32

\* Metal Exchange Reports. † Week ending Sept. 17.

Baltimore.**	Week, Sept. 10.		Year, 1896.	
	Exp.	Imp.	Exp.	Imp.
Bismuth metal, cases.....				52
Chrome ore..... long tons				4,801
Copper, fine..... "	779		23,926	
" matte..... "			500	
" sulphate..... "			2,499	
Iron ore..... "		2,520		280,206
" pigs, bars, ingots, blooms..... "		545		2,621
Iron oxide..... bags				300
" pyrites..... long tons				150
Ferro-manganese..... "				211
Ferro-silicon..... "				1,458
Lead..... "	150		3,547	70
Limestone..... short "			21	2,743
Manganese metal, long "		100		6,643
Spiegeleisen..... "				440
Steel..... "				21
Steel wire, bundles..... "				7,836
Tin, long tons..... "		1,107		2,454
Tin and black plates, boxes..... "				127,337
Zinc (spelter) long tons..... "				258

\*\*From our special correspondent.



tations. Swansea was steady. The mine is shipping a car of about 20 tons of ore per day. A dividend of \$5,000 will be paid September 15th. South Swansea is developing good ore and the stock is in demand. Slightly shaded quotations were made on Utah. The regular dividend of \$2,000 was paid September 10th.

**San Francisco.** Sept. 12.

(From Our Special Correspondent.)

There was a rather quiet opening of the market on Monday, but later prices were firmer and matters looked rather better. Toward the end of the week, however, business was dull and little interest was shown. The quotations on the whole were better than last week, but the dealings were not large. In fact it has been a week of small business, and there seems to be very little stock really afloat, and no one is operating on a big scale.

A local paper complains of inaccuracy in the telegraphic reports of quotations of mining stocks sent out from New York. Possibly it has reason, but there is not much in it to make a fuss over; nobody here is disturbed over the New York quotations, or indeed cares for them at all.

Some of the quotations noted at the close are: Chollar, \$2.80; Consolidated California & Virginia, \$1.92@1.95; Hale & Norcross, \$1.52@1.55; Confidence, \$1.45; Best & Belcher, \$1.10; Ophir, \$1.10; Potosi, \$1; Gould & Curry, 60@63c. Some business was done in the Bodie stocks. Bodie Consolidated closes at 65@68c.; Bulwer, 48c.; Mono, 20@21c.

Business at the call board of the Gold Mining Exchange continues rather quiet. Some people think a mistake was made in putting old Comstock shares on the list, and believe that it would have been better policy to call only the newer gold mining shares, in which some interest could have been excited. The only quotations to be noted this week are: Sebastopol, 31c.; Lockwood, 28@29c.

There was a large audience at the second of the course of lectures given under charge of the Gold Mining Exchange on Friday evening, September 11th. The lecture was in two parts, or rather there were two lectures, both very interesting. Mr. A. J. Bowie discussed present mining methods as compared with those formerly in use, and Mr. A. Ropp described the latest processes adopted by the smelters for treating refractory ores.

Some new assessments noted this week are: De Soto Gold Mining Company, of California, 7c., delinquent October 10th; Quaker Gold Mining Company, of Calaveras County, Cal., 12c., delinquent October 8th; Sum Dum Chief Mining Company, of Alaska, 15c., delinquent October 19th; Troy Mining and Development Company, of Alaska, 11 1/2c., delinquent October 14th; Central Eureka Mining Company, of Amador County, California, 2c., delinquent October 10th. Utah Consolidated Mining Company, of Nevada, 5c., delinquent October 13th.

The following mining companies report having had money on hand September 1st, 1896, as per sworn statements filed in their offices: Alta, \$2,858; Andes, \$8,719; Alpha Consolidated, \$359; Belcher, \$2,871; Best & Belcher, \$18,220; Bodie Consolidated, \$1,192, besides the bullion product of the mine for August to be received; Bulwer Consolidated, \$6,224, besides bullion to be received; Bullion, \$1,484; California, \$4,301; Consolidated California & Virginia, \$7,842, besides unsold bullion of the assay value of \$42,885 at the Carson Mint; Confidence, \$1,169; Church, \$8,404; Chollar, \$20,206; Consolidated Imperial, \$2,835; Challenge Consolidated, \$259; Consolidated New York, \$1,587; Crown Point, \$1,587; Exchequer, \$1,664; Hale & Norcross, \$2,312; Julia Consolidated, \$113; Mexican, \$7,320, Mono, \$2,129; Ophir, 20c., with an assessment of 25c. per share being collected; Overman, \$7,594; Potosi, \$3,994; Savage, \$5,508; Sierra Nevada, \$1,694; Silver Hill, \$1,026; Silver King, \$1,727; Standard Consolidated, \$21,507; Syndicate, \$653; Union Consolidated, \$2,093; Utah Consolidated, \$847.

The following mining companies report having had an indebtedness September 1st, 1896: Gould & Curry, \$154; Lady Washington, \$146; Occidental Consolidated, \$1,710.

The official returns of the ore worked and bullion produced for account of the Consolidated California & Virginia Mining Company at the Morgan mill during its recent run have been received. The amount of ore worked was 1,100 tons, yielding bullion of the gross assay value of \$42,885, of which \$25,920 was gold and \$16,965 was silver. The yield in bullion per ton was \$38.98, and the average assay value of the ore, per battery samples, was \$45.96 per ton. The average assay value of the ore, per railroad car samples, was \$50.11 per ton.

Parties here who are interested in the National Nickel Company, which owns the deposits of nickel ore at Cottonwood, near Lovelocks station, in Nevada, report that the company has bought machinery and arranged to work its mine. A good deal has been said from time to time about this Nevada nickel mine, but I believe very little real work has been done.

**British Columbia.**

(From Our Special Correspondent.)

ROSSLAND, B. C., Sept. 10.

That a very large amount of capital for investment in Trail Creek mines is to come from England seems to be the prevailing belief of the camp. Inquiries have been many, but the investments have not been in proportion, though the interest is certainly increasing.

There is a growing feeling that over-capitalization and the incorporation of some companies have done more injury than good. One of the marked effects of last spring to work in this camp has been the advent of Canadian capital from the Eastern

Provinces, and it seems to be the impression that this will be followed by English money.

The advance praeders of the Spokane & Red Mountain Railway have now reached nearly to the Le Roi mine, and are well into the town: at no part of this road as yet, have any rails been laid, but the work is going on rapidly.

The preparation for fall business has commenced, and the building boom in Rossland is checked only by the scarcity of lumber, which will disappear with the completion of the railroad.

**London.** Sept. 9.

(From Our Special Correspondent.)

The London mining stock market has been in an inert state all the week. The aristocratic holiday season is at its full height, and practically nothing can be done. No new companies have come out during the week. In the South African section some briskness was observed, and it was alleged to be on account of a renewal of Paris buying. On inquiry, however, I find that Paris is far from inclined to buy South African gold or land stocks, and that the orders sent over are chiefly for De Beers, Rio Tintos and Anacondas. The jobbers are making great efforts to interest the public by drawing attention to the probable record output of the Rand for August, and certainly all returns so far received are very encouraging; but the public seem to be standing aloof from the stocks. Chartered shares remain in much the same condition as last week. The long-expeted amalgamation of Barnato interests has at last taken place and it turns out to be of far less importance than was expected. The Johannesburg Consolidated absorbs the Barnato Bank and in future will look after the estate and financial business of the Barnato people, while the Barnato Consolidated will continue to act by itself and will confine its attention to the development of mines and prospects. The amalgamation has had no effect on the London market.

The West Australian market has had some life in it, but as far as can be seen no business of any importance has taken place. New Zealand has been dull. Indians have been in demand and have been the strongest section of all the market.

As regards American mines, the London market has been practically a blank all the week. I hear that Captain DeLamar has concluded negotiations for the purchase of his Nevada gold properties by the British Westralia Syndicate, one of the Barnato companies. Mr. F. L. Gardner represented the syndicate in the negotiations. Presumably the properties will be sold to a London company with a capital of, say, a million and a quarter or a half pounds sterling, as the purchase price to be paid to the syndicate by the new company will be quite a million pounds.

**Paris.** Sept. 6.

(From Our Special Correspondent.)

The mining stock market continues to be rather neglected by the speculators, who are busy watching the fluctuations of the State securities. Turkish funds are still in a very uncertain state. The situation there seems to be bad and there is a good deal of anxiety as to the future. The action of England is somewhat of a surprise, considering the course our somewhat uncertain neighbors have followed of late. The death of Prince Lobanoff adds an element of doubt to the situation. The policy of the Russian minister was definite and well understood; but one does not know just what the course of his successor may be, nor what influences may move the Czar, now that this strong influence is removed.

The metallurgical shares continue to show strength, and nearly all of them have risen again. The moving cause just now is the report of heavy orders for railroad material about to be placed. The prices of these stocks appear high, but at least one prosperous year is assured, and possibly two or three more may be expected.

Huanchaca has fallen slightly for no particular reason. Nickel has also fallen a little, the fluctuation taking a downward turn.

The zinc and lead shares have been well supported. Reports of a new convention among the zinc companies are again in circulation, but the rumor does not come from a reliable source as yet. There is a strong speculation for the rise in Rio Tintos, and nearly all the copper stocks are higher in sympathy. It is said here that exports of copper from your side will be reduced in quantity. One cannot understand why this should be done while the demand for copper here continues so good.

There is a manifest intention to work up another great speculation in Transvaal gold stocks. It has not succeeded very well, and the temper of holders here is not favorable to such a movement.

The liquidators of the old Societe des Metaux announce a final dividend of 7.70%. This dividend will permit a further distribution of 40 fr. per share to the old Comptoir d'Escompte, which was the principal creditor of the company on the collapse of the copper corner.

A treaty of commerce has been concluded between France and Japan. The terms of this arrangement are not yet published in detail, but a note communicated to the press states that the treaty provides for the suppression of the consular jurisdiction and the French concessions in the open ports, within a period of not less than three years. It grants reciprocally the most-favored nation treatment, and contains provisions identical with those contained in treaties recently concluded by Japan with England, Germany, Russia, the United States and other countries. Among the articles of the treaty that concerns France in particular are those limiting the duties to 10% on wines and on cer-

tain of the finer textile goods. France reserves the right to suppress the most-favored nation tariff accorded to Japan on giving one year's notice at any time. The treaty is for 12 years from its promulgation.

One hears a great deal just now of the mineral wealth of the great island of Madagascar, and there is talk of forming syndicates here to prospect for gold, copper, coal and petroleum—for all of these are said to exist in our new possession. It is probable that capital will go there in considerable amounts, and it is said that concessions will be granted only to French parties. AZOTE.

**MEETINGS.**

Crown King Mining Company, at the company's office in Edinburg, Ill., on October 7th at 10 a. m.

Pioneer Gold Mining Company, at the office of A. J. Craven, Helena, Mont., on October 8th, at 10 a. m.

Pleasant Valley Coal Company, at the office of the company, Dooly Block, Salt Lake City, Utah, on October 5th, at 12 noon.

**ASSESSMENTS.**

Name of Co.	Loc'n.	No.	Divq.	Sale.	Amt.
Alpha Con.....	Nev...	17	Sept. 7	Sept. 29	.10
*Alta Silver.....	" .....	53	Oct. 12	Nov. 2	.10
Bay State.....	Cal....	33	Sept. 30	Oct. 20	.03
Belcher Silver....	Nev....	53	" 10	Sept. 30	.25
Bullion.....	" .....	48	" 18	Oct. 8	.10
Bunker Hill.....	S. D....	8	" 21	" 21	.0021/4
*Christmas.....	Utah....	3	Oct. 10	" 27	.002
Confidence Silver	Nev....	27	Sept. 3	Sept. 24	.30
Con. Imperial....	" .....	37	Aug. 27	" 22	.01
Crown Point	Nev....	68	Sept. 22	Oct. 13	.20
Gold and Silver	Cal....	1	Oct. 17	Nov. 16	.07
*De Soto Gold....	Utah....	"	" 6	Oct. 31	.01
*Dutch Canyon...	Cal....	10	Aug. 25	Sept. 25	.001
Gibraltar Con....	Nev....	79	Oct. 5	Oct. 27	.15
Gould & Curry...	" .....	"	" 19	Sept. 19	.001/4
Leo.....	Mont....	24	Sept. 28	" 29	.10
Occidental Con...	Nev....	24	Oct. 8	" 25	.25
*Ophir Silver....	" .....	69	" 7	" 10	1.25
Original Empire.	Cal....	2	Sept. 25	" 12	.002
Providence.....	S. D....	4	" 12	" 9	.05
Sevier.....	Utah....	"	" 9	"	
Sierra Nevada	Nev....	111	" 11	" 1	.25
*Silver.....	S. D....	8	" 26	" 17	.001
Transit.....	Nev....	53	" 28	" 22	.20
Union Con. Silv.	" .....	"	"	"	

\* New assessment.

**DIVIDENDS.**

NAME OF COMPANY	Current Divi-		Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.		
Alta Con.....	Sept. 10	\$10,000	\$30,000	\$70,000
*Alaska-Mexican...			32,200	155,031
*Alaska-Treadwell			275,000	2,950,000
Anaconda.....			750,000	750,000
Aurora Iron.....			50,000	700,000
Bangkok-Cora Bell			6,000	107,510
Big Silver.....			2,500	2,500
*Boston & Mont...			1,050,000	4,475,000
*Bullion-Beck & Ch	Sept. 20	30,000	185,000	2,135,000
Calmat & Hecla...	" 25	500,000	2,000,000	46,350,000
Cariboo.....			32,000	95,000
*Centennial-Eureka	Sept. 15	30,000	300,000	1,830,000
C. O. D.....			5,000	25,000
*Dalton & Lark....			87,500	87,500
*Daly.....			37,500	2,887,500
*Deadwood Terra...			100,000	1,210,000
Dominion Coal...			600,000	600,000
*Elkton Con.....	Sept. —	5,000	35,000	80,000
Florence.....			54,399	89,348
*Galena.....	Sept. 10	5,000	31,000	51,000
*Gold Con.....			65,000	80,000
Golden Eagle.....	Sept. 15	10,000	10,000	10,000
*Golden Fleece....			132,000	533,179
Gold & Globe Hill.			19,500	28,875
Hecla Con.....			30,000	2,130,000
*Helena & Frisco...			50,000	475,000
Highland.....			25,000	3,159,918
*Homestake.....	Sept. 25	31,250	282,250	5,998,750
Hope.....			10,000	10,000
Horn Silver.....			50,000	5,130,000
*Iowa.....			30,000	40,000
Iron Mountain....			30,000	440,000
*Isabella.....	Sept. 25	22,500	180,000	202,500
Jackson.....			7,500	475,000
*Le Roi.....			125,000	200,000
*Mammoth.....			20,000	1,090,000
Mercur.....	Sept. 20	25,000	150,000	500,000
Minnesota Iron...			495,000	3,240,000
Mont. Ore Pur. Co.			280,000	440,000
Moon-Anchor.....			24,000	24,000
Moose.....			6,000	186,000
Napa Con.....			50,000	790,000
*Ontario.....			135,000	13,310,000
Osceola Con.....			125,000	2,072,500
Otaqueachy.....			1,000	1,000
*Portland.....			150,000	773,000
*Quincy.....			70,000	8,370,000
*Silver King.....	Sept. 7	37,500	337,500	787,500
*Sacramento.....			2,000	2,000
Slocan Star.....	Sept. 1	100,000	200,000	200,000
Small Hopes.....			25,000	3,275,000
Smuggler-Union...			100,000	100,000
Swansea.....	Sept. 15	5,000	5,000	6,500
Tamarack.....			150,000	4,320,000
Union.....			23,500	73,000
*Utah.....	Sept. 10	2,000	19,000	151,500
Victor.....			140,000	605,000
Victor M. & L.....			12,000	42,000
War Eagle.....			25,000	157,000
*Wasp.....			40,000	40,000
Totals.....			\$813,250	\$8,944,340

\* August dividend paid.

STOCK QUOTATIONS.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass. listing companies like Allouez, Arnold, Atlantic, etc., with columns for location, par value, and sales for various dates from Sept. 11 to Sept. 17.

\* Official quotations Boston Stock Exchange. Total sales, 23,915.

NEW YORK.\*

Table of stock quotations for New York listing companies like Adams, Ajax, Alamo, etc., with columns for location, par value, and sales for various dates from Sept. 12 to Sept. 19.

\* Official quotations N. Y. Stock and Con. Stock & Petroleum Exchanges. Total shares sold, 25,390.

INDUSTRIAL COAL AND COAL RAILROAD.\*

Table of stock quotations for Industrial Coal and Coal Railroad listing companies like Balt. & Ohio, Ches. & Ohio, etc., with columns for par value and sales for various dates from Sept. 12 to Sept. 18.

\* Official quotations N. Y. Stock Exchange. Total shares sold, 87,792.

COLORADO SPRINGS, COLO.†

Table of stock quotations for Colorado Springs, Colo. listing companies like Ajax, Alamo, Am. Ric. C., etc., with columns for par value and sales for various dates from Sept. 7 to Sept. 12.

† Official quotations and sales Colo. Springs Mg. Stock Assoc. \* Board of Trade Exchange. † Holiday.

ST. LOUIS, MO. Week ending Aug. 11.

Table of stock quotations for St. Louis, Mo. listing companies like Central Lead, Con. Coal, etc., with columns for company name, office, par value, and last dividend.

SAN FRANCISCO, CAL.\*

Table of stock quotations for San Francisco, Cal. listing companies like Alta, Becher, Best & Belcher, etc., with columns for location, par value, and sales for various dates from Sept. 12 to Sept. 17.

\* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD.\*

Table of stock quotations for Baltimore, Md. listing companies like Balt. M. & S., Conrad Hill, etc., with columns for location, par value, and sales for various dates from Sept. 12 to Sept. 17.

\* Official quotations Baltimore Stock Exchange.

BRITISH COLUMBIA.\*

Table of stock quotations for British Columbia listing companies like Bound Creek, Deer Park, etc., with columns for name, selling price, and name of company.

Par val.: Hall Mines Jumbo and Le Rol, \$5; Slocan Star, 50c., other stocks \$1.

LONDON.

Sept. 4

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations (Buyers, Sellers), and Sales.

\* Dividend pending.

DENVER, COLO.\*

Table with columns: NAME OF COMPANY, Par val, Sept 7, Sept 8, Sept 9, Sept 10, Sept 11, Sept 12, Sales.

\* Official quotations Colo. Mg. St'k Exch. Sales, listed, 3,257,900; unlisted, 105,800; total, 3,363,700 - Holiday.

PARIS.

Week ending Sept. 4.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. last year, Prices (Opening, Closing).

SALT LAKE CITY, UTAH.\*

Week ending Sept. 12.

Table with columns: STOCKS, Par value, Bid, Asked, Actual selling price.

\* Special Report of James A. Pollock. All the companies are located in Utah.

MEXICO.

Week ending Sept. 3.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices (Opening, Closing).

NOTE: - In most Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Prices are in Mexican dollars.

VALPARAISO, CHILE.\*

July 30.

Table with columns: NAME OF COMPANY, Capital, Share value, Last dividend, Prices (Bid, Asked, Last sale).

\* Special Report of Jackson Bros. Values are in Chilean pesos or dollars.

SHANGHAI, CHINA.\*

Aug. 7.

Table with columns: NAME OF COMPANY, Country, No. of shares, Par value, Paid up, Last dividend, Price.

\* Special Report of J. P. Bissett & Co. The prices quoted are in Shanghai taels.

PHILADELPHIA PA.\*

Table with columns: NAME OF COMPANY, Loc'n, Par Val, Bid, Asked, Shares sold, Price.

\* Official quotations Philadelphia Stock Exchange. Total sales, 4,627.

HELENA, MONT.\*

Week ending Sept. 12.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid, Asked, Shares sold, Price.

\* Special Report of Samuel K. Davis. Total shares sold, 1,600.

PITTSBURG, PA.\*

Week ending Sept. 14.

Table with columns: NAME OF COMPANY, Loc'n, Par val, Bid, Ask, Selling price, NAME OF COMPANY, Loc'n, Par val, Bid, Ask, Selling price.

\* Official quotations Pittsburg Stock Exchange.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last). Rows include companies like Adams, Etina, Alaska-Mexican, etc.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. † Previous to the consolidation in August, 1884, the California had paid \$31,330,000 in dividends and the Cons. Virginia \$42,390,000. NOTE—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.



CLASSIFIED LIST OF ADVERTISERS.

**Air Compressors and Rock Drills.**  
 American Diamond Rock Drill Co.  
 Bueckel, H. C., Eng. Co.  
 Sunlight Rock Drill Co.  
 Clayton Air Compressor Works.  
 Fraser & Chalmers.  
 Ingersoll-Sergeant Drill Co.  
 (See Diamond Drills.)

**Air Hoists.**  
 Whiting Foundry Equipment Co.

**Amalgamators.**  
 Bucyrus Steam Shovel & Dredge Co.  
 Fraser & Chalmers.

**Amalgam Plates.**  
 Western Plating and Mfg. Co.

**Anti-Friction Metals.**  
 Besley, Chas. H., & Co.  
 Chester Steel Cast. Co.

**Architects and Builders.**  
 Berlin Iron Bridge Co.  
 Elmer & Amend.  
 Pollock, Wm. B. & Co.

**Assayers and Chemists' Supplies.**  
 Answorth, Wm.  
 Baker & Adamson.  
 Baker & Co.  
 Becker, Christian.  
 Bullock & Crenshaw.  
 Denver Fire Clay Co.  
 Elmer & Amend.  
 Henry Bell Chem. Co.  
 Neiden Judson Drug Co.  
 Penn Sm. & Ref. Wks.  
 Perma Salt Mfg. Co.  
 Roessler & Hasslacher Chemical Co.  
 Sargent, E. H., & Co.  
 Solvay Process Co.  
 Taylor, John, & Co.  
 Troemer, Henry.  
 Western Chemical Co.

**Attorneys, Corporation.**  
 Emig, C. E.  
 Hammersley, Hamilton & La Maistre.

**Automatic Boiler Feeds.**  
 Penberthy Injector Co.

**Babbit's Metal.**  
 Besley, Chas. H., & Co.

**Bankers and Broker.**  
 Artell, E., & Co.  
 Bartlett & Co.  
 Bonbright, W. P. & Co.  
 Breuninger, E. N.  
 Crooks, F. F.  
 Dorsey Investment Co.  
 Grant, E. R.  
 Handy & Harran, J.  
 Hendrickson, W. J.  
 Heron Bros.  
 Kinney, M.  
 Leptelmer, N.  
 Mager, Andrew.  
 Miller, J. W., & Co.  
 North Investm't Co.  
 Northwest Mfg. & Investment Co.  
 Partridge & Storer.  
 Perk, Frank G.  
 Prentice, Russell.  
 Prouditt, J. W., & Co.  
 Ropp, Key & Co.  
 Sheldon, E. C.  
 Sill & Sill.  
 Smith, C. H., & Co.  
 Snow, E. P.  
 State Trust Co.  
 Weyand Bros.  
 White, Samuel.  
 Williams, W. W.  
 Woods Investment Co.  
 Wyoming Mfg. Bureau

**Belted.**  
 Hendrie & Bolthoff Mfg. Co.  
 Jeffrey Mfg. Co.  
 New York Belting & Packing Co., Ltd.

**Belt Lacing.**  
 Bristol Co.

**Blasting Caps.**  
 Metallic Cap Mfg. Co.  
 Rheinisch Westphalian Explosive Co.  
 Schroeder, Fr.

**Blasting Batteries, Caps and Fuse.**  
 Climax Fuse Co.  
 Lamb, J. H., & Co.  
 Macbeth, James, & Co.

**Blowers, Pressure.**  
 Connorsville Blower Co.

**Boilers.**  
 Denver Eng. Wks. Co.  
 Fraser & Chalmers.  
 Philadelphia Eng. Wks. Co.  
 Pollock, Wm. B. & Co.  
 Ridsen Iron Works.  
 Stillwell, Bierce & Smith-Valle Co.  
 Standard Boiler Co.  
 (See Machinery.)

**Brattice Cloth.**  
 Besley, Chas. H., & Co.

**Brick Machinery.**  
 Fresno, E. M., & Co.

**Briggs.**  
 Berlin Iron Bridge Co.  
 Shifter Bridge Co.  
 (See Machinery.)

**Car Wheels.**  
 Whiting Foundry Equipment Co.

**Carbons.**  
 Bishor, Victor & Co.  
 New York Diamond Drill Co.  
 Lexow, Theodor.

**Chain and Link Belting (See Belting.)**  
 Chemicals  
 Baker & Adamson.  
 Bullock & Crenshaw.  
 Elmer & Amend.  
 Henry Bell Chem. Co.  
 Penn. Salt Mfg. Co.  
 Roessler & Hasslacher Chemical Co.  
 Solvay Process Co.  
 Western Chemical Co.

**Chemists.**  
 Simonds & Wainwright.

**Chilled Castings.**  
 Whiting Foundry Equipment Co.

**Coal.**  
 Berwind-White Coal Mfg. Co.  
 Gaster & Curran & Co.  
 Davis Coal & Coke Co.  
 Maryland Coal Co.  
 Potts, F. A., & Co.  
 Stickney, Conynghan & Co.  
 Ward & Olyphant.

**Coal Cutters (See Machinery.)**  
 Ingersoll-Sergeant Drill Co.  
 Jeffrey Mfg. Co.  
 Leyner, J. Geo.  
 Link Belt Machinery Co.

**Compressors.**  
 Clayton Air Compressor Works.  
 Laidlaw-Dunn-Gordon Co.  
 Norwalk Iron Works Co.  
 Band Drill Co.

**Concentrators, Crushers, Pulverizers, Separators, Etc.**  
 Allis Co., Ed. P.  
 Bradley Pulverizer Co.  
 Colorado Iron Works.  
 Denver Eng. Works Co.  
 Dodge Mining Machinery Co.  
 Fraser & Chalmers.  
 Hendrie & Bolthoff Mfg. Co.  
 Krupp, F.  
 Link Belt Machinery Co.  
 McCully, R.  
 Stedman Foundry & Mach. Co.  
 Walburn-Swenson Co. (See Machinery.)

**Conveyors.** (See Machinery.)  
 Robbins Conveying Belt Co.  
**Conveying Belts.**  
 Robbins Conveying Belt Co.  
**Copper Dealers and Producers.**  
 American Metal Co.  
 Arizona Copper Co.  
 Atlantic Mining Co.  
 Baltimore S. & Ref. Co.  
 Baltimore Cop. Wks.  
 Bath, H., & Son  
 Bridgeport Copper Co.  
 Canadian Copper Co.  
 Copper Queen Mfg. Co.  
 Detroit Cop'r Mf. Co.  
 Elliott's Metal Co., Ltd.  
 James & Shakspeare.  
 Lambert's Wharf. Co.  
 Lewisohn Bros.  
 Orford Copper Co.  
 Pass, C., & Son, Ltd.  
 Penn Salt Co.  
 Prentiss & Co.  
 Vivian, Younker & Bond.

**Corrugated Iron.**  
 Berlin Iron Bridge Co.  
 Cincinnati Corrugating Co.  
 Sykes Steel Roofing Co.

**Cranes.**  
 Whiting Foundry Equipment Co.  
**Crucibles, Graphite, Etc.**  
 Denver Fire Clay Co.  
 Dixon, Jos., Crucible Co.  
**Cyanide.**  
 Roessler & Hasslacher Chemical Co.  
**Cyanide Potash.**  
 Gas Light & Coke Co.  
 Scherckhoff, Hartford & MacLagan.  
**Diamonds.**  
 Roessler & Hasslacher Chemical Co.  
**Diamond Drills.**  
 Scherckhoff, Hartford & MacLagan.  
 New York Diamond Drill Co.  
**Diamonds.**  
 Scherckhoff, Hartford & MacLagan.  
**Dredges.**  
 Bucyrus Steam Shovel & Dredge Co.  
 Marion Steam Shovel Co.  
 Souther & Co.  
**Driers.**  
 Brown, Horace F.  
 Cummer, F. D. & Son Co.  
**Dump Cars.**  
 Denver Eng. Works Co.  
 Hendrie & Bolthoff Mfg. Co.  
 Hunt Co., C. W.  
 Fraser & Chalmers  
 Truax Mfg. Co.

**Educational Institutions.**  
 Arizona School of Mines.  
 Columbia University.  
 Columbian University.  
 Chicago School of Assaying.  
 International Correspondence Schools  
 Lehigh University.  
 Mass. Inst. of Technology  
 Michigan Mining School.  
 Missouri School of Mines.  
 Polytechnic Institute.  
 Worcester Polytechnic Inst.

**Electrical Batteries.**  
 Macbeth, James, & Co.  
**Electrical Machinery and Supplies.**  
 American Engine Co.  
 Besley, Chas. H., & Co.  
 Card Electric Co.  
 Denver Eng. Wks. Co.  
 Electrical Engineer-  
 ing Co.  
 General Electric Co.  
 Jeffrey Mfg. Co.  
 Link Belt Mach. Co.  
 Quonito Co., Ltd.  
 Repauno Chem. Co.  
 Walker Co.  
 Westphal & Elec.  
 Mfg. Co.  
 Weston Electrical Instru-  
 ments Co.

**Elevators, Conveyors and Hoisting Machines.**  
 Brown Hoist & Conv.  
 Macbeth, James, & Co.  
 Caldwell, H. W., & Co.  
 California Wire Wks.  
 Cooper, Hewitt & Co.  
 Crook, W. A., & Bros. Co.  
 Denver Eng. Wks. Co.  
 Electrical Engineer-  
 ing Co.  
 (See Wire Rope Tramway and Machinery.)  
 Fraser & Chalmers.  
 Hunt, C. W., & Co.  
 Jeffrey Mfg. Co.  
 Link Belt Mach. Co.  
 Nelsonville Foundry & Machine Co.  
 Vulcan Iron Works.  
 Walkins, L. E.

**Emeralds.**  
 Besley, Chas. H., & Co.  
 New York Belting & Packing Co., Ltd.  
**Engineers, Chemicals, Metallurgists**  
 See Directory Pages 4, 5 and 6.  
**Engineer's Instruments and Supplies.**  
 Aloe, A. S. Co.  
 Buff & Berger.  
 Bullock & Crenshaw.  
 Dietzgen, F., & Co.  
 Fauth & Co.  
 Heer, Peter.  
 Keuffel & Esser Co.  
 Lietz Co.  
 Mann & Co.  
 Ridsen Iron Works.  
 Stillwell, Bierce & Smith-Valle Co.  
 Tod, William & Co.  
 Union Iron Works.  
 Union Gas Engine Co.  
 Lidgerwood Mfg. Co.  
 Philadelphia Eng. Wks. Co.  
 Works, Ltd.  
 (See Machinery.)  
**Excavators.**  
 Bucyrus Steam Shovel & Dredge Co.  
 Marion Steam Shovel Co.  
 Souther & Co.  
 Vulcan Iron Works.  
**Fire-Brick and Clay Furnaces.**  
 Chur, A. T.  
 Hoskins, Wm.  
 Moore, S. L., & Son Co.  
 Pollock, Wm. B. & Co.  
 Denver Fire Clay Co.  
 (See Machinery.)  
**Fuses.**  
 Climax Fuse Co.  
 Ingersoll-Sergeant Drill Co.  
 Standard Fuse Co.  
**Gas Engines.**  
 Norman, J. J., & Co.  
 Union Gas Engine Co.  
**Gas Works.**  
 Pollock, Wm. B. & Co. | Wood, R. D. & Co.  
 Bristol Co.  
**Gauges, Recording, Etc.**  
 Roessler & Hasslacher Chemical Co.  
**Geating.**  
 Besley, Chas. H., & Co. | Denver Eng. Wks. Co.  
 Chester Steel Cast. Co. | Fraser & Chalmers.  
 (See Machinery.)  
**Grease, Graphite, Etc.**  
 Besley, Chas. H., & Co. | Dixon, Jos., Cruc. Co.  
**Heavy Machinery.**  
 Denver Eng. Works Co.  
 Fraser & Chalmers.  
**Hose, Rubber, Etc.**  
 New York Belting & Packing Co., Ltd.  
**Injectors.**  
 Jenkins Bros.  
 Penberthy Injector Co.  
**Insulated Wires and Cables.**  
 Okonite Co., Ltd.  
**Insurance Companies.**  
 Hartford Steam Boiler Inspect'n and Ins. Co.  
 Mutual Life Insurance Co.

**Joint Fittings, Tight Joints.**  
 Lead Linings for Chlorination Tubs.  
 Raymond Lead Co.  
**Locomotives.**  
 General Electric Co.  
 Hunt, C. W., Co.  
 Porter, E. K., & Co.  
**Lubricators.**  
 Asbestos Paraffine Co.  
 Detroit Lubricator Co.  
**Machinery.**  
**Dealers in Mining and Other Machinery.**  
 Allis, Edw., & Co.  
 American Diamond Rock Drill Co.  
 Bacon, E. C.  
 Besley, Chas. H., & Co.  
 Blake, T. A.  
 Bradley Pulverizer Co.  
 Caldwell, H. W., & Co.  
 Card Electric Co.  
 Colorado Iron Works.  
 Conservator Blower Co.  
 Crook, W. A., & Bros. Co.  
 Denver Eng. Wks. Co.  
 Dodge Mfg. Mach. Co.  
 Fraser & Chalmers.  
 Hammond, Mfg. Co.  
 Hendrie & Bolthoff Mfg. Co.  
 Ingersoll-Sergeant Drill Co.  
 Jeffrey Mfg. Co.  
 Jessop, W., & Sons, Ltd.  
 Leyner, J. Geo.  
 Lidgerwood Mfg. Co.  
 Krupp, F.  
 McCully, R.  
 McKiernan Drill Co.  
 Mecklenburg Ir. Wks.  
 Metallurgical Steel.  
 Taylor Iron & Steel Co.  
 Merralls' Mill Co.  
 Montgomery, J. H. Mach. Co.  
 More, Fm. L., & Son.  
 Nelsonville Foundry & Machine Co.  
 New York Diamond Drill Co.  
 Norwalk Iron Wks. Co.  
 Parke & Lacy Co.  
 Philadelphia Eng. Wks. Co.  
 Pollock, Wm. B. & Co.  
 Ridsen Iron Works.  
 Stedman Fdy. & M. Co.  
 Snow Steam Pump Co.  
 Stearns-Koger Mfg. Co.  
 Sullivan Mach'ry Co.  
 Tod, Wm., & Co.  
 Truax Mfg. Co.  
 Union Gas Engine Co.  
 Union Iron Works.  
 Vulcan Iron Works.  
 Walburn-Swenson Co.  
 Walker Co.  
 Webster, Camp & Lane Mach. Co.  
 Westinghouse Elec. Mfg. Co.

**Metal Dealers.**  
 American Dev. & Mfg. Co.  
 American Metal Co.  
 Am. Zinc-Lead Co.  
 Baker & Co.  
 Bath, Henry & Son.  
 Besley, Chas. H., & Co.  
 Bridgeport Copper Co.  
 Chas. Kees-Lanoyon Spelter Co.  
 Cookson & Co.  
 Elliott's Metal Co., Ltd.  
 Eureka Co.  
 Foster, Blackett & Wilson.  
 James & Shakspeare.  
**Metallurgical Works and Ore Pur-chasers' Processes.**  
 American Dev. & Mfg. Co.  
 Amer. Zinc Lead Co.  
 Baker & Co.  
 Balbach Sm. & Ref. Co.  
 BaltimoreCopperWks  
 Bridgeport Copper Co.  
 Canadian Copper Co.  
 Chas. Kas. City S. & Mfg. Co.  
 Cookson & Co.  
 Denver Eng. Wks. Co.  
 Elliott's Metal Co., Ltd.  
 Electro Cyanide Gold & Silver Extraction Co.  
 Foster, Blackett & Wilson.  
 Fraser & Chalmers.  
 Kendall Gold & Silver Extraction Co.  
 Mathieson Smelting Co.  
 Mathieson & Hecker Zinc Co.  
 Montana Ore Purchas-  
 ing Co.  
 Orford Copper Co.  
 Pass, C., & Son, Ltd.  
 Phelps, Dook & Co.  
 Picher Lead Co.  
 Raymond Lead Co.  
 State Ore Sampling Co.  
 Tod, William, & Co.  
 Vivian, Younker & Bond.  
 Russell Process Co.  
 State Ore Sampling Co.  
 Walburn-Swenson Co.

**Mine, Mill and Smelters' Supplies.**  
 Denver Eng. Wks. Co.  
 Dodge Mining Machinery Co.  
 Gates Iron Works.  
 Park's & Wilkinson.  
 Roessler & Hasslacher Chemical Co.  
 Stieren, William E.  
 (See Machinery.)  
**Mining and Land Companies.**  
 American Dev. & Mfg. Co.  
 Co.  
 Atlanta Mfg. Co.  
 Arizona Copper Co.  
**Nickel.**  
 Canadian Copper Co.  
**Ore Cars.**  
 Truax Mfg. Co.  
**Ore Hoisters.**  
 Brown, Horace F.  
 Cummer, F. D. & Sons Co.  
**Ore Testing Works.**  
 Hunt, F. F.  
 Ledoux & Co.  
 Montana Ore Purchas-  
 ing Co.  
**Packing and Pipe Coverings.**  
 Asbestos Paraffine Co.  
 Braudt, Randolph.  
 Jenkins Bros.  
 Hine & Robertson.  
 Ricketts & Banks.  
 Robertson, W. F.  
 Simonds & Wainwright  
 State Ore Sampling Co.  
 Packing Co., Ltd.  
 Wycokoff & Son, A.  
**Perforated Metals.**  
 Aitchison, R., Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.  
**Peroxide of Sodium.**  
 Roessler & Hasslacher Chemical Co.  
**Phosphor-Bronze.**  
 Phosphor-Bronze Smelting Co.  
**Pile Drivers.**  
 Bucyrus Steam Shovel and Dredge Co.  
 Ingersoll-Sergeant Drill Co.  
**Pipes.**  
 Pollock, Wm. B., & Co. | Wycokoff, A., & Sons,  
**Platinum.**  
 Baker & Co.  
 Johnson, Matthey & Co.  
**Powder.**  
 Atlantic Dynamite Co. | Lau, J. H., & Co.  
 Ingersoll-Sergeant Drill Co. | Repauno Chem. Co.  
**Pressure Blowers.**  
 Connorsville Blower Co.

**Publication.**  
 American Fertilizer, Arms & Explosives.  
 Australian Mg. Stand.  
 Bullionist.  
 Denver Republican.  
 El Minerio Mexicano.  
 Electrical Plant & Electrical Industry | Snow Steam Pump Co.  
 Blake, Geo. F. Mfg. Co. | Stillwell-Bierce & Smith-Valle Co.  
 Cameron A. S., steam | Tod, Wm., & Co.  
 Denver Eng. Wks. Co. | Washington, Henry  
 Fraser & Chalmers. |  
 Jeaneville Iron Wks.  
**Quarrying Machines.**  
 Ingersoll-Sergeant Drill Co.  
 Rand Drill Co.  
 Sullivan Machinery Co.  
**Quicksilver.**  
 Eureka Co.  
**Railroads.**  
 Aitchison, Topoka & Santa Fe Ry.  
 Chicago & N. West. R. R.  
 C. B. & Quincy R. R.  
 Denver & Rio Grande R. R.  
 Denver, Leadville & Gunnison Ry.  
 Florence & Cripple Creek R. R.  
 Illinois Central R. R.  
 Midland R. R. of Kentucky.  
 Rio Grande Southern R. R.  
 U. P., D. & G. R. R.  
**Railroad Supplies and Equipment.**  
 Hunt, C. W., Co. | Robinson & Orr.  
 Porter, H. K., & Co. | (See Machinery.)  
**Regulators, Dampers, Heat, Etc.**  
 Eddy Valve Co.  
 Jenkins Bros.  
**Rock Drills.** (See Air Compressors)  
**Roofing.**  
 Berlin Iron Bridge Co. | Phelps, Dodge & Co.  
 Cincinnati Corrugat- | Shifter Bridge Co.  
 ing Co. | Sykes Steel Roofing Co.  
**Rubber Goods.**  
 New York Belting & Packing Co., Ltd.  
**Screens.**  
 Aitchison, R., Perf. Metal Co.  
 Denver Eng. Wks. Co.  
 Fraser & Chalmers  
 Harrington & King Perforating Co.  
 Link Belt Machinery Co.  
 Ludlow-Saylor Wire Co. (See Machinery.)  
**Second Hand Machinery.**  
 Hine & Robertson.  
 Robinson & Orr.  
**Separators.**  
 Dodge Mining Machinery Co.  
**Shoes and Dies.**  
 Chester Steel Cast. Co. | Denver Eng. Wks. Co.  
 Chrome Steel Works. | Fraser & Chalmers  
 Crescent Steel Co.  
**Shovels (Steam).**  
 Bucyrus Steam Shovel & Dredge Co.  
 Marion Steam Shovel Co.  
 Souther & Co.  
**Smelting and Refining Works.**  
 Balbach S. & Ref. Co. | Orford Copper Co.  
 Baltimore Cop'r Wks | Penna. Salt Mfg. Co.  
 Bridgeport Copper Co. | Penn Smelting and  
 Con. Kas. City S. & Refining Works  
 H. Co. | Phosphor-Bronze  
 Elliott's Metal Co., Ltd. | Smelting Co.  
 Mathieson Smelting Co. |  
**Steel Rails, Castings, Rails, Drill Steel.**  
 Bethlehem Iron Co. | Robinson & Orr.  
 Carpenter Steel Co. | Pollock, Wm. B. & Co.  
 Chester Steel Cast. Co. | Taylor Iron & Steel Co.  
 Chroms Steel Works. | Jessop, Wm. & Son  
 Crescent Steel Co. | Ltd.  
 Moore, S. L., & Sons Co. |  
 (See Metal Dealers)  
**Tanks.**  
 Denver Eng. Wks. Co. | Walker Co.  
 Gates Iron Works. | Williams Mfg. Co.  
**Telegraph Wires and Cables.**  
 Okonite Co., Ltd.,  
**Tools.**  
 Besley, Chas. H., & Co.  
 Pratt & Whitney Co.  
**Tubes.**  
 Besley Chas. H., & Co. | Pollock, Wm. B. & Co.  
 Williams Bros.  
**Tubeing-Rubber.**  
 New York Belting and Packing Co., Ltd.  
**Turbine Water-Wheels.**  
 Leffel, James, & Co.  
 Pelton Water Wheel Co.  
 Stillwell-Bierce & Smith-Valle Co.  
**Valves.**  
 Eddy Valve Co. | Jenkins Bros.  
**Ventilators.**  
 Bullock, M. O. Mfg. Co. | Tod, Wm., & Co.  
 Fraser & Chalmers.  
**Voltmeters.**  
 Weston Electrical Instrument Co.  
**Vulcanite Emery Wheels.**  
 New York Belting and Packing Co., Ltd.  
**Water-Wheels.**  
 Leffel, James, & Co.  
 Pelton Water Wheel Co.  
 Stillwell-Bierce & Smith-Valle Co.  
**Well Drilling Machinery.**  
 Sullivan Mach'ry Co. | Williams Bros.  
**Wharfage.**  
 Lambert's Wharfage Co.  
**Wheels, Car.**  
 Chester Steel Cast. Co.  
 Taylor Iron & Steel Co.  
**White Lead.**  
 Cookson & Co.  
 Foster, Blackett & Co.  
**Wire Cloth.**  
 Aitchison, R., Perf. Metal Co.  
 Harrington & King Perforating Co.  
**Wire Rope & Wire.**  
 Besley, Chas. H., & Co.  
 Broderick & Bassom  
 Rope Co.  
 California Wire Wks.  
 Colorado Iron Works.  
 Cooper Hewitt & Co.  
 Hunt, C. W., Co.  
 Relpels, Dodge & Co.  
 R'bling, J. A. Sons & Co.  
 Ropeways Syndicate  
 Trenton Iron Co.  
**Wire Rope Tramway.**  
 Brown Hoist & Conv. | Hunt, C. W., Co.  
 Machine Co. | Roebing, J. A., Son  
 & Co.  
 Colorado Iron Works. | Ropeways Synd., L.  
 Denver Eng. Wks. Co. | Vulcan Iron Works.  
 Fraser & Chalmers.

**POSITIONS VACANT.**

**FREE ADVERTISING**

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

**1482 WANTED—TWO TECHNICALLY** educated young men for electric furnace work residing in or near New York City. Work is hard and exacting, but chances good for right men. Reply fully. Address ELECTRON, ENGINEERING AND MINING JOURNAL.

**1483 WANTED—A SUPERINTENDENT** to erect and manage a dynamite factory. Must have had successful practical experience in this line. Address DYNAMITE, ENGINEERING AND MINING JOURNAL.

**1484 WANTED.—A MILL MAN WITH** some experience, who understands concentrating ores by Cornish Jig process, to act as night foreman in small concentrating plant in northern part of Mexico; must speak Spanish. State salary, which must be moderate to commence with. Address CONCENTRATOR, ENGINEERING AND MINING JOURNAL.

**1485 WANTED.—A CHEMIST TO TAKE** charge of a small chlorination mill treating pyritic concentrates containing gold, silver and a little copper. Address OREGON, ENGINEERING AND MINING JOURNAL.

**1486 WANTED.—A MAN TO TAKE EN-**tire charge of a mining property in Mexico; must be a first-class man and thoroughly conversant with the management of Huntington Mills and chlorination; one who speaks Spanish preferred; permanent engagement, with good prospects, given to first-class man. Address INDEPENDENCIA, ENGINEERING AND MINING JOURNAL.

**1487 WANTED—FOR A SOUTH AMER-**ican Copper-Silver Smelting Works, a thoroughly competent manager, to erect and superintend the same. While it is proposed to smelt only to a matte at first, the manager should be thoroughly conversant with all the processes used in the treatment of copper and silver ores; conditions—water power, cheap wood, dear coke, good climate, altitude 3,000 feet above sea. Address ARGENTINA, ENGINEERING AND MINING JOURNAL.

**1488 WANTED—AN ENGINEER AND** Assayer who has had experience in the mines of the Ouro Preto District, Brazil. Address with full particulars, F. F. F., ENGINEERING AND MINING JOURNAL.

**1489 WANTED—A MAN ACQUAINTED** with lead smelting, sweep smelting, cupellation and refining and desilverizing processes, to run a small blast furnace and refinery in South Africa. A technical graduate preferred, but practical experience absolutely necessary, as well as tact and ability to manage men. A man between 30 and 40 years of age preferred. A good salary will be paid to the right party, who will be expected to return it in a responsible position. Address TRANSVAAL, ENGINEERING AND MINING JOURNAL.

**1490 WANTED—A FIRST-CLASS MINING** Engineer with executive ability to take charge of a well known Western mine as Manager. Must be good miner and mill man. Must have experience and be honest and sober. Good position to the right man. Address M. F. T. S., ENGINEERING AND MINING JOURNAL.

**1491 WANTED—A FIRST-CLASS MILL-**man who thoroughly understands amalgamation and concentration of gold ores and assaying; state experience, age and wages expected; mine in one of the Southern States. Address THOROUGH, ENGINEERING AND MINING JOURNAL.

**SITUATIONS WANTED.**

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

**WANTED—POSITION, LONG AND** varied experience in opening and working mines of coal, gold, silver, copper, lead and zinc ores; in concentration, smelting and milling; in planning and erecting works; in examination of mining lands. Address H. C., ENGINEERING AND MINING JOURNAL. No. 17,489, Oct. 10.

**A GRADUATE MINING ENGINEER NOW** under engagement with well-known mining company desires change. Has been continuously engaged for past 20 years with the most successful mines in the West in every capacity. Best reference. Address WEST, ENGINEERING AND MINING JOURNAL. No. 17,462, Sept. 26.

**MASTER MECHANIC WANTS SITUATION;** experience of 10 years in mill work; 29 years of age, and strictly temperate; now employed at large silver reduction works in Mexico; unquestionable references; speaks a little Spanish; has first-class kit of tools and not afraid of hard work; correspondence solicited. Address M. M., ENGINEERING AND MINING JOURNAL. No. 14,801, Oct. 3.

**MECHANICAL ENGINEER WITH LONG** experience in designing Mining Machinery and complete Mill Plants, is open for engagement; highest references furnished. Address L. W., ENGINEERING AND MINING JOURNAL. No. 14,807, Sept. 26.

**POSITION WANTED BY A PRACTICAL** Metallurgist and Chemist; competent to run a smelter, cyanide or chlorine leaching work; best references. Address H. COLO., ENGINEERING AND MINING JOURNAL. No. 14,810, Oct. 10.

**MINING ENGINEER OF OVER 20 YEARS'** experience in Gold and Silver Exploration, Mining and Milling, desires to change location. No objection to foreign countries or the tropics; 10 years as superintendent and general manager; speaks Spanish; New York, Chicago and London references. Address ORO, ENGINEERING AND MINING JOURNAL. No. 14,812, Oct. 10.

**POSITION WANTED BY ASSAYER AND** Chemist, graduate of technical school; experienced with smelter and mine work; out of work on account of Leadville strike; best of reference. Address BOX 672, Lake Geneva, Wis. No. 14,811, Oct. 10.

**POSITION WANTED BY YOUNG CHEMIST** and assayer with cyanide chlorination company or sampling works; has smelter experience; good ore sampler and buyer; best of references. Address H. B., ENGINEERING AND MINING JOURNAL. No. 14,813, Oct. 10.

**MINING AND MECHANICAL ENGINEER** of executive ability and 20 years' experience is open for engagement with first-class company, as superintendent or resident manager; specialty, erection and treatment of low-grade ores; speaks German and Spanish; references the best. Address A. L., ENGINEERING AND MINING JOURNAL. No. 14,819, Nov. 7.

**WANTED—POSITION BY A YOUNG MAN** with ten years' general mining experience; accustomed to handling men; knowledge of assaying and accounts; best of references. Address M. W. F., 824 Warren street, Hudson, New York. No. 14,814, Oct. 3.

**MINE BLACKSMITH—A FIRST-RATE ME-**chanic, able to do well everything, from setting diamonds in a drill to the heaviest forging. An excellent, industrious, sober man, desires a permanent position, where he will get high wages—which he will earn—and have good educational advantages for his children. He has the very best references. Address BLACKSMITH, ENGINEERING AND MINING JOURNAL.

**Contracts Open.**

**BEAR TRAP DAM, ETC.—**Sealed bids addressed to the Board of Trustees of the Sanitary District of Chicago, Ill., and indorsed: "Bids for Constructing Foundations for Bear Trap Dam and Collateral Work" will be received by the Clerk of said Sanitary District at Room H, Rialto Building, Chicago, Ill., until 12 m. (standard time), of September twenty-third (23), 1896, and will be publicly opened by the said Board of Trustees at the regular meeting held that day, or at a special meeting called for that purpose. The work for which the said tenders are invited is the furnishing, delivering and erecting in place ready for continuous use the various parts of the Foundations for Bear Trap Dam and Collateral Work, described and specified in the detailed specifications furnished by the Chief Engineer. Each bid must be accompanied by a certified check or cash to the amount of \$3,000. All certified checks must be drawn on some responsible bank doing business in the City of Chicago, and be made payable to the order of the Clerk of the Sanitary District of Chicago. Said amount of \$3,000 will be held by the Sanitary District until all of said bids have been canvassed and the contract awarded and signed, the return of said check or cash being conditioned upon any bidder to whom the award of said work may be made appearing within ten days after notice of such award being given, with bondsmen, and executing a contract with the Sanitary District for the work so awarded, and giving a bond satisfactory to the said Board of Trustees for the fulfillment of the same in the amount of \$15,000. All bids must be made upon blank forms furnished by the Sanitary District, and must give the price for each separate class of work or material called for by the specifications. The bids will be compared on the basis of the aggregate of the lump sum bids, and of the prices per cubic yard for all other work. The quantities of such work to be done being estimated inside of lines on the plans being marked "estimate line." No bid will be considered unless the party making it shall furnish evidence satisfactory to the Board of Trustees of his experience and ability in this class of work, and that he can control sufficient capital to enable him successfully to prosecute same in case the contract therefor shall be awarded him. Bidders are required to state in their bids their individual names and places of residence in full. Specifications and plans may be seen at the office of the Chief Engineer, Room 522, Rialto Building, Chicago, Ill. The said Board of Trustees reserve the right to reject any and all bids. THE SANITARY DISTRICT OF CHICAGO, By B. A. ECKHART, President. JAMES REDDICK, Clerk.

**SEVEN-INCH STEEL MORTAR FORGINGS.—**Office of the Chief of Ordnance, U. S. Army, Washington. Sealed proposals in duplicate will be received at this office until October 5th, 1896, for 20 sets of steel forgings of American manufacture, for 7-in. siege steel mortar. Information can be had upon application to Brig. Gen. D. W. FLAGLER, Chief of Ordnance.

**DREDGING.—U. S. Engineer Office, 106 Granby** street, Norfolk, Va.—Sealed proposals for dredging harbor at Norfolk and its approaches, Va., will be received here until September 28th, 1896, and then publicly opened. Information furnished on application. THOS. L. CASKEY, Capt. Engineers.

**TREASURY DEPARTMENT, OFFICE SUPER-**vising Architect, Washington, D.C., September 19th, 1896.—Sealed proposals will be received at this office until 2 o'clock p. m., on the 20th day of October, 1896, and opened immediately thereafter, for all the labor and materials required for the low-pressure, return circulation, steam heating and ventilating apparatus for the U. S. Post Office Building at Allegheny, Pa., in accordance with the drawings and specification, copies of which may be had at this office or the office of the Superintendent at Allegheny, Pa. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect of informality in any bid should it be deemed in the interest of the Government to do so. All proposals received after the time stated for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for the Heating and Ventilating Apparatus for the U. S. Post Office Building at Allegheny, Pa.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

**WATER WORKS.—**Sealed proposals will be received by the Mayor of the Town of Dows, Iowa, until September 15th, 1896, at which time they will be publicly opened and read, for all materials and labor for construction of a complete system of water works in accord with plans and specifications prepared by Crellin & Lovell, on file at the Mayor's Office in Dows, or at the office of the Engineers at Des Moines. Plant will be let in three parts or as a whole: Part 1. Steel tower supporting a wooden tank. Part 2. Pipe line and appurtenances. Part 3. Steel wind-mill and tower. A certified check payable to treasurer of the Town of Dows of \$75 for each part bid upon must accompany each bid. Plans and specifications may be seen at office of City Clerk, or at office of engineers, Des Moines, Iowa. I. C. PENNINGER, City Clerk; Crellin & Lovell, Civil and Consulting Engineers, Des Moines, Iowa.

**CALIFORNIA.**

If you are going there

by all means inquire about the Burlington Route Personally Conducted Excursions to San Francisco and Los Angeles, which leave Chicago every Wednesday with a Pullman Palace Tourist Car through to destination. The Route is via Denver, the Denver & Rio Grande Ry. (Scenic Line) and Salt Lake City. The Cars are fitted with carpets, upholstered seats, mattresses, pillows, blankets, bed linen, berth curtains, toilet rooms, heat and light, and, in fact, all the conveniences of a standard Pullman Palace Car; they lack only some of the expensive finish of the Pullmans run on the limited express trains, while the cost per berth is only about one-third (1/3) of the price.

Write for full particulars to T. A. GRADY, Excursion Manager, C. & Q. R. R., 211 Clark Street, Chicago, Ill.

THE ENGINEERING AND MINING JOURNAL									
ADVERTISING RATES. (NON-PAREIL MEASUREMENT.)									
	Lines.	Inches.	Regular Edition 1 time.	One Month 4 times.	Three Months 13 times.	Six Months 26 times.	Nine Months 39 times.	Twelve Months 52 times.	Total.
1/4 Column.	6	1 1/2	\$2	\$5	\$12	\$20	\$28	\$34	84
	12	1 1/2	3	8	16	28	38	47	60
	18	1 1/2	4	11	24	42	57	73	87
	24	1 1/2	5	14	33	58	78	100	122
	30	1 1/2	6	17	42	72	98	125	157
	36	1 1/2	7	19	50	86	117	149	181
	42	1 1/2	8	20	54	93	126	161	194
	48	1 1/2	9	21	58	99	135	173	210
	54	1 1/2	10	25	64	118	160	204	249
	60	1 1/2	11	28	75	129	180	224	279
1/2 Column.	6	3	\$3	\$8	\$18	\$32	\$42	\$51	126
	12	3	5	13	32	57	78	100	126
	18	3	7	16	39	69	93	121	153
	24	3	9	19	47	84	111	144	183
	30	3	11	22	55	99	132	171	213
	36	3	13	25	63	114	153	198	243
	42	3	15	28	72	129	174	224	282
	48	3	17	31	81	144	195	255	321
	54	3	19	34	90	160	216	288	360
	60	3	21	37	100	177	240	321	396
3/4 Page.	102	8 1/2	\$18	\$45	\$120	\$210	\$290	\$360	825
	108	8 1/2	19	47	125	219	296	366	855
	114	8 1/2	20	49	132	228	309	381	885
	120	8 1/2	21	51	137	238	322	400	915
	126	8 1/2	22	53	143	248	336	420	945
	132	8 1/2	23	55	149	258	349	440	975
	138	8 1/2	24	57	155	268	362	460	1005
	144	8 1/2	25	59	161	278	375	480	1035
	150	8 1/2	26	61	167	288	388	500	1065
	156	8 1/2	27	63	173	298	401	520	1095
1/2 Page.	204	17	\$32	\$79	\$218	\$374	\$500	\$626	1426
	408	34	61	147	407	708	956	1220	2852

**SPECIAL POSITIONS.** Front page, double regular rates. Back outside page, 80 per cent. above regular rates. Page facing editorials, 50 per cent. above regular rates. Page facing market reports, 25 per cent. above rates. Inside front cover, 50 per cent. above regular rates. Inside back cover 25 per cent. above regular rates.

**LANDS AND MINES FOR SALE.**

**J. F. CROSETT,**  
Secretary, Gold Mining Exchange,  
No. 628 Sacramento Street, San Francisco, Cal.  
**GOLD MINES FOR SALE.**  
On Pacific Coast. Correspondence solicited.

**IMPORTANT.**

To be sold, the Mineral Property called  
**"DIOS TE GUIE,"**

producing Silver and Gold, situated in the Section of  
Yepachi, Municipality of Famocachic, in the District  
Guerrero, State of Chihuahua, Mexico, by the Rascon  
Hermanos Co., of Nuevo Leon, Rayon District, State of  
Chihuahua, Mexico.

For information as to price and conditions of sale  
apply to RASCON HERMANOS.

**UTAH MINES** Gold,  
Silver,  
Copper,  
Lead,

In All Stages of Development.

Deposits of Graphite, Sulphur-Asphaltum,  
Fireclay, Elaterite, Gilsonite and Coal.

Only properties which will stand the closest investi-  
gation will be submitted.

When writing, state clearly the kind of property you  
want, whether fully or partially developed; also the  
kind of mineral wanted.

The demand for copper properties is increasing. I  
have some good ones at reasonable prices on liberal  
terms.

**J. H. WATTS,**  
50 West 2d South St., Salt Lake City, Utah.

**JUDICIAL SALE  
OF A GOLD MINE.**

Pursuant to the winding-up orders made in the mat-  
ter of the Ophir Gold Mining Company there will be  
offered for sale by Public Auction, with the approbation  
of Neil McLean, Official Referee, by the William  
Dickson Company, at their Auction Rooms, No. 73 King  
Street East, in the City of Toronto, on Saturday, the  
17th day of October, A. D. 1896, at 12 o'clock noon, the  
mining property known as "The Ophir Gold Mine," and  
described as the south half of the north half of Lot No.  
12 in the Third Concession of the Township of Gal-  
braith, in the District of Algoma, being parcel 283 in  
register for the District of Algoma, and the north half  
of the south half of Lot No. 12 in the Third Concession  
of the said Township of Galbraith, being parcel 303 in  
the register for the said District of Algoma.

This mining property is conveniently situated within  
14 miles of Bruce's Mines, a station on the line of the  
Canadian Pacific Railway.

There are erected on the property a substantial frame  
stamp mill, well equipped with necessary and valuable  
machinery, an office, an assay building, a blacksmith  
shop, buildings for cooking and dining, two bank  
houses, an ice house, a pump house, a dwelling house  
and a stable.

The mine has been developed and operated and given  
good results.

The property will be offered for sale subject to a re-  
served bid.

Terms—Ten per cent. of the purchase money is to be  
paid at the time of sale to the vendors or their solicitors,  
and the balance within thirty days thereafter,  
without interest, into Court to the credit of this mat-  
ter. In all other respects the terms and conditions of  
sale will be the standing conditions of the Court.

Further particulars can be had from Clute, Macdon-  
ald, Macintosh & McCrimmon, of McKinnon Building,  
corner of Melinda and Jordan streets, Toronto, ven-  
dors' solicitors, and McCarthy, Osler, Hoskin & Creel-  
man, Freehold Building, corner Victoria and Adelaide  
streets, or to Henry W. Barber, Liquidator, Welling-  
ton Street East, Toronto, and from Thomas Grigg, at  
the Mine.

Dated at Toronto, the 10th day of September, 1896.  
NEIL McLEAN, Official Referee.

**CRIPPLE CREEK**  
INVESTMENT  
\$300,000 CAPITAL  
3 YEARS ON  
GROUND  
RELIABLE INFORMATION WITH THE CRIPPLE CREEK  
MAP FREE  
THE WOODS INVESTMENT CO.  
COLORADO SPRINGS, COLO.

**DIVIDENDS.**

**ISABELLA GOLD MINING COMPANY.**

COLORADO SPRINGS, Colo., September 10th, 1896.  
DIVIDEND NO. 9.

A dividend of ONE CENT PER SHARE (\$22,500) has  
been declared, payable September 25th, 1896, to stock  
holders of record September 18th, 1896.

The stock transfer books will be closed September  
18th, 1896, at 3 o'clock p. m., and will be re-opened on  
the morning of September 26th, 1896.

PERCY HAGERMAN,  
Vice-President and Treasurer.

**MACHINERY AND SUPPLIES  
FOR SALE.**

**SECOND-HAND RAILS.**

If you have any Rails which are in good  
condition to relay—or if only good to be  
used as scrap—write us; we buy both  
kinds.

**ROBINSON & ORR,**  
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**CONTRACTS OPEN.**

Continued from Page 18.

**PUMPING ENGINES—OFFICE OF THE DE-**  
partment of Public Works.—Sealed proposals will  
be received by the city of Chicago until November 14th,  
1896, for furnishing and erecting on the foundations to  
be constructed at the proposed pumping station at the  
southeast corner of Springfield avenue and Bloom-  
dale road (Pacific Junction), in the city of Chicago,  
three vertical condensing triple-expansion engines of a  
capacity of twenty (20) million gals. per 24 hours each,  
with a total lift of one hundred and fifty (150) ft., to-  
gether with necessary boilers and all accessories and  
appurtenances, arranged for a complete plant of the  
best type, according to plans and specifications on file  
in the office of the Department of Public Works of said  
city.

Proposals must be made out upon blanks furnished  
at said office, and be addressed to said department, in-  
dorsed "Proposals for Pumping Engines, Pacific Junc-  
tion Pumping Station" and be accompanied with \$25,  
000 in money or a certified check for the same amount  
on some responsible bank doing business in the city of  
Chicago, and made payable to the order of the commis-  
sioner of public works.

The commissioner of public works reserves the right  
to reject any or all bids; due consideration will be  
given to general merits of design, durability of con-  
struction, economy of operation and maintenance,  
facility of repair and proven performance and record  
of similar works in actual service elsewhere.

No proposal will be considered unless the party offer-  
ing it shall furnish evidence satisfactory to the com-  
missioner of public works of his ability, and that he has  
the necessary facilities, together with sufficient pecuni-  
ary resources to fulfill the conditions of the contract  
and specifications, provided such contract should be  
awarded to him.

Companies or firms bidding will give the individual  
names as well as the name of the firm with their ad-  
dress. JOSEPH DOWNEY, Commissioner of Public  
Works.

**PUMPING ENGINE.**—Sealed proposals will  
be received by the Board of Public Works of Kansas  
City, Mo., until October 17, 1896, for the construction,  
erection and testing of a pumping engine at Turkey  
Creek Station in this city.

Capacity required, ten millions of gallons in 24 hours,  
with piston speed of 200 ft. per minute, steam pressure  
150 lbs. per sq. in., to pump into closed mains for direct  
service; usual pressure, 130 lbs. per sq. in., raised to 170  
lbs. for fire pressure, water in supply basins level with  
engine-room floor; available depth of basement, 13 ft.;  
room allowable in engine-room floor, 16 by 30 ft.; height  
of engine allowable, 23 ft. Type of engine vertical,  
triple expansion, with three single-acting outside  
packed plungers.

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facturers of pumping machinery. Bids to be accom-  
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Board of Public Works. R. M. GODFREY, Secretary.

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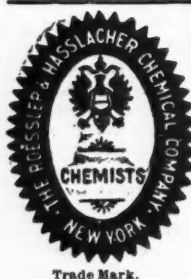
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