

THE ENGINEERING AND MINING JOURNAL



Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. LVI. SEPTEMBER 16. No. 12.

RICHARD P. ROTHWELL, C. E., M. E., Editor.

ROSSITER W. RAYMOND, Ph. D., M. E., Special Contributor.

SOPHIA BRAEUNLICH, Business Manager.

THE SCIENTIFIC PUBLISHING CO., Publishers.

SUBSCRIPTION PRICE: For the United States, Mexico and Canada, \$5 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7.

ADVERTISING RATES furnished on application. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO.

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THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS: R. P. ROTHWELL, Pres. & Gen'l Mang. SOPHIA BRAEUNLICH, Sec'y & Treas. P. O. BOX 1833. 27 Park Place, New York.

Cable Address: "Rothwell, New York." Use A B C Code, Fourth Edition.

LONDON OFFICE:

20 Bucklersbury (Room 366), London, E. C., England. Edward Walker, Manager.

CHICAGO OFFICE: "The Rookery," Room 531.

HEADQUARTERS AT THE WORLD'S COLUMBIAN EXPOSITION: Mining Building, Montana Pavilion, Bullion Boulevard. Machinery Hall, Section K, Aisle 37 (Central Aisle).

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THE Index to Volume LV. of the ENGINEERING AND MINING JOURNAL accompanies this number of the paper.

THE Ways and Means Committee of the House of Representatives has begun to consider the Tariff question, and has also begun to give hearings to parties interested. On two days of this week a number of iron and steel men from Pittsburg and other parts of western Pennsylvania presented their arguments against any present change in the duties.

THE Senate at Washington still continues its discussion of the Silver question, and while it is believed that there is a safe majority in favor of the repeal of the SHERMAN law, the silver men are postponing action by an apparently endless flood of talk. The rules and customs of the Senate do not prevent of the closing of debate, and it is still uncertain when a vote on the repeal bill will be reached. The Senate does not seem fully to appreciate the weight of public opinion.

THE reports from West Australia confirms the statement already made of the great richness of the gold discoveries there, although their extent is not determined as yet. The conditions, however, are extremely unfavorable, and there is much suffering among the prospectors who have gone to the new fields. Their remoteness and the absolute lack of water in that section of the country must make the development of the mines slow; but there seems little doubt that an important addition to the gold supply of the world will come from that quarter.

IN spite of the hard times the attendance at the Columbian Exposition is reported as increasing very largely as the cooler weather comes on. The railroads running to Chicago have a great increase of travel on their World's Fair specials and on the Western lines also the same condition is reported, although in a less marked degree. The financial condition generally prevailing reduced the attendance in July and August below the expected number, but the indications now are that the closing months will make up the deficiency and that a very large number of people will see the great Exposition before its gates are finally closed.

THE Standard Oil Trust—at least in its present form—is to be wound up: not, however, because the Trust's control of the oil business is to be given up, but because it is to be reorganized in a new and more effective form. As usual the details of the plan are not made public.

FOR a long time to come the hold of the Standard on the petroleum business seems to be assured, and its reported agreement with the NOBEL and the ROTHSCHILD syndicates in Europe will keep the petroleum supply of the world in the same hands which now control it, for the new supplies expected from the oil wells of Burma, Sumatra and Japan will require years for their development, even if they are not secured by some branch of the trust.

THE development of the gold fields of Mashonaland is proceeding at a rapid rate and a large number of Europeans are already in the country, which promises to become a prosperous mining region, and is indeed a good country in many respects, the climate and agricultural conditions being more favorable than those of the Transvaal and some other sections of South Africa. The mines are generally "reefs" which give promise of permanence.

JUST at present, however, the Matabele tribes have assumed a hostile attitude and trouble is threatened. The latest reports seem to show that England will have another war on hand to protect her colonists, though there is little doubt that the Matabele will be subdued in the end, as the Kaffirs and the Zulus have been in turn before them.

OUR mining news columns contain further particulars of the consolidation of the mining interests on the Mesaba Range in the hands of the MERRITT-ROCKEFELLER syndicate. While, for the reasons stated last week, it will be impossible for any syndicate or trust to control the iron ore output of this country as the oil production is controlled, it is probable that the new consolidation will be able to deliver high grade Bessemer ore at Cleveland and other lake ports at a lower price than any other miner; whether it will attempt to control the output and cut ore prices is a question for the future. But it is entirely improbable that the price of standard Bessemer ore at Cleveland will ever reach the old figures, or that the \$4 basis talked of can be maintained. As an effect—as much, however of the discovery of the Mesaba itself as of the combination—the depression that has settled over the Marquette and Menominee ranges will be, to a certain extent, permanent.

THE Vermillion Range, or the Minnesota Iron Company, will feel the effect less than the others, for several reasons. Its ore is of a high and uniform quality, is thoroughly tested, is controlled by a large and wealthy corporation, owning transportation facilities and closely identified with some large consumers, while its machinery plant is of high efficiency. All these causes will combine to give the Vermillion advantages in the competition with the new syndicate which the older ranges in the Lake Superior region do not possess.

## THE SILVER QUESTION—PROPHECY AND FULFILLMENT.

We have received recently the following letter from Mr. H. E. COLLINS, of Pittsburg:

"If my memory serves me correctly, you pointed out in 1890, when the Sherman law was under discussion, the disaster which its passage would work to the silver interest, and subsequently gave an article or articles on the cost of silver production."

When the Sherman law was under discussion in Congress the ENGINEERING AND MINING JOURNAL took occasion to show that the position occupied by the silver men was a mistaken one, and to point out the bad results which, in its opinion, would follow the passage of the law. In the issue of April 12th, 1890, a strong stand was taken against the bill on economic grounds, especially against the dangers of free coinage and its probable effect in destroying confidence and causing the withdrawal of the foreign capital invested in our securities. In that issue, and also in the number for June 21st of the same year, it was pointed out that gold would be exported—in the latter number that the exports had already begun—just as followed in 1891 and 1892.

In the number for June 14th, 1890, the question was more fully discussed, and at that time the opinion was expressed that while the price of silver might be temporarily increased, the effect of the purchases would be to increase production, to draw out reserves everywhere and to bring to our market a flood of silver with the inevitable result of a continuous and heavy fall in price. We pointed out that there was no probability of new uses for silver increasing the consumption, as the consumption of copper was increased at a decreased cost, since silver is not a metal entering largely into use in the arts. Moreover, a temporary rise would diminish even its present use in the arts and add to the flood which would come upon the market and hasten the fall.

In support of our arguments we then quoted an article from our able contemporary, the London *Statist*, taking very much the same ground and predicting a fall in price, even should the United States adopt free silver coinage, as then seemed possible.

In these articles, as in others which appeared in the numbers for July 11th and 18th, 1891, August 8th and December 3d, 1892, and many others, we pointed out that unfavorable results must come, not only to the silver interest, but to the general business of the country, and urged the adoption of different measures, notably the international agreement and the monetary clearing-house system.

In these articles the results which have followed the passage of the Sherman law and the policy then adopted were clearly pointed out, with the exception of the sharp and sudden decline which followed the suspension of silver coinage in India—an action which was not then anticipated, and which, in fact, only served to intensify and bring to a head the already existing tendency. To prophesy the future is generally a somewhat dangerous business, but in this case we have fair ground for claiming that the course of events has justified our anticipations, and that public opinion has been brought by the logic of circumstances up to the ground taken over three years ago in these columns.

## THE SITUATION IN COLORADO.

The mining industry of the State of Colorado is slowly recovering from the collapse caused by the sudden fall in the price of silver. At Creede some of the most important mines, such as the Amethyst, Last Chance and New York, have recently resumed operations. There are symptoms of revival at Leadville, and Aspen will not remain quiet long. At the Denver smelters the stocks of ore have been considerably reduced and more ore is now being purchased than has been the case since the end of June.

The southwestern portion of the State—the "Silvery San Juan"—is still in a woful condition, owing to the closing down of the mines. How severe has been the blow to the business of this particular section is best indicated by the falling off in the earnings of the Rio Grande Railway, which for August were \$469,300, as compared with \$931,000 for the corresponding month of last year. At Leadville only about 550 men are at work, or about one-quarter of the force employed two months ago.

In the gold mining regions, however, there is evidence of healthy activity. The small but rich veins of Boulder County are receiving renewed attention; in Summit County, and especially around Breckenridge, old mines are being reopened, while in the vicinity of Blackhawk and Central City, the twin towns of Gilpin County, the "little kingdom" of the older citizens, there is a revival that is better than a boom. The stamp mills are crowded with ore, the old mines are being cleaned out preparatory to undergoing further development, and there is much talk of leases and options. At Cripple Creek, the youngest of the gold mining districts of the State, there is much vigorous prospecting going on. There has been some difficulty in obtaining a proper extraction of the values in the ore, but there is reason to expect that the milling problem will soon be satisfactorily solved. Much of the ore is rich, and though the veins that carry it appear to be irregular, there is every expectation that this camp will add very materially to the gold yield of Colorado.

The facts just noted have helped to lighten the gloom caused by the prevailing business depression; there is every sign of a recovery, and ere long we shall see fresh life infused into the development of this State, one of the most varied and productive of the mineral producing regions of the world.

In the meantime it is to be sincerely hoped that the suggestions for warehousing silver and the issuing of certificates for use as currency will be set aside as dangerous and impracticable. This scheme is almost unanimously opposed by the bankers of Denver, and receives but little support among business men. There seems to be no clear idea how to proceed, and though a public meeting may be called it is safe to predict that it will come to nothing.

The reopening of certain banks which had suspended has done much to restore a feeling of confidence. The resumption of work at some of the important silver producing mines proves that their owners believe that the price of silver has reached its lowest, and in conclusion it may be added that the general situation has become more clear and hopeful, promising a return of the vigor and energy which have always characterized the development of our Western mining regions.

## THE PRICE OF ZINC.

In plotting the curves of the prices for the principal metals in the United States during 1893 there will be some very extraordinary lines, certain of them having fallen to a lower point than ever before recorded. Thus copper has dropped below the level to which it sank after the collapse of the French syndicate; lead has been lower than it fell after the Corwith failure in 1888, and almost to the panic price of 3c. in May, 1879; pig iron is about down to bed-rock, at \$14.50 for No. 1X Foundry here; while tin and quicksilver are both very low, though these have not declined so much proportionately as some of the other metals. We have already commented upon this phase of the financial crisis of the summer of 1893 in previous issues, but a fortnight ago there was an event in the metal market of such unusual character that it deserves further mention. We refer to the continued decline in the value of zinc, which carried the price for that metal below that for lead.

It is not extraordinary that zinc should be quoted lower than lead, but it is uncommon. In looking over the statistics of the average monthly prices of the two metals in "The Mineral Industry" for 1892 we find that since 1874 the value of zinc first declined below that of lead in September, 1881, in which month the former averaged 5.125 cents per pound, and the latter 5.16. This happened again in September, 1885, and several times during 1886, which year was remarkable, the average for lead for the whole twelve months (4.63 cents) exceeding that of zinc by 0.23 of a cent. In August, 1887, and September, 1888, lead was again sold at a higher rate than zinc, and in September, 1887, the average for the two metals was the same. August, 1893, was extraordinary, however, in having zinc quoted for less than lead, when both were below 4 cents!

Two weeks ago the price of lead in New York was 3.675 to 3.75, having risen in a fortnight from 3.30 on account of restriction in production, as we foretold in our issue of August 19th. The condition in the zinc market had become about as bad as it could be, however, and the price continued to fall, until finally, at the end of the month, 3.275 to 3.30 (East St. Louis) was reached, this being equivalent to 3.525 to 3.55 in New York, and lower than the price in London. Ordinary brands of spelter were quoted in London on August 17th at £17 5s. per gross ton (3.74c. per pound); the next week there was a drop to £16 15s. (3.63c.), through fear of importations from America, but during the week following the price recovered to £17 2s. 6d. (3.71c.). When spelter, which it costs more to produce in the United States than in Europe, actually sells at a lower rate here than abroad, the weakness of our market is forcibly shown.

As to the chances for improvement we hesitate about expressing our opinion. Things are bad among the brass-workers, and among the galvanizers, from whom came the great increase in the demand for spelter last year, business seems to have had a very serious setback. At the same time production has been large. According to a statement published in our market report August 19th, the output in the first six months of 1893 was stated to be 45,794 short tons, against about the same amount in the corresponding period of 1892. If these figures be correct the output of spelter during the first half of the present year was much greater than during the last half of 1892, and this notwithstanding the strike commencing June 1st among the coal miners of Kansas, cutting off the fuel supply of the Kansas-Missouri works.

Since the middle of June the production of spelter has been restricted sharply, but the stocks have been large and pressing for sale. The productive capacity of the Mississippi Valley States has been increased so largely during the past two or three years that, without doubt, the demand can be met easily as soon as it springs up again. We do not look for so great a rise proportionately in the price of spelter, therefore, as in that of lead—when the country begins to recover from the recent panic—and we fear that the zinc smelters will have hard times for many months, during which only the best designed works will yield much profit.

NEW PUBLICATIONS.

**THE ELECTRIC TRANSMISSION OF INTELLIGENCE.** By Edwin J. Houston. New York; the W. J. Johnston Co., Limited. Pages, 324; illustrated. Price \$1.

This book is in line with a series by the same author on electrical topics, which he calls "Primers of Electricity." The present volume treats of the transmission of intelligence by electricity—that is, of telegraph and telephone lines in their various forms and of the appliances used in their operation. Like the other "Primers" of the series, it is complete in itself, and gives a condensed and practical account of the latest and most approved methods now in use in these departments of electrical science. While it is intended more for the general public than for trained electricians, the book presupposes at least an elementary knowledge of the subject, such as most intelligent people have nowadays. It is a convenient manual for those who wish to be posted on this topic.

**ARITHMETIC OF MAGNETISM AND ELECTRICITY.** By John T. Morrow and Thorburn Reid. Lynn, Mass.; the Bubier Publishing Co. Pages, 144. Price 50 cents.

This little book is intended chiefly to explain the rules of electricity and magnetism connected with their commercial applications, and to show how electrical measurements are made and applied. There is no attempt to enter into strictly technical questions or to explain the phenomena involved. The chapters are on electric currents and resistances, electric circuits, batteries, dynamos and motors, alternating current apparatus, lighting and power, and electrical railroads. In each case rules for the calculations required are given, with a number of examples worked out in illustration. The book will be a very convenient one, as it gives the rules in a very compact form, without requiring the student to hunt for them as he would have to do in a more elaborate work. It is in similar form to several other brief practical books on electricity prepared by the same company.

**A PRACTICAL TREATISE ON FOUNDATIONS.** By W. M. Patton, C. E. New York, John Wiley & Sons. Pages, 402; illustrated. Price \$5.

In the preface of this book the author states that he intended in writing it to pay very little attention to theories and formulas, and this plan has been generally followed, although it has been impossible to dispense with some theoretical work. The book is divided into three parts, the first treating of the general subjects of foundations in different kinds of ground and of the materials to be used. Here are chapters on concrete, stone, brick, cement, masonry, retaining walls, arches and similar topics; and they are generally treated in a thoroughly practical way.

The second part treats of timber foundations, with chapters on piers, trestle work, piles and on the different kinds of timber. To this section the author has evidently given a great amount of labor, and supports his positions by many instances taken from practice.

The third section considers difficult foundations and those required for special conditions. Among the special points are caissons, the Poetsch freezing process, coffer-dams, iron piles and others of the same kind, while considerable space is given to the foundations of high buildings. This part of the book is worth careful study, since it considers many important points, among them several which have been much discussed by engineers.

The book is illustrated by numerous examples from existing structures. Perhaps a greater number of engravings would have been acceptable to many, since the drawing is often much clearer than description. This is a minor fault, however, and it may be said that the book is a valuable one on a subject which has not had too much literature devoted to it. Foundations are among the most difficult questions with which an engineer has to deal, and it is almost impossible to lay down general rules for their construction, since so much depends on local conditions which vary almost indefinitely. Almost every important structure requires a special study, and the only rules that can be given for an engineer's guidance are based on the experience of his predecessors, of whose work the present book gives us a compact and intelligent summary.

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 in another page of the Journal.

*Selected Papers of the Institution of Civil Engineers.* London, England; Published by the Institution.

*The Expert Calculator.* By John D. Haney. New York; the Excelsior Publishing House. Pages 126. Price, 50 cents.

*The Lehigh University Exhibit at the World's Columbian Exposition.* South Bethlehem, Pa.; The "Lehigh Quarterly," Pamphlet, pages 22.

*Annals of the American Academy of Political and Social Science.* Volume III. July, 1892—June, 1893. Philadelphia; The American Academy of Political and Social Science.

*The Transition Curve by Offsets and by Deflection Angles.* By C. L. Crandall, C. E. New York; John Wiley & Sons. Pages 64; with diagrams and tables. Price, \$1.

*Department of Agriculture, Bulletin No. 13. Foods and Food Adulterants: Part II. Canned Vegetables.* By K. P. McElroy. Washington; Government Printing Office. Pages 160.

*The Coal and Metal Workers' Pocket-Book.* Specially compiled and prepared. Scranton, Pa.; the Colliery Engineer Co. Pages 564; illustrated. Price, \$2.75 in flexible morocco; \$2, cloth.

*A Week at the Fair: Illustrating the Exhibits and Wonders of the World's Columbian Exposition.* Chicago; Rand, McNally & Co. Pages 252; with maps, plans and illustrations. Price, paper 50 cents; cloth \$1.

1. *The Neocene Rivers of California.* By Waldemar Lindgren.
2. *The Archean Rocks West of Lake Superior.* By W. H. C. Smith.
3. *Some Maryland Granites and Their Origin.* By Charles Rollin Keyes.
4. *The Laurentian of the Ottawa District.* By R. W. Ellis.
5. *Height of the Bay of Fundy Coast in the Glacial Period.* By Robert Chalmers.
6. *Relations of the Laurentian and Huronian Rocks North of Lake Huron.* By Alfred E. Burlew. Rochester, N. Y.; published by the Geological Society of America.

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. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Silver Question.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Now that the battle is practically over, as far as the United States is concerned, permit me to humbly congratulate you on the patriotic stand and fight you have made throughout the struggle on the silver question, and gratefully to thank you for the instructive light and guidance your "Journal" has afforded in this important national and international question.

MONTREAL, Canada, Sept. 9, 1893.

J. MOWAT REID.

Koch's Latitude Triangle.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: To prevent some enterprising genius from patenting my "Latitude Triangle," if not already patented, I send you a description for publication. Koch's "Latitude Triangle" was originated and designed by me, and has been used by me for a long time. It is a plain 45° steel triangle; the inner edges of the legs are beveled and graduated to any scale, zero for both graduations being at the inner corner of the right angle. Its usefulness can only be appreciated by those who try it. I have employed it in several ways, which I am sure are only a few of the possible applications.

First (and principally): For plating latitude and departures on mine maps. In our case we have true north and south and east and west lines drawn on the map at convenient distances, say, 50 ft. apart, scale 200 ft. equals 1 in. Supposing we have a point N. 45 ft. E. 725 ft.; place the graduation of one leg along east and west zero line and 25 ft. mark of the scale on first east 500 ft. north and south line, the right angle is at the right hand, the other leg points north, and the required point is at 45-ft. mark of this leg. Thence lay graduation of one leg from station to station, connect by pencil line and the observed distance between stations ought to be the same as the notes call for, which will give a check on calculating as well as plotting the latitudes and departures. This system will be found more accurate and much quicker than the old way by parallel and intersecting lines.

Second. In finding latitude and departure points on a completed map by using this triangle you can avoid all pencil marks whatever.

Third. In plotting right-angled offsets of any line it obtains alignment distance, offset distance and right angle at one setting.

Fourth. Plotting small angles by table of natural tangents, the working field being entirely unobstructed.

Fifth. Plotting railroad lines by radii and tangents, having always the right angle between the graduations established for radii and tangents. Small interior angles can be plotted, as above.

Sixth. For making right-angled offsets to left and right of any line by adopting any point on the scale as zero.

Seventh. For plotting buildings on a small scale, of any regular or irregular shape.

Eighth. For drawing parallel lines equidistant, mark zero of scale on map after the ungraduated edge is brought to the first or beginning line, then move triangle upward, reading the graduation as it passes the point on the map.

Ninth. For roughly reducing slope distance to horizontal and vertical, or calculating latitudes and departures in the field, accuracy depending on scale employed.

Tenth. In architecture, where numerous right angles and squares of given dimensions have to be laid down.

In general, it will be seen that it is not necessary, as in the old way, to erect perpendiculars, prolong beyond the distance wanted and to erase the unnecessary part. All errors accumulating from using blunt pencil points are avoided; the true right angle and true dimensions or distances can be pricked off. This triangle is not patented, to my knowledge, and it may be useful to some of your readers.

DENVER, Colo.

AD. KOCH,

Assistant Engineer Colorado Fuel and Iron Co.

Is Carbonic Oxide Dissolved by Iron?

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Direct proof of this question either way involves much difficulty. Is the carbonic oxide dissolved in the metal or is it formed by the action of the escaping oxygen upon the carbon? Before giving conclusions, description of apparatus and experiments is desirable. A bar of very pure "hoop L" iron was secured; composition: Carbon, 0.061; silicon, 0.055; phosphorus, 0.016; sulphur, 0.007; manganese, 0.101. This was planed, the shavings dissolved, the impurities were removed and the iron was deposited electrolytically. It was then redissolved and again deposited; still I obtained a trace of carbon. The iron was again dissolved and precipitated as hydrate. This was placed in a porcelain tube, and the temperature was gradually raised to high redness, purified oxygen was then passed through for three hours; this burnt the carbon and removed it as oxide. After such treatment analysis failed to show carbon.

For melting a special apparatus was constructed. A small crucible was built up, bit by bit, of pure quartz. To toughen the walls a small quantity of iron filings was sprinkled over the outside; then the whole protected by a layer of magnesia. The crucible top was drawn in to a diameter of 1 in.; to this a 12-in.-long porcelain tube was fused. Such a crucible was airtight. Two glass tubes entered the porcelain neck of the crucible; one, platinum tipped, extended within 4 in. of the bottom. The neck was then stoppered with asbestos, magnesia, etc.; a depth of two cm. of mercury above the cork insured tight-

ness. The entire apparatus was then exhausted. A thorough test showed no leaks. Before the final sealing 500 grams of the pure metal had been introduced. Three oxyhydrogen blowpipes quickly melted the iron. It was then allowed to cool in this vacuum. The apparatus was now filled with purified oxygen, diluted with pure nitrogen, and the iron again melted. After holding molten for some time powdered glass was introduced through the platinum tipped pipe. No air entered during this operation, for the tube containing the glass had been exhausted, filled with oxygen and re-exhausted, the glass finally being blown in by a stream of oxygen. This strongly acid slag, together with the acid lining precludes excessive solution of oxides. The blowpipes were turned out, and the iron allowed to cool, but under great pressure which prevented large escape of any oxygen that might be occluded. The crucible was now broken, the iron removed, and the whole outer surface planed off till only bright metal could be seen.

The iron now contains oxygen, but no carbon. It was found impossible to construct a crucible of pure magnesia that would remain airtight. So a silica crucible was lined with pure magnesia (containing no oxides of carbon). The iron was then placed in this, and the apparatus arranged as previously. The entire system was now quickly exhausted and filled with purified hydrogen, which was forced into a moderate degree of pressure. The iron was again melted. Carbon was now introduced through the platinum-tipped tube. This carbon contained no oxides. It was heated to a very high temperature in a vacuum, cooled and again heated, maintaining the vacuum all the while. Hydrogen was then passed into the tube on the still hot carbon; it was allowed to cool, then again heated and exhausted. No trace of gases was found. Without removing the carbon from the tube in which it had been subjected to the above treatment it was finally blown into the crucible of molten iron by a stream of hydrogen. All the carbon added disappeared. Of course no allowance was made for oxidation of the carbon because the atmosphere was hydrogen.

The iron now contains hydrogen, nitrogen, oxygen and carbon. If, on cooling in a vacuum we obtain hydrogen and oxygen, but no oxides of carbon, we can say that, in this case, carbonic oxide was not formed by any action of escaping oxygen on carbonated metal. Still continuing the pressure the iron was cooled. The apparatus was then exhausted, filled with hydrogen and re-exhausted. The blowpipes were then turned on and the iron melted in vacuo. The apparatus was cooled, filled with mercury, and the gas collected for analysis. The gas contained 16.61 cub. em. of oxygen and 0.96 cub. em. of carbonic oxide, but no carbon dioxide. Several blanks were similarly treated but no gases were found.

Many observers have found carbonic acid and oxide in gases escaping from iron. This experiment would seem to indicate that these gases were dissolved, and not formed by the action of escaping oxygen on the carbon—for in this case oxygen escaped from carbonated metal, and practically neither carbonic acid nor oxide was formed.

With similar precautions a new sample of the pure metal was melted in an atmosphere of carbonic oxide. The gas was collected as before, and contained 0.23 cub. em. of carbonic oxide and 0.70 cub. em. of carbonic acid. I would not insist that this one experiment should decide such a question, but will say that with this piece of iron the facts point in a definite direction.

R. K. GRATIGNY.

#### The Treatment of Zinc-Lead Sulphides.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In the "Engineering and Mining Journal" of July 1st, 1893, appears a letter from Mr. F. L. Bartlett, the general manager of the American Zinc-Lead Works, Canon City, Colo., referring to my article on "The Treatment of Zinc-Lead Sulphides" in that monumental publication, "The Mineral Industry." Mr. Bartlett, in a very courteous manner, takes exception, first, to my having, as he infers, written of the process carried out at his works, as though it were not distinguishable from the "Lewis-Bartlett" process; secondly, to my having, as he considers, erroneously objected to his process; and, thirdly, to my remark that "as the American Zinc-Lead Company's works on this system commenced operations in the spring of 1891 and treated 100 tons daily of the blende tailings from the dressing-floors at Leadville, it seems probable that the practical success of the method, if attained, would, ere now, have been widely published."

First, I have to remark that, in writing my article for "The Mineral Industry," I did not consider it necessary to specifically mention both the "Lewis-Bartlett" and the "F. L. Bartlett" processes. I regarded them as being generically the same, and I referred to them both under the common name of the "Bartlett" process, taking care, in order to avoid any misunderstanding, to define such "Bartlett process" as consisting "in smelting the ores for the express purpose of volatilizing the zinc, and providing special chambers and apparatus for collecting the lead sulphate and zinc oxide that pass away from the furnace, while the residual slag and matte contain the iron, together with some of the lead and silver." That this definition covers the F. L. Bartlett process in use at Canon City, Colo., as well as the "Lewis-Bartlett" process worked at Joplin, Mo., will be evident to any one who will read Mr. F. L. Bartlett's article "On the Treatment of Complex Zinc Ores by Smelting" in the "Engineering and Mining Journal" of August 3d, 1889, to which Mr. Bartlett refers me in his letter under reply. I may also direct attention to the report on the ores of the Barrier Range, Australia, by Dr. C. Schnabel, director of the Royal School of Mines, Clausthal, Germany, published in the "Engineering and Mining Journal" of September 17th and 24th, 1892. The eminent writer of that report uses the term "Bartlett process" generically, to signify both the Joplin and the Canon City methods; and I do not remember to have observed that Mr. F. L. Bartlett took any exception to this grouping together of the two systems of treatment.

In the second place, I have to point out that my criticism of the "Bartlett process" was worded as follows: "The a priori objections to the method are two-fold; first, the treatment of ores rich in blende and low in galena can hardly be effected with less than three fire operations, namely, a preliminary roast, a crude-fume smelting, and a refining smelting, in addition to the ignition of the crude fumes and the double work of collection, all of which entails a relatively heavy cost; and, secondly, no continuous market for any very large quantity of pigment is possible." With regard to the second of these objections Mr. Bartlett is silent. With regard to the first he says: "The process, as carried out at the American Zinc-Lead Works, Canon City, Colo., requires but two treatments of the ore at most; on some classes of ore only one. There is no 'preliminary roast,' no 'crude fume smelting,' no 'ignition of the fume.'" And yet, in the article of August 3d, 1889, to which he refers me as containing "a complete description of the processes employed at our works," I find the following statement: "The fume, as collected in the process mentioned, is dark colored, very light and bulky. It contains carbonaceous matter, as well as many of the lighter volatile elements, loosely combined with sulphurous acid. To remove these and to whiten and condense the material it is subjected to a slow red heat in a closed tube containing a screw which keeps the material in constant motion and performs the double action of grinding and condensing, as well as moving the material forward. Air is admitted sparingly through a graduated opening." Surely this is "ignition of the fume"; and surely the furnace operation which produces the "dark colored, very light and bulky" fume is a "crude-fume smelting." This furnace operation is in the F. L. Bartlett process preceded by a preliminary furnacing which (see specification of U. S. Patent No. 406,870, dated July 16th, 1889, and issued to Mr. F. L. Bartlett) "consists of burning the ore and fuel in a suitable furnace whereby the metals are fused to form a scoriating bath, directing an air blast onto this bath to expel the volatile metals and keeping up the heat in the body of ore to prevent such metals from condensing." It is true that the two furnacings are conducted in an apparatus which allows the product from the first hearth to pass to the second without handling; but they are, none the less, two distinct "fire operations" which, with the requisite refining-smelting of the matte or scoria from the first hearth, make the "three" mentioned in my article. And as the word "roast" is a general term inclusive of "scorification," it seems to me that my comments on the "Bartlett process" were sufficiently accurate.

Thirdly, I must disclaim writing anything which asserted or implied that the owners of the American Zinc-Lead Works had "necessarily made a failure" in every sense of the word. And I am delighted to hear of their "steady work" and "constantly increasing output" with "actual results" that have been "extremely good," even though "the profits have been small." But this recognition of Mr. Bartlett's success as a pigment maker is quite consistent with the doubt expressed in my article as to the American Zinc-Lead Company having attained practical success in solving the problem of how to profitably treat zinc-lead sulphides in general. "The Engineering and Mining Journal" of February 8th, 1890, says: "The American Zinc-Lead Company last year commenced the erection of works at Canon City, Colo., for the reduction of ore of this character by the process devised by Mr. F. L. Bartlett. A section of these works has now been in operation about four months, and we are informed that results have been better than was anticipated. About 100 tons of the low-grade zinky tailings from the dressing works at Leadville have been treated daily with an outcome of about eight tons of zinc-lead oxide. The latter product is shipped to Chicago, and is said to be meeting with such favor that the company has more orders for it than it can fill. The capacity of the works at Canon City is to be increased to 300 tons per day as soon as possible. An important feature in connection with the practical operation of the Bartlett process has been that the loss in silver is not so great as was anticipated. With ores assaying 10 oz. silver per ton the loss has not exceeded 15%. It is thought, consequently, that ores of higher grade in silver may be accepted for treatment than was originally intended."

It is not reasonable to suppose that if these expectations had been fulfilled, the fact would have been widely published. I think Mr. Bartlett himself will, upon reflection, admit that such a supposition does not repose upon any "curious" or untenable argument. If, however, he thinks otherwise, I hope he will favor the readers of the "Journal," or, in other words, the mining and metallurgical circles of the world, with a statement of the manner in which he conceives the operations at the Canon City works to have solved the problem of profitably treating zinc-lead sulphides in general. In expressing this hope, I would remind him that the only figures published as yet seem to indicate that the problem is very far from being solved. The specification of his U. S. Patent No. 477,488, dated June 21st, 1892, says that a "fair sample" of his pigment shows, by analysis: Zinc, metallic, 47.33; lead, metallic, 24.92; sulphur, 2.96; moisture, oxide of iron and soluble zinc sulphate, 0.45; oxygen (by difference), 24.34. This analysis, if representing the "eight tons of zinc-lead oxide" mentioned in one of the foregoing quotations from the "Journal" shows the average result of the F. L. Bartlett process to be an extraction of only 4% of zinc and 2% of lead from the "low-grade zinky tailings" treated. I mention this, not for the sake of depreciating Mr. Bartlett's work (which, personally, I regard most highly) but simply to show him that I had the most ample justification for my remarks in "The Mineral Industry." In a book of that class the "scientific conscience" is more than usually concerned. Every writer therein is bound to take the utmost pains to be sure of his facts, and to be absolutely just and impartial in his comments. Perfection, of course, is impossible; and the correction of such errors as may inadvertently creep into the pages of a book of reference should be invited and gladly welcomed. But before any allegation of error can be admitted as well founded, it must be supported by clear proof.

S. H. EMMENS.

Youngwood, Pa.

THE EXHIBIT OF THE CANADIAN COPPER COMPANY.

Written for the Engineering and Mining Journal, by D. H. Browne, Chemist-in-Chief of the Canadian Copper Company.

To be of general interest, the description of any exhibit must cover more than a categorical enumeration of the specimens shown, and for this reason in the following description of the exhibit of the Canadian Copper Company an effort has been made to show the relation of the specimens one to the other, and the progress of manufacture, from crude ore to finished product.

The exhibit of the Canadian Copper Company, a photograph of which is here presented, occupies the center of the Ontario section in the Mines and Mining Building. Around the central pyramid, composed of massive specimens of ore, matte and finished nickel, showcases containing samples of intermediary products are grouped, while at either side a series of photographs of buildings and furnaces explains the process of manufacture.

Entering the Ontario booth from the central aisle, the attention of a visitor is drawn first to large specimens of Copper Cliff and Stobie ore—these weigh 6,000 and 8,000 lbs. respectively—while on the op-

ing these into respective bins, while the average mixed ore falls from the end of the tables into a larger hopper.

Samples of the ore from the three mines graded to coarse, raggings and fines are shown in the showcase to the right as you enter the Ontario booth, while to the left samples of picked copper and picked nickel ore may be seen. Analysis of an average month's output from the three mines, and comparison with the picked nickel and picked copper ores, will be found interesting.

|                 | Copper Cliff. | Evans. | Stobie. |
|-----------------|---------------|--------|---------|
| Silica .....    | 13.44         | 24.55  | 12.50   |
| Iron .....      | 39.02         | 35.18  | 47.25   |
| Sulphur.....    | 26.26         | 18.27  | 25.26   |
| Copper.....     | 4.31          | 1.43   | 1.92    |
| Nickel.....     | 5.57          | 3.74   | 2.36    |
| Alumina.....    | 4.49          | 8.02   | 3.30    |
| Lime.....       | 2.28          | 2.06   | 1.48    |
| Magnesia.....   | .85           | 1.67   | .80     |
| Phosphorus..... | .015          | .01    | .018    |
| Manganese.....  | .09           | .08    | .09     |
| Moisture.....   | .15           | .07    | .09     |
| Total.....      | 93.575        | 95.08  | 95.068  |

As the iron is in part combined as silicate, part as pyrrhotite and part as chalcopyrite, the balance of the analysis represents oxygen.



EXHIBIT OF THE CANADIAN COPPER COMPANY AT CHICAGO.

posite side a six-ton mass of Evans mine ore completes the trio. The large specimens are of particular interest as showing the relation of ore to gangue. It will be noticed that the nickel occurs as pyrrhotite and the copper as chalcopyrite, both forming a breccia or conglomerate in a matrix of black diorite. The peculiar value of the diorite as flux in the smelting will afterward be noted. It is doubtful whether any exact mineralogical combination of nickel can be found in the Sudbury ores, a long experience having shown that no two samples of picked ore carry the same percentage of nickel. The general consensus of opinion is that the nickel ore is simply a pyrrhotite in which nickel replaces iron in irregular amounts.

From the mines, from which excellent photographs are shown, the ore is hoisted to rockhouses where it is roughly sorted, the rock being wheeled to a dump and the distinctively nickel ore or copper ore being piled at either side. A Blake crusher breaks the ore and allows it to fall through revolving screens, the coarse ore passing a 4-in., the medium or raggings a 1 1/4-in. and the fine ore a 3/4-in., opening. The raggings and fine ore pass direct to their respective bins, while the coarse ore falls from the screens on washing tables. It is here passed under a spray of water, and while being carried onward by the jerking motion of the tables, is rapidly sorted by boys, who pick out any pieces in which nickel or copper seems to predominate, throw-

A month's output from the Evans mine shows the results obtained by sorting the ore.

|   |          | Copper. | Nickel. |
|---|----------|---------|---------|
| Evans' mine, regular run mixed ore..... | Coarse   | 1.62    | 3.45    |
|   | Raggings | 2.99    | 3.90    |
|   | Fines    | 3.78    | 5.04    |
| " " picked nickel ore.....              | Coarse   | .58     | 5.13    |
|   | Raggings | 1.14    | 4.87    |
|   | Fines    | 1.36    | 6.64    |
| " " picked copper ore.....              | Coarse   | 11.74   | 1.80    |
|   | Raggings | 11.15   | 2.46    |
|   | Fines    | 13.45   | 3.35    |

The ore is now taken to the roast yard, in which space is provided for roasting about a quarter of a million tons of ore per year. The company has usually about 50,000 to 60,000 tons roasted ore on hand ahead of the smelters. On the roast yard, as shown by a photograph in the exhibit, the coarse ore is piled to a height of 5 or 6 ft. on an 18-in. bed of cordwood; it is then covered with a layer of raggings, and finally topped and banked at the sides with 6 or 8 in. of fines. The piles hold from 600 to 1,800 tons of ore. Each roast heap burns from six to ten weeks, during which operation the sulphur is lowered to about 7%, the iron is in large part oxidized, and the diorite is thoroughly disintegrated by the swelling and oxidation of the ore. Samples of roasted ore are shown in the left hand cases.

After the ore is thoroughly roasted it is taken to the smelters. These have been so often described that it will suffice to say that the furnaces are of the Herreschoff pattern, of boiler iron, water jacketed, about 9 ft. in height to charging door, of oval section 6 ft. 6 in. by 3 ft. 3 in., with 2-in. water space, and provided with an exterior, brick-lined, water cooled forehearth or well. The capacity of each furnace is about 125 tons of ore or 15 tons of matte in 24 hours, two furnaces being always in operation. A photograph shows the tapping of matte into cast iron, conical matte pots, in which it is allowed to cool. Ten of these matte castings are grouped around the upper part of the exhibit. The slag runs continuously over a slag lip at the top of the well, and during the winter is wheeled away in pots similar to those used for matte. In summer the slag is allowed to flow continuously from the well through an opening in the floor, where a powerful jet of water granulates it and carries it to the dump—a system devised by Mr. James McArthur, the general manager of the company.

The process of smelting is very economical, the ore furnishing in itself the exact ingredients necessary for fluxing; so that by skillful mixture of the ores the company has never been obliged to put a pound of extraneous flux into their furnaces. About 15% of Connells-ville coke is used to reduce the ore to matte, or, in other words, one pound of coke makes one pound of cupola matte. The average grade of matte will analyze as follows: Copper, 20 to 25%; nickel, 18 to 23%; iron, 25 to 35%; sulphur, 20 to 30%. From picked ore cupola matte is sometimes made as high as 52% nickel; the grade is varied to suit the consumer, some desiring high copper and low nickel, and some low copper and high nickel. Any desired proportion of copper and nickel can be made from selected ores.

It is interesting to note that as the mines deepen the ore changes in character, from a distinctively copper ore at the surface to a distinctively nickel ore on the lower levels. Copper Cliff mine, for example, produced on the first level a chalcopryite, in which the nickel was found by accident after large shipments had been made of the ore as a copper ore alone. On the fourth and fifth levels the ore was about 4% copper and 4.5% nickel, while on the seventh level many stopes show an average of 0.5% copper to 8 and 10% nickel. As these levels are opened the cupola matte will be raised thereby to 25 or 30% nickel.

The next step in the treatment is the refining of cupola matte. At the Canadian Copper Company's refinery at Sudbury the matte, after remelting in cupolas, is run into Bessemer converters, similar to those used in the refining of copper. There are three converters in the refinery, one being always in use, while a second is being relined and a third is in readiness for a charge. The capacity of the Bessemer plant is about 25 tons of cupola matte supplied or 15 tons Bessemer matte produced in 24 hours. In the converters the iron is almost entirely removed, the sulphur lowered to from 5 to 15%, and the copper and nickel raised to about 45 and 40% respectively. As there are none of the usual flame reactions to guide the operation, the point at which to stop the blowing, after the iron has been removed and before the nickel has commenced to slag in undue amounts is one in which the skill of the furnace manager is best shown. As the converter slags rarely show over 2% copper and 3.5% of nickel, and as the ratio of copper to nickel in the supply is about 23 to 20 and in the product about 43 to 39, sufficient proof is given of the skill and judgment needed and practiced in the Bessemer concentration of such an easily oxidizable metal as nickel. All converter slags are returned to cupolas for remelting.

For convenience in handling, the converter matte is cast in slabs of 3 ft. square and about 3 in. thick, weighing about 1,500 lbs. each. These slabs are lifted on the buggies by hydraulic cranes which serve for handling the converters. A sample of Bessemer matte is shown in the left hand showcase. A fair average analysis of this is: Copper, 43.36; nickel, 39.96; iron, 0.3; sulphur, 13.76; silver, 7 oz. per ton; gold, 0.1 to 0.2 oz. per ton; platinum, 0.5 oz. per ton.

After Bessemerizing the matte, the process branches into two distinct parts. For the manufacture of copper-nickel alloys for use in German silver, the Bessemer matte, after roasting to remove all the sulphur, can be reduced direct to alloy, either by charcoal or by reducing gases. A refined copper-nickel alloy containing 50% copper and 49% nickel, with very small amounts of iron, silicon and carbon, is produced direct from Bessemer matte. The economy to German silver manufacturers of purchasing a ready made alloy, which melts at a low heat and requires simple addition of zinc, instead of buying the nickel and copper separately, is patent to any one. Samples of copper-nickel shot, bars and ingots are shown in the front showcase. It will be noticed that this alloy, "50-50," as it is called, is almost indistinguishable from pure nickel. As its cost is much less than nickel and its melting point much lower, and as it can be cast solid in any form desired, and furnishes a casting which works easily in the lathe or planer, yielding a silvery white surface unchanged by air or moisture, this alloy is destined to have a large use in all hardware specialties where brass or nickel-plated iron is at present used. For the new bullet casings now used in various British and continental rifles, a special alloy of 80% copper and 20% nickel is made.

The separation of nickel from copper is a process which has always been kept more or less of a trade secret, and for this reason the steps in the production of nickel oxide from Bessemerized matte are not shown.\* We venture to say that this reticence about certain processes in the manufacture of nickel is not due so much to individual preference as to the conditions forced upon manufacturers by others in the same line of business, and we may state that a general disarmament, so to speak, would be of as much benefit to the metallurgy of nickel as it has been to the metallurgy of silver, copper and iron. We will, however, say that heretofore the usual process employed for the production of nickel from its oxide has been the direct reduction of this oxide, either loose or pressed into cubes, with charcoal in crucibles. This yields a product, which in the case of cube nickel is not strictly

a homogeneous metal, but a loose sponge of metallic particles which retain all the impurities contained in the oxide, plus from 1/2 to 2% of carbon. The metal produced by the Canadian Copper Company in their refinery, near Cleveland, O., is, however, a solid metal, having been melted direct from the oxide and the carbon and silicon entirely removed. By direct melting alone can a metal free from carbon be produced. The casting of 4,500 lbs. of nickel, which forms the capstone of the exhibit, was made at the Cleveland works. Its purity is shown by the presence of blow holes at the surface. It assays as follows: Ni, 98.78; Fe, 0.301; S, 0.068; Cu, 0.76; Si, 0.19; Carb, 0.0; Tin, 0.0. It is usual in nickel casting to add a small quantity of magnesium or aluminum, to make a solid surface; but in this case it was not desirable to spoil an ingot already pure by the introduction of any foreign element whatever, so the casting has been left as it came from the mold.

The adaptability of pure nickel to solid castings is shown by the group of nickel anodes exhibited and by the letters forming the words "The Canadian Copper Company" in the front and rear cases. These letters are cast from pure nickel, the surfaces afterward planed and polished. The anodes are particularly noticeable for their solidity and purity.

In the right hand showcase will be found a sample of Vermillion platinum sand, and a tube containing about 100 grms. of Sperrylite or arsenide of platinum—this is believed to be the largest amount of this unique mineral ever exhibited. It occurs in the surface sand at the Vermillion mine, on property owned by the Canadian Copper Company. The ore from the Vermillion mine will average 17.40 copper and 16.80 nickel and contains 9 oz. of platinum per ton. The yellow surface sand which is a product of the decomposition of the underlying ore, contains 15.75 oz. platinum per ton.

All the mattes produced by the Canadian Copper Company contain small amounts of silver, gold and platinum. In electric refining of the Bessemer mattes comparatively large amounts of precious metals are found in the slimes or residues in the electric baths.

In connection with this subject of nickel a study should be made of the nickel steel armor plate and test bars shown by the Bethlehem Iron Company in the Transportation Building. This material was made from nickel supplied by the Canadian Copper Company. The remarkable tensile strength and ductility of nickel steel, as shown by the test bars and the wonderful behavior of the nickel steel armor plate under shot tests, are witness of the valuable qualities conferred upon steel by the addition of a few per cent. of nickel. In Krupp's exhibit comparison of nickel steel armor plate with ordinary steel is afforded by two plates which have been subjected to nearly the same test. The ordinary compound armor is shattered in many directions, while the nickel steel seems to flow under the impact of shot almost as copper does under a punch without the slightest crack or fracture.

The following tests made on nickel steels, together with the report of the Bethlehem Iron Company, by Mr. Maunsel White—in charge of the Bethlehem Iron Company's Chicago exhibit—will corroborate the above claims of nickel steel:

| Specim'n from                                      | Dimensions of specimen. |       | Test per sq. in. |            |       |         | Remarks.  |
|--|-------------------------|-------|------------------|------------|-------|---------|---|
|  | Size.                   | L'gth | Tens. str.       | Elas. lim. | % ex. | % cont. |   |
| Forged bars...<br>3/4% nickel steel.               | 625                     | 4     | 276,800          | ...        | 2.75  | ...     | Special treatment. Annealed.  |
|  | "                       | "     | 246,595          | ...        | 4.25  | 6.0     |   |
|  | "                       | "     | 105,300          | ...        | 19.25 | 55.0    |   |
|  | "                       | "     | "                | "          | "     | "       |   |
| 1 1/4 in. round rolled bar....<br>2% nickel steel. | 564                     | 4     | 142,800          | 74,000     | 13.0  | 28.2    | Rolled down from 1 1/4 in. ingot to 1 1/4 in. square billet and turned to size. Rolled down from 1 1/4 in. ingot to 1 in. round and turned to size. |
|  | "                       | "     | 143,200          | 74,000     | 12.32 | 27.6    |   |
|  | "                       | "     | 117,600          | 61,000     | 17.0  | 46.0    |   |
|  | "                       | "     | 119,200          | 65,000     | 16.66 | 42.1    |   |
|  | "                       | "     | 91,600           | 51,000     | 22.25 | 53.2    |   |
|  | "                       | "     | 91,200           | 51,000     | 21.62 | 53.4    |   |
| 1 1/4 square b'r roll'd<br>2% nickel steel.        | 798                     | 8     | 115,464          | 51,820     | 36.25 | 66.23   | Annealed.   |
|  | "                       | "     | 112,600          | 60,000     | 37.87 | 62.82   |   |
|  | "                       | "     | 102,010          | 39,130     | 41.37 | 69.59   |   |
|  | "                       | "     | 102,510          | 40,200     | 41.00 | 68.34   |   |
|  | "                       | "     | 114,590          | 56,020     | 47.25 | 68.4    |   |
|  | "                       | "     | 115,610          | 59,080     | 45.25 | 62.3    |   |
| 1 in. r'nd b'r roll'd<br>2% nickel steel.          | 500                     | 2     | 105,240          | 45,170     | 49.65 | 72.8    | Annealed.   |
|  | "                       | "     | 106,780          | 45,176     | 55.50 | 63.6    |   |

Among the steel alloys that of nickel has shown itself to be possessed of some exceedingly valuable properties—these are, resistance to cracking, high elastic limit and homogeneity. Resistance to cracking, a property to which the name of nonfissibility has been given, is shown more remarkably as the percentage of nickel increases. Bars of 27% nickel shown in the exhibit of the Bethlehem Iron Company, of South Bethlehem, Pa., at the Columbian Exposition, illustrate this property. The 1 1/4-in. square bar has been nicked 1/4 in. deep and bent double on itself without further fracture than the splintering off, as it were, of the nickel portion. Sudden failure or rupture of this steel would be impossible; it seems to possess the toughness of rawhide with the strength of steel. With this percentage of nickel the steel is practically non-corrodible and non-magnetic. The resistance to cracking shown by the lower percentages of nickel has been best illustrated in the many trials of nickel-steel armor.

The elastic limit rises in a very marked degree with the addition of about 3% of nickel, the other physical properties of the steel remaining unchanged or perhaps slightly increased.

In such places (shafts, axles, etc.) where failure is the result of the fatigue of the metal this higher elastic limit of nickel steel will tend to prolong indefinitely the life of the piece and at the same time, through its superior toughness, offer greater resistance to the sudden strains of shock. In lines of shafting this increased stiffness will materially assist in maintaining true alignment. The greater homogeneity of nickel steel is due to the tendency of nickel to check segregation. This fact, set forth in M. A. Poncelet's paper on "Segregation" at the Engineering Congress, is well worthy of consideration

\* They have, however, been described in "The Mineral Industry" by Mr. Robert M. Thompson, president of the Orford Copper Company where this work is carried on.

and of vital importance where the pieces to be used assume anything like large proportions or where the treatment demands great uniformity of material.

#### THE FERTILIZER MANUFACTURE IN GEORGIA.

Written for the Engineering and Mining Journal by W. M. Brewer.

Directly connected with mining, an industry has been built up in the South during the past few years which has become of much importance to both the mineral and agricultural resources of the country. This is the manufacture of fertilizers. In Atlanta this industry has grown to almost as large proportions as in Charleston, notwithstanding the fact that the phosphates used are principally shipped from South Carolina to Georgia, as this mineral is not known to occur in paying quantities in the last named State. The capacity of the six acid plants of Atlanta is between 40,000 and 50,000 tons yearly. Two of these plants, the Atlanta Fertilizer Company and the Kenesaw Guano Company, use entirely, for the production of the sulphuric acid necessary in manufacturing the fertilizers, brimstone, which is imported direct from Sicily. The Scott Manufacturing Company uses one-half imported brimstone and one-half imported pyrites, the latter

especially of Atlanta. The price per ton of pyrites of the requisite grade is about \$5 delivered, and the nearest supply to Atlanta is Villa Rica, about 40 miles west on the Georgia Pacific Railroad. A large quantity has been at times shipped into Atlanta from the different mines in the vicinity of this place, but because of the reasons already given the industry of mining and shipping is not at all extensive, although some work of a development nature is being carried on at these mines in the hope of showing up the mineral in paying quantities of the requisite grade. From reliable information it is very doubtful whether the domestic pyrites will ever displace the foreign unless freight rates could be so arranged as to make it possible to ship from South Dakota, where some very extensive deposits of high grade iron pyrites occur. Before this could be possible, though, the price of pyrites must advance very materially or the rates of freight fall. As long as the manufacturers are at such a distance from the Western country it is probable that they can import from Spain cheaper than it could be mined in the West.

A New Welding Process.—Before the Society for the Advancement of Industry, at a recent meeting in Berlin, Dr. A. Slaby, of the Charlottenburg Technical High School, gave a demonstration of a new electric process for welding iron, devised by M. Julien, of Brussels. The



EXHIBIT OF THE CANADIAN COPPER COMPANY AT CHICAGO.

coming from Spain. The other three companies, the Southern, the Furman and the O. A. Smith, use entirely pyrites imported from Spain. There are known to exist in Georgia several bodies of pyrites, and experiments have been made with the view of utilizing the domestic instead of the imported article, but they have to the present time proved unsuccessful, although the companies would prefer the domestic on account of economy. The chief trouble has been the limited quantity carrying the requisite percentage of sulphur. Another difficulty has been the high percentage of silica, also the small extent of the ore bodies. These difficulties may all be overcome if the owners of pyrites mines will show enterprise enough to fully develop the ore bodies by thorough prospecting, which the value of the mineral would justify in this section, where labor is so cheap and the market so near the mines. North Carolina is the next nearest supply point, and experiments are now being made with pyrites from that State, but they have not yet proved sufficiently successful to warrant any statement regarding the adoption of such supply. South Carolina and Florida furnish all the phosphate used, while the potash and kainit are imported directly from Germany.

Nearly all the known deposits of pyrites in Alabama are copper pyrites, which do not carry a sufficient percentage of sulphur, but the deposits of Georgia are mostly iron pyrites, and if found in solid bodies of sufficient extent carrying the necessary per cent. (from 47 to 49) in sulphur, would prove very popular with the fertilizer men,

lecturer took an iron bar which formed one pole of a source of electricity and plunged it into water containing the other pole. As soon as the bar entered the water, that portion of it immersed at once assumed a white heat; and Dr. Wedding made it into a rivet. This method is based upon the fact that if one pole of a source of electricity is plunged into acidulated water, or water having in it a salt solution, and a sufficiently strong electric current is passed through, oxygen is given off at the (lead) anode, and hydrogen at the (iron) cathode. By increasing the current, the evolution of gas can be augmented to such a degree that the iron bar, surrounded by hydrogen, is no longer in contact with the solution. As, however, the hydrogen "envelope" offers great resistance to the passage of the current, considerable heating takes place, whereby the "envelope" and the iron bar are brought to a white heat or glowing condition. In this way temperatures up to 4,000° F. can, it is said, be attained. Dr. Slaby states that no difficulties are experienced in regulating the temperature between 800° and 1,200° necessary for the forging or welding of the iron, since the degree of heating depends upon the proportionate size of the anode to that of the cathode, as well as upon the available electric pressure. It is claimed that by the Julien method, iron bars of from 2 to 3 cm. in diameter can be welded with current at a pressure of from 100 to 200 volts. It is suggested that a large lead plate be adopted as the anode, the cathode being practically formed by the appliance in which the iron bar is fixed for the time being.

THE BERTHA ZINC MINES AT BERTHA, VA.\*

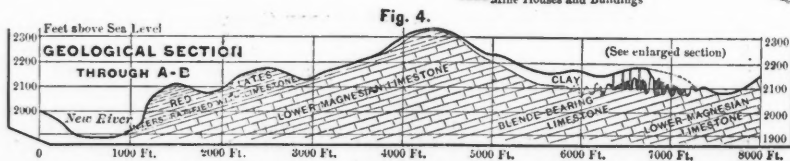
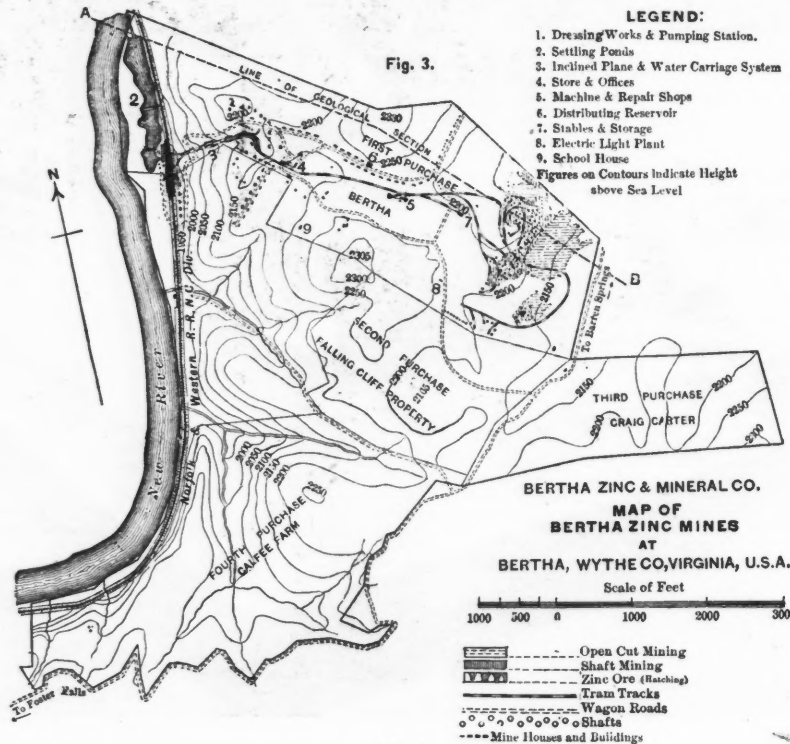
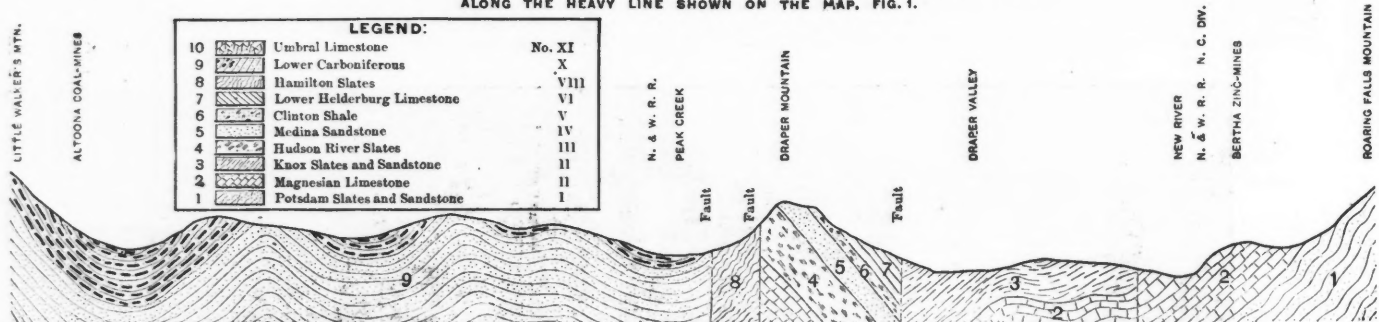
By William H. Case.

The Bertha zinc mines are in southwest Virginia in the New River-Cripple Creek Mineral Region; they lie in the southeast part of Wythe County. The only other zinc mines that are opened in the region are those of Manning & Squier, which adjoin the Bertha zinc mines on the northeast, and the mines of the Wythe Lead and Zinc Company, at Austinville, eight miles to the southwest. A little farther southwest of Austinville, near Ivanhoe, a new company is preparing to mine zinc ores. The mining properties named are included within a distance of 10 miles along a direct line, bearing N. 55° E., on the south side of New River, which here flows northeastward in a tortuous course. The greatest distance of any of the mine openings from the river is a little less than two miles.

be seen that the mining operations are upon the outcrop of strata of zinc-bearing limestone, a little more than half a mile from the river. The dip of the limestone is between 6° and 7° toward the river, and the zinc-bearing strata pass under the river at a depth of several hundred feet. Strictly speaking, the limestone does not outcrop to daylight. As shown on the section, the outcrop is covered with heavy clay, varying in depth from a few feet to more than one hundred feet. This clay probably results from decomposition of the magnesian limestone.

The zinc ores thus far mined at Bertha are the silicate and carbonate of zinc (calamine and smithsonite), the larger proportion being silicate. Their occurrence, in segregated bodies, and their freedom from lead and iron, are unique. Reference to the enlarged section, Fig. 5, will facilitate a clear understanding of their situation. As will be seen, the outcropping limestone has weathered with extreme irregularity, leaving limestone pinnacles, cones, columns and domes of

Fig. 2. GEOLOGICAL SECTION, ALTOONA COAL-MINES TO BERTHA ZINC-MINES, ALONG THE HEAVY LINE SHOWN ON THE MAP, FIG. 1.



The mining property of the Bertha Zinc and Mineral Company comprises 742 acres, the larger portion of which is considered to be zinc-ore bearing. The tract has a northwest frontage of 1½ miles along New River. The North Carolina extension of the Norfolk & Western Railroad skirts this boundary along the river front. Topographically, the tract is an elevated plateau, with a rolling surface and rounded hills, its general elevation being about 300 ft. above New River, and 2,200 ft. above sea level.

Geologically, this tract is wholly underlain by the lower magnesian limestone, No. II, of the State Geological Survey. The limestone rests directly on the Potsdam slates, and is everywhere covered with a varying thickness of heavy, red and brown clay, except where it forms bold and picturesque bluffs along New River. Huronian and Laurentian areas succeed the Potsdam to the southeast, toward the Blue Ridge. By reference to Figs. 3 and 4 it will

varying heights, locally called "chimneys," some of which have an altitude of nearly 100 ft. above the bottom of the cavities at their base, but they are generally of less height. Rarely, the limestone is cavernous, with small caves, and narrow openings many feet in length, sometimes overarched with limestone, and, in other cases, having the appearance of clefts or crevices in the rocks, which, however, do not continue in depth, but invariably terminate below in solid limestone near the level of the base of the chimneys. When they are uncovered the limestone chimneys show clearly the same parallel planes of stratification as the bedded limestone on which they rest, and of which they form a part.

When the zinc ores (silicate and carbonate) are found they invariably rest against the sides of the limestone chimneys, and of the conical, hemispherical, and trough-like cavities at their bases; at times they cover also the upper surface of the limestone, sometimes entirely enveloping the chimneys, particularly the lower ones, but, more often covering them only partially. Frequently, however, a chimney will be almost or entirely barren of ore, as also will be the cavities and de-

\* Abstract of paper read before the Mining Section of the Engineering Congress at Chicago.



pressions at its base, the occurrence of the ore being quite irregular. The small caverns, clefts and crevices, above referred to usually carry ore, wholly or in part. Where they are covered or overarched with limestone the ores often rest upon the floor, leaving an open space above. In the open crevices the clay rests upon the ore, but, as before mentioned, the occurrence of these caves and crevices is quite exceptional. The ore upon the limestone varies in thickness from a few inches to many feet. The greatest observed thickness, normal to the surface of the limestone, has been 40 ft. between the chimneys. Normal to the sides of the chimneys a thickness of between 5 and 10 ft. occurs frequently, but the average thickness is less than 5 ft. The section Fig. 5 shows the usual occurrence of the ore.

The ore bodies consist of hard and soft ore, and are won simply with pick and shovel. The hard ore occurs throughout the mass of the ore body in all sizes, from small grains up to masses of several tons' weight. These bowlders, small and large, often have a concretionary

The ore body is entirely distinct between the overlying clay and the underlying limestone. The material in which the grains, pebbles, bowlders and other forms of the zinc ores are directly contained, forming collectively the ore body, is of a clay-like nature; it is both hard and soft, and is dubbed by the miners "hard buckfat" and "soft buckfat." Strictly, this is a lean zinc ore of great purity, too low in zinc to be profitably used in the present practice of smelting; it is separated from the richer ores by roughly hand-sorting the larger masses in mining, and by subsequent washing and jigging. It is now stored in dams below the dressing works for future treatment for "blue powder," or oxide, previous to its conversion into spelter. The soft buckfat dissolves in water by a violent washing operation; the hard buckfat is of a fine-grained, brittle structure, like common chalk, and does not dissolve, but, being of lower specific gravity than the hard ores, it is largely separated from them in crushing and jigging.

The clay that invariably exists as an immediate covering, or blanket,

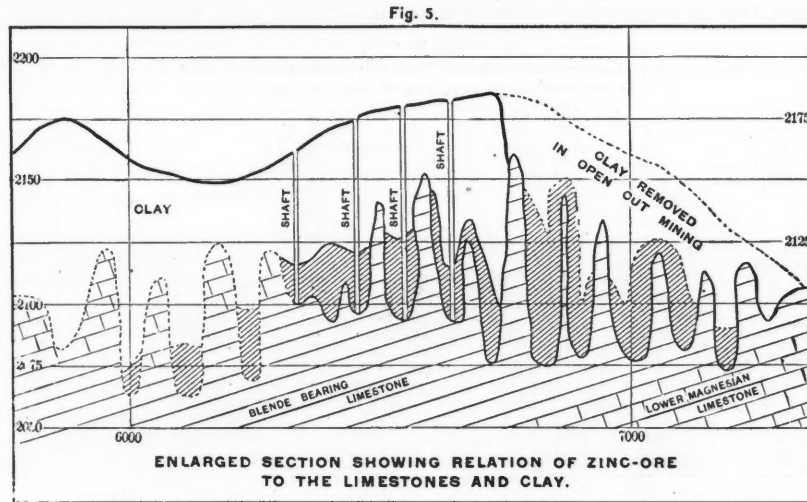
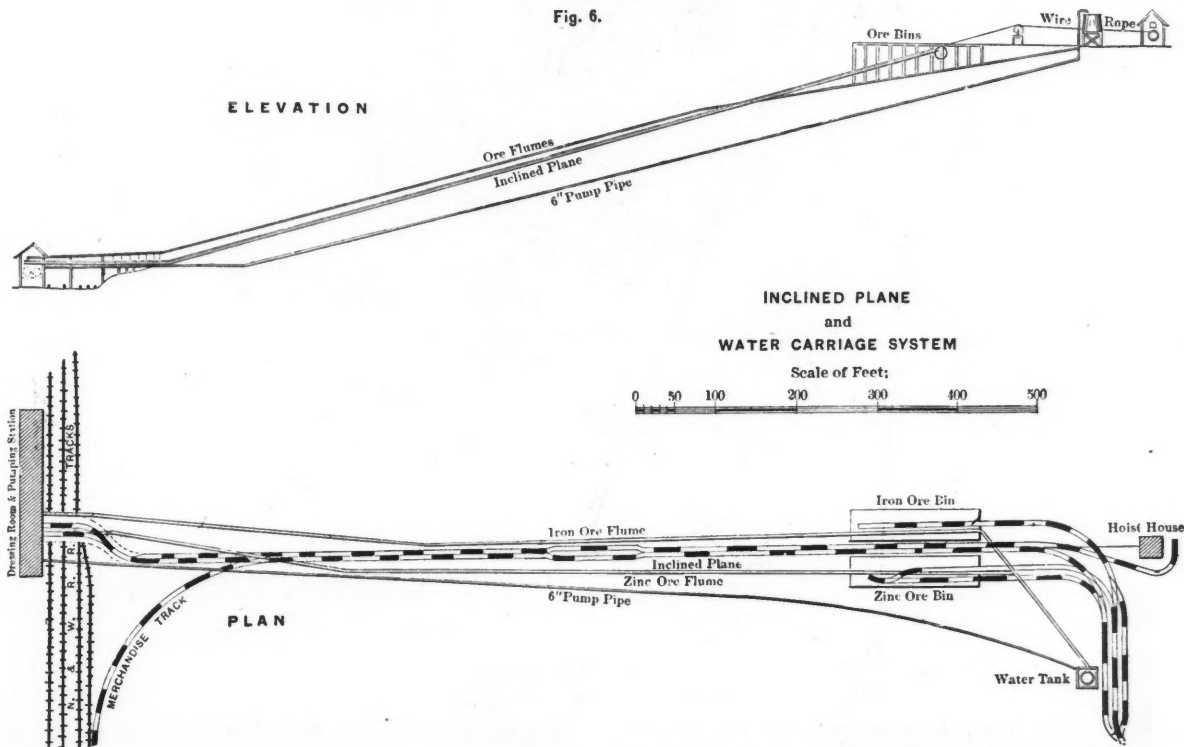


Fig. 6.



structure, like pot ore, with beautiful incrustations and crystallizations of zinc in spots. An irregular, shelly, or honeycomb structure is common, with cavities and cells filled with gray, yellow and brown powdery zinc ore having the appearance of wood ashes and pulverized yellow ochre. When the formation is not compact and small cavities occur in it the ore facing these cavities is covered with minute, brilliant zinc crystals, often drusy in appearance. Slab-ore is common where cavities are larger. Rarely, the hard zinc ore clings to the limestone in sheet form, and is won by gadding. Frequently this solid sheet of ore is found several inches away from the limestone, and the space between it and the limestone is filled with loose, powdery silicate and carbonate, while it is not unusual to find a thin sheet of sandy material next to the limestone, evidently a product of the decomposing silicious magnesian-limestone chimney. Beautiful milk-white incrustations of silicate of zinc, like a thick enamel, with surfaces covered with mammillary and delicate stalactitic forms, occasionally occur between series of sheet-like layers of solid zinc ore, while often the spaces of this sheeted structure are filled with pockets of fine, light, rich ores in honeycomb form.

upon the ore bodies, is extremely compact and unctuous. The line of demarcation between this clay and the ore body is not always visible, but usually there has been a movement of the yielding clay upon the firmer ore body, resulting in a distinct parting or cleavage plane, and when this is not readily seen the miner's pick or shovel determines the distinction as unerringly by "feel" or sound, singly or together, as it would the difference between clay and sand or gravel, when thrust into them. Outside of this peculiar clay is the red or brown clay forming the general surface of the country. This upper clay is the gangue, or home, of brown limonite ore, which it carries to a greater or less extent at the Bertha mines and very abundantly elsewhere in the New River-Cripple Creek mineral region. The section A-B, Figs. 7 and 8, shows the relation of the series, and the forms assumed by its members. They are approximately concentric. Slickensides in the clay, as smooth and polished as in the walls of hard-ore bodies, are frequent near the chimneys, and where cohesion has been overcome they are noticeable in the ore bodies, and are very common in the clay near barren chimneys. They here indicate a slow settlement and movement of the clay mass.

It is noticeable that where ore bodies are the largest the chimney which they cover, or to which they are attached, is very seamy and porous, and presents the appearance of having had soluble constituents leached from it. Almost invariably the barren chimneys present smooth, hard surfaces, like cut stone. As a rule, the limestone in the chimneys, and immediately underlying the ore, is barren of ores of any kind. In a very few places zinc blende has been noticed in the sides of chimneys or depressions, covered with the silico-carbonates, evidently too meager in blende to weather rapidly, yet undergoing an apparent slow change. So far as explored, such bodies have not extended far in depth, nor has their lateral continuance been observed. They appear to be remnants of isolated bodies, occurring in certain horizons of the stratification.

The mining of zinc ores has thus far been confined to a surface belt or strip 1,500 ft. wide extending across the tract in the direction of the strike of the limestone, south, 35° to 40° west. Outside of this belt, to the southeast, on the Bertha property, as also on the Manning and Squier property to the east and northeast, a second belt of similar ores is known to exist, but has not yet been explored

the flume, it being admitted as fast as the rapid current of water will carry it along the flume to the dressing works below. By this plan the ores are well washed and freed from adhering clay when they arrive at the dressing works. The usual form of gravity plane, also shown in Fig. 6, was formerly used to convey cars of ore from the top of the hill to the dressing works, but at present it is used only for taking timber and merchandise up to the mines, and cars of heavy lump ore down the plane to the dressing works. The limonite ores which are occasionally mined at Bertha are similarly transferred in a second flume to a separate washing and screening plant at the dressing works.

The ores are dressed by washing and jigging at the dressing mill connected with the mines to as near the grade of a 40% concentrate as is practicable without too great loss, and the product is shipped to 10 furnaces owned and operated by the company at Palski. Here it meets the semi-anthracite coal of the Altoona coal mines, which is used in reducing the ores directly to spelter. The average analysis of spelter made by direct smelting of the ore in the Welsh-Belgian furnaces shows 99.9% metallic zinc and 0.1% lead and iron.

Fig. 7.  
SECTION THROUGH A-B SHOWING OCCURRENCE OF ZINC ORE IN RELATION TO THE LIMESTONE AND CLAY  
THE POSITION OF SHAFTS AND METHOD OF HOISTING ORE.

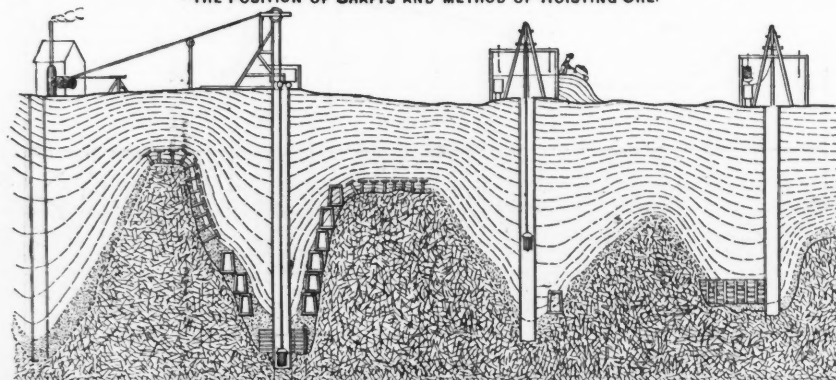
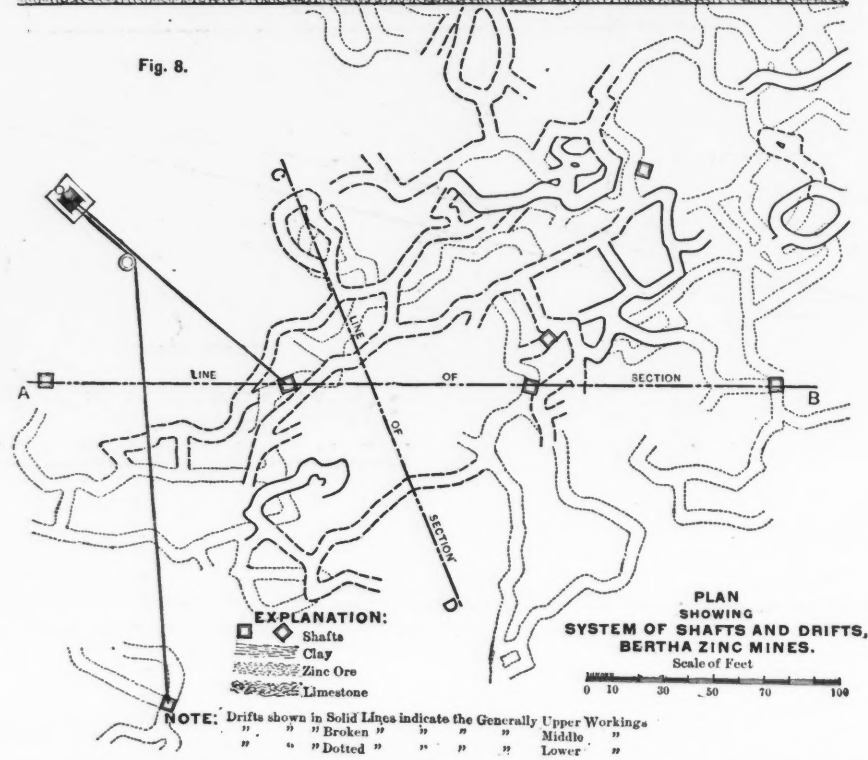


Fig. 8.



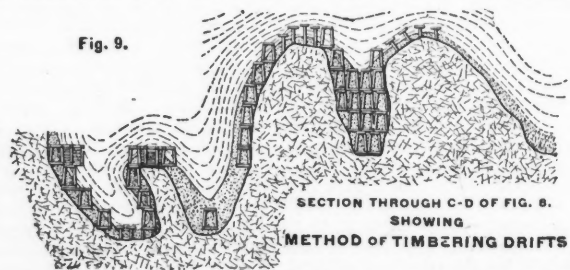
ciently to determine its extent. It is parallel with the first strip, and at a slightly lower geological horizon, unless, as may be the case, the strata have been faulted in a line nearly parallel to the strike, and this second belt occurs in a down-throw from the first belt. As the rock here is everywhere covered with clay, observation has not yet been sufficient to determine whether or not such a fault exists.

Originally the open-cut system of mining was pursued, but in 1880 the underground system of extraction was started. This has been carried out by running drifts into the hills, by sinking shafts and by drifting in the usual way. Test shafts are sunk from time to time, and surveys are made, to direct the general course of the workings.

The ore from the mines is conveyed in tram cars by steam locomotives to the brow of the plateau above the river and dumped from trestles into storage bins, as shown in Fig. 6. Underneath the bins runs a small plank trough or flume, 18 in. deep and 12 in. wide, with a semicircular cast iron lining at the bottom. The flume under the bins is covered with short pieces of plank to retain the ore. At the upper end of the flume, water is introduced from a tank, to which it is pumped from the river, and the ore is allowed to enter the flume by taking up, one after another, the short pieces of plank that cover

The Bertha mines were discovered in 1866 by Mr. David S. Forney, a pioneer in the mineral development of this region, not from any visible outcrop or float, but in the amateur pursuit of mineralogical

Fig. 9.



and geological investigations, suggested by the favorable appearance of the region to which he came from Pennsylvania to pursue his profession of landscape artist,

## MINING AT THE COLUMBIAN EXPOSITION.

Specially Reported for the Engineering and Mining Journal.

## THE JEFFREY MANUFACTURING COMPANY.

In the northeast section on the ground floor of the Mines and Mining Building may be found the extensive exhibit of the Jeffrey Manufacturing Company, of Columbus, O., an acknowledged authority on machinery for mining and handling coal.

This company, organized in 1877, bent all its efforts toward the best and most economical methods of coal mining. The space in the Mining Building comprises 1,500 sq. ft. of floor on which are placed samples of their mining machinery. Their exhibit might properly be divided into two parts; first, the Mining Department, in which are shown the Jeffrey electric and air power under-cutting machines, electric air-power and hand rotary coal drills, electric pumps, electric truck, dynamo, etc., while in the other or second department are complete handling devices for the elevating, screening and conveying of coal. To better show the position and conditions under which the machines operate there has been erected an imitation of a coal bank, showing the formation and strata of an ordinary coal vein, this ingenious arrangement making it possible to see the machines in actual operation. As this company was the first to build a successful electric mining machine the exhibit is of special interest. Seeing the advantage of showing operators and those interested in coal mining machines at work, arrangements were made with the Exposition authorities, at considerable expense, for sufficient power continuously supplied.

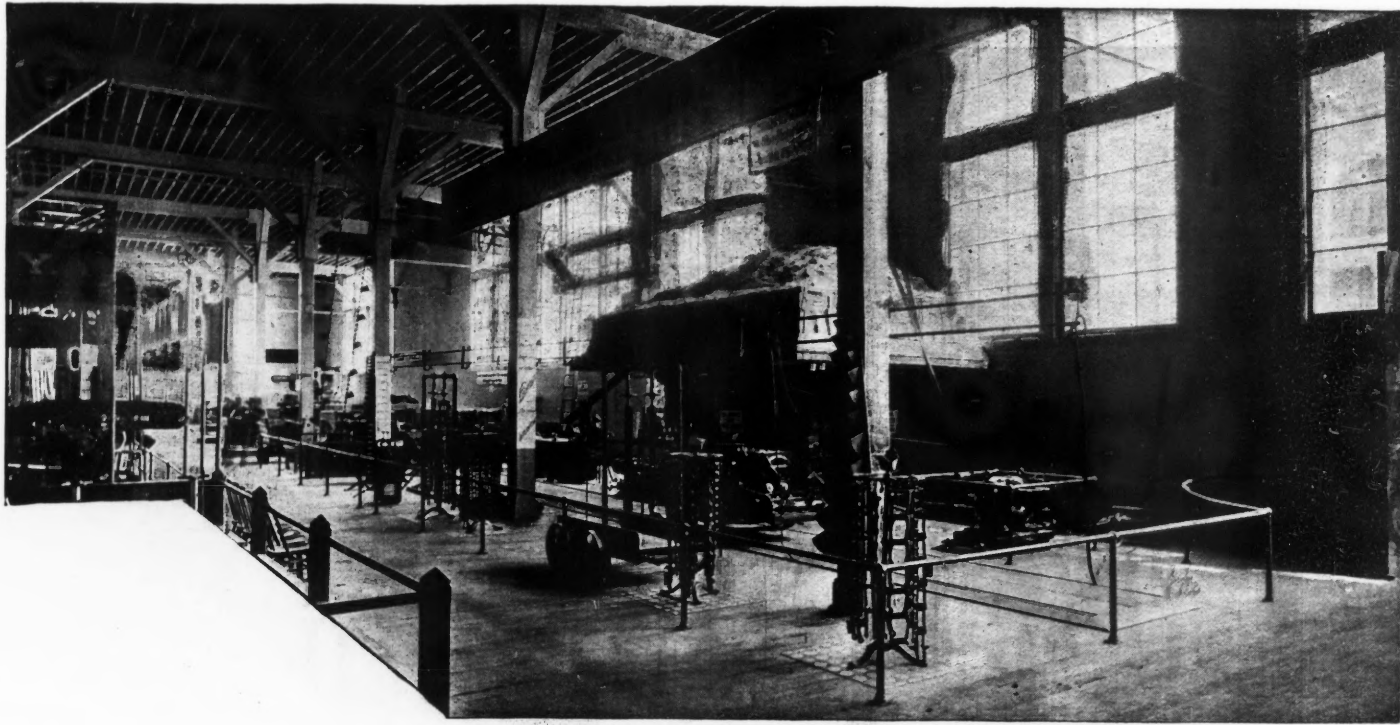


EXHIBIT OF THE JEFFREY MANUFACTURING COMPANY AT CHICAGO.

To describe more clearly the coal-cutting department of the exhibit, we go over, in detail, some of the machines here shown. On a suitably arranged track extending the full length (60 ft.) of the space, is a truck bearing a complete electric mining machine which is connected to a trolley system of special construction by means of which they can be moved with perfect ease. This device is shown to demonstrate the simplicity and ease with which the machines may be moved from one room to another in mines. At one end of the track, mentioned above, there is a movable electric pump on small wheels, which is admirably adapted to the purpose of pumping water in mines from dipping rooms or entries. To show the practicability of this pump the company has placed a tank under the floor, and by means of suction and discharge hose can keep a constant stream passing through. Fastened to the roof of the mine is an electric drill in operation, while along the front of the space on racks may be found both positive and air-feed coal drills, which are operated by compressed air; also several different patterns of hand-drill.

The elevating, screening and conveying devices shown in the illustration require some further explanation. Located below the floor at one end of the space is a cast iron boot from which extends to the gallery above a single-chain elevator with malleable iron ore buckets, about 24 inches apart. This elevator discharges into a revolving screen, which is hung from the gallery; this screen is constructed in a substantial way, and is covered by three different meshes of steel wire in order to make the proper separation of the coal. At the opposite end of the screen from the elevator the material is discharged into a drag conveyor. From this conveyor the material is delivered into a hopper, which, in turn, delivers it on the picking table, and from there, by means of a screw conveyor, the material is returned to the boot. As all these devices are in continuous motion and running in unison, the material which they handle is constantly being passed from one to another.

Thinking that it might be of interest to those interested in this line of coal-hauling machinery the company has on display a large number of the different sizes and styles of chain-belt for all conceivable purposes, such as conveyors, elevators, drive-belts, etc.

In charge of this exhibit are men who are practically versed in their department and able to give information and useful hints to all who may be interested. There is also a large collection of blue-prints of drawings showing special designs, which are of great interest to operators.

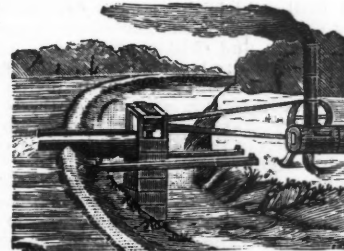
The foregoing description is as full as it is possible, in this limited space. More comprehensive description of the workings and construction of the different machines and devices shown are given in a complete mining catalogue issued by this company, which will be mailed to all interested parties.

## THE MENGE PUMP.

In Section I, J, Column 34, next the railing on the east side of the southern pool in Machinery Hall, can be seen in daily operation the Menge pump that attracts much attention. This pump is used chiefly for irrigation and drainage purposes where it is necessary to handle large quantities of water. It has no suction pipe, no foot valve, nor stuffing boxes; neither gaskets nor gum-lined joints, and consequently no cramped suction or discharge. It is easily and quickly set up, and is not affected by freezing weather. The working parts are of iron and the frame and walls of durable wood. The discharge pipe can be placed at any side of the pump and at such height as may be required.

The working parts consist of a turbine water-wheel, upright shaft,

pulley and journals. The solid journals at the top are recessed to receive a collar supporting the weight of the shaft and wheel, by which means it is possible to adjust the wheel to a position midway between the upper and lower entry ports. In operation, the pump consists of a free horizontal wheel between top and bottom entry ports. There is a free continuous delivery of the water rising from the blades of the wheel to the discharge chute, where it resembles a cataract, so great is its volume.



THE MENGE PUMP.

The quantity of water possible for this pump to handle is limited only by the face and diameter of the wheel. On a lift of 10 ft. the efficiency of the wheel is claimed to be 85% of the applied H. P.

The usefulness of this pump where it is desirable to handle large quantities of water to a moderate height is quite evident.

## THE GENERAL ELECTRIC COMPANY.

This company displays in the Electricity Building a magnificent line of the latest improvements in the application of electrical power. It is

an exhibit of machines particularly adapted to the various kinds of work expected of them. That part of the exhibit which will be of most interest to mining men is the space in which is the application of electricity to the operation of the many different machines used in general mining work. The central feature of the exhibit is the direct conversion of water power into electrical power for transmission to considerable distances. This is accomplished with a Pelton waterwheel, coupled directly to an alternating current dynamo, and delivering an alternating current to a bank of "step-up" transformers, raising the pressure to not less than 10,000 volts; from these transformers the current is transmitted over fine copper wire to a bank of "step-down" transformers, reconverting the current to a safe working pressure; from this latter bank are fed incandescent and arc lamps, also motors of several different designs. A description of some of the principal measures will be of interest.

The generator for operating the percussion drills, which is driven by a motor operated by the current from the high-pressure alternating current dynamo and transformers, is a modification of a standard generator, adapted to transmit current alternately to upper and lower coils of the drills. To effect this distribution, rotary brushes are so arranged as to bear upon the commutator and at the armature upon the large fixed collector rings surrounding it. These rings serve, not only as collector rings, but at the same time as the terminals of the drill circuits, by suitable gear reduction from armature shaft. The rotary brushes are driven at a speed corresponding to the original number of blows of the drill per minute. The current required for the field excitation is taken from the commutator by small fixed brushes, supported by a special brush-yoke, placed between the large fixed collector rings, and the field magnets of the generator. The functions of the machine as a continuous current generator have not been in-

Other machines in this interesting exhibit which are well worth investigating by persons interested, and which, at some later date, we hope to take up in more detail, are a 110-H. P. reversing mining hoist, driven by a 4-pole series motor, and a 15-H. P. mining hoistwork, water proof motor. An 85-H. P. multipolar motor, using a current of 300 amperes, at 220 volts, is used to operate a Knowles triplex pump, with cylinders  $5\frac{3}{4}$  in. diameter by 18-in. stroke. This pump has a capacity of 450 gallons per minute, delivered at a height of 650 ft. In the exhibit it is used to operate the Pelton water wheel, to which the high-pressure alternating current generator for long distance transmission is attached, thus giving a practical idea of power transmission. Motors are also shown attached to several other styles of pumps, including a direct attachment to a centrifugal. A line of diamond drill machinery is shown, in which the electric motor is used to do the boring, run the hoist and pump the water used in boring. Motors are also shown operating an Ingersoll-Sargeant air compressor and a Baker blower of large capacity. The whole electrical exhibit of this company is in charge of Mr. E. Spenser, through whose courtesy we are able to present this interesting account.

#### IN THE BALCONY.

Scarcely any one visits the galleries of the Mines Building; why they are so ignored is perhaps because there are stairs to climb, but the fact should be instructive to the architects of future fairs. In the west gallery of the Mining Building is a fine display of metallurgical products, of ores, minerals, precious stones, etc., many of the exhibits the finest ever exhibited. Case after case filled with handsome specimens line the gallery its entire length, and such a collection money could not buy, for in it are exhibits from Tiffany & Company, New York; the National Museum, Washington, D. C.; Geo. F. Kunz, of

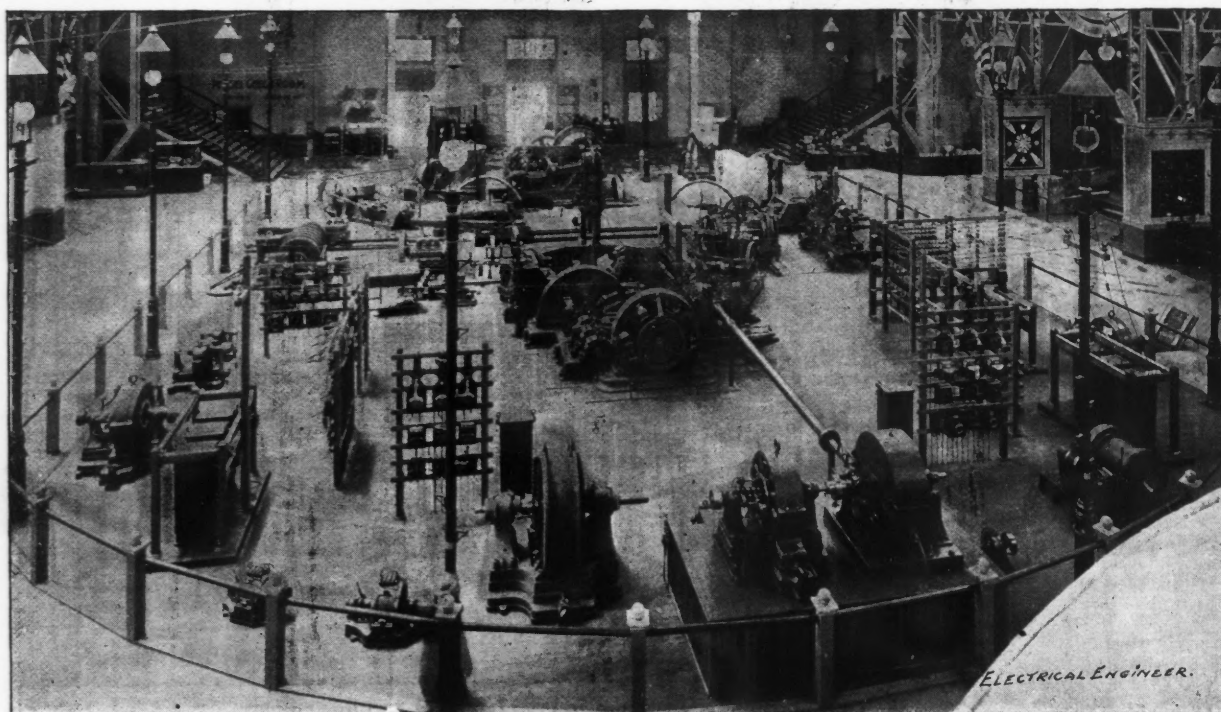


EXHIBIT OF THE GENERAL ELECTRIC COMPANY AT CHICAGO.

paired, as by the substitution of the standard fixed brushes and yoke for the rotary brushes, which can be easily and quickly made, the machine can be used as an ordinary dynamo. Percussion drills are gaining in favor all the time, as is demonstrated by the fact that several large mining plants have adopted them, and have had them in operation for some time, thus proving the feasibility of effective drilling. We have, in previous numbers, described the details of construction of this drill, which in principle consists of two specially wound energizing coils, with mica insulations forming the drill body. The reciprocating piston and drill chuck are in one piece, operating in the center of the energized coils, the special dynamos supplying current to the coils alternately, giving the piston a powerful blow. The other parts of the machine, and the methods of setting up are similar to the ordinary steam and air percussion drills. This drill consumes  $7\frac{1}{2}$  H. P. when in operation, and uses a current at 220 volts using the three-wire circuit.

The electric sinking pump, which was illustrated in the "Journal" for May 20th, page 487, is one having a capacity of from 100 to 125 gallons a minute, and will force to a height of 200 ft. The weight of the pump is 3,500 lbs. The motor, with gearing and operating mechanism of this pump, is entirely contained in a cast steel casing absolutely waterproof. It is claimed that this pump will work better under water than out of it, as the cooling effect of the water increases the efficiency of the current. The mining locomotives shown are designed to operate in low and narrow tunnels or entries. In construction they are solid and substantial throughout, and embrace several new features. All the working parts are well covered and protected from injury. The two motor mining locomotives are very compactly built, and can be constructed for any gauge down to 18 in. These locomotives have the standard water-proof motors, all parts being shielded from moisture and dirt, while all parts are easily accessible in case of repairs.

New York, and others. Tiffany's exhibit is a remarkable collection of oxides, native minerals and precious stones. The National Museum's exhibit is worthy of much notice, and many private collections adorn the exhibit. Metallurgical features of most all the ores of commerce are shown, together with models of mines, etc. We urge our readers to visit the galleries; just climb those stairs for the reward there is above.

Nevada is the only mining State of importance that is not represented on the main floor of the Mines Building. Why it is so is hard to find out, but we presume it was from the lack of an appropriation. Away up in the west gallery the State has made an attempt to make a display of the minerals in which the State abounds. It is situated in the space reserved for private collections, but a large sign tells one that Nevada is yet on deck and just as ready as ever she was for capital to enter her domains. The Comstock ores are well represented, almost every producing mine of that region having sent specimens, some of them showing what has been and others what might be. A case near the wall displays specimens of gold and silver in their native state, any of which would enrich a collection. There is not a soul about to talk for the State, but a sign tells everybody that should they walk over to the Agricultural Building the State representative there will give any information sought.

Coal in Prussia.—The total output of coal in Prussia (including lignite or brown coal) during the first half of 1893 has been, according to the "German Official Gazette," 40,762,950 tons, produced in 741 mines employing 296,284 miners, as compared with 39,336,380 tons obtained from 749 mines employing 295,133 men in the same period of 1892. This increase of 1,426,570 tons in the output is noteworthy, as it was obtained from a less number of mines, viz., eight, employing 1,151 fewer men.

CAUSES OF ERROR IN THE ASSAY OF GOLD.

We give below a brief abstract of two long and important papers read by Mr. T. K. Rose, one of the assistant assayers of the British Mint, before the Chemical Society of London on March 16th last, entitled "The Limits of Accuracy of Gold Bullion Assay and the Losses of Gold Incidental to It" and "The Volatilization of Gold." From experience Mr. Rose has found that a higher degree of accuracy is attained if the weighings are made with the precautions recommended by Kohlrausch and others on a balance indicating differences of 0.01 per 1,000 instead of 0.5 per 1,000, which is the smallest difference shown on ordinary assay balances. He finds also that differences either in the amount of copper present, to the extent of only 16 parts per 1,000 of alloy, or in the amount of silver added to the extent of 3%, produce alterations in the surcharge of about 0.05 and 0.1 per 1,000 respectively, the surcharge being the difference in weight between the gold in the assay piece originally taken and the cornet finally obtained, i. e., the algebraical sum of the gold lost and the silver remaining in, undissolved by the acids. It follows, therefore, that in order to insure accuracy check assays must be made on alloys of the same composition as those under examination. The author also attributes variations in the surcharge to the want of uniformity of temperature ordinarily prevailing in the muffle furnace during cupellation. The temperatures of the different parts of a muffle at the Royal Mint were taken during cupellation by a thermo-electric pyrometer on three occasions, and the mean temperature of the muffle was found to be 1,063.7 degrees C. At this temperature a rise of about 5 degrees is found to be accompanied by a reduction in the surcharge of about 0.01 per 1,000. If attention is paid to the three points named by Mr. Rose the gold in bullion in a high degree of purity can be determined within a range of  $\pm 0.02$  per 1,000, the limits of accuracy having previously been  $\pm 0.10$  per 1,000. This extreme degree of accuracy can only be obtained when the check gold is pure. The losses of gold in bullion assaying are due to absorption by the cupel, volatilization in the muffle, and dissolution in the parting acid. Mr. Rose conducted a series of experiments to ascertain the average losses with standard gold (916.6 fine) from these three sources, and the results obtained are given in the following table, the figures being in parts per 1,000:

| Loss.               | A.    | B.   | C.   |
|---------------------|-------|------|------|
| In cupel.....       | 0.513 | 0.36 | 0.51 |
| In first acid.....  | ?     | 0.01 | 0.03 |
| In second acid..... | 0.012 | 0.02 | 0.04 |
| Volatilized.....    | 0.075 | 0.05 | 0.06 |
| Totals.....         | 0.607 | 0.44 | 0.64 |

Series A and B are the means of four experiments, and C a mean of three. In each case the gold was recovered from the cupels and acids, and, after the gold so recovered had been allowed for, the loss by volatilization was estimated by difference. The amount due to volatilization is only approximate, as the result obtained includes the errors in several estimations.

The loss of gold involved in the fusion of the pure metal was investigated by Mr. Rose by subjecting small test pieces of 0.5-2 grams in weight to a high temperature under varying conditions on bone ash cupels placed in a muffle. The temperatures varied from 1,045 degrees C. to 1,300 degrees C., and were measured either by the platinum couple or by Le Chatelier's optical pyrometer. The losses of gold could be measured by the alteration of the mass of the test pieces in the muffle owing to absorption of gases, which sensibly augment the weight of the gold buttons. The true loss was found by assaying the buttons after fusion. From these experiments Mr. Rose draws four conclusions: (1) An increase in the loss of gold takes place when the temperature is high, pure gold losing four times as much at 1,245 degrees C. as at 1,090 degrees C. (2) A large amount of gold is volatilized in an atmosphere mainly consisting of carbonic oxide, while a small amount is lost in coal gas. (3) A comparatively small amount of gold is carried away by the more volatile metals, copper appearing to exert an exceptional action; metals which are easily volatilized do not appear to be completely driven off by the highest temperatures attained in the experiments. (4) A large proportion of gold is lost in the case of alloys which form flat buttons on the cupel, and, conversely, a small proportion is lost from spherical buttons, although the surface actually exposed is greater in the latter case than in the former. A current of air or gas passing over the buttons does not seem to increase the loss, provided the surface of the molten metal remains at rest. These results point to the conclusion that the conditions which lower the surface tension of the gold button simultaneously raise the vapor pressure of gold.

Determination of Phosphorus by the Molybdenum Method.—In the process for the determination of phosphoric acid by the molybdenum method, the complete washing of the ammonium-magnesium phosphate is difficult, because both the precipitate and the filter retain traces of ammonium molybdate with great obstinacy. In addition, the impurity which almost always appears as a slight turbidity of the liquid on dissolving the ammonium phospho-molybdate in ammonia passes into the precipitate on throwing down the magnesium-ammonium phosphate in the cold. Dr. O. Foerster has investigated these difficulties, and communicates his opinions to "Chemiker Zeitung." He states that these defects may be almost entirely avoided if the ammoniacal solution of the ammonium phospho-molybdate is gently heated before the addition of the magnesia mixture. The precipitate is then crystalline, much less bulky, and can be easily thrown upon the filter, so that it is much more easily washed. The impurity which occasions a turbidity on dissolving the ammonium phospho-molybdate in ammonia does not pass into the precipitate, and on washing runs through the filter. In order to throw down small quantities of ammonium magnesium phosphate, which may remain in solution on precipitation in heat, the liquid when cold is once more thoroughly stirred up before filtration. For washing the precipitate it is convenient to use a solution of ammonium nitrate. The residue on ignition is then almost white.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Supreme Court of Colorado.

Waiver of Conditions in Lease.

A lease of the property of a mining company, signed for it by its superintendent, provided that it should not be valid or binding on the company until approved by its executive committee, said approval to be attested on the lease by the company's secretary. Though the lease did not receive the approval of the company, it would be considered to have waived this condition by permitting the lessees to commence work under the lease, and continue the same for more than three months. The failure of one of the lessees to sign the lease would not destroy its binding effect upon them, they having treated it as a valid contract by going into possession and prosecuting work under it. Where the lease provided that the lessor should put in order the water pipe and air compressor, the purpose for which they were to be used not being specified, parole evidence was admissible to show the object. Equator Mining and Smelting Company versus Guanella. 33 Pac. Rep., 613.

Supreme Court of Indiana.

Rights of Miners to Watercourses.

Parties being the owners of coal land have the right to mine the coal. Every man has the right to the natural use and enjoyment of his own property; and while lawfully in such use and enjoyment, without negligence or malice on his part, an unavoidable loss occurs to his neighbor, it is a loss without injury, for the rightful use of one's own land may cause damage to another without any legal wrong. The taking out of mineral is a natural use of mining property, and no adjoining proprietor can complain of careful, proper mining operations. The right to mine coal is not a nuisance in itself. It is a right incident to the ownership of coal property, and, when exercised in the ordinary manner and with due care, the owner cannot be held for permitting the natural flow of mine water over his own land into the watercourse by means of which the natural drainage of the country is effected, even if he created an artificial watercourse upon his own land from his mine to the natural watercourse, and conducted no more water than, by the natural conformation of the surface, could otherwise have reached it. In the operation of mining in the usual and ordinary manner he can, upon his own lands, lead the water which percolates into his mine into the streams which form the natural drainage of the basin in which the coal is situated, although the quantity as well as the quality of the water in the stream may be affected. Barnard versus Shirley. 34 N. E. Rep., 600.

Tin Plate Production in the United States.—The report of special Agent Ayer, recently issued by the Treasury Department, shows that from July 1st to March 31st, 1893, the aggregate production of tin-plate in this country from sheets rolled in the United States was 34,632,052 lbs. The aggregate amount of imported black plates which have been converted into tin-plate in the United States was 39,290,282 lbs., making the grand total of both kinds 73,922,334 lbs. The increase of the March quarter over the December quarter of tin-plate produced in this country is 3,300,000 lbs., and of imported black plate 6,750,000 lbs. Ten firms use their own black plates exclusively. 13 firms use both American and foreign plates, and nine use only foreign plates. Agent Ayer states that his figures as given are made up from the sworn returns of manufacturers. The report for the quarter ended March 31st, 1892, the last made, shows the production to have been 29,566,399 lbs., of which 40% were made from American black plates.

PATENTS PUBLISHED IN GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

WEEK ENDING SEPTEMBER 20, 1893.

- 15,183 of 1892. Miner's Safety Lamp. P. Holland, Manchester.
- 15,793 of 1892. Electric Smelting. C. P. de Laval, Stockholm, Sweden.
- 16,184 of 1892. Manufacture of Lead Oxide and White Lead from Crude Sulphate of Lead. P. Bronner, Stuttgart, Germany.
- 16,737 of 1892. Improvements in the Manufacture of Sulphuric Acid. J. Rice, Plymouth.
- 18,037 of 1892. Electric Welding Apparatus. W. C. Mountain, Newcastle.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

THURSDAY, AUGUST 29<sup>th</sup> H. 1893.

- 503,958. Brick Machine. Samuel E. Harkin, Avoca, N. Y.
- 503,561. End Welding Machine for Headers or other Tubes. Campbell P. Higgins, New York, N. Y.
- 503,962. Die for Forming Polygonal Tubes. Campbell P. Higgins, New York, N. Y.
- 503,965. Metal Working Apparatus. Campbell P. Higgins, New York, N. Y.
- 503,996. Tar or Petroleum Still. William H. Stelwagen, Philadelphia, Pa.
- 504,044. Erdless Chain Elevator. Joseph P. Manton, Providence, R. I.
- 504,097. Hydraulic Air Pump. Edward H. Weatherhead, Cleveland, O.
- 504,109. Method of Extracting Silver from Ores. Juan F. N. Macay, Chararote, Ecuador.
- 504,118. Furnace. William Swindell, Allegheny, Pa.
- 504,131. Apparatus for Casting Ingots. Lewis W. Mallasee, Pittsburg, Pa.
- 504,137. Carbureter. Edward Savill, Lexington, Ky., Assignor of two-thirds to John W. Newman and James C. Oliver, same place.
- 504,171. Machine for Cutting off Parts of Metal. Francis A. Pratt, Hartford, Conn., Assignors to the Pratt & Whitney Company, same place.
- 504,172. Roll Grooving Machine. Francis A. Pratt, Hartford, Conn., Assignor to the Pratt & Whitney Company, same place.
- 504,179, 504,180, 504,181. Tunneling or Mining Machine. Reginald Stanley, Nuneaton, England.
- 504,193. Spiral Conveyor. Alfred E. Baxter and Allan G. Mather, Milwaukee, Wis.
- 504,200, 504,201. Art of Concentrating Magnetic Iron Ore. Gurdon Conkling, Glens Falls, N. Y.
- 504,238. Apparatus for the Purification of Molten Tin or its Alloys. David Owen, Morriston, near Swansea, England.
- 504,282, 504,308. Apparatus for Melting Iron or Iron Ore. Solomon Shaw, Milwaukee, Wis., Assignor of one-fourth to the Edward P. Allis Company, same place.
- 504,297. Hydrocarbon Burner. Joseph O. Beazley, Baltimore, Md., Assignor to the Standard Heater Company, of West Virginia.

## PERSONALS.

The President has called for the resignation of Mr. M. E. Smith, assayer of the mint at Denver, Colo.

C. B. McKellar, of Ingersoll, Ont., is looking over the Fair, at Chicago. He will remain in Chicago for a week or so.

Mr. Stuart W. Cramer, who is connected with the D. A. Tomkins Company, of Charlotte, N. C., is at present in Chicago.

Emory R. Johnson, Ph. D., lecturer on transportation in the University of Pennsylvania, was at the World's Fair last week.

Mr. Walter Seranton, recently vice-president, has been chosen president of the Lackawanna Iron and Steel Company, in place of E. S. Moffett, deceased.

Prof. H. K. Landis, of Landis Valley, Pa., has been elected to the chair of mines and metallurgy, in the School of Mines of the University of Missouri, at Rolla.

Chas. E. Seymour, president of the Seymour Concentrator Company, of Lake Geneva, Wis., is now at the Fair. He can be found at his exhibit, in the Mines Building.

Mr. John Thomas, of the Thomas Iron Company, of Holkendaqua, Pa., has returned from his trip to Alaska and is now in Chicago viewing the Fair, where he will be for the next few days.

The mineral exhibit now attracting most attention in the gallery of the Mines Building is that of Mr. R. W. Hatch, of California. Mr. Hatch has been at mining for nearly 40 years.

Prof. F. W. Traphagen, who had charge of Montana's mineral exhibit at the World's Fair, has returned to Bozeman, Mont., to attend to the duties of his professorship in the Montana School of Mines.

George W. Maynard, consulting, mining and metallurgical engineer, of this city, has just started for Canada and from there will go to Colorado and other points in the West on professional business. His address for the present will be Windsor Hotel, Denver, Colo.

Mr. H. H. Stock, of Lehigh University, has been elected assistant professor of mining at the Pennsylvania State College. It was stated through a misapprehension in our issue of September 2d that Professor Stock would go to the Colorado School of Mines, at Denver.

Mr. Hugh M. Thompson, of St. Louis, Mo., is visiting the Fair, at Chicago. Mr. Thompson claims to have started the first expedition in search for minerals in Montana. This was in 1861. The expedition proved a success and so Montana's mineral wealth was opened to the world.

Among the passengers who reached New York on the steamship "Lucania" was Mr. Thomas G. Clayton, of Derby, superintendent of construction of the Midland Railway of England. He comes as the guest of his brother, Mr. James Clayton, president of the Clayton Air Compressor Works, New York, and while here will visit the World's Fair and make a study of the railway systems of this country.

Messrs. Beauveau Borie and Henry S. Drinker have been elected directors of the Lehigh Valley Railroad Company in place of George C. Thompas, resigned, and Robert A. Lambertson, deceased. Mr. Borie is well and favorably known in financial circles, and Mr. Drinker has been connected with the company for about 20 years, having been for a long time its general counsel. Mr. Drinker also represents as trustee, the Lehigh University, which is largely interested in the Lehigh Valley Railroad.

Fifty-two French workmen representing many trades and industries arrived in this city this week, who have been appointed by their government to visit the World's Fair and to make a general inspection of American industries and the organizations of American workmen. Among the delegates are: Paul Anache, yardmaster on the Northern Railroad of France; Henri Armagnot, electrician, Paris; Joseph Azzopardi, machinist, Oran; Julian Boiteaux, machinist, Paris; M. Bourck, railroad yardmaster, Ronen; M. Brunswick, inventor-electrician, Paris; Thomas Collin, electrician, Paris; Henri Cuchelet, ironworker; Isidor Finance, second secretary of the Interior and head of the Labor Department, Paris; Desire Gruson, machinist, Calais; Louis Joubert, machinist, St. Lazare; M. Lefebvre, miner, Lens; M. Legarros, railroad machinist, Orleans; M. Lelu, machinist, Pines Sis; Frederick Maguire, electrician, Paris; Charles Montier, machinist, Paris; M. Nonorgue, blacksmith, Ronen; Albert Pillot, machinist, Constantin; M. Postillon, machinist, Paris; M. Thibaudeau, electrician, Paris.

## OBITUARY.

Frederick L. Ames, who died suddenly September 13th, on a Fall River boat while on his way from Boston to New York, was born in Massachusetts 58 years ago. He was the wealthiest man

in New England, having inherited a large fortune which increased under his management. He was the largest individual stockholder and an active director of the Union Pacific company, and was interested in several Western coal properties.

Charles R. Johnson, who died at Ampersand, N. Y., September 12th, aged 41 years, was born in England and received his early training in that country. He came to America and was for a time in the service of the Pennsylvania Railroad, and then engineer of the Union Switch and Signal Company, in Pittsburgh. Some years ago he left that concern and founded the Johnson Railroad Signal Company, at Rahway, N. J. He was an exceptionally able man, but unfortunately of delicate physical constitution and nervous temperament. Hard work and worry wore him out, so that he had to retire from active business over a year ago, though still quite a young man.

## SOCIETIES AND TECHNICAL SCHOOLS.

Foundrymen's Association.—At the regular meeting in Philadelphia, September 6th, reports from the different sections of the trade showed that there was little change in business or prices. Generally the local foundries were running, but report prices very low. There were discussions on the value of the chemist's services in the foundry and on the requirements of the new building law in Philadelphia.

American Bankers' Association.—The executive council has determined to hold the deferred 19th annual convention of the Association at Chicago, on October 18th and 19th. The convention was to have been held in Chicago on September 6th and 7th, but on account of the monetary stringency, necessitating the presence of officers at their posts, was indefinitely postponed. The Committee on Arrangements, Papers and Addresses, previously appointed by the executive council, will arrange the programme.

Southern & Southwestern Railway Club.—The next meeting will take place at the Kimball House, Atlanta, Ga., September 21st. The subjects for discussion will be: 1. The best methods of securing cylinders, smokeboxes and frames together, with Messrs. R. P. C. Sanderson, Pulaski Leads and Thos. W. Gentry, as special committee. 2. The best methods of cleaning and banking fires, and the best practice with different styles of fireboxes, to avoid troubles from leaky flues, and strains in firebox sheets, with Messrs. C. B. Gifford, Geo. D. Harris and J. J. Anderson as special committee. Messrs. W. J. Hartman, J. M. Holt and R. E. Libby are expected to make report on air brake practice, piston travel in inches, and determination of the actual and available brake power. Messrs. Philip Wallis, T. W. Gentry, W. Hassman and A. T. Hooker are expected to report on soft plugs for crown sheets of fireboxes, best form and how to keep them effective.

## INDUSTRIAL NOTES.

The New Jersey Zinc Works, at Newark, N. J., have shut down for the present.

The steel works, at Ashland, Ky., have resumed work after a two-months idleness.

The Whitely Malleable Iron Works, of Springfield, O., started on September 11th with 200 hands.

The American Sheet Mill, of Phillipsburg, N. J., started up September 11th on full time; all trouble with the puddlers have been adjusted.

The Cambria Iron Company, of Johnstown, Pa., started a part of its mills September 11th, giving employment to a large number of men.

The employees at the furnace of the Stewart Iron and Steel Company, Sharon, Pa., have accepted a reduction in wages, and the furnace will continue in blast.

A reduction of 10% in wages has been made at the Duquesne works of the Carnegie Steel Company, which had been closed for a month, but started on the 11th inst.

The rolling mills of John A. Roebling's Sons Company, at Trenton, N. J., resumed operations September 11th, after a shutdown of three weeks. The remainder of the works are still on half time.

The new drawbridge at Flushing, L. I., is fast approaching completion, as the Berlin Iron Bridge Company, of East Berlin, Conn., which has the contract for building it, has a large force of men employed.

The Susquehanna Iron Company and the Columbia Iron Company, at Columbia, Pa., resumed operations September 11th. The puddlers' wages at both rolling mills have been reduced to \$3.35 per ton, and all other salaries have been cut down 10%.

At the Pennsylvania Steel Works, Steelton, Pa., No. 1 blooming mill shut down September 11th and Bessemer and No. 2 blooming mills shut down on the following day. The rail mill will also shut down this week. Only four of the open-hearth furnaces are running.

Representatives of the iron and steel trades gave their opinions before the House Committee on Ways and Means on the subject of changing the present tariff on iron and steel articles. The manufacturers are all opposed to a change at present, in view of the prevailing depression in the iron market.

The works of the Cumberland (Md.) Steel and Tin Plate Company, which have been closed for 10 days to make necessary repairs, resumed September 8th with a full complement of employees and plenty of orders on hand. It has been erroneously stated that the works were closed all summer.

The American Wire Nail Company, of Anderson, Ind., employing 600 men, has posted notice that hereafter the company would operate all its mills non-union, work to be resumed as early as possible between now and October 1st. Employees who do not apply for work before September 20th will be stricken from the rolls.

In announcing the reduction of puddling from \$3.50 to \$3.25 per ton and a readjustment of wages in the other departments at the Central Iron Works, Harrisburg, Pa., to take effect on September 25th, the management say they have held out as long as possible against competition, but are now compelled to reduce. Over 400 men are affected by the reduction.

The oxide department of the Lehigh Zinc and Iron Company's works, South Bethlehem, Pa., has closed down for an indefinite period. The cause of the stoppage, the officials say, is a lack of orders. They say they have a large stock of oxide on hand now that they cannot dispose of, and the works will not be started until orders are received. About 100 are affected. The spelter department of the works is in operation.

Advices from Pittsburg, Pa., state that on September 11th many resumption of mills and departments of plants occurred—among others the plant of Jones & Laughlins, six additional furnaces at the National Tube Works, Zug's mill, a portion of the United States Iron and Tin Plate Works, including two heating and two puddling furnaces and one bar and four sheet mills and the wire and nail mills at New Castle.

It is reported that the Amalgamated Association will accept the 10% reduction in guide and bar mills demanded by the manufacturers at the conference held in July, and which at the time caused a disagreement between the contending forces. The result of a vote for another conference with the manufacturers will be made known shortly. Many lodges have already acted upon their circular, and from what can be learned it is likely that a majority favor the acceptance of the reduction.

The Link-Belt Machinery Company, of Chicago, recently built and erected in the new retail store of Marshall, Field & Co., Chicago, a link-belt elevator for handling boxes, bundles, etc., from the first to second and third floors. A like elevator to handle books and paper was furnished Shea, Smith & Co., printers, Chicago, for their new factory, while a similar outfit was built for the Chicago "Herald" some time ago, for carrying folded papers from pressroom to delivery-room.

## 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.

## ALASKA.

Kyak Bay.—The Sitka "Alaskan" reports that a number of prospectors have returned from Kyak, all the locations there having been taken up.

Kachemak Bay Coal Company.—This company is now shipping coal to Sitka, and will increase its shipments as rapidly as possible.

## ARIZONA.

## Pima County.

The Hermoza group of mines, owned by J. Finley, has been leased, says the Tucson "Citizen." The French mines, at Harshaw, are shipping some ore.

## Yavapai County.

Harquahata Gold Mining Company, Limited.—Mr. Allen, the manager, in his report for July, says: In the prospecting department the section explored has been chiefly confined to the fourth and fifth levels, and some work above the first level on the south end of the Discovery vein. In the drift above the first level on the Discovery vein the ore is of fair grade, averaging \$8 to \$10 per ton, and latterly the face has somewhat improved in value. The main object of this work is to prepare a seg-

tion of ground for stoping from the surface down to the first level to add to the reserves already broken and in the shoots. Fourth level: A cross-cut driven west has opened out a large body of ore averaging \$14 to \$16. This ore body appears to be a junction of the Discovery and Horse veins, and further development on its downward course seems to point to the absorption of the Horse vein by the Discovery vein. Fifth level: On the iron vein, the ore shoot, which, when the examination of the property was made, had apparently reached its termination on the south end, opened out again, and for a distance of 60 ft. maintained an average width of 3½ ft. of good milling ore. In the face, however, to-day it is poorer, and its appearance rather indicates the existence of a fold or roll in the footwall. Further exploration, doubtless, will prove this to be the case. Shaft: Sinking to the sixth level has been resumed. The mill is being supplied with ore from the various veins in the mine, the harder material from the Discovery and Horse veins making a very good milling mixture with a softer ore of the iron vein. Milling Department: The mill commenced running on our account on the morning of the 8th inst., and worked steadily till the 18th, when we were forced to close down. A storm of unusual severity—more in the nature of a cloudburst—broke over this vicinity, and washed our pipe line out in two places. The belts got wet, owing to the forceful wind driving the rain into the mill building and engine-room. These had to be unriveted and dried out, as, being Gandy belts, they shrink, and if left riveted on the pulleys endanger the shafting. This storm caused a delay of over 48 hours in all. On July 31st we experienced a repetition of the first storm, and again we were delayed; and on the night of August 1st an accident happened to our boiler, which necessitated our closing down. The mill worked 21 days, crushing about 2,000 tons of rock yielding \$35,000 (estimated). The expenses of mining, milling, etc., are estimated at \$8,000, leaving an estimated profit for July of \$27,000.

## CALIFORNIA.

## El Dorado County.

According to the local papers, there seems to be a renewed activity in mining operations throughout the county. C. D. Lane is pushing work on the Oro Fino mine, at Angel's Camp. Chas. A. Bishop, of Portland, Ore., is making arrangements to open the Daly mine, near Grizzly Flat, in the near future, and Frank Staples, backed by San Francisco parties, has commenced work on the Minuehaha mine, near Logtown, formerly known as the Capital mine. He has purchased the mill and machinery on the old Greenstone and has a number of men already at work. A. D. Staples, near the same place, is at work on an extension of the old Poca-houtas, and has a shaft down about 60 ft., taking out some quartz carrying free gold.

## Mono County.

Bodie.—According to the local papers, the prospects of Bodie district are improving. The Standard consolidated mine is looking well and the new electric plant is working satisfactorily. The milling of ore from the Bulwer Consolidated mine will soon be resumed. It is reported that a strike of good ore has been made in the Bodie Consolidated mine.

Syndicate.—This mine and mill, at Bodie, have shut down, throwing 10 men out of employment. It is thought work will be resumed shortly.

## Plumas County.

Johnny Bull.—This mine, says the Plumas County "Bulletin," has been producing bullion of late in satisfactory quantities. The mill has only five stamps, but during last month \$2,030 was realized from the clean-up, the ore yielding from \$10 to \$11 per ton. Crushing is in progress now on equally as good ore.

## COLORADO.

## Clear Creek County.

According to the Silver Plume "Standard," heavier ore shipments are being made from that camp. The Fay Rock, Seven-Thirty, Diamond Tunnel, Mendota and Stevens all shipped ore last week. Some of the ore which has been accumulating at the Dunderburg mine has been sent to the sampling mill. There is a large amount of ore on hand at the mine.

The Idaho Springs "News" publishes the following items of mining news from that camp: Shipments were made last week from the Franklin, Arizona, Kangaroo, Ashland, Amy C., Metropolitan, Apex, Inter-Ocean, Silver Age and Kent mines. It is rumored the Falcon mine, situated near the Lamartine, is about to shut down temporarily on account of some misunderstanding between the lessees and owners. The Silver Glance mine, near Silver Plume, is allowed to fill up with water, the pumps, track and cars being removed, and all work abandoned while silver remains at the present price. The Freeland Extension, operated by Langdell & Co., has a streak of ore varying from 6 to 16 in. The ore has been stripped for some distance. It is said to run about \$200 to the ton, principally gold. Development work is going on in the Pelican mine, connections between two of the levels having been completed which improves the ventilation. A carload of Gem Extension ore was shipped recently which ran 5.55 oz. in gold and 42 oz. in silver. A lot of concentrates shipped at

the same time returned 3.77 oz. in gold and 27 oz. in silver to the ton. The 10-stamp Humboldt mill, located near the Humboldt mine, on Ute Creek, was burned last week.

## El Paso County.

(From an Occasional Correspondent.)

The cyanide process at Cripple Creek has gotten into trouble. Experiments and tests gave very high results, but the usual bad luck which has followed the process in the West has befallen it at Cripple Creek. Excuses are made, but in the meantime I learn that the French company, which owns the Deerhorn mine, at Cripple Creek, and operates the Lexington, at Butte, is preparing to put up chlorination works.

The cyanide plant erected in the San Juan to treat certain copper-bearing gold and silver ores, has been idle for some time past.

## Gilpin County.

About Central 470 stamps are working and some of the old mills are being refitted. The Fiske is doing very well. The Jupiter-Belmont property is drifting both ways on two levels and is getting out good ore. Gold-bearing quartz has been discovered lately in the Pine mining district, in the Gold Belt lode, the vein having been exposed for a distance of 30 ft. by an open cut 20 ft. in width, disclosing a vein 18 to 30 in. wide. Assays show gold and some silver.

## Lake County.

Advices from Leadville report the filing on the 5th inst. of a bond for \$5,000 on the Mud lode, in the Twin Lakes mining district, between L. E. Nelvar, of Colorado, and William F. Alney, of Fall River, Mass.; also a bond of \$5,000 on the Queen Bee lode, in the Twin Lakes mining district, between Caroline R. Mallou, of the first place, and W. F. Alney. A bond for \$3,000 on the C. R. M. lode and a bond for \$5,000 on the Tom Payne lode, in the same mining district, between the same parties are also filed. An agreement between A. E. Wright, of Buena Vista, and W. F. Alney was also filed, whereby an extension was granted on bonds covering Mr. Wright's interests in the Mud lode. Thomas Henneberry, of Arapahoe County, has disposed of his interest in the Long Tom, Little Tom, Juniata, Golconda, Extra Session and the Albatross mining claims to W. F. Alney, consideration not stated; all situated in the Twin Lakes mining district.

L. A. Reynolds has disposed of a one-third interest in the National placer mining claim, in the California mining district, to M. F. Estey, for a consideration of \$1,000.

(From our Special Correspondent.)

A conference was held this week between mine-owners and workmen looking toward a reduction of wages all along the line, but nothing definite has yet been accomplished.

American Smelter.—This concern has entirely blown out and a number of leases which have been shipping ore there have closed down. There is only one smelter now running in Leadville, the Bi-Metallic, which is cleaning up.

A. Y. & Minnie.—It is understood that in a few days some parties will begin work on the surface veins that outcrop on this property. These consist of some small gold leads in the porphyry.

Capitol.—Operations have been suspended on this shaft, belonging to the Clipper Mining Company, on account of an unexpected flow of water, about 1,200 gallons per hour. Mineral indications were excellent when the water was encountered.

Maid and Henrietta.—The Maid workings, consisting of the Maid and Henrietta and the Adams, were started up this week with 50 men on the co-operative plan. The lease runs from month to month and the men will continue work if they can make averages. Up to date, however, they have not done so, and state that owing to the low price of silver they will likely give up the lease next month.

Mike & Starr.—A few men have been at work on the stopes in this property and the Lillian mine, but have again been laid off until the silver question is settled, as at the present low figure of silver expenses cannot be made.

Red Hook.—The vein was encountered some 400 ft. in the tunnel. It was only 2 in. in width when disclosed, but now shows 3½ ft. in the face of the drift; some of this ore runs 400 oz. to the ton, but the general average is only fair.

Walcott.—The immense body of mineral in this property is dipping to the west. A new shaft was begun this week and is going down 400 ft. west of the old one. It will be sunk to the first level, a distance of 250 ft. Shipments now average from the old workings 30 tons daily of good lead ore.

## FLORIDA.

## Citrus County.

Florida Syndicate, Limited.—This company, which controls a large tract of land near Anita, is preparing to put up works with a capacity of 150 tons per day.

## Marion County.

Bone Valley Phosphate Company.—The phosphate works at Bone Valley are turning out 150 tons of nebble phosphate per day.

Central Florida Phosphate Company.—Work on this company's mines, near Anthony, is suspended for the present. It is understood that the company is to be reorganized.

## IDAHO.

## Ada County.

Snake River Placers.—A great number of locations have been made and men are constantly coming in. Wages range from \$1.50 to \$4 per day. The gold is quite generally distributed and can be washed wherever water can be obtained.

## Alturas County.

Galore-Stormy Mine.—A trial shipment of 4½ tons was made to Leadville, Colo. It ran 422 oz. silver, and 41% lead.

Red Cloud Mining Company.—This mine continues to ship its high-grade ore notwithstanding the low price of silver.

Texas Star Mine.—This property, located in the Camos Prairie district, has commenced shipping ore.

## Boise County.

Neal Mine.—Twenty stamps have been started and prospects are said to be good for a continuous run.

## Coenr d'Alenes.

Bunker Hill & Sullivan Mining Company.—This company has signified its desire to commence work if the miners will accept a reduction of wages.

## Kootenai County.

Pend d'Oreille Coal District.—Work has been discontinued on the coal properties for this season. A tunnel has been driven in the Harvey claim over 140 ft. The veins ran from 1 to 4 in. wide, having a total width of about 30 in.

## Lemhi County.

(From an Occasional Correspondent.)

Lemhi Placer Company.—This company, working mines in Idaho, and operated by Denver men, has shipped 832 oz. of gold to the branch mint, in Denver. It is said to be the result of a partial clean-up.

## Owyhee County.

De Lamar Mining Company, Limited.—The manager, Captain Plummer, reports the prospecting done during July as follows: 77-Ft. Vein, from No. 5 Level, West.—This portion of the vein has been reached by a cross-cut 36 ft. long. The vein measures 6 ft., and assays from \$12 to \$30 per ton, chiefly gold. The objective point of this cross-cut is now the Hamilton vein. 77-Ft. Vein, 6th Level, East.—The vein in this level holds out in a remarkable manner. It is bounded by the clay dike and porphyry, and closes up and opens out again in a very erratic manner. It has been advanced for the month 18 ft. The vein measures 5 ft. in width, and assays \$5 gold and \$22 silver = \$27 per ton. Cross-cut No. 2 South, 7th Level.—This cross-cut was recommenced for the purpose of intersecting the No. 7 vein, coming up from the 8th level. In this we were not disappointed. It was driven 47 ft.; at this point it entered the No. 7 vein, which measured 5 ft. wide, assaying \$35 gold and \$5 silver = \$40 per ton. More recent developments show a width of 9 ft., and assays \$40 per ton in gold. Wahl Tunnel.—From the face of this tunnel a cross-cut has been commenced, for the purpose of intersecting the clay dike in a shorter distance than by continuing the main tunnel. This cross-cut was extended 19 ft. during the month; its face shows hard porphyry. It is now suspended. No. 9 Vein, 8th Level, West.—The stopes above this level have nearly approached its face, and its driving has been resumed. The vein measures 3 ft. wide, and assays \$25 gold and \$17 silver = \$42 per ton. 9th Level, Footwall Cross-cut.—This cross-cut is being driven from the No. 5 vein for the purpose of intersecting the 77-ft. vein, the Hamilton vein and the Wilson vein. It has been advanced 36 ft. It has recently passed through seams of quartz, measuring from 2 in. to 18 in., but of low grade. Its face is in porphyry. All the milling machinery worked regularly during the month. The mill was stopped on July 31st for clean-up and repairs, recommencing on the evening of August 1st. The work done during the month was as follows: Number of tons crushed, wet, 2,797; number of tons crushed, dry, 2,507; assay value of pulp, gold, \$20.08; silver, \$11.98; assay value of the tailings, gold, \$4.18; silver, \$1.76; percentage saved, 81.48. Receipts from bullion sales, \$65,157; ore sales, \$2,000; miscellaneous, \$568; total, \$67,725; expenses for the month, \$33,966; estimated profit for July, \$33,759.

## Shoshone County.

Murray District.—The owners of many placer claims in this district have been forced to suspend operations on account of the scarcity of the water supply.

Spokane Hydraulic Mining Company.—This company has made its clean-up and will discontinue pipping for the season.

## KENTUCKY.

## Logan County.

Kentucky Asphalt Company.—This company is pushing work at its mine, near Russellville, and has recently put up special machinery under direction of Mr. J. H. Tabler, manager.

### MARYLAND.

#### Allegany County.

**Koontz Coal Company.**—For some time past this company has been boring near Lonaconing for the lower strata of coal and the drill has reached a depth of over 700 ft. Last week water was struck, which rose to the surface and is now throwing out a stream 4 in. diameter over 20 ft. high above the surface.

### MICHIGAN.

#### Copper.

**Calumet & Hecla Mining Company.**—Not less than 30 miners have been laid off at the South Hecla branch.

### MINNESOTA.

#### Duluth County.

(From our Special Correspondent.)

Iron ore shipments for the week have been as follows: Vermilion range, 23,364 tons; for season to date, 604,084. Mesaba range for week, 35,000 tons; for season to date, 205,000 tons. Gogebic range, from Ashland, for week, 53,174; season to date, 851,000 tons.

A large sale of ore from the Mountain Iron, one of the new Consolidated Mesaba mines, is reported; it is said to be 300,000 tons. Ore freights are better, and are ruling at 60 cents a ton from Duluth. The Mesaba has shipped in the past four days a total of 25,000 tons. There is talk of resumption of work at several now idle mines, and the force of unemployed on the Vermilion and Mesaba ranges is much reduced. Not less than 2,000 foreigners have bought tickets here in the past month or more for their homes, expecting to remain. The Minnesota made a further cut in wages this week, but added 25 men to the stockpile force.

#### Iron—Mesaba Range.

(From our Special Correspondent.)

**Biwabik.**—Of about 45,000 tons so far shipped the average content has been 65.80 iron, 0.024 phosphorus. The Drake & Stratton Company, which had a three-years stripping contract, has shut down, temporarily at least.

**Buckeye Iron Mining Company.**—This corporation, the largest holder of lands on the western Mesaba, has just bought 6,040 acres additional. Its chief stockholders are Cleveland and New York men, including ex-Governor Campbell, of Ohio.

**Chicago & Minnesota Ore Company.**—This company, which is an exploration corporation of the Minnesota Iron Company, has a shaft 110 ft. in the Norman, most of which is in an ore rather low in iron, but excellent as a silico. In 58-19 this company has very large and excellent deposits, running high in iron, on which explorations are being pushed. The property is about 15 miles west of the present terminus of the Mesaba branch of the Iron Range road, and will be an argument for an extension of the line. It is probable that shipments from this company's Canton mine will shortly be resumed.

**Duluth Ore Company.**—This company, operating 40 acres of the original Biwabik, shipped 20,000 tons in August, and is sending out 600 tons daily.

**Franklin.**—Shipments are to be resumed this week.

**Lake Superior Consolidated Iron Mines.**—The daily papers have had not a little to say the past week concerning the Rockefeller-Merritt combination of Mesaba mines, the Lake Superior Consolidated Iron Mines. While the combination has been under consideration since last autumn, and has been actively simmering for four months, it was not till last Tuesday that it was actually closed, and even yet several mines that expected to enter it are not yet in. So far the Consolidated has issued about \$17,000,000 trustees' certificates in payment for the following percentages of the properties named: Mountain Iron, 51%; Missabe Mountain, 51%; Biwabik, 51%; Adams, 51%; Lake Superior, 51%. The above properties are all, with the exception of two of the Lake Superior's three ore finds, steam shovel mines. They are, also, the only steam shovel mines so far found on the Mesaba. Besides these the purchases include 75% of the Shaw and 100% of the Great Western, Lone Jack, Great Northern, McKinley and Rathbun. Besides these negotiations are in progress that may add to the syndicate the Mesaba Chief, with not less than 15,000,000 tons of ore, the Ohio and others. The Duluth, Missabe & Northern Railroad, with grades low enough to permit it, a new road and yet hardly ballasted, to carry loads of 1,000 tons behind a single locomotive direct from the mines to the docks, is close identified with the Consolidated and may be made an integral part of the system. The road has a debt of a trifle over \$30,000 to the mile, including a \$500,000 dock and approach at Duluth. Interests almost identical with the mines and railroad control the American Steel Barge Company, which owns the patents of the McDougall whaleback ships. At present the boats of the fleet have a season's capacity each way of not far from 1,300,000 tons from Duluth to Lake Erie.

**Longyear.**—E. J. Longyear, of Marquette, who has been diamond drilling along the range for a year, has made a good find in the west part of 57-21, near the Lake Superior property of the Consolidated.

**McKinley.**—The local owners of this mine have sold to the new syndicate, and have received such

offers for the Consolidated stock taken in payment as to give them \$600,000 for their fee and \$400,000 for the leases.

### MONTANA.

#### Beaverhead County.

**Montana Grasshopper Gulch Placer Mining Company.**—This company owns 9½ miles of patented placer ground on Grasshopper Creek, near Bannock. The company claims a pay streak of 40 to 80 ft. in width that will run \$4 per square foot of bedrock which is from 20 to 40 ft. below the surface. The ground is rather flat and there are some difficulties in working it, but it is believed that these can be successfully surmounted.

#### Deer Lodge County.

**Aurum Mining Company.**—This company now has men driving a tunnel about 1,000 ft. to the ore body.

**Hope Mining Company.**—It is reported that this company will soon resume work.

#### Granite.

**Granite Mountain Mining Company.**—This company and the Bi-Metallic have closed down, throwing some 200 men out of work.

#### Jefferson County.

**Walkerville.**—The new properties north of this place are making big returns. It is reported that the negotiations for the sale of the American Gulch placers to Boston parties have fallen through. The work on the placers will close down in about 10 days for the season, on account of low water. A good clean-up has been made.

**Pipestone District.**—Alonzo Boyd and others have recently located about a dozen claims near Pipestone, and the discovery work justifies them in the belief that they have struck ore carrying silver and copper.

#### Madison County.

The search for new gold fields is being engaged in by thousands of prospectors and miners who have become discouraged with the outlook for silver, says the Anaconda "Standard." Many report fairly good success, while a few have struck it rich. Among the latter are the owners of properties on Baldy Mountain, about 15 miles from Norris. Dr. Sarchet, Oscar Steinborn and Frank Wills, of this city, are the owners of the Bald Mountain mine in that vicinity, which they have been developing for some time. There are a number of other gold properties in that district that will show well, and more upon which development work has not progressed sufficiently to demonstrate what is in them, but with indications for a good strike.

#### Silver Bow County.

The mining industry is at a very low ebb in Butte, according to the "Daily Intermountain." During the last week of August the forces at some of the Anaconda mines were curtailed. The usual forces are at work at the Boston & Montana, Butte & Boston and Heinze smelter. The Colorado company and the Butte Reduction Works are running light. The Moulton is the only silver mill in the district in operation. Superintendent Clark says about 15 men are working in the mine, but they are not producing enough to pay expenses. The mill is running almost entirely on custom ore. Many miners who had leases had to continue at work upon them regardless of the price of silver and they have been compelled to sell their ore for whatever it would bring. Mr. Clark says he is handling about \$20,000 worth of custom ore a month.

**Boston & Montana Mining Company.**—The output for August was slightly over 3,000,000 lbs.

**Heinze Smelter.**—The additions to the smelter are now complete and the converters will soon start working. It is reported that the smelter is now one of the best appointed in the district. The company has leased the Lundberg claim, near the Alice. A force of men have been put to work cleaning up and pumping out.

**Rarus Mine.**—This and the Gambetta are still turning out rich ore and the ore bodies show no sign of falling off.

(From an Occasional Correspondent.)

The news of late strikes in Meadow Creek has caused a great many expeditions to be made into the new (?) gold fields by Butte miners. The principal assemblage of prospectors is at Sure Shot Creek (a branch of Meadow Creek), about 27 miles by trail from Pony. Here there are two great ledges with croppings out from 10 to 20 ft. high. The ledges run north and south, according to the mountain range, and can be seen for over a mile. Assays taken in Butte give from \$50 to \$130 in gold with about 3 oz. silver, and from one portion of ore ledge a sample was taken which gave 74 oz. silver. These assays, of course, are of samples.

### MISSOURI.

**Duquesne Lead and Zinc Mining and Smelting Company.**—This company has been incorporated under the laws of Illinois, with offices at Chicago, the incorporators being James E. Davidson, John A. Young and Robert A. Burke. The company will mine and smelt ore in the State of Missouri. The capital is \$200,000.

### NEVADA.

#### Lyon County.

**Silver City District.**—The following are the latest items of mining news from Silver City: The Al-

hambra mine has started up. The Red Jacket company has resumed operations. The Umatilla mine, owned by Henry Scheel, is said to be looking well. He has recently refused \$12,000 for it. Jolese Lawson has purchased another quarter interest in the Last Chance mine. Three different strikes have been made in the Combination tunnel; they were all made in the Golden Eagle, owned by Keating, Zadig and La Crouts, and show rich ore. The clean-up of 150 tons of Haywood ore, worked at Taylor's mill, netted about \$3,500. The owners will shortly put on several more men and do some extensive work. Lockerman and Collier, who have a lease of the Pedrol mine, below the Buckeye, in Devil's Gate district, have taken out some very rich ore and had it sacked. On September 5th bullion valued at \$15,000 was received at Virginia City from the Silver City mines.

#### Storey County—Comstock Lode.

It is reported that the Brunswick mill will soon begin to crush a large accumulation of good ore from the Yellow Jacket mine.

Recent advices from Virginia City say: The wage question is not yet settled, but it is certain the miners and mechanics will not accept the 25% reduction asked by the mining management. Committees of the Virginia and Gold Hill miners' unions and of the Mechanics' Union of Storey County, met last week and replied to the document submitted to the unions early in August by Charles H. Fish and other mining presidents. The reply framed states that the reduction asked will not be acceded to. A conference with the mine superintendents on the question is asked, in accordance with a former agreement entered into by the miners' unions. Representatives of the railroad, water, wood, milling, mining and other corporations at a recent meeting drafted a document which has been mailed to the different unions, asking a conference with the miners and mechanics on the labor question. The communication will come before the several unions at the next meeting.

### NEW MEXICO.

#### Grant County.

There are quite a number of prospectors out in the Burro Mountains looking for gold.

There will not be much work done in the silver mines in Grant County during the rest of this year, says the Silver City "Sentinel." Some silver will be produced from mines which produce gold principally and some of the richest silver mines will be worked on a small scale.

**Manhattan Gold Mining Company.**—Some time ago it was reported that the Manhattan Gold Mining and Milling Company and the Pacific Gold Company had agreed to pipe water to Pinos Altos and move the mills from this place to the mines there. The Silver City "Sentinel" says that no confirmation of the report can be obtained, and it is more than probable that no such arrangement has been made.

**Montana Tunnel.**—The Montana tunnel is now in over 700 ft. and there are indications that the ground will get easier to work in a few feet more. It is thought that the vein will be reached before the expiration of the present contract which is to complete 829 ft. of the tunnel. The tunnel is now considerably longer than the estimated distance to the vein when the work was commenced. The tunnel is perfectly dry, the water which was struck some months ago in it having completely dried up and water to supply the boiler has to be obtained from the Pacific mine.

**Pinos Altos.**—The shipments of gold bullion from Pinos Altos continue steadily, the largest shippers being Bell and Stephens, who own two mills in the camp. The Montana tunnel is now in about 800 ft., and it is hoped that it will be completed within a month. This will open the largest mining property in the camp.

#### Sierra County.

**Kingston Smelter.**—The old smelter at Kingston is being remodeled. Most of the old machinery has been taken out and the old water jacket will be replaced by a new one. The plant has been leased to a New Jersey company and will be in running order about October 1st.

### NEW YORK.

#### New York County.

A remarkable collection of mineralogical specimens is on exhibition in the New York State section of the gallery exhibits, Mines Building, World's Fair. It is the collection of the New York Mineralogical Club, and is owned by Mr. Geo. F. Kunz, of Tiffany & Co., New York. The specimens represent all the known rocks, minerals and precious stones found on Manhattan Island, or New York City. There are hundreds of them, and all show from what locality in the city they were taken from. The ship canal, at Kingsbridge, has yielded numerous specimens, such as pyrites, dolomite, calcite, epidote, etc. The new water tunnel furnished garnets, tourmalines, apatite, stilbite and many other specimens. Tourmalines have been found in many parts of the city. In color they are black, green, brown, olive and pink. Radiated tourmaline is also found. From Fort George is a moonstone. It is not exactly perfect, but it is a good representation for a New York City find. Numerous splendid beryls in granite also hail from Fort George. A fine specimen of molybdenite is shown, which was found in the upper part of New York City. A small piece



of malachite offers possibilities that New York may some day produce copper, apatite, tremolite, muscovite, siderite, marcasite, cyanite, kaolin, pyrrhotite and numerous other specimens are to be seen, all showing that the mineralogist has in New York City a wonderful field for study.

#### NORTH CAROLINA.

##### Macon County.

Corundum.—The Corundum mines, in this county, have either shut down or reduced their working forces for the present.

#### OREGON.

##### Douglas County.

Anglo-American Nickel Mining Company.—This company has been incorporated under the laws of Illinois, with headquarters in Chicago. The capital is \$5,000,000. The company will work nickel mines in Oregon, in the vicinity of Riddle. It is an English and American concern. The incorporators are W. H. Dyrenforth, W. N. Williams and C. E. Gaylord.

##### Union County.

Bonanza Mining Company.—This company was recently organized, with headquarters at Tacoma, Wash. The property includes a group of 14 claims on Eagle Creek, in Union County. The creek furnishes abundant water power and a 40-stamp mill is to be put up. The ore is free-milling and of low grade, but can be very economically worked.

Oregon Gold Mining Company.—This company has about 50 men employed. The mill is crushing about 40 tons per day. There is a considerable amount of ore in sight.

#### PENNSYLVANIA.

##### Anthracite Coal.

The demolished Royal Oak breaker, at Shamokin, is fast nearing completion and will soon be ready for the machinery. It has been constructed on a larger scale than it was when the old breaker was blown down.

Evans Mining Company.—This company, at Beaver Meadow, put a corps of workmen to work last week making room for a new screen and a set of new monkey rollers in their breaker. This company is enlarging its breaker gradually and placing in new machinery.

Union Coal Company.—This company has issued orders to have the Hickory Swamp colliery, near Shamokin, resume operations next week, and workmen are now completing necessary repairs. A nest of three new boilers is being put in. The Swamp has been shut down for several weeks past on account of the dullness of the coal trade. All of this company's other collieries, the Pennsylvania, Hickory Ridge, Richards and Scott, are in operation.

Upper Lehigh Coal Company.—This company has just awarded the contract for developing its new coal stripping operations, at Hazleton, which is located at No. 5. Two steam shovels are already being placed and preparations for commencing work on a large scale are being made. Several hundred men will start in to excavate the surface at once.

##### Bituminous Coal.

Advices from Pittsburg state that the coal miners' strike was inaugurated September 11th and about 4,500 men are now idle. The river miners are taking active part in the strike, as it is to their interest to have the 79-cent. rate maintained. If the rate were lowered the river operators would in all probability insist on a reduction equivalent to that in railroad mines in order to compete.

A press dispatch from Philipsburg says about the strike at the Troy mines: The miners are on a strike against a return to monthly payments. A number of miners from Philipsburg and other places have taken the places of the strikers. A mass meeting of all the miners in the Philipsburg district will be held very shortly, for the purpose of influencing the men now at work in the mines to come out.

Eagle Coal Works.—This colliery, owned by Thomas F. Cain, was sold by the sheriff September 13th, to satisfy a judgment of \$4,000 held by the first National Bank of Homestead. The colliery is a new one, in Washington County, and employs about 100 men.

#### SOUTH CAROLINA.

##### Phosphates.

The recent cyclone which passed over the eastern part of this State inflicted great damage on the companies operating in the phosphate region. State Inspector Jones reports that the works of the Coosaw company, the Farmers' Mining Company and the Beaufort Phosphate Company, in the Port Royal district, were almost entirely destroyed, their dredges and lighters wrecked and the stock on hand damaged. The property of the Carolina Mining Company was also much damaged. The total loss to the phosphate operators in this district is estimated at \$350,000.

In the Charleston district also much damage was done. The Ashpoo Phosphate Company's works were partially destroyed, leaving, however, the remaining portion still in condition to turn out work. At the Atlantic Works the damage was

very heavy, estimated at nearly \$60,000. Their acid chamber was a total wreck and their building was razed, the scene presenting general disaster. The Edisto Works, Etiwan Company, Chicora Works, Stono Works, Charleston Mining Company, Imperial Works, Royal Fertilizer Company and Pacific Company each loses from \$1,000 to \$5,000.

#### SOUTH DAKOTA.

##### Lawrence County.

American Express Mine.—This property shows quite a large body of low-grade silicious ore which is exposed by a drift of 50 ft.

Buxton Mine.—Three cars of ore will be shipped to Aurora, Ill., for treatment. Another car will be shipped shortly. The ore is very high grade, running between \$50 and \$60 per ton. A few men are constantly employed at the mine taking out ore.

Comet Mine.—The shaft will be sunk 25 ft. deeper to strike if possible the ore body recently found in the Alpha property.

Cumberland Group.—This group has a large ledge of free milling ore exposed by various workings a distance of 700 ft. in length and 60 ft. in width, and in depth by a shaft of 50 ft., from the bottom of which a drift has been run east several feet, showing a solid body of slate averaging in value \$10 gold per ton.

Goodenough Mine.—A test of this ore at the old Noble Grand mill gave very good results; 91 tons were run through and it averaged about \$4 per ton. The mill is in bad condition and needs repairs. Messrs. Tortat & Brodie are expected to again start the mill within a short time on ores from the Bonanza and Challenge mines. The Bonanza mine shows up quite a large body of ore, which requires simply the stripping of the surface to enable the owner to take out considerable ore. It is partly free milling, and from tests made it is expected to yield from \$3.50 to \$4 per ton. The tailings are saved and afterward treated by smelting or chlorination. The successful result of the late run has put confidence into the prospectors and mineowners of the district.

Horseshoe Mining Company.—Superintendent T. H. White continues development work on this property, but as yet without finding any large ore body. The west drift, on the 365-ft. level, has been driven on an incline during the past three weeks, leaving the quartzite for a roof and slate for the floor. The drift is rapidly approaching the 400-ft. level and will be continued to the boundaries of the property. The east drift is being driven on the same level on which it was commenced.

Keystone Mining Company.—The trouble between the miners and management has been settled and the mine is now running on half capacity.

Welcome Mining Company.—This company has begun suit against J. Thorborn and the Black Hills Milling and Smelting Company to settle the title to the Welcome property.

##### Pennington County.

Hawkeye Mining Company.—The last clean-up yielded 53 lbs. of amalgam worth about \$4,000.

Nigger Hill Hydraulic Mining Company.—The company has spent a large amount of money in the construction of a water ditch to carry the water to Nigger Hill. The bars have been worked in a desultory fashion for the past 16 years, but only for a short time in the spring, when the melting snows furnish the only available water for sluicing.

Palmer Mine.—A five-stamp mill has been set up near this property and the ore will be given a thorough trial.

#### UTAH.

##### Beaver County.

Busy Bee Mine.—This claim, in the Indian Creek district, has a shaft now down about 75 ft. At a depth of 40 ft. a drift was driven east on the ledge 60 ft. A prospect shaft, 45 ft. in depth, was sunk on the ledge east of the main shaft, which shows ore on all sides from the surface to the bottom.

Glencoe Mines.—Only three men are at work now. The tunnel has been driven in 200 ft.; and although a small vein was cut at 40 ft. in, nothing has since been discovered. A shaft started on the vein outcrop is now down nearly 100 ft. At 125 ft. drifts will be run each way. The group, which consists of three claims, has been bonded to Geo. A. Rice and M. L. Powers.

Indian Creek District.—A correspondent of the Salt Lake "Tribune" writes: I have not seen a more promising camp than this, for, although the value of the ore has not been demonstrated to a certainty, the quantity in sight is immense. At the Rob Roy a large amount of work has been done. The main shaft is down 140 ft. A tunnel from the bank of the creek was driven west and cut the vein at a distance of 140 ft. and at a depth of about 75 ft. At the tunnel level the vein was drifted on north 40 ft., and at the 100-ft. level another drift was driven north 50 ft. Both drifts are all in ore, the vein being 5 ft. at the tunnel level and 10 ft. at the bottom of the shaft. The vein consists of a partially decomposed quartz gangue, lying between smooth, true and thoroughly well defined walls, which gradually but surely widen as depth is attained. The footwall is trachite and the hanging wall is a conglomerate,

cased with several inches of tough, slim, yellow clay or talc. The 10-stamp mill has been for some time ready for the treatment of ore with the exception of the plates, which have been ordered.

At the Fourth of July mine the vein has been exposed by a series of open cuts.

Sheep Rock Mining Company.—This company has been incorporated, with a capital stock of \$262,500, to work a seven-eighths interest in the Cremona group of mines, in the Newton mining district.

(From our Special Correspondent.)

Rob Roy.—Several men have recently been employed on the Rob Roy. The new mill of 10 stamps has started and much activity prevails on Indian Creek. The Cunningham and Contact mines, in Preuss district, have been leased to Philip Swartz, of Salt Lake City, who will begin operations at once. These mines are owned by H. Alexander of New York City.

##### Cache County.

Mahogany.—Work on this property, in Logan Canyon, is being developed by the owners, Tom Hart and Ogden parties. At a depth of 30 ft. it shows galena. Considerable ore has been taken out and shipments will begin in a short time.

Rich-Cache Mine.—Eugene Kimball, one of the operators of this mine, reports the striking of an excellent pay vein in the west drift. The vein shows 4 ft. of good ore on one level. After sinking the shaft 20 ft. and drifting, a body of copper ore 6 ft. wide by 15 in. in depth was discovered. The average assay gives 26% copper. A shaft will be sunk to the 100-ft. level when it is thought by drifting good silver ore will be found.

##### Juab County.

Bullion-Beck.—Work has resumed on this mine. About 85 are working, and more will be put on soon. The Eureka camp, that a short time ago was idle, now has over 175 men at work. The Bullion-Beck and Centennial-Eureka have reduced wages to \$2.50 per day, with a corresponding reduction to 75 and 80 cents for board. The Eureka Hill and Keystone have kept up wages and are putting on more men.

Herkimer Mine.—This mine will probably be started up in September. There are now only about 250 men employed in the Tintic district.

##### Millard County.

Detroit District.—The Rattler was recently bonded for \$30,000 and is being worked. The First Chance and Clara B., owned by H. A. Mears, are showing up some good silver ore. The Ilex is not being worked at present. Efforts are being made to work the refractory ores of this district on the ground.

Montreal Mining and Smelting Company.—Suit was begun at Salt Lake City September 6th by Attorney James A. Williams, on behalf of himself and Candido Balzaret, Paul Balzaret, Adolph Rossy, Geo. Westervelt and A. B. McKean, other stockholders, against this company, Joseph A. Bush, president, and Chas. A. Stebbins, secretary. The complaint sets forth that the company had advertised for sale about 52,000 shares of the company's stock, and that the assessment was illegal, in that the notice published in a local newspaper was without authority from the board of directors or five or more of the stockholders holding a controlling interest of the capital stock; that the president, Mr. Bush, had controlled the capital stock and filled up the directorate with his personal friends after donating them a few shares of the stock; that he has so conducted the business of the company as to make it oppressive on the remainder of the stockholders, etc., etc. Judge Zane granted the temporary injunction as prayed. There are some interesting points in this case, the decisions upon which we will inform our readers when they shall be given.

Native Onyx.—A ledge of onyx is being operated in the Detroit district, about 30 miles northwest of Deseret. The property is owned by R. A. McBride, of Fillmore. The ledge is about 5 ft. thick and contains stone of every hue and color. Near the onyx ledge is a quarry of black marble, 25 to 30 ft. thick.

##### Salt Lake County.

Bingham Gold.—Edward Egan, of the Stewart No. 1, at Bingham, has shipped to Salt Lake City a gold bar weighing nearly 60½ lbs., which assays 96% fine and is valued at \$17,086. It is the result of a 25-days run of the Stewart. Other shipments will soon be made from this camp, which promises a fine output for the season.

Christina.—This mine is being worked by two men. A tunnel has been cut on a 25-ft. vein of ore, assaying \$20 to \$35 per ton.

Exchange Gold Mining Company.—This company has filed articles of incorporation, with headquarters in Salt Lake City. The capital stock is placed at \$1,500,000, divided into shares of \$5 each. The officers are A. Hanauer, president; J. R. Middlemiss, vice-president and treasurer; R. Markham, secretary. These, with P. P. Jackson, F. W. Schriemer and S. C. Markham, constitute the board of directors. This company will develop the Waverly gold lode, in White Pine County, Nev.

Florence.—This mine is located in Little Cottonwood Canyon and is being operated by E. B.

Weare. A tunnel has been driven 23 ft. through black shale. This shale was sampled and a mill-run test given which resulted in 4½% iron, 17½% copper and \$33 in gold. The find is creating considerable excitement among local mining men.

Highland Mine.—The shipments from this mine are very small and no improvement is expected for the moment.

Rustler Mine.—A seven-ton lot of ore from this mine ran 540 oz. silver, \$10 in gold and 37% lead. The vein, 18 in. wide, is cut by the tunnel and work is being vigorously carried on.

Tilden No. 2.—This mine has a small force of men at work. Over 800 ft. of tunneling has been done, about 300 ft. of which is on the vein. A good grade of milling ore is being obtained.

#### Summit County.

Ontario Mining Company.—During August this company shipped 85 bars of bullion containing 40,134 oz. silver. The new leaching plant has been placed under cover.

Snake Creek.—The copper outcrops on Snake Creek have been examined in the interest of the Salt Lake Copper Smelting and Refining Company by H. J. Kearns.

#### Washington County.

New Gold Location.—W. L. Dykes is reported to have discovered and located a gold ledge about 45 miles west of the old sandstone camp, of Silver Reef. He reported a vein 3½ ft. wide, carrying pay ore from 15 to 18 in. in width. Frank Stanley, of Salt Lake City; G. M. Burgess, of Pine Valley, and W. L. Dykes are the owners and will proceed to develop the property at once.

#### VIRGINIA.

#### Rockingham County.

Elkton.—The manganese mines, which have been closed down for two months, have been reopened with a small force, which is to be increased gradually.

#### WASHINGTON.

Boundary Creek District.—The first carload of ore ever shipped from this district was sampled at the Tacoma smelter during the last of August and the ore carried over \$160 in silver and \$100 in gold per ton. The Spokane "Review," speaking of the smelter, says: The Tacoma smelter is still in active operation, but produces only \$3,000 worth of bullion daily, as against double that amount when the "slump" in silver occurred. At present the purchase of ore is limited to actual requirements for mixing with ore on hand and the product of districts that were shipping to Tacoma when the other smelters closed down. The regular weekly report from Boundary Creek indicates that the Providence and Skylark claims are doing handsomely, and shipments will be continued as long as the smelters can purchase ore, says the same authority.

#### Okanogan County.

Chelan District.—This has only recently been discovered. The ore is free milling and of good quality. A rush is expected.

#### WEST VIRGINIA.

New River Coal Operators' Association.—At a meeting held in Charleston, W. Va., recently it was resolved to reduce the price for mining to 40 cents per ton, in order to meet the competition of the mines on the Norfolk & Western. The miners have held several meetings, but have come to no decision.

#### Coke.

Extensive preparations for making coke along the line of the Norfolk & Western extension are in progress, according to the Baltimore "Manufacturers' Record." The Ashland company is opening a new mine on North Fork. It has its tipples about half completed, and the drums and other machinery have arrived and are being put in. It will have a capacity of 40 cars a day when in operation. The Peerless company's new mine, at Clansen, is well under way. The new tipple is almost completed and a block of 50 coke ovens are half done. The Shawnee company, at Eckman, will be ready to make coke in their new bank of 100 ovens in a few weeks. At Elkborn, the Crozier company is putting in a new crusher plant which will have double the capacity of the old one. The Turkey Gap company is building a lot of new coke ovens, at Morgau, which it will have ready for use in about two weeks. The Crozier company, mentioned above, now has 300 ovens ready for use, which puts it third in point of capacity in the Elkborn region. The Gilliam company is preparing to build a block of 50 new ovens. The Lynchburg is making improvements at Kyle. It is putting up a new tipple a few yards from the old one, and will open a new drift about 300 yds. from the present mine. It will also put in a steam haulage system for use in both mines. The Pulaski company has begun shipping coke and is now at work on the remainder of its ovens. It is building a lot of new ovens for its men. It will have 72 block and 85 bank ovens when completed. It is also putting up a crusher with a capacity of 400 tons daily, with elevators and all improvements for making coke, which will be its specialty. In the neighborhood of Vivian improvements are being made by the Bottom Creek, Tidewater and Peerless companies. All of them will increase their capacities, and the

Norfolk & Western are building yards which for size and conveniences are excelled only by those at Bluefield.

#### WISCONSIN.

#### Lafayette County.

Zinc Carbonate Company.—This company has received at the Columbian Exposition the medal for concentration of lead and zinc ores. The mill in which the work was done which secured this award was designed and built by Mr. F. C. Richmond, vice-president and general manager of the company.

#### WYOMING.

Oronogo Milling Company.—We are indebted to Mr. Wm. E. Mead, mining engineer, of Oronogo, for the following information: This company is opening a deposit of auriferous pyrites, having cross-cut two veins, one 35 ft. and the second 24 ft. A working tunnel is being driven at creek level by a compressed air drill, as tests prove in over 20 mill-run assays that the ore after roasting is free milling. The ore runs \$10 in gold and from 1 to 2 oz. silver per ton. Other parties are talking of work as this is a 12-months camp.

#### Johnson County.

Big Horn.—A discovery of a true fissure gold quartz vein is reported from the Big Horn Mountains. A large number of people are flocking to the scene of the find.

#### FOREIGN MINING NEWS.

#### BRITISH COLUMBIA.

Le Roi Mining Company.—This mine, situated in the Trail Creek district, will shortly commence to ship ore. There is about 1,500 tons of good shipping ore on the dump now. The Le Roi has nine men at work now and as soon as transportation arrangements for shipping are completed the force will be increased.

Loma Gold Mines, Limited.—The last report of the superintendent says that the ditch has again given way at Guarumo. The ground has by no means come up to expectations, and the returns are consequently very disappointing.

North Star Mining Company.—Work has been suspended for a time. Mr. Leslie C. Hill, the engineer, reports development, according to the "Golden Era," as follows:

A cross-cut run from 60-ft. level in main shaft cut the vein 14½ ft. wide, nearly perpendicular. This is well defined but shows little mineral. There seems to be a horse of diorite at this point. North of shaft, vein is exposed for 257 ft. by two surface cuts. Vein is about 30 ft. wide, carries carbonates and galena. The galena assays 70 oz. A winze is sunk 36 ft. in, and cut through carbonates and galena, and there is good galena in the bottom; 137 ft. south of this shaft a drift is run across the vein. The vein is 63 ft. from wall to wall, all carbonates and galena. There are 4 ft. of solid galena in foot-wall. The vein in this winze is straightening up, and there is from 6 to 10 in. of soft clay gouge in the foot-wall.

In the south drift there is about 20 ft. of backs. Another drift is started 150 ft. farther south, which will have about 50 ft. of backs. This drift has not reached the vein yet, but there are bowlders of float, and indication show that the vein is not far off.

The ore body is proved for 400 ft., with an average width of about 30 ft., and the lowest depth is 36 ft. with good ore on the bottom.

White Grouse Mountain.—Messrs. I. Thompson, Arthur Goodenough and others have just returned from a prospecting tour in the St. Mary's country, where they located 11 claims of ore, consisting of chloride and gray copper, which assays high in silver and 31% copper. The properties are located on White Grouse Mountain, 18 miles from St. Marysville.

#### Vancouver Island.

(Reported for the Engineering and Mining Journal.)

The auriferous quartz veins of Vancouver have been overrun by prospectors owing to the dull times prevalent. Some good showings have been made and many claims have been located. The rusty quartz has proved the heaviest gold bearer; telluride exists, not found by the earlier prospectors on account of their lack of knowledge.

The Minerva Mining Company has a shaft down 38 ft., and the vein has widened from 18 in. to 4 ft.

Experts representing English smelters are expected to arrive soon to report upon the properties of Texada Island. The American syndicate asked for a renewal bond to January 1st, 1894, which was referred to the owner; the price, \$250,000, equals 1,000 acres, or eight claims.

#### NEW SOUTH WALES.

Broken Hill Proprietary.—The yield for week ending August 17th was 918 tons lead, containing 250,366 ozs. silver from 8,233 tons of ore.

#### ONTARIO.

Ogeura Mine.—This silver mine was sold at public sale at Port Arthur, August 15th, and the company will be wound up. The mine, which has not been worked for some time, was bought by J. F. Ruttan for \$925.

#### SOUTH AFRICA.

(From an Occasional Correspondent.)

In gold production South Africa is rapidly forging ahead, and bids fair within a comparatively

short time to secure premier rank. In this district of Witwatersrand alone the output of gold for the month of June last was nearly 123,000 oz. In "The Mineral Industry" you doubt that 1894 will see an output of 200,000 oz. per month. If this amount be not exceeded by the end of 1894, it will be through no fault of the district. The extent of production is practically unlimited. Our main series of reefs, which is being worked in an unbroken line for many miles, and extensions of which are constantly being brought to light by prospecting operations, has been proved to a depth of 2,500 ft. The reefs more than maintain their value, and the class of rock met with at the depth mentioned presents no difficulty in the matter of treatment of gold extraction. There are also many other lines of reefs which have been proved to be payable, and there are others which will become payable as conditions of working are improved. Greater progress is being made here in gold-saving processes than in any other mining district, and much success is being attained. Capable mining men from the United States are settling down here, and seem very well satisfied with the chances of the future. The silver industry here seemed at one time to have a fair chance of assuming considerable proportions. The metal is abundant, but we have not yet mastered the conditions of working. There will be time, however, to improve ourselves in this respect before the silver market again assumes a healthy condition. In diamonds, the South African fields are likely to continue to hold their own with unimpaired vigor and success—indeed, the indications are that the production of these gems will be materially increased in the near future. As an instance of the extent of the diamond industry at Kimberley it may be mentioned that a single transaction recently at 'De Beers' involved the sale of diamonds for a sum of over \$5,000,000. The Transvaal is rich in minerals which have not yet been worked to any extent; but developments are bound so take place shortly in the production of iron, copper, tin, nickel, cobalt, asbestos, etc. Coal deposits are vast in extent and will continue to assist considerably in the progress of the mining industry. The remarkable occurrence of coal beds in close proximity to our gold mines here is an important feature. In some instances both gold and coal exist on the one property, and the significance of this can be realized by mining men. Discoveries of cinnabar and sapphires have lately been reported, but we have been unable as yet to obtain any reliable information regarding them. Altogether the mining prospects in this part of the world are exceptionally bright, and there is every inducement for the introduction of capital to develop not only the mineral resources of the Transvaal, but of many other portions of South Africa.

#### Mashonaland.

A correspondent of the London "Mining Journal" says that the increase of population has been rapid this year. Nearly 3,000 mining licenses were granted within a very short time and prospecting was carried on vigorously. The Salamander mine, Hartley Hill, has a reef 7 ft. thick and produces close upon 1 oz. of gold per ton. In the Momba goldfield the Inez reef is 8 ft. thick and gives 1½ to 2½ oz. In the Victoria district the Coropaxi reef is about one mile in extent and is 22 ft. thick. Over 1,000 tons of quartz have been raised awaiting the starting of the new stamps. This quartz is rich, possessing visible gold. The Standard and Dickens mines gives 1 to 2 oz. In the Mazoe district the Alice mine produces 2 to 3 oz. The Vesuvius, Etna and Hecla mines show 2 oz. Some reefs have been discovered near the Odzi River, Manica, but they do not appear to be so rich as those of the Victoria and Mazoe districts, which occupy the first places for richness of rock. The Odzi reefs are composed of soft quartz or soapstone and may prove to be less costly to work. Manica is healthy for Europeans, much more so, indeed, than the Victoria district, parts of which have rather a bad reputation. These are but a few of the important properties which have been discovered; and should they continue as rich in depth as they have proved to be at surface, the Rand will have to look to its laurels. Rapid progress is being made in city building. Plans of Salisbury, Victoria and other towns are already drawn, town lots are taken up, and in Salisbury some large buildings are even now erected. Already there is a surplus of skilled labor in the country, and advice has been given to skilled artisans to keep away from the country for the present. Land has been taken up to a great extent for farming, and the price of it has advanced. It is now a time of prospecting and discovery in Mashonaland. Everywhere there discoveries of reefs are being announced. The whereabouts of some of these are, for the time, being kept secret. Crashings are generally successful, and mines are being developed quickly, and, what is more satisfactory in this prospecting work, the reefs improve in richness as depth is attained.

#### VENEZUELA.

El Callao Mining Company, Limited.—During the month of August this mine produced about 1,800 oz. of gold.

#### WEST AUSTRALIA.

The gold produced and entered for export during the quarter ended June 30th was: Yilgarn, 12,003 oz., value, £45,614; Murchison, 6,153 oz., value £23,383; E. Kimberley, 355 oz., value £1,352; Dundas Hill, 100 oz., value £380; Pilbarra, 4,508 oz., value £17,130. Total, 23,121 oz., value £87,800.

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, Sept. 15.

Statement of shipments of anthracite coal (approximated) for week ending September 9th, 1893, compared with the corresponding period last year:

|                          | Sept. 9, 1893. | Sept. 10, 1892. | Difference.  |
|--------------------------|----------------|-----------------|--------------|
| Wyoming region.....      | 401,004        | 412,651         | Dec. 11,647  |
| Lehigh region.....       | 133,879        | 116,212         | Inc. 17,667  |
| Schuylkill region.....   | 204,704        | 229,253         | Dec. 24,549  |
| Totals.....              | 739,587        | 758,116         | Dec. 18,529  |
| Total for year to date.. | 28,510,020     | 27,670,274      | Inc. 839,746 |

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending September 9th and year from January 1st:

|                          | 1893.   |            | 1892.      |
|--------------------------|---------|------------|------------|
|                          | Week.   | Year.      | Year.      |
| Shipped East and North:  |         |            |            |
| Phila. & Erie R. R.....  | 891     | 38,883     | 58,601     |
| Cumberland, Md.....      | 74,644  | 2,807,599  | 2,576,617  |
| Barclay, Pa.....         | 415     | 37,314     | 37,278     |
| Broad Top, Pa.....       | 7,914   | 437,143    | 410,097    |
| Clearfield, Pa.....      | 56,746  | 2,721,104  | 2,717,987  |
| Allegheny, Pa.....       | 16,581  | 859,961    | 879,412    |
| Beach Creek, Pa.....     | 48,041  | 2,005,066  | 1,683,671  |
| Pocahontas Flat Top..... | 36,405  | 1,894,378  | 1,666,046  |
| Kanawha, W. Va.....      | 48,742  | 2,243,895  | 1,669,925  |
| Totals.....              | 290,378 | 13,065,346 | 11,669,631 |
| Shipped West:            |         |            |            |
| Pittsburg, Pa.....       | 15,895  | 849,452    | 881,992    |
| Westmoreland, Pa.....    | 31,754  | 1,352,207  | 1,163,846  |
| Monongahela, Pa.....     | 8,619   | 479,206    | 499,292    |
| Totals.....              | 56,268  | 2,680,865  | 2,485,130  |
| Grand totals.....        | 346,646 | 15,746,211 | 14,154,761 |

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending September 9th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 27,420 tons; year 3,174,253 tons; to corresponding date in 1892, 3,717,327 tons.

**Anthracite.**

The anthracite coal trade is to-day in a better condition than for many months past. The general improvement of business throughout the country is being reflected to an encouraging degree in this market and the outlook is good for a better business in the near future. Producers seem firmly determined to adhere strictly to the July circular prices, and the restriction of production is also being less closely followed up. There has been less disinclination to buy at the higher rates, and most, if not all, of the business done during the current week was at the July prices. We hear, however, of an Eastern firm which purchased 25,000 tons of anthracite at an advance. Altogether, this state of affairs did not exist a fortnight ago. Consumers are inquiring more freely, although the demand as yet has no "rushing" elements to it.

It must be borne in mind, however, that the general lack of confidence will not be wholly eradicated as quickly as optimistic observers of the time would fain have us believe. The policy of hand-to-mouth buying will probably continue to be followed by consumers for some months yet, and, in view of the outstanding accounts and other after effects of the financial crisis which we have just undergone, must be taken into consideration by sellers. The operators must act wisely, not only during the next fortnight but during the entire coming season, especially should they find that coal is not selling as freely as they now anticipate.

At last week's meeting of the independent operators and the Lehigh Valley the latter asked the operators to take some of the company's 5% bonds in lieu of cash for the coal, or otherwise it should feel obliged to cancel the existing agreement which is that until October 1st, pending negotiations for a continued purchase of the operators' coal, the company will take coal on the old term of 60% of the tidewater price.

At the Bethlehem meeting this week practically nothing further was done, and the case remains "in statu quo"—that is, until October 1st. It is hoped and expected by both the operators and the company that a final agreement will be reached before that date.

The Lehigh Valley Railroad Company passed its quarterly dividend last Tuesday. This action is deemed a wise one; it will make the company financially stronger, for it obviates the necessity of having to issue bonds at this time.

The Reading official circular rates, subject to the usual commissions, are as follows, f. o. h. at its New York harbor shipping ports:

|                         | Broken. | Egg.   | Stove. | Chestnut. |
|-------------------------|---------|--------|--------|-----------|
| Hard white ash.....     | \$4.00  | \$4.25 | \$4.00 | \$4.00    |
| Free white ash.....     | 3.90    | 4.15   | 4.00   | 4.00      |
| Shamokin.....           | 4.50    | 4.80   | 4.60   | 4.60      |
| Schuylkill red ash..... | 4.50    | 4.95   | 4.75   | 4.75      |
| Lykens Valley.....      | 5.00    | 5.80   | 6.20   | 4.45      |

Pea, \$2.50@2.75; No. 1 Buckwheat, \$1.75@2; No. 2 Buckwheat, \$1.50.

**NOTES OF THE WEEK.**

The following is from the Philadelphia "Press" of September 14th: During the month of August, 1893, 73,459 tons of the coal of Coxie Brothers & Co. were transported over the Reading Railroad. The notice of the termination of the hitherto existing rules for the division of the freight rate on this coal took effect August 16th. In the first half of the month 37,085

tons were carried under the old division rates, and in the last half of the month 36,374 tons were carried under the new division. The business of the month netted the Reading Railroad Company \$15,979 more than it would have done under the old division. Messrs. Coxie Brothers & Co. have protested against the change.

We are advised from Stroudsburg, Pa., that the new extension of the New York, Susquehanna & Western Railroad, from Stroudsburg to Wilkes-Barre, is to be opened for coal traffic the latter part of this month. It has passed from the hands of the contractors to the company, and the number of workmen has been reduced one-half. The Susquehanna has a number of collieries near Scranton, and has sent the coal to its line at Stroudsburg over the Delaware, Lackawanna & Western Railroad.

The referee's report in the action brought by William L. Lance, to the use of Thomas A. Gummy and the Fidelity Trust and Safe Deposit Company, against the Lehigh & Wilkes-Barre Coal Company, was filed in the Common Pleas Court at Philadelphia, Pa., September 13th. The amount in suit was \$264,010. Mr. Lance owns certain coal mines in Plymouth Township, Luzerne County, Pa., for which the defendants hold a lease. The action was brought to recover from the company certain amounts alleged to be due as royalties for specified grades of coal taken from the mine and for waste coal from the breakers. The referee decides in favor of the defendants.

**Bituminous.**

The bituminous coal market shows some improvement. There is an increasing activity in the trade, and the mining regions are in a fair condition. Many of the mills have gone to work again, and those which have not yet done so are generally ordering supplies of coal in anticipation of the resumption of operations. This, in addition to the demand from shoal water ports, and the lack of stocks at shipping points, will probably bring about a better state of affairs in the market before long.

The car supply remains good on all roads, and transportation from mines to destination is also good. The combination of vessel owners, captains and brokers continues to maintain the rates of freight which it names as their minimum rates. The supply of vessels at all ports is practically equal to the demand. Rates are firm, and are as follows from Philadelphia: To Boston, Salem and Portland, 75c.; Providence, New Bedford, New Haven and Bridgeport, 65c@70c.; Newburyport, 60c.; Bath and Bangor, 75c@80c.; Gardiner, 80c., alongside and towage. From Baltimore, Norfolk and Newport News the rates are 10c. above the preceding figures.

We understand that a delegation of soft coal miners from the various districts will shortly appear before the Ways and Means Committee of the House of Representatives to petition against a reduction of the present duty on coal.

**NOTE OF THE WORK.**

The trouble between miners and operators in the Clearfield region is at an end, the miners agreeing to accept monthly pay as long as the present stringency lasts. A number of mines that were closed started work on the 14th inst.

**Boston.**

Sept. 14.

(From our Special Correspondent.)

The policy of anthracite buyers seems to be to wait and see what the developments will be among the companies, especially to see whether or no prices are to be maintained. So far the net circular has been well lived up to, but it is not long since the meeting at which the new price was fixed was held. Outside individual operators are willing to shade considerably on circular prices to secure business. The reduction offered in the latter coals are from 10 to 15c. of circular rates.

Trade is of but moderate proportions in bituminous coals. The demand, however, is only from those mills that really need the coal immediately. The really heavy buying will not commence until next month. The following prices on cars are quoted here: Cumberland, \$3.65; New River and Pocahontas, \$3.55, and Clearfield, \$3.35.

The combination continues to maintain freight rates. From New York higher rates are asked. About all the charters placed of late have been at 60c.; from Philadelphia, 75c.; from Baltimore, 85c.; from Newport News and Norfolk, 75c.; to Sound ports, 65c. In a retail way trade is very good, as consumers are now laying in their winter stocks. Prices remain unchanged.

**Buffalo.**

Sept. 14.

(From our Special Correspondent.)

Business is picking up a little in the anthracite and bituminous coal trade. The general disposition is only to purchase for immediate requirements. Tugs and propellers are still small buyers, and manufacturers have not fully resumed. That a revival of industrial activity has set in there is no doubt, and if continued the wheels of commerce will soon be in full action again. Money is easy and confidence is being gradually restored.

Lake freighting is more active, but no change has taken place in rates. The continued small charges for carrying coal westward by the water channel is anything but satisfactory to the vessel

interests, but many owners think it better to have their craft on the water than laid up in ordinary.

The scheme of building a breakwater from 2½ to 3 miles in length from Stony Point, on the lake shore, in this city, to connect with the Government breakwater here has taken a new start. Agents have been sent to England to interest capitalists therein and the result of their visit may be expected before long.

The shipments of coal westward by lake from Buffalo from September 3d to September 9th, both days inclusive, aggregated 73,275 net tons, distributed as follows: 34,800 to Chicago, 18,550 to Milwaukee, 4,100 to Duluth, 6,150 to Toledo, 875 to Detroit, 4,000 to Superior, 600 to Green Bay, 1,200 to Lake Linden, 700 to Manistique, 1,500 to Gladstone, 600 to Escanaba and 200 to Alpena. The rates of freight were 20c. to Duluth, Superior and Gladstone; 25c. to Alpena, and 30c. to Chicago, Milwaukee, Toledo, Green Bay, Detroit and Manitowoc.

**Chicago.**

Sept. 14.

(From our Special Correspondent.)

The strong efforts being made by the majority of the shippers' agents to maintain prices on anthracite coal, mentioned last week, are bearing fruit. It must be confessed that the anthracite coal trade in all its branches is very dull, but at the same time the business has come down to a sounder basis and long credits are being abolished. Stocks on hand are large and have been all summer, as sales so far have been light, but under ordinary conditions they should and would have been greatly reduced and replenished by lake, but now there is little chance for that, as there will be no active movement until later in the month. Some shippers are of the opinion that October will be well along before there is any real activity. Demand, considering the time of the year, is surprisingly high and can be accounted for in one way only—reluctance of consumers to place orders, as coal now means cash, and they hate to part with it. The result is that dealers are very largely making hand to mouth purchases. Local retail trade continues quiet as reported by dealers, and a recent trip made by one of the shippers to all the larger yards this week confirms the report. But most of this business is now filled at \$7.25 delivered to consumer.

Circular prices are at the following rates: Lehigh lump, \$6.25; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$6.75@7; small egg, range and chestnut, \$7@7.25.

Bituminous coal is still superabundant here and spot coal in 5 or 10 to 20 car lots can be picked up very cheap. This, however, does not apply to all grades, only the cheaper kinds of soft coal produced in Indiana and Illinois. There is a moderately fair demand from the country trade, and business in various manufacturing and milling industries is quietly but steadily increasing. Some of the trunk lines have also, within the week, largely increased their orders on contracts placed earlier in the season, and several of them are now taking their maximum number of cars daily, especially those having Northwest connections. The recent advances in Indiana block and Illinois best lump coal has had the effect of curtailing country business, but as operators are a unit in uniformity of quotations the reluctance to place orders is wearing off and there is already some reaction.

Hocking is in fair demand and the circular is well maintained here and throughout the Northwest, but in the southern part of the State some cutting is noticed by an operator who evidently is on the inside track. The bituminous coal market is in a sound, and healthy condition with promise of much prosperity before it. Prices of bituminous per ton of 2,000 lbs. f. o. b. Chicago, are: Pittsburg, \$3.35; Hocking Valley, \$3.10; Youghiogheny, \$3.25; Illinois lump, \$2.70; Brazil block, \$2.75.

Coke is in fair demand, but the improvement is not marked. Crushed Connellsville for domestic consumption is in better inquiry from the country and the outlook very promising for an increased tonnage. Quotations are: \$4.10 furnace; \$4.35@ \$4.40 foundry, crushed; \$4.50 Connellsville. West Virginia: \$3.90 furnace, \$4.10 foundry; New River Foundry, \$4.40; Walston, \$4.10 furnace, \$4.35 foundry.

**Pittsburg.**

Sept. 13.

(From our Special Correspondent.)

Coal.—Trade is at a standstill; the small shipment that left about 10 days ago succeeded in reaching its destination. Prices are unchanged, with a very light local demand. The railroad coal miners are on strike against a reduction of 5c. a ton for mining. About 4,000 men are now out and about a dozen pits in the Pittsburg district are temporarily closed. The men feel that 79c. a ton is a low enough rate for mining, and propose to make a determined fight against the 74c. rate ordered by the operators. The river miners are taking an active interest in the strike, since if the rates were lowered the river operators would insist on a reduction equivalent to that in railroad mines. The river miners, however, are all idle for the want of empties to load.

Connellsville Coke.—The firing up of so many ovens has improved the outlook in the coke regions very materially. Preparations are still going on at various plants for starting. The operations and output of the region for the week shows 3,600 ovens in blast and about 14,000 idle, with an estimated pro

duction of about 30,000 tons—but little change from the previous week. The shipments were consigned as follows: To Pittsburg and river tipples, 593 cars; to points west of Pittsburg, 612 cars; to points east of Connellsville, 492 cars; total, 1,607 cars. The present rates for the various kinds are: Furnace coke, f. o. b. cars at ovens, \$1.35 per ton; Foundry coke, f. o. b. cars at ovens, \$1.65 per ton; Crushed coke f. o. b. cars at ovens, \$1.75 per ton. Add 70c. per ton, and you have the price of coke delivered at Pittsburg.

### IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 15, 1893.

#### Pig Iron Production.

| Fuel used.  | Week ending     |                 | From Sept. 15, 1892. | From Jan., '92. | From Jan., '93. |
|-------------|-----------------|-----------------|----------------------|-----------------|-----------------|
|             | Sept. 15, 1892. | Sept. 15, 1893. |                      |                 |                 |
| Anthracite. | 67              | 28,937          | 51                   | 23,679          | 1,261,558       |
| Coke.       | 131             | 118,659         | 85                   | 80,637          | 4,886,682       |
| Charcoal.   | 41              | 8,926           | 34                   | 5,634           | 385,297         |
| Totals.     | 239             | 156,522         | 170                  | 110,000         | 6,533,537       |
|             |                 |                 |                      |                 | 5,966,334       |

**Pig Iron.**—There is nothing new to report of the pig iron market this week. The main features continue as last reported. With the increasing confidence in business, more activity is being displayed in iron-consuming works, and the volume of business shows an increase, but a general improvement has by no means taken place, and the outlook for the near future is not particularly encouraging. It is more than likely that consumers for some months to come will persist in their determination to purchase supplies only as their immediate wants require. An improvement in prices seems remote at this writing, and reports of offers of pig iron at low figures have been numerous during the past week.

There is a lack of firmness on this point that fully offsets any beneficial effect which the greater volume of business might have had upon the market. Still, a more hopeful feeling prevails among dealers, which, however, seems based upon the belief that as every dog has his day the iron market will have one too. The tidewater prices of the Thomas Iron Company on the new basis are as follows: No. 1, \$14.50 per ton; No. 2, \$13.50; No. 3 or No. 2 plain, \$12.75. For regular brands we quote as follows: Northern brands; No. 1, \$14@14.50; No. 2, \$12.50; gray forge, \$12. For Southern iron we quote: No. 1, \$13.25@14; No. 2 F., \$12@13; No. 1 soft F., \$12@13; gray forge, \$11.75@12—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglintou, \$19.50@20; Summerlee, \$20.

**Billets and Rods.**—There is nothing of interest to report of this market, which continues dull. Low prices prevail. We quote: Steel billets, tidewater, \$22.50@23.75; foreign, \$27.75@28.50; wire rods, \$30@31; foreign, \$30@40.50.

**Manufactured Iron and Steel.**—Some improvement is noted in the market, although actual business does not show much of an increase. Some sales are reported, but we do not bear of any single large transaction in this market. We quote: Angles, 1.75@1.9c.; axles, scrap, 1.80@2.10c.; delivered; steel, 1.75@2c.; bars, common, 1.45@1.60c.; refined, 1.60@1.85c. on dock; beams, up to 15 in., 1.70@2c.; 20 in., 2.10@2.30c.; car truck channels, 2@2.10c.; channels, 1.90@2c. on dock; steel hoops, 1.8@1.9c.; delivered; links and pins, 1.70@1.80c.; plates, flange, 2@2.10c.; firebox, 2.5@2.8c.; flange, 2.10@2.25c.; marine, 2.50@2.75c.; sheared, 1.85@2.10c.; shell, 1.85@2.10c.; tank, 1.75@1.90c.; universal mill, 1.75@1.90c.; tees, 1.85@2.05c., all on dock.

**Merchant Steel.**—Nothing new or interesting can be reported of this market, excepting that several plants which, for some reason or other, had closed down have resumed operations. Quotations are: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.60@1.70; open hearth machinery, \$2.25@2.30; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

**Old Material.**—There is nothing doing in this market. Quotations are nominally as follows: Old iron rails \$15@15.40; steel rails, \$12@12.75; car wheels, \$11.50@13.50.

**Rail Fastenings.**—The market for rail fastenings is dead. Quotations remain: Fish and angle plates, \$15@15.80 at mill; spikes, 1.80@1.90c.; bolts and square nuts, 2.45@2.50c.; hexagonal nuts, 2.55@2.60c., delivered.

**Spiegelisen and Ferromanganese.**—There is absolutely nothing doing in either ferro or spiegel. Quotations are nominally as follows: 10 to 12% Spiegel, \$22@22.50; 20% \$25@25.50. Ferro, \$56@57.

**Steel Rails.**—We do not hear of any business in this market. Reports from the various mills are anything but encouraging, and the future just now seems as gloomy as the present. Quotations are unchanged at \$29 mill or tidewater. Girder rails, \$31@33.

**Tubes and Pipe.**—Business in tubes and pipes is very dull. Ruling discounts on carload lots are as follows: Butt, black, 5%, 10 and 5%; butt, galvanized, 50, 10 and 5%; lap, black, 6%, 10 and 5%; lap, galvanized, 5%, 10 and 5%.

#### NOTE OF THE WEEK.

The Conference Committee of the Amalgamated Association will be reconvened at Pittsburg, Pa.,

September 18th, and the manufacturers will be met on that day. The committee will be empowered to accept the reduction of 10% in the guide and bar mills, the objection to which by the workmen caused the abrupt ending of negotiations over the scale. The manufacturers are willing to start the idle mills at the reduction, though the resumption in a number of them will not be entirely full. The prospect is that the conference Monday will adjust matters.

#### Buffalo.

Sept. 14.

(Special Report of Rogers, Brown & Co.)

Buyers of pig iron report on every hand that their business is fearfully dull, that there are very few signs of encouragement ahead; but instead of remaining idle they are beginning to melt and therefore buy iron, under protest, however. If foundries and mills could be run without iron the market would be weak. As it is, the demand is increasing rapidly and the market gaining in strength. We quote for cash f. o. b. cars Buffalo: No. 1X foundry strong coke iron, Lake Superior ore, \$13.75; No. 2 X foundry strong coke iron, Lake Superior ore, \$13.25; Ohio strong softener No. 1, \$14; Ohio strong softener No. 2, \$13.25; Jackson County silvery No. 1, \$16.50 @ \$17.30; Jackson County silvery No. 2, \$16.00 @ \$16.80; Lake Superior charcoal, \$16; Tennessee charcoal, \$16; Southern soft No. 1, \$13.15; Alabama car wheel, \$18; Hanging Rock charcoal, \$20.50.

#### Chicago.

Sept. 14.

(From our Special Correspondent.)

Apparently the tide appears to have turned in the iron, steel and closely allied trades, but the improvement is more noticeable in the East than it is here. Still it must be said there is some betterment here, both in pig iron and the finished material. Orders, though small, are coming in more freely, and there is very fair inquiry as to prices. Specifications on contracts recently placed with steel mills are beginning to come forward from factories which are now starting up, after their prolonged shutdown. While these are not large they show a marked improvement over the business lethargy of the past few months.

**Pig Iron.**—There is more inquiry for iron, and though the tonnage asked for is small it is well distributed over the territory supplied from this point. Local coke iron so far as regards actual transactions shows but slight improvement over the previous week, but there is evidently a better feeling among manufacturers, foundrymen and other consumers. Indications point to a greater degree of activity within the month, as inquiry shows that more work has been given out requiring a fair amount of iron. Several lots of 200 to 400 tons have been placed during the week, but most of the orders are for one or two carloads up to 100 tons. Two large deals were consummated for Southern iron—foundry and forge iron—the amount aggregating 7,500 tons; deliveries are scattered over twelve months. Ordinary smelters are buying in small quantities until business improves. Lake Superior coke iron is still quite dull. Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.00@16.50; Lake Superior coke, No. 1, \$13.50@13.75; No. 2, \$12.75@13.25; No. 3, \$12.25@12.50; Lake Superior Bessemer, \$14.00; Lake Superior Scotch, \$14.50@15; American Scotch, \$15.50@16.00; Southern coke, foundry, No. 1, \$14.00; No. 2, \$12.35; No. 3, \$12.00; Southern coke soft, No. 1, \$12.50; No. 2, \$12.00; Ohio silveries, No. 1, \$16.50; No. 2, \$16.00; Ohio strong softeners, No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal, No. 1, \$16.50; No. 2, \$16.00; Southern standard car wheel, \$18.50@18.75.

**Structural Iron and Steel.**—Architectural iron of every description is in very light demand. Some mill agents report a moderate activity in bridge plates and similar material. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$1.75@1.85; tees, \$1.95@2.05; universal plates, \$1.75@1.85; sheared plates, 75c.@1.85; beams and channels, \$1.80@1.90.

**Plates.**—Quite a little improved demand is quoted for plates and tank steel from warehouse and mill. A very fair movement of tubes is also reported. Steel sheets, 10 to 14, \$2.25@2.35; iron sheets, 10 to 14, \$2.20@2.30; tank steel, \$1.90@2; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.25; flange steel, \$2.74@3; boiler rivets, \$4@4.15; boiler tubes, all sizes, 65%.

**Merchant Steel.**—In the department of soft steels there is no falling off, and in several specialties increased tonnage is noted. A few of the large contracts placed last week aggregated nearly 10,000 tons, and others are pending which will close soon. Quotations are: Tool steel, 6.50@6.75c. and upward; tire steel, 2@2.10c.; toe calks, 2.20@2.30c.; Bessemer machinery, 2.10@2.20c.; Bessemer bars, 1.80@2c.; open hearth machinery, 2.20c.; open hearth carriage spring, 2.10@2.20c.; crucible spring, 3.75@4c.

**Galvanized Sheet Iron.**—Shows a steady increase in the volume of business both from mill and warehouse and the outlook promising for its continuance. Discounts are unchanged at 70, 10 and 5% off on Juniata and 70, 10 and 10% off on charcoal, and jobbing quantities at 70 and 7 1/2% off on the former and 70 and 10% off on the latter.

**Black Sheet Iron.**—Mill agents state that orders are scarce. Jobbers and large dealers report a reasonable degree of activity from the retail country trade. Mill price is 2.85c. Chicago for No. 27 common and 2.90@2.95c. for steel. Jobbers quote 3c. for iron and 3.10@3.15c. for steel, same gauge.

**Bar Iron.**—There is a decided and distinct improvement in the demand for large as well as small lots of bar iron, and prices are certainly steadier at 1.45@1.50c., as manufacturers have in nearly every instance refused to absorb the difference in freight, 13c. to 15c.—2c. per 100 lbs. Business from warehouse is improving at 1.70@1.80c. for iron and steel.

**Nails.**—In steel cut nails business is fair, inquiry on the increase and mill purchases are more free at \$1.20 and \$1.35 from jobbers. Wire nails are rather more active, though price is still a little irregular at \$1.50@1.55. Jobbing demand is very fair at \$1.55@1.60 in less than carloads.

**Steel Rails.**—Officials of the steel mills here state that orders of any moment or worthy of mention are rare and they look for no improvement until the tariff question is settled. Quotations are \$30@31. Track repair material is dull.

**Scrap.**—There is little doing locally, but some inquiry is noted from mills outside the State. Prices are merely nominal. Railroad, \$12.50; No. 1 forge, \$11.50; No. 1 mill, \$9.00; fish plates, \$13.50; cast borings, \$5.00; wrought turnings, \$7.50; axle turnings, \$9.25; machinery castings, \$9; stove plates, \$6.50; mixed steel, \$9; coil steel, \$15; leaf steel, \$15; tires, \$14.50.

**Old Material.**—No transactions in iron rails and a nominal price would be \$14.50. Steel rails are very dull at \$9@11.50, according to condition, etc. A sale of four carloads of car wheels, about 80 tons, was made at \$10, an unprecedentedly low price.

#### Philadelphia.

Sept. 15.

(From our Special Correspondent.)

**Pig Iron.**—Brokers and makers are trying without success to talk up the market. There is no real improvement. While anthracite stocks are not burdensome, others are, and the fact depresses the market. Southern iron continues to be offered at low prices, but it does not sell. No. 1 standard is \$14.50 and No. 2 \$13.75@14; forge \$12.75.

**Steel Billets.**—The wild efforts of Western makers to force stocks on the market on any terms has further demoralized prices. It is said to-day that Western steel has been sold here for delivery in 30 days at \$22.

**Muck Bars.**—This drop knocks out muck bars, and the chances are against any business for two or three weeks.

**Merchant Iron.**—There is more iron selling and more inquiry, but it is not correct to report the market stronger. Common iron is going at 1.45@1.50.

**Nails.**—Trade is bad, prices weak, and the spirit of organization is lacking.

**Skelp.**—Two fair orders were booked this week at prices not to be had for publication.

**Pipes and Tubes.**—Large orders for tubes are placed at shaded figures. Two or three large buyers are putting in supplies.

**Merchant Steel.**—All consumers are looking around, and manufacturers are in quite a hopeful mood for early business.

**Sheet Iron.**—Not so much can be said for sheet iron. Expected buyers are still waiting. Manufacturers persist in saying consumers' requirements must be very large before winter and that present conditions are no sign of what the market will be in a few weeks.

**Plate and Tank.**—It is not easy to draw out a favorable expression. With very few exceptions, all mills are at work, but the half-time output does not meet the expectations of employers or workmen. Tank steel orders were taken to-day at 1.60; shell at 1.75.

**Structural Material.**—Small orders for stores and structures of one kind or another are on the increase. Builders are pushing work, though no large orders are coming along. Beams were quoted on an inquiry yesterday at 1.75.

**Steel Rails.**—After considerable negotiating Pennsylvania mills will have a chance in a week or two at a large order, it is said, which will be divided up among three mills. Standard sections are \$29.

**Old Rails.**—The asking price is \$16. Sheet rails, \$18. A good deal of stock is being offered.

**Scrap.**—No. 1 wrought is plenty at \$13; cast borings, \$7.

#### Pittsburg.

Sept. 13.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The outlook shows signs of improvement. The demand for certain descriptions of raw material is larger. Many of the mills that started since the first of the month are still in operation, and from present indications will continue for some time at least; how long will depend on circumstances. Their stock of pig iron and billets on hand being limited will soon be consumed, and should business justify mills will purchase fresh supplies and continue in operation. This will increase the demand for pig iron and may have a possible effect on values.

Some manufacturers report a slight increase in the volume of business during the week, the requests being for the usual small lots for immediate wants. In view of the tightness of money and unsatisfactory prices, purchases have been made sparingly to cover contracts on hand; and even when the furnaces have orders taken some time back



**St. Louis Lead Market**—The John Wahl Commission Company telegraph us as follows: Lead, on account of increased offerings from various channels, has shown material signs of top heaviness in the last few days, and prices have declined from 372½c. to 367½c., and at the decline there are more sellers than buyers.

**Spelter**, too, is firmer, for the demand for consumption here has again shown considerable life, and more than offsets the cessation in export sales. Producers are not at all anxious to sell at present values of 370 New York and 340 East St. Louis, anticipating better prices in the near future.

The foreign market closes at £17 7s. 6d., or 2s. 6d. higher than a week ago.

**Antimony** is the slowest of all to recover, but again shows signs of life, the demand having improved somewhat. Cookson's we quote 10¼, L. X at 10, and Hallett's at 9 7/8.

**Quicksilver**—This market continues quiet. Prices this week are as follows: London, £6 10s. New York, \$38.

**Nickel** is quiescent.

### CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Sept. 15.

**Heavy Chemicals**.—Last week's review of the heavy chemical market might stand as then written, for there has been no change worthy of mention during the present week. With the resumption of operations at various glass works and the returning to confidence in business throughout the country the prospects of normal activity in heavy chemicals is good. Business in this line continues to improve slowly. There has been some ordering forward of supplies on old contracts, but strictly new business has been small. Prices are as quoted last week, although there has been a number of re-sales at low figures, which, however, cannot be taken as indicative of actual market values.

Quotations are unchanged nominally as follows: Caustic soda, 60%, 3'05@3'20c.; 70%, 2'80@3c.; 74%, 2'82½@3'05c.; 76%, 3@3'10c. Carbonated soda ash, 48%, 1'25@1'50c.; 58%, 1'15@1'25c. Alkali, 48%, \$1.15@1.20; 58%, \$1.10@1.20, according to package. Sal soda, English, 1'10c.; American, 1@1'10c. Bleaching powder, 2'25@2'50c.

**Acids**.—There is very little of interest to say of the acid market in general. A better demand is reported for muriatic and sulphuric and there has been a fair business in the latter. Prices are without marked change and we quote as follows: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.87½; in carboys, \$2.25; muriatic, 18°, 90c.@1.10; 20°, \$1@1.25; 22°, \$1.10@1.35; nitric, 40°, \$1; 42°, \$1.50@1.75; sulphuric, 80c.@1.15. Mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.50 to \$3.75; glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

**Brimstone**.—No business is reported in this market. It is as dull and featureless as it can be. Prices are unchanged from last week, and are as follows: Best unmixed seconds, \$17.25; best thirds, \$16.25. Spot is nominally from 50 to 75c. higher than futures.

**Fertilizing Chemicals**.—There is a better feeling in this market, and a greater inquiry for goods for future delivery has been experienced during the week. The fall trade is about to set in, and buyers are commencing to look ahead for their supplies. As yet the actual business has been small. Some sales of ammoniates at current prices are reported, but sellers' views seem to be above buyers' in the matter of values for future deliveries.

Quotations are: Sulphate of ammonia, gas liquor, \$3.30@3.35; bone, \$3.05. Dried blood, \$2.07½@2.12 per unit for high grade, and \$1.95@2 for low grade; azotine, \$2.15@2.20. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P<sub>2</sub>O<sub>5</sub> 60c. per unit at seller's works in bulk. Dissolved bone-black, 17% to 18%, P<sub>2</sub>O<sub>5</sub> 92@95c. per unit. Acidulated fish scrap, no stocks on hand; dried scrap is quoted at \$25 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$24.50@25.50; low grade, \$22@23. Bone tankage, \$22@24; bone meal, \$24@25.50.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14½; Charleston and Savannah, \$1.17 cwt., basis 48@50%, in 50-ton lots on foreign weights and analyses. Sulphate of potash, 90%-96%, basis 90%; New York and Boston, \$2.07; Philadelphia, \$2.09½; Charleston and Savannah, \$2.127, sulphate of potash, 96-98%, basis 90%, is 4% higher.

**Phosphates**.—Quotations for high grade land rock, f. o. b. Charleston are \$4.50@4.75. Freighters are \$2.25.

**Muriate of Potash**.—No business is reported in this market. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.78; Philadelphia, \$1.80½; Southern ports, \$1.83. During the past week there were no arrivals.

**Kainit**.—Practically nothing is doing in kainit. Quotations for shipments are as follows: New York, Philadelphia and Boston, \$9 for foreign, invoice weight and test, and \$9.25 for actual weight; Charleston, Savannah and Wilmington, \$9.75 for invoice weight and test, and \$10 for actual weight.

**Nitrate of Soda**.—There is a better feeling in this market, and nitrate is higher and firmer, holders now asking \$1.75 for goods on the spot.

### Liverpool.

Sept. 5.

(Special Correspondence of Joseph P. Brunner & Co.) There are still no signs of an abatement of the coal strike, and the inconvenience, owing to the short supplies of fuel, is seriously felt by manufacturers. The curtailment of production in this country is very considerable and every day makes the position more serious for manufacturers.

Soda ash still rules very quiet; and with ample stocks coupled with light demand, prices are quite nominal.

For Leblanc makes quotations are unreliable, varying according to make, quantity, destination, etc., and range below is quite nominal, viz.: Caustic ash, 48%, £4 10s.@£5 per ton; 57%, 58%, £5 10s.@£5 15s. per ton. Carbonate ash, 48%, £4 15s.@£5 per ton; 58%, £5 5s.@£5 15s. per ton, net cash.

Ammonia ash, 58%, is slow of sale at nominally £4 7s. 6d.@£4 10s. per ton, less 2½%, while bids are solicited.

Soda crystals, owing to scarcity, have again been advanced 5s. per ton and are now quoted at £3 5s.@£3 7s. 6d. per ton, less 5%.

Caustic soda is very firm, the plant being stopped and stocks at works decreasing. Quotations vary considerably according to export market, and the nearest spot range is as follows: 60%, £8 10s.@£9 5s. per ton; 70%, £9 10s.@£10 5s. per ton; 74%, £10 10s.@£11 5s. per ton; 76%, £12@£12 5s. per ton, net cash. For parcels under 10 tons, 5s. per ton extra is charged.

Bleaching powder is quiet, and, although makers are firm at £9@£9 5s. per ton net cash for hardwood packages, resale parcels are offered at less money and it is not easy to find buyers.

Chlorate of potash is in request principally for Japan, and prices continue to stiffen. We quote: Prompt, 8½d.@9d.; September, 8½d.@8½d.; October, 7½d.@8d. The Alkali Company having made fair progress with sales of chlorate of potash over 1894, are for the present declining to go on for the delivery stated, preferring to hold off for the time being. The position is certainly firmer for 1894 delivery, and 7d. is nearest value for most quarters and 7½d. for United States orders.

Bicarb. soda is in good request and firm at £7 per ton for 1 cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia, although still scarce, is off a little, and £15@£15 5s. per ton, less 2½%, may be quoted as nominal spot range for good gray, 24-25% in double bags f. o. b. here. Nitrate of soda quietly steady at £9 10s. per ton, less 2½%, for double bags f. o. b. here. Carb. ammonia lump 3½d. per lb. Powdered, 3½d. per lb., less 2½%.

### NOTE OF THE WEEK.

A personal item in our number for August 28th was so worded that a false impression might be given in relation to the well known firm of Couper, Millar & Company—now Couper & Company—of London. The partnership was dissolved as of June 30th, by mutual consent, but the old business was and is continued without interruption by Mr. W. G. Couper under the style of Couper & Company, he retaining the old offices, and the books and accounts of the firm. Mr. Millar, as then noted, continues his connection with the Florida Phosphate Company.

### MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 308, 309 and 310.]

NEW YORK, Friday Evening, Sept. 15.

The course of the mining stock market during the week under review has been identical with that which has been reporting every week for a year past. The dullness is excessive. The market, or at least what goes under that name, is altogether of a negative nature: No business, no interest, no buyers, no sellers, and, as an epigrammatic broker said to day, "no nothing."

The Comstocks have been neglected. The only sales this week were 100 shares of Ophir at 90c., 100 shares of Sierra Nevada at 50c., and 500 shares of Comstock Tunnel stock at 5c.

The only California stock traded in during the week was Brunswick Consolidated, of which 500 shares changed hands at 2@4c.

Leadville Consolidated was in fair demand, 1,500 shares being sold at 12c.

Of Horn Silver the total transactions this week aggregated 525 shares at \$2.60. The Horn Silver Mining Company has declared dividend No. 31 of 12½c. per share, \$50,000, payable September 30th. Transfer books close on Thursday, September 21st and reopen on October 2d. This makes a total of \$4,830,000 which this company has declared in dividends.

Ontario this week shows sales of 150 shares at \$7.50@8.

Phoenix, of Arizona, was the most popular stock this week. Total sales amounted to 1,700 shares (re-organization certificates) at 45@60c.

There was a solitary sale of 100 shares of El Cristo at 15c.

### NOTES OF THE WEEK.

Michigan Copper Output.—The reports of a number of the companies show outputs as follows for

the month of August: Atlantic, 253 tons, against 236 in July; Franklin, 181 tons, against 175½ in July; Quincy, 742 tons, against 738 in July; Wolverine, 77 tons.

**English Coal Strike**.—A London dispatch of September 14th says that the miners of Yorkshire and Lancashire have voted unanimously against accepting a reduction of wages and against submitting the dispute with their employers to arbitration. A small minority was in favor of resuming work at the old rates, pending a settlement of the question of wages.

**Calumet & Hecla Mining Co.**—Mining has been resumed in the Red Jacket perpendicular shaft. This shaft has been closed down since the accident of several months ago, when 10 miners were dashed to pieces by the mistake of the engineer in reading the indicator. The water was pumped out of the shaft last week, and sinking has now begun. The total depth of the shaft will be 5,500 ft.

**Standard Oil Company**.—A meeting of certificate holders was held in New York, September 13th, to hear the report of the trustees appointed to close the affairs of the present trust. The trustees advised the cancellation of the certificates and the issue instead of securities against the companies forming the old trust. The report was adopted. The capitalization of the new companies after all the details are completed will be \$10,000,000. The old trust had a capital of \$97,250,000. The number of companies now operated by the trust is 20. Originally there were about 70 different concerns. Mr. George Rice presented some questions on which no action was taken. The report presented was not made public, nor were any of the details of the proposed new organization given out.

The following companies report having had balances on hand September 1st, 1893, with the expenses for August unpaid: Andes, \$9,703; Alta, \$328, with \$19,173 due from C. Derby, the late treasurer of the company; Alpha Consolidated, \$1,901; Bullion, \$15,837; Best & Belcher, \$9,908; Bodie Consolidated, \$8,722; Caledonia, \$8,507; Challenge Consolidated, \$1,086; Consolidated Imperial, \$1,579; Consolidated New York, \$1,026; Consolidated California & Virginia, \$42,615 in cash and bullion of the assay value \$31,196, with further shipments to arrive; Crown Point, \$4,400; Exchequer, \$880; Gould & Curry, \$7,097; Hale & Norcross, \$1,221; Independence, \$41; Justice, \$505; Lady Washington, \$94, with \$4,577 due from C. Derby, late treasurer of the company; Mexican, \$20,557; Mono, \$5,037; Nevada Queen, \$518; Navajo, \$1,702; Obpir, \$2,932; Occidental Consolidated, \$1,348; Seg. Belcher, \$1,294; Sierra Nevada, \$5,263; Savage, \$11,730; Silver Hill, \$182; Standard Consolidated, \$24,917; Union Consolidated, \$7,280.

The following mining companies report having had an indebtedness September 1st, 1893, with the expenses for August unpaid: Belcher, \$13,853; Belle Isle, \$292; Bulwer Consolidated, \$2,777, with the company's mill about to be started on an accumulation of good ore; Chollar, \$4,742; Commonwealth, \$26,431; Confidence, \$2,535; Del Monte, \$25,086; Grand Prize, \$767; Kentuck Consolidated, \$2,755; North Belle Isle, \$3,888; Overman, \$3,388; Potosi, \$19,073; Silver King, \$8,057; Utah Consolidated, \$1,142.

The official reports of the Comstock companies, just received, make the following showings:

**Savage**.—On the 1,100 level we continue to extract ore of fair grade from the 14th to the 19th floors, are doing considerable prospecting work between this and the 950 level. During the week we have hoisted 24 cars of ore, shipped to the Nevada mill 210 tons. Car samples average \$28.11 per ton. Battery samples average \$21.48. Bullion yield for the week, \$3,157. Shipped to the United States mint at Carson, August 29th, 392 lbs. of crude bullion. We are re-timbering the shaft between the 750 and 800 levels.

**Hale & Norcross**.—On the 900 level west crosscut 1 from south drift was advanced 8 ft.; total length 70 ft.; face in porphyry; have also been digging a drain in the south drift. 1,300 level—Completed winze station during the week, and sunk the winze 8 ft. The bottom of the winze is all in ore of good quality; extracted 14 cars, average assay value \$38.80 per ton.

**Potosi**.—Last week there were extracted and sent to the mill 424 tons of ore from the 1,000 and 1,180 levels. Milled 992 tons, on hand. On hand at mill 133 tons. Average battery assays \$21.58, average car sample assays \$22.05. Shipped to the United States Mint at Carson 303 lbs. of crude bullion. The east crosscut on the 850 level is cutting quartz which gives low assays. It is likely that an upraise will soon be started to follow some of the streaks. The management has strong hopes of the 650 and 750 levels of the mine to the eastward.

Consolidated California & Virginia.—Surplus for August, \$14,000, over all expenses. Regular shipments of ore are being made to the Morgan Mill.

Boston. Sept. 14.

(From our Special Correspondent.)

There is a much better feeling in copper stocks and prices have advanced all along the line under the lead of the Montana stocks, in both of which there have been large transactions at improved figures. Boston & Montana, which closed last week at \$20, advanced to \$22½, with good buying, and

Butte & Boston sold up from \$6 1/4 to \$8 1/2. These stocks are getting to be favorites in the market and are said to be booked for higher figures.

There is also a good investment demand for both Calumet & Hecla and Tamarack. The former on small transactions advanced from \$250 to \$271, and the latter from \$139 to \$150, with reaction in the case of the Tamarack to \$145, while Calumet & Hecla holds the advance.

Quincy was also strong and shows a gain from \$100 to \$105 on small sales.

Oscoda also comes in for a small share of the improved feeling and advanced from \$25 1/2 to \$27 1/2. This stock is remarkably well held, the advance bringing out but very little stock.

Franklin was fairly strong, although the transactions were light, showing an advance from \$9 to \$11, with later sales at \$10 1/2. Centennial advanced from \$2 1/2 to \$3 1/2 on rumors that the company is to commence work again on the Oscoda lode, and that No. 7 shaft will be sunk at a point 500 ft. north of where the rich deposit was found in No. 6 shaft.

Kearsarge advanced to \$7 1/2; the last sale (Aug. 24) was \$5 1/2 for a lot of 24 shares, the improvement being due to the better condition of the market generally.

Atlantic sold at \$8, a gain of 1/4 only. Tamarack, Jr., advanced to \$18 on the better outlook for the mine. Wolverine sold this week, assessment paid, at \$1.50, which is an advance of 75c. from the lowest point. Allenz advanced 5c. to 40c. for 100 shares. There is nothing doing in silver stocks.

San Francisco.

SAN FRANCISCO, Sept. 15 (By Telegraph).—The opening quotations to-day are as follows: Best & Belcher, 50c.; Bodie, 15c.; Belle Isle, 10c.; Chollar, 20c.; Consolidated California & Virginia, \$1.25; Gould & Curry, 20c.; Hale & Norcross, 45c.; Mexican, 50c.; Mono, 10c.; Ophir, 80c.; Savage, 30c.; Sierra Nevada, 40c.; Union Consolidated, 30c.; Yellow Jacket, 45c.

London.

Sept. 7.

(From our Special Correspondent.)

The feeling on the Stock Exchange has been fairly good all week, though the volume of business still continues small and variable from day to day. American mining stocks have received rather more attention than during the preceding few weeks and one or two stocks are a trifle firmer. Elkhorns have

had more inquiry and they are pretty firmly held at fully a shilling higher than last week's prices. Jay Hawks have also been in better request and the price has steadily risen a few pence, which is quite as much as we can expect in these days of dullness. Montanas are still very low and the 6d. call of capital has not had much effect on prices either way. Altogether 19s. out of 20 have now been called up out of the capital of the reconstructed company and the present price is 2s. 6d. Holcomb Valley shares have been dealt in all week and buyers came forward readily in expectation of the result of the first clean-up since the new Bucyrus machine came into active work; the price of the shares did not rise above 1s., but was hard and unbreakable at that.

The Harqua Hala (Arizona) mine, whose stock has lately obtained a quotation on the exchange here, seems from all reports to have a good prospect, and private opinion is generally favorable to it. As regards the development by prospecting of the Harqua Hala property, we are informed that the section explored is chiefly in the fourth and fifth levels, and to some extent in the first level on the south end of the Discovery vein. In the drift above the first level, on the Discovery vein, the ore is of fair grade, averaging \$8 to \$10 per ton, and the value appears to be increasing. On the fourth level, a crosscut driven west has opened out a large body of ore, averaging \$14 to \$16. This ore body seems to be composed of the Discovery and Horse veins combined. The mill is being supplied with ore mined from the various veins of the mine.

As usual, Colonel MacLaughlin's reports from Golden Feather Channel mine in California deal with the difficulties of getting bowlders and rock debris cleared away from the gravel deposits. Late last autumn, just when the approach of winter put a stop to operations, he had got proper access to the gravel and promised that the gravel, which was reported to be of great richness, would be worked in the spring and shareholders might expect a dividend in summer. At the present time shareholders are being treated to another series of letters and telegrams. The terms of these messages are rather vague and complicated, but it would appear that the same things are happening as have been happening in his messages from year to year; that is, the winter storms have covered the gravel deposits with debris again, and so it is necessary to spend the rest of the summer and autumn in clearing the debris away again. Probably as winter sets in again the "rich deposits" will once more be ready

for working, and so on. At any rate, these reports serve the purpose of getting people to speculate in the stock, and quotations of fluctuations in prices appear pretty regularly in the official list.

DIVIDENDS.

Church Gold Mining Company paid dividend No. 2 of ten cents per share September 7th, at the office of the company, Room 4, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

Homestake Mining Company, dividend No. 182 of ten cents per share, \$12,500, payable September 25th at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York City. Transfer books close September 20th, and reopen September 26th.

Mercur Gold Mining and Milling Company paid dividend No. 1 of \$25,000 September 1st, at the office of the company, in Salt Lake City, Utah.

New York & Honduras Rosario Mining Company, dividend of twenty-five cents per share, payable September 21st, at the office of the company in New York City.

Pan American Mining and Milling Company paid dividend No. 1 of one-half cent per share September 1st, at the office of the company, Rooms 12 and 13, Union National Bank Building, Salt Lake City, Utah.

MEETINGS.

Bahama Mining Company, at the office of the company in Deadwood, S. Dak., September 22d, at 2 P. M.

Butte & Boston Mining Company, at the office of the company, at Butte City, Mont., October 4th, at 12 o'clock noon.

Gray Eagle Mining Company, at the office of the company, Room 4, Nevada Block, No. 309 Montgomery street, San Francisco, Cal., September 20th, at 1 P. M.

Horn Silver Mining Company, at the office of the company in Salt Lake City, Utah, October 3d, at 12 o'clock noon.

Mono Gold Mining Company, at the office of the company, No. 307 Montgomery street, San Francisco, Cal., September 21st, at 12 o'clock noon.

Richland Mining Company, at the office of the company in Deadwood, S. Dak., September 22d, at 3 P. M.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table listing various commodities and their prices, including acids, alcohols, ammonias, and various salts.

Table listing various metals and minerals such as Cadmium Iodide, China Clay, Chromic Water, Chrome Yellow, and various ores.

Table listing various oils, phosphorus, platinum chloride, and other chemical products.

Table listing various tin, chrome, cobalt, and other metals, along with their prices and specifications.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for Dividend-Paying Mines and Non-Dividend-Paying Mines. Each section lists company names and their stock prices for various months from Sept. 9 to Sept. 15. Includes a SALES column and a summary row at the bottom.

\*Ex-dividend. †Dealt in at New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 2,375 Non-dividend shares sold, 2,800. Total shares sold, 5,175

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Dividend-Paying Mines and Non-Dividend-Paying Mines. Lists company names and their stock prices for various months from Sept. 8 to Sept. 14. Includes a SALES column and a summary row at the bottom.

Dividend shares sold, 5,261 Non-dividend shares sold, 3,992 Total shares sold, 9,253

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Large table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and amt of last. It lists 54 companies with detailed financial data.



DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Assessments, Dividends, Name and Location of Company, Capital Stock, Shares, Assessments. Lists various mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Denver and Leadville paid \$275,000 in eleven dividends and \$75,000 in dividends. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$2,390,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ‡‡ This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 dividends. \*\*\*\* Previous to this company's acquiring Northern Bell, that mine declared \$2,400,000 in dividends against \$425,000 in assessment.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Stock Names, Sept. 9-15, and Sales. Lists various coal and railroad stocks with their respective prices and trading volumes.

Total shares sold, 130,433.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Names, Sept. 9-15, and Sales. Lists industrial and trust stocks with their prices and trading volumes.

Total sales, 368,324.

CALIFORNIA. San Francisco.

Table with columns for Stock Names, Sept 8-14, and Closing Quotations. Lists California stocks with their closing prices.

Colorado Springs, Sept. 9.

Table with columns for Stock Names, Bid, and Asked. Lists Colorado Springs stocks with their bid and asked prices.

MARYLAND. Baltimore.

Table with columns for Stock Names, Bid, and Asked. Lists Maryland stocks with their bid and asked prices.

MONTANA. Helena.

Table with columns for Stock Names, Bid, and Asked. Lists Montana stocks with their bid and asked prices.

MINNESOTA. Duluth.

Table with columns for Stock Names, Par, Bid, and Asked. Lists Minnesota stocks with their par, bid, and asked prices.

MISSOURI. St. Louis.

Table with columns for Stock Names, Bid, and Asked. Lists Missouri stocks with their bid and asked prices.

PENNSYLVANIA. Philadelphia.

Table with columns for Stock Names, Bid, and Asked. Lists Pennsylvania stocks with their bid and asked prices.

Pittsburg.

Table with columns for Stock Names, Bid, and Asked. Lists Pittsburg stocks with their bid and asked prices.

London Quotations.

Table with columns for Stock Names, Buyer, and Seller. Lists London quotations with buyer and seller prices.

Table with columns for Stock Names, Buyer, and Seller. Lists various international stocks with buyer and seller prices.

Table with columns for Stock Names, Bid, and Asked. Lists various international stocks with bid and asked prices.

New York Mining Stocks.

Table with columns for Stock Names, Bid, and Asked. Lists New York mining stocks with their bid and asked prices.

ASSESSMENTS.

Table with columns for Company, No., Dlnqt. in office, Day of sale, and Amt. per sh're. Lists company assessments with their respective details.

ALPHABETICAL INDEX TO ADVERTISERS.

- Indicates every other week or monthly advertisements. -

Table with 4 columns (A, D, K, Q) listing various engineering and mining companies and their advertisement frequencies. Includes entries like 'Abbot, Wheelock & Co', 'Darling, L. B.', 'Kanda, Reiji', and 'Quebrada R.R. Land & Copper Co., Lt.'.



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**DREDGING.—U. S. Engineer Office, 537 Congress** street, Portland, Me.—Sealed proposals for dredging in Harraseeket River, Maine, will be received at this office until September 30th, 1893, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieutenant-Colonel of Engineers.

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**WATER-WORKS.—Sealed proposals, addressed** to Trustees Norwood Water-Works, will be received by the village of Norwood, Hamilton County, Ohio, at the office of J. M. Harper, Engineer, Ninth and Plum streets, Cincinnati, Ohio, until September 24th, 1893, for the following approximate quantities of material and work pertaining to the construction of the Village Water-Works:

Item No. 1—1,570 tons of cast iron pipe composed of 230 tons of 12-inch pipe, 570 tons of 8-inch pipe, 470 tons of 6-inch pipe, 210 tons of 4-inch pipe, 90 tons of special castings. All f. o. b. cars Norwood, Ohio.

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Bids will be received for items 1, 2 and 3 separately. A bond of \$500 must be given as per specifications, and accompany all bids for item 3 as a security for the execution of the contract.

Bids must be addressed to the Water-Works Trustees, Engineer's office, Ninth and Plum streets, Cincinnati, Ohio.

Forms of proposals and specifications can be had on application to ALFRED SPRINGER, GEO. PUCHTA and HENRY RIKHOFF, Trustees.

**CABLE.—U. S. Engineer Office, Willets Point,** N. Y.—Sealed proposals in duplicate will be received at this office until the 24 day of October, 1893, and opened immediately thereafter in presence of bidders, for about \$33,000 worth of submarine insulated cable, single and multiple. Specifications, instructions to bidders, and blank forms will be furnished on application to this office. W. R. KING, Lieutenant-Colonel, Corps of Engineers, U. S. A.

**BRIDGE, ETC.—Sealed proposals will be re-**ceived at the office of the City Clerk, Bradford, Pa., until Sept. 25, 1893, for furnishing all materials and labor and constructing the superstructure of an iron highway bridge of 60-ft. span, from center to center of end pins, 16-ft. roadway, with two six (6) foot sidewalks. Also stone abutments for the above, containing about 170 cu. yds. of masonry. Bids must be made for the bridge and abutments separately. Structures to be erected in accordance with plans and specifications on file in the office of the City Engineer. Each bid must be accompanied by a certified check for \$200, and must be on the regular printed forms. For specifications or any other information address the City Engineer or City Clerk. Councils reserve the right to reject any or all bids. JAS. A. LINDSEY, City Clerk.

**DREDGING.—United States Engineer Office,** Mobile, Ala.—Sealed proposals for improvement of Mobile Harbor, Ala., dredging in Mobile River, Ala., will be received at this office until September 28th, 1893, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. A. N. DAMRELL, Major of Engineers U. S. Army.

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56 BROADWAY, NEW YORK, September 14th, 1893.  
 The regular quarterly dividend of TWELVE AND ONE-HALF CENTS A SHARE has been declared upon the stock of this company, payable on and after September 30th, 1893, to stockholders of record at the close of business, September 21st.  
 The transfer books will close at 3 o'clock P. M., September 21st, and reopen at 10 o'clock, October 2d, 1893.  
**A. I. HARRISON, Secretary.**

**MOLLIE GIBSON CONSOLIDATED MINING AND MILLING COMPANY.**

COLORADO SPRINGS, Colo., July 25th, 1893.  
 DIVIDEND NO. 65.  
 A dividend of five cents per share (\$50,000) has been declared, payable September 15th, 1893, to stockholders of record on September 8th. Transfer books close September 8th, and reopen September 16th, 1893.  
**PERCY HAGERMAN, Sec'y-Treas.**

**ASSESSMENT.**

**OFFICE OF BULWER CONSOLIDATED MINING COMPANY.**

117 LIBERTY STREET, NEW YORK.  
 Delinquent Stockholders of Bulwer Consolidated Mining Company.—Sale of delinquent stock on assessment No. 8 has been postponed from September 22d to Monday, October 9th, 1893.

By order of the Board of Directors,  
**L. OSBORN, Secretary.**  
 Office, Room No. 22 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

**OFFICE OF THE CALEDONIA GOLD MINING COMPANY.**

SAN FRANCISCO, Cal., Sept. 13th, 1893.  
 Resolved and Ordered, that an assessment of fifty (50) cents per share upon the capital stock of this corporation be and the same is hereby levied, payable immediately to the Treasurer, at the office of the company, in the Mills Building, on the northeast corner of Bush and Montgomery streets, in the city and county of San Francisco, California.

That Monday, the 16th day of October, 1893, be and the same is hereby fixed as the day upon which all unpaid assessments upon said stock shall be delinquent, and that Wednesday, the 15th day of November, 1893, be and the same is hereby fixed as the day for the sale of all delinquent stock.

This assessment will be received and payment stamped upon certificates by Lounsbury & Co., transfer agents, 15 Broad street, New York City, until October 16th, 1893, without extra charge.

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