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Table listing market prices for various locations under categories 'MINING NEWS', 'MINING STOCK', 'IRON', 'COAL', 'METALS', 'TABLES', 'CURRENT PRICE', and 'ADVT. IND. V. 19'.

NINE-TENTHS of the business of the country is based on credit or confidence. Anything which disturbs or destroys confidence affects this. The fear that the continued purchase of silver will bring us to the single silver standard, whether well founded or not, has impaired confidence in the value of our money.

It would, indeed, be a sad and humiliating admission to make that the intelligence and civilization of the present day can devise no safe and effective means to regulate and steady the standard of values, but that we must bungle along blindly, revolutionizing industry and commerce, while experimenting in an ignorant manner with a sudden change in the world's standards of value.

THE literature of engineering is so extensive nowadays that it is utterly impossible for one man to attempt to cover it, even in his own special branch, scattered as it is over a large number of periodicals and the proceedings of various societies. Several attempts have been made to furnish a periodical index of articles and papers; at least two journals in this country and several in Germany making a specialty of this work.

FEW people realize that there still exists on the North American Continent a region about which even less is known than about Central Africa. The interior of Labrador is a blank on our maps, and the great region extending from Lake St. John and the headwaters of the Saguenay to Hudson's Bay is almost entirely unexplored.

THERE is a concern in London which makes a business of furnishing to any one willing to pay a reasonable amount for the accommodation the names of investors in joint stock companies. Under British law the secretaries of such companies are required to furnish the names of stockholders to any one willing to pay a moderate fee for the trouble of copying the amount of this fee being fixed by law.

THE ENGINEERING AND MINING JOURNAL has unbounded faith in the great West, in its limitless resources, scarcely touched as yet, and in its

citizens, the most courageous, enterprising, industrious and hopeful people on the face of the globe. Such men cannot be kept down, and they will quickly recover from the stampede their foolish cranks have done so much to bring on. They will build up other industries besides silver mining, and will so reduce expenses that even that will prosper, for they have the greatest mines in the world and can and do produce silver cheaper than does any other country. The world will continue to use some silver in any event, and our Western mines can supply it better than any other producer.

The best friends of the silver mining industry are those who seek to provide a permanent cure for fluctuations in the value of the metal, and through universal bimetalism would provide a wide market for the metal and a stable money for the world.

Let the representatives of the mining States, laying aside the cry for free coinage that they know is impossible of attainment, unite to secure a fair, just and permanent solution of the silver question in accordance with the needs of an advanced and progressive civilization. Let them show themselves to be patriots and wise men, and they will be the true friends of the silver mining industry.

THE unconditional repeal of the purchase clause of the Sherman bill seems to be assured. Every one concedes a majority of about forty in the House for repeal, and those who claim to be well informed count on a substantial majority in the Senate also. The question of the free coinage of silver at any ratio seems to be definitely settled in this country. The vast majority of our people recognize that it would be simple madness for us to attempt to carry the world's silver and keep it in circulation with gold—every one knows well that under free coinage we would have no gold in circulation.

The doom of silver is not, however, decreed. On the contrary, the need and even necessity for the adoption of universal bimetalism become more apparent every day.

The English are having a forcible "object lesson" on the insufficiency of the gold supply. Our purchases of gold, though only about \$35,000,000, have already sent the Bank of England's discount rate up from 2½ per cent., at which it stood a month ago, to 5 per cent., which it reached on the 24th inst. Where would it go if we should buy, at whatever premium was necessary to get it, \$50,000,000 or \$100,000,000 more?

It is certain that if universal bimetalism is not adopted the United States must increase its gold reserve by several hundred millions of dollars. Where will it come from, and to what point will the Bank of England raise its rate to hold its gold? This object lesson will be a more efficient educator of English financiers and statesmen, on the sufficiency or insufficiency of the gold supply, than would tons of volumes containing the most learned and conclusive arguments of experts and statisticians. How long would the Gladstone government, which opposes bimetalism, last with a bank rate of 6 or 7 per cent. caused by the insufficiency of gold?

THERE is nothing mysterious or sacred about gold and silver: they are simply commodities whose market values depend, like those of all other commodities, upon supply and demand. The demand for silver previous to 1871, when nearly all the nations had free coinage of silver, took all that was offered at about its average coinage ratio with gold. Whether the amount produced was actually or relatively great or small it found a market in coinage at the coinage ratio; the demand was not so urgent as to induce "a scramble for silver" when its output was only four times as great as that of gold, and its market price never advanced materially above the coinage ratio; yet when it was produced in relatively enormous quantities its price did not decline because of this universal use in coinage. Unquestionably the growing wealth of the world as well as the intrinsic properties of the metal have tended to increase a preference, which seems always to have existed, for the more valuable metal, gold, and to widen its use in money, thus tending to restrict that of silver.

Germany, in December, 1871, assumed the sovereign right of coinage, adopted the gold standard and discontinued the mintage of the silver standard, and in July, 1873, it commenced the sale of its silver and thereby forced France, and in the following year the whole Latin Union, to limit its coinage of silver. In February, 1873, the United States, which had then no silver money in circulation, reduced the legal tender right of silver to payments not exceeding five dollars; thus practically demonetizing it. In 1874 the Scandinavian states demonetized silver, and in 1875 and 1876 Holland, Switzerland, Belgium, France, Spain and Russia suspended the mintage of silver except in special cases, for government account.

These various acts greatly curtailed the demand for silver in coinage; and the German sales, added to an increasing production, so overstocked the market that the price of the metal declined below its coining value, a condition which has continued to the present time, notwithstanding the heavy purchases of silver by the United States Treasury under the Bland act of February, 1878, and later under the Sherman act of July, 1890.

Under the recent suspension of free silver coinage in India, the market for the metal is still further lessened, and, with the proposed and inevi-

table stoppage of purchases by the United States Government, to be followed, no doubt, by the suspension of free coinage in the remaining silver basis countries, we are brought face to face with a sudden decline in the value of silver, and an appreciation in that of gold, which threaten great financial distress to the whole world. In only one way, namely, by an international agreement for bimetalism, does it seem possible to prevent these impending disasters.

COLORADO MINES.

Not all the Colorado miners are as ready to throw up the sponge, or to accept the statement that silver is the sole interest upon which their State depends as have been the few speakers who have assumed to be their mouthpiece. Colorado was a gold State before it was a silver one, and it was the gold placers that first drew attention to Pike's Peak and the neighboring mountains, and to-day, according to the statements of local authorities, not a few of those who have been temporarily thrown out of work by the stoppage of the silver mines and smelters have returned to their first love and gone back to the placers. Old districts which were abandoned because they did not pay the exorbitant rates of living which prevailed years ago are being reopened and careful search is being made for new ones. That this has already had its effect is shown by the fact, noted by the *Denver Republican*, that the gold deposits at the Denver mint in July exceeded by \$60,000 those of any previous month in its history. Part of this doubtless came from the working of gold mines, but it is altogether probable that some of it is the result of the recent increase in placer mining.

Encouraging reports in this connection come from all parts of the State, as will be seen by reference to our mining news columns from week to week. The Cripple Creek district is already a considerable producer and promises well for the future. The Yankee Hill district in Gilpin County is also a promising district. The Telluride mines are doing well, and new discoveries are reported in Gilpin, Gunnison and Pitkin counties which may be the beginning of a considerable industry. The almost unknown districts in the extreme south of Colorado and on the Utah border are attracting many, and very good reports come from them, although it is too soon to speak definitely of their future.

This disposition is one to be approved and encouraged. If silver and lead are low, they are not the only mineral resources of the State. It has been and is a considerable gold and copper producer, and there is no doubt that these products can be enlarged. Already Colorado is an important producer of coal, coke, iron and steel, and the mining and preparation of these useful minerals and metals will give employment to a constantly increasing number of men. It is not impossible that the State has a future before it in which silver will play so subordinate a part that men will look back to some of the utterances of the present day with simple wonder at their folly.

PIG IRON PRODUCTION AND PROSPECTS.

The iron trade has apparently reached very nearly the lowest point of depression. The pig iron production is usually looked on as the indicator or barometer of the trade, and we find that during the last three months the blast furnaces have been stopping in all directions, so that the production has decreased until it has reached a point which would give us only about half the output of 1892 or 1891. The capacity of the furnaces in blast on August 1st was not much over 100,000 tons a week, and the advices received from day to day indicate that it has fallen still farther and is probably not over 90,000 tons a week, or at the rate of about 4,700,000 tons a year, the lowest figure reached for some years. It is not only the absence of demand that has brought about this change, but also the failure of large customers to pay for the iron they have already taken.

Meanwhile, no new furnace will go into blast unless its owners have a special use for the iron or a special market assured. The general market is not sufficiently encouraging to justify any general resumption, and can hardly be so for some months to come. From different quarters we hear of mills starting up, some of them full and some on short time; but the pig-iron trade is generally one of the last to show improvement, as it is one of the first to feel depression. Stocks of pig on hand are not unusually large, but they will probably be pretty well worked down before the blast furnaces which have blown out are ready to start up again, as they will be slow to resume work until a steady market is assured, and until there is some improvement on the very low prices now prevailing. How low these are may be judged from our Philadelphia report, which quotes transactions in No. 1 foundry iron at \$15, and offerings of forge iron at \$12.50 per ton. Even these figures are "shaded" liberally to good buyers.

It does not seem possible, however, that improvement can be very long deferred, especially if Congress acts judiciously and with reasonable promptness on the financial question now before it. A large amount of construction work of various kinds is in progress which must be completed, even if few new enterprises are undertaken this year. The railroad demand for iron and steel has been very light, but repairs have in many cases been held back as long as possible, and next year will show an

increased consumption from this important source. These and other facts point to an end to the extreme depression and a general resumption of work at no very distant day.

It is not a discouraging fact that some of the large Lake Superior mines which had shut down, expecting to supply all this season's demand from their stock piles, have resumed work, a course which they would not have taken so late in the season without a reasonable certainty that they could sell their ore to the furnaces.

NEW PUBLICATIONS.

STANDARD STEEL CONSTRUCTION: A MANUAL FOR ARCHITECTS, ENGINEERS AND CONTRACTORS. Arranged by J. M. Larimer. Pittsburg, Pa.: Jones & Laughlin, Limited. Pages 215; illustrated. Price, \$2.

This useful trade publication contains much valuable information, including tables and formulas about beams, channels and other structural shapes, particularly of the "Larimer column." Many of the tables are based on original experiments and are not to be found elsewhere. The book also contains standard tables on areas and circumferences of circles, logarithms and natural sines, tangents and secants. It is profusely illustrated and cannot fail to be of value to the constructing or contracting engineer.

THE MONETARY SITUATION IN GERMANY. By Walther Lotz. Philadelphia: The American Academy of Political and Social Science. Pamphlet. Pages 21. Price, 25 cents.

This interesting little pamphlet was evidently written in defense of the attitude of the German delegates to the Brussels International Monetary Conference, and embraces a brief review of the present monetary situation of Germany, its origin, and, lastly, the various important interests which, in the writer's opinion, forbid any concessions on the part of Germany to future bimetallic proposals. In conclusion, the author states that although Germany would derive some advantage if a universal rehabilitation of silver should take place, its interests are not so urgent as to justify any dangerous experiments.

A SELECT BIBLIOGRAPHY OF CHEMISTRY: 1492 to 1892. By Henry Carrington Bolton. Smithsonian Miscellaneous Collection, No. 36. Washington, D. C.: Published by the Smithsonian Institution. Pages 1,212. Price \$2.50.

This valuable book of reference bears upon its face the evidence that its compilation was a work of love on the part of the author. Dr. Bolton's aim has been to collect the titles of the principal books on chemistry published in Europe and America from the rise of such literature to the present time, and in this he has succeeded beyond cavil. To facilitate reference the work is divided into seven sections as follows: Bibliography, dictionaries, history, biography, chemistry, pure and applied; alchemy and periodicals. The titles under these sections are arranged alphabetically, and numerous cross-reference introduced. The sections are unequally developed, as indeed might be expected, owing to the difficulty of drawing sharp lines of division between the sections themselves and between co-related sciences and arts. For example, under the section of chemistry, pure and applied, pharmaceutical chemistry finds place, but not the science of pharmacy. It is, however, not an easy matter to draw the line between the two. The total number of titles given is 12,031, of which 4,507 are German; 2,765 English; 2,141 French; the rest being divided among 22 other languages.

FREIBERG'S BERG- UND HUTTENWESEN. Herausgegeben durch den Bergmännischen Verein zu Freiberg. Zweite, neu bearbeitete und vermehrte Auflage. Freiberg im Sachsen, 1893; Craz & Gerlach. Pages 344; with 18 lithograph tables.

The Bergmännische Verein at Freiberg, published in 1883, a short and incomplete review of the mining and metallurgical industry of that place, chiefly to serve as a guide-book for visitors to its mines, ore-dressing and smelting works. The new book which has just been brought out is intended for the same purpose, all data and descriptions having been carried forward to the present time.

The book is divided into two parts, one treating of the history, geology and practice of ore-dressing and mining, while the other is metallurgical. All of the chapters have been written by engineers of Freiberg, whose names are well known in the mining industry. A list of the contents and authors will give a clear idea of the scope of the book. The geography, geology and history of the district are described by H. Mueller, system of mining by O. Bilharz; water supply and mine machinery by K. R. Booneman; mine timbering by C. A. Sichel; ore-dressing by E. W. Neubert and O. Bilharz; government and administration by G. H. Wahle and H. Fischer; the royal mining academy by A. W. Stelzner, and the metallurgical works by K. Mehrbach.

The character of the book is well indicated by its title. It is not a technical treatise on the Freiberg processes, but a general statement of them. It contains also some statistics that are useful for reference. It is a valuable reference book for the technical library, and as a hand-book for visitors to Freiberg it is indispensable.

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.

The Requisites of Smooth Track. By Philip Noonan. Pamphlet, 30 pages. *Seventh Biennial Report of the Bureau of Labor Statistics of Illinois, 1892.* Springfield, Ill.; State Printer. Pages 640.

Success and Its Conditions. By Edwin P. Whipple. Boston and New York; Houghton Mifflin & Co. Pages 336. Price \$1.50.

The Silver Dollar: A Business View. By Col. E. F. Browne. Denver, Colo.; the Chain & Hardy Co. Pages 96. Price 25 cents.

Character and Characteristic Men. By Edwin P. Whipple. Boston and New York; Houghton, Mifflin & Co. Pages 324. Price \$1.50.

The Infringement of Patents—for Inventions, Not Designs. By Thomas B. Hall. Cincinnati, O.; Robert Clarke & Co. Pages 276. Price \$5.

Arithmetic of Magnetism and Electricity. By John T. Morrow and Thorburn Reid. Lynn, Mass.; The Bubier Publishing Co. Pages 148. Price 50 cents.

Missouri at the World's Fair: Official Catalogue. Edited by James Cox. St. Louis; published by the State World's Fair Commission. Pages 176; illustrated.

Republica Mexicana: Importaciones, 1889 a 1890. Formadas bajo la direccion de Javier Stavoli, Jefe de la Seccion 7. Mexico; National Printing Office. Pages 256.

Electricity up to Date, for Light, Power and Traction. By John B. Verity. London and New York; Frederick Warne & Co. Pages 164; illustrated. Price 75 cents.

Electric Lighting and Power, Distribution, Part, III. By W. Perrin Maycock. London and New York; Whitaker & Co. Pages 136; with 70 illustrations. Price \$1.

A Plea for Silver Coinage and the Double Standard. By T. B. Buchanan. Denver, Colo.; the Chain & Hardy Co. Pages 149; with tables and diagrams. Price 50 cents.

Bureau of Education, Circular No. 4. Abnormal Man: Essays on Education and Crime. By Arthur MacDonal. Washington; Government Printing Office. Pages 448.

Speeches and Papers on the Silver, Postal Telegraph and Other Economic Questions. By Nathaniel P. Hill. Denver, Colo.; the Chain & Hardy Co. Pages 290. Price 50 cents.

Western Australia. Blue Book for the Year 1892. Compiled from returns in the Registrar-General's Office. Perth, Western Australia; Government Printing Office. Pages 292.

Digest of Trade-Marks for Machines, Metals, Jewelry and the Hardware and Allied Trades. By Wallace A. Bartlett. Washington; Published for the author. Pages 176, illustrated.

Geological Survey of Alabama: Report on the Geological Structure and Minerals of Murphree's Valley. By A. M. Gibson, Assistant Geologist. Montgomery, Ala.; State Printer. Pages 132.

Profit-Sharing Between Employer and Employee: A Study in the Evolution of the Wages System. By Nicholas Paine Gilman. Boston and New York; Houghton, Mifflin & Co. Pages 460. Price \$1.50.

Eleventh Annual Report of the United States Geological Survey to the Secretary of the Interior: Part I., Geology; Part II., Irrigation. J. W. Powell, Director of the Survey. Washington; Government Printing Office. Pages 760 and 396; with maps and illustrations.

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.

Phosphorus and Silicon in Iron.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In my letter which you kindly published in your issue of August 5th, I discover a mistake of mine where I wrote: "In my opinion it should not be difficult to keep phosphorus under 1%." I meant to have said "silicon" instead of "phosphorus." Please correct in accordance, as I do not care to make claim of being able to reduce, materially, phosphorus in the blast-furnace. However, I do remember that, while operating Cedar Point furnace on Bessemer iron, some 12 or 15 years ago, the phosphorus at times disappeared in a way that pointed to volatilization, a fact which I mentioned to Mr. Fred Ackerman, and my recollection is that he made some experiments that seem to confirm that theory. I also think that Mr. Frank Firmstone contributed some evidence of the volatility of phosphorus.

DURANGO, Mex., August 14, 1893.

T. F. WITHERBEE.

A Plan for Solving the Silver Question.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I feel pleased to declare that the Engineering and Mining Journal is the only newspaper I read (and I read a good many) that suggests a plan to solve the silver question. I refer to your International Clearing House plan. My object is not to discuss that scheme in any way for the present. Our economists have written much on the present situation and on its historical aspect, but none of them seems to be foresighted; as in the whole of Europe not one of those eminent men suggests any plan whatever, America will again have the honor of solving this perplexing question.

My plan is that the States of the world, united in an international silver syndicate, should buy all the mines, all the stocks, all the holdings of that metal, each State having a part in this operation according to its importance, or to the importance of its interest in the question. The silver business would become strictly official, and no private dealing would be tolerated; fraud would be severely punished. The working of the mines would be managed by this international syndicate, the productions would be regulated according to the demands for coinage or for the arts, there would never be over-production; some mines would stop working when necessary. The silver would be sold at a price that, when once fixed, would be permanent. This plan is monopoly in its fullest sense, but it is a monopoly of such importance that no enemy of syndication or monopolizing can declare himself opposed to it.

BRUSSELS, Belgium, July 21, 1893.

E. SAMUEL.

(Any plan contemplating interference with private interests and putting the working of mines in the hands of governments could not for a moment be entertained in this country or in England or her colonies. It is not necessary to discuss it.—Ed. "Engineering and Mining Journal.")

Nickel Steel.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: During some experiments about nickel metallurgy in the year 1875, I melted in a crucible lined with charcoal some pulverized

garnierite from New Caledonia and got a carburated alloy of nickel and iron, without any sulphur, arsenic, copper or silicon, which I found was much more malleable than the best charcoal pig iron. Some other experiments showed me the same important result, and at the beginning of the year 1876 I wrote several papers in France and England to show how important it would be to produce nickel-steel, which could be made by the addition of metallic nickel to the molten steel in the crucibles, on the Siemens hearths, or in the Bessemer converters. Nevertheless, pursuing my experiments, I observed that some substances were impervious, even in a low proportion, and that the fabrication of the nickel-steel needs a special management, and I wrote the following notice, which, I think, is yet worthy to be published: "My researches aim at the production of nickel-steel practically. It is not the first time such experiments have been made, but the contradictory opinions of the best chemists and metallurgists are a proof of the intervention of several elements, the influence of which is not as yet exactly settled, and which we hope to detect; therefore, we can say now that nickel is a most inconstant metal, and infinitesimal mixtures of some other substances are sufficient to modify its qualities. It is the study of those substances and their influences, as well as how to eliminate or add them, which is now the aim of the experiments by which we hope to obtain an industrial alloy nickel steel, very useful, owing to its qualities of inoxidability, tenacity and malleability."

But when I succeeded in finding the laws for making a good nickel-steel, the steelmakers were indifferent for many years, until some nickel-steel armor-plate trials gave a strong illustration of the facts, showing that such steel did not crack, while the shot penetration was only 75%, as compared to a good steel armor plate. But it is very difficult to produce regularly the nickel-steel wanted, because what we may call the "mystery" of the nickel-steel is not entirely known, even by the best steel works. In France the St. Chamond steel works followed my directions in preparing the nickel, which must be free from sulphur, arsenic, silicon, carbon, etc. Now those works which have very careful chemists and metallurgists make nickel-steel with very few condemned ingots.

It is said that nickel-steel is too expensive, but its elastic limit is much higher than that of common steel, so that we can reduce by 25% the weight of the steel and get the same resistances. Such a metal is invaluable in the navy, in war material and for many other uses.

As for my process of obtaining a good nickel-steel, the metallic nickel I use is refined by dry process; it must contain a very small percentage of sulphur, arsenic, silicon and carbon. Some nickel refined by wet processes is not fit for nickel-steel purposes, and must be refined again in my furnaces. As for cobalt, if any is in the ores, I lose a part of it, but as I ascertained that this metal is at least as good as nickel for steel, I looked rather for methods which should keep it with the nickel, and I succeeded for certain kinds of nickel ores.

JULES GARNIER.

PARIS, FRANCE, JUNE 23, 1891.

THE GREAT GOLD STRIKE IN WESTERN AUSTRALIA.

Written for the Engineering and Mining Journal, by Dr. E. D. Peters, Jr.

As the local journals are teeming with accounts of the wonderful gold discoveries in western Australia, it will no doubt prove interesting to your readers to hear an authentic description of the facts in the case, obtained directly from one of the owners of the wonderful mine now known as "Bayley's Reward;" it being customary in this country to award a claim of double size to the fortunate discoverer of any of the valuable metals in a new district. This mine is situated in western Australia, in the district of Coolgardie, and some 350 miles inland from Perth, the main port of entry on the western coast of the Australian continent. It is in a dry and sterile country, water being almost entirely wanting during nine months of the year, and uncommonly scarce for the other three. It is now hauled by bullock teams, and stored along the road at the various halting places, where enough to sustain life in one's self and one's animals can usually be obtained for about 15c. per gal. Until this system of hauling water was established, and the use of horses thus rendered possible, nearly all passengers and freight were conveyed across the plains on the backs of camels, which are numerous and comparatively inexpensive in that district; a very decent baggage animal being procured for \$75.

The mines, themselves, are in a low, rolling, waterless tract of country, consisting mainly of slates, intersected in all directions by dikes of diorite, a most favorable formation for rich gold mines. Although there is plenty of gravel that would yield large returns if water were procurable, it is at present only worked in the few spots that are so rich as to yield a profit by picking nuggets off the bedrock, or winnowing the sand with a blast of air; the coarser particles having been separated previously by passing the dirt through a sieve. Most of the gold that is being shipped from the camp, however, comes from lodes, or as the Australian miner designates them, "reefs." These are of a pure quartz formation, only slightly stained or honeycombed; a proof that the ore in depth may be expected to contain but little sulphurets. Among these reefs, many of which are said to be yielding rich ore, one stands forth pre-eminently from the extraordinary richness of the first lot of rock that was treated from it on any considerable scale; and the papers have doubtless been criticised for publishing such a wild and improbable story. Yet it is true without a question. I have received my information direct from one of the owners, a most intelligent and reliable gentleman, who is now spending a short time in Melbourne, after the hardships he has undergone in prospecting and working a mine in one of the most difficult and inaccessible places imaginable. Now that water can be obtained, trails are made, stages put on, and provisions supplied along the road at reasonable rates (reasonable when the conditions are considered), there is no great difficulty in reaching the camp.

I have also seen something over one-third of the gold produced from this celebrated run of only 4½ tons of quartz, which yielded 9,000 oz. of the precious metal. So far as I am aware, this is a totally un-

precedented yield, when the large quantity treated is considered. The means employed for obtaining this yield, and the only means as yet used in the district for treating quartz, consists of a simple "dolly," or hand-crushing machine, with rude mechanical appliances added, while the crushed quartz is cradled or treated in a rocker. Most of the gold is very coarse, and some 3,200 oz. of it has been for several days on exhibition in the window of a jeweler in Collins street, Melbourne. The gold was shown in various shapes. In the middle was a pile of 13 beautiful nuggets, weighing over 100 oz. each. Next came three very large and solid retorts of beautifully pure gold, showing that some of the gold in the ore was fine enough to require the addition of mercury to collect. These three masses of yellow metal were each the exact size of an old-fashioned Colorado gold retort, such as we always used (and very probably do still) in the Gilpin County quartz mills. They certainly averaged 300 oz. each. Another striking feature of the exhibit was an ordinary glass globe, such as one would use to keep gold-fish in, half full of leaves, ribbons, cakes and nuggets of pure gold; many of them several ounces in weight.

But to me the most interesting part of the whole collection was the exhibit of quartz containing free gold. Such specimen rock was, I think, never seen, even in the palmy days of California's quartz veins. On one side were piled many large pieces of quartz, simply studded and permeated with gold, and not in specks or thin flakes; but in coarse grains, nuggets, ribbons, planches, and in places extending quite through the fragment of rock, in veins thicker than thick pasteboard. Beside this was a large heap of smaller, but much richer specimens. In these, the precious metal certainly formed 50% of the weight, and in some of the pieces predominated to such an extent that they seemed to be simply a fragile skeleton of quartz, held together and filled out with gold. There were many other interesting specimens, and boxes full of stones that would delight the collector's heart; but I have described the most striking features of the exhibit, and can leave the rest to the imagination. I forgot to ask the owner what was the fineness of this gold; but from more inspection I should say that it contained very little silver, and would probably run over \$19 per oz.

There are few geological phenomena more difficult to explain than those connected with the genesis and filling of veins, especially those containing free gold and sulphides. Nor does it make the problem any clearer when we learn in this case that the lode, so far as explored, seems to consist of comparatively barren quartz (containing less than ½ oz. per ton), for the greater part of its course; and that the pay ore is confined to a single narrow shoot, which, however, seems to be rapidly increasing in extent as depth is gained. On the surface the vein was only 2 ft. or so in width, while the pay chimney had a longitudinal extent of only 12 ft. or thereabouts; but at a depth of 10 or 15 ft. the vein has widened to nearly 4 ft., while the rich portion has increased in length to about double its original size.

Of course the development of the vein has been greatly hindered by the natural drawbacks of the district, the scarcity of food and water, and the precarious means of communication with the coast. But even if all these troubles had not been encountered, it is scarcely probable that the owners would have gone ahead much faster; for they feel that they prefer to work such rich ore with their own hands, and are very loth to trust to hired labor under the conditions. Nor can we wonder at it. Who would be willing to turn a lot of men loose in the vaults of a bank to pick up and sack uncounted golden eagles, that lay in heaps on the floor? I am sure it would be too much for weak human nature in America, and I fancy that Australians are not very different from us in these matters.

I think it would be difficult to cite another instance where within a few weeks after the discovery of a lode-claim, and in sinking a shaft only 12 or 15 ft. deep, and working only 4½ tons of rock extracted, nearly \$60,000 of clean money was produced, with only the labor of the partners in the claim. A considerable amount of second-class rock also came out with the richer ore, and has been piled one side for future treatment. I am told that even this rock is handsome enough for a mineralogical cabinet, and will probably yield some 30 oz. gold per ton or more. The shaft is now 160 ft. deep, with coarse gold in great abundance during its entire extent. There are plenty of other quartz reefs in the district, and I have heard several tolerably reliable accounts of the discovery of other most promising claims. But I think that nothing equal to the original find has yet been unearthed, and it is very probable that the same rule will govern here that is so often noticed in mining districts, that the first discovery is always bigger and richer than anything that ever comes after. Still, it is no doubt a great gold district, and I am told by reliable men that there is a tract of country there, 30 miles wide and 200 miles long, containing more or less gold throughout its entire extent. Many men are leaving the ranks of the unemployed in Melbourne and Sydney to seek their fortunes in the new El Dorado. And while the usual disappointments and losses will no doubt be incurred, yet there is every reason to believe that a new gold-field has been opened of greater richness and extent than anything that has been discovered in Australia since its early days. Some 500 men are now reported in the district.

British Coal Exports.—The exports of coal from Great Britain for the month of July were 2,900,680 tons, against 2,965,131 tons in July, 1892, and 3,047,885 tons in July, 1891. For the seven months ending July 31st the exports were 17,409,976 tons this year; 16,395,870 tons in 1892, and 17,955,212 tons in 1891. In addition to the exports for the seven months this year, 4,670,916 tons, were shipped for steamers engaged in foreign trade.

Pig Iron in Germany.—During the month of June 396,417 tons of pig iron were produced in Germany against 389,691 tons in June, 1892. The output of Thomas pig increased from 168,157 to 192,270 tons, while the production of all other sorts has been less. In the Westphalian district no Bessemer pig-iron was produced in June, and only 22,463 tons of spiegeleisen. From January 1st to June 30th of this year the total production was 2,327,538 tons against 2,396,127 tons for the corresponding period of last year.

MINING AT THE COLUMBIAN EXPOSITION.

Specially Reported for the Engineering and Mining Journal.

THE UTAH MINERAL EXHIBIT.

The extent and variety of the mineral wealth of Utah are well shown by the display of minerals at the pavilion in the Mines Building, for in the collection almost every known mineral is displayed. Within the 100,000 square miles of the territory are mines of gold, silver, lead, copper, zinc, antimony, manganese, nickel, cobalt, iron, plumbago, and numerous other minerals. It has the celebrated Ontario mine, which has paid in dividends to date the sum of \$13,175,000, and which has a mill and mining plant costing \$2,700,000, and an annual pay-roll amounting to over \$500,000. The Horn Silver mine is another of Utah's great properties. Up to date it has paid in dividends nearly \$5,000,000. The Daly mine, which adjoins the Ontario, has paid nearly \$3,000,000. In 25 years Utah has added to the world's stock of precious metals over \$136,000,000, the greater portion of which was produced in the five counties of Summit, Juab, Salt Lake, Tooele and Beaver. Its lead mines produced during the year 1892 nearly 70,000,000 lbs. of lead. The copper production for the same time was nearly 2,000,000 lbs., while the other mineral productions of the Territory added their

finer it becomes white. It is proof against water air and acids, and can be used to render other fabrics equally impervious. The only other deposit of this mineral worked is in Austria-Hungary.

The water of the Great Salt Lake is estimated to contain 20% of pure salt and 2% of other saline matter. The extraction of salt by solar evaporation is now carried on by works in Davis, Salt Lake, Box, Elder, and Weber counties. Only a comparatively small part of Utah is yet reached by the railroads, and for this reason some of the most valuable and interesting regions are practically unknown. The Henry, Blue and La Salle Mountains, so rich in gold, silver, lead and copper, are as yet hardly worked for their mineral wealth, owing to the difficulty of reaching them, which keeps away the wagon or pack train of the pioneer or prospector. In the many small streams that flow from the sides of these mountains may be found grains of gold or flour of silver or copper that proves conclusively the wealth above.

Utah now holds fourth place in all the States and Territories of the Union in her production of precious metals, having produced in 1892 gold and silver valued at \$12,300,000.

In 1891 the gold output of Utah, according to the statistics given in the "Mineral Industries," was valued at \$650,000, and the silver at \$11,313,131, a total of \$11,963,131. In 1892 the amount increased to \$12,300,000, as above. The Territory is not an iron producer as yet,



ENGINEERING & MINING JOURNAL

THE UTAH EXHIBIT AT CHICAGO.

share. Utah's climate permits of mining all the year around, and its agricultural resources are hardly surpassed by any State west of the Mississippi. In addition to the precious metals found, Utah has 45,000 square miles on which is found scattered fields of bituminous and semi-bituminous coal, the veins running in thickness from 1 ft. to 20 ft. At Scofield and at Castle Gate, on the Rio Grande Western Railroad, the Pleasant Valley Coal Company is mining over 250,000 tons of coal a year of excellent quality. The vein at Scofield averages 14 ft. in thickness. At Castle Gate the company has 100 or more coke ovens, where from 10,000 to 15,000 tons of coke are turned out yearly. The Union Pacific Railway Company owns mines also at Scofield, and annually turns out 100,000 tons of coal. Of the hydrocarbons there are various mineral oils, and the mineral known as gilsonite, now used greatly in the manufacture of varnishes, lacquer, etc., is found near Prince Station in large beds, and is said to be 90% pure asphaltum.

Elaterite, albertite, quartzite and uintahite are found in many locations.

In gems, Utah has many, including beautiful specimens of the topaz, in color, white, pale blue, and pink; the garnet vies with those of any other land. The malachite is superior, and the water opals found in Utah are superb. Onyx of many shades and colors abounds in various parts of the Territory. Building and ornamental stone is plentiful, 13 different varieties of sandstone alone being known. The exhibits of kaolin and pottery clays are especially fine. Ozokerite or mineral wax is found near Soldier Summit, on the Rio Grande Western Railway. In its natural state it is black and waxy; when re-

but its coal output is considerable, having been for nine years past, as stated in the "Mineral Industry," in tons of 2,000 lbs.:

1884	200,000	1887	180,021	1890	318,159
1885	213,120	1888	238,961	1891	371,045
1886	200,000	1889	236,051	1892	362,284

The coal development has naturally been chiefly along the lines of railroad where transportation could be had.

The lead production of Utah, from the same authority, has been, in tons of 2,000 lbs.:

1884	23,000	1887	19,000	1890	18,000
1885	23,000	1888	18,000	1891	28,000
1886	21,000	1889	16,500	1892	30,000

The copper production was 600,000 lbs. in 1890; 1,700,000 lbs. in 1891 and 2,000,000 lbs. in 1892. The copper deposits are known to be large, but are not very extensively worked as yet.

The engraving shows a general view of the exhibit, which is very tastefully arranged, and includes numerous specimens of ores, minerals and metals, maps, photographs and other sources of information.

COWARD'S NIAGARA PULVERIZER.

In the British section of the Mines Building is the exhibit of Mr. W. H. Coward, of Bath, England, who displays the well known Niagara Pulverizer, for which he took first prize at the International Exhibition, held in Crystal Palace, London, 1890. Mr. Coward is both the inventor and manufacturer of the machine. He owns American patents, and his chief purpose in exhibiting his pulverizer:

is that he proposes manufacturing it in this country. The present pulverizer made its appearance early in the year 1890, and since then 63 of them have found their way into Sweden, Norway, Germany and South Africa. Several are soon to be sent to Australia, where they have recently been introduced. Mr. Coward claims for his mill that it will pulverize any rock or mineral, that it requires much less power to run it, and wears less than other machines of the kind. A peculiar feature of the machine is that the wearing parts are all exterior to it, and there is no moving part within, with the exception of the crushers, and they are in a closing aperture, formed by the path and ring that can be renewed at a cost of \$20, and such a change is necessary but once in every few years. The pulverizer is adapted to grind material, hard or soft, and to the fineness of flour.

A 5-ft. machine, using 5 H. P., will grind cement at the rate of 1,000 lbs. per hour. The mill consists primarily of a drum which rotates on a horizontal axis or trunnion. This drum contains a heavy edge runner, and is moved by gearing. The runner is caused to roll in

ing a heavy runner, and thereby necessitating the use of a large drum. A 6-ft. drum is used for most substances crushed for commercial purpose.

The adjustment of this mill for work of a particular nature can be made simply, quickly, and with unflinching accuracy. With fine powders the speed of the fan is the only point requiring adjustment, and so accurate is its action that it can be set to pull the material so as to pass certain meshes (or an impalpable powder) with absolute uniformity, and without any screens whatever. When granulated or coarse products are desired, the roll is slightly set up so as to pass the size required, and the fan is speeded to draw to a corresponding degree of fineness.

With fine impalpable powders, the same air that exhausts the pulverized material returns and passes through the mill so that nothing is lost. All wearing parts, journals, bearings, etc., are placed outside the mill, are always accessible, of ample proportions, and fitted with adequate lubricating arrangements. One feature that will attract

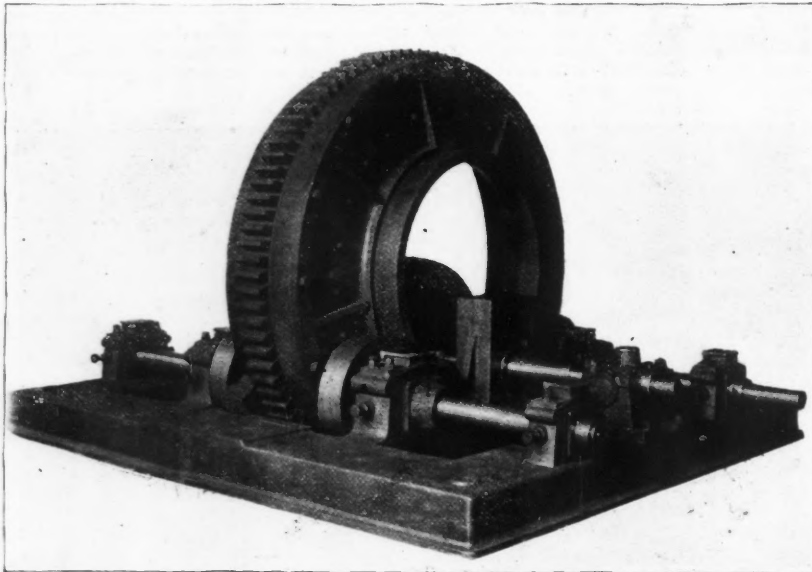


FIG. 1.

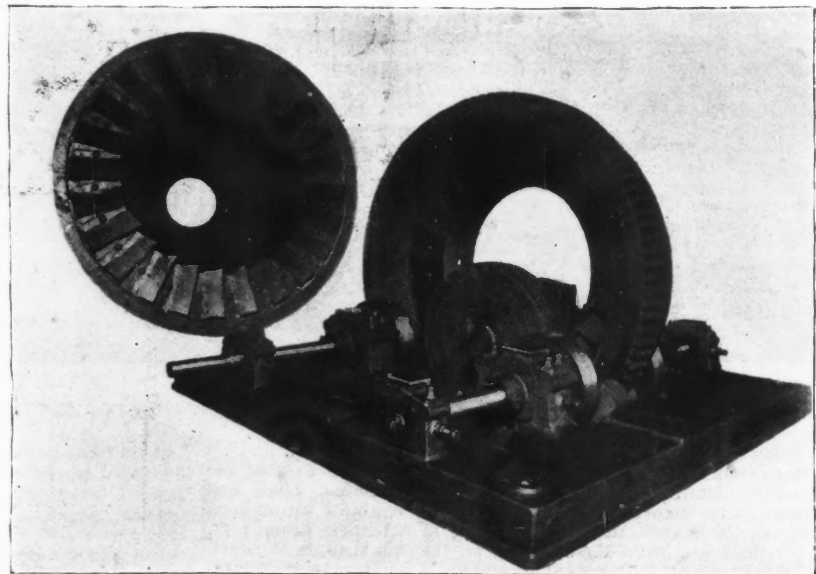


FIG. 2.

COWARD'S NIAGARA PULVERIZER.

contact with the periphery of the drum and reduce the substance brought under its action. The edge-runner is carried by a shaft, which is fixed in the runner and revolves in a bearing, which slides in the pedestal. The end bearing is made to swivel, while at the same time it holds the edge-runner and prevents it working out of its path. Two circles of wedge-shaped cups are fixed on each side of the drum. In operation; when the substance to be reduced has passed under the runner, it is taken up the path a short way so that when it falls back these cups receive it and carry it to the top. They then reverse their position and the material is thrown out, the finer substance being drawn away by means of an exhaust fan. The edge-runner being narrower than the drum, a space is provided on each side for the cups to pass. The coarser material, in falling from the cups, is brought again in front of the roll and passes under it. This continues until the whole is reduced to the fineness required. The material to be reduced is admitted through an opening in front, which is the same size as the edge-runner. The size of the machine required depends on the nature of the substance to be worked, hard rock need-

attention is the principle of fine crushing with a revolving closing aperture avoiding the loss of back action. It is claimed that this mill requires less power to drive it than any other mill of equivalent capacity, owing to the slow speed at which it may be run, and the advantageous manner in which the power is applied. It is also claimed that this mill has especial advantages in concentrating.

In the exhibit within a glass case various kinds of rock and stone are shown in the rough and also pulverized. The manufacturers invite engineers, manufacturers and others interested in the pulverization of materials, no matter of what character, to investigate the merits of this mill, and it is believed that it has a brilliant future before it in this country.

The illustrations given are in Fig. 1, a general view of the mill, and in Fig. 2 a perspective view showing the interior construction with one side of the drum attached. The machines at present for use in all parts of the world are manufactured in England, but the inventor intends to establish a branch or an independent company in the United States.

THE ENGINEERING CONGRESS AT CHICAGO.

We give below some additional abstracts of papers read in the mining and metallurgical sections of the Congress:

THE DETECTION AND MEASUREMENT OF FIRE DAMP IN MINES; BY G. CHESNEAU, PARIS, FRANCE.

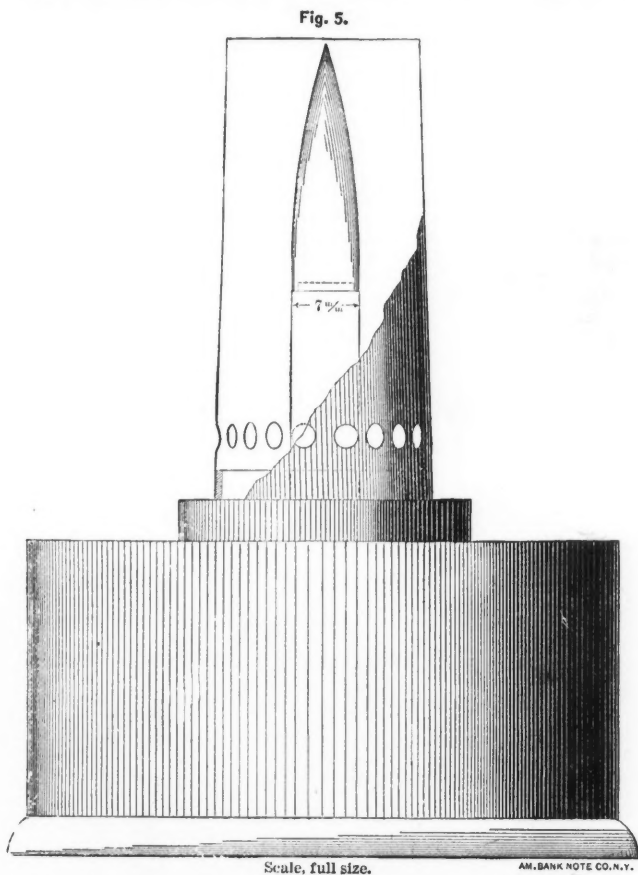
In this paper the author gives, besides a general review of the subject of the detection and measurement of fire-damp, detailed descriptions of the portable indicator devised by himself, and of the improved and simplified laboratory apparatus introduced by Prof. Le Chatelier, of the National School of Mines, and who was a colleague with M. Chesneau on the French Fire-Damp Commission. M. Chesneau considers his subject under two heads, viz. (1) Practical Methods for the Determination of Fire-Damp in the Laboratory and (2) Portable Fire-Damp Indicators for Underground Use.

1. Laboratory Methods.—Fire-damp can be determined by direct combustion or by observation of the limits of inflammability of the combustible gases. In discussing the method by combustion, the researches of Coquillon, Schöndorf and Poussigie are briefly reviewed, following which M. Chesneau gives the following detailed description of Le Chatelier's apparatus shown in Figs. 1-3:

In this apparatus special care has been taken to remove, or reduce to the smallest possible importance all the sources of error inherent in the inexperience of the operator, and particularly to avoid all joints through which the gas could escape. All rubber-tubing has been discarded; only a single stop-cock, required for the introduction of the sample, has been

moreover, completes the tightness of the joint of the iron cap, which is screwed on a ring terminating, A, at the top, so that it can be removed when the interior of A is to be cleaned.

In making a test, the cock, R, being open, the mercury is first leveled to the point above described, and the division, *h*, at which the mercury stands in the manometer, and which will be the zero of the manometer-scale, is noted. The air is then expelled from A by elevating the mercury-reservoir (which is placed upon the support, D); after which the cock, R (by means of a rubber tube so short and small that the volume of its contents may be disregarded in comparison with that of the gas introduced into A) is connected with the receptacle holding the air to be analyzed. The mercury-flask is then lowered, so as to draw in the sample of air, which is at the same time expelled from its former receptacle by the introduction of water (preferably salt water, which absorbs less gas). The operation is now reversed, and the air in A is forced back again into the receptacle containing the air to be analyzed. This is done for the purpose of mixing with the whole mass of air in the receptacle the small amount of pure air which was in the short rubber tube, and thus reducing to a minimum which can be disregarded, its influence upon the test. The measurer, A, is now filled anew; the mercury being leveled to the neighborhood of the point previously described, but without attempting an exact adjustment. Five minutes are allowed for the establishment of an equilibrium of temperature, which is read to within one-tenth of a degree, C, by means of a thermometer immersed in the water of B. The pressure of the gaseous mass is then observed, for which purpose the mercury must be exactly leveled to the point. This is done before a window or a light which strongly illuminates the surface of the mercury. At the moment of contact, the height, *h*, of the mercury in the manometer is noted: and the pressure,



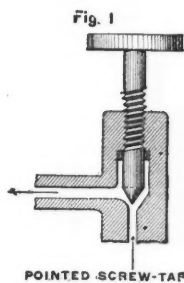
retained; and this cock is a pointed screw-tap Fig. 1, not a plain cock, and therefore gives almost absolute guaranty of tightness.

The Chatelier apparatus, as shown in Fig. 2, consists of a glass cylinder A, 20 mm. (0.8 in.) inside diameter, capped with an iron top, in which is the cock R, for the introduction of the gaseous mixture to be analyzed, and the subsequent escape of the same, at the end of the test. The bottom of the glass cylinder is closed with mercury, the level of which can be varied at will through the movement of a body of mercury contained in a flask, F, connected by a rubber tube with the lower part of the glass cylinder, the bottom of which is drawn out to fit this connection. The cock R, being open, gas may be made to enter or leave the cylinder, A, by simply lowering or raising the flask, F, and the cylinder thus constitutes a closed receptacle, serving at once as a measurer and as a combustion-chamber.

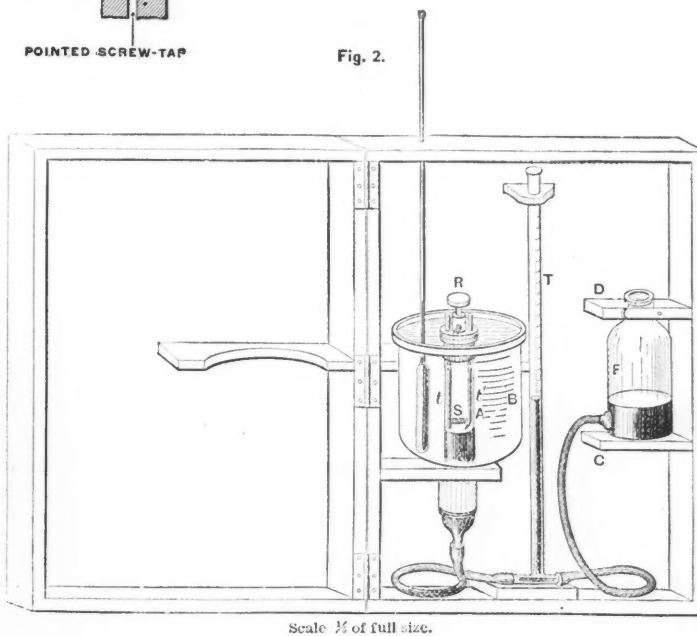
The mercury reservoir communicates also with an open tube, T, constituting a manometer under atmospheric pressure, the height of the mercury in which measures the pressure of the confined gas.

The combustion of the mixture is secured by the incandescence of a platinum spiral, S, connected with two platinum wires, *tt*, which pass through the iron cap, in isolating sheaths, and to the conductors of an electric battery. One of these platinum wires terminates below, very near the spiral, S, with a slender point. Before and after the combustion, the mercury is leveled in the cylinder to this point, so that observations are made always at constant volume, and only the height of the mercury in the manometric tube, T, is noted. The volume of air in the measurer is about 22 cu. cent. (1.34 cu. in.).

The cylinder, A, is wholly immersed in a glass reservoir, B, filled with water, the mass of which regulates the temperature, reducing its variations and permitting its easy measurement. The water in this reservoir,



POINTED SCREW-TAP



P, of the gaseous mass will be (*H*, being atmospheric pressure, and *h*, the former manometer-reading, as above explained):

$$P = H + h' - h.$$

The platinum spiral is then made incandescent by an electric current. The arrangement and the temperature of this wire have great influence on the rapidity of combustion. A wire coiled in a spiral is much more effective than a straight one of the same length, because the heating effect at a given instant is exerted upon a smaller quantity of gas, and necessarily raises it to a much higher temperature. The spiral should be in the lower part of the combustion-chamber, so that the circulation produced by the heating may bring all parts of the gas into contact with it. Combustion is evidently the more rapid, the hotter the spiral. Its temperature should be between 1300° and 1600° C. Outside of these limits, either combustion will be too slow or there will be danger of fusing the spiral. Some practice of the eye is necessary to the proper regulation of the temperature. For approximate regulation, the two following indications may serve: (1) The spiral should be sufficiently luminous to seem to emit rays, but (2) not so brilliant as to blind the eye to the separate coils of which it is composed. Good results are obtained by making the spiral of six turns, 3 mm. (0.12 in.) in diameter, 1 mm. (0.04 in.) apart, and of wire 0.3 mm. (0.012 in.) in diameter. If a wire be used, made of platinum-copper alloy, containing 3 per cent. of copper (which has the advantage of being highly refractory) a suitable incandescence of the spiral may be affected with a source of electricity capable of giving a maximum current of 6 amperes, with an electromotive force of 12 volts.

If a battery be used, it is necessary to interpose a rheostat of variable resistance, which will permit the control and the progressive increase of current-intensity. More convenient is a hand-dynamo, with which the

current can be easily controlled by more or less rapid revolution of the crank. The machine is, moreover, always ready to work; and the tedious installation of batteries and accumulators is dispensed with.

Fifteen seconds of incandescence of the spiral suffices to excite complete combustion in the gas: but it is well to repeat incandescence twice, after the interval of some seconds, because the expansion of the gas by heat raises the descent below the spiral of a portion which may thus escape combustion, whereas the momentary cooling causes all the gas to pass again above the spiral. This reascension of the gas may be aided by elevating the mercury reservoir; but care must be taken at the moment of the passage of the current not to permit both conductors to touch the mercury, which would direct the whole current and thus render the incandescence of the spiral impossible.

Combustion being complete, it is necessary to wait 10 minutes for the re-establishment of an equilibrium of temperature. This is an absolutely indispensable precaution; and it is necessary to wait even longer, if the incandescence of the spiral has lasted more than thirty seconds. It is necessary to avoid prolonging the operations of one anal-

The limit of inflammability when the initial temperature of the mixture of gas and air is between 10° and 20° C., 8.1% for illuminating gas and 6.1% for methane. Mr. Shaw had found 8% for the former and 6% for the latter. The agreement shows that the limit of inflammability may be determined at least to within 0.1% of the total volume of air and combustible gas.

To determine the proportion of fire-damp contained in a given sample of air, it is sufficient to add either illuminating gas or methane until the mixture becomes inflammable.

In order to effect in rigorously definite proportions the mixture of combustible gas with the sample of air to be tested, M. Le Chatelier employs a glass gauge, Fig. 3., 35 millimetres (1.4 in.) in diameter and 250 millimetres (9.8 in.) long, contracted at its lower end to 20 millimetres (0.8 in.), so that it can be closed with the thumb. This gauge is prolonged at the upper end in a smaller tube, 10 millimetres (0.4 in.) in diameter and 250 millimetres (9.8 in.) long. The volume of the gaseous mixture is limited by a line drawn at 50 millimetres (2 in.) above the lower opening; the upper tube is graduated to thousandths of this volume.

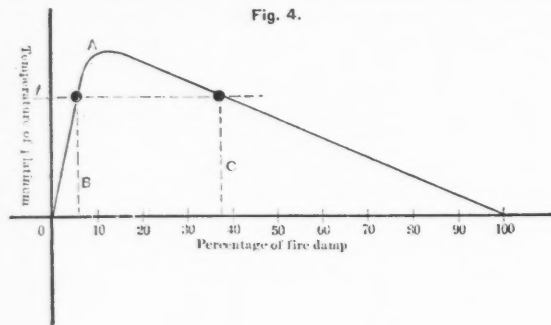


Fig. 4.

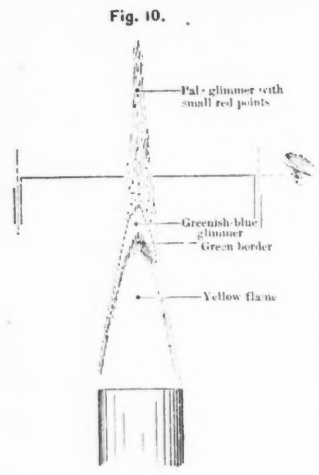
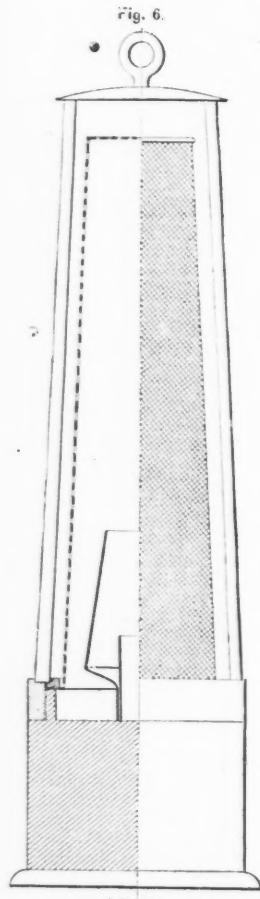


Fig. 10.



LAMP.

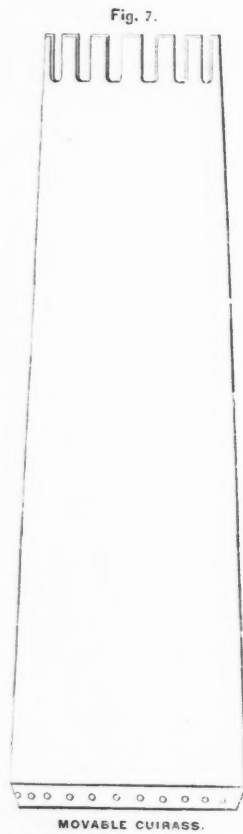


Fig. 7.

Scale, 2/3 of size in practice.

Fig. 3.



Scale, 2/3 of size in practice.

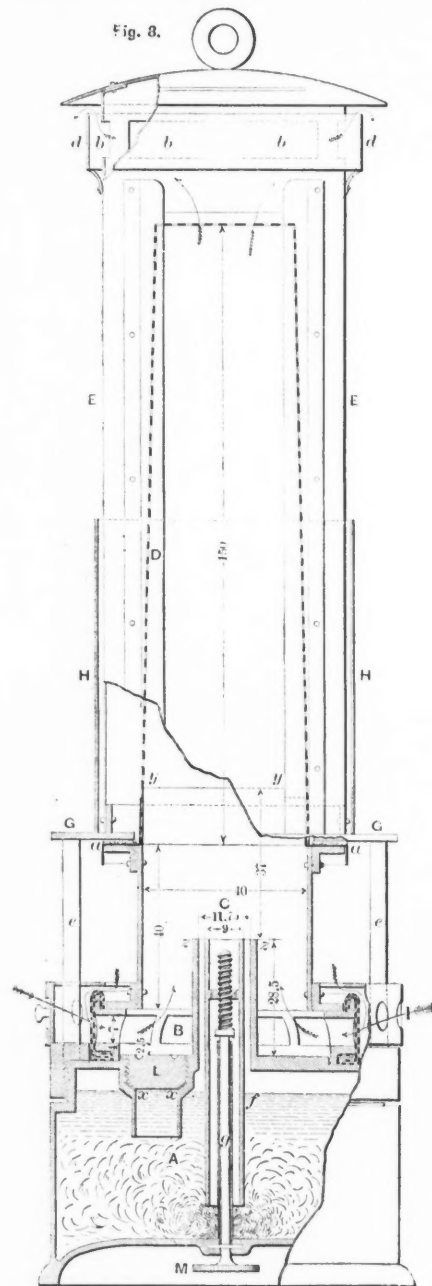


Fig. 8.

Scale, 2/3 of size in practice.

ysis beyond 1 hour. By the oxidizing action of the humid air upon the iron cap of A, oxygen is absorbed, and the volume of the air in a measure is consequently reduced. But this effect is appreciable only after some hours.

As at the beginning, the temperature, t' , and the height, h'' , of the mercury in the manometer, are not noted.

The proportion of fire-damp is calculated from the diminution of $b-h''$ of the pressure of the gaseous mass at constant volume, corrected for the difference in temperature.

M. Le Chatelier has also devised a gauge for testing fiery gases on the principle discovered by Mr. Shaw, an American engineer, that the limit of inflammability of a gas, that is, the smallest proportion of it which, present in air, will give a combustible mixture, is a rigorously definite quantity, capable of being determined with great precision. M. Le Chatelier made a large number of experiments to verify this principle, and to determine the degree of precision of the tests based upon it.

To make a test, the gauge is filled with water, and set in a pan of water. The combustible gas (illuminating gas, for instance) is introduced through a capillary tube, permitting the delivery of very small bubbles, of a volume less than one-thousandth of that of the gauge, that is, less than 0.2 cubic centimetres for the dimensions given above. It is equally indispensable, to secure a regular delivery, bubble by bubble, that the volume of the tube between the stop-cock and the orifice of delivery should be as small as possible. The volume of combustible gas is reduced by calculation to that which it would occupy under atmospheric pressure.

If the water in the pan is sufficiently deep the volume of the gas at atmospheric pressure can be directly determined by lowering the gauge until the water stands inside and out at the same level.

The gauge is now filled to its lowest mark by the introduction of the air of the sample to be analyzed. It is then taken in the hand by the lower end, the orifice being closed by the thumb, and is reversed and so held until the water remaining in it has completely replaced the gas contained

in the upper prolongation. It is then violently shaken for some moments, the water in the larger portion being rapidly moved to and fro, to effect a mixture of the air with the combustible gas. Finally, it is elevated in vertical position, until the operator is ready to ignite it, when it is quickly turned upside down, the thumb is removed from the orifice, and a burning match or small gas flame is introduced without delay.

If the mixture is inflammable, a pale blue flame descends almost to the bottom of the gauge; if not, nothing is seen. The operation is then repeated. Combustion, in fact, extends some distance beyond the flame which has kindled it; but the fugitive aureole which surrounds the latter for an instant is most frequently masked by the light.

The limit of error in determining the percentage of the gas by this method does not reach one-thousandth of the total volume, provided the above precautions are strictly observed.

After reviewing various indicators constructed upon such physical properties of fire-damp as the phenomena of diffusion through a porous body, and variations in density of a mixture of air and methane, and pointing out the unavoidable errors that vitiate such tests, M. Chesneau lays it down that only the three following properties of fire-damp can be utilized for the purpose of continuous measurement in all parts of a mine.

1. The heating, by the combustion of the fire-damp contained, in the air, of a platinum wire already brought to a certain temperature by means of an electric current. According to the proportion of the gas and the initial temperature of the platinum in pure air, the metal is carried from incipient red to bright red heat by the slow combustion of the gas in contact with it, and this heating may serve to measure the percentage of gas in the surrounding atmosphere.

2. The flames of oil lamps may be employed to indicate the presence of fire-damp by the elongation which they exhibit in air impoverished in oxygen.

3. Finally, observations may be made on the aureoles produced in contact with the flames by the combustion of fire-damp in the hot zones nearest to them, the height of an aureole depending upon the size and temperature of the flame as well as the proportion of fire-damp, and its visibility depending upon the relative brightness of flame and aureole.

Upon this third property are based the most widely employed indicators, as well as the grisometer, which the author designed, and which seems to satisfy the requirements of precision and safety.

1. The tendency to electric lighting in mines lends great interest to the first class of indicators named above, but there are two sources of serious errors.

Thus, although it appears to be beyond doubt that the heating of the platinum wire is proportioned to the percentage of fire-damp; but in order that observations may be mutually comparable, it is necessary that the initial temperature of the wire in pure air shall be rigorously constant, and hence that the electric current which produces that temperature shall be constant—a requirement difficult, but apparently not impossible, to realize.

The same cannot be said of the following difficulty: If the proportion of fire-damp be gradually increased from 0 to 100%, the temperature of the platinum wire will first rise gradually until the percentage of fire-damp (9 to 10%) corresponding to the most rapid combustion is reached, after which the temperature will decline, arriving, when the percentage of fire-damp is 100, at the point from which it started. If the percentage of fire-damp be represented by abscissæ and the corresponding temperatures of the wire by ordinates, the phenomenon will be represented by a curve starting at the origin, reaching its maximum at about 10% of fire-damp and returning to the horizontal axis at 100%.

It follows that to one and the same temperature t of the wire, two very different percentages, B and C will correspond, and particularly that any apparatus whatever, based on this principle, whether the brightness, the heat or the varying conductivity of the platinum be observed, will give precisely the same results in pure fire-damp as in pure air.

2. The flame of an oil lamp, adjusted in pure air at the height suitable for good light, elongates and may become smoky in an atmosphere containing fire-damp. This elongation, which was studied in 1880 by MM. Mallard and Le Chatelier, is due to the fact that the zone surrounding flame consists, not of pure air, but of a mixture of air and fire-damp in combustion. The proportion of free oxygen in this zone is thus greatly diminished, and the volume of the flame must be correspondingly increased if it is to receive upon its surface the quantity of oxygen necessary to burn the combustible products furnished by the wick. Moreover, the action of the fire-damp is not merely due to the volume which it occupies, thus diminishing by so much the volume of the air available for supporting combustion. It acts also by absorbing for its own combustion double its own volume of oxygen, and, consequently, six times its own volume of air. While 3 to 4% of carbonic acid in the air produces upon the flame almost an appreciable effect, a few tenths per cent. of fire-damp suffice to elongate the flame.

Unfortunately, it is seldom possible to utilize the indications of this kind furnished by oil lamps, for the following reasons:

In the first place, the elongation, at least when it is small, is difficult to observe in the almost always agitated air of a mine gangway. Besides (and this is the most serious hindrance), in passing gradually from pure air to air containing 3 to 4% of fire-damp, and after having traveled a more or less extended road through the mine workings, the miner will indeed observe an elongation of the lamp flame; but it will be difficult to affirm that this elongation results from the presence of fire-damp, and is not due to other causes, such as a higher temperature, a deoxygenation of the air, etc., or even simply to bad adjustment of the wick. This method is therefore only a differential one, permitting us only to observe, at a given place in the workings, the differences of composition which may be exhibited at the same instant by two distinct parts of a gangway or breast. It is applicable, for instance, to the examination of the recesses of the mine roof for fire-damp; and, up to a certain point, it may serve to compare the greater or smaller quantity of fire-damp in the recesses with the amount in the air of the gangways; but the percentage of fire-damp cannot be even roughly approximated by any deduction from the observed flame elongation.

3. Air containing from 6 to 17% of fire-damp is inflammable; that is to say, when it is tranquil the combustion excited at one point will extend progressively, with more or less rapidity, to the whole mass,

If the proportion be less than 6%, a flame or sufficiently hot body introduced into the mixture causes combustion only in a larger or smaller zone surrounding the hot body. The gas still burns, but only with the aid of external heat.

The quantity of gas burned, or, what is the same thing, the extent of the zone in which combustion is effected, is thus greater the more heat is emitted in the unit of time by the hot body. If, for instance, an oil lamp be introduced into an atmosphere containing 5% of fire-damp, the white flame of the lamp will be seen surmounted with a bluish flame which has received the name of aureole. This aureole, at the proportion of 5%, will have a height of 2 to 3 centimeters (0.8 to 1.2 in.) at most if the flame of the wick be reduced to a minimum. It might be more than 10 centimeters (3.9 in.) long if the flame were of ordinary dimensions, but in that case the brilliancy of the latter would render almost invisible the extremely pale light of the aureole.

It is, in fact, by observing these aureoles, after having lowered the wick until the flame shows no longer any brilliant point, that miners have endeavored, since the time of Davy, to estimate rapidly the proportion of fire-damp in the air of mines.

MM. Mallard and Le Chatelier, who were the first to study, with care, the aureoles given by the Davy and the Mueseler lamp in continuous slow currents of air mixed with methane, concluded from their experiments that, as indicators of fire-damp, these lamps do not begin to give tolerably clear indications below 2 to 3%. It is necessary with these small proportions of methane to commence, before the operation, by lowering the wick slowly, so as to cause the luminous part of the flame to disappear. For 3% the conical aureole thus obtained is 6 to 8 mm. (0.24 to 0.32 in.) long, and attains, for 5%, in the Davy lamp the length of 30 mm. (1.2 in.).

At and above 6% these lamps can no longer serve as indicators—the Davy lamp becomes filled with flame, and the Mueseler goes out.

Practically, oil lamps cannot be relied upon to show with certainty the presence of less than 3% of fire-damp—a percentage which should never be expected in the ventilated portions of fiery mines. The security attributed to inspection with oil lamps is therefore wholly illusory.

In the course of their studies upon flame aureoles, MM. Mallard and Le Chatelier pointed out that much larger aureoles could be obtained by flames of alcohol and of hydrogen; but they considered that, in practice, the use of alcohol would be dangerous and that of hydrogen difficult, and confined themselves to recommending the use of the aureoles from oil-lamps, with the additional introduction of a shade for the Mueseler lamp.

The idea of the alcohol lamp was taken up by Herr Pieler, an Austrian engineer, whose apparatus, now widely used in Germany, Austria and the north of France, is merely an ordinary Davy lamp supplied with alcohol instead of oil, and furnished with a shade surrounding the flame which just reaches the edge in pure air, and gives in fire-damp perceptible aureoles from 0.25 per cent. upwards. Fig. 4.

The recent experiments of the Austrian and the French Commissioners on Fire-Damp have shown that, in this form, the Pieler lamp is unsafe, an explosive current of four to five meters (13 to 16 ft.) per second being sufficient to propagate ignition to the outside, even through a double gauze. Hence, it should only be used when provided either with a perfectly close shield, which is removed at the moment of observation, as recommended by the Austrian commission, or else, with a complete permanent shield containing a window which is opened for the observation. The latter is the form employed for the last eight years in the Anzin colliery.

The Austrian commission admits that for ordinary percentages, below 3% of fire-damp, the determinations of the Pieler lamp are correct to within about 0.25%, and that, from 3 to 6%, the error may amount to 1% in consequence of the heating of the lamp and the distillation of alcohol vapors.

Mr. Chesneau describes the apparatus devised by himself to avoid the disadvantages of the Pieler lamp as follows: It consists essentially (see Fig. 4) of a brass reservoir for alcohol, A; a circular crown made of double-wire gauze, B, serving for the admission of fresh air; a hollow cylinder, C, made of sheet metal, surrounding the wick-holder and serving as a shade; an iron-wire gauze, D, with 196 meshes to 1 sq. cc. (1.264 to the square inch), and 140 mm. (5½ in.) high, the collar of which, resting on the hollow sheet metal cylinder, completes the shade; and, lastly, of a sheet-iron shield, E, provided with a window for observation, thoroughly closed by a sheet of mica as thin as possible to permit accurate observations. This shield is fitted at its base with an annular diaphragm, G, which rests on the collar of the gauze and thus completely closes the bottom of the shield so that the outer air can never reach the gauze directly. Between this diaphragm and the collar of the gauze there is interposed a washer of asbestos cardboard, a, a, the object of which is to lessen any heating in the lower portion of the lamp, when the latter is plunged into mixtures containing a large proportion of gas, and when the shield has a tendency to become heated. The upper portion of this shield is provided with apertures, b, b, protected by a fixed shade, d, which prevents the air-currents from impinging directly on the gauze at too great a speed. A movable shade, H, formed by a cylinder of thin sheet-copper, pierced with a window, protects (when necessary) the bottom of the observation window from sharp currents of fresh air, and thus prevents a mist from being formed inside the mica through its being cooled on the outside. It suffices, when making an observation of the aureole, to bring the window of the movable shade opposite that made of mica, when in a calm atmosphere the mist will disappear of itself a few minutes after lighting, and only form again when the lamp is taken into a current of cold air. A scale is painted in white on each side of the window—one side giving tenths of 1% of fire-damp; the other, centimeters. A fixed shade, I, pierced with holes which can be closed when necessary with a movable part operated by a button, protects the gauze crown, B, against draughts. In the interior of the reservoir, A, there is a certain quantity (6 grammes—92 grains) of wadding. The alcohol is introduced into the reservoir by an orifice closed by the screw-plug b, and tightness of the joint is obtained by a lead or leather washer interposed between the plug and its seat. The weight of the lamp, filled with alcohol, is 1,450 grammes (3 lbs. 3 oz.).

As the entrance of the air and the exit of the burnt gases are absolutely separated in the new indicator, there can be no mingling between them as in the ordinary Pieler lamp. Introduced into mixtures of air and marsh

gas with an increasing proportion of the latter, at rest, the new indicator shows aureoles which only reach the top of the gauze at about 3%, with the height of flame and alcohol adopted. For proportions between 3 and 5% the alcohol flame proper becomes elongated, the aureole widens and becomes cylindrical, but is more and more depressed at the top; the lamp can no longer give out the increasing volume of the products of combustion, and the gauze remains completely dark. A little below 5.75% the alcohol flame is drawn out to near the top of the gauze, always without making it turn appreciably red, the quantity of air drawn in through the gauze crown, B, being insufficient to cause the complete combustion of the gas and of the alcohol vapors disengaged through the heating of the lamp.

From 5.75% (a proportion lower than the limit of inflammability of the mixture of air and marsh gas, which is 6%) all flame disappears from the gauze, and the mixture of air and gas burns with a very pale flame only in the crown, but without heating the reservoir to any considerable extent. Everything is extinguished after a few seconds, and very rapidly if the orifices of the shade, I, be closed.

Plunged into explosive mixtures of air, with a maximum of illuminating gas moving very rapidly (the orifices of the shade I being closed), the indicator has given the following results:

1. The velocity of the current being 6.35 m. (20.8 ft.) before reaching the lamp, and 11 m. (36 ft.) at the lamp, the gauze remains dark, and there is no apparent combustion there. The explosive mixture burns in the crown, but developing there a temperature of only 250° to 300° C. at most (commencement of fusion of tin solder). After five minutes, during which the lamp has been violently shaken in all directions, the gas is cut off; the lamp relights itself, the alcohol, vaporized by the heat developed from the combustion of gas in the crown, burns with a reddish dim flame in the gauze cylinder, which remains dark, and this flame rapidly diminishes, resuming the height of initial adjustment in 30 seconds.

2. With the same current of air and a progressive admission of gas, the series of phenomena observed was the same as in mixtures at rest. At about 8% (the limit of inflammability of illuminating gas with air) the alcohol flame proper, which had been elongated too near the top of the gauze, but was growing dimmer and dimmer, suddenly disappeared from the gauze, and the mixture burned only in the gauze-crown. The proportion of gas at which the lamp seems to be most heated (the gauze, however, still remaining dark) is about 6%.

3. With a current-velocity diminished to 2.75 m. (9 ft.) before reaching the lamp and 4.75 m. (15.6 ft.) at the lamp, the flame goes out at 8% of illuminating-gas, as in mixtures at rest.

As to safety, therefore, the new indicator has all the properties of ordinary safety-lamps of approved construction.

The same experiments repeated with the orifices of the shade I open have given the same results.

Experiments made in rapid currents have shown in addition that the lamp may be placed in currents of 8 or 10 m. (26 to 32 ft.) velocity without being extinguished, provided it has been lighted for 15 or 20 minutes before being exposed, and no attempt is made to shield it with the hands (or any other means tending to hinder the draught), which will cause it to go out. Mr. Chesneau has observed that the length of the aureole varies considerably, according to the nature and to the degree of volatility of the alcohol.

In order to emphasize the difference between flame and aureole, M. Chesneau adds cupric chloride, with a few drops of hydrochloric acid to the alcohol. With this salt, which is very soluble in alcohol, the difference in brightness between flame and aureole is not very great, and hence the clearness of the aureoles is considerably increased, which gives the flame a green tinge, especially at the edges, while it imparts to the aureole a fine greenish-blue color.

The coloration of the aureoles is the greater, the greater the quantity of chloride; but too large a proportion causes a voluminous deposit of salt on the wick, which modifies the flame adjustment, rendering it also somewhat uncertain, and similarly affecting the observations of the aureoles, by coloring too highly the luminous glow at the tips of both flame and aureole. On the whole, a satisfactory result is obtained by adding to one liter (0.22 gal.) of methylic alcohol, of the proper degree, 2 cu. cm. (0.122 cu. in.) of a saturated solution of crystallized cupric chloride in concentrated hydrochloric acid (or about 30 drops of this solution per liter). The cupreous alcohol, thus prepared from normal alcohol of 92.5° Gay-Lussac, will mark, after the addition of the chloride, 92° Gay-Lussac at 15° C. The presence of this metallic salt renders the aureoles perceptible at 0.1 to 0.2% of fire-damp.

From 0.5% upward, as is shown in Fig. 9, which gives the appearance of the aureoles for increasing percentages of marsh-gas, it is clearly seen that the aureole is composed of a blue cone, slightly tinged with green, the point of which is surrounded and surmounted by a whitish glimmer, which forms a sort of hood on the blue cone, and the intensity of which diminishes rapidly toward the top.

A number of indicators of this type have been put in use at several collieries since July, 1892, on the recommendation of the French Fire-Damp Commission. The trials thus made up to the present time (January, 1893), have included 15 different specimens of this indicator, and the results have confirmed in all respects those of my laboratory experiments.

As to its safety, the lamp has always extinguished itself at the end of a few seconds in explosive mixtures, without becoming more highly heated than a Mueseler lamp under the same conditions. In no case has the gauze been observed to attain, in explosive mixtures, incipient red heat.

With regard to the distinctness of the aureoles, the tests have been generally very satisfactory. In some mines, where the proportion of fire-damp was always below 1%, and where a little difficulty was experienced in locating the tip of the blue cone it was found that the alcohol employed was much below the normal degree.

In various mine inspections it has been found that the lamp instantly announces the smallest changes of percentages in the surrounding air; and when it is suddenly transferred from an atmosphere containing fire-damp into pure air, the return to zero is immediate.

A REMARKABLE DEPOSIT OF ORES OF WOLFRAM; BY A. GURLT.

The deposit is situated near Long Hill station, on the Housatonic railroad, in Fairfield County, Conn., about eight miles from Bridgeport, and is now owned by Mrs. A. E. Hubbard, of Port Chester, Westchester

County, N. Y. The occurrence of wolfram-ores in this locality was known more than 50 years ago, but they attracted no attention until recently, the property having been exploited for copper, lead and silver with indifferent results.

The deposit is situated in a district composed chiefly of a younger metamorphic amphibole-gneiss, of a dark blackish color, alternating with beds of mica-gneiss, in which mica predominates. The gneiss incloses a bed of crystalline limestone, 35 to 45 feet thick, exposed over an area of about 25 acres, and only covered by gneiss in South Hill, near the southern boundary of the property, where the copper, lead and silver mining had been carried on. The limestone is highly crystalline, and is intersected by several true-fissure veins, in the neighborhood of which it contains foreign minerals, such as mica, pyroxene, analcite and amphibole. The lodes or veins traverse the underlying as well as the overlying gneiss. They may be enumerated as follows: (1). A lode of white, milky quartz over six feet wide, called the "Champion lode," in the western part of the property. It bears northwest and southeast with an almost vertical dip, and may be traced for more than half a mile. It is generally composed of admirably pure quartz, but sometimes contains small quantities of magnetic pyrites, copper-ore and galena, near the walls. (2). A topaz lode, which intersects both the gneiss and limestone in the east part of the mine, bearing almost parallel with the Champion lode and dipping east. The vein is about three feet wide; its centre consists of white, vitreous, and compact topaz, which is often found crystallized in druses or cavities, the crystals being three to seven inches long and five to six inches in diameter. (3). The feldspar lode, composed of fine, granular, white albite, sometimes containing beryl and blende in small quantities, which cuts the topaz lode. The feldspar lode is 7 to 8 ft. thick, and has a north-west and southeast strike. It does not seem to disturb the topaz vein perceptibly, nor does it exhibit well-defined walls; the vein-filling gradually merges into the country-rock without any distinct line of separation.

The wolfram-ore, consisting of wolframite, scheelite, and wolfram-ocher occurs as a contact-deposit, three to five feet thick, embedded between the crystalline limestone and the lower gneiss, and is conformable with their general dip and strike. It is evident that this contact-deposit is intimately connected with the lodes which traverse it. The close genetic connection of the lodes and the ore-bed seems to be confirmed by the fact that the topaz-vein occasionally yields wolfram minerals. When I visited the mine I found on the western outcrop of the ore-bed, about midway between the topaz and quartz lodes, a few shallow pits and a short adit in the gneiss. The pits had been sunk vertically through the ore-bed into the gneiss and then had been abandoned, instead of following the bed, which dips east 20 to 25 degrees. Nevertheless, a not inconsiderable quantity of wolfram-ore, chiefly scheelite and wolframite, had been taken out.

In its principal mass the ore-bed consists of vitreous, translucent quartz of an entirely different character from that of the Champion and topaz veins. It usually forms a compact mass, containing cavities or druses studded with quartz crystals that are frequently covered by a thin film of yellow wolfram-ocher, iron pyrites, epidote, calcite, mica, scheelite and wolframite. The wolfram minerals occur imbedded not only in the quartz but in the adjoining metamorphosed beds of the country-rock, as well-shaped crystals or solid lumps and strings. The wolframite crystals never show the peculiar crystallization of this mineral, but always that of scheelite. They are really pseudomorphs, and indicate that the original wolfram-mineral was scheelite or tungstate of lime. The crystals are sometimes only partially converted, showing both minerals in the same individual.

As the ore bed is traceable all along the outcrop between the limestone and gneiss, it is probably continuous in the whole basin of the gneiss, which is filled by the limestone over a surface area of about 25 acres.

THE MONEY OF THE WORLD.

Acting Director of the Mint Preston has prepared a table of the monetary systems of the world. The table shows that the aggregate stock of gold is \$3,582,605,000; silver, \$4,042,700,000; uncovered paper, \$2,635,873,000.

Stock of gold possessed by principal countries is as follows: United States, \$604,000,000; Great Britain, \$550,000,000; France, \$800,000,000; Germany, \$600,000,000; Russia, \$250,000,000. The stock of silver is as follows: United States, \$615,000,000; Great Britain, \$100,000,000; France, \$700,000,000; Germany, \$211,000,000; Russia, \$60,000,000.

The stock of silver is divided as follows: United States, \$538,000,000 full tender, and \$77,000,000 limited tender; Great Britain, no silver full tender, \$100,000,000 limited tender; France, \$650,000,000 full tender, \$50,000,000 limited tender; Germany, \$103,000,000 full tender, and \$108,000,000 limited tender; Russia, \$22,000,000 full tender, and \$38,000,000 limited tender.

The ratio prevailing in nearly all principal countries between gold and legal tender silver is 1 to 15½. The ratio between gold and limited tender silver is as a rule 1 to 14.38. The respective ratios in the United States are 1 to 15.98 and 1 to 14.95.

The various monetary systems as divided among countries: Gold and silver—United States, France, Belgium, Italy, Switzerland, Greece, Spain, Netherlands, Turkey and Japan. Gold—United Kingdom, Germany, Portugal, Austria, Scandinavian Union, Australia, Egypt, Canada, and Cuba. Silver—Russia, Mexico, Central and South America and India. Of the uncovered money South America has \$600,000,000; Russia, \$500,000,000; United States, \$412,000,000; Austria, \$260,000,000; Italy, \$163,000,000; Germany, \$107,000,000; France, \$81,000,000, and Great Britain, \$60,000,000.

The per capita circulation of gold is: United States, \$9.01; United Kingdom, \$14.47; France, \$20.52; Germany, \$12.12; Russia, \$2.21. Per capita of all classes of money is: France, \$40.56; Cuba, \$31.00; Netherlands, \$28.88; Australia, \$26.75; Belgium, \$25.53; United States, \$24.34; United Kingdom, \$13.42, and Russia, \$7.16.

THE MICROSTRUCTURE OF INGOT IRON IN CAST INGOTS.

By A. Martens.*

In this paper Mr. Martens extends the microscopic examination of the structure of iron, to which reference has already been made in the papers of Mr. Osmond and others. He gives in his paper a large number of sections which have been photographed showing the results obtained, and these sections are shown on the accompanying plates. The ingots illustrated were marked by the Bochum Works, where they were made, as follows: Ingot A, Bessemer, medium hard, C 0.32%; ingot B, Bessemer hard, C 0.4%; ingot C, Bessemer, very hard, C 0.5%; ingot D, Thomas (basic Bessemer), soft, C 0.06%; ingot E, Thomas (basic Bessemer), medium hard, C 0.25%; ingot F, Martin (open-hearth), soft (wire), C 0.1%; ingot G, Martin (open-hearth), soft, C 0.25%; ingot H, Martin (open-hearth), medium hard, C 0.45%.

The surface of fracture of each of these blocks was cut off cold with a circular saw, in as thin a plate as possible, and after each plate another was cut off in the same way, several millimeters thick. These plates were quartered, each part representing one-fourth of the cross-section of its respective ingot. One part of each plate was

strips must reflect light in the same direction if the result of the etching is to be clearly shown. Single sections offer no such difficulty, and in order to overcome it for the several strips, and secure tolerably useful photographs, a special stand was used for their support, by means of which every possible adjustment toward the incident light could be obtained. The eight sets of strips A, B, C, D, E, F, G, H, four to each set, are represented on plates II, III, and IV. Next, six micro-photographs of each strip, magnified 9.5 to 10 diameters, were taken with a special apparatus. The object was to photograph similarly-located parts of the several strips, regardless whether each particular part happened to be specially suited to make a good picture.

The specific descriptions of the sections given by the author are of great interest. The examination shows the surfaces by reflected light; that is, that kind of illumination in which the upper, illuminated, opaque surface of the object casts the light into the tube of the instrument precisely, or almost, in the direction of the optical axis. For weak objectives, this may be accomplished as in Fig. x, and for strong ones as in Fig. x'. To explain more fully, the terms used are vertical light when the rays fall perpendicularly upon the illuminated

PLATE I.

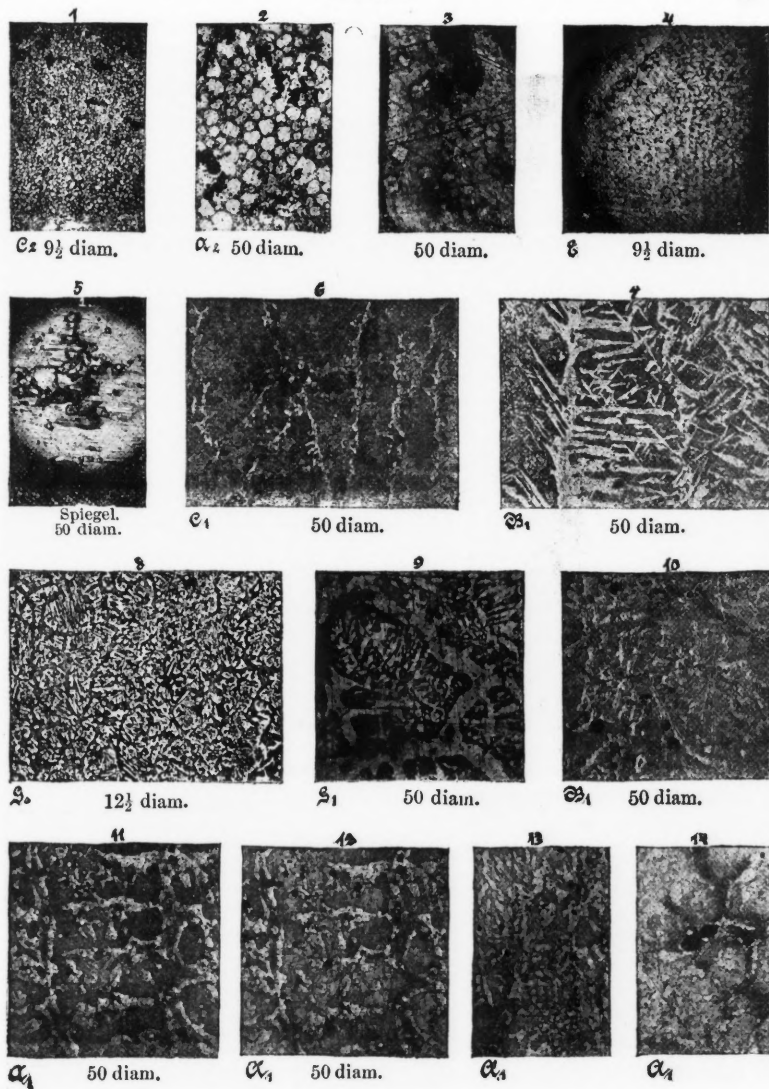
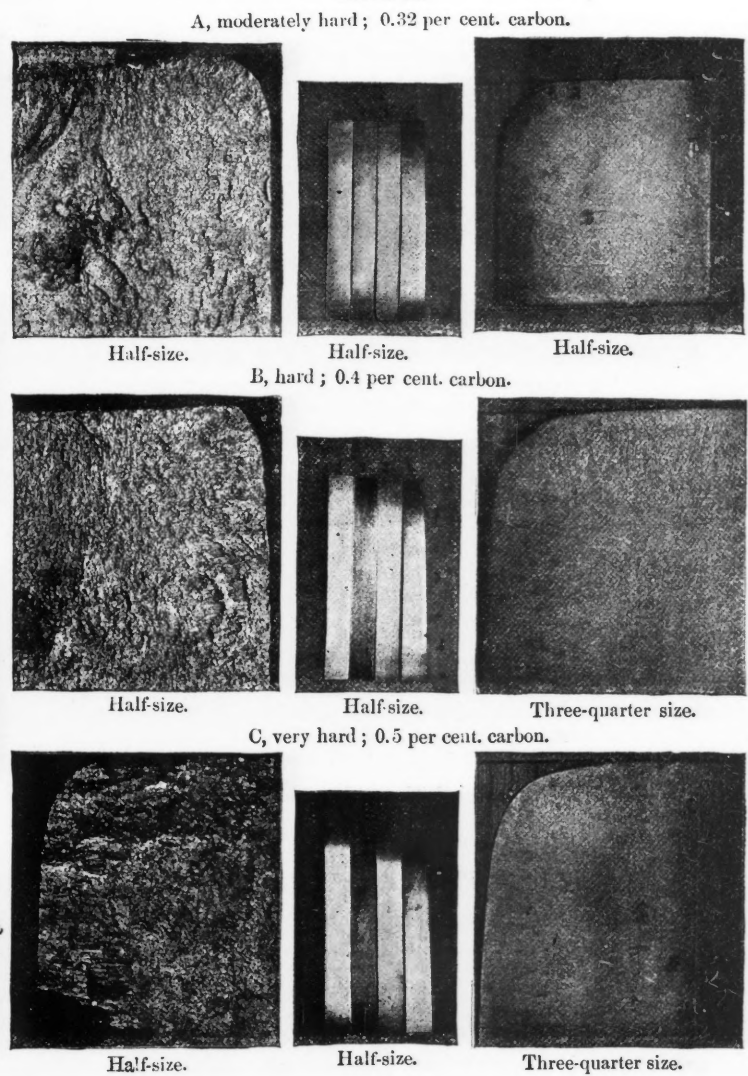


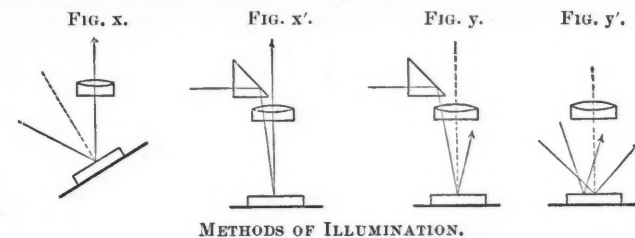
PLATE II.



then finely ground and polished, and etched with an ether-alcohol solution of nitric acid. The structure of the ingot appeared very distinctly, in forms generally radiating toward the cooling side. These etched quarter-plates were photographed in three-fourths their natural size and placed beside photographs of the corresponding surfaces of fractures, each taken in half size and representing somewhat more than one-fourth the cross-section of the ingot (Plates II, III, and IV). Another quarter plate from each set was cut into seven strips, 7 to 10 mm. wide, numbered consecutively from the middle to the side of the ingot, and stamped with the mark of the plate. In every case these marks were stamped near that end of the strip which formed part of the side of the ingot, and which in the photographs is the upper end. All like-numbered strips of the plates A to H were treated alike: Strips No. 1 were not touched; strips No. 2 were heated white-hot at one end, and then plunged into water; strips No. 3 were likewise heated white-hot at one end, and then cooled very slowly in charcoal-dust; strips No. 4 were heated to a bright-red, plunged into water and then heated from one end, until the heat of that end was incipient red, whereupon the strips were again quenched in water.

After etching, each set of four strips was photographed in one-half size, an operation attended with no small difficulties, as all the

surface of the object and are reflected at the same angle (Fig. x'). Oblique light is that produced when the incident rays are so directed that the line of the reflected rays does not coincide with the optical axis of the instrument (Fig. y). Where all parts of the object do not



lie in the same plane, oblique illumination creates shadows on the lower planes and bright edges on the higher ones, as we have already seen. Diffused light is the expression for the illumination when no pencil of particularly directed light-rays (such as those in Figs. x' and y) is used, but when the light (daylight or lamp-light) strikes the object from all sides, and the surface of the object is set perpendicular

* Abstract of paper read before the International Engineering Congress in Chicago.

to the optical axis (Fig. y'). Oblique illumination always may be assumed in the case of Figs. x and y', as there the light is always derived from a window or a lamp.

The conclusions are best expressed in the author's own partial summary: If we summarize and compare our descriptions of the structure of cast ingot-metal in its original, unwrought condition, we notice as the first contrast between Bessemer metal and Thomas and open-hearth metals that the bright veins lie deeper in the first and higher in the last two than the blue and dark-gray fields. For the purpose of acquiring more positive knowledge on this point, I measured the difference in elevation directly, with a magnifying power of 180 diameters, by bringing contiguous parts successively into exact focus. Measurements carried out in this way at different points of the object showed the difference in elevation between the bright veins and the adjoining dark surfaces of the matrix.

(To be Continued.)

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

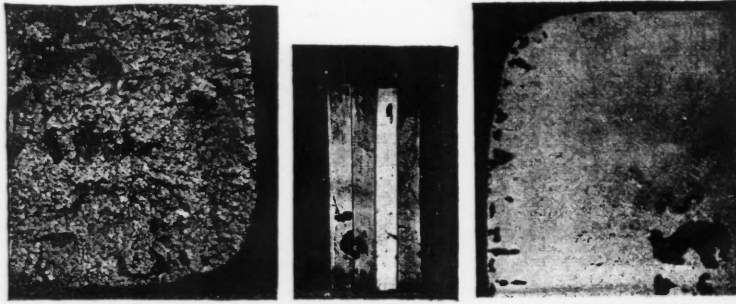
Supreme Court of Utah.

Quieting Title to Mining Claim.

In an action to quiet title to a mining claim, the failure to file a

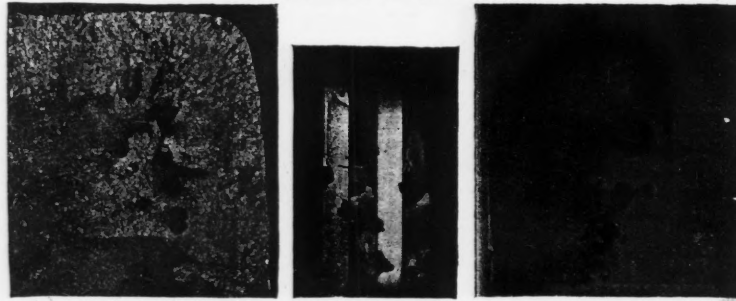
PLATE III.

D, soft; 0.06 per cent. carbon.



Half-size. Half-size. Three-quarter size.

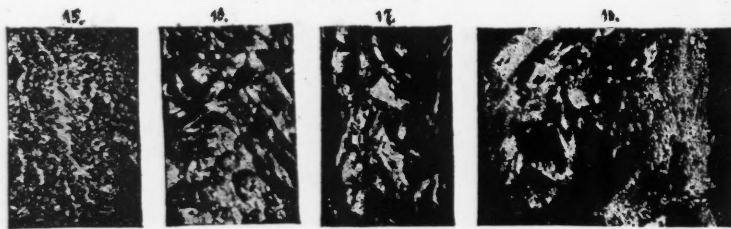
E, moderately hard; 0.25 per cent. carbon.



Half-size. Half-size. Three-quarter size.

D and E, Thomas Metal in Cast Ingots:

Details.



F. 10 diam. F. 50 diam. F. 100 diam. F. 100 diam.

F, Soft, Open-hearth Metal.

counter claim or a cross complaint will not prevent the rendition of a judgment establishing their title to the premises, where the answer alleges facts showing them to be entitled to affirmative relief.—(Perego versus Dodge. 33 Pac. Rep., 221.)

Supreme Court of Colorado.

Annual Assessment Work on Mining Claims.

Where all the work claimed as the annual assessment work on a mining claim is done outside the exterior lines of such claim, the burden of proof is on the persons doing such work to show that it inured to the benefit of such claim, so as to prevent a forfeiture, and not on a person claiming under a junior location to show the contrary. Where work is, in fact, done for the development of a certain mining claim, it may properly be considered as annual assessment work therefor, though it is all performed outside of the exterior lines of such claim. It is immaterial whether such work is done on patented or unpatented property, except as such fact may throw light on the intention of the parties doing the work. Where the owners of a mining claim get permission from the owner of an adjoining claim to continue across the former's claim a tunnel made by the latter on his claim, and they extend it beyond the line of their claim, and discover a lode,

they are not precluded from locating the latter, as against the assignee of the owner of the adjoining claim on the ground that they were trespassers, though such discovery and location were not contemplated by their license. (Hall versus Kearney. 33 Pac. Rep., 373.)

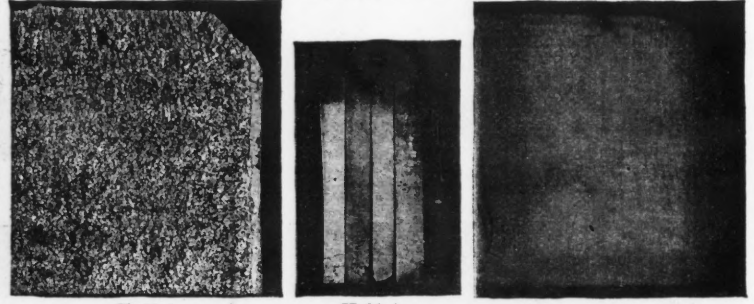
Court of Errors and Appeals of New Jersey.

Construction of Deeds in the Conveyance of Mines.

The deed from Samuel Fowler to the Sussex Zinc and Copper Mining and Manufacturing Company, dated March 10th, 1848, and the confirmatory deed between the same parties, dated March —, 1849, purported to convey to the grantee, inter alia, all the veins, strata and masses of zinc ore in the Mine Hill farm, which, in the then state of the arts and sciences, would be reasonably fit to be mined for zinc, and also all the franklinite and iron ores which did not exist in such veins, strata or masses as were capable of being mined without interfering with the veins, strata or masses of zinc ore aforesaid. The deed from Samuel Fowler to James L. Curtis and Daniel H. Curtis, trustees, dated December 13th, 1850, purported to convey to the grantees such veins, strata and masses of franklinite and iron ores on the Mine Hill farm as were capable of being mined without interfering with the veins, strata and masses of zinc ore which the grantor had conveyed to the Sussex Zinc and Copper Mining and Manufacturing Company, as above stated.

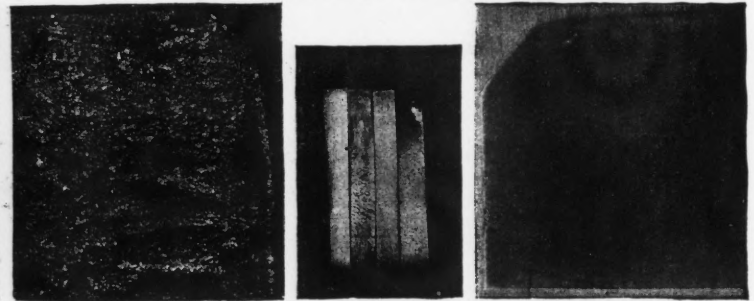
PLATE IV.

F, soft (wire); 0.1 per cent. carbon.



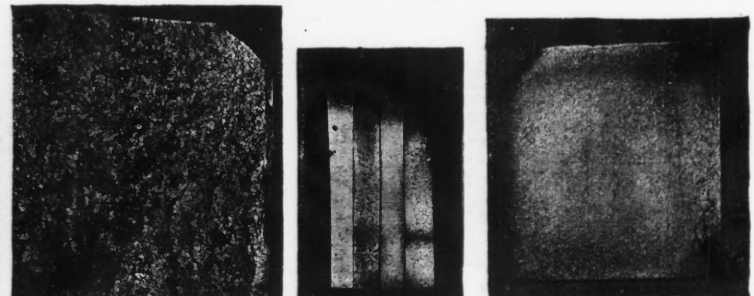
Half-size. Half-size. Three-quarter size.

G, soft; 0.25 per cent. carbon.



Half-size. Half-size. Half-size.

K, moderately hard; 0.4 per cent. carbon.



Half-size. Half-size. Half-size.

Open-hearth Metal in Cast Ingots.

Upon an issue whether certain ore had been taken from such a vein, stratum or mass of ore as is described in the deed above mentioned from Fowler to Curtis, or from a different vein, stratum or mass, to prove that the vein from which the ore was taken was, in 1848, usually called franklinite; that, although this vein was then known to contain certain compounds of zinc mixed with franklinite, yet these were then worthless as zinc ore, and were for that reason rejected by the New Jersey Zinc Company while it held the plaintiff's title; that of all the ore discovered in the Mine Hill farm the only zinc ore then deemed commercially valuable was the red zinc ore which is scarcely found in the vein from which the ore in suit was taken; that this vein was then available only as iron ore, and did not become useful in the arts for the manufacture of zinc until the discovery, in 1866, of what is known as the "lime process"; and that those holding the plaintiff's title had always acquiesced in the occupation of this mine by those holding the defendant's title. A judicial determination of a question of fact binds only the parties in the cause and their privies, and is not even evidential against others. Trover will not lie at the suit of the owner of land against a person who severs and converts to his own use what was a part of the realty, such as timbers, ores, etc., if at the time of severance the defendant was in adverse posses-

sion of the realty under a bona fide claim of title. (Lehigh Zinc and Iron Company versus New Jersey Zinc and Iron Company. 26 At. Rep., 920.)

Supreme Court of Arizona.

Rights of Mine Locators.

Revised Statutes, United States, section 2,322, gives to the owner of a mining location all veins, lodes or ledges throughout their depth, the tops or apexes of which lie inside the surface lines of the senior location. Section 2,336 provides that where two or more veins intersect or cross each other the prior location is entitled to all ore within the space of intersection, but the subsequent locator shall have the right of way through the space of intersection. If a lode on a junior location intersects, on its strike, within the boundaries of a senior location, the latter act did not give to the junior locator the right to take all the ore in the first mentioned lode within the boundaries of both the senior and junior locations except at the space of intersection, and hence such act did not conflict with section 2,322, an

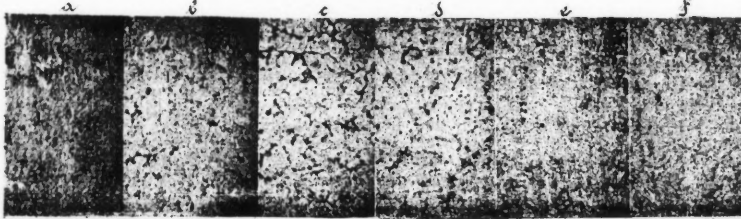
Precipitation by Blast.—In a note to the Chemical Section of the Engineers' Society of Western Pennsylvania, Mr. R. B. Carnahan, Jr., says: "A very convenient way of precipitating phosphorus in iron and steel is to agitate the fluid by blowing through it a stream of air or natural gas. With a fairly good pressure precipitation is complete in from two to three minutes, with any percentage of phosphorus. By using this method of precipitation I have succeeded in getting very accurate results in phosphorus in steels in 12 minutes."

Minerals in Western Australia.—The "Blue Book" of this colony for 1892 gives the following statement of the number of gold mining leases and the quantity of gold produced in the year 1892; Kimberley district, 17 leases, 1,089 oz.; Murchison, 88 leases, 24,356 oz.; Pilbarwa, 42 leases, 12,894 oz.; Yilgarn, 56 leases, 21,209 oz.; total, 203 leases, 59,548 oz.

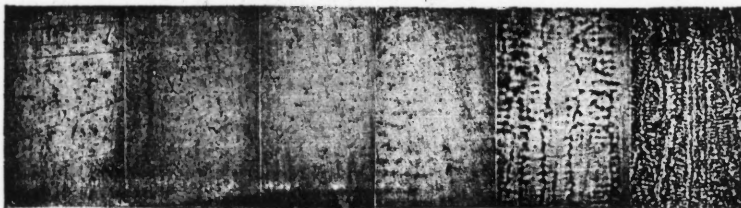
Other mineral leases reported are: Silver, 2 leases, no ore raised; copper, 2 leases, 2½ tons ore; lead, 7 leases, 12 tons ore; tin, 20 leases, 122 tons ore.

PLATE V.

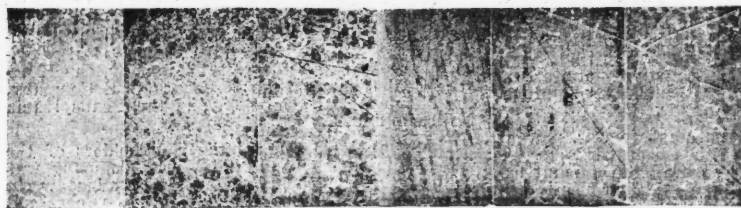
A, moderately hard; 0.32 per cent. carbon.



No. 1.—In original condition.



No. 2.—Heated from the left, and quenched in water.



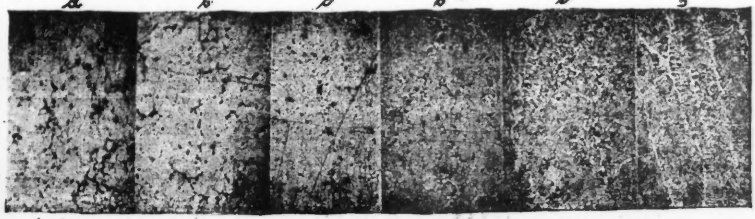
No. 3.—Heated from the left, and slowly cooled.



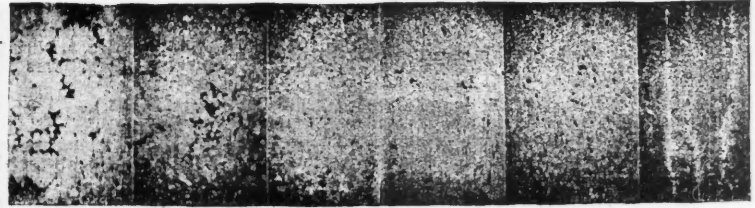
No. 4.—Hardened and tempered from the left.
Bessemer Metal in Cast Ingots.

PLATE VI.

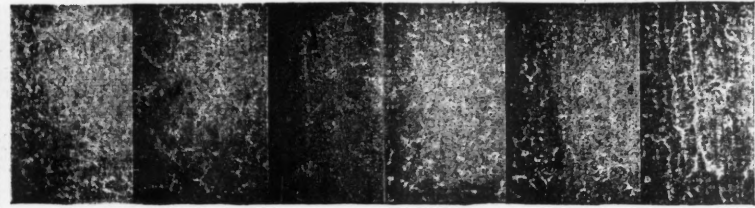
B, hard; 0.4 per cent. carbon.



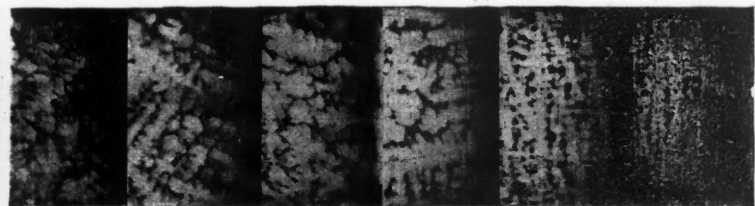
No. 1.—In original condition.



No. 2.—Heated from the left, and quenched in water.



No. 3.—Heated from the left, and slowly cooled.



No. 4.—Hardened and tempered from the left.
Bessemer Metal in Cast Ingots.

earlier act, so as partially to repeal it.—(Watervale Mining Company versus Leach. 33 Pac. Rep., 418.)

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 AUGUST 5TH, 1893.

- 14,441 of 1892. Miners' Picks. C. Hodgkinson, Wigan.
- 15,244 of 1892. Distilling Apparatus. V. J. Kness and C. H. J. Donnadieu, Paris.
- 16,046 of 1892. Electrolysis of Salt. H. Y. Castner, London.
- 16,214 of 1892. Water-jacketed Tuyere for Furnaces. J. Parker, Bradford.
- 16,312 of 1892. Preparation of Aluminum Sheets as Printing Surfaces. O. C. Strecker, Meintz, Germany.
- 16,421 of 1892. Miners' Safety Lamps. W. Ackroyd and W. Best, Morley, Yorkshire.
- 16,489 of 1892. Electric Rock Drill. A. L. Taylor, Liverpool.
- 16,588 of 1892. Oxygen and Hydrogen by the Electrolysis of Water. P. Garuti, Florence, Italy.
- 17,228 of 1892. Double Salts Containing Antimony Fluoride and Chlorides or Sulphates of Alkalis. W. P. Thompson, Liverpool (T. Mayer, Ferenbach, Germany).
- 6,815 of 1893. Manufacture of Iron Salts. P. Hart, Manchester.
- 10,620 of 1883. Electrolytically Coating Ships' Hulls with Copper. T. L. Crane, East Orange, N. J., U. S. A.
- 11,524 of 1893. Apparatus for Dressing Tin Ores. J. Rule, Camborne.
- 11,622 of 1893. Magnetic Separators. R. H. Sanders and C. T. Thompson, Philadelphia.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, JULY 25TH, 1893.

- 501,915. Mold. Milan C. Bullock and Samuel W. Douglass, Chicago, Ill.; said Douglass, Assignor to said Bullock.
- 501,988. Process of Refining Sulphurous Petroleum. Francis J. Carman, Washington, D. C.
- 501,999. Ore-Crushing Machine. Andrew Fraser, San Francisco, Cal.
- 501,997. Apparatus for the Electrolytic Extraction of Metals. Stephen H. Emmens, London, England.
- 502,021. Pulverizer. Austin Stevens, Brooklyn, N. Y.
- 502,023. Artificial Stone. John W. Turner, Jones' Mill, Ala.
- 502,062. Apparatus for Preparing Coal for Transportation. Wallace C. Andrews, New York.
- 502,063. Settling or Storage Pond or Basin for Pulverized Coal. Wallace C. Andrews, New York.
- 502,125. Apparatus for Manufacturing Gas. John J. Kirkham, Terre Haute, Ind.
- 502,151. Excavating Machine. Friedrich W. Volbhering and Carl Bernhard, Lubbeck, Germany.
- 502,167. Metallurgical Furnace. Francis G. Bates, Philadelphia, Pa.
- 502,173. Apparatus for Estimating the Quantity of Combustible Gas or Vapor Present in Air. Frank Clowes, Nottingham, and Boverton Redwood, London. Assignors of a part to Sidney Waters, London, England.
- 502,181. Method of Treating Refractory Ores. Charles J. Fauvel, London, England.
- 502,219. Cam for Stamp Mills. Albert Amshury, Keystone, S. Dak., Assignor of one-half to Eugene Little, same place.
- 502,226. Workman's Time Recorder. Seward A. Dean, Minneapolis, Minn., Assignor of one-half to Harry L. Woodburn, same place.
- 502,250. Apparatus for Handling Coal. William D. Ewart, Chicago, Ill., Assignor to the Dodge Coal Storage Company, Philadelphia, Pa.

PERSONALS.

Mr. John Milne, of the University of Tokyo, Japan, is now in Chicago.

Dr. Daniel G. Brinton, of Philadelphia, has been elected president of the American Association for the Advancement of Science.

Mr. Charles A. Flagg succeeds Mr. Charles W. Seabury, secretary and treasurer of the Calumet & Hecla Mining Company for 26 years.

Professor Schulz, of Aachen, Germany, has been spending some time at Deadwood, S. Dak., examining the mining and milling resources of the vicinity.

Mr. E. C. Cartledge, of Dahlouega, Ga., is in Chicago, seeing the Fair. Mr. Cartledge comes from the center of Georgia's gold mining field, where he is interested.

Mr. James Robinson, of Melbourne, Australia, is in Chicago. Mr. Robinson is interested in mining and takes great pride in the New South Wales mineral exhibit at the World's Fair.

Mr. James F. Kemp, professor of geology of the School of Mines, Columbia College, New York, and the author of the "Ore Deposits of the United States," is paying his respects to the Fair, in Chicago.

Mr. Louis Ruhl, who has charge of the mining trade of the Roessler & Hasslacher Chemical Company, of New York, is visiting Chicago for the purpose of studying the Fair, and he can be found at the Great Northern Hotel.

Dr. W. Lotz, professor of political economy at the Royal University of Munich, is at present in Chicago, where he will remain for several weeks, after which he may go to Montana to inspect the mines. His address is Room 96, University of Chicago.

Mr. Herbert W. Smith, one of the executive committee of St. Paul (Minn.) Academy of Science, is now in Chicago, where he is attending the meetings of the Science Congress, Art Institute. He will be in Chicago a few weeks and can be found either at the Art Institute or 2520 Prairie avenue.

Mr. J. Edward Litten, of Lodz, Russia, is now in Chicago. Mr. Litten represents the firm of Pitzner, Laurahutte & Co., manufacturers of welded iron tubes, and a number of other Russian houses. While here he will correspond for several papers there. He can be found at the Russian Office, Manufacturers Building.

Dr. Max Schumann, geologist and naturalist, of Paris, Tex., left El Paso last week for a day in the mountains west of Juarez, in Mexico. He expected to return on the same day, but he has not been heard of since. His friends have organized a searching party to look for him. It is feared he lost his way and perished in the mountains.

The firm of Messrs. Couper, Millar & Co., phosphate merchants, has ceased to carry on business since July 1st, the partnership having been dissolved by mutual consent. Mr. C. C. Hoyer Millar will continue his connection with the Florida Phosphate Company, of London, England, and Phosphoria, Fla., at No. 1 Farchurch avenue, London, as heretofore.

OBITUARY.

Frank Cobin, of New York, died August 22d, in Denver, Colo., where he had gone for his health. He had large mining interests in Rico and Aspen.

A dispatch from the city of Mexico announces the death of Frederick Roth, a German mining engineer, who lately left that city to examine some gold mines in the State of Guerrero. He was killed by his companion, a Swiss called Neff, who has confessed.

SOCIETIES AND TECHNICAL SCHOOLS.

Union of German Engineers.—The 34th annual meeting was held in Barmen-Elberfeld, August 14th-16th. The Union has now 9,000 members. At this meeting a special report on the Exposition at Chicago was presented and discussed.

New Mexico School of Mines.—This institution, at Socorro, will be formally opened on September 5th. Addresses will be delivered by the Governor, by President Hadley, of the Agricultural College, and President Davis, of the School of Mines.

Iron and Steel Institute of Great Britain.—The autumn meeting will be held at Darlington, England, September 26th, 27th and 28th. Some important papers will be presented, including one on "Carbon in Iron," by Professor Ledebur, of Freiburg, one of the metallurgical exhibits at Chicago, and others.

American Association for the Advancement of Science.—At the meeting in Madison, Wis., August 22d, this association elected 30 Fellows, and voted \$100 for the establishment of a table in the Marine Biological Bureau, at Woods Hole, Mass. A brilliant entertainment on the lake shore was given in honor of the visitors.

INDUSTRIAL NOTES.

Phillips, Nimick & Co. started their Sligo mill August 21st. Over 300 men went to work.

The Inman Machine Shops, of Amsterdam, N. Y., have closed for an indefinite time.

The Oliver Coke Furnace Company fired 100 ovens at Uniontown, Pa., August 21st, employing 300 men.

The United States Iron and Tin Company's plant, at Demmler, Pa., started eight departments August 21st, giving work to 300 people.

At the request of creditors, the Lima Steel Casting Company, Lima, O., has been placed in the hands of a receiver, W. T. Agester being appointed.

The Parkesburg Iron Works, at Parkesburg, Pa., temporarily shut down August 21st, for the first time in 50 years. About 300 hands are thrown out of employment.

It is authoritatively stated that an effort would be made by the Brown-Bonnell Iron Company, of Youngstown, O., to have their large plant resume operations next week.

The plant of the Sharon Iron Company, Limited, Sharon, Pa., resumed operations August 16th in nearly all departments. In the puddling department 20 furnaces were started up.

The rolling mills of the Springfield Iron Company, Springfield, Ill., which have been idle for several weeks on account of the depression of the iron trade, resumed work August 21st.

The Brown & Sharpe Manufacturing Company, of Providence, R. I., one of the largest toolmaking concerns in the country, will resume operations August 28th, after a shutdown of four weeks.

Jones & Laughlin's started all the departments of the American Iron Works, Pittsburg, Pa., August 21st, except Nos. 1, 7, 9 and 10-in. mills. The new 26-in. mill was put in operation for the first time.

A notice was posted by the Lukens Iron and Steel Company, of Coatesville, Pa., August 22d, stating that on September 4th the plate mills will drop to single turn, and there will be a general reduction of wages.

The Midland Steel Company, of Muncie, Ind., has signed the scale of the Amalgamated Association, it being the last mill in that State on a strike. The firm employs 400 men. Its plant will be put in operation next week.

The Thomson-Houston Electric Welding Company, of Lynn, Mass., has discharged all but eight of its employees, and the company will not start up again until general business conditions improve. The company employs 100 hands.

Reports from the Bucyrus amalgamator, now at work, show that thus far it has been very successful. The work done has exceeded the amount expected, and the saving of fine gold has been much more than sufficient to pay the working expenses.

The blast furnaces at the Central Works of the Cleveland Rolling Mill Company, Cleveland, O., closed down on the 22d inst., throwing several hundred workmen out of employment. The furnaces are blown out entirely and indications point to a long shutdown.

The executive committee of the United Miners' Western Association has declared the sympathy strike ordered in the districts of Missouri, Arkansas and Indian Territory at an end. The Kansas miners will stay out until the companies agree to weekly instead of monthly payments.

The sheet and plate department of the Falcon mill, at Youngstown, O., resumed operations August 21st, with 200 men. The scale question between the Amalgamated Association and the officials of the Brown-Bonnell Iron Company, at Youngstown, will probably be settled very shortly.

Justice Fursman has granted an order allowing Receivers Kemp and Keenan, of the Troy Steel and Iron Company, to resume work at the Albany Iron Works and at the Rensselaer Iron Works, to complete the orders on hand, and also allowing them to sell merchant steel and iron at market rates.

Contracts have been closed to build a sheet mill for the Los Angeles Iron and Steel Company, of Los Angeles, Cal. The persons chiefly interested are J. G. Chamberlain, formerly of the Cherry Valley Iron Company, Leetonia, O., and A. S. Robbins. Local scrap and imported billets are to be the raw materials.

The National Tube Works, of McKeesport, Pa., started in partial operation August 21st. Both turns will be given work next Monday. All of the men had their wages reduced from 7½ to 15% in accordance with the amount they made. There was no trouble, as the men had resolved to accept a cut without a strike.

The Lockhart Iron and Steel Company, at Chartiers, Pa., resumed operations in the puddling department on the 22d inst. The mill is being operated non-union, but the firm says the accepted

scale of prices as agreed upon by the Amalgamated Association will be observed throughout. This plant employs 300 men.

The Findlay Rolling Mill Company, of Findlay, O., employing 400 men, resumed operations August 21st. The men have signed a contract to accept as much cash as can be paid by the company and time checks and notes payable in 60 days for the remainder. Other mills at Findlay will, it is stated, resume on a like basis.

Messrs. Fraser & Chalmers, Chicago, have issued a supplementary catalogue describing their new alloy, "ferro-alumina," which they recommend especially for its extreme hardness and toughness. It is used for stamp shoes and dies, crushing rolls, gearing, mine car wheels and a variety of other purposes where those qualities are valuable.

A remarkable feature of the industrial situation is that orders have been issued to shut down the Edgar Thomson Steel Works, of the Carnegie Steel Company, at Braddock, Pa., owing to the lack of orders. Two thousand men will be thrown out of work. This is the first time in the history of the plant that it has shut down from this cause.

The Black Diamond Steel Works, of Pittsburg, Pa., started on single turn August 21st. About 2,000 men were given work, and next week another turn will be on. At the office it was given out that the mill will be operated steadily for many months, as the firm has plenty of orders. The half scrip system may be continued unless money becomes easier.

The Falcon Iron and Nail Company, Niles, O., has concluded arrangements by which its workmen will agree to accept one-half cash and one-half in scrip for wages until the financial stringency has been removed. In case the employees decide to agree to this arrangement the plant of the concern will be put in operation at an early date, probably this week.

It is reported that the Pottstown Iron Company's steel works, Pottstown, Pa., have closed without a promise of resumption. The puddle and plate mills of the same company, and nail factory, are all closed, but it is believed that the suspension of the latter departments will only be temporary. The Potts Brothers Iron Company, Pottstown, Pa., employing over 150 men, has closed its mills until the iron trade improves.

The use of the Shaw gas tester, for detecting the presence and the strength of firedamp is rapidly extending. Among the operators now using this instrument in the anthracite coal region are the Delaware, Lackawanna & Western Railroad Company, the Lehigh & Wilkes-Barre Coal Company, the Lehigh Valley Coal Company, the Kingston Coal Company, the Plymouth Coal Company, the Newton Coal Company, and the Pennsylvania Railroad mines.

The annual meeting of the stockholders of the Old Dominion Iron and Nail Works Company was held at their office in Richmond, Va., last week. The president's report showed a large business and the finances in excellent condition. The officers were re-elected as follows: President, Arthur B. Clarke; vice-president, Douglas Baird; secretary, G. W. Catlett. Directors, Capt. Philip Haxall, Dr. E. T. Willis, Meredith F. Montague, Douglas Baird and Arthur B. Clarke.

About three-fourths of the mills in the Pittsburg district are now in operation, and with fairly good prospects of running steadily. The sheet mills are all operating in part, except Apollo, and the iron and steel mills now in operation include the largest in Pittsburg, except A. M. Byers & Co., Moorhead, McCleane & Co., the Oliver Iron and Steel Company and the Linden Steel Company. At this latter company an extension was granted, and it is expected the mill will resume at once. The statement made by the officials of the firm shows a surplus of nearly \$300,000 over liabilities. Under the agreement for an extension 20% of the indebtedness is to be paid in 12 months, and 10% each six months thereafter, with interest. The Vesuvius works, of Moorhead Brothers & Co. have shut down, owing to a lack of paying orders.

Wallace & Sons, manufacturers of brass and copper goods, at Ansonia, Conn., with offices in this city, have been forced to suspend on account of hard times, and their affairs have been placed in the hands of receivers. Thomas Wallace, of Ansonia, the treasurer of the concern, and Robert M. Thompson, president of the Orford Copper Company, have been appointed receivers. Wallace & Sons are one of the oldest and largest concerns in their line. The business was established in 1848, at Ansonia, and was incorporated in 1853, with a capital stock of \$100,000. They have large rolling mills, wire mills and factories at Ansonia. The concern employs from 1,000 to 1,400 hands at the mills. The liabilities are placed at \$875,000, of which \$450,000 is on open account, nearly all of which are past due, and \$425,000 on notes. The nominal assets are put down at \$2,000,000, of which the plant and machinery are valued at \$1,000,000; book accounts, \$600,000, which are supposed to be good, and merchandise \$400,000, of which about \$50,000 is in this city.

The Berlin Iron Bridge Company, East Berlin,

Conn., is full of orders and running the entire plant full time and portions of the works over time. The contracts include a new electric light and power station at Lynn, Mass., a drawbridge at Salem, Mass., a new foundry building for the New Home Sewing Machine Company, at Orange, Mass., an iron building to go to Tampa, Fla., a large bridge for Chester County, Pa., a new iron storehouse for the New York Knife Company, at Walden, N. Y., a large power plant for the Philadelphia Traction Company, a large cotton shed for the Southern Pacific Railroad, at New Orleans, La., a new roof for the purifier house of the Northern Liberties Gas Company, at Philadelphia, a new power-house for the Reading Traction Company, Reading, Pa., a new power-house for the State Street Railway Company, at New Haven, Conn., a car barn for the Easton Transit Company, at Easton, Pa., a large smelter building for the Anaconda Smelting Company, at Anaconda, Mont. The work now in hand will keep the company busy for five or six months.

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.

ARIZONA.

Maricopa County.

Phoenix Mining Company.—Work on the Phoenix mine, says the Phoenix "Herald," has been steadily pushed for the past month. Since July 15 over 700,000 lbs. of lumber and 600,000 lbs. of machinery have been taken to the mine. All of this has been placed in position and the management is now awaiting the receipt of five more cars of machinery. As soon as this has been received and placed in position the stamp mill will be started. The ore bins, mill frames and battery frames are already up. Messrs. Alley and French have left for the mine.

Pima County.

The Tucson "Citizen" publishes the following items of Arivaca news: The Forman mill started up recently on a trial run, which proved satisfactory, the machinery working well. The mill will start up for regular business shortly. At the Golden Star group the properties are being put in shape for letting contracts. Some ore is out, nearly enough to start and run the mill when it is put up. The ore is gold. Placer mining is being done on an increased scale on account of abundance of water from the late rains.

ARKANSAS.

Pulaski County.

Daisy Dell Mining Company.—This company has been organized by R. Ferrier, J. B. Jones and R. K. Pitkin to mine lead and zinc. The capital stock is \$10,000.

Sebastian County.

Sebastian Coal and Mining Company.—This company has been organized to mine coal. The officers are: Thomas H. Jones, president; Thomas M. Jones, vice-president; David F. Davis, secretary, and Richard J. Protheroe, treasurer.

CALIFORNIA.

Amador County.

Bay State Mining Company.—At the stockholders' annual meeting of this company, held in Plymouth on August 7th, the following directors were elected: J. F. Parks, president; W. A. Green, vice-president; W. T. Jones, superintendent; Wash Marion, L. G. Griffiths, G. W. Easton, J. Graham; Bank of California, treasurer; A. J. Coster, secretary. The superintendent reports the water decreasing daily and that it is now handled exclusively by the pump at reduced speed.

Calaveras County.

(Reported for the "Engineering and Mining Journal.")

Utica Mining Company.—This company, which is the owner of several large mills and extensive chlorination works, has erected here a plant for the treatment by cyanide on a working scale on some of the extremely fine sulphurets and slimes that resulted from the canvas or blanket plant. The new plant was started a few weeks ago and run since to the entire satisfaction. The mine produces a large amount of concentrates, and for many years a great deal of attention has been paid to the chlorination process which has been brought to a high state of proficiency, both in regard to percentage of extraction and low cost of treatment. The chances of a cyanide process in competition with a satisfactory working chlorination process appeared at the outset very small, but since the cyanide process has beaten chlorination on certain materials by several points. The plant in question has been erected specially for the treat-

ment of the fine slime concentrates and is said to be giving an extraction of 97% of the assay value, the cost of treatment is said to be below \$4 per ton. The operations will not remain limited to such slimes, but will be extended on to all kinds of concentrates which have given highly satisfactory results in trial parcels. So far the precipitation of the gold from the solution has not given any trouble as so often seemed the case in other instances. The plant is constructed on the agitator principle; all apparatuses, filter boxes included, are made of steel. It was designed and erected by Dr. A. Scheidel, a chemist and metallurgist of New Zealand, who has erected in that country an extensive plant. He is conducting the operations for the Utica Mining Company, for which he made the first experiment with cyanide.

The operations here are attentively followed by interested parties throughout the State, and I hear that several parties are consulting with Dr. Scheidel with the view of introducing his system into their works.

Nevada County.

Champion Mining Company.—The new hoisting works at the Champion mine are completed and in operation.

San Francisco County.

American Metallurgical Company.—This company has been incorporated at San Francisco, to engage in a general mining business; directors: J. S. Leeds, E. P. Rann, A. C. Van Dyck, Charles Stewart and B. F. Bergin.

COLORADO.

Chaffee County.

Mountain Boy.—A strike is reported in the Mountain Boy lode, situated in Trout Creek mining district, 1½ miles southeast of Buena Vista, and owned by Dr. J. A. Gafford, R. S. Clark and Fred Childers. The vein, which carried but a 3-in. pay streak when first discovered, has been followed 30 ft. by a tunnel, and has lately widened to a 2½-ft. vein, with 12 in. of pay mineral, which is said to run \$100 to the ton. It is a free-milling gold ore. The prospectors who have for several months been searching on Free Gold Hill, just north of the late strike, have, it is said generally, removed to the Trout Creek district, and the placer miners along the Arkansas River are deserting their claims with the same object.

El Paso County.

Ex-Senator Stephen J. Dorsey, who has been in Cripple Creek lately with L. D. Roubensh, is reported to have made several important purchases of mining property for himself and associates. They secured the Manitou, located on Bull Mountain, for \$20,000 on a six-months' bond, and paid \$15,000 for the Konyho and Fortuna, located south of the Strong, and \$21,000 for the Gold Dollar, the Areqna townsite claim.

Gunnison County.

Colorado Fuel and Iron Company.—Work has been resumed at the Ruby-Anthracite coal mine by this company. The Denver & Rio Grande Railroad has finished laying the track to the mine and Superintendent R. T. Lawther arrived from Denver, employed 40 or 50 men and started to work finishing the coal breaker and developing the coal entries preparatory to putting a force of coal-diggers at work digging coal.

Lake County.

(From our Special Correspondent.)

The Pioneer and Bonanza and all their group are now showing free gold in paying quantities.

The New Year mine, bonded to Colorado Springs parties, shows a body of free-milling ore 5 ft. in width.

The strike, made some weeks ago, in the Solix Tyece, still holds out. Some 200 sacks of mineral have been mined and shipped from the rich vein uncovered.

Granite district, the gold section of Lake County, is attracting considerable attention at present. The Magneta shows up a body of ore 2½ ft. in width, 2 ft. of which is a good milling grade and 6 in. a high grade gold running from 10 to 15 oz. The main tunnel is in 50 ft. and a shaft is also being sunk.

Union Mining and Leasing Company.—Amended articles of incorporation were filed this week, the capital stock being made \$500,000; shares \$10 each, full paid. The members of the board for the first year were elected as follows: John Harvey, F. L. Ballou, I. E. Blake, J. E. Price, Jas. W. Clark, S. W. Mudd and M. H. Price.

Jaybird.—This is one of the leading gold properties lying on the Breece Hill. In the several shafts and tunnels there are now completed over 2,000 ft. of working. This week while working in a new drift a true vein of mineral was met with. The vein material is pyritiferous porphyry, talc and iron-stained quartz. The results of the assays have not yet been made known.

Mountain Boy.—On this lode, located about two miles below Buena Vista, a strike was made this week. For some time past a 3-in. pay streak on the vein has been followed and after some months the vein has widened to nearly 3 ft. with 12 in. of pay mineral which average assays show to run \$100 to the ton. One assay made on the 2-in. streak next to the hanging wall returned 82 oz. gold.

The Bi-Metallic smelter, in Leadville, started up this week with one stack and two more will be blown in before the first of next week. These people have placed a new plant of machinery in their works. The workmen were asked to accept a reduction of 10% on their wages, but they refused this, so the old wages will be paid. It is probable, however, that the plant will run only long enough to smelt up the ore now on hand.

Pueblo County.

Colorado Fuel and Iron Company.—The first annual meeting of this company, under its present organization, was held at Denver, August 16th. Out of \$13,000,000 of stock over \$8,000,000 was represented. The following directors were elected: J. C. Osgood, H. R. Wolcott, Dennis Sullivan, M. H. James, O. H. Tull, J. L. Jerome, A. C. Cass, C. M. Schenck and J. A. Keller, all of Denver, E. Thalman and C. N. Meek, of New York; W. L. Graham, of Pueblo, and Paul Morton, of Chicago. The directors elected the following officers: J. C. Osgood, president; Henry R. Wolcott, first vice-president; Paul Morton, second vice-president; J. Kelley, third vice-president; J. L. Jerome, secretary and treasurer; J. A. Kebler, general manager; R. C. Hills, geologist. President Osgood's report to the directors showed the company to be in good condition. The income account for the eight months from November 1st to June 30th shows a credit net earnings of \$733,033 and a debit of \$350,434, leaving a gross surplus of \$262,599. From this gross surplus the following items deducted: Sinking fund, for coal and iron mined, fuel department, \$51,082; iron department equipment, \$4,486; real estate, \$33,368; total, \$89,931. Dividend on common stock, 1¼%; paid May 15th, 1893, \$115,348. This makes a grand total of \$205,280, to be deducted from the gross surplus, having a net surplus of \$157,318.69.

FLORIDA.

Polk County.

Belle Phosphate Company.—This company is now at work and has a plant capable of handling 125 tons a day.

Lake Hancock Phosphate Company.—This new company has begun work. Its plant has a capacity of 100 tons a day.

Palmetto Phosphate Company.—This company has been organized by W. Goodwin, F. Swift, J. H. Cottman and Robert Rasin. The company has already ordered the machinery for its plant and anticipates breaking ground at an early date. Dr. C. G. Memminger has taken the management of the company.

GEORGIA.

Cobb County.

A new coal field has been discovered near Austell, and arrangements have been made for a careful examination of the property. The coal is reported to resemble anthracite, and there is much interest in the field.

IDAHO.

Alturas County.

Queen of the Hills Mining Company.—This mine has at last been drained, the water standing below the 500-ft. level, and work will be resumed.

Boise County.

Boulder.—Work on the tunnel is progressing. The mill will not be started for some time.

Golden Fleece.—This mine was recently pumped out and examined in the interests of Mr. Charles Balbach, of the Omaha Smelting Company.

King Mine.—Work is progressing satisfactorily at this mine. A new pump has been put in and sinking will be continued 300 ft. deeper.

Monarch Mine.—Exploratory work on this property will soon be undertaken. The shaft is now down 40 ft.

Muddy Group.—The superintendent reports that work will not be resumed until the financial situation improves. One of the veins has been developed by shaft to the depth of 228 ft., and in the bottom of the shaft the ore is of better grade than that at the surface. The tunnel is in over 1,800 ft., and will have to be driven only a short distance to reach the veins.

Shoshone County.

Union Concentrator.—The mill is now treating about 70 tons daily of standard ore, yielding about 20 tons of concentrates. This requires 20 jigs, of which 12 are of the Hartz pattern.

Bond Mine.—This mine is located in Berkley Gulch about four miles from the old placer camp, Pierce City. A tunnel has been driven 90 ft. on the ledge and a shaft has been driven from above. The vein is only 10 in. wide, but the ore is high grade. The owners expect to put in a 5-stamp mill. Adjoining the claim is a second, owned by Dr. Boles, of Lewiston, upon which a 100-ft. tunnel has been driven.

ILLINOIS.

Consumers' Coal Company.—This company has been incorporated, with office in Chicago, to mine and deal in coal. The capital stock is \$35,000, and the incorporators are J. W. Thatcher, M. McCormick and A. L. Coates.

Keystone Coal Company.—This company has been incorporated, with office in Chicago. The

capital stock is \$100,000. The incorporators are R. R. Pierce, C. J. Devlin and G. M. Eckles.

Greene County.

Sorento.—About 150 coal miners employed in the Sorento mines are on strike, because of the discharge of one of their number. They refuse to return unless he is taken back.

Woodford County.

The coal mines at Minonk have shut down, throwing 500 men out of employment.

KANSAS.

Bourbon County.

Tenmyson Mining Company.—This company has been organized at Fort Scott to mine coal by E. S. Tenney, H. C. Post, J. H. Richards and others.

MARYLAND.

Cecil County.

It is reported that Baltimore parties have bought the Hanna property on Broad Creek, near Northeast, and will work the kaolin beds there on a large scale.

MASSACHUSETTS.

Berkshire County.

Richmond Iron Company.—At the annual meeting recently the following officers were elected: President, George Church; vice-president, M. H. Robbins; treasurer and general manager, R. A. Burget; secretary, John H. C. Church.

MICHIGAN.

Copper.

Copper Falls Mining Company.—This company has closed its mine and works.

Quincy Mining Company.—It is announced that this company will reduce wages 10%.

Iron—Marquette Range.

Cleveland-Cliff Iron Company.—This company, which reduced its force from 1,300 to 500 men six weeks ago, has made a further reduction, closing down one mine now, working and cutting the force at the Salisbury mine in half. It is reported that the company can neither sell ore already mined nor borrow money on it for further operations.

Iron—Menominee Range.

Pittsburg & Lake Angeline.—The management of this mine has decided to work on two-thirds time, but will endeavor to retain all of the 600 men employed now.

MINNESOTA.

Duluth County.

(From our Special Correspondent.)

Shipments from iron mines in this county to date this year have aggregated 695,000 tons, of which the Vermilion range has sent 520,725 and the Mesaba the remainder. The Minnesota Iron Company's shipments will hardly fall short of \$50,000 or 900,000 tons, far less than was expected in the winter, but considerably ahead of later estimates. Of this total 518,000 tons have gone forward, nearly 300,000 tons are still in stockpile and a good part of the rest is in the company's docks or in transit.

The commissioners of this county recently sent a man over the ranges to investigate reports of suffering among unemployed miners. He found a great many unemployed, but little actual suffering. Out of a usual force of 3,500 men on the Vermilion but 600 are at work, but this force consists entirely of men with families; on the Mesaba the proportion is not quite so bad, though arrears of wages, of which there are none on the Vermilion, are heavy. These arrears are, however, being gradually paid. Several Mesaba properties are resuming operations, which will absorb a good deal of labor. Unemployed miners on both ranges are catching and salting fish, picking berries, taking lands under the homestead law and preparing to wait till next season. The Minnesota Iron Company has decided to give all its men free rent till work is resumed, and has offered woodlands and the free use of teams for getting firewood for winter, acts that are generally appreciated.

Iron—Mesaba Range.

(From our Special Correspondent.)

Biwabik.—This mine, which stopped operations late in July, started up last week, mining with one steam shovel for the present. From 1,000 to 1,200 tons daily can be mined with the present force. The sale of the Adams to the New York and Mesaba syndicate helped out the Biwabik company.

Irondale.—This company has been formed to operate an underground find in 58-17. Ore was struck with a diamond drill 130 ft. down.

Minnewas.—This mine has stopped shipping ore, but is still doing a little underground. It has shipped some 14,000 tons to Lake Erie ports.

Mountain Iron.—This company has put at work a second steam shovel, the two being capable of mining nearly 4,000 tons every 24 hours. Not nearly this quantity is being mined, however. Results show that the force needed to operate one shovel effectively need not exceed 10 to 12 men.

New York & Mesaba.—This syndicate, operating the Lake Superior company's mines, is doing a large amount of development work. A branch of the Duluth, Mesaba & Northern roads is nearly

completed to the properties, and they will be in position to ship ore in September, if necessary.

Oliver.—This company, operating the Mesaba Mountain mine, is not affected by the receivership of the Oliver Iron and Steel Company. It is claimed that the mine will hasten operations in a few days with a view to mining 100,000 tons this season. Some 16,000 tons have been sent forward.

Shaw.—This company did not negotiate a sale of ore it expected and all operations are stopped for the season.

MISSOURI.

At a meeting of the Joint Executive Committee of the United Mine Workers' Association of Missouri and Kansas, held at Kansas City, August 20th, the strike among the Missouri miners was declared off and the men were ordered to go to work on August 23d. It is claimed that this order effects 9,000 men. The men in Arkansas and those in Indian Territory were also ordered back.

La Fayette County.

Matthews Coal Company.—This company, owning a coal mine at Mayview, has increased its capital stock with a view to extending operations.

MONTANA.

Beaverhead County.

Hecla Consolidated Mining Company.—About 125 men are now employed at this mine. Two furnaces are kept going in the Glendale smelter. It is the intention to keep the mines and smelters running the larger portion of the year, although its operation will result in a loss at the current price of silver. The management, however, prefers to lose money in this way, and at the same time give remunerative employment to a number of men who have no other means of subsistence, according to General Manager Kruppenberg, rather than shut down the works completely, and thus suffer a corresponding loss through a complete abandonment of all work.

Cascade County.

(Reported for the "Engineering and Mining Journal.")

Sand Conlee Coal Company.—This company is mining on a 6-ft. seam of coal opened by drift running in level to a covering of about 200 ft. The output is about 1,500 tons daily. The mine supplies the Great Northern and the Montana Central railroads, while about 38% of the coal goes to smelters and other trades. Mr. H. Burrell is manager of the company.

Deer Lodge County.

Parrot Copper and Silver Mining Company.—In addition to shutting down its mines this company commenced to close down its smelter on August 14th and men are being laid off as fast as the supply of ore now on hand runs out. General Manager Gaylord stated, says the "Anaconda Standard," that the shutdown is mainly for repairs, and as there is a great deal to be done in this direction he is unable to state when work will be resumed. The smelter has run along steadily without a cessation of more than a day or two at a time, and it is understood that the works are very much in need of extensive repairs. It is also stated that considerable repair work is needed at some of the mines. The shutdown will throw about 500 men out of employment.

Lewis & Clarke County.

Jay Hawk & Lone Pine Consolidated Mining Company, Limited.—The manager of this property reports that a fine body of ore has been developed in the Bonanza mine. It is 20 ft. wide, and good milling ore.

Piegan Mine.—This mine is vigorously prosecuting work and taking out good ore. It was deemed necessary by the management to cut a raise to connect the upper and lower tunnel for the purpose of obtaining air, and this has necessitated the extension of the upper tunnel quite a distance before a larger force of men can be profitably employed. The ore body is large and in about 30 days the company will commence milling the ore, probably at the mill of the Golden Leaf Company, at Empire. It is expected that connection between the tunnels will be effected inside of 30 days, or by the time of the annual meeting of the company.

Madison County.

Dry Georgia Creek.—An 18-in. vein of free milling ore has been discovered on this creek.

Wisconsin Creek.—Roach & Miller are putting up a 10-stamp mill at the head of this creek. They own several claims and have a considerable quantity of ore on hand.

Silver Bow County.

Butte City.—It is reported that the gold receipts at Clark Bros.' Bank during the last six weeks have exceeded the total receipts of last year. The gold came from German Gulch, the Lowlands and Highland Montana and Gibbonsville, Idaho.

Butte City.—The "Daily Inter-Mountain," in reviewing the copper situation at this point, says: There have not been any shutdowns or suspensions of operations, while in the copper mining industry much new work is in progress. The copper industry, together with the construction of the new railroad to Anaconda, has greatly relieved what might otherwise have proved a dull season. All the Anaconda, Butte & Boston and Boston & Montana mines are regularly producing ore. Train loads go to the smelters at Anaconda and Great

Falls daily. The Butte & Boston company is working five mines, but only two—the Gray Rock and Silver Bow are producing ore. This company has secured the Comanche mine, having purchased the lease held by Patrick Mullins. The lease extends to August, 1894, and the bond of \$200,000 is due in October of this year. The Comanche is one of the most promising copper properties in the district. The Butte & Boston company is actively engaged in developing the Comanche. It transpires that Mr. Mullins and his partners were paid \$10,000 for the lease of the Gambetta. Mr. Leggatt receives 30% royalty of the ore produced during the lease.

NEVADA.

Storey County—Comstock Lode.

Two men have been discharged from the Segregated Belcher mine, leaving a very small force.

Alta Mining Company.—The annual meeting of this company was held in San Francisco on the 17th inst. Contrary to expectations, there was no excitement, and only a small number of stockholders outside of the old and incoming directors attended. By a vote of 96,437 shares of the capital stock an entirely new board of directors was elected, consisting of John Landers, Herman Zadig, James McBoyle, J. W. Maguire and E. D. Goodrich. John Landers was elected president; Herman Zadig, vice-president; J. E. Jacobus, secretary, and Col. E. D. Boyle, the old superintendent, was unanimously re-elected to that position. A resolution was adopted authorizing the directors to employ an expert to examine the books of the company and to take necessary steps to collect any moneys due the corporation.

Belcher Mining Company.—Eight more men have been laid off at the Belcher mine, leaving but seven at work.

Crown Point Mining Company.—The Crown Point mine was shut down on the 16th inst., pending a test of 400 tons of gold-bearing ore recently extracted from the upper levels. Should the test prove satisfactory, operations will be resumed. If otherwise, suspension of work in the mine will continue indefinitely.

Hale & Norcross Mining Company.—The night shift in the Hale & Norcross has been discontinued, involving a draft of seven men and leaving only four miners employed in underground work.

Savage Mining Company.—The latest official weekly letter says: On the 1,100 level we continue to extract ore of fair grade from the 13th to the 17th floors; we are also doing some prospecting work from the sill floor of this level and at a point midway between this and the 950 level. During the week we have hoisted 334 cars of ore; shipped to the Nevada mill 210 tons and milled 210 tons. Car samples average \$27.44; battery samples average, \$25.05. Bullion yield for the week, \$3,829.35. Shipped August 10th to the United States Mint, at Carson City, 350½ lbs. crude bullion.

NEW MEXICO.

Colfax County.

Aztec.—Advices from Santa Fe report the sale of this mine to an English syndicate for \$150,000.

Grant County.

Pyramid Mining Company.—This company's mill, at Pyramid, which has been closed down for repairs, will be started up again very shortly, says the Silver City "Sentinel." An important strike was made in the company's mine recently. There has been nothing but development work done in the mine of late.

Manhattan Gold Mining and Milling Company.—The tenth assessment on the capital stock of this company has been called, and the tunnel is not yet completed. It is safe to say that this tunnel is one of the most expensive ever driven in this territory and the end is not yet, says the Silver City "Sentinel." One-fifth of the entire number of assessments which can be levied on the stock have already been levied and the vein has not yet been reached. If the mine is to be operated at a profit, adds the "Sentinel," the mill will have to be removed to Pinos Altos and water will have to be brought there.

NEW YORK.

Essex County.

All the mines at Mineville shut down August 19th for an indefinite period, and by reason of the shutdown the Lake Champlain & Moriah Railroad will be stopped. This is the first shutdown on account of business depression since the mines were opened. The three furnaces at Port Henry are out of blast.

NORTH CAROLINA.

Moore County.

Southern Red and Brownstone Company.—This company, which has quarries at Sanford, has secured the contract for the stone for a large building in Philadelphia, and will add a number of men to its working force.

OREGON.

Baker County.

Mabel Mine.—The shaft is now down 115 ft. The ledge, as exposed, is 5 ft. wide, showing some free gold.

PENNSYLVANIA.

Anthracite Coal.

Preparations for sinking a new slope are being made at the Hazel Brook colliery, at Hazleton, which, when completed, will give employment to an additional number of men and largely increase the output from that colliery. Two veins of coal have been proved there. They are known as the 7 and 9-ft. veins, and are said to be rich in quality.

Old Forge Coal Company.—This company has mortgaged its property to the Girard Life Insurance Annuity and Trust Company, Philadelphia, to the amount of \$520,000. Of this amount \$270,000 is in cash and the balance in bonds. The mortgage was placed on record on the 23d inst.

Bituminous Coal.

The mines in the Sawmill run district shut down August 19th for an indefinite period. Ever since the strike has been declared off the men have only been working 32 hours a week.

SOUTH CAROLINA.

Phosphates.—The Pinckney mines, says the "Manufacturers' Record," and the Charleston Mining and Manufacturing Company are both in operation and have light stocks on hand. The Bolton mines are running, have good stock on hand and are holding stiff on prices. Gregg's horseshoe mines are closed, but Boyle rock, 52% grade, is being mined. Among the river mines the Coosaw company is at work and has a good stock on hand. The output of this company should reach 120,000 tons this year. Brotherhood is mining; has good stock on hand and ought to reach an output of 40,000 tons. The Farmers' Mining Company is also at work and has a fair stock on hand. The following mines are closed at this writing: Horseshoe, Archdale, Rose, Drayton, Mead, Wando, Liberty Hall, Latham & Williams, Campbell & Hurtz and Dottener.

Richland County.

Cumberland Buffstone Company.—This company has been organized by R. Carrell, W. M. Bird and others to open stone quarries.

SOUTH DAKOTA.

Lawrence County.

Red Cloud Mine.—A new shaft has been started northwest of the old workings. At 18 ft. in depth a vein of ore was found which assayed high in gold.

Hudson Group.—This group is developing into a valuable property, according to the "Black Hills Times." The openings consist of two shafts, one 60 and the other 100 ft. in depth, from the bottom of which cross-cuts have been driven on the ore body for distances of 20 and 38 ft. A 100-ft. tunnel on another claim also exposes the ore. On the adjoining location a 200-ft. tunnel has been run. The claim to the south is opened by a 150-ft. tunnel, about one-third of which is in ore. A new tunnel lower down on the hillside was commenced a short time ago, which is now in 50 ft. Within a few feet of the surface a shoot of ore was struck and has been followed for the distance above mentioned. All of the workings show the ore body, some in flat formation and others vertical.

Red Cloud Mine.—Last week a shaft was commenced on the southwest part of the claim. At a depth of 6 ft. a vein of dry ore assaying \$281 gold and 20 oz. silver per ton was encountered. At a depth of 53 ft. in the shaft, near the center of the claim, the ore has changed from a dry, silicious ore to a vein carrying 110 oz. silver, \$271 gold and from 30 to 60% in lead to the ton. It is more than probable that this is but a temporary change.

Pennington County.

Minnesota Mine.—An experimental run on this ore was recently made with a Huntington mill and is reported to have been quite satisfactory. The mines, which are located near Rochford, are developed by a tunnel running in from the east a distance of 700 ft., cutting the ore body at a depth of 300 ft. From the entrance to this tunnel a railroad will be built on an easy grade to the mill site, four miles distant. On the west side of the hill is another tunnel to the shaft. In the east side tunnel the ore body consists of several large parallel veins, which form an almost continuous ore body 430 ft. in width, which, in the mill test recently made, was found to run from \$1 to \$10 per ton of free milling ore, making an average value of \$3 per ton.

TENNESSEE.

Bradley County.

Blue Springs Mining Company.—A statement, taken from the Chattanooga "Tradesman" in a recent number, was incorrect, owing, probably, to a typographical error. The company informs us that it expects to increase its output of ore to 50 tons a day, and will hereafter run its Scotch hearth furnace double time, making two tons of metal instead of one, as at present. The ore runs from 65 to 80% lead. The company also expects to put up a 30-ton water jacket furnace in the fall.

Roane County.

Roane Iron Company.—This company's mines, at Rockwood, have been closed for the present. One of the furnaces has also been blown out.

TEXAS.

Presidio County.

A railroad line has just been surveyed from

Chispa on the Southern Pacific to the coal mines already opened in this county, the distance being 20 miles. It is said that the line will be built at once. The coal company will extend its operations as soon as shipments can be made.

UTAH.

Juab County.

Annie Consolidated Mining Company.—The annual meeting of the stockholders of this company will be held in Enreka City, Juab County, Utah, on Monday, September 4th.

(From our Special Correspondent.)

Mammoth Mining Company.—Another gold strike is reported at this mine. It is said to be almost equal to the great find years ago.

Salt Lake County.

Bingham District.—At the head of Carr Fork Ed Clary and J. B. Stevens have a tunnel in on a vein 400 ft., which has cut several chimneys of ore running high in silver and 60 to 82% lead. These ore chutes are small, while the vein is from 3 to 5½ ft. wide, and being within 100 ft. of the top of the divide they hope to tap a larger body of ore before getting on the Tooele side of the hill. They have three claims and employ two men. The ore shows horn silver and also native silver. The mine is known as the Julius. The Elnora, located near by, has 12 to 18 in. of ore running 50 oz. silver and 30% lead, and some work is being done. Peterson & Co. are working the York and Agnes and getting some ore. A number of properties are being worked to a very small extent in Carr Fork besides the ones already named. The Old Telegraph is practically idle, the leases all having expired lately and work generally stopped. Along Highland Gulch there is very little doing, except that the Old Jordan mill is running and the South Galena and other Holden properties are being worked, chiefly by leasers, so as to send out a good amount of ore daily. But the worst changes of late in the way of discharge of men and stoppage of operations are found on the Lead mine side of Bingham, says the "Salt Lake Tribune." Three months ago the Sampson, the Yosemite No. 2, Brooklyn and Dalton & Lark were running, giving employment to 200 men. Now all that is doing is at the Dalton & Lark, where 30 men are employed and are taking out 15 tons of ore per day.

Julia S. Mine.—The tunnel is now in 400 ft., and it is said that some rich stringers of ore have been cut.

Stewart Mining Company.—This mine is now turning out considerable gold bullion. The mill is equipped with five Huntington mills, having a combined capacity of 50 tons per day. It is wet crushing, with discharge over long plates to catch the gold. That is the process now used, and results show a saving of 80%. A short time ago the cyanide process was introduced, but it has subsequently been abandoned, the reason given being lack of tankage. In July the mill turned out about \$9,000 worth of gold, and the ore now being run through is showing still better on the plates.

(From our Special Correspondent.)

Blue Jay Mining Company.—This company has elected the following officers for the ensuing year: W. H. Chamberlin, president; J. R. Letcher, vice-president; John T. Lynch, secretary and treasurer. These officers, with Jackson Bolton and O. D. Hendrickson, form the board of directors.

Greeley Mining Company.—The directors of this company recently sold 100,000 shares of treasury stock to Robert C. Miller, of Boston. Work will be pushed as fast as possible.

San Pete County.

(From our Special Correspondent.)

Webster Mine.—Several prospectors, who have been exploring the country contiguous to Ephraim, have given good reports of mineral outcroppings. The Webster has been located in Otterstrom Canyon. It is reported as assaying well in gold, silver and copper. John E. Josephsen, Christian Larson, John Christiansen and John J. Jones are the locators.

Summit County.

(From our Special Correspondent.)

New Gold Field.—Since many miners have been idle at Park City they have put in time prospecting for gold in the adjoining mountains. James McCune, who has searched the mountains of north-eastern Utah, is reported to have made a rich discovery. Some samples exhibited show valuable tellurium. Several old miners have taken tools and provisions and gone to the new field.

Wasatch County.

(From our Special Correspondent.)

Gold Quartz.—George Muir has discovered some gold-bearing quartz near Heber City. Assays show it to be valuable. The exact location is unknown to the public, but development work is said to be progressing.

Washington County.

Dixie Smelter.—The last shipment of Wolley, Lund & Judd's smelter, at St. George, amounted to 99,185 lbs. of copper bullion.

VIRGINIA.

Montgomery County.

Fisher's View.—A shaft is now being sunk by H. D. Walters. A vein has been found carrying free gold, which promises well.

Roanoke County.

Castle Rock Mining Company.—The branch railroad to the mines has been completed, and the company will soon begin shipping iron ore.

Wythe County.

Bertha Zinc Company.—Two of the furnaces at Bertha have been blown out for necessary repairs, but will start up as soon as possible.

WASHINGTON.

King County.

Washington Mining and Milling Company.—This company held its annual meeting at Seattle, August 8th, and elected the following officers for the coming year: A. B. Ball, president; Charles H. Holden, vice-president; H. C. Gordon, secretary and treasurer; David H. Summers, superintendent of mines, and the following trustees: A. B. Ball, H. C. Gordon, C. H. Holden, A. L. Hawley, H. C. Bickford. The company owns and is operating some mines in Washington and at Elk Creek, Idaho.

Lewis County.

Toledo.—A promising field for gold mining has been discovered and made fairly accessible east from this town into the Cascade Mountains. The most important discoveries have been made in the valley of the Green River, a tributary of the Tontle River, about 6 to 8 miles in a northwesterly direction from Mount St. Helens. About 200 claims have been staked out already and registered at Chehalis or with the clerk of the mining district. This mining district, embracing the valley of the Green River, is organized already and has elected its officers. Five or six of the established mines are in a fair state of development and afford assurance of success. At present it is by no means easy to reach the mines on account of the lack of roads and trails.

Snohomish County.

Monte Cristo.—The completion of the Everett & Monte Cristo Railroad will soon make it possible for ore to be shipped to the smelter. Development work and stoppage are in active progress, and the trams from the Wilman's properties will be completed by the time the track is in condition for regular traffic, and by that time also there will be several hundred tons of ore ready for shipment.

WEST VIRGINIA.

Marshall County.

Marshall County Oil, Gas and Coal Company.—This company is preparing to put down an oil well on its property near Monndsville.

Mineral County.

A tract of 50 acres near Shaft, who have begun to sink a shaft. The big vein is said to run through the property.

Randolph County.

Mingo Mountain Coal and Coke Company.—This company has put in a new revolving screen at its No. 2 mine.

WYOMING.

There has been no reduction in the wages paid miners in the Union Pacific coal mines at Rock Springs. At Almy the men suffered a reduction of 9 cents a ton, and at Carbon and Hanna wages were reduced 10 cents a ton. The men at these places, however, were better paid than the men at Rock Springs, and the company is shipping but 200 cars of coal a day from that place at present. One year ago 300 cars were being sent out every day.

Union Pacific Coal Company.—A meeting of the miners employed at this company's mines was held at Evanston, August 15th, to take action regarding the reduction of their wages; also to protest against the advance in prices of supplies.

Weston County.

Cambria Coal Company.—This large plant, the property of Kilpatrick Bros. & Collins, near Newcastle, has started up at its full capacity. The fire which occurred some time ago was more serious than was supposed, causing a loss of \$40,000 partly covered by insurance. The Jumbo and Antelope workings, the principal ones, from which nearly all the coal is mined, are situated on opposite sides of a canyon which is nearly 1,000 ft. wide. Between the workings and below, in the canyon, were located the crushers, screens, bins, chutes, and, in fact, all the massive and expensive engines and machinery, which were entirely destroyed. The company has reconstructed the entire plant. The output of the mines is 2,000 tons per day. Besides this the coke ovens have been renovated and were also started, with a capacity of 50 tons per day.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

(Reported for the "Engineering and Mining Journal.")

In Slovan things are dull. It is said that machinery is going in for the Dardanelles mine.

The Nakusp-Slocan Railroad is being pushed to completion as rapidly as men and horses can work. This road will supply a long felt want in this district.

The Poorman (gold) has once again started up and is running night and day in order to take advan-

tage of the water. This mine has yielded by actual tests with a 10-stamp mill at present in operation from \$18 to \$35 gold per ton.

Considerable attention is being attracted to the Salmon River placer ground. This lies about 25 miles south of Nelson and is reached by following the wagon road from Waneta at the mouth of Pen d'Oreille River or by trail from Nelson.

Up to the present Nelson and all the mining camps in this section are very dull. There does not seem to be any money in circulation, and everyone seems to be waiting for better times. Trait Creek is the busiest of any at present, work being carried on developing the Le Roi, the War Eagle and the Josie, all of which show up well.

In Nelson itself silver is at a discount, and those who have gold properties are making efforts to realize on them. So far the Majestic mine has been bonded for \$16,000 to Jas. R. Pierce, of Philadelphia. This mine shows a well-defined vein of iron-stained quartz about six feet wide, showing from \$20 to \$400 per ton in gold. It is situated about seven miles west of Nelson, near Eagle.

Silver King Mine.—John MacDonald, one of the owners of this mine at Nelson, has just arrived in Spokane on his way home from England. He says that the erection of the concentrator and the actual development on the mine will commence at once, and that the sale was completed on terms already made public. These are, price for whole property £215,000, payable £165,000 in fully paid ordinary shares, £40,000 cash and £10,000 shares or cash at the option of the directors. The following are the directors of the new company: Sir Joseph Trutch, chairman; James Roberts Brown, London; J. R. Drake, Sydneyham; Rankine Dawson, Robert Day, D. H. Gibb, Walter Neilson Eisenfield, directors; F. Ramsey, secretary (one of the original owners). The offices are at 111 Wool Exchange, London, E. C., England. Assays of samples sent to England showed from 24.9 to 47% copper, 1.8 to 7.3% iron, 0.23 to 0.233% silver, 1.3 to 5.7% zinc, 0.4 to 5.1% manganese, 2.1 to 4.5% arsenic, 22 to 24% sulphur; traces of cobalt, nickel, magnesium and gold.

Kaslo-Slocan.

The Boston & Montana company has completed its 100 ton sampling works at Kaslo and is now receiving and treating ores.

Bonds have been thrown up on the Rice group, Wonderful, Moutezuma, Reid & Robinson and Great Western. Some of these have been rebonded.

The Grady group, consisting of the Alpha and four other claims, has been sold for \$150,000. A cash payment of \$10,000 has been made and the balance becomes due in five months.

The hoisting machinery and pumps for the Dardanelles, one of the three shaft mines in the camp, arrived last week at Kaslo and is now on the way to the mine. Work which has been suspended will recommence at once.

The Canadian Pacific Railway is pushing the construction of a branch line known as the Nakusp-Slocan Railroad from the Columbia River to the mines. The contractor agrees to have it ready for operation by January 1st, next.

Bluebird Mining Company.—This company has let a contract to Gilliam Bros. to haul 300 tons of ore to Kaslo at \$30 per ton. The duty on this ore into the United States will be \$21, and the freight from Kaslo and smelting charges \$28 if the ore goes to San Francisco, as is likely. Work on the mine is temporarily suspended, but as soon as the dumps are cleared of the sacked ore about 1,000 tons more will be stowed out and shipped. There about 300 tons of second-class ore on the dumps, which will not be moved until railroad communication to Kaslo is had. The ore now being shipped sampled 134 oz. silver and 74% lead.

Bonanza King.—George Hughes, the Kaslo freighter, has begun moving the ore from this mine to Kaslo. Over 200 tons will be shipped at once to prosecute development work.

Idaho Mine.—This mine has let a contract to move 70 tons of ore to Kaslo. The former shipments from this property averaged over 190 oz. of silver per ton and over 1,400 lbs. of lead.

Mountain Chief.—This mine, owned by George Hughes, is shipping ore daily. Including about 30 tons in Kaslo there is now nearly 80 tons en route to the smelter. This ore, it is claimed, will go over 400 oz. in silver and about 79 to 81% lead.

Washington Mine.—This mine, in which a half interest was recently purchased for \$85,000 cash, has let a contract to George Hughes to deliver 1,000 tons of ore at Kaslo. The ore is expected to average about 140 oz. in silver and over 70% in lead.

Wellington.—This mine shipped 40 tons of ore last week to the Tacoma smelter, which sampled 280 oz. silver and 78% lead. About 300 tons more is stacked at the mine en route to Kaslo.

BRITISH GUIANA.

The exports of gold from January 1st to August 7th amounted to 73,467 oz., worth \$1,307,601, against 64,217 oz., worth \$1,143,150, during the same period of 1892.

ENGLAND.

It is probable that the great strike of the coal miners will soon be brought to an end. At a conference of the delegates of the miners held in London, August 23d, a resolution was adopted declaring that if the mine owners would withdraw the

notice of reduction, the striking miners would pledge themselves to return to work forthwith. The resolution further declared that the miners would ask for no advance in their wages until the selling prices of coal reach the level of those prevailing in 1890.

FRANCE.

For the half-year ending June 30th the districts of the Pas-de-Calais and the Nord, the chief coal producing districts of France, showed a total output of 7,207,768 metric tons of coal, against 7,153,094 tons for the same period in 1892, an increase of 54,674 tons, or 0.76%. There are now 96 collieries at work in the two districts.

GERMANY.

An explosion of firedamp occurred in the Kaiserstuhl coal pit at Dortmund, in Westphalia on the 19th inst., killing 50 persons and injuring many others.

INDIA.

Assam Petroleum.

The annual report of the Director-General of Railways gives some particulars regarding the subject of petroleum in Assam. Only two concessions have so far been granted by Government, one to the Assam Railway and Trading Company, who are primarily interested in developing the new industry, and the other to the Assam Oil Syndicate. The latter have not extracted any oil from their wells yet, but the Railway company has been fairly successful. At Makum, it is true, five out of six borings have been abandoned; but at Digboi three out of four wells are being worked. The total quantity of crude oil yielded during the year ending March 31st was over 32,000 gallons, and since then a real spouting well has been tapped. The oil is of excellent quality when refined, it having been proved on the spot in a small refinery erected at Digboi. The company are determined to exploit this field without delay, and have ordered more machinery from England, so that operations may be carried on this year on a larger scale.

Coal.

Indian papers report that the explorations in Beluchistan are proving successful. Two new mines have been discovered near Sharigh and Khost, and now the authorities contemplate working the seams found in Ghundak, situated about nine miles from Quetta. A small quantity of coal extracted from the mine is being tried on the engines running between Quetta and Rukh.

Kolar Gold Fields.

Official returns from the leading gold mines in this district for the half-year ending June 30th, give the output as follows: Balaghat-Mysore, 4,148 oz., against 2,653 oz. in 1892. Ooregum, 35,937 oz., against 23,817 oz. in 1892. Nundydroog, 13,268 oz., against 15,143 oz. in 1892 and 9,524 oz. in 1891.

Phosphates.

According to "Indian Engineering," Dr. H. Warth, Superintendent of the Central Museum, Madras, has proceeded to the Trichinopoly District for a further exploration of the phosphate-bearing tracts in the Perambalur taluk. An additional staff has left Madras to join him at the latter place.

MEXICO.

Guandjuato.

United Mexican Mining Company, Limited.—The gross return for week ended August 5th, at San Coyetano were \$1,400; expenses, \$1,750; loss, \$350. At El Cubo; gross returns, \$6,305; expenses, \$4,000; profit, \$2,305.

Zacatecas.

Mesquital del Oro Mining Company, Limited.—Result of the July mill run: 50 stamps ran 31 days, quantity of ore crushed, 3,691 tons; bullion produced at clean up, 1,102 oz.; value about \$4,050. Also remitted copper bar, value about \$50.

NEW SOUTH WALES.

A rush has taken place to the White Cliffs opal fields, and between 400 and 500 men are now there. The discovery of gems is very patchy, and at present it is not at all probable that so many seekers will make a living. Writing of this rush, the mining warden says a report has reached him that 200 men from Broken Hill are on their way to the mines. Operations on the field are active, and ground some miles in extent is being worked. Large parcels of valuable opal are being obtained at an average depth of 8 ft. from the surface. The warden further states that over 80 mineral licenses have been issued from the Wilcannia office during the past half year.

Block No. 14 Mine.—The general manager of this mine has received instructions to close without any delay two of the furnaces; 100 men will be immediately thrown out of employment in consequence. The actual returns of the first parcel of bullion smelted by the Junction North Company after adjustment with Block 14 are 4,594 oz. of silver and 4½ oz. of gold. Greater attention will in future be paid to saving gold, the present output of bullion being three tons, thus giving 1½ oz. to the ton, besides which it is anticipated that over 40% of gold is lost in tailings, and more must be also contained in the copper precipitate. Up to date 440 tons of argentiferous sandstone have been treated.

Hill End District.—Gold reefs of large size and good quality have been discovered near Hill End, and there is much excitement in consequence. About £800 worth of gold was obtained in one day by prospectors. Red Hill, Tambaroora, is proving

very profitable to the few working syndicates there now. Recently a party cleaned up 43 tons for 50 oz. of gold, paying wages at the rate of £6 a week. Two other crushings from the same locality will be put through in a short time.

Junction Mine, Broken Hill.—A contract has been entered into whereby 2,000 tons of sulphides, of the value of not less than 30% lead and from 28 to 30 oz of silver, will be dispatched via Port Pirie to Freiberg. In order to push on the completion of this contract, nearly the whole strength of the mine will be centered in the sulphide stopes; and the carbonate bodies now being worked, with the exception of one at Brown's shaft, at the back of the 300-ft. level, will, for the time being, be neglected. The works at Port Adelaide are amply supplied with a stock of both sulphide and carbonate ore, which will keep them going for some time to come, so that shipments there will temporarily cease. Work has been started at the 450-ft. level in McIntyre's shaft, with a view of extending the drive south, which will be continued in the sulphide body right under the stopes being worked above. The stopes at the back of the 40-ft. level overhead still present the same healthy appearance. The southern faces show a great improvement, the intrusive sandstone body, which recently made its appearance, having given way to ore of good grade. The lode at the back of the 300-ft. level in Brown's shaft presents an extensive breast of sulphide material quite 20 ft. wide, assays returning up to 34 oz. silver and 35% lead. This body is making up on the hanging-wall to the 200-ft. level. The carbonate stopes at the back of the 300-ft. level in Brown's shaft are also returning good oxidized and silicious material.

Mount Morgan Mining Company.—The annual report of this company shows that the total quantity of ore treated during the past year was 62,200 tons, and the yield of gold 119,900 oz. The year's dividends amounted to £300,000.

ONTARIO.

Ogema.—This silver mine was sold at public sale at Port Arthur, August 15th. The affairs of the company will be wound up, on account of dissension among the stockholders. The mine, which has not been worked for some time, was bought by J. F. Ruttan, of Port Arthur, for \$925.

QUEENSLAND.

Etheridge District.—Returns from this gold field for May from seven mills give a yield of 3,129 oz. gold from 1,918 tons ore, or an average of 1 oz. 12 dwt. 7 gr. per ton. The Percy River, which has not given any large returns for some time past, contributed 1,864 oz. from 596 tons, or an average of 3 oz. 2 dwt. 13 gr. to the ton. For two months (April and May) the yield has been 5,119 oz. 17 dwt. 12 gr. from 4,032 tons, which added to the returns for the last quarter give approximately 13,314 oz. 2 dwt. 6 gr. from 11,141 tons, from the whole field for the five months.

Gympie Goldfield.—The ore crushed during June amounted to 4,693 tons, yielding 6,792 oz. of gold. The total tonnage crushed during the half-year is 27,081 tons which yielded 27,345 oz. 17 dwt. 5 gr. of gold. This gives an average about 5 gr. over 1 oz. per ton. It is expected that the amount of stone crushed monthly during the coming half of the year will be nearly double what it has been in the half that is passed. The dividends paid amount to £12,118, making the total sum paid during the half-year £41,963. During the month 21 companies made calls amounting to £4,103; the total calls for the half-year amount to £24,103. The dividends for the month exceed the calls by £8,015, and for the year to date by £17,860.

SOUTH AFRICA.

De Beers Diamond Mining Company, Limited.—According to a Reuter dispatch the Hon. Cecil Rhodes has sold on behalf of this company the entire stock of the company's diamonds to Messrs. Barnato Brothers, who are acting as the representative of a syndicate. The amount of money involved in this sale is over £1,000,000 sterling, being the largest transaction in diamonds ever made.

Diamonds.

An unusual number of large diamonds have recently been found in South Africa. In our last issue we gave a short description of the 971 carat stone found at Jagersfontein. Since then a stone weighing 27½ carats, and of perfect form, has been found at the Vaal River diggings. New diggings have been opened up at De Aar. The geological conditions are the same as those at Kimberley, but the flue is not as rich so far as developed. The shaft is now down 95 ft. and a 2½ carat stone has been found.

Griqualand.

A discovery of a rich vein of galena is reported to have been made near Griquatown and prospecting is now being vigorously carried on.

Mashonaland.

Mashonaland Agency.—At the annual meeting in London recently the chairman said that during the two years the company had been in existence they had expended £32,597 of the authorized capital of £100,000, only half of which had been called up. For this outlay they had already acquired 400 claims and the right to take up 235 more. These were in the Victorian district, to which they were paying the most attention, and they had so far succeeded with their preliminary work that they were justified in calling in other companies to assist in the development of the country. In fact, they had al-

ready been able to dispose of 120 claims to a company with a capital of £140,000, formed without even the issue of a public prospectus. This capital had been placed against their claims. As to the future of Mashonaland, it had been shown that the climate was good. The opening of the Beira Railway would completely revolutionize the position. Instead of the very tedious route now used, goods could then be conveyed by steamer from Cape Town to Beira, and then over the 50 miles of railway to Fort Salisbury cheaper than they were now delivered in Johannesburg. The gold reefs already worked had been found to be payable, and it was no longer an open question whether settlers in the country would be able to reap a profit from their exertions.

Transvaal.

Glowing accounts are published of the mineral prospect in the Kroonstad and Potchefstroom districts of the Free State and Transvaal, says "Africa." Seven reefs have been found and prospected. They vary from narrow leaders up to 6 ft. in width at the outcrops, and are in places fully 20 ft. thick, with solid blanket auriferous ore. The pannings from the outcrop run 6 dwts. of free gold, at a depth of 40 ft. 8 dwts., and at 70 ft. 11 dwts. From leaders pannings of free gold have run up to 2 oz., and various assays to 5 oz. The syndicate has also acquired mineral rights to a large farm of 6,000 morgen close to the gold belt, with beds of good coal. Shafts sunk into the coal bed have gone 18 ft. without going through the seam. There are also large beds of iron ore on the property, in which occur veins of silver and lead ore.

Witwatersrand.

Simmer & Jack Gold Mining Company, Limited.—The eleventh half-yearly report by the directors of this company states that the net profit for the half-year was £17,966. The report proceeds: As is the custom with this company, the cost of mine development, £10,720, has been charged against working expenses. The amount was expended in driving and sinking 3,137 ft., opening up, approximately, 48,722 tons of ore. The working expenses have increased during the half year under review, from 21s. 5²/₉d. per ton to 22s. 4⁶/₉d. This includes 4s. 1⁶/₉d. per ton for mine development, as against 3s. 5⁸/₉d. per ton during the previous six months. The assets were written off £13,589 8s. 4d., which leaves a credit balance of £55,053.

The engineer's report shows 150,000 tons of ore in sight and available for stopping, and states that the reefs increase in value as the lower levels are opened. During the six months the 100-stamp mill has crushed 51,846 tons of quartz, yielding 19,256 oz. 19 dwts. of smelted gold, an average of 7.53 dwts. per ton; and, in addition, 57½ tons of concentrates, equal to, say, 210 oz. of gold. The tonnage crushed and yield per ton are lower than was anticipated, owing to the mine being flooded during the heavy rain of last February, and the failure of coal transport during the same month caused the mill and other works to be closed down. The cost of milling, including charges for removal of tailings, was 6s. 6⁸/₂d. per ton. A contract for treating tailings by the cyanide process is now being concluded with the Rand Central Ore Reduction Company.

United Iry Mining Company.—At the recently held annual meeting of this company a profit of £4,965 was shown as the result of the year's working. A dividend of 2% was declared, making, with previous dividends, 10% for the year; 2,615 tons of ore milled yielded 3,423 oz. of gold, equal to 1.3 oz. per ton. Reference was made to the development expenditure, the new milling plant and cyanide works, and the future hopefully spoken of.

TONQUIN.

La Societe des Mines de Kebao has formally and with some ceremony opened the main shaft in the island of Kebao. Some work was done there a year ago and coal taken out for testing purposes, and the company now intends to work on a large scale. There are two veins so far discovered, one 1.8 m., the lower 2.3 m. thick, and the coal is of excellent quality. Used in a French gunboat it proved equal to ordinary Welsh steam coal.

URUGUAY.

Goldfields of Uruguay, Limited.—During the month of July only 200 oz. of gold were produced.

VENEZUELA.

El Caratal Mining Company, Limited.—Mr. Sketchly, the expert sent to examine this mine, reports that there are 100,000 tons of tailings on the dump, and advises that they be treated by the cyanide process.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 230, 231 and 232.]

NEW YORK, Friday Evening, August 25.

In common with other security markets the mining stock market is very dull. Indeed, of all the markets that for mining stocks is the dullest and most uninteresting. Nobody, apparently, wishes to buy mining stocks, whether the company's mine be of gold, silver, copper, iron, or any other metal.

During the past week there has been a slightly better inquiry for some of the gold stocks at the Consolidated Stock and Petroleum Exchange, such as Phoenix (reorganization certificates), Deadwood and Standard, but these inquiries have not resulted in actual sales. Still, it is encouraging to note that there is some inquiry, even if it be more or less of an idle nature, for it shows that the public commences to remember that there are such things as mining stocks, something which it seemed to have forgotten altogether.

Of the Comstocks, Consolidated California & Virginia was in some demand, and shows sales of 225 shares at \$1.40. The only other Comstock to be traded in was Hale & Norcross, of which 200 shares were sold at 13c.

Of the California stock Brunswick had a sale of 100 shares at 4c. One hundred shares of Quicksilver, preferred, were sold at auction at \$15.50.

Leadville Consolidated was the only Colorado stock to show any transactions: 200 shares were sold at 13c.

The shipments from the Victor gold mine of Cripple Creek, Colo. from August 1st to August 19th, amounted to \$43,178.

In our mining news columns will be found an item of interest concerning the Phoenix Mining Company's property. It shows that the reorganization committee is doing its best to put the property on a good working basis.

Boston.

August 24.

(From our Special Correspondent.)

The market for copper stocks the past week has ruled extremely dull, with only slight variations in prices. This, in view of the decline of ingot copper below 10c., would seem to indicate that we have seen about the lowest figures for the best mines, and that with a favorable turn in financial affairs prices will show a substantial improvement.

Calumet & Hecla sold at \$260, declined to \$257½, and recovered to the former figure.

Tamarack advanced from \$125 to \$126, but lost the advance and closed at the former figure.

Quincy sold at \$98, but improved in later sales to \$100.

There was a very light business in the Montana stocks. Boston & Montana sold at \$19 for round lots, declined to \$18½ and recovered to \$18¾. A few small lots sold at \$19½@ \$19¼.

Butte & Boston touched \$5½, but most of the sales were at \$5¼.

Osceola was dealt in only in a small way at \$22@ \$23.

Franklin declined to \$8½ for 100 shares, a small lot selling at \$9.

Centennial sold at \$2¼, an improvement of the fraction, and Kearsarge declined to \$5¼ for 100 shares.

Tamarack, Jr., sold at \$12, same as last week.

Wolverine declined from \$1 to 75c. on the announcement of another assessment of 50c. per share. The net indebtedness June 30th is reported as \$20,300. The cost of copper mined in July is reported to be 9½c.

Napa quicksilver sold at \$4. No change.

San Francisco.

SAN FRANCISCO, August 25 (By Telegraph).—The opening quotations to-day are as follows: Best & Belcher, 55c.; Bodie, 20c.; Bulwer, 10c.; Chollar, 20c.; Consolidated California & Virginia, \$1.30; Gould & Curry, 25c.; Hale & Norcross, 50c.; Mexican, 50c.; Mono, 10c.; Ophir, 55c.; Savage, 35c.; Sierra Nevada, 30c.; Union Consolidated, 30c.; Yellow Jacket, 35c.

London.

Aug. 17.

(From our Special Correspondent.)

The amount of business transacted during the past fortnight has been almost the smallest on record in all departments of the Stock Exchange, and the settlement ending to-day has passed well-nigh unnoticed. Many causes have combined to bring about this result, the chief being the recent troubles at settlements. The hot weather has had a good deal to do with it also. During the past week we have had a spell of hot, dry weather not often experienced in this country, and everybody that has any money to spare is out of town on his holiday. The amount of business transacted has therefore been extremely small and any variations in quotations are strictly nominal. Elkhorns have recovered 6d., and Montanas and Poormans have fallen 3d. and 6d. respectively. Golden Feathers, American Belles and Jay Hawks have fluctuated a trifle during the week, but have ended up at the same price as they started at. Jay Hawks in usual times might have been worked up a little on the strength of the report that a new ore body of considerable value and extent had been opened up in the Bonanza mine, but, nowadays, all that such a report can do is to temporarily counteract the natural tendency to decline.

The most serious news of the week, however, is the collapse of the intended reconstruction of the Yankee Girl mines. It will be remembered that a few weeks ago I reported that the directors of this company advised a reconstruction of the company, with the object of raising additional capital of £39,000 to

pay off the mortgage bonds with interest, and provide a sufficiency of money for prospecting and development work. Unfortunately for the directors, holders of only 113,000 shares out of a total of 200,000 shares have responded favorably to the scheme of reconstruction. As the amount of money thus obtainable could not be any greater than £15,000, it would only suffice to pay off the debentures and not provide anything for the future. There is, therefore, no alternative but to abandon the scheme of reconstruction, and a resolution was passed to wind up the company voluntarily. A proposal is now on foot to form a company of much smaller capital for the purpose of purchasing the mine, and every shareholder in the present company will be given a chance of subscribing to the new one. The present quotation of Yankee Girls on 'Change is 0 buyers and 6d. sellers, so that in all probability they will be erased from the list entirely at no short time ahead.

The Harquahala Gold Mining Company, recently established here to take over gold properties in Arizona Territory, report that during July the mill worked night and day for 20 days and yielded an amount of gold estimated to be worth \$35,000. Many investors in this country are asking how the "Alien Capital Law" of the territory is likely to affect the rights of this English company to the property. It is true that this company was formed to take over the property on a working agreement (practically a lease) from a company owning the property that was formed under the laws of Minnesota.

In these days of receiverships, failures and commercial depression, it is, to say the least, exhilarating to read the report for the half year, January-June, 1893, of the well known firm of chemical manufacturers, Brunner, Mond & Company, of Northwich, Cheshire. This firm have just paid a dividend on the half year's work at the rate of 100% per annum on its ordinary stock, as compared with a dividend at the rate of 50% per annum for the corresponding period of last year. The paid up capital of the company is £437,800 in 7% preference shares, and £632,500 in ordinary shares. The amount of dividend distributed for the first half of 1893 is £15,323 on the preference, and £316,250 on the ordinary shares.

The English Crown Spelter Company, operating zinc mines in Italy and smelting works at Swansea, have issued a report on their workings for 1892. Owing to the severe decline in the price of spelter and the recent fall of the contents of the ore, no dividend can be declared, but with the more modern machinery recently erected there are better prospects for the current year.

METAL MARKET.

NEW YORK, Friday Evening, Aug. 25, 1893.
Prices of Silver per Ounce Troy.

Aug.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in \$.	Aug.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in \$.
19	4'86¼	33¾	73¾	0'569	13	4'86¼	34¾	75¾	0'585
21	4'89¼	34	74	0'573	24	4'86¼	31¾	74¾	0'578
22	4'86¼	31¾	75½	0'584	25	4'86	34	73	0'565

The London market has been a strong and advancing one, based on an active demand for spot silver for India and short supplies. China has also been an active buyer for future shipments. The urgent demand being supplied the market dropped back to 34 and closes with sagging tendency, not due to any pressure to sell silver from this side, but in sympathy with some prospect of a repeal of the Sherman law.

Gold and Silver Exports and Imports at New York, Week Ending August 19th, 1893, and for Years from January 1st, 1893, 1892.

Week	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1893...	None	\$10,706,358	\$264,600	\$3,246	\$10,967,712*
1892...	69,225,427	37,588,778	20,590,593	1,556,256	41,470,986
1892...	53,829,363	6,420,314	13,611,260	1,396,563	59,693,746

* Imports.

During the five days ending August 25th the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$5,000; silver, \$565,800. Imports, gold, \$5,724,566; silver, \$101,527.

NOTES OF THE WEEK.

The Chamber of Commerce of Bombay and the India Currency Association have sent protests to the Marquis of Lansdowne, Viceroy of India, against the sale of India Council bills under 1s. 4d. They state that the action of the Council in selling bills at less than 16d. has demoralized trade and is causing immense loss to the commercial interests of the country. A dispatch from Calcutta says the absence of demand for India Council bills is attributed there to the enormous importations of silver during the protracted sittings of the Herschell Indian Currency Commission. Those importations

during the year ending last March amounted to 150,000,000 rupees against a nominal yearly importation of 80,000,000 rupees.

Orders have been issued by the Treasury Department to all sub-treasuries to pay out gold over the counters the same as other classes of money. The effect of this is to practically place the gold reserve among the available Treasury cash assets.

The measures adopted by the Mexican Government to meet the results of the silver crisis will result in an annual difference of \$10,000,000 in the revenue of the Republic. The various economies which are in actual operation are estimated to produce a saving of \$6,000,000, and an increase in taxation is expected to bring in \$4,000,000. If these anticipations are realized it is thought that Mexico will have no difficulty in meeting all her foreign creditors with payments in full and to date.

At a meeting of the Cabinet of the Italian Government held August 10th it was decided to order the coinage of 10 and 5-centime bronze pieces to the amount of 10,000,000 of lire, and to issue provisionally 30,000,000 of one-lira Treasury notes, which shall be legal tender until organic measures have been adopted for the regulation of the currency. These notes will be covered by an equal sum of small silver money deposited in the Treasury. It was further decided that payment of the rente coupons, due January 1st, 1894, shall be made only on the presentation by bondholders of the title deed, together with an affidavit, and lastly, that the Treasury shall at once hand over 70,000,000 lire to the issue banks.

The mine owners and metal refiners of Murcia, Spain, have represented to the Minister of Finance that the imposition of an export duty on argentiferous lead, as proposed by the Marquis Villamejor, is detrimental to the mining interests of the country. The contention is supported by the fact that of upward of 2,000 mining concessions registered in the province only 130 are actually utilized. In the opinion of the miners the duty proposed will diminish instead of increasing the revenue of the treasury, as it will restrict mining operations still more.

The Russian Government has published an order which provides that the acceptance of silver in bars or old coins by the mint, in exchange or for recoinage into new coins shall discontinue. The importation into Russia of foreign silver coins, with the exception of certain Chinese coins, is also forbidden.

The usual 10-day statement of kinds of money received at the New York Customs House in payment of duties shows a decided increase in the proportion of gold coin. This now stands at 36.7%, against 24.6% ten days ago. The changes in the period are an increase of 12.1% in gold coin, and decrease of 2.6% in gold certificates; 0.2% in silver certificates; 7.7% in United States notes, and 1.6% in treasury notes. The proportions now are: Gold coin, 36.7%; silver coin, 0.3%; gold certificates, 6%; silver certificates, 4.9%; United States notes, 46.0%; and treasury notes, 6.1%.

In Congress on Monday Speaker Crisp announced the various committees of the House. Mr. Holman, former chairman of the Committee on Appropriations, has been transferred to the Committee on Indian Affairs, and Mr. Springer, of Illinois, formerly chairman of the Committee of Ways and Means, has been transferred to the Committee on Banking and Currency, his place as chairman on the Ways and Means Committee being given to Mr. Wilson, who, it is stated, will bring in in the regular session a new tariff bill repealing many of the most obnoxious features of the McKinley Bill of 1890.

The Coinage Committee contains seven opponents of free silver coinage, eight decided free coinage men, and two whose views are conservative. Mr. Hager, one of the latter is, it is stated, in favor of the concurrent use of gold and silver, and also in favor of a ratio of 27 or 28 to 1. He will, it is said, vote for the repeal of the Sherman Bill. The Committee on Banking seems to be unfavorable to the repeal of the State Bank tax. But it is yet too soon to decidedly affirm this point.

On Friday the only change in the money situation was the arrival, by two European steamers, of about \$2,350,000 more gold. The gold engagements of the day in London were once more insignificant in amount, and sterling exchange, governed as usual by the local premium on gold, sank once more almost to the normal gold importing point. The only distinctly weak spot in the stock market was in Louisville & Nashville, which seemed to be pressed for sale by foreign houses, and which broke

fully two points. Reading stock was a little slower in its movement than the rest of the market; perhaps because the quarrel among its security-holders renders the prospects of reorganization somewhat more doubtful.

Money on call is more plentiful, but time money does not increase in supply, and mercantile paper is not in demand. The pressure for time loans is not so great, however, and a general lightening of the situation begins to be apparent.

We have noted in our coal market reports something about the anthracite trade. It is just now entirely exceptional, because quotations are being at least nominally maintained at a time when there is a general depression and prices are falling everywhere. How long this can be kept up it is hard to say, but there are not wanting some indications of a break in the combination. The weak point, of course, is in the Reading, whose necessities may force an increased output. All this is speculation, however, and the combination may hold together and present for some time yet the unique spectacle above referred to.

Currency continues to be very scarce, although the premium has fallen somewhat from its highest point.

The silver debate in the House at Washington has not been especially interesting, although the time set for taking the vote is drawing near. It has been largely carried on by the silver men, although there have been some effective arguments in favor of the repeal of the Sherman Act. There are rumors current of a compromise measure, as there have been all along, but none which seem very probable.

The Secretary of the Treasury to-day orders the prepayment of the interest on the 2% extended bonds of the funded loan of 1891. The amount of these bonds, however, is only \$5,000,000.

An incident of the depression is a demonstration of unemployed miners at Ironwood, Mich., which was not unlike those at other points and was practically without result.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$.58 1/2	\$.59 1/2
Peruvian soles and Chilean pesos.....	.55	.54
Victoria sovereigns.....	4.57	4.58
Twenty francs.....	3.56	3.59
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.75	4.86

The United States Assay Office at New York reports the total receipts of silver at 258,000 oz. for the week.

The general position continues to be very unfavorable, for although the premium paid for currency is less now than it has been, money is very scarce, still dealt in as a commodity and utterly unobtainable for commercial needs, the result of which must be patent to all.

Copper.—The market—what there is of it, which is next to nothing—is very flat indeed; a few sales have been made, and some parcels resold at 9 1/2% and at 9 3/4% as well, and this latter figure must be quoted as the nominal value of Lake copper to-day, rather lower prices having been accepted abroad for Lake, it is understood. Electrolytic copper is held here at about 9 1/2% and casting at about 9 1/4%, every quotation being more or less a nominal one.

It is with regret that we have to record the failure of one of the oldest, widest and best known houses in the copper trade, that of Wallace & Sons, for whom receivers have been appointed, the action being necessary because of the stress occasioned by prevailing financial conditions.

The exports continue to be made on an unprecedented scale, nearly all the outgoing steamers being almost completely filled with copper, but it is now said by exporters that it is only with great difficulty that anything can be placed abroad.

In London, G. M. B.'s are closing at £40 15s. for spot and £41 5s. for three months prompt, refined and manufactured sorts having to be quoted as follows: English tough, £44 5s. @ £44 15s.; best selected, £45 5s. @ £45 15s.; strong sheets, £53 @ £54; India sheets, £50 10s. @ £51; yellow metal sheets, 4 1/2 d.

The exports of copper from the port of New York during the past week were as follows:

Copper:			
Liverpool—Arizona.....	45 cases	56,250 lbs.	\$6,000
" " " " " " " " " " " "	45 cases	56,250 "	6,500
" " " " " " " " " " " "	596 pigs	172,590 "	17,000
" " " " " " " " " " " "	325 bars	114,976 "	9,700
London—Massachusetts.....	3,103 plates	222,438 "	23,215
" " " " " " " " " " " "	2,038 ingots	35,750 "	3,500
Swansea—Brooklyn City.....	358 bars	115,739 "	10,706
" " " " " " " " " " " "	732 bars	230,305 "	20,378
Hull—Buffalo.....	64 billets	10,000 "	1,000

Copper:			
Havre—Victoria.....	78 casks	97,500 lbs.	\$10,725
" " " " " " " " " " " "	260 casks	325,000 "	36,500
Antwerp—Belgenland.....	36 casks	45,000 "	4,900
" " " " " " " " " " " "	9 casks	16,250 "	1,738
" " " " " " " " " " " "	18 casks	22,400 "	2,137
Rotterdam—Loch Maree.....	998 plates	56,106 "	5,690
" " " " " " " " " " " "	106 bars	35,884 "	3,600
Hamburg—Dania.....	172 casks	215,600 "	23,500
" " " " " " " " " " " "	40 casks	46,759 "	5,075
" " " " " " " " " " " "	350 casks	437,500 "	48,625
" " " " " " " " " " " "	183 pigs	45,114 "	4,500
Stettin—Italia.....	283 plates	33,603 "	2,333
Copper matte:			
Liverpool—Aurania.....	875 bags	163,680 "	18,350
" " " " " " " " " " " "	2,323 bags	239,077 "	10,910
" " " " " " " " " " " "	2,191 bags	256,500 "	11,000
" " " " " " " " " " " "	7,327 bags	854,793 "	38,001
" " " " " " " " " " " "	1,116 bags	121,935 "	5,500
Swansea—Mohican.....	1,700 bags	186,000 "	8,000
" " " " " " " " " " " "	87 casks	120,752 "	6,000

Tin.—The tin market has exhibited a great deal of strength, this being due to the general belief that the present extra session of Congress will not take any action in regard to tariff matters, and that the stocks of tin in this country will not last more than about two or three months, so that America will soon again be a buyer in the London and Eastern markets. The larger and stronger houses here are taking advantage of this outlook to the extent of taking in what is offered here, and the upward movement is helped, as is usually the case, by consumers more freely covering their wants. We quote spot, 19c.; September, 19 1/2c., and October deliveries at 19 1/4c.

In London a better feeling has been apparent, and after declining at first, prices reacted, and are closing at £76 17s. 6d. for spot and £77 5s. for three months prompt.

Lead.—Now that it is an established fact that the production has decreased considerably, and that none of the smelters were willing to sell, the market has shot up, and while last week we reported sales as having been made at 3:30, we have this week to report them as having been made only at 3 1/2, 3% now being asked.

The foreign market is dull, and values have been lowered to £9 17s. 6d. for Spanish and £10 for English lead.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is strong and advancing. Very light offerings and an urgent demand for prompt delivery has caused sellers to mark up the price to 3:25 at the close.

Spelter is in as bad a condition as it very well could be, as stocks are accumulating at all the works, and the demand and consumption are not in the least improved. We have to quote the nominal value of 3 1/2c. per lb., East St. Louis.

In the foreign market there has been a sharp decline to £16 15s. for good ordinaries, and to £16 17s. 6d. for specials, this being due to the fear of imports of American spelter. As the quotations a week ago were £17 5s. and £17 7s. 6d. respectively, this is a decline of 10s.

Antimony is salable only in retail lots. Cookson's at 10 1/2, L. X. at 10, and Hallett's at 9 1/2.

Nickel is without alteration in price or condition.

Quicksilver.—The price of quicksilver was advanced yesterday by the Rothschilds, and London quotations are now £6 7s. 6d. The New York price is \$37. The market is quiet.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, August 25, 1893.

Pig Iron Production.

Fuel used.	Week ending		From Jan., '92.	From Jan., '93
	Aug. 25, 1892.	Aug. 25, 1893.		
Anthracite.....	67	23,937	51	23,679
Coke.....	131	118,659	85	80,637
Charcoal.....	41	8,926	34	5,634
Totals.....	239	156,522	170	110,000
			6,063,971	5,636,018

Pig Iron.—While in certain branches of the iron and steel trades there seems to be some improvement, it is certain that this has not taken place in the pig iron market here. The situation at present is in no wise different from what it was a month ago. We do not hear of anything to justify the belief that the prospects of returning activity are good, but, on the other hand, the market is not growing worse. We hear reports of sales at very low figures by Southern furnaces and also of contemplated reduction by some well known Northern producers.

But it is impossible to ascertain which dealer is meant by the buyers when they hint of the very low offers they have received. It is safe to say that the price at which transactions are made depends altogether on the financial condition of the seller, but we have not received trustworthy information concerning the "very low prices" said to have been made during the past week. In all probability the aforementioned prices are not any lower than the same class of sellers have been getting for many weeks past. It is difficult to quote actual prices, but the following are fair quotations, though doubtless they would be shaded

in special cases and for special reasons: Northern brands: No. 1, \$14.50@15; No. 2, \$13.50@14; gray forge, \$12.25@12.50. For Southern iron we quote: No. 1, \$13.75@14.75; No. 2 F., \$12.75@13.50; No. 1 soft F., \$12.25@14; gray forge, \$11.75@12.50—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglinton, \$19.50@20; Summerlee, \$20.

Billets and Rods.—We hear of no business in either billets or rods. We quote: Steel billets, tide-water, \$23@24; foreign, \$28.50@29; wire rods, \$30.50@31.50; foreign, \$40@40.50; Swedish, \$50@52.

Manufactured Iron and Steel.—We do not hear of any new business of consequence in this market. Prices show little or no change from last week. We quote: Angles, 1.75@2c.; axles, scrap, 1.80@2.10c.; delivered; steel, 1.75@2c.; bars, common, 1.45@1.60c.; refined, 1.65@1.9c. on dock; beams, up to 15 in., 1.80@2c.; 20 in., 2.10@2.30c.; car truck channels, 2@2.10c.; channels, 1.40@2c. on dock; steel hoops, 1.8@1.9c., delivered; links and pins, 1.85@2.10c.; plates, flange, 2@2.10c.; firebox, 2.5@2.8c.; flange, 2.10@2.25c.; marine, 2.5@2.75c.; sheared, 1.85@2.10c.; shell, 1.95@2.10c.; tank, 1.75@1.9c.; universal mill, 1.75@1.90c.; tees, 1.95@2.15c., all on dock.

Merchant Steel.—This market continues exceedingly quiet. We hear of little business. Reports from Pittsburg are rather more encouraging, but the financial difficulties are being felt acutely by the mills. Quotations are: Tool steel, \$6.50@6.75c. and upward; tire steel, 2@2.10c.; toe calk, 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.

Old Material.—There is nothing doing in this market. Quotations are nominally as follows: Old iron rails \$15.50@16; steel rails, \$11.50@13; car wheels, \$11.50@13.50.

Rail Fastenings.—The market for rail fastenings continues lifeless. Quotations remain: Fish and angle plates, 1.55@1.60c. at mill; spikes, 1.9@1.95c.; bolts and square nuts, 2.45@2.50c.; hexagonal nuts, 2.55@2.60c., delivered.

Spiegeleisen 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.—There is no improvement in this market. It continues dull and uninteresting. We hear of no sales of any consequence during the past week. 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, 57%, 10 and 5%; butt, galvanized, 50, 10 and 5%; lap, black, 67%, 10 and 5%; lap, galvanized, 57%, 10 and 5%.

Buffalo. August 24.
(Special Report of Rogers, Brown & Co.)

The market continues lifeless under a very light demand. Prices remain stationary because the transactions are all small. There is an impression prevailing that the spot cash buyer could have things his own way, but as there are none in the field there is no opportunity of judging how susceptible to pressure the market really is. Curtailment of production is the order of the day.

We quote below on the cash basis f. o. b. cars Buffalo: No. 1X foundry strong coke iron, Lake Superior ore, \$13.73; No. 2X 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, \$17@17.30; Jackson County silvery No. 2, \$16.30@16.60; Lake Superior charcoal, \$16; Tennessee charcoal, \$16; Southern soft No. 1, \$13.65; Alabama car wheel, \$18; Hanging Rock charcoal, \$20.50.

Chicago. August 24.
(From our Special Correspondent.)

Evidence of general improved conditions are still lacking in this market; the more prominent feature being a continuation of the extreme caution and conservatism previously noted on the part of seller and buyer of crude or finished iron or steel. Thus, while business is not wholly suspended in these lines, it continues very largely of the same hand to mouth fashion which has characterized it for several months. The only manufacturing industries which appear to be making forward contracts for material are the agricultural implement men whose confidence in the future is in marked contrast to those in other consumptive branches. It is also notable that their tonnage is fully as heavy as it was last year, and their purchases of iron decrease astonishingly, fully seven-eighths of them being steel. Some of the boiler shops are taking in more work, but in this, as in all other branches of manufacturing, credits are carefully scrutinized before contracts are accepted and material ordered. Yet on the whole there appears to be rather more tone and a more hopeful feeling in iron circles generally, but at the same time there is a sad lack of confidence.

Pig Iron.—Foundry men and general smelters are buying very lightly, and as previously stated the only purchases of any moment are those made by the implement trade. Local coke iron is very quiet, sales rarely exceeding 100 tons, most orders being for carloads. Southern coke iron is exceedingly dull; a few orders are being placed for small amounts for quick shipment. With few exceptions furnace agents seem very willing to meet buyers'

views for current requirements, but not for forward or long scattered deliveries. Several manufacturers of the malleables are making inquiry for Lake Superior charcoal iron, and one or two sales are reported, but the tonnage is small. Prices given represent what carloads would sell for. 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, \$16.00; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$18.50@18.75.

Structural Iron and Steel.—About 1,000 tons of beams, columns, etc., will be required for the Academy of Science, Lincoln Park, skeleton steel frame construction and specifications are now out. Prospective business very unsatisfactory. 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.—Mill orders are very slow, but warehouse business shows some improvement as boiler shops are taking in more work. Steel sheets, 10 to 14, \$2.25@2.35; iron sheets, 10 to 14, \$2.20@2.30; tank steel, \$1.80@1.90; 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.—There is an active buying movement among implement makers for their season's wants of steel specialties. A number of large contracts have been placed in the last two weeks, the amount aggregating a good round tonnage, and others are now in negotiation. Tool steel continues dull. 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.

Galvanized Sheet Iron.—The improved inquiry for mill shipments is undoubtedly stimulated by protracted shutdown of mills and the badly broken stocks. Discounts are unchanged at 70, 10 and 5% off on Jurjata 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.—There is very little new business in mill orders, but jobbers are commencing shipments to the Northwest. Prices are unchanged at 2.85c. 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.—Small lots continue the order of the day, and with the exception of the implement trade, business of any size is conspicuous by its absence. Mill agents are not forcing the market and 1.45@1.50c. base are now being firmly held. Jobbing trade improved, and each week sees a fair tonnage disposed of at 1.70@1.80c. for iron and steel bars respectively.

Nails.—Wire nails from mills show a better inquiry the past few days and price is stiff at \$1.48 Chicago; jobbing quotation on less than carloads is \$1.55. Steel cut nails are also rather more active from factory at \$1.20 base. Jobbers note a little more movement as compared with a week ago at \$1.35.

Steel Rails.—Business continues very dull only small orders being received, but inquiry is a little better this week and the outlook is thought to be rather more favorable for fall business being comparatively active. Quotations are \$30@31. Splice bars, spikes and bolts are in light demand.

Scrap.—Wrought iron and steel grades are absolutely stagnant. Small orders are noted for East and quotations are only 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, \$9.75; machinery castings, \$9; stove plates, \$6.50; mixed steel, \$9; coil steel, \$15; leaf steel, \$15; tires, \$14.50.

Old Material.—Iron rails are nominally quoted at \$14, though it is doubtful if cash buyers would pay even that low price. Steel rails show no movement at \$9@13 according to length, etc. Car wheels are nominally unchanged at \$14.

Philadelphia. August 24.
(From our Special Correspondent.)

Pig Iron.—About the only business heard of from day to day is the selling of a few lots of No. 1 foundry iron at \$15. Brokers are hoping to bring to a close negotiations for forge iron in large lots, but the condition of work at mills is against it. A good deal of forge has lately been offered at \$12.50.

Muck Bars.—The expected business has not been secured, and mills are idle, waiting.

Steel Billets.—Small sales are being made at \$23, delivered, for Western steel.

Merchant Iron.—Not a single important transaction in bar has been reported for more than a week. The only hope of the trade has been in large orders from ear builders; but while the ear works are generally running, there has been very little business from that quarter. Several concerns have

enough iron on hand, or bought, and they are ordering very slowly.

Nails.—The distribution of nails has improved, on account of a further resumption of building, but prices have not been benefited by the increased activity.

Skelp Iron.—The general anticipation is that large orders for skelp will be placed about September 1st. This hope is based on the fact that several large enterprises are about to be entered upon, and the material must be ordered pretty soon if it is to be furnished in accordance with the plans of the engineers.

Pipes.—Very little pipe has been contracted for since July 1st, but the demand for boiler tubes has not fallen off very much.

Sheet Iron.—A further development of trade in sheet iron is encouraging manufacturers to run their rolls full time, and one or two concerns feel sufficiently encouraged to accumulate stock.

Plate and Tank.—Tank steel is offered at 1.70 and heavy plates at about the same. Shell is 1.80; flange, 2.10@2.25. The only business reported at the offices this week is made up of small orders, and the only expression of opinion is to the effect that until there is a general resumption of activity the large orders talked of in the summer will not be placed.

Structural Material.—The bridge builders are the only people who are pretending to buy material at present, and they are only purchasing enough to fill contract work now on hand.

Steel Rails.—The steel rail makers are discouraged over the reported determination of several railroad companies to not push construction this fall, as was expected. This is in conformity with the recently adopted policy of retrenchment.

Old Rails.—The usual offerings of old rails are made by railroad managers anxious to turn them into cash; but about the only transactions heard of are where trade is accepted.

Pittsburg. August 24.
(From our Special Correspondent.)

Iron and Steel.—While the situation in the iron trade is no worse than last week it would take a person of very keen powers of observation to discover any particular improvement. The situation remains practically unchanged, the foundries, machine shops and the various consumers of iron and steel continuing to show great cautiousness in making contracts for any material not absolutely needed to complete orders on hand. The sales of iron and steel, therefore, continue light with very low prices ruling for such deliveries as are made. The failures that continue to be announced in various parts of the country cannot fail to have a depressing effect here and elsewhere.

Production is now at a point lower than it has reached for a long time, being at the rate of about 3,000,000 tons a year, the consumption during ordinary periods of good trade absorbing fully 9,000,000 tons. This heavy reduction in output has been largely the result of the general financial stringency, producers being adverse to selling on long time and buyers finding it impossible to pay cash. There is no disposition to force the market, although where a favorable opportunity arises for securing ready money the price named is very close to the views of the buyer as regards value.

Sales this week are the smallest of the year. You will see reports in the papers of mills starting up and running to the full capacity. We regret to say such is not the fact. There is not a mill in Pittsburg or vicinity running full. The Vesuvius works at Sharpsburg closed down indefinitely, and others will follow before the end of the month. There is no certain value for iron or steel at present.

Coke Smelted Lake and Native Ores.		Blooms, Billets and Slabs.	
Tons.	Cash.	Tons.	Cash.
500 Bessemer, City furnace.....	\$13.00	1,000 Bl. at works... 500 B. & S., Sept. at works.....	\$20.00
500 Bessemer, City furnace.....	13.00	250 B., pr'pt. at works..	20.65
500 Bessemer, Aug. Sept.....	12.50	250 B., spot at works..	20.75
250 Bessemer, Aug.....	12.60	Charcoal.	
200 Bessemer, Sept.....	12.50	25 No. 2 Foundry.....	18.50
200 No. 1 Foundry.....	13.75	25 Cold Blast.....	26.00
175 No. 2 Foundry.....	12.75	25 No. 1 Foundry.....	19.75
50 Bessemer, offgrade..	12.00	Sheet Bars.	
		350 At mill.....	26.50

In the absence of sales the following are the asking prices:

- Steel wire rods, \$26.50@27 cash.
- Blooms, billets and bar ends, \$14@14.50.
- Skelp iron, wide and narrow ground, \$1.40, four months.
- Sheared iron, \$1.60, four months.
- Skelp steel, wide ground, \$1.40, four months.

COAL TRADE REVIEW.

New York, Friday Evening, August 25th.
Statement of shipments of anthracite coal (approximated) for week ending August 19th, 1893, compared with the corresponding period last year:

	Aug. 19, 1893.	Aug. 20, 1892.	Difference.
Wyoming region.....	331,568	422,488	Dec. 40,920
Lehigh region.....	122,164	127,888	Dec. 5,424
Schuykill region.....	207,665	218,567	Dec. 17,902
Totals.....	704,697	768,943	Dec. 64,246
Total for year to date..	26,411,382	25,329,421	Inc. 1,081,961

PRODUCTION OF BITUMINOUS COAL for week ending August 19th and year from January 1st:

	1893.		1892.
	Week.	Year.	Year.
Shipped East and North:			
Phila. & Erie R. R.	2,595	56,795	55,524
Cumberland, Md.	80,860	2,583,192	2,322,533
Barclay, Pa.	422	36,071	39,826
Broad Top, Pa.	8,614	411,839	370,048
Clearfield, Pa.	62,728	2,584,155	2,406,426
Allegheny, Pa.	29,910	807,985	801,245
Beach Creek, Pa.	27,305	1,004,508	1,568,590
Pocahontas Flat Top.	43,315	1,748,135	1,564,938
Kanawha, W. Va.	53,778	2,086,975	1,472,462
Totals.....	320,527	11,319,655	10,641,532
Shipped West:			
Pittsburg, Pa.	11,451	797,448	812,177
Westmoreland, Pa.	28,844	1,267,076	1,057,977
Monongahela, Pa.	7,502	454,666	393,032
Totals.....	47,797	2,519,590	2,263,166

Grand totals..... 368,324 13,839,245 12,906,758
 PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending August 19th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 24,911 tons; year 3,096,000 tons; to corresponding date in 1892, 3,427,947 tons.

Anthracite.
 The Bureau of Anthracite Coal Statistics issues the following statement of anthracite coal shipments and stocks for July and the seven months to July 31st:

	July, 1893.	July, 1892.	Year 1893.	Year 1892.
Wyoming.....	1,854,900	2,026,761	13,723,582	12,686,429
Lehigh.....	542,837	548,744	3,860,630	3,351,530
Schuylkill.....	878,126	1,073,078	6,714,505	6,969,352
Totals.....	3,275,863	3,648,583	24,298,717	23,028,311

The stock of coal at tidewater shipping points July 31st was 733,446 tons; June 30th, it was 808,854 tons; decrease during July 75,408 tons, or 9.3%.

The shipments for July show a decrease from last year of 372,730 tons, or 10.2%; this decrease was largest proportionally in the Schuylkill region. For the seven months, however, the shipments show an increase of 1,270,406 tons, or 5.5%, more than five-sixths of this being from the Wyoming region.

The condition of the anthracite coal trade continues as outlined in our last issue. There has been no change worthy of mention since then. The dullness which we have been reporting during the past month is unrelieved. We hear of but very little new business, and that is being done at June prices. The present "circular rates" have not obtained. Of what use they have been nobody has been able to find out. A similar doubt exists as to their present value and in some minds this doubt extends to and includes their future usefulness. We hear very little now concerning an advance for next month. In Western parlance, "it is dollars to doughnuts" that there will be none, as there is nothing to justify it.

In this period of financial distress it behooves the coal trade to act with greater caution than it has displayed on various occasions in past years. An era of cutting of prices and much overproduction will be as dangerous as too high values. We take it for granted that the production will not fall below the demand. If the prominent companies will follow the suggestions as to output which their sales agents make monthly, and some consideration for the feelings of the public is shown by the agents in the matter of prices, the coal trade for the remainder of the year will be better than many pessimistically inclined observers now believe possible.

The Reading company has given to the Lehigh Valley some 400,000 tons of coal in payment of the former company's indebtedness. There has been much said about this transaction, but as a matter of fact the Reading was simply giving back to the Lehigh Valley what it had purchased and could not pay for. The fear that the Lehigh Valley would "force" this coal upon the market, to the detriment of other producers and of the trade at large, does not appear to be well-founded, inasmuch as it would be exceedingly difficult, if not altogether impossible, for anybody to "force" any coal at all on the market just now. The Reading officials were evidently of the same opinion or they surely would not have consented to the transfer.

The Lehigh Valley has continued to negotiate with individual operators along its line for the purchase of their output. As was stated exclusively in this column last week, the company offered as high as 57 1/2% of the tidewater price, and the operators stubbornly refused to accept these terms. Representatives of the company and a committee from the operators are now holding a meeting in Philadelphia for the purpose of settling this question.

The receivers of the Philadelphia & Reading Railroad Company have abrogated the contract between the company and Cox & Brothers & Co., involving the movement of over 1,000,000 tons yearly. The claim upon which the Reading receivers base their right to abrogate the contract is that the company did not get a fair proportion of the profit out of the rate paid for tonnage by Cox & Brothers & Co. How the latter will dispose of their tonnage and to which of the rival railroads it will be awarded have not yet been decided.

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

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash.....	\$4.00	\$4.25	\$4.60	\$4.60
Free white ash.....	3.90	4.15	4.60	4.60
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.

The Reading Railroad system reports that its coal shipment (estimated) for last week, ending August 19th, was 215,000 tons, of which 38,000 tons were sent to Port Richmond and 10,000 tons were sent to New York waters.

Bituminous.

There is little of interest to report of the soft coal trade this week, as everything that has occurred has been merely the continuance of the conditions reported in our last issue. The market shows no change. Shipments continue on a large scale, with no change in prices. The demand, as foreseen in our last week's review of the trade, is becoming less urgent in view of the fact that sea freights have advanced and show a tendency to rise still more. Between 300 and 350 vessels are now tied up in Philadelphia, New Haven, Boston, Portland and Bath; their owners declare that they cannot pay their bills at 60c. alongside and that they will not go for less than 65c. to Sound ports or 70@75c. to Boston. The effect of this tie-up, if the latter should be persisted in, will be an advance in freights until the figures asked will be approached closely.

Ocean freights are firm as follows from Philadelphia: To Providence and New Bedford, 55@60c.; Wareham, 80c.; Boston, 60@65c.; Lynn, 75@90c.; Salem, 60@65c.; Newburyport, 75c.; Portsmouth, 65@70c.; Dover, \$1; Saco, 90c.; Portland, 60c.; Bath, 65c.; Gardiner, 70c.; Bangor, 65c.

A large proportion of the coal that will be needed in the East, provided that present financial difficulties are abated, has yet to be moved, and the action of Congress and the immediate results thereof are awaited with much anxiety. The car movement and the supply are good.

Boston.

August 24.

(From our Special Correspondent.)

Although the feeling in anthracite coal is better than it was a week ago there has been little or no improvement in business. It is too early as yet for dealers to start in and buy coal. Prices are well maintained, and it now looks as though they were on bottom, and it would not take much business to show that they really possess strength. Two or three weeks ago there was a feeling in the trade that prices would have to drop, so long continued had been the dull spell. Coal, of course, can be had for considerably less than circular, but the cutting does not begin to be as had as it was. Stove and chestnut both sell for \$4.15 per ton.

We quote f. o. b. prices at New York on free burning coal: Stove, \$4.15; egg, \$3.90; free broken, \$3.65; chestnut, \$4.15; Lykens Valley (at Philadelphia), broken, \$4.90; egg, \$5.55; stove, \$6; chestnut, \$5.25.

The month of August has been an extremely quiet one in bituminous coal. There seems to have been little or no demand for coal. Just at present some of the mills are purchasing small lots to carry them along, as their stock must have surely been reduced after such a long period without purchasing. On cars here Cumberland coal is bringing \$3.45; New River and Pocahontas, \$3.42; Clearfield, \$3.25.

The New England vessel owners have, after much agitation of the subject of freight rates, formed a combination and decided on advancing rates. The prices they fixed are as follows: From Baltimore, 85c.; Philadelphia, 75c.; Newport News and Norfolk, 75c.; and New York, 50c. Actual charters have been made at the following: From New York, 40c.; from Philadelphia, 55@60c.; from Baltimore, 60@65c.; from Newport News and Norfolk, 55c.; to Sound points, 50c.

In a retail way trade is quiet, but dealers are able to maintain fair prices quite well. In this city they are as follows: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

Buffalo.

August 24.

(From our Special Correspondent.)

The absence of any new features of the coal trade is quite observable. Business is in a quiescent condition; occasional orders are filled with quick dispatch if accompanied by the cash, but otherwise only after careful consideration of the purchaser's financial position.

Prices of anthracite unchanged, with a rumor floating around that quotations may be advanced a 25c. notch on September 1st. Bituminous nominally without change, but concessions would undoubtedly be made if the applicant was flush of funds.

The supply of anthracite and bituminous is ample for local requirements.

The shipments of coal by lake westward from August 13th to 19th, both days inclusive, aggregated only 31,300 net tons, distributed as follows: 10,140 tons to Chicago; 12,100 to Milwaukee; 4,600 to Duluth; 2,700 to Toledo; 100 to Bay City; 1,400 to Gladstone; 100 to Ontonagon, and 250 to Detroit. The going rates of freight were: 30c. to Chicago and Milwaukee; 25c. to Duluth; 30c. to Toledo, Escanaba and Marquette; 40c. to Ontonagon, and 25c. to Gladstone and Detroit. The coal freight situation as regards lake transportation is that business is practically at a standstill. The charters made are generally by liners. Outside vessels are, as a rule, laid up in ordinary for the lack of grain, ore or coal freights. A one-cent rate in wheat from Chicago to Buffalo, and a return to that port light is a losing game which vessel owners do not care to

participate in any longer, hence the orders to tie up. It will be observed that coal freights have declined from 50c. to 30c. hence to Chicago; 45c. to 30c. to Milwaukee, and 30c. to 25c. to Duluth and Lake Superior ports.

The syndicate which has in hand the project of connecting Lakes St. Clair and Erie by a canal large enough to admit the passage of the largest propellers and barges, has fully decided to adopt the Two Creeks route, about 14 miles from lake to lake. The preliminary work has been commenced.

The New York Central Railroad will build this fall new coal pockets at Lyons, N. Y., of improved pattern, to take the place of the present old-fashioned structures.

The Pennsylvania Coal Company has shut down its trestle at this port and discharged its men. The stoppage is only temporary and the machinery may be going again before many days.

Chicago.

August 24.

(From our Special Correspondent.)

The situation here has experienced no change from that of a week ago; orders from any source are very light. Receipts of lake and all-rail coal are exceedingly small, notwithstanding the fact that the water freight rate from Buffalo to Chicago is only 30c. per net ton, the lowest on record. Docks and yards are fairly well stocked, but the demand so far has been very slim from country customers, and there is less than one-half the tonnage in stock which will be required for this season's supplies, providing consumption is not seriously curtailed. Should there be but little decrease in general consumption there will be at least half a million tons required to supply the deficit, this too at a season when all Eastern roads will be crowded with traffic. The result of next week's meeting of the sales agents in New York is looked forward to with a good deal of anxiety.

It is currently reported that while the separation of the Lehigh Valley and the Reading interests has actually taken place, J. W. Skeele, the resident manager of the latter, and formerly of the combined companies, remains temporarily in charge of both. Retail coal is dull, almost unprecedentedly so. The larger domestic consumers are out of town at the different resorts, and the shortage of money and general stringency cause the smaller consumers to wait until the last possible moment before laying in their winter supplies. Two agents only of the various producing companies are strictly maintaining circular prices; other shippers are shading more or less.

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; small egg, range and chestnut, \$6.75.

Bituminous coal supplies, while still abnormally large here, are not more so than they were a week ago. The increasing dullness so glaringly apparent among manufacturing and railroad interests has resulted in accumulations of Indiana and Illinois coal on track here and at junction points tributary to Chicago. So great has this become that we understand a majority of the mines in Indiana are working only two or three days a week, and are even then producing and accumulating more coal on their tracks than would be sufficient to fill all orders. Despite the wretched condition of the bituminous coal trade locally and in surrounding manufacturing towns, business in the country dealers' line and smaller manufacturing and milling industries in the Northwest shows a steady and healthy improvement. So that, while orders are small, they are frequent, and some dealers, to make sure of prompt shipments, are paying for their coal in advance. Best grades of Indiana block and Illinois (Northern) lump are in fair demand and country trade is growing. Hocking is also in moderate demand, though most of the mines in the valley are shut down. Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.25; Hocking Valley, \$3.10; Youghiogheny, \$3.25; Illinois block, \$2.60; Brazil block, \$2.50.

Coke continues in very poor demand and the condition in this market very unsatisfactory to shippers, who say there cannot possibly be any improvement until there is a reactionary movement in the iron and steel industries. Prices are easy. Quotations are: \$4.35 furnace; \$4.65@4.75 foundry, crushed; \$5.10 Connellsville. West Virginia: \$3.90 furnace, \$4.10 foundry; New River Foundry, \$4.50. Walston: \$4.50 furnace, \$4.60 foundry.

Pittsburg.

August 24.

(From our Special Correspondent.)

Coal.—There has been no practical change in the situation here, nor is there likely to be any until there is a rise sufficient to float a few million bushels of coal to the lower markets. The mines along the Monongahela Valley, with a few exceptions, are idle and will remain so for some time to come; a rise in the river is the only thing that would put them in operation. The local river trade shows slight signs of improving; the starting up of some of the iron mills has increased the demand. Prices are unchanged. Some of the coal operatives have given up all hope of a rise before we have a fall of snow.

Connellsville Coke.—The market is certainly a very unsatisfactory one; each works seems to have their own prices and no two are the same figures. Retrenchment is the rule, not the exception. The latest from the region shows a somewhat better feeling, and more encouraging features and reports of better times in sight in the iron business are a

ready having their effect in the region. True the production is still falling off, but the slump is so much less than it was at the same time last week that it is rated a relative improvement.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 25.

Heavy Chemicals.—There is little change to report of this market, but the change, small though it may be, is for the better, and when the black cloud that overhangs our financial sky is dispelled, we shall be able to report good times in the heavy chemical trade.

There is not much business doing in any of the heavy chemicals just now. Caustic soda, owing to the coal miners' strike in England, has been advanced 10 cents per hundred pounds.

Quotations this week are nominally as follows: Caustic soda, 60%, 3.05@3.20c.; 70%, 2.80@3c.; 74%, 2.82@3.05c.; 76%, 3@3.10c.

Acids.—There is nothing of interest to report of the acid market, which, in common with other branches of the general chemical market, is now undergoing a period of great quietude.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid—Acetic, chem. pure, 17@.19 Commercial, in bbls. and obys., 0.13@.02 Carbonic, liquefied, 18@.25 Chromic, chem. pure, 1.00 for batteries, .40 Hydrobromic, dilute, U. S. P., 25@.30 Hydrocyanic, U. S. P., 45@.60 Hydrofluoric, 20@.30 Alcohol—95%, 22.90@24.40 Absolute, 23.30 Ammoniated, 23.80 Alum—Lump, 1.15@1.15 Ground, 1.15@1.15 Powdered, .04@.05 Lump per ton, Liverpool, .45 Aluminum Chloride—Pure, 1.25 Amalgamating solution, .60 Sulphate, 1.90@2.50 Ammonia—Sal., in bbl. lots, .07@.08 Carbonate, 0.7@.08 Muriate, white, in bbls., 0.7@.08 Aqua Ammonia—in obys., 3.8@3.04 20%, 0.4@.05 28%, 0.4@.05 Antimony—Oxymur, 0.4@.06 Regulus, 1.0@1.14 Argon—Red, powdered, 15 Arsenic—White, powdered, 0.03@.034 Red 0.05@.07 Yellow, 0.08@.09 White at Plymouth, 12 2 6 Asbestos—Canadian, 50@500 Italian, 100 c. i. f. Liverpool, 215@250 Ashes—Pot, 1st sorts, 4.75@5 Pearl, 0.5@.064 Asphaltum—Prime Cuban, 0.4@.05 Hard Cuban, 0.23@.30 Trinidad, refined, 0.30@.35 Egyptian and Syrian, 0.05@.074 Californian, at mine, 0.12@.26.00 at San Francisco, 0.15@.29.00 Barium—Carbonate, pure, 0.45 Carbonate, commercial, 0.05@.10 Chlorate, crystal, 0.75 Chloride, commercial, 0.05@.10 pure, 0.40 Iodide, 0.02 Nitrate, 0.07@.07 Sulph., Am. prime white, 0.17@.19 Sulph., foreign, floated, 0.21@.24 Sulph., off color, 0.11@.15 Carb., lump, f. o. b. Liverpool, 46 No. 1, Casks, Runcorn, 43.10 No. 2, bags, Runcorn, 43.10 Bauxite—10.00 Bichromate of Potash—Scotch, 11@.12 American, 11@.12 Bichromate of Soda—0.09@.10 Borax—Refined, in car lots, 0.09 San Francisco, 0.08@.09 Concentrated, in car lots, 0.07@.08 Refined, Liverpool, 0.09 Bromine—25@.35 Cadmium—1.20

noted all the way from \$3.50 to \$3.75; glycerine for nitro-glycerine, 1 1/2@1 3/4c., according to quality and quantity.

Brimstone.—The brimstone market is unchanged from last week, except in the matter of prices, which are slightly lower. There is no demand to speak of, and we do not hear of any business doing.

Fertilizing Chemicals.—There is absolutely no change to report of the fertilizer market. The conditions which have prevailed for some time past prevail to-day and the dullness is as great as ever.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14; Charleston and Savannah, \$1.17 cwt., basis 48@50%.

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, \$1.80; Southern ports, \$1.83.

Kainit.—Practically nothing is doing in kainit. Quotations for shipments previous to September are as follows: New York, Philadelphia and Boston, \$8.75 for foreign, invoice weight and test, and \$9 for actual weight; Charleston, Savannah and Wilmington, \$9.50 for invoice weight and test, and \$9.75 for actual weight.

Nitrate of Soda.—There is nothing of importance doing in nitrate of soda just now. Goods on the spot are offered at \$1.65@1.67 1/2.

doing in nitrate of soda just now. Goods on the spot are offered at \$1.65@1.67 1/2.

Liverpool. Aug. 16.

(Special Correspondence of Jos. P. Brunner & Co.) There is not much change to note since last report, although the coal strike has had the effect of causing an improved demand for caustic soda, some buyers being afraid of supplies going short, and it has also stiffened chlorate of potash.

Soda ash is as dull as ever and business is very slack. For Leblanc makes prices vary considerably, according to market, make, quantity, etc., and the nominal range is about as follows: Caustic ash, 48%, 4 1/2 lbs. @ 45 per ton; 57% to 58%, 4 1/2 lbs. @ 45 per ton.

Caustic Soda.—Orders are coming to hand more freely, as buyers seem getting afraid that if the coal strike continues supplies may be curtailed. Quotations remain unchanged, varying considerably according to export market, and spot range we quote as follows: 60%, 4 1/2 @ 48 lbs. per ton; 70%, 4 1/2 @ 49 lbs. per ton; 74%, 4 1/2 @ 49 lbs. per ton; 76%, 4 1/2 @ 49 lbs. per ton, net cash.

Bleaching powder, is very quiet at 48 lbs. @ 48 lbs. per ton net cash for nardwood packages.

Chlorate of Potash.—There has been a better demand of late and prices have improved for all positions to the end of this year. We quote as follows: Prompt and August delivery, 8 1/2 @ 8 1/2 d.; September, 8 1/2 @ 8 1/2 d.; October-December, 7 1/2 @ 7 1/2 d. For all 1894 7d. is asked for United States, and 6 1/2 d. for other quarters.

Cadmium Iodide—1.50 Precipitated, 1.30@2.25 China Clay—English, 1.13@1.18 Domestic, 0.9@1.11 Chlorine Water—1.10 Chrome Yellow—1.0@.25 Chrome Iron Ore—10.00 Francisco, 10.00 Chromalum—Pure, 35@.40 Commercial, 0.2@.40 Cobalt—Oxide, 1.60@1.70 Copper—Sulph. English Wks, ton, 220@221 Vitriol (blue), ordinary, 0.3@.034 extra, 0.4@.40 Nitrate, 0.40 Copperas—Comm c, 100 lbs., 85@.95 Best, 100 lbs., 1.35@1.50 Liverpool, 1.2@.10s. Corundum—Powderee, 0.4@.09 Flour, 0.3 Cryolite—Pow., bbl. lots, 0.7@.08 Emery—Grain, 0.4@.06 Flour, 0.02@.04 Epsom Salt—0.1@.014 Feldspar—Ground, 0.6@.10.00 Crude, 2.00@3.00 Fluorspar—Powdred, No. 1, 20@30 Lump, at mine, 3@.35 French Chalk Fuller's Earth—Lump, 0.16@.20 Glauber's Salt—in bbls., 0.1@.014 Glass—Ground, 0.09@.10 Gold—Chloride, pure, crystals, 0.12.00 pure, 15 gr., o. v., 5 doz., 5.40 liquid, 15 gr., g., 5.50 Chloride and sodium, 0.2 Chloride, 15 gr., c. v., 27.75 Oxide, 0.2 Gypsum—Calcined, 1.25@1.50 Land Plaster, 30@.33 Iodine—Resublimed, 0.30@.33 Iridium—Oxide 0.90 Iron—Nitrate, 40%, 0.1@.014 47%, 0.2@.024 Kaolin—See China Clay. Kieserite—0.9@.10 Lead—Red, American, 0.6@.074 White, American, in oil, 0.6@.074 White, English, in oil, 0.6@.084 Acetate, or sugar of, white, 0.06@.064 Granulated, 0.09@.12 Lime Acetate—Am. Brown, 0.9@.95 Gray, 1.75@1.874 Litharge—Powdred, 0.5@.074 English flake, 0.6@.094 Magnesite—Crude, 1.015 kilos, 14.75 Calcined, 2.240 lbs., 22.00 Brick, 2.240 lbs., 47.50 Manganese—Ore, per unit, 23@.28 Oxide, ground, 0.2@.064 Mercuric Chloride—Corrosive (Sublimat), 0.2@.64 Powdered, 0.2@.64 Marble Dust—bbl., 1.25@1.50 Metallic Paint—Brown ton, 20@.25 Red, 20@.25 Mica—in sheets according to size. 1st quality, 25@.60.00

Mineral Wool—Ordinary slag, 0.114 Ordinary rock, 0.214 Ground, 0.214 Naphtha—Black, 10.00 Nitre Cake—10.00 Ochre—Rochelle, 0.114@0.134 Washed Nat Ox'rd, Lump, 0.06@.064 Washed Nat Ox'rd, Powder, 0.07@.074 Golden, 0.03@.05 Domestic, 0.12@.20 Oils, Mineral—Cylinder, light filtered, 0.14@.16 Dark filtered, 0.10@.13 Extra cold test, 0.20@.24 Dark steam refined, 0.17@.19 Phosphorus—0.5@.55 Precip., red, 0.8@.85 Platinic Chloride—Dry, 0.2@.07 Piampago—Ceylon, 0.4@.05 American, 0.05@.07 Potassium—Cyanide, 0.1 b., C. P., 52 67%, 0.28@.30 mining, 0.28@.30 Bromide, domestic, 0.1 b., 28@.32 Chlorate, English, 18@.184 Chlorate, powdered, English, 18@.19 Carbonate, 0.1 b., by casks, 82% 0.4@.06 Caustic, 0.1 b., pure slick, 0.5@.06 Iodide, white, 0.5@.06 Nitrate, refined, 0.25@.28.80 Bichromate, 10@.114 Yellow Prussiate, 2.1@.224 Red Prussiate, 0.39@.4c Pumice Stone—Select lumps, 0.034@.15 Original cks., 0.12@.02 Powdered, pure, 0.11@.014 Pyrites—Non-onpreous, p. units, 12@.1 Quartz—Ground, 0.6@.10.00 Rotten Stone, Powdered, 0.034@.034 Lump, 0.06@.07 Original cks., 0.04@.054 Rubbing stone, 0.034@.04 Sal Ammoniac—lump, in bbls., 0.8@.80 Salt—Liverpool, ground, 0.7@.70 Domestic, fine, 0.7@.75 Common, fine, 0.45@.45 Turk's Island, bush, 26@.25 Salt Cake—10.00@15.00 Saltpeter—Crude, 0.3@.04 Domestic, Ground, 0.3@.04 Block and slab according to size, 0.6@.24 Sodium—Prussiate, 0.22@.24 Phosphate, 0.04@.05 Stannate, 0.06@.12 Tungstate, 0.30@.35 Hyposulphite, 0.17@.18 Strontium—Nitrate, 0.1@.06 Sulphur—Roll, 0.11@.024 Flour, 0.11@.02 Sylvinit, 27@.35, S.O.P., per unit. 75 Tale—Ground French, 0.114@.014 American No. 1, 0.114@.014 American No. 2, 0.06 Terra Alba—French, 0.65@.30 English, 0.65@.30 American, No. 1, 0.60@.80 American, No. 2, 0.40@.50

Tin—Crystals, in kegs or bbls., 14@.15 feathered or flossed, 20 Muriate, single, 0.7@.12 Double or strong, 0.4@.10 Oxymur, or nitro, 1.80 Vermilion—Imp. English, 1.80 Am. quicksilver, bulk, 57@.60 Am. quicksilver, bags, 58@.60 Chinese, 85@.100 Trieste, 90@.95 American, 111@.112 Zinc White—Am., Dry, 0.4@.06 Antwerp, Red Seal, 0.6@.07 Paris, Red Seal, 0.7@.08 Muriate solution, 0.08 Sulphate crystals, in bbls., 0.3@.034

THE RARER METALS.

The prices given below are the prices at works in Germany, and are per gramme except where otherwise stated:

Arsenic (metallic), per kilo, 80.25 Barium (ex amalgam), 2.12 (per electro.), 7.75 Bismuth (metallic), per kilo, 6.25 Cadmium (metallic), 2.75 Calcium (per electro.), 5.25 Cerium (pulv.), 2.25 (fusum in globulis), 5.50 Chromium (fus.), 40 (cryst.), 75 Cobalt (metallic), per kilo, 10.00 (pure), per kilo, 40.00 Didymium (pulv.), 5.50 Erbium-Vitrium (oxydat.), 10.00 Germanium (cryst.), 100.00 Germanium (fus.), 37.50 (pulv.), 35.00 Gluchium (pulv.), 7.00 (cryst.), 10.75 Iridium (fusum), 5.00 Iridium (pulv.), 1.25 Lanthanum (pulv.), 6.00 (per electro.), 11.00 Lithium (in glob.), 5.00 (wire), 6.25 Magnesium (bars), 0.14 (wire), 0.2 (pulv.), 0.14 Manganese (fusum), 25 Molybdenum (pulv.), 124 Niobium (pulv.), 4.25 Osmium, 1.00 Palladium (wire), 1.00 Potassium (pulv.), 1.00 Rhodium (metal), per kilo, 27.30 Ruthenium, 1.63 Rubidium, 2.50 Selenium (cryst.), 6.25 (precipitates), 50 Sodium (precipitates), 0.04 Strontium (per electro.), 7.25 (ex amalgam), 3.25 Tantalum, 1.75 Tellurium (fusum), 1.50 (precipitates), 2.24 Thallium, 0.634 Titanium, 1.13 Tungsten (pure), 0.85 Uranium, 0.00 Vanadium, 4.00

NEW YORK MINING STOCK QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stock Quotations, listing various mining companies and their stock prices for August 19, 21, 22, 23, 24, and 25, 1893. Includes columns for Name and Location of Company, H. L., and Sales.

*Ex-dividend. †Death in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. ¶Dividend shares sold, 537. ††Non-dividend shares sold, 100. †††Total shares sold, 839.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing various mining companies and their stock prices for August 18, 19, 21, 22, 23, 24, and 25, 1893. Includes columns for Name of Company, H. L., and Sales.

Dividend shares sold, 1,267. Non-dividend shares sold, 540. Total shares sold, 1,807.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Large table detailing mining companies, their capital stock, shares, assessments, and dividends. Columns include Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total levied, Date and amount of last), and Dividends (Total, Date & amount of last).

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Date and amount of last, Total paid, Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Date and amount of last, Total paid.

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 Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$12,390,000. ** 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 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 in assessment.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Stock Names, Aug. 19, Aug. 21, Aug. 22, Aug. 23, Aug. 24, Aug. 25, and Sales. Lists various coal and railroad stocks with their respective prices and sales figures.

Total shares sold, 56,795.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Names, Aug. 19, Aug. 21, Aug. 22, Aug. 23, Aug. 24, Aug. 25, and Sales. Lists industrial and trust stocks with their respective prices and sales figures.

* First a-ress. paid.

Total sales, 303,524.

CALIFORNIA. San Francisco.

Table with columns for Stock Names, Aug. 19, Aug. 21, Aug. 22, Aug. 23, Aug. 24, Aug. 25. Lists California stocks with their respective prices.

Colorado Springs. Aug. 12.

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

Denver.

Prices and sales for the week ending July 4:

Table with columns for Stock Names, High, Low, Sales. Lists Denver stocks with their respective high, low, and sales figures.

Total sales, 50,000.

COLORADO. Aspen.

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

MONTANA. Helena.

Prices for the week ending Aug. 19:

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

MARYLAND. Baltimore.

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

MINNESOTA. Duluth.

Table with columns for Company, Bid, Asked. Lists Minnesota stocks with their respective bid and asked prices.

Table with columns for Company, Bid, Asked. Lists unlisted stocks with their respective bid and asked prices.

London Quotations.

Table with columns for Buyer, Seller, Aug. 17, 1893. Lists London quotations with their respective buyer and seller prices.

Paris.

Table with columns for Buyer, Seller, Aug. 10. Lists Paris quotations with their respective buyer and seller prices.

New York Mining Stocks.

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

ASSESSMENTS.

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

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