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MANY of those who have been hoarding money, either through fear of the solvency of the banks or for the purpose of selling the currency at a premium, may very likely lose the chance to make a good turn. It is said that as much as 18 per cent. can now be had, with abundant security, on time loans. The very best thing for those to do who have money is to loan it now at the longest time possible on good security. In a very short time money will be a "drug." No one will want to borrow because, industry being slow to recover activity, there will be little use for money. And the familiar condition will be seen again of the banks filled and no one wanting to use their money. Now is the time to make long time loans.

THE investors and capitalists of the whole world know again that the American people want and will have no cheap or dishonest money; they will pay their debts in money good the world over, and no one need have the least uneasiness on that score. Not only do investments in this country bring much higher returns than in Europe, but they are safer here than anywhere else. The free coinage craze, like the greenback craze, is dead—dead beyond any possibility of resurrection. Foreign capital will hasten to take advantage of the enormous rates the present financial panic has occasioned, and money hoarded here will also come out and seek investment. In a short time money will be abundant and cheap; cheap, because, unfortunately, the paralyzed industries cannot be revived at once, and we may expect a period of dull business, with money "going begging."

THE enormous majority of 130 in the House in favor of repealing the silver purchase clause of the Sherman Act settles forever the question of what the will of the country is. Probably never before was the will of his constituents made so clear to the Congressman, both through private communications and the newspapers.

The 239 representatives who voted for repeal represent in their States and districts, according to the last census, 41,000,000 people, while the 109 who voted against repeal represented 19,000,000. Such a majority as 22,000,000 of our people in favor of a measure should be sufficient to silence those who have favored these purchases and those who have advocated free silver coinage, as they vociferously claimed, 'in the interest of the "masses." Every one sees clearly enough now that the masses of the American people want no debased money: they want honest money, good the world over, and this is none too good for them.

The majority against free coinage on the existing ratio of 16 to 1 was 102, while that against even 20 to 1 was 101.

The question is now before the Senate, but with two-thirds of the population of the country in favor of unconditional repeal there can be no question as to the action of the Senate. Let it act promptly and gracefully and give what relief the restoration of confidence in our money may afford to the suffering business of the land. The country needs prompt action, and there are surely enough patriotic men in the Senate to bring to their senses the narrow-gauge demagogues.

THE great increase in the deposits of unrefined gold at the Denver assay office in July and August is indicative of the more attention that is being given to gold mining in Colorado since the decline and uncertainty in the value of silver made the extraction of that metal in many instances unprofitable. While the politicians and calamity-howlers were proclaiming the ruin of the State (which led directly to the closing of some of the Denver banks) the miners have been turning to other branches of the mineral industry, wherein they can earn their living. Thus many have begun washing over the old placer diggings, which were abandoned in the bonanza silver days as good only for Chinamen, who were not, by the way, permitted to work them in several districts; now, if we may believe the local papers, some men who were thrown out of work by the shutting down of the silver mines have been panning for gold in the old gulch-workings with very fair results. Other men have gone into the field prospecting for gold lodes, and new discoveries are announced frequently by our Western correspondents and contemporaries. Few of them have been especially important, it is true, but the number of them shows that the shrewdest, most far-seeing miners are beginning to adapt themselves to a new order of things. Of course it is not this new work that has led to the increased amount of bullion deposited at the Denver assay office, which has been due chiefly to the greater activity at Cripple Creek, but its results will begin to be apparent before the end of next year, when they will show in the statistics of the gold product, and in the capital they will attract for investment. This is one of the changes likely to take place in the mining industry of the Rocky Mountains, as we have heretofore pointed out.

THE need of universal bimetallism and an international control of money is now the most important question before the world. We are stopping silver purchases and all the nations which still have free coinage will promptly follow India's example. All these nations will need gold and the United States must also increase largely its gold reserves. The 285,000,000 inhabitants of India may suddenly become inspired with the belief that silver will shortly have no value, that gold alone is the desirable thing to have, the sole evidence of wealth, and they will then "run for gold."

Where will the gold come from which so large a part of the world must have? To what price will the yellow metal, the whole standard of values, go? If it should double in price then every commodity, and the labor which produces it, must sink to half its present value as measured by gold. Even if it were absolutely true, which is, however, far from being the case, that men would get as much for their \$1 of wages a day, as they now do for the \$2 they are paid, yet would the reductions in wages produce incalculable disasters. Who, that has seen men desperate and starving, would submit the civilization of the world to the inconceivable horrors that would result from such a sudden appreciation in the value of the standard of values? Who that has seen the wild stampede before a prairie fire will stand idly by while the foolish or ignorant are making experiments to see whether the grass will burn? It is surely time that the money of the world, the one thing in which every living being is interested, and which affects the welfare of all, should be placed under international control.

It is barbarous to destroy so suddenly the value, for international business, of nearly one-half the world's money in a blind and ignorant experiment to find out whether, in time, the other half might not suffice. The world should have but one standard for money and changes in the value of existing money should be made gradually and only as experience dictates to be necessary. Do not let us destroy the industries of the world in an experiment which we may then learn was as unnecessary as it was barbarous, but let us control the money of the world in a civilized manner, in the interests and for the good of all.

NOTHING could be more naïve than Senator WOLCOTT's attempts, in his speech before the Senate on the 31st ult., to controvert the argument that there was an over-production of silver in the world and that it can be produced at a cost much less than its present market price. In demonstration of the falsity of the latter statement, he cited particularly the case of Leadville, where a careful inquiry had been made into the cost of production by a committee of leading citizens. The results showed, said Senator WOLCOTT, that Leadville had produced in fourteen years \$104,515,824 net, at a cost of \$121,521,583, showing a loss in *silver mining*, changed into a fair profit by the value of the *by-products*. The italics are ours. The inference from this statement is that the silver turned out in Leadville has been charged by the "committee of leading citizens" with the total cost of production, while the by-products (which sounds insignificant) have been counted as costing nothing, and as yielding the "fair profit" on the whole business. The "by-products" which are referred to so casually are lead, copper and gold, of which the first is so important in the ores that the camp gained its name thereby. In 1880 about 36,000 tons of this "by-product" were produced, and in 1892 there were 22,211 tons, between which figures the annual output for 12 years has ranged. Undoubtedly this lead has brought, at least, an average of \$50 per ton on the spot. Some of the famous mines of Leadville, like the Henriett & Maid and Morning Star, produced formerly ore with about 600 lbs. of lead (worth \$15, say) and 4 ounces silver (worth \$3.80 when silver was at \$1 per ounce) per ton; this being the famous carbonate ore to protect which the tariff was imposed on Mexican lead ore. We think it might fairly be said in this case that the silver was the "by-product," and cost nothing at all, according to Senator WOLCOTT's method of figuring. With mixed ores, in which the value is divided between two or more metals, the proper way to arrive at the cost of production is to divide the expense proportionately among the constituent elements as we pointed out in criticising some statistics of Senator MCPHERSON on the same subject in our issue of February 18th, 1893. Of course Senator WOLCOTT, whose ability is unquestioned, knows that this is the true method of calculation as well as we do. He should know also that it is folly to make such palpable mis-statements in argument. It hurts the cause he advocates.

THE LOWEST PRICE FOR COPPER EVER RECORDED.

The financial depression—we hope soon to be able to say the recent financial depression—has forced down the price of copper like that of the other metals. The market quotation in New York last week was 9½ cents for Lake, while a lower figure was accepted for export; this week 9½@9¼ has been quoted. Even after the collapse of the French syndicate prices did not go so low as this. Of course the copper market is directly affected by stringency in the money market. A very large part of the consumption of the metal is by the manufacturers of electric machinery, and in the installation of lighting, power and tramway plants. This business has been carried on in a high degree by means of the credit system. A local company is organized to build an electric street railway, say, by the efforts of the manufacturing electric company, which takes all the bonds of the local company, perhaps, or a part of them at least, in payment for the plant furnished. The central company holds these bonds until the local company becomes a going concern, and a favorable opportunity to dispose of them appears, when the transaction is closed. This system of business was made necessary by the very magnitude of the undertakings, especially when such electric installations

were a new thing and the identification of the company which wanted to sell them with the local companies or purchasers was in the nature of a guarantee. It was for the interest of the manufacturing companies to follow this policy in order to sell the largest possible number of plants, not only for the profit in the first transaction, but also for the business of furnishing supplies to them ever afterward. The success of the Thomson-Houston and Edison electric companies, now consolidated as the General Electric Company, in building up an enormous business demonstrated the wisdom of this plan, but when the credit system failed, of course the whole fabric tottered, it being impossible to carry the bonds and securities of subsidiary concerns, and no capital coming forward for investment in new undertakings. The shares of the General Electric Company, showing 8 per cent. dividends hitherto, which sold above par, are now quoted at less than 40. Of course the demand for copper is cut off, and notwithstanding the unusually large exports the price has declined to the lowest point on record.

The lowest previous average monthly quotation was 10 cents in June, July and August, 1886, and in May and June, 1887. At that time the lowest possible point in copper prices were supposed to have been reached and they were certainly unprofitable except to a few of the great producers. The present prices are also unprofitable, but some of the large producers have reduced costs within the past seven years, and this is especially true of electrolytic copper. Every metal used at all extensively in the arts becomes cheaper as years go by. All history shows no exception to this rule.

THE EXAMINATION OF STEEL.

Perhaps there is nothing more notable in the metallurgical history of the past two decades than the investigations which have been made into the composition and structure of steel. For some time after the invention and introduction of the Bessemer process had made possible the substitution of steel for wrought iron as a material of construction by increasing its production and lowering its cost, we were generally inclined to accept the metal as we had it and to make the best of it. Steel was steel, and the variations in its strength, hardness and other qualities which were found were for a time taken as inevitable drawbacks to its use and as offsets to the advantages which it presented for many purposes, with which we could not well dispense. The Bessemer metal was better than puddled iron in many respects, and why some should be better and some of inferior quality was a matter beyond control.

It was not to be expected, however, that this state of affairs would satisfy those to whom the use of the metal was important. To the railroad men belongs the credit of making the first advance, and the remarkable investigations of Dr. C. B. DUDLEY into the quality and characteristics of the steel rails furnished to the Pennsylvania Railroad first called general attention in this country to the possibility of regulating the composition of steel and adapting it closely to the special purpose for which it was to be used. The publication of the results obtained by Dr. DUDLEY brought out other investigators both in this country and in Europe and a great amount of study was applied to the question. The comparison of physical tests and chemical analyses revealed something, and new points in the metallurgy of steel were constantly revealed. The extent to which these investigations have been carried is well shown by the great work of Professor HOWE on the metallurgy of steel, which is the most complete and thorough study of the subject yet presented.

The invention of the open-hearth and the basic processes, which have supplemented that of Sir HENRY BESSEMER, have largely extended the production of steel by making possible the use of iron formerly considered unfit for the purpose, and have aided in increasing the substitution of the metal for wrought iron in many directions. The attention paid to the elimination of sulphur, phosphorus and other undesirable elements is gradually extending the production of raw iron which is adapted for treatment. Much greater certainty is now attained in securing the qualities of steel needed for special purposes, as hardness and resistance to wear in rails, tensile strength in bridge work, toughness and resistance to impact in armor plates, and vast progress has been made also in the study of alloys of steel, such as nickel-steel, chrome-steel, aluminum-steel for castings, and others.

One of the later developments in the study of steel is the microscopical examination of its structure, on which some remarkable notes were presented at the recent congress in Chicago. Taken in connection with physical and chemical tests, these structural investigations are bringing out new points in relation to the metal which will prove of great value to the metallurgist. Much still remains to be done in this direction to decide the exact relations between chemical constitution and physical properties, but the way has been made fairly clear, and the metallurgists are rapidly approaching the time when uncertainty and so-called mystery will be eliminated and the variations of quality in the product which are now unexpected will be fully understood and that steel of any desired property can be made to order. The extremely valuable papers of M. A. MARTENS and Mr. SAUVEUR, which we have illustrated in these pages, mark a distinct progress in this important department of metallurgy.

NEW PUBLICATIONS.

THE WEALTH OF NATIONS. By Adam Smith. London and New York George Routledge & Sons. 1893. Pages 703. Price, \$1.

The publishers of this cheap edition of Adam Smith's great work should meet with a hearty response on the part of the public. In these times of financial depression, when factories, mills and mines are closed and closing, when the wheels of commerce have come almost to a standstill, and disaster is imminent, all on account of unwise financial legislation enacted partly in ignorance and partly in defiance of economic laws, this classic production should be read by every one, and the moderate price at which it is sold permits every one to get it.

This book, first published in the year of Independence, 1776, produced an almost immediate, general and irrevocable change in some of the most important parts of the legislation of all civilized nations, and wherever such change was made it was for the better. The general underlying principles of economic science enunciated by Adam Smith have never been successfully controverted, and much that was at first accepted as good theory is now, a century and a quarter later, recognized as sound fact. To the people of the United States, now that we are about to embark upon tariff and financial reform, the book is of special interest, for Smith's doctrine of trade and thesis upon the decline in the value of silver are applicable to our present condition.

VENTILATION AND HEATING. By John S. Billings, M. D., LL. D. New York; *the Engineering Record*. Pages 500, illustrated. Price \$6.

The object of the author in this book has been not only to make it useful to students of architecture and engineering, but also to those who are interested in the subject generally, but are not professionally engaged. In the course of his medical work he has had much to do with the designing and management of hospitals and public buildings, where ventilation is of the greatest importance, and has been led to make a study of its principles and the conditions governing their successful application, and this study and experience have been applied in preparing the book.

The book is divided into 20 chapters, eight of which treat of the general principles of ventilation, including its utility; history and literature of the subject; the atmosphere and its composition; conditions of respiration; air pollution and purification; moisture in the air; air supply needed; natural ventilation and the forces concerned. These chapters are in general clearly written, and much stress is laid on the natural laws which must be regarded, on the dangers arising from air pollution and the necessity of purification. On these points the author shows much knowledge of the subject, and also the ability to consider and treat it in a comprehensive way.

The remaining 12 chapters are devoted to applications of the principles set forth in the first part, and are on tests of ventilation; methods of heating; sources of air supply; methods of removing foul air; application of ventilation systems to hospitals, schools, churches, theatres and other public buildings, to dwellings, and finally to mines, tunnels, sewers, cars and vessels. Nearly all of them are illustrated by descriptions of notable buildings, showing practical applications, and in many cases the methods adopted are fully analyzed and criticised, showing their practical merits and defects. Among the instances selected are several hospitals in this country and Europe; the Capitol at Washington; the Houses of Parliament in London; the Music Hall and several theatres in New York; the Grand Opera House in Vienna, and a number of others. The chapter on mine ventilation is short and is chiefly historical; it is evidently based rather on reading than experience, and added to round out and complete the book. It would be, perhaps, expecting too much to look for an exhaustive treatment of a very complex and difficult subject in a general work like this. It is on the question of ventilation of hospitals and public buildings that Dr. Billings is especially strong, as might be expected, while the chapter on ventilation of dwellings is also in the main sound and practical in its treatment. Tunnel ventilation is briefly treated, and here, indeed, the lack of illustrations was unavoidable, for unfortunately the ventilation of tunnels so far has been chiefly notable for the complete failure to find, or at any rate to adopt, any practical or successful system. Not to go far from home, indeed, almost every one knows the utter absence of fresh air in the Fourth avenue tunnel of the New York Central, and the railroad tunnels under Bergen Hill.

The book is copiously illustrated, having 210 cuts and diagrams, besides a large number of tables. It has a very complete index, an important point in a book of reference, and the publishers have given it a good setting.

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.

Thirteenth Annual Report of the Ohio Society of Civil Engineers. Charles A. Judson, Secretary, Sandusky, O.; Printed for the Society. Pages 168. Price 50 cents.

The Best Things to See and How to Find Them. Pocket Guide and Note Book of the World's Fair. Chicago, Ill.; The White City Publishing Company. Pages 127. Price 25 cents.

Production of the Mansfeld Mines in Germany in 1892.—The year 1892 was one of the most unfavorable ever experienced by the mines at Mansfeld, Germany, on account of the low prices of silver and copper, and influx of water in the underground workings. Their productions amounted to 15,446 metric tons of refined copper (including 650 tons of electrolytic), 85,984 kilograms of fine silver, 8,473 tons of sulphuric acid of 50° B., 2,825 tons of 55° B., 1,428 tons of 60° B. and 2,633 of 66° B.; 38 tons of green vitriol, 140,000 kilograms of argentiferous lead (from 3,077 tons of fine dust smelted). The yield of the ore (copper-schist) was 30.20 kilograms of copper and 0.176 kilograms of silver per ton, or 0.5866 kilograms of silver per centner of copper.

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.

Alabama Iron and Money.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: There is nothing to report from this quarter except that we have come upon trying times. I do not know that we are suffering more than other coal and iron centers, or than our sins deserve! The reaction which was sure to come has at last arrived, and Southern iron is having rather a hard time of it, not because of its quality, but because of its quantity, a factor less easy of adjustment than the quality. To make better iron is easier than to make less iron, for the one depends upon blast furnace management, the other upon business management. The curtailment in the production of the country at large, amounting to at least 75,000 tons per week, does not as yet affect the price, nor does the amount of stock on hand. Ordinarily the shortening of the production and the available stock do influence prices, but when people are on the bottom nothing seems to do any good for a while. We get back to elemental business, which was merely the exchange of one commodity for another. For instance, A B works for an iron company and is paid in checks on the commissary. These he exchanges for tickets on the street cars and dummy lines, and even for cigars, beer and newspapers. His wife buys milk with street car tickets, and hires a woman to do house-cleaning for 2 oz. of tea, a bit of bacon and some flour. Anything that can be used as food, clothing, medicine, etc., is exchanged without the use of a medium of exchange, and money for the time being is useless. It is locked up, withdrawn from circulation and deadened. W.

BIRMINGHAM, Ala.

The Gold in Europe.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: It is rather a late hour to express my admiration of your great work, "The Mineral Industry." I have no doubt it is the best work in existence about metals, mining and metallurgy; and the subscribers to the "Engineering and Mining Journal" have every reason to be thankful for so valuable a supplement.

I have read with much interest your editorials and other paragraphs about the silver question. I have at a former occasion already expressed my opinion that, though your plan about a universal clearing house for silver and gold is admirable, there is no chance at present for its adoption by Europe.

But I unreservedly indorse the plan you now advance in your number of July 8th, 1893, page 25, "The United States to stop at once buying silver and commence buying gold heavily." This would no doubt be the bedrock proof for the whole question. Europe is well prepared at present to spare the \$100,000,000 of gold for which you ask. The visible gold supply in Europe, as the Berlin "Boersen Courier" gives it on good authority, is as follows:

	Francs.
Bank of France.....	1,717,000,000
" " Germany.....	707,000,000
German private banks.....	97,000,000
German war treasure.....	150,000,000
Bank of England.....	753,000,000
Other English banks.....	200,000,000
Scotch banks.....	108,000,000
Irish.....	68,000,000
American State Bank.....	217,000,000
Treasury.....	440,000,000
Italian State Bank.....	211,000,000
" Note Banks.....	188,000,000
" Treasury.....	109,000,000
Belgian State Bank.....	60,000,000
Bank of Greece.....	1,000,000
" " Spain.....	198,000,000
" " Holland.....	71,000,000
" " Algier.....	22,000,000
" " Roumania.....	65,000,000
" " Portugal.....	26,000,000
" " Sweden.....	23,000,000
Other Swedish Banks.....	10,000,000
Bank of Norway.....	34,000,000
" " Denmark.....	83,000,000
" " Servia.....	9,000,000
" " Bulgaria.....	6,000,000
" " Finland.....	22,000,000
Swiss Banks.....	69,000,000
Russian State Bank.....	1,511,000,000
" Treasury.....	588,000,000
Total.....	7,763,000,000

As every American who has traveled in Europe knows, circulation in England, France and Germany is saturated with gold. It is a further fact that when the Bank of England raises its rate to 4½ or 5% it invariably attracts gold from Australia, South America, the Cape and the United States. The gold production of the world is given by Mr. Leech as 196,000 kilos, or 680,000,000 francs, with an expanding tendency.

These facts given, there can be no doubt that Europe can spare \$100,000,000 gold if the United States asks for them. It is even expected in financial circles that when the export of breadstuffs and cotton begins in the autumn, Europe will have to send a big amount of gold to the States, so that the long and short of the whole affair is: No European nation will interfere with the currency policy the United States will pursue; on the other hand, Europe is financially and commercially so strong and sound that the United States cannot hope to force her into a currency policy or system she does not wish.

MANNHEIM, July 21, 1893.

ROBERT BASSERMANN.

Universal Bimetallism.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: It is strange that in the declining years of the 19th century the last thing to be made the subject of international agreement should be the most important of all. We have agreements as to com-

merce, seals, law, piracy and, in a measure, alleged violations of national honor. But the very means by which the successful carrying out of all these matters, viz., money, is regarded as something which each nation can adjust irrespective of every other nation. It is as if one should provide the doors, windows, floors, cornices and interior decorations of a house, and expect the foundation to look out for itself. Your solution of the matter is simple, safe and easily adjusted—in a word, scientific—and what more is required? I hope to see it adopted, for until it is we shall always be at the mercy of those who will have gold, at any price. As Mr. Balfour well says, the appreciation in the value of a standard is what brings disaster, and we are to-day suffering from this very cause. Until the nations of the earth come to some agreement as to the place which silver shall occupy we shall always be subject to panics.

P. W.

Universal Bimetallism.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I was agreeably surprised to-day at receiving your work "Universal Bimetallism," which, let me say, I was just about to send for, feeling that I could not get along without it, having had constantly to my hand your "Mineral Industry." I welcome your work as the most valuable one on the subject that I have yet seen, because your conclusions are based on such an impregnable array of facts and statistics, and I am glad to say that independently I have been led almost throughout to your conclusions. As we are on absolutely common ground to such a large extent, I think it may interest you to know wherein at present I differ from you, and the reasons for such difference, a difference that may disappear as you bring better reasons to refute mine.

I believe that it is a sub-law of price that when there are alternate commodities which can almost equally well supply human needs, whatever the fluctuation of supply, the price of alternates cannot drift far apart. Such alternates are almost universal. In building materials there is stone (brick) or wood; in dress, wool or cotton; in food, pork and beef, wheat and rye or corn; in drinks, tea and coffee, or wine and beer. When wood rises in price above a certain limit all building is done in stone, as in Italy; when wood falls below a certain price all building is done in wood, as on our Western prairies, where a few years ago one could travel 500 miles without seeing a single stone or brick structure. I do not believe that it would be possible for beef to rise to three times or more the price of pork, for, long before this increase had been reached, the great majority would have abandoned beef as food and the supply, however curtailed, would have been sufficient for the reduced demand. It is unnecessary to expand this theory. It holds good of water and rail transportation, will be found to have operated when steam displaced sails, etc. Now I find historically that previous to 1873 the human race had alternate metal money. When the production of gold relatively increased, more of it was used under exactly the same law that causes more pork to be eaten when its price begins to fall. If more silver was produced, more silver was used as money. Under the practical operation of free and alternate coinage, it was impossible for the value ratio of the metals to fluctuate rapidly or seriously, as is convincingly shown in the first 70 years of this century. From 1800 to 1850 the ratio of production was not far from 1 to 40, and in the next twenty years it was not far from 1 to 5. We know why it was that gold did not fall markedly in price. Under free coinage it became at once money in England, in France, in the United States, and in these two latter countries displaced silver, putting all bimetallic countries on the gold basis, and leading shallow economists to declare that the commercial nations deliberately preferred gold on account of its superior excellence.

We know that, if by any chance the Colorado and other Western silver finds had occurred between 1850 and 1870, the silver would have been as readily absorbed as the gold was; that, if England instead of Germany had gone over to the single silver standard and the mints of France and the United States been closed to the free coinage of gold, the depreciation of gold would have been greater than the present depreciation of silver.

I agree therefore wholly with you that what we need is international bimetallism, but it seems to me that it would be easier, better, more practical, to keep the ratio between gold and silver absolutely fixed by international free coinage on some such basis as a gigantic Latin Union. Above all I dissent from your suggestion that a new ratio of from 1 to 20 ought to be adopted. To use my former simile, it would not help a scarcity of beef to decree that every butcher should give 20 oz. of pork for a pound, it would not help a scarcity of wool to decree that 50 in. of cotton were a yard, nor a scarcity of stone to decree that wooden houses should be built larger. We know that the price of pork fell in this country when France and Germany prohibited its importation, and that the only remedy for the partial destruction of American pork raising was to remove the prohibition and not to decree that hereafter 20 oz. of pork should be reckoned a pound.

We know that with free coinage of silver in the United States, France and Germany, as before 1873, all the silver supplies of recent years would have been readily absorbed at 16 to 1, and that without free coinage and suspension of silver purchases neither the ratio 16 to 1 nor 20 to 1 nor 40 to 1 has any guaranty of permanency. Since the ratio depends wholly on demand for coinage, why not regulate that demand on the old ratio instead of making confusion worse by the adoption of a new ratio, open to many serious objections?

Why should \$4,000,000,000 of silver coin, perhaps \$6,000,000,000 of silver bullion, be depreciated 20% in value, entailing a loss which somebody has to bear of a minimum of \$800,000,000? Why should we in the United States favor an unnecessary depreciation of the value of one of our own chief products, a loss to the country at large and a stunning blow to those communities whose prosperity largely depends on silver? Why should we make it more hard for France and India to join us, by making this severe tax the condition of international agreement? I doubt whether thrifty France would be willing to abate even as much as the change from 15½ to 16.

I cannot help regretting that you should have given the great weight of your authority to the "ignis fatuus" of change of ratio, a change not necessary, and in fact hindering, to international agreement, and not justified by the relative productions of the metals. This little point of difference only emphasizes the painful agreement that exists between us as to the disasters that will follow perfected demonetization of silver, and the necessity of international agreement on the lines you propose.

H. EMERSON.

Secretary Reliance Trust Company.

PHILADELPHIA, August 9, 1893.

UNIVERSAL BIMETALLISM.

The "Wall Street Journal," in its issue of August 18th, says: "In any case it is a book that any one interested in monetary matters should buy and keep in a place handy for reference."

The "Republic," of St. Louis, in its issue of August 20th, says: "In these days of constant inquiry in regard to the history of money, it is an agreeable task for a newspaper to commend to the general public a work which furnishes an answer to nearly every one of the more frequently presented questions. 'Universal Bimetallism,' by Richard P. Rothwell, fulfills this purpose. Its object is to recommend an international monetary clearing house for the simplification of exchanges among civilized countries. Incidentally the author contributes a compact history of the banks and monetary systems of all important countries, with tables of gold and silver production and chronology of the gold and silver industries."

The Brooklyn "Eagle," in its issue of August 20th, says: " 'Universal Bimetallism,' by Richard P. Rothwell, published by the Scientific Publishing Company, New York, is a book which every student of money questions should read. The author remarks in his preface that 'the acute financial crisis through which the United States is now passing and the indescribable disasters which the sudden demonetization or destruction of the money value of silver and the consequent sudden appreciation in gold will bring call for prompt and wise action. Can there be any more rational, any fairer or juster method of reaching a permanent solution of this question than to submit it to the arbitrament of experts representing all the interests involved?' The book is designed to help matters."

The "Industrial World," of Chicago, Ill., in its issue of August 24th, says:

"We recognize this book a valuable and important contribution to the discussion of what is known of 'The Silver Question,' which now presses for solution with an intensity never felt before. It certainly cannot be settled in ignorance of its controlling factors, and essential elements to study these is to acquire knowledge about the most stupendous problem which has perplexed men's minds in these latter days. Mr. Rothwell's views are certainly novel, and he no less certainly is in a white heat of earnestness in championing his plan; besides, his aim is the general welfare, and he invites correspondence, suggestions and criticisms. We feel sure that his book will be widely read, both at home and abroad."

The "Banking Law Journal," of New York, in its issue of August 15th, says:

"Among the most notable addresses at the World's Fair Bankers' Congress was the one by Mr. R. P. Rothwell, in which he advocated his plan for universal bimetallism and an international monetary clearing house as a simple, absolute and permanent solution of the great money problem. The failure of the Brussels Conference to evolve, or even to suggest, any plan whatever for the permanent solution of the silver problem, or for the prevention of the dangers then evidently impending, and which have since in a measure materialized in a widespread financial crisis, induced the maturing and suggestion of this plan by Mr. Rothwell. We commend the reading and study of this plan (now published in book form with full statistics) to all careful students of financial questions."

The Chicago "Inter-Ocean," in its issue of Aug. 19th, says: " 'Universal Bimetallism,' by Richard P. Rothwell, M. E., C. E. (New York, the Scientific Publishing Company).—This is a thin volume of 53 pages, but one of the best theses upon bimetallism that have been written, and it has already attracted wide attention from students of finance. Mr. Rothwell has studied his subject from every standpoint, and his wise conclusions are told so clearly and concisely and pointedly that a child can understand them. His proposition of an 'international monetary clearing house' is rational and practical. He argues for money good the world over, as a necessity for the nation's commerce and the individual. That the rights of all would be best served by a conference of experts of each nation—that they would more wisely decide questions of such gravity than would politicians (not experts), acting through their several legislatures. Such an international body would do away with all such financial revulsion as far as it relates to the value of its coins as now seen in the United States and India. Mr. Rothwell estimates the money of the world at \$10,264,968,000; of this \$3,632,605,000 is gold, \$4,000,000,000 silver and \$2,626,663,000 uncovered paper. Of this the United States holds 15.93%; France, 15.40%; Germany, 8.95%; Great Britain, 6.82%; China, 6.82%; India, 9.03%, and Russia, 7.89%, etc. About 67% of the population of the world do business on the silver basis alone, while 33% have the double standard. Our author argues that the time has fully arrived, and the lesson is made impressive enough, to settle this great question wisely. The nations of the earth were never so near together before as they are to-day. They visit each other and accept hospitalities more frequently than did a former generation 100 miles distant, and do it as easily. We shall not attempt to make even a synopsis of the little volume, but advise all to read it and study its lessons. It is going to be one of the live questions of the future and is now."

MINING AT THE COLUMBIAN EXPOSITION.

Specially Reported for the Engineering and Mining Journal.

THE OREGON MINERAL EXHIBIT.

Oregon appropriated \$60,000 for its exhibits at the World's Fair, of which \$8,000 has been used in its mineral display. This exhibit is situated in the central eastern part of the Mines Building, and comprises some 1,500 sq. ft. A miniature placer mine is the central attraction, and up to date nearly 5 oz. of placer gold and several nuggets have been washed out, the gravel having been contributed by several placer mining companies of Oregon. In the entire collection there are represented 420 quartz mines that mine gold, 25 silver properties and six of copper. Nine magnetic and hematite iron mines display a portion of their product. Likewise several mines show nickel, kaolin and metallic nickel paint. The International Nickel Mining Company, of the Excelsior District, exhibits specimens of silicate nickel ore that assays 10% and over. This is said to be one of the greatest deposits of nickel in the world, outside of the New Caledonia mines. Oregon offers special inducements to the profitable investment of capital in mining enterprises. The climatic conditions are favorable, and the geographical features are such that all kinds of mining can be carried on without injury to a single public or private interest. Labor and provisions are cheap and the transportation facilities ex-

100 mining claims have been worked in the past six years, a larger portion of which have developed in paying properties. The veins in this district are quite large and exceedingly well defined. The Oregon Gold Mining Company, established in this district in 1886, is the most important company there. They have worked two mines, the Whitman and the Red Jacket, and have shown the existence of large bodies of low-grade ore that can be milled profitably. The district has two stamp mills aggregating 25 stamps. Baker and Union counties have made the greatest progress during the past year. West of Baker City is the Baisley-Elkhorn mine, which is the chief producing property, having turned out over \$100,000 in the past two years. The Robins-Elkhorn, which is working a heavy vein of sulphuretted gold rock; the Bellevue, a valuable property; the White Star, which produces \$20,000 per month, and the Connor Creek, which is said to be the first producer of the State, are among the mines in this district. Statistics of the Connor Creek Mining Company show that the cost of mining, hauling and reduction of ore is about \$2.50 per ton. The mine produces an ordinary low-grade quartz, in which the gold is mainly free, and the percentage of pyritous matters extremely small. Occasionally, pockets of rich ore are found containing beautiful metallic gold, thereby increasing the average output. Such a pocket was found in 1888 and yielded \$104,000. From 1876 to 1892 inclusively Oregon has produced in gold \$16,200,000, and in silver nearly \$1,000,000.



THE OREGON EXHIBIT AT CHICAGO.

cellent. It has been proved that most of the ledges are true fissure veins, extending downward to a great depth and yielding profit from the surface. In many districts new developments are being rapidly pushed, and many of them exceedingly promising. The region along the Blue Mountain range, in eastern Oregon, which abounds in minerals, is about 100 miles long from east to west, and varies in width from 15 to 30 miles. Both quartz and placer mines are represented. The Virtue mine, near Baker City, has produced gold to the amount of \$2,000,000. Assays of some specimens of the ore reach as high as \$10,000 to the ton. The Connor Creek gold mine, a great producer, is situated near Baker City. The gulches of Baker County produce over \$500,000 yearly, and have been producing gold for over 20 years. It is said that there is a vast area of placer ground there worthy of the attention of capital. The placers of Douglas County, in southern Oregon, yearly produce \$80,000 in gold. The Coyote Creek, the hydraulic washings at Waldo, and the Sterling mines, in Jackson County, are the other representative placer mining companies of the State. Oregon's placer workings do not differ from the gravel claims of California and other regions. The estimated annual product of the southern and western Oregon placers is placed at about \$300,000 per year. The quartz mines of eastern Oregon form collectively one of the State's most important resources. They are scattered over a large territory, occurring in formations of the most dissimilar character, and represent a wide range of value. This region has many promising and many paying properties. In Pine Creek district over

The principal deposits of coal in the State lie along the coast range from the Columbia River to the Californian range. Oregon's coal mostly resembles lignite in character. The quantity of it in the State is practically inexhaustible, but the quality is not of the best. Iron ores are found for the most part in basalt. At the Oswego mine, the property of the Oregon Iron and Steel Company, the ore, which is brown hematite, has given rise to the industry of the company at Oswego. It has in operation one of the best charcoal iron plants in the country. The works consist of tramways for conveying the ore, locomotives for moving, blast furnace, blowing engines, etc. The product is charcoal pig of excellent quality. Other noted iron mines of the State are the Gold Hill Iron Company, of Gold Hill Station, Southern Oregon, and Rafferty's iron mine near Scappoose. Copper is found chiefly in Southern Oregon, but lack of development and systematic effort has not as yet enabled the State to add materially to the world's product of that metal. Nickel is found in Oregon near Riddle Station, Douglas County. It is claimed to be unlike any other deposit of that metal in the world. The ores average 5% and upward in metallic nickel. It is composed of a peculiar hydrated nickel-magnesia silicate called garnierite, soft and amorphous, and of light green color. It contains, when pure, 24% of nickel. The difficulty of treating this ore is a problem that has not yet been solved, the excess of silica in the material rendering smelting very costly. The International Nickel Mining Company have erected lately on this property a plant costing nearly \$300,000, and it is expected as soon as they

get to working that new methods for treating the ores will be devised. Oregon is said to have within its borders nearly all the precious and economic minerals and metals known to the world. It invites attention to this fact and stands ready to prove it.

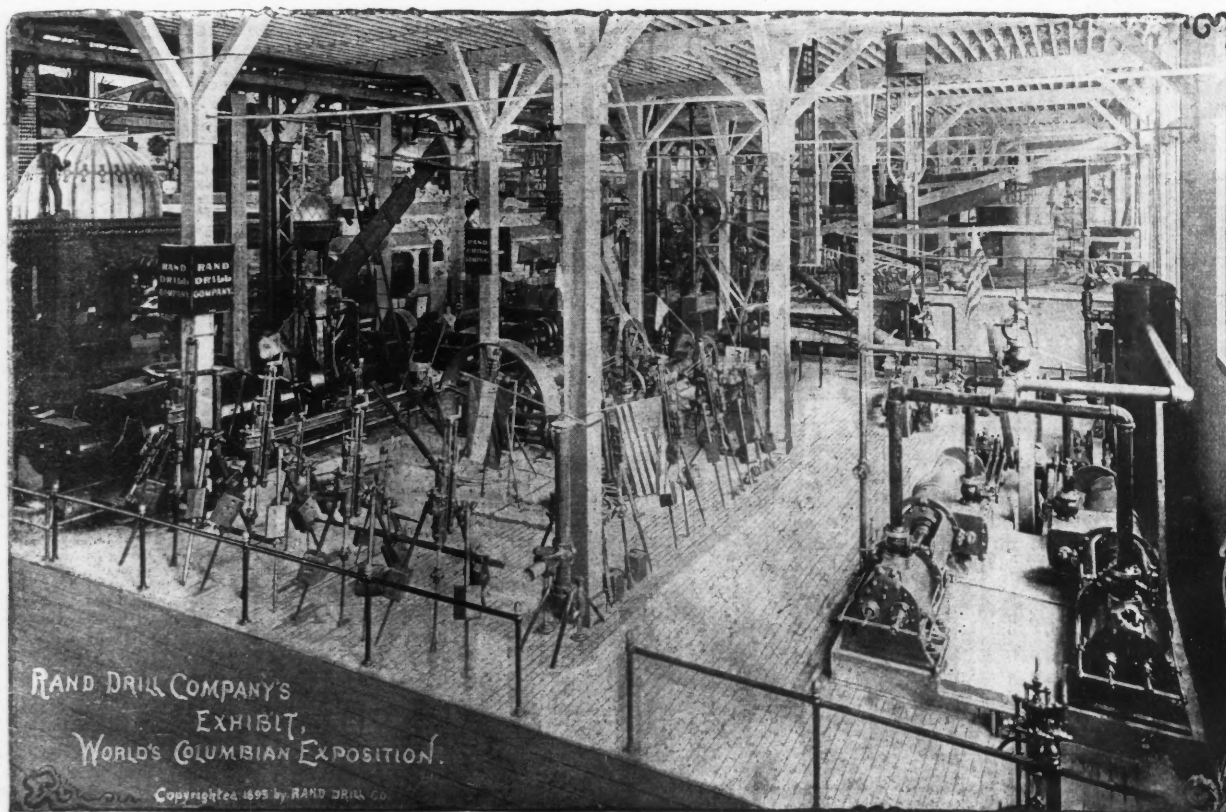
THE RAND DRILL COMPANY

This company has on exhibition in the Mining Building a full line of the different mining machines manufactured by them, and in Machinery Hall, one of the largest air compressors is in operation, supplying air to work machinery in the different buildings on the grounds. The exhibit of rock drills covers a range from the largest used for submarine and heavy contractors' operations, to the smallest, used for block holing and plug and feather work. These sizes are shown in the three different classes, namely, the "Little Giant," the "Sluggo" and the "Economizer." They also represent the recent improvements that have been made in valve movements, in the cylinder heads and packing rings. The valve movement of the "Economizer," to which special attention is called, is arranged so as to cut off automatically the admission of air into the cylinder at a certain point and use its expansive force to complete the stroke; thus, it is claimed, doing as effective work as the drill that uses the full pressure of air the full length of the stroke, with a corresponding saving. The new style of head, in which is used only a cup leather ring, instead of the old style of stuffing box and gland, is an improvement that will be appreciated by mine managers and master mechanics.

In the exhibit also are a full line of tripods, columns, shaft and quarry bars, on which the drills are mounted. There is also shown a new style of drill bit made by the company, which is a tube of steel turned at one end to fit the drill chuck, and at the other end arranged

Another compressor is exhibited which will well repay a careful inspection by parties interested in the compression of air or gases, such as oxygen or carbonic acid gas, to high pressures for transportation. Several of these machines are already in operation compressing gases to pressures ranging from 2,000 to 4,000 lbs. per square inch. This compressor, of which we present an illustration, is of the upright cylinder type. The compression is carried out in three cylinders, all of which are inclosed in a water-tight tank, of cast iron, open at the top, through which a constant supply of cold water is circulated, insuring the cooling of the gas or air as the compression increases. In operation, the first compression is made in a double-acting, low-pressure cylinder, from which the gas or air passes into a small receiver placed alongside the cylinders, and also surrounded by the water in the tank; from this receiver it passes into the middle cylinder, then through a coil of copper pipe around the inside of the tank and into the high-pressure cylinder, from which it again passes through a coil of pipe in the tank into the high-pressure receiver placed outside, from which it is drawn into the cylinders in which it is shipped. The middle and high-pressure compression cylinders are single-acting hydraulic cylinders made especially for the purpose. These machines are fitted with special high-pressure joints in which no packing of any kind is necessary, and which are always tight under the highest pressures attainable, and which can be taken apart as often as required without impairing their efficiency. Other compressors of the usual kind adapted to various uses are exhibited here. It is also the intention of this company to give an exhibition of the Pohle system of pumping water with air; this interesting method we will describe later on.

The large compressor in Machinery Hall is well worthy the atten-



to have the hardened steel point fastened on. These points are shaped like the regular X bit, and are furnished by the company at so low a cost that it does not pay to try to sharpen them when dulled. The removal and attachment of the point is very simple; it is pressed on to the drill by a machine which the company provides, and is fastened so firmly that there is no danger of its coming off while in operation, if proper care has been taken. The advantage claimed for this bit is that the current of air which is allowed to pass down through the piston and drill bit when on its downward stroke forces the rock cuttings of the previous blow out of the hole and allows the drill point to strike on the solid rock each time, instead of having the impact force of the blow reduced by striking into and pulverizing the previous cuttings or working in mud.

On the Duplex air compressor, which is shown in this exhibit, a special feature well worth noting is the mechanical valve arrangement for operating the air inlet and outlet valves. This valve motion is operated through a gear and pinion motion and compound springs, by which the inlet valve is opened at the beginning of the stroke and held open till the stroke is completed, thus insuring a full cylinder of air at atmospheric pressure. As soon as the compression stroke is commenced the valve closes, and when the air in the cylinder has been compressed to the same pressure as in the receiver, the outlet valve, from which all external spring pressure has been relieved, opens and allows the air to pass to the receiver. By this movement it has been possible to reduce the number of valves to a minimum and still insure a perfect filling and discharge of the air cylinders. The valve stems are made extra long, and work in long bearings, thus insuring a perfect and even seating of the valves at all times.

tion of large mine owners and other parties who have occasion to use this class of machinery. The compressor is a compound, both air and steam; it is fitted with a compound condensing Corliss engine of the latest design, connected to a crankshaft and heavy flywheel. The piston rods passing through the back head of each cylinder connect with the piston rods of the air cylinders. The dimensions of the cylinders are steam high-pressure, 22 in.; steam low-pressure, 40 in.; air low-pressure, 32 in.; air high-pressure, 22 in.; diameter, all 48-in. stroke. In action the air is taken into the low-pressure air cylinder and compressed to a pressure of between 25 and 30 lbs. per square inch; it then passes through a water jacketed receiver and into the high-pressure cylinder, where it is compressed to as high a pressure as is required. The pressure required is regulated by a device acting directly on the cut-off mechanism, in connection with the governor; it is connected with the same shaft as the governor, but does not interfere with it or its action. The pressure of air is recorded daily by a recording gage, and an examination of the cards which are kept on file shows how closely the compressor is regulated to maintain a uniform and constant pressure of air at a given point.

The Rand Drill Company has extended a cordial invitation to all its friends to call and see this exhibit at the Fair, and promises to spare no pains in entertaining them in a substantial manner.

Alloys of Aluminum and Antimony.—According to Roche, "Chemiker Zeitung," 1893, 113, aluminum and antimony combined easily in all proportions. Alloys with less than 5% antimony are harder and more elastic than pure aluminum of silver-white color, lustrous and unaffected by atmospheric influences.

THE LATE HAYWARD AUGUSTUS HARVEY.

Hayward Augustus Harvey, who died at his home in Orange, N. J., August 28th, 1893, after a painful illness of several months, was one of the few examples of the distinguished son of a distinguished father. He was born in Jamestown, N. Y., January 17th, 1824, and was thus in his 70th year. His father was General Thomas W. Harvey and his mother was Matilda Hayward, both of Vermont.

A sketch of Mr. Harvey's life and work would be incomplete and would not be fully understood without a preliminary account of his father, who was himself a distinguished inventor.

General Thomas William Harvey was a Brigadier-General in the old New York State Militia; he was one of the earliest settlers in Jamestown, coming originally from Wardsboro, Vt. He was an inventor of great fecundity; as his son said, "his work was a continual unfolding of future possibilities." His inventions included many mechanisms which are to-day in operation all over the world. He was the pioneer in automatic pin machinery and screw machinery, into which he introduced the toggle joint and the cam movement, which give to so many machines their almost human capacity of operation. He was the inventor of the gimlet-pointed screw. He made many inventions in connection with the manufacture of pins, screws, spikes, haircloth, type molding. He was, perhaps, the first to depart in steel manufacture from the old blister or cement process, and to introduce the manufacture of crucible steel. Further than this, and perhaps even more striking, is the fact that in 1842 he ran all the machinery in his machine shop in New York City by a magneto-electric engine. In this, however, he was in advance of his times, as nothing was then known of the modern dynamo, and it required an enormous number of batteries to run his engine. His inventions acted



THE LATE HAYWARD A. HARVEY.

as great educational forces in the mechanical world, and attracted much attention from mechanics and mechanical engineers of that day. He was invited to lecture on the subject of the cam before the American Institute, of which he was one of the founders, and at one time the president. He was well known as an investor and promoter of mining and other enterprises.

General Harvey moved from Jamestown to Ramapo in 1833, and to Poughkeepsie in 1836. Here young Harvey spent his boyhood, attending the Academy; later he studied at the Academy of New Paltz, N. Y. From this school he went into his father's shop in Poughkeepsie, where he learned drafting and various branches of mechanical engineering.

The names of the Harveys, father and son, are very closely connected with the manufacture of wood screws in this country. General Harvey had carried on the manufacture of wood screws in a small way at Ramapo and Montgomery, N. Y. This was continued in Poughkeepsie, the first patents being granted to General Harvey in 1836, in which year the Poughkeepsie Screw Company was organized. Before General Harvey's inventions the operation of screw making was very crude, the blanks being put in and taken out one by one, and the cutting tool operated by hand. By General Harvey's first improvement the operation was made partially automatic. The blanks were still supplied one by one, but the operation of the cutting tools was regulated and adjusted by the machine itself.

Although the gimlet-pointed screw is generally supposed to be a comparatively modern invention, yet the first screws offered by General Harvey in the market in New York were gimlet-pointed and were so named by him. They were, however, superseded by tapered screws, which held the market for many years. General Harvey also first introduced machines for shaving screw-heads, and the chaser tool in place of the cutting dies—previously employed.

In 1839 the Poughkeepsie company sold out to a company organized

at Somerville, N. J., and screws were made first in Providence about 1840. In 1842 General Harvey began the experiments which made the screw machines entirely automatic, introducing self-feeding of blanks, etc. Patents on this machinery were taken out in 1846. In 1844 the New York Screw Company was organized, with General Harvey as president. Young Harvey was connected for a time with this company, and in 1850 he took charge of the wire department of the screw company at Somerville. In 1849 the Somerville company was reorganized, buying the machinery of Thomas W. Harvey and of a small concern at Schenectady, and taking the name of the Union Screw Company.

The patents of 1846 had been carefully studied by parties in Providence and New York, and they produced another automatic machine. From this time on the competition was severe, being entirely among home manufacturers, the foreign makers being ruled out of the market by the low prices. In 1854 the Somerville company was obliged to close on account of the competition.

Mr. Harvey was interested with his father in what was known as the Harvey Steel and Iron Company, of Mott Haven, New York; and in 1854, upon the breaking up of this company and after his father's death, he conducted for a time a steel works, chiefly experimental, at Norfolk, Conn. During the following ten years his attention was directed to developing many of his father's unfinished projects, and during these years he was at times closely connected with the American Screw Company, of Providence. In 1865 he founded the Continental Screw Company in Jersey City, which became the owner of Mr. Harvey's first patents on screw machinery, covering the entire process of wood-screw making. After a short existence these works were bought out by the American Screw Company. From 1870 to 1890 Mr. Harvey was constantly at work designing new machinery



GENERAL THOMAS W. HARVEY.

for making screws, bolts, wire nails, washers, spiral springs and many other articles of that kind. The most notable of his inventions during this period is what is known as the "rolled thread" screw. Instead of cutting the screw thread into the wire, Mr. Harvey rolled or cold-forged the thread partly into, partly upon the surface of the wire itself. He gave to these screws a sharp central point, which, with the large thread and small neck, with incidental saving in the weight of wire, necessarily gave to the Harvey rolled screw such an immense advantage over all other screws that the great screw manufacturers of the world, the American Screw Company, of Providence, and the Nettlefolds, of England, were practically obliged to purchase the Harvey patents, which they did in 1886.

Among other inventions of Mr. Harvey should be mentioned the so-called grip bolt, which has been and is very largely used as a fish-plate bolt on many of the principal railroads of this country, doing away with nut locks. The bolt once being screwed into the nut, forms a "perfect fit," and cannot be shaken off by the jar of passing trains.

In connection with railroad track bolts an incident may be mentioned showing the fertility of Mr. Harvey's mind in mechanical matters. A prejudice existed among many engineers and master mechanics of railroads in favor of a washer or nut-lock of some kind. Mr. Harvey refused to entertain the idea of changing the principle of his grip bolt, but being pressed to devise a washer which could compete with the Verona washer, at that time very largely used, he invented the now well known ribbed spiral washer, which has gone into very extensive use.

Of late years, however, Mr. Harvey's name has been best known as that of the inventor of the so-called "Harvey process for tempering steel." The history of the inception of this is interesting. During a time when the Harvey Screw and Bolt Company was in operation, Mr. Harvey conceived the idea of making a bolt and nut of cast iron, with threads partially impressed on them in the mold, and then

hardening or "steelifying" the surfaces of the threads and of the bolts and nuts so as to give them the necessary toughness. The experiment was, however, a failure, but the product was so peculiar that it was remarked at that time, 1885, that Mr. Harvey had probably made a discovery in the metallurgy of steel. This peculiar product attracted the attention of Mr. B. G. Clarke, of the Thomas Iron Company, who for some years had been associated with Mr. Harvey in the screw patents. On Mr. Clarke's encouragement, Mr. Harvey pursued his experiments, and soon succeeded in producing from ordinary low-grade Bessemer steel a steel equal in every respect to the finest crucible or cast steel. He made out of this razor blades, knife blades, files, etc. The first patents on this new product and process were granted to Mr. Harvey in 1888. Works were established at Jersey City, afterward moved to Newark. Out of these experiments grew the Harvey armor plate process and product, which promise to make a revolution in the armoring of vessels.

The naval authorities of the United States Government were not slow in perceiving the superiority of the Harvey plate over any other form. The tests made by the United States Government have been so recent that it is not necessary to recapitulate them here. Other

ABSTRACTS OF OFFICIAL REPORTS.

WOLVERINE COPPER MINING COMPANY, MICHIGAN.

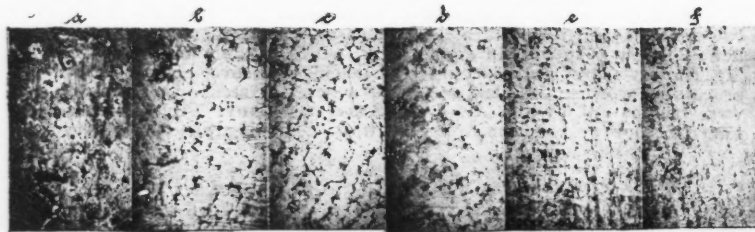
During the year ending June 30th, 1893, the expenditures of this company exceeded its receipts by \$33,887. The account in detail is as follows: Receipts, sales of copper, 218,855 lbs., at 10.98 cents per lb., \$24,030; assessment No. 3, \$30,000; total, \$54,030. Expenditures, at mine, \$82,332; smelting, \$1,607; freight, brokerage, etc., \$3,979; total, \$87,918; deficiency, \$33,887, which, less balance on hand June 30th, 1892, of \$13,657, leaves a net deficiency of \$20,230.

The receipts and expenditures of this company since its organization have been as follows: Receipts, from capital stock, \$600,000, less \$550,000 paid for property, \$50,000; assessments, 1, 2 and 3, \$90,000. From sales of copper, 718,929 lbs., \$80,544; total, \$220,544. Expenditures—Expenses at mine, August 1st, 1890, to June 30th, 1893, \$223,352; other expenses, salaries, etc., \$6,741; listing stock, \$1,639; smelting, freight and brokerage, \$8,793; interest account, \$249; total, \$240,774, leaving a net deficiency of \$20,230.

The expenses at the mine during the year were divided as follows: Sinking, 475 ft. at \$11.29 per ft., \$5,363; drifting, 2,903 ft., at \$6.03 per

PLATE VII.

C, very hard; 0.5 per cent. carbon



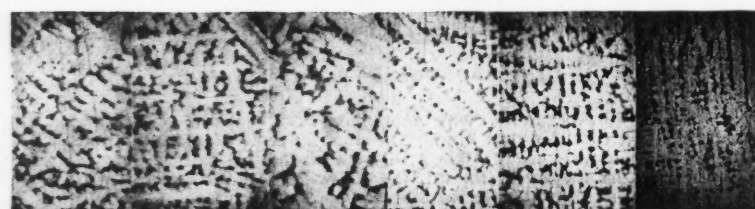
No. 1.—In original condition.



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.

tests were made in various places in Europe and have confirmed the experience in this country.

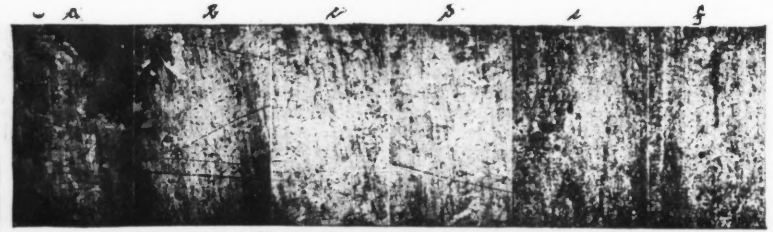
Mr. Harvey lived long enough to see the fruits of his labors and to participate in the profits. He was emphatically a progressive man. When his mind was engaged in inventions it was difficult for him to stop; he always saw so much beyond. His processes of thought were entirely original. In making his inventions he usually declined to be guided by the experience of others. The fact that some one had done a certain thing in a certain way almost always made him reject that way, and look for a path of his own. He was a singularly persuasive man, as he must needs be to get the attention and the confidence and support of prominent capitalists, in which he was very successful. Although always a positive man, yet it is doubtful whether he left any enemies behind him, on account of his sympathetic and really lovable nature, which made warm friends for him among all classes of men.

He was twice married; first in 1850 to Miss Matilda Winant, of New York, who died in 1856, leaving one son, Dr. Thomas W. Harvey, of Orange. In 1865 he married Miss Emily A. Halsey, of Bridgehampton, Long Island; and their son is Hayward A. Harvey, Jr., in charge of the Harvey Steel Company's works at Newark.

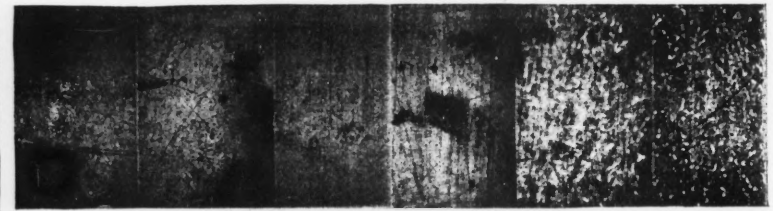
Mr. Harvey was one of the founders of the New England Society of Orange, was a Blue Lodge Mason, and had taken all the degrees of Odd Fellowship.

PLATE VIII.

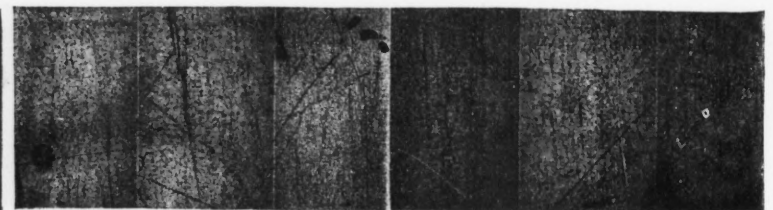
D, soft; 0.06 per cent. carbon.



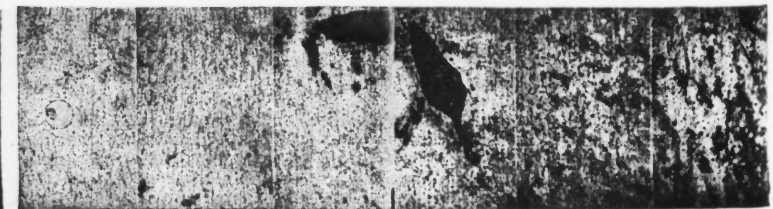
No. 1.—In original condition.



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.
Thomas Metal in Cast Ingots.

ft., \$17,517; winzes, 55.3 ft., at \$8 per ft., \$442; stoping, 738.5 fathoms, at \$9.21 per fathom, \$6,804; labor, \$290; total, \$30,416. This on 10,491 tons of ore milled is equal to \$2.89 per ton. Timbering cost \$2,190, or 21 cents per ton; tramming, \$3,932, or 37 cents per ton; labor, \$6,501, or 63 cents per ton; hoisting and pumping, \$5,278, or 50 cents per ton; compressor, \$7,384, or 70 cents per ton; supplies, etc., \$4,082, or 39 cents per ton; total of underground expenses, \$59,784, or \$5.69 per ton. From this total should be deducted profit on supplies, \$7,790, or 74 cents per ton. Rock house expenses were \$1,691, or 16 cents per ton; milling, \$6,203, or 59 cents per ton; surface and office expenses, \$3,498, or 33 cents per ton; construction account, \$18,946, or \$1.81 per ton. Mr. Fred Smith, the agent, reports work done during the year as follows: No. 2 shaft was sunk 198 ft. to the 10th level through unproductive ground. No. 3 shaft was sunk 275 ft. to the 7th level, and some stamp copper was found. About 2,831 ft. of drifts were driven, and various small bodies of stamp copper were encountered. New construction and betterments were considerable during the year. In closing the agent speaks of the future of the mine as follows: "Part of the ground now opened in the mine I must regard as good copper ground, promising well for future production. Some good reserves of stoping ground are yet untouched, after drifting through them. Most of the stopes worked the past two months appear quite promising for future yield, and if the line of new openings to be made in

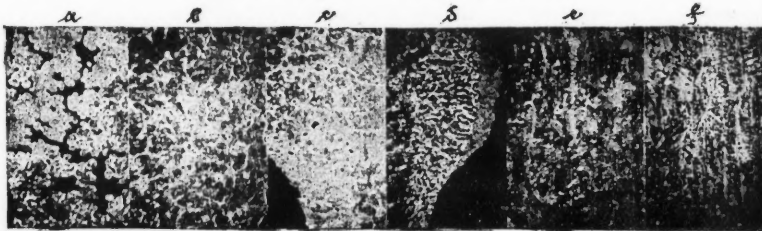
the regular course of working the mine shall open deposits of copper ground, even not more extensive than the past year, we shall be in a position to maintain a product fully equal to, if not surpassing, the last two months."

BROKEN HILL PROPRIETARY MINING COMPANY.

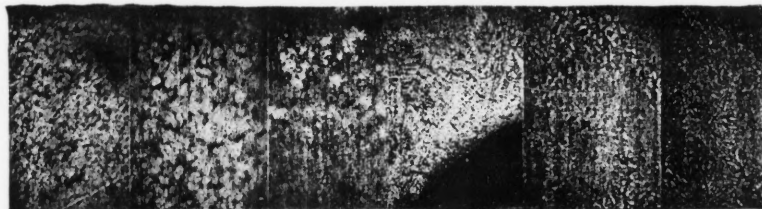
The report of the directors of this company, submitted at the semi-annual meeting of shareholders, held July 27th, states that the purchase of the Brisbane blocks for £5,000 has been effected. Considerable rains had fallen, and the company's dams now contained over 19,000,000 gallons of water. Besides this the directors had large water reserves on several small mining leases, and in addition the Broken Hill water supply had conserved over 800,000,000 gallons, so that no difficulty was anticipated in regard to water. The general manager and the chief metallurgist had been fully occupied with the experimental plants, but further experiments would have to be made. Up to the present stage the results had been satisfactory. The question of deep sinking and prospecting had been carefully considered, and the directors had decided to proceed with the sinking of two deep development shafts, on sites to be fixed by the general manager; and it was intended that the sinking in these shafts should

PLATE IX.

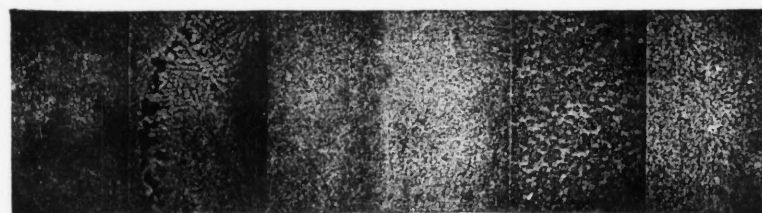
E, moderately hard; 0.25 per cent. carbon.



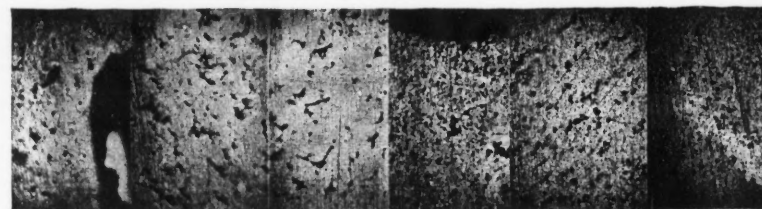
No. 1.—In original condition.



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.
Thomas Metal in Cast Ingots.

not be interfered with by ore raising, but that sinking should proceed without interruption for, say, 1,500 ft. One shaft had already been commenced and was down 40 ft. It had also been arranged to start sinking two more working shafts to relieve the pressure on those already in use. During the half year three new shafts had been sunk, and several very important ore developments met with, materially adding to the reserves. A reserve fund had been started, and it now amounted to £80,000, of which sum £70,000 was placed at fixed deposit, bearing interest at from 4½% to 4%. Satisfactory results had been obtained from the refinery. The market for soft lead in the East had been steadily increasing. The quantity of bullion treated in the refinery amounted to 10,994 tons, or equal to half the total bullion production; 2,857,722 oz. of fine silver were produced, and in addition 1,848 oz. of gold were recovered. The refinery returns showed that since May, 1890, the cost per ton of bullion had been reduced from £2 4s. 5½d. to £1 8s. 2½d. On May 31st the floating assets, less outstanding liabilities, amounted to £242,736. The amount of dividends paid during the six months had been £384,000, and in addition to this there was an actual cash reserve fund of £80,000.

The mining manager's report showed that during the period under notice 230,463 tons of ore had been treated, producing 408 tons of copper, 21,952 tons of lead, and 5,972,194 oz. of silver.

THE MICROSTRUCTURE OF INGOT IRON IN CAST INGOTS.

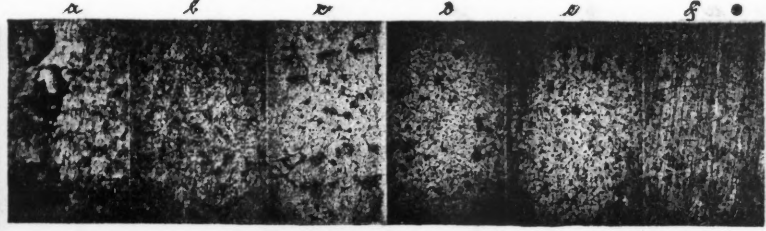
By A. Martens.*

(Continued from page 218.)

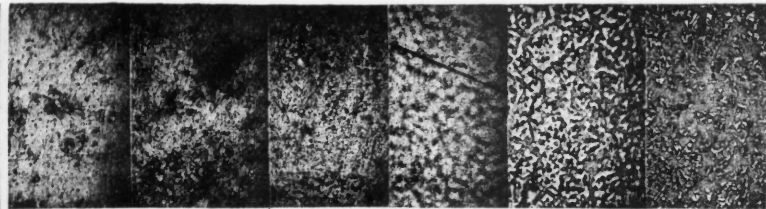
I attach greater importance, however, to the previously described light-and-shadow indications of relative elevation, though I am free to admit that the same phenomena might occur if, as in Figs. z and z', there should be a depressed rim between the two surfaces—a condition which is not at all probable and has never yet been identified. When the dark surface a lies lower, as well as when it lies higher than the light surface b, a bright edge must be formed at l and a shadow at s. In making other examinations, I have found very distinctly after etching that the veins lay deeper than the mesh-surfaces of the net. Selecting a special small test-piece from plate F, I divided it in halves and strongly etched one part (a) in its original state with a solution of nitric acid in ether-alcohol (about 1 to 50 + 50). The resulting etching was extraordinarily well defined, the strongly attacked surface of the section being bright as a mirror and showing extremely delicate details, which were beautifully developed. The measurement of the elevations showed that points b and c, Plate XIV.,

PLATE X.

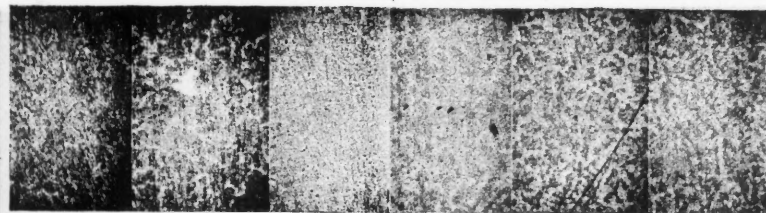
F, soft (wire); 0.1 per cent. carbon.



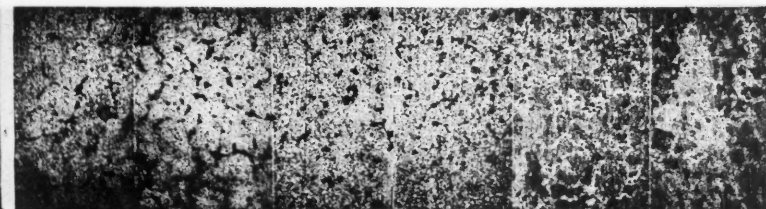
No. 1.—In original condition.



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.
Open-hearth Metal in Cast Ingots.

Fig. 4, lay respectively 0.0122 and 0.0221 mm. lower than point a. The ridge a corresponds with a light-colored vein, and b and c with

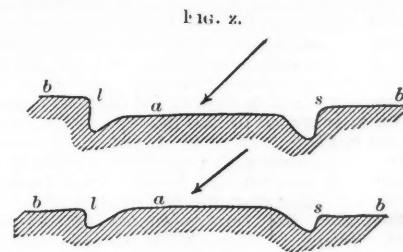


FIG. z.

HYPOTHETICAL CONDITIONS OF THE ETCHED SURFACE.

dark-meshed fields of the open-hearth metal F. The second part (b)

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

of the small test-piece was heated white-hot, and then quickly cooled and etched like (a). Its structure is shown in Plate XIII., Fig. 20, magnified 100 diameters. The white spots are raised, the dark ones are depressed.

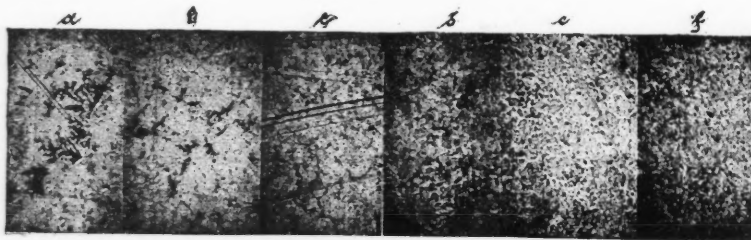
Under high magnifying powers (apochromatic objective with 0.30 aperture and compensating eye-piece 12 of Karl Zeiss, Jena, enlarging about 180 diameters) the blue and dark gray surfaces of all the foregoing sections show, generally speaking, a granular structure. In weak etchings, such as I commonly employ, and such as have been used exclusively in the preparation of the sections illustrated on Plates V. to XII., the grain does not always appear with uniformity and regularity. Usually it is most distinct at the edges of the dark surfaces. Sometimes it is possible to detect a species of stratification due to a certain interflow of the grains, while occasionally there are feathery groupings, like those on crystals of spiegeleisen.

If the corroding action is carried very far, as in test-piece (a) of the metal F, Plate XIV., Fig. 4, the component of the bright vein-surfaces (point a in Fig. 4), most resistant in the ether-alcohol solution of nitric acid, exhibits a cross-section in which these feather-

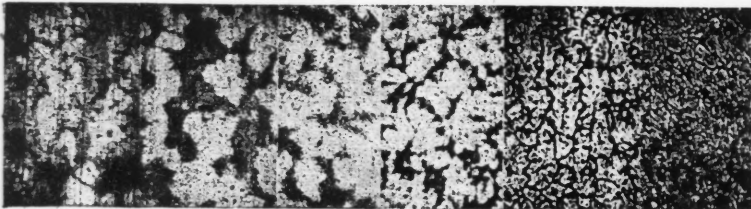
character of these surfaces, one may well hesitate whether to assume a granular structure as peculiar to one or the other of the constituents that are separable in dilute acids, or as common to both. If one constituent solidifies before the other, the more fusible one will presumably envelop the one already solidified, unless, indeed, the latter should remain soft, in which case the grains of the constituent which solidifies last, being possibly the harder, might imprint themselves in the still plastic mass of the other constituent. At all events, it is apparent that no safe conclusions upon the structure of either substance can yet be drawn from the phenomena of strongly etched sections. A certain structural arrangement of one or the other may be regarded as demonstrated only when a given treatment invariably and unquestionably produces absolutely constant phenomena on the weakly etched surfaces of like materials, under like conditions.

If the phenomena of the etched surfaces and sample strips be investigated with higher magnifying powers, some of the spots which we have been designating as pores resolve themselves into dark-gray, smooth, more or less circular areas, which appear like embedded bodies. Two such surfaces are shown in connection with a real pore

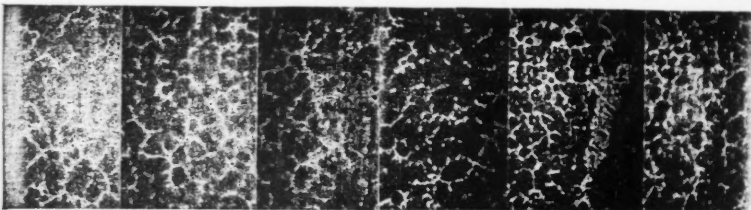
PLATE XI.
G, Soft; 0.25 per cent. carbon.



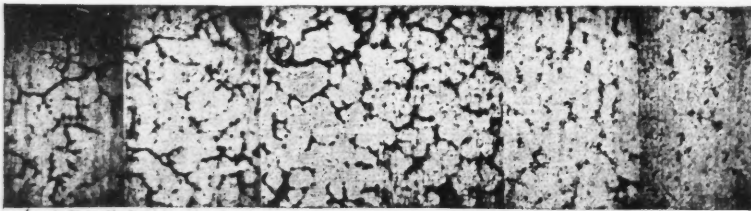
No. 1.—In original condition.



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



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

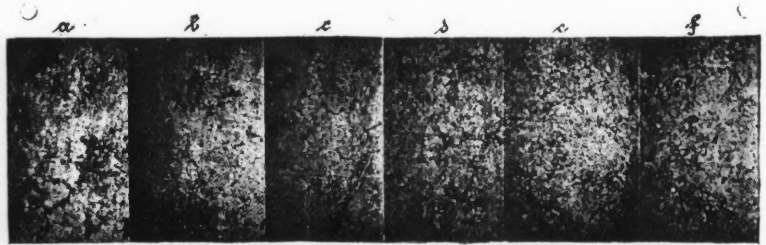


No. 4.—Hardened and tempered from the left.
Open-hearth Metal in Cast Ingots.

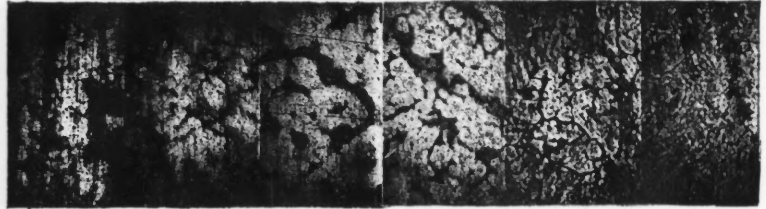
and-branch forms and, occasionally, granular figures are remarkably well defined, showing that even this constituent of the structure is attacked, though with difficulty, by the highly diluted nitric acid solution. A granular character of the white surfaces is also indicated in Plate I., Fig. 7. As a rule, it is difficult to reproduce these details by photography in such a way that the picture shall satisfactorily represent the constitution of the surfaces.

The granular nature of the substances of the dark mesh-surfaces may be inferred from the appearance of the deeply etched parts, such as those drawn at b and c, Plate XIV., Fig. 4, and from the features of Fig. 18 on Plate III. But whether this granular structure is peculiar, as I assume, to these dark meshes can be determined only from the appearance of the surfaces (for example of b and c) when it has been positively established that they are remnants of the more easily attacked component. Frequently the slopes between the higher and the lower planes are likewise covered with grains, although as a rule elongated, parallel swells and feathery forms predominate, like the figures described as characteristic of the cross-sections of the chemically more resistant substance. It is reasonably certain that the upper parts of these slopes represent the exposed surfaces of the resistant substance, and hence, in seeking a cause for the granular

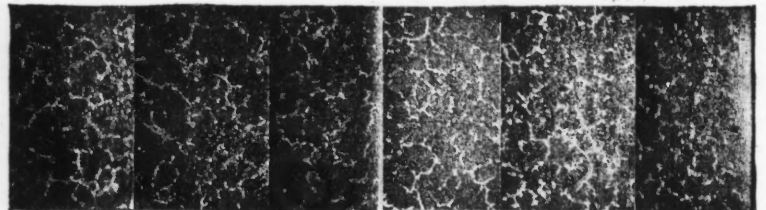
PLATE XII.
H, moderately hard; 0.4 per cent. carbon.



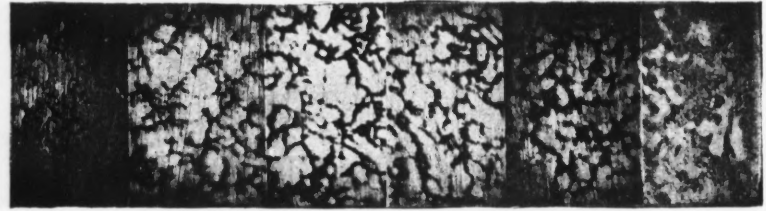
No. 1.—In original condition.



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.
Open-hearth Metal in Cast Ingots.

at a on the right side of Fig. 14, Plate I. I have not yet been able to determine whether they represent slag or something else; they certainly differ from the otherwise almost invariably round form of included slag in cast ingot-metal (Plate VII., D₃ and D₄ a). In rolled ingot-metal the pressure of the rolls lengthens the form of the cross-section of the slag-inclusions.

(To be Continued.)

Coal Mining Accidents in New South Wales.—The mine inspectors' reports for the year 1892 show the following results: In the northern district, 8,204 persons were employed, of whom 6,783 were underground. There were six persons killed by accident and 59 injured. The averages show 318 tons of coal raised for each person employed; 44,266 tons for one injured, and 435,288 tons for one killed. In the Southern district, 1,860 men were employed, 1,469 underground; 16 persons were injured by accident. The averages were 502 tons of coal for each person employed; 58,304 tons for each one injured. In the Western district, 450 persons were at work, 372 underground; 2 were killed and 2 injured. The coal raised was 525 tons per man at work; 118,181 tons per man killed and the same to one injured.

REPORT ON THE BENDIGO GOLD FIELD.

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

This "blue book," recently published,* forms one of a series of similar special reports to be issued by the Department of Mines, Victoria. There is reason to believe that its preparation was suggested by the more complete and elaborate monographs of the United States Geological Survey. Among the many benefits conferred upon the mining industry by the works of Emmons, Becker, Gilbert and others, not the least is the example which they have set to the scientific departments of foreign governments.

This "Report on the Bendigo Goldfield" is the work of a geologist of wide experience and high reputation. Those who have been to the Transvaal are well aware that Mr. E. J. Dunn is the father of South African geology. Mr. Dunn learned his early geological lessons among the hills of northeastern Victoria previously to studying at the Royal School of Mines in London. For many years he was geologist to the government of Cape Colony, and when he returned to Australia his services as a specialist were promptly secured by the Victorian Department of Mines.

The work of examining the Bendigo district for the purpose of compiling this report was commenced by Mr. Dunn in 1890. Previous to that date careful underground surveys and certain geological observations had been made by the government mining surveyors. To these gentlemen the author of the report expresses his indebtedness. The letter-press consists of only 15 pages, the bulk of the blue book being very considerably enlarged by the addition of a number of extremely valuable, interesting and accurate maps, sections and diagrams.

The introductory portion of the report tells of the position and extent of the goldfield. Bendigo "is distant 100 miles by rail in a north-west direction from Melbourne." "The railway station is 753 ft. above sea level." The goldfield "may be considered to occupy about 140 square miles, or a tract 20 miles long by 7 miles wide."

The prevailing country rock is Silurian, consisting of slates and sandstones. They "cover nearly the whole surface," whose geological features are only diversified by the recent and tertiary alluvial deposits, which were so rich a depository of gold in the early days of Bendigo, and in addition there is "an outlier, a few chains in length and from one to two chains wide, of conglomerate" which the author's investigations elsewhere in the colony enable him to determine as of approximately Permian† age.

The Silurian rocks of the district are divided by Mr. Dunn into three concentric areas, of which the central portion is the most productive and the outer the least auriferous. The diminution of the yield of gold from these three zones is accompanied by certain changes in the appearance and character of the country rock. To put it briefly, as you pass from the innermost zone, "the heart of the auriferous area," the rocks become harder, less highly colored and less decomposed. The gold bearing portion represents "but a fraction of the whole area of Silurian rocks," and it may be added that even in the auriferous area, consisting of "thousands of alternating sandstones and slates," "only some of the beds are favorable to the presence of gold."

The structure of these silurian beds is intimately related to the lode formation. The confusion created by the ignorance of this fact was, until a comparatively recent date, a stumbling block in the way of the economic progress of this mining region. The true relationship of the bedding and the quartz reefs was first pointed out by Mr. Dunn in 1888. In the present report he refers to the "existence of numerous nearly parallel axial lines having a strike of about N. 16° W., along the course of which the great mass of slate and sandstone rocks is bent over into a series of anticlines with corresponding synclines between them. This, he adds, "is the key to the Bendigo goldfield." This is true, without a doubt, for wanting this key the miner is in a maze of tangled cleavage and stratification, wherein he will find it well nigh impossible to carry out an intelligent search for the depositories of gold-bearing quartz. In describing the succession of the anticlines and synclines the author refers only to the country rock, leaving the inclosed quartz reefs for later, separate consideration. This is a feature of the report to which serious objection may be made. If the examination of this district by a geologist is to teach anything it will be the close relationship, between the rock structure and the lode formation; to treat of them separately is to miss the opportunity of emphasizing the main lesson offered by the study of the region.

The quartz bodies of the Bendigo mines occur as "saddle reefs," which are conformable to the anticlinal and synclinal undulations of the inclosing country. The "line of reef" of the miner is the "anticlinal axis" of the geologist. Mr. Dunn has noted that the synclines are found to be much less productive than the anticlines. He adds, "from one anticlinal to the next the distance ranges from 300 to 1,300 ft." "The anticlinal axial lines are inclined to the east," and it may be added that in this particular the successive formations of quartz are also found to correspond. "The direction of any bed from the horizontal in the direction of the axial line is its pitch. Generally the angle of pitch does not exceed 20° to 30°," but it may be north or south. This refers to the country rock, but it is identically true of the quartz formations. "The pitch of beds vertically beneath each other is generally about the same in amount and in the same direction," but "the pitch in two axial lines at opposite points may be quite different, both in direction and in degree." Similarly, the bodies of quartz—the "quartz reefs" and "saddles" of the miner—while they have a corresponding pitch when they occur in nearly vertical succession on any given line of reef are nevertheless found to incline at an angle, dissimilar in degree and kind when on two parallel lines of reef.

The report contains much valuable information regarding the faults, corrugations and other structural details of both the country rock and

the inclosed quartz formations. Mr. Dunn, as a geological observer, is very accurate, but when he throws out theories and suggests explanations of some of the perplexing features of the goldfield, he will not be followed with such unquestioning confidence. The origin of the corrugations of the Silurian beds may not be easy of explanation, and while many will agree that "the rocks look as though some movement similar to the waves of the ocean had passed through them," yet we believe that few will follow Mr. Dunn when he says "it is quite possible that some undulatory motion long continued has produced these great results." Elsewhere, again, he says, "such corrugations of the strata as are exemplified on this goldfield are generally attributed to the secular cooling of the earth's mass; the phenomena here presented do not conform to such a theory, for the contraction is practically but in one direction. Vibratory movements connected in some way with the earth's motion have probably produced these remarkable folds in the strata."

The thin lava dykes which penetrate through the slates and sandstones are an interesting feature of the Bendigo mines. Mr. Dunn says that "these dykes occur along the course of every anticlinal axis, but have not been noticed anywhere along the synclinal axis." Of this interesting fact he offers no explanation, but referring to the origin of the dykes, he speaks of them as filling fissures "where some convulsions have fractured the rocky mass right through." "The injection through thousands of feet of such thin dykes as penetrated the strata could only have been accomplished by forces which caused the molten rock to fill the fissures instantaneously." This may be in keeping with the catastrophic theories of the past, but is, I submit, out of accord with the evidence obtainable in the Bendigo mines. The tortuous, broken, irregular course of these dykes, their remarkable thinness and their penetration of so great a thickness of rock cannot be explained by a "convulsion" which caused fissures to be instantly formed and simultaneously filled.

The limits of this report prevented the author, very properly, from entering into anything like a detailed discussion of the origin of the quartz reefs. Such references as are, however, incidentally made are likely to be questioned, and most of all by the men who spend their time underground. Mr. Dunn says of the saddle reefs, "generally they appear to have been formed in cavities caused by the bending over sharply of the unyielding rocks of this region." Again, "the beds have been sharply bent over, leaving cavities; they have been ruptured, leaving chasms." While it is probable that along the anticlinal axis the country rock was broken and shattered, offering greater opportunity for the slow passage of mineral solutions than was afforded by the adjoining country, yet it is surely contrary to underground observation to speak of "chasms," "cavities" and "myielding rock." The miner will tell the geologist that he finds the rock far from unyielding, so much so that it requires his utmost skill to keep open the excavations he has made, and that workings once abandoned are soon closed by reason of the pressure of the surrounding rock. If this be so during the short space of time with which man is concerned, how can the geologist suppose that a "chasm" was kept open by "unyielding rock" during the enormous periods of time, which are required for lode formation and under the pressure of rock masses vastly greater than those with which the miner has to contend.

The author further states that "it is noticeable that no cases are met with in which the country rock appears to have been replaced by quartz." He will, I trust, pardon me if I say that the converse seems to me to be more true. What is the "mullocky reef" of the Bendigo miner but quartz in which much country rock is intermixed? The country rock so occurring may be fragmentary, or it may appear as thin regular partings, but in either case it is a very common feature of the reefs. Instances are frequent where lode matter consists of rock and quartz so mingled as to be indistinguishable, and this is due not to mechanical causes alone, but to chemical also, not to the inclusion of broken fragments only, but to the substitution of rock for quartz by a very evident process of silicification.

Those matters which appertain to theory are, however, of immensely less importance than the ascertaining of the facts. In this connection the maps and sections are of more value than the diagrams. One of the best features of the report is the number of very detailed and thoroughly accurate plans and sections which accompany it.

They will be much valued by the mining men of Bendigo, and they cannot but prove of great assistance in the systematic development of this great goldfield. In conclusion it may be said that reports and maps, such as these are an invaluable boon to the mining industry, and that the preparation of others similar to them will do much to bring into closer and more useful relation the mining centers of Victoria and the scientific branches of the government.

Action of Nitric Acid on Tin.—Mr. C. H. H. Walker read a paper at the last meeting of the Chemical Society of London, on the action of nitric acid on tin. It is generally supposed that metallic tin dissolves in nitric acid with the production of both a stannous and stannic salt, according to the conditions of temperature and concentration of the acid. This supposition does not appear to be based on the results of quantitative investigations. Mr. Walker has conducted experiments to determine the amounts of stannous salt formed under varying conditions of temperature, concentration of acid, and mass of tin treated. From these experiments it appears that the proportion varying conditions of temperature, concentration of acid, and mass of treated. With dilute acids the increase of temperature has but little effect, but with more concentrated acids the effect is more marked, for the alteration of a few degrees will reduce the amount of stannous salt to nothing. Increase of concentration, other things being equal, decreases the proportion of stannous salt. Mr. Walker states that the yellowish-white substance formed from concentrated solutions is a hydrated stannic nitrate of varying composition, the average value corresponding to the formula $\text{SnNO}_3(\text{HO})_2$. This substance slowly decomposes with exposure, so that the composition varies with the time between production and analysis and also according to the method of purification adopted for eliminating the nitric acid.

* "Report on the Bendigo goldfield," by E. J. Dunn, F. G. S., one of a series of Special Reports issued by the Secretary for Mines (A. W. Howitt), Melbourne, Victoria.

† Mr. Dunn says, "Permian or later date." This is probably an oversight and should read, "Permian or not much later date."

SEGREGATION IN INGOTS OF IRON AND STEEL.*

By Alexandre Poursel.

The phenomena of liquation in steel or iron ingots of all sizes, but naturally to greatest extent in the heaviest ingots, have been noticed ever since the commencement on a large scale of the Bessemer and open-hearth manufactures; but they have been studied with care during the last few years only. The English and the Americans were the first to publish the results of investigation upon phenomena of this class, to which they have given the name of "segregation."

According to Tchernoff (with whom we discussed this question at length in 1878, in connection with the cast steel plates of large dimensions designed for the Italian fleet, which we showed him at Terre-Noire) Kalakoutsky called attention in 1866 to the lack of homogeneity in Bessemer ingots, especially when cast in sand. But our own attention had been called to the phenomena of liquation in 1868 by a somewhat surprising fact which appeared in almost every one of a number of steel-rail ingots coming from the works of Messrs. Pierre and Emile Martin at Sireuil, to be rolled at Terre-Noire. In the heating or in the first groove of the rolls, a slice of from 6 to 10 cm. (2.4 to 3.9 inches) separated itself from the head of each ingot. As a general consequence, the section of rail coming from the upper part of the ingot was weak, while the section from the bottom of the ingot

from the lower part. It has been attempted to attribute to blow-holes, as principal cause, the defects observed in forged or rolled pieces, such as rails or plates of hard or soft steel, but principally soft steel.

M. Poursel gives a number of instances showing great deviations in the composition of steel plates and ingots. The tables appended show some physical tests and chemical analyses of plates, and illustrating the differences in various portions of a plate. There seems to be no absolute rule by which the order of liquation or the results to be obtained can be determined. Various methods have been tried, but with very different results in different cases.

In his opinion, the injurious consequences of segregation must be suppressed by reducing, as far as possible, the elements subject to liquation. Upon the basic or neutral open-hearth, and starting with an initial bath of approximately pure materials, it is easy to obtain a metal containing not more than 0.1% of carbon; 0.02 phosphorus and traces of sulphur, with 0.10 of manganese. By adding 0.1% of aluminum, the metal can be cast quietly, and without altering its composition. Consequently, if from an ingot so cast and destined for boiler-plate, one-fourth to one-third of the upper part (in which the carbon and phosphorus may reach respectively 0.12 and 0.03, for example) be cut off, the remainder will be a block of approximately perfect homogeneity. Operating in this way, he has obtained in a large establishment in the northeast of England ingots from 2 to 3 tons, 18 inches

APPENDIX I.—Physical Tests.

Ordinary soft Martin steel plate, 14 mm. (0.56 in.) thick.				Boiler plate, Martin steel, 17 mm. (0.68 in.) thick.					
No. of test.	Elongation per cent. in 2 in. (51 mm.)	Resistance in kilos per sq. mm. (6 in.²)	Remarks on fracture, etc.	No. of test.	Elongation per cent. in 2 in. (51 mm.)	Resistance in kilos per sq. mm. (6 in.²)	Remarks on fracture, etc.		
Lengthwise.	Crosswise.	Lengthwise.	Crosswise.	Lengthwise.	Crosswise.	Lengthwise.	Crosswise.		
1	16.0	45.3	Granular; large flaw in centre.	1	19.5	42.7	Irregular; many large white lines.		
2	17.0	44.9	Do, ditto.	2	19.5	43.5	Do, ditto.		
3	17.0	45.0	Finely granular; flaw at one corner.	3	21.5	43.0	Do, ditto.		
4	18.0	45.6	Do, ditto, serious flaw on one edge.	4	22.0	43.5	Do, ditto.		
5	18.5	46.5	Do, ditto.	5	20.0	44.8	Do, ditto.		
6	19.0	47.2	Do, ditto, serious flaw on one corner.	6	10.0	47.3	Irregular; half-grain, half-fiber, center hard.		
7	20.0	46.2	Normal; central part appears very hard.	7	16.0	44.5	Irregular; two strong white lines.		
8	23.0	44.2	Beautiful necking; some blow-holes.	8	23.0	42.5	Fine white lines.		
9	21.0	47.2	Piped; some hard spots in center.	9	17.5	45.5	Piped.		
10	22.5	44.7	Normal; fine white line.	10	24.5	42.6	Do, ditto.		
11	19.5	44.0	Piped; large white lines.	11	18.5	43.2	Many white lines at center.		
12	14.5	48.5	Coarsely granular; serious flaw on one edge.	12	11.5	40.7	Large flaw in center; no necking.		
13	21.0	45.2	Normal.	13	18.0	43.9	Normal.		
14	23.5	44.0	Do, ditto.	14	23.5	41.6	Fine white lines.		
15	21.5	42.3	Do, ditto.	15	23.0	41.7	Piped; some white points.		
16	23.0	46.5	Piped; much necking.	16	23.5	42.3	White line on one edge.		
17	17.5	43.6	Do, ditto; some white lines.	17	25.0	40.0	Normal; fine impure lines.		
18	18.5	44.0	Do, ditto; granular spot; several large white lines.	18	19.5	41.4	Many impure lines.		
19	17.5	44.6	Normal; some white lines.	19	18.0	46.9	Hachure of white lines.		
20	20.0	44.9	Much necking; some blow-holes; slight flaw at cent'r.	20	15.0	43.7	Normal; some impure lines.		
21	22.0	42.5	Normal; do.	21	27.0	40.1	Do, ditto.		
22	23.5	40.7	Much necking; some blow-holes; slight flaw at cent'r.	22	25.0	39.4	Piped.		
23	22.5	41.5	Piped; some blow-holes.	23	18.0	40.4	Normal.		
24	24.0	40.8	Much necking; some blow-holes.	24	31.0	38.7	Piped.		
25	28.0	41.2	Much necking; fracture without flaw.	25	23.5	38.6	Do, ditto.		
26	21.0	41.6	Normal; large white line at cent'r.	26	21.0	39.2	Piped; some white lines.		
Av.	18.8	20.9	44.1	44.0	Av.	17.7	22.0	42.8	42.3

endured admirably the tests required by the railway. These observations led us to adopt at Terre-Noire in 1870 a special treatment for Bessemer ingots intended to be forged into cannon. The metal was poured into a cast iron ingot mold of hexagonal section and truncated pyramidal form and very thick walls, surmounted by a mold of heated sand. Thus, besides the weight of the metal required for the cannon-ingot, there was poured an additional weight half as great in an envelope previously brought to red heat in order to preserve its fluidity as long as possible after the solidification of the mass contained in the ingot-mold. This arrangement was always used at Terre-Noire in casting ingots of all weights for shaft forgings. It is evident that this does not absolutely avoid the partial liquations which take place in the center of the ingot, principally in the zones nearest to the part cast in sand, and serving as sinking-heads; but this is an inconvenience without consequence for cannon, and of little importance for forge-shafts; since in the first case the non-homogeneous material disappears in the boring of the piece; and, in the second case, finds itself in the region of the neutral fibers of the solid. The accident which occurred to the boilers of the "Livadia" gave rise to very lively discussion in England upon the causes of the lack of homogeneity in steel boiler-plates. The specifications at that time adopted for boiler-plates could seldom be met by one plate in ten, so that, as a general rule, it was arranged to take the tensile test-pieces from the upper part of the plate and the tests for quenching

APPENDIX II.—Chemical Analyses.

Ordinary soft Martin steel-plate, 14 mm. (0.56 in.) thick.						Boiler-plate Martin steel, 17 mm. (0.68 in.) thick.							
No.	Part.	C.	Si.	S.	P.	Mn.	No.	Part.	C.	Si.	S.	P.	Mn.
1	Mean	0.260	0.056	0.042	0.085	0.160	1	Mean	0.250	0.032	0.043	0.060	0.100
2	Interior	0.290	0.019	0.083	0.109	0.150	2	Interior	0.320	0.096	0.070	0.077	0.100
	Exterior	0.250	0.190	0.025	0.057	0.150		Exterior	0.180	0.056	0.030	0.049	0.100
5	Interior	0.270	0.140	0.038	0.078	0.150	5	Interior	0.028	0.023	0.048	0.065	0.100
	Exterior	0.240	0.028	0.020	0.060	0.150		Exterior	0.210	0.028	0.022	0.057	0.100
6	Mean	0.270	0.019	0.038	0.093	0.170	6	Mean	0.280	0.028	0.058	0.073	0.100
8	Interior	0.270	0.028	0.040	0.078	0.150	8	Interior	0.250	0.065	0.030	0.067	0.100
	Exterior	0.290	0.037	0.022	0.065	0.150		Exterior	0.220	0.032	0.020	0.063	0.100
12	Interior	0.270	0.043	0.046	0.077	0.150	12	Interior	0.280	0.032	0.040	0.078	0.110
	Exterior	0.220	0.065	0.022	0.062	0.150		Exterior	0.210	0.046	0.026	0.065	0.090
14	Interior	0.260	0.028	0.026	0.078	0.160	14	Interior	0.240	0.046	0.042	0.091	0.100
	Exterior	0.230	0.093	0.028	0.060	0.150		Exterior	0.210	0.046	0.028	0.060	0.090
15	Mean	0.240	0.084	0.035	0.057	0.160	15	Mean	0.240	0.028	0.028	0.065	0.100
16	Interior	0.250	0.075	0.030	0.076	0.160	16	Interior	0.250	0.028	0.038	0.078	0.100
	Exterior	0.250	0.028	0.027	0.068	0.160		Exterior	0.200	0.046	0.020	0.049	0.090
17	Interior	0.260	0.046	0.054	0.073	0.180	17	Interior	0.230	trace	0.024	0.070	0.110
	Exterior	0.230	0.065	0.042	0.060	0.150		Exterior	0.200	0.019	0.022	0.047	0.100
19	Mean	0.260	0.170	0.048	0.085	0.150	19	Interior	0.240	0.019	0.028	0.117	0.110
								Exterior	0.220	0.046	0.026	0.057	0.100
20	Interior	0.200	0.028	0.030	0.067	0.160	20	Interior	0.240	0.056	0.031	0.077	0.110
	Exterior	0.240	0.063	0.018	0.058	0.160		Exterior	0.200	0.076	0.028	0.068	0.100
22	Mean	0.220	0.046	0.032	0.075	0.160	22	Mean	0.230	0.042	0.028	0.062	0.090
23	Mean	0.250	0.075	0.038	0.070	0.150	23	Mean	0.230	0.028	0.030	0.057	0.100
24	Interior	0.220	0.093	0.018	0.068	0.150	24	Interior	0.200	0.042	0.018	0.044	0.100
	Exterior	0.200	0.046	0.019	0.057	0.150		Exterior	0.210	0.023	0.020	0.054	0.090
25	Interior	0.230	0.037	0.028	0.074	0.150	25	Interior	0.200	0.042	0.028	0.065	0.110
	Exterior	0.230	0.063	0.022	0.068	0.160		Exterior	0.180	0.046	0.032	0.052	0.100
26	Interior	0.250	0.074	0.020	0.060	0.150	26	Interior	0.210	0.070	0.028	0.065	0.110
	Exterior	0.210	0.130	0.015	0.049	0.150		Exterior	0.180	0.046	0.032	0.052	0.100
	Mean	0.248	0.064	0.031	0.070	0.155		Mean	0.229	0.0408	0.0305	0.0652	0.099

square, which, being first treated by the hydraulic press and subsequently rolled into billets, were utilized almost without waste in the manufacture of wire for telegraphic cables. Chrome-steel has already been tested; and when to a pure metal, like boiler-metal, 0.2 to 0.4% of chromium has been added, homogeneous blocks have been obtained, and the limit of elasticity has been raised notably—up to two-thirds of the breaking strain—without sensibly altering the elongation. In the direction of alloys there may be found various advantageous solutions of the problems involved in the manufacture of metals destined for civil constructions.

As a final conclusion of this summary survey, attention is called to the fact that tensile tests and mechanical tests in general may determine a priori the intrinsic qualities of a mass of fluid metal, but not those of a solid metallic block, whether before or after work has been done upon it.

The Determination of Thallium.—In the "Zeitschrift fur Analytische Chemie," Dr. Sponholz describes a new method for estimating thallium quantitatively. The method depends on the fact that in a neutral or acid solution a thallous salt may be converted by bromine water into the corresponding thallic salt. The oxidation is instantaneous, and its completion is shown sufficiently precisely by the liquid turning yellow. For effecting the titration in practical work, a 1-6th normal solution of bromine water is prepared by means of potassium iodide and sodium thiosulphate. A burette, graduated to 1-10 c. c., is filled with the solution, and the point is plunged into the acid solution of thallium. The bromine is allowed to flow into the thallium until the excess of bromine causes a distinct yellowness to appear. It is necessary to place the point of the burette within the solution, as otherwise the bromine evaporates and thus an error is introduced. It is also highly necessary that the solution should be acidified, as thallic salts are decomposed by water, and after the separation of the dark-colored thallium hydroxide the completion of the reaction cannot be distinctly recognized. It is desirable to correct the determination by determining the quantity of bromine which gives a distinct yellow color to a volume of water equal to the thallium solution.

* Paper read before the International Engineering Congress in Chicago.

THE ROESSLER-EDELMANN PROCESS OF DESILVERIZING LEAD WITH ALUMINUM AND ZINC.

In the process for desilverizing lead by spelter there is obtained desilverized lead with about 0.6% of zinc on the one part and a mixture of lead with zinc and silver intermixed with oxides of zinc and lead, the so-called zinc-scum, on the other. By smelting this scum only a part of the lead is removed, while a great deal of it remains in the zinc-scum with the oxides of zinc and lead, whence it cannot be removed by liquation even at red-heat. The oxides prevent the metallic particles from collecting and from liquating out of the mass; a complete separation of lead from the zinc-silver alloy is therefore not obtainable. For working up this oxidized product containing zinc-silver with some lead, the "rich-scum" distillation has been used at most refining works. The result is a concentrated silver-lead for cupellation. The litharge produced must be reduced and the refined lead returned anew to the desilverizing process.

The old process, therefore, comprises the following operations: 1. Softening of the base bullion; 2. Desilverizing the lead by a repeated addition of spelter and cooling the lead in the kettle from two to six times. The number of these operations depends on the contents of silver and of some impurities remaining in the lead; 3. Liquation of the zinc-scum; 4. Distillation of the concentrated zinc-scum; 5. Cupellation of silver-lead; 6. Reviving the litharge and other products of cupellation; 7. Desilverizing the lead obtained by the reviving process.

The new Roessler-Edelmann process being based upon the use of an alloy of zinc and aluminum for the desilverization of lead offers, it is claimed, considerable advantages over the old process with ordinary zinc. The quantity of aluminum required does not exceed 0.5% of the spelter applied. This alloy is very little disposed to oxidation and retains its bright metallic surface even at red-heat. The lead treated with such an alloy of aluminum-zinc remains likewise nearly completely bright on the surface. Lead rich in silver requires, of course, more spelter than poor; the quantity of spelter which dissolves in the lead rises with the temperature of the latter. Hitherto the temperature of the lead had to be kept as low as possible in order to restrict losses by oxidation. As the addition of the aluminum alloy nearly prevents oxidation the temperature may be raised as far as required without harm. We are, therefore, able to saturate the silver-lead at one operation with the quantity required for extraction of the total contents in silver, separating the alloy of silver and zinc with some lead upon subsequent cooling of the kettle.

While hitherto for the desilverization of lead with 0.5 or 1% of silver four to six additions of spelter were required, such lead can be desilverized at one operation down to 0.0004% of silver. This means a saving of labor of about 50% on one hand and an increase of capacity of the plant of 50% on the other. No modification of the ordinary plant is required for the process. The main advantage, however, is neither the saving of labor nor the increase of capacity of the plant, but the fact that the greatest part of the silver is collected in an alloy instead of in a mixture of oxides, from which it can be extracted only with considerable losses. The alloy of zinc-silver with lead, obtained by desilverizing silver-lead with aluminum-zinc alloy is free of oxides, and therefore it can easily be delivered from a surplus of lead by liquation, by which operation an alloy is obtained containing about 20 to 40% silver, 3 to 4% lead; 1.5 to 2% copper, and 76.5 to 54% zinc, with small quantities of Al, Fe, As, Sb, and separating as a homogeneous and liquid mass from the lead, which latter is to be returned to the process.

This alloy is ladled at once into molds and thus cast into anodes for electrolysis. The electrolytic-zinc is very pure; it consists of an average of 0.0099% Fe; 0.0114% Cu; 0.0341% Pb; traces of Ag, As and Sb; 99.9446% Zn. This exceedingly pure metal commands, of course, a price much superior to that of ordinary spelter. The costs of the electrolysis are nearly covered by the higher value of the electrolytic-zinc. The remainder of the anodes forms a slime rich in silver; it consists on an average of 80 to 74% Ag; 10 to 12% Pb; 1.5 to 5% Cu; 0.2 to 0.5% Zn, with impurities of some As, Sb and Fe. It is melted to fine silver.

From the description above it is evident that the cupellation is not needed. In place of it a short fining process on the test of the silver-slimes is substituted. As hardly any litharge and hearth is to be treated in the smelting furnaces, the losses of metal unavoidable there are prevented. The quantity of lead to be desilverized is reduced, and a large product of lead obtained at the first operation.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY

Supreme Court of Colorado

Rights of Locators to Tunnel Claims.

Where a tunnel is run for the development of a lode or vein or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within 3,000 ft. from the face of such tunnel, on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel, of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid. But failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of such tunnel.—Ellet vs. Campbell, 33 Pac. Rep., 521.

Circuit Court District of Colorado

Description of Premises in Complaint for Trespass.

In trespass for entering on land belonging to a mining company, and carrying away and converting its ore, the description of the premises in the complaint as a mining claim of certain dimensions, with a reference to the location certificate and the patent for metals and bounds, is sufficient. The means by which the trespass was accomplished are sufficiently set forth when the complaint alleges that

it was by means of certain drifts, levels and other workings run by said company. But where it merely alleges that these workings were made from the J. L. mining claim, adjoining the said claim, the court will grant a motion to make the complaint more definite and certain as to the points at which the trespasser entered the mining company's domain, and the extent to which it was invaded. (Rico-Aspen Consolidated Mining Company versus Enterprise Mining Company. 36 Fed. Rep., 131.)

Supreme Court of California.

Right to Select Mineral Lands as Homestead.

Mineral lands of the United States which have been used chiefly as a placer mining claim, though also used by the owner as a residence for himself and family, and to some extent for pasturing stock and raising vegetables, may be selected under the State laws as a homestead; and the fact that such lands are reserved by acts of Congress from entry and sale, except as mining claims, and that title to them cannot be obtained by pre-emption and homestead entry, is immaterial in a contest between a homestead claimant and his creditors, since as between them the title to the land claimed as a homestead is immaterial. The fact that the statute exempts from execution the dwelling of a miner, not exceeding in value \$500, and also his mining claim, actually worked by him, not exceeding \$1,000, does not preclude the right to select the dwelling and claim as a homestead. (Gaylord versus Place. 33 Pac. Rep., 484.)

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 12TH, 1893.

- 14,607 of 1892. Collection of Pure Carbonic Acid from Kilns. H. H. Lake, London. (A hemische Fabrik, Billwälder, Germany.)
- 15,113 of 1892. Electrolysis of Salt. J. P. Ronbertie, Bordeaux; U. Grenier, Poyand, and V. Laneyre, Paris, France.
- 16,874 of 1892. Recovery of Tin from Waste Tin Plate. C. L. C. Bertou, Paris.
- 16,891 of 1892. Improvements in Zinc Smelting. E. Ruck and F. N. Raggatt, Swansea.
- 16,892-3 of 1892. Electrolytic Extraction, Separation and Refining of Metals. D. Tommasi, Paris.
- 16,894 of 1892. Recovery of Gold by Cyanide of Potassium and Sodium Dioxide. J. C. Montgomerie, Stair, Scotland.
- 17,825 of 1892. Facilitating the Fusion of Steel. H. Inrass, London. (Compagnie Anonyme des Forges de Chatillon et Commentry, Paris.)
- 1,589 of 1893. Guides for Stamp Mills. E. Major, Terraville, South Dakota, U. S. A.
- 19,780 of 1893. Separating and Concentrating Apparatus. B. J. Atterbury and P. Ewens, London.
- 11,578 of 1893. Electric Welding. W. P. Thompson, Liverpool. (C. L. Coffin, Detroit, U. S. A.)
- 11,882 of 1893. Clinometer. A. J. Boulton, London. (W. Nisbett, Toronto, Canada.)
- 12,003 of 1893. Pulverizers and Amalgamators. D. Stevens, Guithian, and C. D. Bartle, Illogan, Cornwall.

WEEK ENDING AUGUST 19TH, 1893.

- 14,451 of 1892. Machinery for Recovering Placer Gold. S. S. Bromhead, London; J. Anandin & Co., Bordeaux, France.
- 15,346 of 1892. Obtaining Ammonia, Hydrochloric and Chlorine from Ammonium Chloride, and Chlorine from Hydrochloric Acid. F. Bale, Droitwich.
- 15,444 of 1892. A Cementation Steel Process. H. H. Lake, London (G. F. Simonds, Fitchburg, Mass.).
- 16,890 of 1892. Recovering Nickel and Copper from Ores and Malte. J. Strap, Paris.
- 16,873 of 1892. Obtaining Tin as Oxide from Waste Tinplate. C. L. C. Bertou, Paris.
- 17,692 of 1892. Purification of Iron and Steel from Sulphur. E. H. Saniter, Wigan.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, AUG. 1ST, 1893.

- 502,233. Multiple Fuse. Gardner T. Voorhees, Boston, Assignor to James E. Maynard, trustee, Taunton, Mass.
- 502,416. 502,417. Apparatus for Reducing and Softening Bituminous Rock. Elias Groat, San Luis Obispo, Cal.
- 502,424. Process of Obtaining Meta or Pyro-Phosphoric-Acid Combinations. Heinrich Precht, Neu-Stassfurt, Germany.
- 502,431. Process of Desilverizing Metallic Ores. Henry H. Eames, Baltimore, Md.; Assignor by direct and mesne assignments to the Eames Purifying and Separating Company of West Virginia.
- 502,482. Process of Making Iron. August Dauber, Bochum, Germany.
- 502,482. Process of Refining Iron and Apparatus Used Therefor. Heinrich Höfer, Hagen, Germany.
- 502,521. Pumping Engine. George de Laval, Warren, Mass., Assignor to the Geo. F. Blake Manufacturing Company, New York, N. Y.
- 502,555. Apparatus for Piling Coal. James M. Dodge, Philadelphia, Pa.; Assignor to the Dodge Coal Storage Company, same place.
- 502,593. Furnace for Heating Chain-Link Blanks, Etc., for Welding. Philander H. Standish, St. Mary's O.
- 502,668. Ore Washer and Concentrator. Griffith M. Eldridge, Philadelphia, Pa.

TUESDAY, AUGUST 8TH, 1893.

- 502,737. Duplex Steam Pump. Cassius M. Miller, Canton, O.
- 502,746. Manufacture of Piles. William H. M. Neave, Sheffield, England.
- 502,750. Valve for Oil Well Pumps. Joseph O'Neil, Taylorsville, Pa.
- 502,791. Apparatus for the Manufacture of Gas. Stephen W. Van Syckel, Hopewell, N. J.
- 502,805. Rotary Tinsle for Dunn Cars. Irving Barker, Springfield, Ill.
- 502,822. Process of Preparing Oxide of Zinc Pigment. George T. Lewis, Philadelphia, Pa.
- 502,902. Amalgamation of Precious Metals. George R. Evans, San Francisco, Cal.; Assignor of one-half to Benedict Zehnder, same place.
- 502,921. Manufacture of Pyroxyline Compounds. Charles L. Borgmeyer, Rahway, N. J.
- 502,922. Condensing Apparatus. Niels A. Christensen, Chicago, Ill.
- 502,946. Miner's Squib. Jesse Reagle, Shickshinny, Assignor of one-half to Esther A. Daddow, St. Clair, Pa.
- 502,950. Hydraulic Pump. William Cameron, Milpitas, Cal.
- 503,073. Ore Separator. Charles F. Willis, Ouden, Utah.
- 503,034. Ore Amalgamator. Conant B. Briery, Boise City, Idaho, Assignor of one-half to Abraham Friedline, Moscow, Idaho.
- 503,051. Apparatus for Drilling Wells. Samuel MacEachen, Scranton, Pa., Assignor of one-half to Thomas J. Foster, same place.
- 503,059. Limestone. Patrick McLeon, Sulphur Springs, Mo.
- 503,066. Salicylate of Para-Tolyl-dimethylpyrazolon. Hermann Thoms, Berlin, Germany.
- 503,076. Apparatus for the Electrolytic Manufacture of Tubes. Alexander S. Elmore, Leeds, Assignor to the Elmore's American and Canadian Patent Copper Depositing Company, Limited, London, England.
- 503,091. Hydraulic Accumulator. William Krutzsch, Dayton, O. Assignor to the Buckeye Iron and Brass Works, same place.
- 503,097. Pocket or Bin for the Storage of Coal, Grain, etc. Thomas E. Murray, Albany, N. Y., Assignor of one-half to William McEwan, same place.

PERSONALS.

Mr. Walter Scranton has been elected president of the Lackawanna Iron and Steel Company.

Mr. Wm. G. Mather, president of the Cleveland-Cliffs Iron Mining Company, is now at Ishpeming, Mich.

Sir Henry Bessemer, who is now in his 80th year, is said to be engaged in writing an autobiography.

F. C. Poisson, of London, England, is now in Chicago, at the Hyde Park Hotel. He is interested in mining at Barberton and Johannesburg, South Africa.

Prof. H. H. Stock, recently of Kensington, Ind., has been appointed assistant professor of mining and metallurgy at the Colorado State School of Mines, at Golden.

Mr. Leonidas Merritt, of Duluth, Minn., has been elected president of the Lake Superior Consolidated Iron Mines. The offices will be at Cleveland, New York and Duluth.

Mr. W. P. Headden, dean of the South Dakota School of Mines, Rapid City, S. Dak., has been elected professor of chemistry at the Colorado Agricultural College, Fort Collins, Colo.

Messrs. P. A. Fuze, L. M. Ramsay, Charles McLure and A. B. Ewing, of St. Louis, and officials of the Bi-Metallic and Granite Mountain Mining companies, are now at Phillipsburg, Deer Lodge County, Mont.

Stopping at the Keene Holet, Chicago, is Mr. Jas. B. Hammond, metallurgist and chemist, of Sudbury, Ontario, Canada. Mr. Hammond is studying the exhibits at the Fair, and will be in Chicago for a few weeks.

Dr. Geo. T. Kennely, professor of chemistry, geology and mining, at King's College, Windsor, N. S., is at present in Chicago, at the Cambridge Hotel. He will be there a few weeks looking over the Fair.

The superintendent of Ontario's exhibit, Mines Building, Columbian Exposition, is Mr. David Boyle, who is also curator of the Canadian Institute Museum, at Toronto, and is much interested in the mines of Ontario.

Mr. Edmund Slattery, of Osceola, Fla., is visiting the Fair, at Chicago. He is interested in Florida phosphate lands and other mining enterprises, but phosphate is his specialty. He can be found at the Florida exhibit, Agricultural Building, Fair.

Prof. M. C. Ihlseng has retired from his position at the State School of Mines, at Golden, Colo., and has accepted a professorship at the Pennsylvania State College, where he will have charge of the department of mining, a post which he is admirably fitted to fill.

Mr. Stephen H. Eumens, mining engineer, president of the Eumens Metal Company, of Youngwood, Pa., has gone to the Mayflower Gold Mine, Amador County, Cal., of which he is general manager. His address will be P. O. Box 2094, San Francisco, Cal.

Mr. T. S. Austin, superintendent of the Great National Smelting Company, of Monterey, Mex., has severed his connection with that company. He superintended the building of the Great National plant, and has since had charge of the entire works. He is now traveling for a much-needed recreation. He will be in Chicago at 163 State street, about September 10th.

Visiting the World's Fair, at Chicago, at the present time is Mr. A. M. Konchine, of Gifitis, Russia. He is the delegate of the Ministry of Public Domains, sent to this country by that bureau to obtain statistics and information in general relative to petroleum in this country. Mr. Konchine would be pleased to hear from those interested in this material. His address is Seventy-seventh street, and Windsor Park, Chicago.

Señor F. de P. Muñoz, a noted Colombian mining engineer, and author of "Tratado de la Legislación de Minas de Antioquia," is now in this city. His special object in visiting this country is the study of our mining and metallurgical processes, particularly the treatment of auriferous pyrites. Señor Muñoz will soon leave for California, visiting on his way, the World's Fair and the great smelting centers. He will then go to Australia.

The trustees of the Colorado School of Mines, at Golden, Colo., have elected the following professors for the coming collegiate year: To be professor of geology and mineralogy, Mr. Horace Bushnell Patten, late professor of mining engineering at the Michigan Mining School; professor of engineering, Mr. William Henry Hall, late professor of mining engineering at Lafayette College; Mr. W. W. Cummings, of Troy, N. Y., will be assistant to the professor of engineering.

Mr. I. E. Umpsted, general superintendent of the Delaware, Susquehanna & Schuylkill Railroad, has resigned. He had held the position of superintendent ever since the road was constructed. Mr. Daniel Coxe, of Drifton, Pa., has been appointed to succeed Mr. Umpsted, and H. J. Davis is the

new assistant superintendent. The position of superintendent of motive power, which Mr. Coxe formerly held, is abolished, and A. J. Beltz is made head of the mechanical department.

The Mansfield Copper Company, of Eisleben, Germany, is now represented at the World's Fair, Chicago, by Mr. H. Schrader, a mining engineer of note. He will remain at the Fair for some weeks, after which the copper mines of Montana and those of Lake Superior will be inspected by him. His visit to these mines is in the interest of his company, for the purpose of observing new devices in the production of copper, from its raw state to the refined product. Bismark Hotel is Mr. Schrader's Chicago address.

OBITUARY.

John S. McClure, president of the Moseley Iron Bridge and Roofing Company, died on the 26th ult., at Brooklyn, N. Y., aged 79 years.

Samuel Francis Du Pont, son of the late Victor Du Pont, and treasurer of the Reppano Chemical Company, died in Wilmington, Del., on August 27th ult. He was a graduate of the University of Pennsylvania.

The late Prof. Richard A. Proctor is to be reburied in October at Greenwood Cemetery, and contributions from friends who may desire to send money for flowers wherewith to decorate his grave on the day the memorial services are held, will be gratefully received by Miss Mary Proctor, the oldest daughter, at her residence, 616 North Sixth street, St. Joseph, Mo. She is also willing to accept funds for the future maintenance of the monument and fence and perfect preservation of the plot. The memorial services are to be held the first week in October at Greenwood Cemetery.

Joseph Battin, a well known inventor and mechanical engineer, died on the 29th ult., at Elizabeth, N. J., aged 87 years. He was born near Philadelphia, Pa. During his career as an engineer he built the Albany gas works, Washington (D. C.) gas works, Syracuse gas works, Scranton (Pa.) gas and water-works, Charleston (S. C.) water and gas works, Rochester (N. Y.) water-works, Paterson (N. J.) gas works, and Elizabeth gas and water-works. He furnished the controlling capital for all these enterprises when he undertook them. He devised the scheme of bringing the water through a tunnel from Lake Erie to supply the city of Buffalo, and built its water-works. The same system is now in use in Chicago. Mr. Battin claimed to be the inventor of the coal breaker, and for 20 years had a litigation with the Lehigh Valley Railroad over the patent. He received half a cent a ton royalty from the other coal companies for the use of his invention while the lawsuit was pending. It was finally compromised by the Lehigh company paying him \$50,000, but the litigation cost him nearly \$100,000. He also invented a steam road carriage, but derived no practical benefit from this.

SOCIETIES AND TECHNICAL SCHOOLS.

Pennsylvania State College.—The State has made a liberal appropriation for a new building and the appliances of a metallurgical laboratory. A full four-years course and a short two-years course in mining and metallurgy have been arranged to meet the needs of a large number of ambitious miners who wish to fit themselves for special lines of work. Prof. M. C. Ihlseng, late of the Colorado School of Mines, will have charge of the mining department.

INDUSTRIAL NOTES.

The Lockhart Iron and Steel Company, of Pittsburg, Pa., started its guide mill on the 26th ult.

The Niedringhaus Tin Plate Works, of St. Louis, Mo., resumed operations on the 29th ult., employing 1,500 persons.

It is reported that the Illinois Steel Company, of Chicago, Ill., will close down this month. About 3,000 men will be thrown out of work.

The Bethlehem Iron Company's No. 4 blast furnace was blown out on the 28th ult., for repairs. The company had but three furnaces in blast and the blowing out of No. 4 leaves but two.

The Benwood and Etna mills and the Bellaire Nail Works, three of the biggest concerns in Wheeling, W. Va., announce that they will resume in a few days. They will employ about 2,000 men.

John G. Kauffman, a well known retired ironmaster, of Reading, Pa., has confessed judgments for over \$50,000. His financial difficulties are said to be due to the Sheridan Iron Company's failure.

The Chapman Valve Manufacturing Company, Boston, Mass., has issued a handsome illustrated catalogue of its manufactures, which are chiefly valves and gates for water, gas and steam, and also fire hydrants.

Bessemer Mill No. 1 and the blooming rail and merchant mills, of the Pennsylvania Steel Works, at Harrisburg, Pa., shut down on the 26th ult. The

breaking of the shears in the new slab mill causes idleness in that department.

The Williamsport Iron and Nail Works, of Williamsport, Pa., resumed operations on the 28th ult., after a suspension of several weeks, affording work for 160 hands. The proprietors hope to continue in operation for the rest of the year.

Two of the four new heads in the Hech mill were started on August 25th. Solid foundations have been put under all the heads and the work of tearing out the foundations of the old Cahumet mill are well under way; 16 heads in all are now at work.

The York Rolling Mill, of York, Pa., which resumed work but two weeks ago, after a short suspension, announced on the 28th ult. their indefinite suspension of operations. Between 300 and 400 operatives are affected. Lack of orders is the cause of the suspension.

The Lebanon Rolling Mills, of Lebanon, Pa., employing about 300 men, has shut down temporarily. The length of the suspension is not known. The West End Rolling Mill Company, of the same place, has posted a notice to the employees of a 10% reduction in wages, to take effect at once.

The Edgar Thomson Steel Works, of the Carnegie Steel Company, Limited, closed down on the 26th ult., for repairs and improvements. None of the blast furnaces will suspend operations and only about 600 men will be laid off in the steel department. The shutdown will probably last several weeks.

On August 26th the National Tube Works Company, at McKeesport, Pa., issued the following notice: On August 30th we shall start five welding furnaces in the lap mill until such time as additional furnaces in that mill, as well as furnaces in the butt mill, can be put in operation. The work will be divided in as fair proportion as practicable, with a view of giving all of our employees an equal share of employment.

The new steel rail mill of the Bethlehem Iron Company suspended operations on the 26th ult. It had been running the past four weeks and had been in operation but about four months so far this year. The officials could not say when it would resume operations. The puddling mill and merchant mill will continue in operation. The old rail mill started work on the 28th ult., after a week's idleness. Forty-pound rails are being made and it is expected the order will keep the mill running for some time.

T. H. Thorn, assignee of the Duquesne Tube Works Company, of Pittsburg, Pa., has filed an application to have the company's affairs taken out of his hands, and that it be allowed to continue business, inasmuch as the creditors have granted it an extension of time. The principal creditors are the Tyrone Iron Company and W. A. Dunshee. All creditors having claims over \$500 have signed the extension agreement. The company will make some payments at once, execute a million-dollar mortgage on their plant to raise bonds to turn over immediately, and a second million-dollar mortgage for 6% bonds to run six years for the benefit of the unsecured creditors. The latter agree to take 10% of their claims without interest every six months, commencing February 1st, 1894. H. B. Shields is to act as trustee for the unsecured creditors by holding a majority of the company's stock so that they can choose three out of the company's five directors. A. W. Thompson, J. M. Bailey and W. C. Frick are to be chosen.

The largest photographic transparency ever made is exhibited at the Standard Oil Company's exhibit, Mines Building, World's Fair. It is 7 ft. long and 4 ft. 2 in. high, and represents a relief map, showing the oil-bearing districts of the United States. It has taken three years to make this map. A model relief map was first built up of wood veneers 1-32 of an inch thick, each thickness representing 100 ft. of elevation. The map having been built of these veneers, and carved in relief, a plaster cast was taken, and then a photograph taken of the cast. When the negative was transferred to paper the lakes, names, etc., were drawn in, and a negative was taken from it 20 in. square. This was enlarged to the size 84x50 in. No ordinary camera being able to do the work, a room 12x15 ft. in size took the camera's place. The room was blackened inside and made light and even airtight. The shutter was placed in the window, and the lens in the shutter. With the aid of three assistant photographers and good judgment the first plate proved a success. Nearly \$250 worth of nitrate of silver was used in the construction of a silvering bath. It took four months from the time the first negative was taken to finish the transparency. All the oil-bearing districts are shown in yellow and in each particular region where oil is produced the oil wells are shown by the color of oil itself. The cost of this work is estimated at \$5,000.

Advices from Pittsburg, Pa., show that the situation is improving in the iron and steel trades, and many mills are resuming work. On the 28th ult. over 6,000 iron and steel workers who have been idle for two months went to work. All the puddling furnaces in Park Brothers & Co. resumed on that day. Nearly 500 more laborers

were also taken on. Fires were started in the puddling furnaces of Howe, Brown & Co. and Shoenberger & Co.'s mills, and about 600 men given work. The No. 3 tin mill of the United States Iron and Tinplate Company's plant, at Demmler, was started and 200 men given employment. On the south side there is much activity also. The Sligo mill, of Phillips, Nimick & Co., started on double turn, and this means employment for 200 additional men. Three departments of Singer, Nimick & Co.'s West End mill went on, giving work to 150 men. The bar mill of the Lockhart Iron and Steel Company resumed on the 28th also. Many other mills still idle are hurrying up with their repairs for a start next week. Among them is the Leggett Spring and Axle Company, which, it is reported, will start on the 4th inst. The Carnegie Steel Company's Twenty-ninth and Thirty-third street mills started up double turn in several departments. They will give work to about 600 additional men. This is being done to finish up some contracts with the Government for beams and structural iron for bridge-work and steamship fittings. Every department of these mills are now in operation, most of them on double turn. The heads of departments of the Oliver Iron and Steel Company had a conference on the 29th ult. with Manager Oliver. The latter wants to start the mills with non-union men if he can secure them. If not the plant will start up with the present employees, who have been idle since June 30th. The concern is in the hands of a receiver and will have to do something soon or lose some of the orders on hand.

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.

CALIFORNIA.

Amador County.

Mayflower Gold Mine.—This company has been incorporated under the laws of West Virginia, with a capital of \$300,000 divided into 30,000 shares of \$10 each, for the purpose of operating two full-size and contiguous mining claims known as the Bunker Hill and Mayflower, together with a mill site adjoining the mines on Rancheria Creek, near Amador City. The officers of the company are: President, T. J. McTighe; vice-president, Hugo A. Strong; secretary and treasurer, Stephen H. Emmens. Directors: T. J. McTighe, Hugo A. Strong, O. W. Bennett, G. T. Jacoby, Arthur B. Chase, N. W. Emmens and Stephen H. Emmens. Mr. John Myers is superintendent. According to the prospectus, the property is well developed and is equipped with a 40-stamp mill, chlorination works, hoisting machinery, pumps, etc. Ample water power is available. The property came on the market owing to the failure of the Spring Garden National Bank, of Philadelphia, Pa., and the present company is operating under a lease which has been granted by the receiver of the bank, with the special approval of the comptroller of the currency. The lease is granted at a royalty of 10% of the returns, subject to a rebate of one-half of this royalty in respect to the first \$500,000 extracted, with an option of purchase at any time within five years for \$300,000. Work is now actively progressing under Mr. Myers' superintendency. The Mayflower shaft has been pumped dry and a level is being driven to reach the body of quartz near the end of the Mayflower tunnel, which was discovered before the mine closed down. This body of quartz carries free gold in seams ¼ in. wide and the drift now being run will intersect it at a level of 100 ft. below the point of discovery. The breast of the drift is now 112 ft. to the north of it. A ledge 70 ft. wide has already been cut, of a character generally corresponding with that of the first ore body. The promoters estimate that at this one point alone there is now pay ore in sight for a length of 112 ft., a height of 100 ft. and an average thickness of at least 24 ft. or, 20,000 tons. It is proposed to commence the extraction of ore and to start the mill and chlorination works. For this purpose fully paid and non-assessable shares of the company's capital stock are now offered for sale at \$6 each.

Butte County.

The Oroville "Register" of a late date, says: The mining outlook in this county is constantly growing brighter as the mines about Bangor, Forbestown and Hurleton are attracting many men; those in the Gravel Range region are also attracting attention and paying well; the quartz mines, at Oregon City, are making a good showing, and so on with other localities that might be named. The quartz deposits of this county are mostly of low or medium grade, but the ledges are

extensive and give every indication of permanency. Many valuable mines are being opened in the county, and these are producing gold every week.

Hurleton Mining District.—The Hurleton mining district extends from near the South Fork, a distance of several miles toward Bangor and Wyandotte, says the Oroville "Register." The elevation is from 1,400 to 2,000 ft., and the country appears to be a network of veins or lodges of gold-bearing quartz. The most prominent of these are the Pactolian and the Phoenix. Work is being pushed on the Phoenix, so far as development is concerned, but the mill has had to shut down again on account of the lack of water. The rock is good and the lode widens with depth. The Pactolian promises well, but none of the rock is being crushed, as the owners have not erected a mill. George McNair has struck a good lode on the land of A. McNair, and though but little work has been done the rock indicates good ore. H. P. Stow in his mine has cleared the shaft of water and the rock is said to look well. Work will now be vigorously pushed on this mine. The Frenchwoman's quartz ledge is small, but the ore is valuable.

(Special report to the "Engineering and Mining Journal.")

The Spring Valley quartz mine, near Oregon City, has been bonded to Mr. Rodda, a mining expert, and the old tunnels and cuts are being cleared, through which new life will be poured by the aid of English capital. The mine has been idle for more than 15 years and capital alone is necessary to make this a paying mine. The Standard Gold Mining Company, of Oregon City, contemplates building a new mill. Their ore is high-grade and developments justify a reducing plant.

The most valuable find in Butte County of late years is probably that of an old Swedish prospector, who unearthed a 2-ft. quartz ledge "filled with gold" near Bangor. Some 20 years ago a pocket of \$1,500 was taken out of the same ledge and abandoned under the belief that the pocket was thoroughly emptied. If the prospectors had continued to drive the tunnel 6 in. farther they would have found what is now believed to be the richest spot in the county. The last two weeks this veteran prospector has taken out \$1,184 by the aid of a hand mortar and only yesterday 52 oz. were pounded out in the same mortar. The country between Bangor and Hurleton is almost unknown except as cattle ranges, and prospectors will reap a golden harvest if they know their business, as the hills and ridges are ribbed with gold-bearing quartz ledges.

Calaveras County.

The copper mines at Copperopolis have closed down, throwing 300 men out of employment.

Inyo County.

It is reported that a large deposit of mica has recently been discovered in this county.

Nevada County.

Yuba.—This mine, in Washington district, after remaining idle for some time, is to be worked again soon, says the Grass Valley "Tidings." Preparatory work has already begun.

COLORADO.

Concerning the Yankee Hill district, a correspondent of the Denver "Republican" writes: Yankee Hill is reached by wagon road from Idaho Springs, or Central City, being 11 miles distant from the former and 8 miles from the latter place, in a northwesterly direction. It lies at the base of James' Peak, at an altitude of about 10,000 ft. The greater portion of the district is in Clear Creek County, the other being in Gilpin, being on the mineral belt running northwesterly from Central City to Empire. While this district has been known to be mineral-bearing for 30 years past, nothing, comparatively, has been done for that period toward development until during the past year. Hundreds of locations have been made, but with a few exceptions, none of these claims has been worked beyond the required location labor. The ores of Yankee Hill are honeycombed quartz, and are easily mined and milled in stamp mills. They yield generally from 4 to 7 oz. of gold per cord. Up to the present time there has been no deep mining.

Colorado Fuel and Iron Company.—Ex-Secretary of State Eaton has turned over to Secretary of State McClees the sum of \$1,200 held by him pendente lite in injunction proceedings brought against him by this company. It was during Mr. Eaton's term of office that the Colorado Fuel and Iron companies consolidated, and in filing their articles of consolidation Mr. Eaton refused to issue a certificate unless the legal incorporation fee was paid. To this the corporation objected, saying that the fees had been paid once, at the time of original incorporation, and that a second fee could not be demanded. Eaton insisted and the fee of \$1,200 was paid under protest. Legal proceedings were then instituted, but withdrawn last week, hence the surrender of the money to the State.

Boulder County.

United Coal Company, of Lafayette, has an order for 600 tons a day through the month of September. The summer work has been slow, but a good fall trade is expected. This company paid its

men in full for last month's work, notwithstanding contrary reports.

Conejos County.

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

The Mammoth mine (owned by Messrs. Hyman, Hallam, Hughes & Palmer and McCurdy) has been sinking a shaft to 200 ft. level, and on completion started to cross-cut from shaft to vein which dips from the shaft. In a short distance they cut the vein as well as a new vein or pay streak, not only disclosing high-grade ore, but proving the existence of an entirely new and heretofore unknown ore chute running high in gold. This disclosure shows the Mammoth to be a most valuable property and strengthens the belief that in Platoro the vein requires fairly deep development to expose the large and rich ore bodies existing. The Mammoth ore yields gold \$200 to \$1,200 per ton, with silver \$150 to \$800 per ton, the gold generally being 60% in value of the total return.

The Peoria (owned by Chas. Barnes et al.) has a streak of high-grade ore averaging 8 to 16 in. wide running all the way in carload lots from \$80 to \$800.

The Merrimac is still idle, and it is strange that this property with its known ore body on the 150-ft. level should not at least be leased. The Merrimac is one of the finest properties in Platoro and some day will return its owners large profits.

The Camp is remarkably bright considering the depression in mining generally, owing to its high-grade ore and large percentage of gold.

The Silver Maiden, it is reported, is shortly to be taken hold of by a company with plenty of capital.

The talked-of railroad up the Alamosa canyon is in statu quo for the present.

Puzzler Company.—This company is steadily developing and expects shortly to cut the vein on their cross-cut tunnel. At Lake Fork many prospects are looking more than well.

El Paso County.

The following items of Cripple Creek mining news are taken from the local papers: The Burns shipped 11 tons of first-class ore to Denver last week. The new working shaft, at the Summit, is 29 ft. deep. The Rosebud is dropping 40 of its 50 stamps every day and will soon be using them all regularly. The furnaces are ready for use. The Narod mill, south of town on Cripple Creek, which was recently purchased by Binford & Co., has been put in first-class repair and is now treating a small lot of low-grade Gold King ore to test the machinery. It will be regularly at work on Gold King, C. O. D. and Anaconda ore shortly. The Wichita will ship 50 tons of ore to the Rosebud mill this week. Since it became a producer this mine has shipped 100 tons to the mill and 25 tons to the Denver smelters. The returns on the smelting ore are not known, but the milling ore, it is said, ran about \$20 to the ton. The Wichita shaft is only 50 ft. deep and it cannot be called a developed mine. The Raven shipped a carload of first-class ore to Pueblo last week. The new castings for the Sylvanite mill have arrived and as soon as they can be put in place the mill will resume operations. The Gold Geyser mill has resumed treating ore. Honihan & McCoy, the lessees of the Londonderry, have let a contract to Bryar, Knott & Wilmore to run in a tunnel below the shaft to a distance of 350 ft. The shaft is at present 95 ft. deep and it will be necessary to sink it a total depth of 150 ft. to intersect the tunnel. Three carloads of smelting ore were shipped from the Pharmacist last week.

Little May.—The owners of this property, in Cripple Creek, will, it is said, build a large stamp mill which will be located in Gold Run Gulch, between Squaw Gulch and Arcqua. Ground will be broken for the mill in a few days. The mill will contain 60 stamps and a tunnel will be driven into the hill, so that the ore can be taken out at a point near the mill. The engine to operate steam drills is now being placed in position.

Gilpin County.

A good deal of prospecting has been going on in Grand Island mining district during the past few months, says the Central City "Observer." Several new discoveries of gold-bearing quartz have been made which promise well. The pay streaks average from 1 to 4 ft. and mill returns show a value of from 3 to 6 oz. of gold to the cord, the smelting certificates a value from \$48 to \$125 a ton in gold. The erection of a 25-stamp mill near the foot of Spencer Mountain is contemplated. Among the most prominent claims recently located there may be mentioned the Summerside, owned by J. L. Tucker and J. Weller. The discovery shaft has been sunk 30 ft. and has shown a body of free-milling quartz nearly all the way down, 4 ft. wide, that has run well in gold. In the last 10 ft. some streaks of yellow copper iron about 3 in. wide have been encountered. The Grand View and Hoosier Boy claims, located north of Summerside, have been developed by shafts 10 ft. deep. The Grand View has a pay streak 1 ft. wide that shows coarse gold in the pan. The Hoosier Boy shows 18 in. of honeycombed quartz with some yellow copper iron in spots through it all the way down from the grass roots. None of the ore has been tested yet. Messrs. Victor and Hart have made a discovery east of the Hoosier Boy, upon which a shaft has been sunk 50 ft. and

a tunnel started on the vein which is in 80 ft. Both workings show a continuous pay streak of mill dirt 1 ft. wide that runs $3\frac{1}{2}$ oz. of gold to the cord, and 6 in. of smelting ore. John Gilfillan has a location made on another vein. A shaft has been sunk on it 50 ft.

According to the local papers all the stamp mills in the vicinity of Central City are well supplied with ore and are running their full capacity night and day. At the Polar Star mill all the bins are full and several cords are piled up outside. A large proportion of this ore is from old properties now being worked over again by leasers. Twenty more stamps will soon be in operation in the old Miley mill, on north Clear Creek, which has been recently purchased by Hugh A. Campbell, of Central City.

Goconda Mining Company.—At this company's property a body of milling and smelting ore has been struck in the two tunnels. Heretofore the pay streak has been divided by country rock commonly known by miners as a "horse," which has now disappeared and the whole breast of the level is in ore, the smelting ore hugging the hanging wall and the rest being mill dirt, says the Central City "Observer." The mill dirt is about two-thirds of the whole and pans well in free gold.

Last Hope.—At this mine, at Yankee Hill, the drift now being driven west at a depth of 112 ft. has disclosed a body of milling and smelting ore 4 ft. wide, 3 ft. being free-milling ore, reported to run \$85 a cord in gold, the remainder selling at the smelter for \$100 a ton in gold.

Lake County.

(From our Special Correspondent.)

The Bi-Metallic smelter, which blew in last week with one stack, has started up another furnace and within a few days will start up the third. It is understood, however, that the plant will only run long enough to treat the ore that is on hand.

Henriett & Maid Consolidated Mining Company.—Parties have recently secured a lease on the Maid's first and third levels and quite an amount of sulphide ore is being taken out.

Leadville Consolidated Mining Company.—The Shamrock lease on this company's property is giving a good output; the Aetna, Gray and other leases are producing some good carbonate ore.

Little Chief Mining Company.—Austin Blakey has closed a contract with the Omaha & Grant smelter for 60 tons of iron ore daily, and has started up the Little Chief property. There are large iron ore reserves in these workings; the iron runs from 45 to 55 excess over the silica and from 10 to 15 oz. silver.

Wolcott.—The big ore body opened up on this property some weeks ago shows no signs of giving out although it is dipping slightly to the west. The lessees have a good market for this mineral and are taking out from 50 to 60 tons of lead sand daily. The new shaft which was started lately has been entirely abandoned, the work being unprofitable.

There is not a single mine in the camp that is being worked on company account; work at present is being done by lessees. On the Chrysolite and Lee, lessees are breaking some carbonate ore and storing it in bins; no shipments are being made.

Jas. A. Shinn has secured a lease on all the White Cap property running to the fourth level, excepting that ground known as the Neal lease.

The Solix-Tiye, in which a good gold strike was made recently, again reports another find. A 10-in. ore body has been opened up in a winze that pans well in free gold.

The Gold Flake mill has been started up near Breckenridge.

Ourray County.

American Belle Mining Company, Limited.—The manager reports for the month of July as follows: National Belle mine: Expenses on revenue account, including developments, \$7,255; shipped 690 tons ore, value (estimated), \$6,034. Silver Bell mine: Expense on revenue account, \$1,945; shipped 140 tons ore, value (estimated), \$600.

Yankee Girl Silver Mines, Limited.—An extraordinary general meeting of this company was held August 16th, in London, for the purpose of submitting for confirmation the resolutions passed on July 21st, providing for the winding-up and reconstruction of the company. The chairman stated that at an extraordinary general meeting, held on July 25th last, they deemed it advisable, in the interests of the shareholders generally, to adopt a scheme of reconstruction. The directors told them that if all the shareholders responded favorably to that recommendation, they would obtain additional capital to the amount of £39,000, which would enable them to pay off the mortgage bonds with interest, and leave them with an ample margin for prospecting and development work, but that less than that amount would not be sufficient. They also stated that although they had reason to believe that the resolution would be carried, it would have to be confirmed, and that before such confirmatory meeting they would circularize the shareholders for the purpose of ascertaining what support they would receive. He regretted to state that in answer to that circular the absolute and unconditional support only represented 113,000 shares out of 260,000, showing that the holders of

147,000 shares were inimical or indifferent to the scheme. Even if the shareholders who had assented had paid 3s. per share on their holdings, it would only have amounted to £15,000, which, after paying off the debentures, would not leave sufficient to develop the mine. Therefore they had no alternative but to abandon the scheme of reconstruction.

Pitkin County.

Holden Smelting and Milling Company.—A press dispatch from Aspen states that this company's plant has been attached for \$199,310, by Charles H. Graham, of Philadelphia, one of the owners of the Philadelphia smelter, at Pueblo.

Saguache County.

Sultan.—The Sultan group of mines, near Duncan, has been bonded to Cripple Creek parties for \$20,000, the option to run for 60 days. The new men are pushing work upon the mines. The group includes the Sultan, Bondholder and Lincoln, the two latter being merely prospects. The Sultan has considerable development, showing a large body of mineral on six different levels. The vein is a quartz body, heavily charged with copper and carrying, it is said, about \$100 in gold per ton, besides about 2 oz. of silver. A force of men has been put at work and arrangements have been made for a 15-stamp mill.

IDAHO.

Coenr d'Alene.

Standard Mining Company.—This mine has closed down. It had been under development for about two years without profit, but just as a new tramway and ore bins, buildings and other improvements were completed, a vein of ore developed in the lower tunnel, but the low price of silver and lead precludes, according to the owners, profitable working.

Elmore County.

Big Lode Mining Company.—During the past year a large amount of development work was done on this property and it is now claimed that the tunnel has cut the old Leonora lode, 1,000 ft. in. The reports of 30 assays show from \$10 to \$40 per ton. The vein is 8 ft. wide and all free milling.

KANSAS.

At a mass meeting of the striking coal miners held in Leavenworth, on the 30th ult., it was decided to return to work at the old scale.

MICHIGAN.

Copper.

The Quincy and Franklin mining companies have cut wages 10%. The Atlantic, it is said, will follow their example shortly.

Osceola Mining Company.—This company has purchased the unused stamp head of the Belt mine. This stamp is a new one of the Ball make, and has never been used or even set up. When put in position at the Osceola it is to be used to stamp the rock of the Tamarack Jr. There is no expectation of increasing the output of the Osceola at present. The company produced 337 tons mineral in July last, against 336 tons in July, 1892.

Ridge Mine.—Three tributaries are just now engaged in opening up a surface pit on the old Butler or Champion vein, on the east bluff of this mine. They have taken out some 1,200 or 1,300 lbs. of heavy pieces of copper. As the pit is an open one sunk on the outcropping of the vein, it cannot be worked in the winter, so the tributaries have started in a drift from the base of the bluff and have already cut the vein showing copper.

Tamarack Mining Company.—This company produced 876 tons of mineral in July last, against 920 tons in July, 1892. The lode in this mine has been struck at the 18th level in both shafts and it looks better than it did above, says the Torch Lake "Times."

Tamarack, Jr., Mining Company.—Superintendent Daniell writes that he expects by November 1st to be able to work the sixth level, and thereby double the present output of the mine. President Bigelow says there is no danger of the capital stock of the Tamarack, Jr., being assessed at present.

Iron—Marquette Range.

Winthrop Iron Company.—At the South Winthrop the new deposit shows up better as further explorations continue. The company has just let a contract for sinking No. 2 shaft an additional 150 ft. There is a winze on the present lowest level which is down 40 ft. lower than the present bottom of the shaft, and from this better ore is being taken than has thus far been shown in this portion of the property. Assays lately made give 65.80% and 64.30% metallic iron.

Iron—Menominee Range.

Chapin Iron Company.—This company has been reorganized by the principal creditors, led by the Fire and Marine Insurance Company. Bonds have been issued enabling the creditors to make provision for the payment of labor and freight claims, for royalties and keeping the mine clear of water. Messrs. Chapin, who own the fee simple of the property, are a party to the organization and have

agreed with other creditors to an arrangement making a first mortgage given to a bank for advances, a lien on the mining fee. There is another feature which, according to the Cleveland "Marine Review," must receive attention before operations are resumed, namely, the contract with the Menominee Transit Company, under which the six steel steamers of that company were built by the Globe Iron Works Company, of Cleveland, the builders being paid from the sale of bonds secured by a mortgage on the boats, and the transit company holding a contract with the mine, which stipulates that the boats are to pay for themselves in carrying ore at \$1.10 a ton from Escanaba. This contract, made in time of prosperity, has since been a great drawback to the mining company, but it is, of course, valid, and a modification of it can be expected only in view of the extraordinary conditions that prompt expectations of reduced royalty. The plan of reorganization seems to indicate a determination, on the part of the creditors now in charge, to secure a modification of the vessel contract, as well as the royalty now paid to the fee owners.

Cyclops Iron Mine.—A small amount of exploratory work is being done at this mine, and this is all that is left of the former glory of two mines (Norway and Cyclops) which once employed 950 men, says the Norway "Current."

Loretto Mine.—The loading of ore into the pocket has begun and soon shipping will begin in earnest. The Loretto and Appleton are now employing 150 men and are steadily increasing the force.

Penn Iron Company.—This company has discharged about 350 men during the past week, reducing the working force to about 500.

MINNESOTA.

Duluth County.

(From our Special Correspondent.)

The county has set unemployed miners about Biwabik and Virginia at work building roads along the range. So far but few men have applied for work, as the mines are using more labor than a few weeks ago. Lake County, immediately east of this and in which is the Vermilion shipping port, Two Harbors, is doing the same. Ore shipments from the Vermilion range are small, amounting to only 32,800 tons last week. The Mesaba in the same time shipped about 18,000 tons, chiefly from the Oliver and Franklin, though the Mountain Iron and Berringer also sent some ore. Twelve ore train crews have just been laid off the Duluth & Iron Range road, carrying Vermilion ores.

Iron—Mesaba Range.

(From our Special Correspondent.)

The Oliver has sold 100,000 tons in Cleveland on private terms, and is shipping largely. The Biwabik has secured advances and will ship nearly as much. The Franklin, employing 350 men, and shipping 600 tons daily, has shut down, as has also the Commodore, which was shipping over 300 tons daily. Wages are being paid up and exploratory operations are resuming in many localities. It is rumored that the directors of the Cincinnati Iron Company will take steps at once to forfeit their lease to the Standard Ore Company. Those interested, however, say nothing.

McKinley.—The long-pending deal for the sale of this property, consisting of two mines, one in S. 58. 16 and one in 17. 58. 16, to the New York and Mesaba syndicate, is understood to be practically closed. The consideration is not far from \$1,400,000 for the entire properties as well as unexplored lands.

Iron—Vermilion Range.

(From our Special Correspondent.)

Anderson.—At present this mine, on which shaft sinking alone is going on, is the only one on the eastern Vermilion, where any work is in progress. One working shaft is down 200 ft., and a drift is to be run into the ore body at once. It is on the Chandler & Pioneer ore body.

Pioneer.—Preliminary work on this property, on which a four-compartment shaft was being sunk 300 ft., has been abandoned. The shaft is down about 400 ft. The mine looks well.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, August 28.

Our lead and zinc mining industry remains unchanged. There is little or no demand for the zinc ore. Some of the large purchasing agencies were not in the market during the past week, and those who were held the price at \$16 per ton. One sale of a choice lot of ore at Carterville brought \$19 per ton. Lead ore was in good demand and prices advanced \$1.25 per thousand, the market closing at \$18.25 per thousand. The outlook at present is not encouraging. Some of the large operators are still manning their pumps and employing a small force of men in exploration work. The miners have been holding meetings at Carterville and have decided to ask the operators to give them employment at reduced wages. The landowners and mine operators have held sev-

eral meetings in Joplin which have been well attended. It has been reported that these meetings were held for the purpose of organizing a combine or trust against the zinc smelters and force them to pay better prices for zinc ore. As a matter of fact the landowners and operators propose to form a corporate company whereby they will control the sale of the ore to the smelters. The ore is to be sold on its assay value, the price to be regulated by the price of the metal in either New York or St. Louis. To carry out this plan it is found necessary to build warehouses where the ore will be collected and offered for sale by sample. Take, for example, the Rex. M. and S. company's tract of 1,000 acres of land. There are not less than 75 to 80 different companies operating on this tract of land on the royalty plan. The large companies hold under lease from 20 to 80 acres of land and pay a royalty of 10% to the Rex. M. and S. Company on all ores produced. These large companies sub-lease mining lots 200x200 ft. at a royalty of 20%. By the proposed plan all the ore produced on this land would be weighed and stored in the warehouse and the operator would receive a warehouse receipt for it. When the ore was sold the operator would draw his money on his warehouse receipt. By this plan the miner with one ton of ore for sale would receive the same price as the larger operator with 50 to 100 tons for sale.

Following are the sales of ore from the different camps: Joplin mines, 669,170 lbs. zinc ore and 308,920 lead, value \$10,980; Webb City mines, 206,490 lbs. zinc ore and 59,630 lead, value \$2,745; Carterville mines, 233,090 lbs. zinc ore and 133,180 lead, value \$4,341; Zincite mines, 123,330 lbs. zinc ore and 5,600 lead, value \$1,078; Oronogo mines, 31,350 lbs. of lead, value \$438; Galena, Kan., mines, 470,530 lbs. zinc ore and 60,260 lead, value \$4,727; district's total value, \$24,309; Granby mines, 229,000 lbs. zinc ore and 71,000 lead, value \$3,154; Peoria, I. T., 17,400 lbs. lead, value \$296; Anrora, Lawrence County, mines, 102,090 lbs. zinc ore and 140,300 lead, value \$6,836; lead and zinc belt's total value, \$34,595.

MONTANA.

Deer Lodge County.

Anaconda Mining Company.—According to Boston advices, this company has reduced its output one-half since July 1st.

Bi-Metallic Mining Company.—This company has increased its working force to 225 since the beginning of the month.

Granite Mountain Mining Company.—This company has about 260 men employed and 50 stamps dropping.

Montana Mining Company, Limited.—Something more than a year ago, says the Marysville "Mountaineer," R. T. Bayliss, managing director of the Montana Mining Company, Limited, in addressing a stockholders' meeting in London, predicted that "the Drum Lummon mine is abundantly able to work out its own salvation." Time has verified his prediction, and notwithstanding the low price of silver and the financial stringency, the company is in a very prosperous condition, due to conservative and intelligent management, and the outlook for its future is of the most encouraging nature. A large force of men are employed and development work is being vigorously prosecuted. It is more than likely that the company will resume the payment of dividends in the near future.

Puritan Mining Company.—All work on this mine has stopped, owing to the refusal of the Granite Miners' Union to all the miners to work on certain terms proposed by the company and accepted by the miners interested. About July 1st the managers of the Puritan told their miners that they could not continue work and pay all cash at union rates, but that the company could continue if the miners would agree to accept two-thirds in cash and one-third in stock of the company, at the rate of 25 cents per share. The men accepted the proposition and continued working until August 23d, when they were ordered out by the Union.

Madison County.

Broadway Group.—The group of four gold claims known as the Broadway, has been sold by F. R. Merk, to M. J. Silvia, of California; Davies, of Salt Lake, and Wm. Everett, of Denver, the purchase price being, according to the Butte City "Miner," about \$100,000. The claims were leased to Cobban & Co., who joined in the sale. In addition to a 300-ft. shaft, levels to the extent of several hundred feet have been driven and a large amount of free-milling ore has been opened up. The purchasers intend to begin active operations at once.

Meagher County.

Gilt Edge Mining Company.—This company has its new machinery in operation and is now crushing about 100 tons per day. The ore runs \$20 per ton.

Missoula County.

The activity in the gold camps continues, and in the Lou Lou district the owners of the Chickerman mine, the principal property in the district,

have an eight-stamp mill ready to start on their gold-copper ore. This mine employs about 20 men and is said to have yielded well as far as developed. Captain Anderson's Peacock mine shows some fine free-milling gold ore. In the same district the old Boss mine is being worked, the owners using a two-tub arrastra for extracting the metal. Smith Brothers have six or eight men at work on their claim with good results.

Iron Mountain Mining Company.—The work of getting in the new machinery progresses favorably. The tunnel, which is 1,100 ft. long, has been enlarged to admit the drum and crane of the new hoist. The superintendent reports that most of the men who were employed in the mine before the shutdown are now prospecting in that vicinity and some of them have met with unusual success. One of the engineers who went up Cedar Creek has located a rich placer claim.

Silver Bow County.

Reports of proposed shutdowns have been quite numerous during the past week, but they have been nothing more than idle rumors, says the Butte "Inter-Mountain." The most important of these was in connection with the Butte & Boston company, but at the company's headquarters it was authoritatively denied. The company is working its smelter and concentrator to the limit, the Silver Bow mill alone being shut down. The Parrot shutdown is confined to the concentrator and will be only temporary. The Boston & Montana Heinze smelter, Butte Reduction Works and Colorado company are still operating. At Walkerville the Moulton mill is still in operation, but all others are idle.

(From our Special Correspondent.)

Butte City.—Another railroad is being built into the town, and the outlook for this camp is cheery. Of course the silver mines have suffered. Excepting the Moulton, there is not a silver mine of magnitude in operation. The Moulton 40-stamp mill is the only quartz mill working in Silver Bow County. This, considering the fact that one year ago there were 280 stamps crushing ore in Butte, shows the extent of the injury done Butte by the slump in silver.

The Lexington company has ceased operations, and it is hardly possible that it will commence. This property is developed to a depth of 1,650 ft., and there has been driven drifts, winzes sunk and raises made which aggregate a length of 80 miles. The mine is honeycombed with crosscuts and drifts. The only chance for ore now is in sinking deeper, and the present price of silver will hardly justify that.

The Alice company's property is lying idle, and it is more than probable that it will continue so. It was nipped and tuck with them when silver was at 85 to 90c. The mine has a shaft down about 1,500 ft. and has a great quantity of ground thoroughly prospected, but low grade rock predominates throughout.

The Moulton company appears to possess the most reliable silver producing property in Butte; almost in proportion with the equilibrium of a scale balance, the samples of this mine have gone up as the price of silver went down, so the fluctuations of silver did not affect the workings of the mine. While it is developed to a depth of but 850 ft., and is as old as the Lexington or Alice, yet it has been worked more steadily than either.

The copper mines operated by the Anaconda company are working about half-time, but are expected to resume in full soon. During the last six months these mines have been putting out 2,500 tons of ore per day. Owing to the sinking of the shafts on the several claims the production of ore will be greatly diminished during the next few months. The ledge in the Anaconda at the deepest point of exploration is over 100 ft. in width, but shows a decline in value as compared with the upper levels. The same state of affairs exists in the St. Lawrence. In the Mountain Consolidated the ledge is narrowing at the bottom, but the ore is of higher grade. Between the 900 and 1,000 the ledge is 26 ft. wide and assays generally over 30% copper and 90 oz. silver. This is about the richest body of ore being worked in Butte.

NEVADA.

Elko County.

Belle Isle Mining Company.—The latest official weekly letter from the superintendent says: No. 2 raise, 250-ft. level, has been extended 5 ft., the vein not showing as much ore. The east intermediate cross-cut has cut a small seam showing a little fair ore. The stopes are looking about the same.

Storey County—Comstock Lode.

Regarding the refusal of the Comstock miners to accept lower wages, it is understood that the mining companies will take no compulsory measures against them. Nearly all the other expenses have been reduced. The mines will be kept in operation just as long as the stockholders will furnish the money. The Virginia & Gold Hill Water Company states that its charges have kept pace with the decrease of values on the Comstock. The net income of the company, it is said, hardly amounts to 6% per annum on the original cost of the plant, which was \$2,200,000. The Savage mine

for many years paid \$800 per month for water and is now charged \$250. The Hale & Norcross used to pay \$600 per month, and now pays \$250. The Gould & Curry paid \$750 and now pays \$200 for the mine and \$100 for power, which, if generated by steam, would cost at least \$350. The company says that whenever men are permitted to work for what they can get the water rates to families on the Comstock will be reduced 25%. It is also stated that the company has 41 miles of box flumes which in winter must be covered with earth to keep the water from freezing, and this caused the wood to rot so that much repairing is necessary. Besides the mines named above all the others on the Comstock have secured like reductions from the company.

No changes are reported in the condition of the Ophir, Mexican, Union Consolidated, Sierra Nevada, Best & Belcher, Gould & Curry, Andes or other mines in this part of the Comstock. Only a few men are at work.

Some fair-grade ore is being found on the upper levels of the Challenge Consolidated and Confidence mines and is shipped to the Brunswick mill for reduction.

Belcher Mining Company.—The latest official weekly letter says: On the 400-ft. level the north raise from the end of the north drift is up 62 ft. The top is in porphyry. During the week 18 tons of fair-grade ore were hoisted.

Crown Point Mining Company.—It is said that better results were obtained from the second test on gold rock from the Crown Point mine, at the Mexican mill, than at the first crushing. The official particulars have not yet been given.

Consolidated California & Virginia Mining Company.—The latest official weekly letter says: The ore yield last week amounted to 420 tons, of the average car sample assay of \$41.94 per ton. This good ore came from places just below the 1,650-ft. level, where the prospects are excellent. The amount of ore shipped to the Morgan mill was 333 tons and the amount milled was 380 tons, the average battery assay of which was \$32.22 per ton. Some light prospecting is being done on the 1,500 and 1,600 levels of the mine. We have completed the work of bulkheading and closing the openings which connect with the old stopes in the north end of the mine, and the escape of gas therefrom is scarcely noticeable.

Hale & Norcross Mining Company.—On the 900 and 1,100 levels some small prospecting work is being done, but no ore of paying value has yet been found. The night shift at this mine has been discontinued, and for the present all work will be confined to the daytime only.

Kentuck Consolidated Mining Company.—The latest official weekly letter says: We have extracted from the west ledge on the 1,100 level, about 20 tons of ore per day of the average value, as per car samples, of \$7 per ton in gold. The south drift from the joint east cross-cut is in 33 ft.; face in low-grade ore.

Lady Washington Consolidated Mining Company.—At a special meeting of the board of directors of this company held last week, in San Francisco, Herman Zadig was elected president, vice R. F. Kelly, resigned, and E. B. Goodrich, vice-president. An expert is to be engaged to overhaul the books and thoroughly examine all the accounts of the company.

Occidental Consolidated Mining Company.—About six tons of ore averaging \$26 per ton are daily being extracted from this company's mine.

Potosi Mining Company.—The latest official weekly letter says: The east cross-cut from the south drift, 220 ft. south of the shaft, 850 level, is out 22 ft.; face is in hard porphyry. The east drift, 73 ft. above the 930 level, to connect with north raise from 930 level, is out 133 ft.; face is in soft porphyry and streaks of quartz. Extracted and sent to the mill the past week 355 tons and 500 lbs. of ore from the 930, 1,000 and 1,150 levels. Milled during the week 355 tons. On hand at mill 100 tons and 1,750 lbs. Average battery assays, \$29.69; average car sample assays, \$33.58. Shipped to the United States Mint, Carson, 376 lbs. of crude bullion.

Savage Mining Company.—The latest official weekly letter says: On the 1,100-ft. level we are extracting ore of fair grade from the 15th, 16th and 17th floors, and are also running a drift east from the 19th floor of the west stope to connect with an upraise from the 17th floor of the east slope. This drift is advanced 18 ft. During the week we have hoisted 183 cars of ore from this level, and shipped to the Nevada mill, 210 tons. Car samples average \$24.95, battery samples average \$24.44. Bullion yield for the week, \$3,372.60. The usual repairing and bulkheading is going on, also retimbering the shaft at the 800 level.

NEW MEXICO.

Grant County.

There are but few unemployed miners in this county now, says the Silver City "Southwest Sentinel." Most of the men who were thrown out of

employment by the closing down of the silver mines are either at work in the placers or are out in the mountains prospecting for gold mines. Placer miners are having better success in this county this year than they ever have had before since the discovery of gold in the Pinos Altos district. There is little reason to doubt that the water supply will hold out for several weeks yet.

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

Messrs. Walks & Chiro have contracted for the erection of a 10-stamp mill to be put up below Mammoth, on Bear Creek. They are working 25 men on the Mountain Key mine.

The Mammoth mill is running on Campo Santa ore on full time.

Skillion's mill is running on full time.

Magror's mill is running custom ore and giving good satisfaction.

The Manhattan company is pushing its tunnel to strike the Aztec lode and is in with the tunnel 785 ft., expecting to strike a vein in 50 ft.; this will give them 500 ft. of stopping ground over head.

Miller & Watson are working on the Long Star expecting to strike one of those rich pockets that are found in it occasionally.

Bell & Stephens are running their mill on full time and turning out gold in large quantities out of their noted Pacific mine; they have contracted to take out 7,000 tons of ore; it is said they are going to put up another mill, as their mill has not capacity to more than run Pacific ore.

OREGON.

The old Seven Devils mining district seems to be enjoying a revival of prosperity this year, says the Spokane "Chronicle." Not only have rich placer mines been discovered, but there is a good prospect that machinery will be brought in to handle the ore from some of the old ledges. The following extracts from a letter received recently by a Spokane mining man from a well known expert now at work in the Seven Devil's country set forth these facts: Rich placer mines are now being worked at Indian Springs, on Pollock's Mountain. They belong to Messrs. Lockwood, Stewart, Arnott and Bartimms. This property is 500 ft. in length by 12 to 15 in width, and it is estimated by those who have prospected this property that it will pay \$500 a day as long as it lasts. The owners of the old Peacock mine have sold to Messrs. Rogers and others 100,000 tons of copper ore to be mined and smelted by the purchasers. The terms of the contract are very liberal and the holders are now seeking capital to erect the necessary smelting plant. They need simply a reverberatory furnace for maturing the ore. The ore is nearly self-fluxing and is easily reduced. The Peacock mine was located about 21 years ago. It is a large deposit, having an enormous outcrop that covers half an acre with high-grade copper ore. The development on this mine consists of several open cuts and a shaft 65 ft. deep, said to show ore from top to bottom. Several carloads of ore have been gathered from the surface and shipped.

Coal prospectors continue the development of the discovery near Birch Creek. The coal is said to be of good quality, but the claim is not yet sufficiently developed to prove its quantity.

Mineral Mutual Smelter.—This smelter has shipped 15 tons of matte to Colorado to be refined.

PENNSYLVANIA.

Anthracite Coal.

A press dispatch from Pottsville says that by request of individual operators, E. P. Wilbur, president of the Lehigh Valley Company, has issued orders to all superintendents to close down the collieries Tuesday, Thursday and Saturday of next week.

Last Monday's storm did considerable harm in the Schuylkill region. Several breakers and colliery buildings were more or less damaged, and in the Shenandoah region several collieries are reported as drowned out.

Patterson Colliery.—Because they were not paid their wages on the 26th ult., 800 men at this colliery, Shamokin, Pa., went on strike on the following day, throwing 600 more men out of work.

Philadelphia & Reading Coal and Iron Company.—At a meeting of this company's officials of the Pottsville district, at Pottsville, on the 30th ult., the rate of wages to be paid the miners in the employ of the company for the last half of August and the first half of September was fixed at \$2.47. This is 1% above the \$2.50 basis.

Bituminous Coal.

A telegram from Bellefonte says that dissatisfaction has been occasioned throughout the mining districts over the miners in the Broad Top region and at the Troy mine, in Clearfield region, agreeing to accept monthly payments while the present depression exists. This is in violation of the rules of the United Mine Workers' Association, and a mass meeting will be held at Hontzdale on the 2d inst. to consider the question.

Slate.

The slate regions are beginning to feel the effects of business depression. The Bangor Union Quarry

will work but five days a week. Other quarries will do the same. At Pen Argyl the United States Slate Company cut its employees down to four days a week and reduced wages 10%. The men have struck.

SOUTH DAKOTA.

Custer County.

One of our Dakota exchanges states that an Eastern syndicate has been purchasing and bonding mica properties in the vicinity of Custer City and will shortly put a force of men at work on the old McMackin mine. Some years ago about 40,000 lbs. of mica, it is said, were taken out of this mine and marketed.

Lawrence County.

Bion Mine.—This property, situated near Galena, shows a body of iron pyrites ore assaying \$5 in gold per ton. A tunnel 100 ft. in length with a chamber 25 ft. in diameter at its face discloses a solid body of ore. Owing to an inflow of water the owners discontinued work at that point, and started another tunnel about 75 ft. to the north and 10 ft. lower down the hill. This has been driven in 25 ft. and a cross-cut is now being made to intersect and drain the former workings. This cut is now in about 10 ft., and shows the iron pyritic vein in its face.

Caledonia.—The Homestead company, which purchased the control of this property some years ago, shut it down on the 28th ult. It is said that for the past two years it has failed to pay running expenses. The mine and mill have given employment to about 100 men; 12 or 15 of them will be kept in the mine prospecting for pay ore.

Deadwood & Delaware Smelter.—This company has posted notices in their smelter that a reduction of 10% on wages of all employees of the smelter will take effect on September 1st. Two furnaces are running.

Hawkeye Mining Company.—This company is operating 30 stamps on a good grade of ore, results from which are satisfactory, says the Black Hills "Times." Under an agreement between the company and some dissatisfied creditors, R. M. Maloney was selected to keep account of the amalgam from the tables and plates.

Homestake Mining Company.—The company closed down the Caledonia mine on August 28th. The mine has not paid mining expenses for two years, and 150 men will be thrown out of employment by the cessation of operations.

UTAH.

Iron County.

The railroad from Blake, Ariz., on the line of the Atlantic & Pacific, into the Vanderbilt district, is now within 10 miles of Vanderbilt and recently a contract for 30 miles of grading was let. It is headed for Iron County, in Utah. Pioche, Nev., will also be touched by the new road, from there branching off to Iron City. Thirty miles distant there are extensive coal deposits. The projectors of the railroad placed their bonds prior to the present financial crisis.

Salt Lake County.

Utah Portland Cement Company.—This company has been organized to furnish the Western market with Portland cement. The raw material is found in Parley's canyon, 10 miles from Salt Lake City, and on the line of the Utah Central Railway. Works turning out 60 barrels per day will be completed within 60 days, it is said, and next spring a new plant of a capacity of 300 barrels per day will be erected at a cost of \$125,000.

(From our Special Correspondent.)

It is officially announced that some of the more important mines at Eureka, Bingham and Park City will resume work in the next week.

Lithographic Stone.—William Newton, manager of the Lithographing Stone Company, has made a large shipment of this stone to New York City. Samples of the work done by the Salt Lake Lithographing Company are on exhibition, and compare favorably with those made from imported stone. The quarry is located in Emigration canyon, near the city.

Pan-American Company.—A dividend of \$3,000 has been declared by this company. The profits were made from a mill of 35 tons capacity, operated by the cyanide process. A new mill of 100 tons is now in operation. The company has headquarters in Salt Lake City and is working an immense quantity of tailings in Mexico. Gill S. Peyton is president of the company and Ernest G. Rognou is the treasurer.

Tooele County.

Coleman-Heury.—A carload of copper ore has been shipped from these mines, near Hapah, in the Deep Creek country, to Salt Lake City. It is said that more shipments will be made.

Utah County.

(From our Special Correspondent.)

Gold Miners.—Several placer claims have been located in the West canyon, near Lemhi. The parties are putting in sluices and the panning is reported as very favorable.

Washington County.

Dixie.—The copper mines of Dixie, in southern Utah, are said to be doing very well. The ore has to be hauled 24 miles to the smelter, the coke from Milford, 154 miles, and the iron flux from Iron City, 50 miles. The product in the form of matte is hauled to Milford, 154 miles, and from there shipped to the East. Notwithstanding all the drawbacks and heavy expense, the mines are making money for their owners, Messrs. Woolley, Lund & Judd, says the Salt Lake "Herald."

(From our Special Correspondent.)

Copper Shipments.—Woolley, Lund and Judd, of St. George, have made a shipment of 99,185 lbs. of copper matte. The assays give 90.9% copper. The shipment was made to an Eastern refinery.

WISCONSIN.

Douglas County.

According to the "Evening Wisconsin," Col. E. A. McNair and other Duluth parties, have discovered a vein of copper ore in the town of Brule, 40 miles from Superior.

WYOMING.

La Plata District.—A number of persons have left Laramie to do assessment work in this district. At the Genu City mine the brown iron is coming in 2 ft. wide at the bottom of the shaft and there is 5 ft. of solid ore. Two men have been sinking about 1½ ft. per day on this mine and they are now down about 22 ft. The cap on top has been removed and free-milling ore is exposed.

Carbon County.

Transcontinental Coal and Iron Company.—A new discovery of a fine 14-ft. seam of coal that has just been made by Malachi Dillon is creating big excitement at Rawlins. The seam runs through the new town of Campbell, recently located by the Transcontinental Coal and Iron Company, three miles west. The coal is said to be of excellent quality.

Converse County.

Douglass Consolidated Mining and Milling Company.—This company, capital \$3,000,000, has completed its organization at Laramie, and has secured title to some 20 miles of Douglas Creek placer grounds and will go to work at once to put in hydraulic works to cost \$250,000.

Sheridan County.

Sheridan Fuel Company.—This company is pushing work on its coal lands, situated in the vicinity of Sheridan. Present workings disclose a bed of coal varying from 10 to 16 ft. thick. The company expects to have 300 or 400 men in its employ before many weeks.

FOREIGN MINING NEWS.

ASIA.

Turkestan.

Important coal deposits have been discovered near the River Pefane in the Province of Samarkand.

BRITISH COLUMBIA.

F. L. Chaplin, of Spokane, who has recently been visiting the Slocan County, has given the Spokane "Review" the following information: Nelson is having a boom, consequent upon the announcement that 700 men will go to work on the Silver King almost immediately. It is reported, too, that an offer has been made by the Canadian Pacific people for the Pilot Bay smelter, which they have an idea, so the report goes, of installing at Nelson and working Silver King and miscellaneous ores. The sampler at Kaslo has started and is ready to buy ore.

Kootenai.

There is quite a rush to the Big Bend River on account of the discovery of gold placer deposits. The government has appropriated \$500 to open the trail.

COLOMBIA.

Frontino and Bolivia Mining Company, Limited.—The output for June was 3,030 tons of ore, yielding bar gold, 3,808oz.; tributes produced 110 oz. There was also produced 60,904 lbs. of sulphurets, valued at £1,189. Estimated value of total output, £3,428; total expenses, £6,166.

ECUADOR.

Zaruma Gold Mining Company, Limited.—During July the mill worked 16 days with 15 stamps, crushed 275 tons of quartz and produced 160 oz. of standard gold.

FRANCE.

It is estimated that the quantity of coal raised in the department of the Pas-de-Calais, first half of 1893, was 4,804,184 tons, as compared with 4,782,395 tons during the first half of 1892. Mines in the department of the Nord, 2,403,584 tons for the first half of 1893, as compared with 2,370,699 tons for the first half of the preceding year. Total, 7,207,768 tons for the first half of 1893, as compared with 7,153,094 tons for the first half of 1892.

GREAT BRITAIN.

At a conference of coal owners at London on the 30th ult. a resolution was passed that offers of the

strikers to return to work at their old wages should be refused. The owners believe that the backbone of the strike is gone and that the desire to go back to work is becoming general. In south Wales and Monmouthshire the determination of the men has been weakened by the increasing sufferings of their families.

Castle Eden Colliery.—It is reported that the water from the newly-tapped feeder at this colliery has commenced running over the edge of the low main seam into the shaft. As yet, however, there is a rise of 80 ft. vertical before the water will reach the level of the low main seam, and this will take at least three months to effect, as there is a vast quantity of storage room, nearly a mile in area, in some disused workings, known as the telegraph way, lying to the eastward. These lie at the lower level than the low main and must be filled before the latter and the pumping gear there can be drowned out completely. The present pumping machinery is capable of lifting 2,000 gals. per minute, and was gaining on the water at the time of the latest outbreak. At present there are about 300 hands employed, and the output is about 400 tons per day as against the usual 700.

Wales.

Despite many prophecies of a speedy settlement of the colliers' strike, matters in the coal districts have changed very little. The strike seems likely to end sooner in south Wales, where the men struck for an advance of 20% in wages. The coal carrying railways are losing money in freights every week. But this loss, according to the railway men, is nothing compared with the extraordinary cost and difficulty of procuring fuel with which to operate their lines. The Great Eastern Railway's works in Stratford, Middlesex, which employ 4,000 men, have been forced to run on short time. The company has fitted several furnaces for the consumption of liquid fuel, and has contrived apparatus for a similar innovation on the locomotives, but the success of the experiment is still in doubt.

SICILY.

In a Foreign Office report just issued British Vice-Consul Towsey, of Palermo, gives information respecting the Sicilian sulphur industry. The following description of the working of one of the important mines—viz., "Grottaacalda"—is of interest: This mine, situated at about 7 kilometres from the town of Valguarnera, and 21 kilometres from the nearest railway station of Assaro, belongs to Prince Sant'Elia, and is at present leased to and worked by Messrs. J. Trewhella & Co. It produces about 15,000 tons of sulphur yearly, of which 22% is made over to the proprietor as rent. The extreme depth is 140 metres. There are 3 shafts, besides various "scale" or stairs leading into the mine. At the main shaft the ore is drawn to the surface by a 60-H. P. horizontal winding engine, the cage containing a tram wagon, with about 15 cwt. of ore at a time. The ore is extracted from the 2 smaller shafts by modern steam winches of 3 to 10 H. P. There are 3 horizontal Lancashire boilers, each having 30 sq. metres of superficial heating surface, and 2 vertical boilers for driving the steam winches. The amount of water is about 1,000 cu. metres in 24 hours, and it is raised by a double-acting vertical beam pump (Cornish pattern) working in 3 lifts; the length of stroke is 3 metres, diameter of plunger 30 centimetres, speed of pump six strokes per minute; besides this there are 3 Worthington pumps in reserve against accidents. The quantity of ore brought to the surface in 24 hours is about 300 tons. The ore yields about 3½ cwt. of fused sulphur per ton of ore. There are about 150 miners and 250 hoys employed underground, divided into three shifts. On the surface there are one director, one mining engineer, guards for controlling the sulphur fused at the kilns and ovens, besides a number of workmen. The sulphur, when fused, is taken down to the railway station in carts, 50 of which are regularly employed, each of which takes down 14 cwt. of sulphur.

SOUTH AFRICA.

Cape Copper Company.—The following is the June report of this company: The stopes throughout the mine are yielding their usual quantities of copper ore. Returns for June: Ookiep, 2,000 tons of 19% Spectakel, 140 tons of 28%. Tilt Cove—East mine—output for month: 5,250 tons 4½ wet assay.

De Beers Consolidated Mines, Limited.—The London board of this company has been advised by cable that the revenue for the financial year ending June 30, including the stock of diamonds on hand, was £3,380,000, and the expenditure £1,179,000, leaving a gross profit of £2,201,000. After providing for interest and sinking fund for debentures and all other obligations, there remains a net profit of £1,673,000, out of which two dividends of 12½% each have been declared, absorbing £1,000,000. The stock of blue ground on the floors is about 2,500,000 loads.

Namaqua Copper Company.—The following is an abstract of the superintendent's report for June: Tweefontein mine: Shaft below the 105 fathoms level. The shaft has been completed to the depth of about three fathoms below the 105 fathoms level, which gives space for a plot and skip pit. Ninety-five West: This is now being driven on a part of the lode which looks very promising, the bottom part being in good ore ground. This level must be extended to enable the laying open of the ground for stoping and the sinking of another winze to the 105 fathoms level for ventilation; worth five tons of ore

per fathom. Eighty-five West: There is no great change in the appearance of the ground, although it is of a darker color and a little more mineralized. There is still a leader or hunch of ore on the lode, but of little value. New Shaft: There is no change on the ground beyond its being spotted with ore. There cannot be a great distance further to drive to cut the lode. Output for June, 200 tons of 26% copper.

New Gordon Diamond Mining Company. This company (Dutoispan Mine) has been reconstructed, and the unwatering of the mine has been commenced, 100 white men and 700 natives being taken on, thus giving quite a spurt to business in Beaconsfield.

Mashonaland.

British South Africa Company.—The administrator has issued reports of the respective mining commissioners on the Salisbury, Umtali and Mazoe Fields, Mashonaland, for the month of May. In the Salisbury district it is announced that during May no fewer than 450 claims were registered. In the Mazoe district developing work has been progressing slowly. In the Manica district 262 claims were registered, and 130 abandoned and declared forfeited. Prospectors are now coming in, from the coast principally, and about 46 licenses were issued during July. Prospecting is now being vigorously carried on. In the Umfuli district 85 claims have been registered, 21 claims forfeited, and 10 claims inspected. This makes the total number of claims actually registered on June 1st 3,239, and the total number inspected on the same date 1,200.

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 256, 257 and 258.]

NEW YORK, Friday Evening, September 1.

The improvement in the general stock market has not been reflected to any appreciable extent in mining stocks. A somewhat better demand for the reorganization certificates of the Phoenix (Arizona) Mining Company has developed, but dealings are few and far between.

The California stocks show no improvement. Quotations are bandied about but there is no reason to believe that these represent actual sales. This is an old trick which no longer deceives.

The only transaction reported this week was 500 shares of Lacrosse at 4c.

No oil will be traded in to-morrow, Saturday, on the Consolidated Exchange owing to the closing of the exchanges at Oil City and Pittsburg. Monday, September 4th, is Labor Day and the Western exchanges intend to take a double holiday.

The Victor Gold Mining Company reports expenses and receipts as follows: From date of incorporation, February 15th to August 1st; ore sales, \$123,468; expense during the same period, \$38,468; dividends paid, \$60,000. The surplus on August 1st was \$35,000. During August the ore sales, so far as reported, amounted to \$43,000.

Boston. August 31.

(From our Special Correspondent.)

The month closes with a better feeling pervading financial circles, which may be reflected later on in the market for mining stocks. Early in the week supreme dullness prevailed, and there was no feature, although prices were generally firm. The market assumed more activity yesterday and to-day and there was more disposition to buy stocks, both for speculative and investment account. Calumet & Hecla, which early in the week sold at \$255, advanced to \$270, with reaction to \$265.

Tamarack advanced to \$130 on the good showing for the past year. It is reported that the company has earned \$12 per share the past year and paid all construction charges, and will show \$6,000 to \$8,000 added to the surplus as it stood June 30, 1892. The reports from the Tamarack, Jr., are also favorable. The product for August is expected to be not far from 100 tons. The stock advanced from \$11 to \$13 and is more inquired for.

Quincy showed some weakness for no especial reason, declining from \$100 to \$95. There is very little floating stock, and the price is largely affected by the orders in the market.

Osecola declined to \$22 in the early dealings, but recovered to \$23. The next dividend is due in September. It is said to have been earned, but whether it will be paid is a matter of question. Centennial is selling at \$2@2¼ and Kearsarge at \$5@5½ with very light transactions. Franklin sold in a small way at \$9. The Montana stocks were almost entirely neglected early in the week; yesterday they were quite active with good buying orders. Boston and Montana advanced from \$18¾ to \$20¼ and Butte & Boston from \$5½ to \$6¼; later Boston & Montana declined to \$19½. It is stated that the company is converting about a third of its product into electrolytic copper and is earning all charges and sinking funds and something besides. Napa quicksilver sold at \$4, same as last week.

San Francisco.

SAN FRANCISCO, Sept. 1. (By Telegraph).—The opening quotations to-day are as follows: Best & Belcher, 55c.; Bodie, 20c.; Bulwer, 10c.; Chollar, 20c.; Consolidated California & Virginia, \$1.35; Gould & Curry, 25c.; Hale & Norcross, 60c.; Mexican, 65c.; Ophir, 90c.; Savage, 40c.; Sierra Nevada, 30c.; Union Consolidated, 35c.; Yellow Jacket, 60c.

DIVIDENDS.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 63, amounting to \$50,000, payable September 15th, at the office of the company, Colorado Springs, Colo. Transfer books close September 8th, reopen September 16th.

MEETINGS.

The annual meeting of the stockholders of the Horn Silver Mining Company for the election of directors for the ensuing year will be held at the office of the company at Salt Lake City, Utah, on Tuesday, October 3d, 1893, at 12 o'clock noon. The transfer books will close on September 2d at 12 M. and reopen on September 9th at 10 A. M.

METAL MARKET.

NEW YORK, Friday Evening, Sept. 1, 1893.

Prices of Silver per Ounce Troy.

Aug.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	Aug.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
26	4'86	34	73	.564	30	4'86	34½	73¾	.57
28	....	34	73	.564	31	4'86	34½	74	.572
29	....	34	73	.564	S.1	4'85½	34	73¾	.566

Silver prices this week have been largely nominal, the London market being a waiting one pending the repeal measures in Congress.

There was no allotment of Council bills this week, but it is cabled that the India Council has intimated its willingness to entertain tenders for rupee drafts at the rate of 1s. 3¼d. per rupee.

Gold and Silver Exports and Imports at New York, Week Ending August 26th, 1893, and for Years from January 1st, 1893, 1892.

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week	\$5,000	\$7,923,458	\$754,124	\$111,292	\$7,275,626*
1893...	69,730,427	45,572,236	21,144,717	1,667,548	34,195,369
1892...	55,355,363	6,428,810	14,218,155	1,387,377	61,533,308

* Imports.

During the five days ending September 1st the exports and imports have been as follows: Exports, gold, \$500; silver \$581,800. Imports, gold, \$6,086,289; silver, \$8,741. Of the silver exported, \$211,400 was Mexican coin and bullion, the rest being American bullion.

As a rule the exports of silver consist of from 85% to 90% American bullion, the rest being Mexican and occasionally some Peruvian coin. The Mexican coin is sent to London to be used in the trade with China.

NOTES OF THE WEEK.

On Monday, August 28th, the law known as the Sherman Act, which makes it obligatory upon the government to purchase 54,000,000 oz. of silver bullion per annum, was repealed in the lower House of Congress by a most decisive vote. The repeal bill is known as the Wilson Bill. It had been agreed between the silver and anti-silver parties that votes should be taken on amendments providing for free coinage of silver at ratios varying from 16 to 1 to 20 to 1 and on the re-enactment of the Bland-Allison law of 1878. The votes on these different amendments and on the repeal bill were as follows:

Ratio.	Yeas.	Nays.	Majority.
16 to 1.....	124	226	102
17 to 1.....	100	240	140
18 to 1.....	103	239	136
19 to 1.....	114	228	114
20 to 1.....	121	222	101
Bland-Allison Act.....	136	213	77
For repeal (alone).....	239	110	129

The bill was sent to the Senate the same day, and was referred to the Finance Committee, of which Mr. Vorhees is chairman.

It is not expected that a vote will be taken in the Senate before September 10th.

Secretary of the Treasury Carlisle has ordered that the United States mints at Philadelphia and

San Francisco be run to full capacity in coining gold. The Treasury Department possesses from \$85,000,000 to \$90,000,000 of gold bullion. The coining capacity of the Philadelphia Mint will be between \$5,000,000 and \$6,000,000 per month. The San Francisco Mint will also be utilized, but nearly all the bullion possessed by the government is in the East. There are \$20,000,000 of gold bullion in the Philadelphia Mint. Acting Director of the Mint Preston visited Philadelphia last week and completed arrangements with Superintendent Bosbynell to begin work at once. The Treasury is now paying out gold coin all over the country, and, as a consequence, stands more in need of gold coin than heretofore.

The bill of Representative Johnson, of Ohio, authorizing the exchange of United States bonds for Treasury notes at the Treasury, seems to be losing ground in the House Committee on Banking. Several members of the committee have called upon Secretary Carlisle and received from him the assurance that he did not favor the bill, and thought it open to several serious objections.

Representative McCreary, of Kentucky, has prepared a joint resolution providing for the appointment of a commission to investigate the monetary question. The resolution provides that the commission be composed of nine members, three to be appointed by the Speaker of the House from that body, three by the Vice-President, chosen from the house over which he presides, and three experts, selected by the President. The points to be investigated are: First—On the change which has taken place in the relative value of gold and silver, and whether the change is due to the depreciation of silver or to the appreciation of gold; cause of the change, whether permanent or temporary; the effect thereof upon finance, trade, commerce, agriculture, labor and other interests of the country, and upon the standard of value in this and other countries. Second—On the policy of maintaining the double standard in the United States, and what should be the legal ratio between silver and gold when coined. Third—On the best means of reorganizing the banking system, and of restoring confidence in commercial and financial circles, and promoting international bimetallicism.

The August purchases of gold at the Denver branch mint will exceed \$200,000, and the excess of purchases for July and August over the corresponding two months of last year will be \$106,000. The heaviest purchases are of Cripple Creek gold.

During the month of August the amount of gold imported into this country reached the enormous total of \$40,000,000, an amount unparalleled in our history. This has naturally had a beneficial effect on our various industries, and this is true even although it is quite apparent that a considerable portion of this sum has been hoarded, like other millions withdrawn from banks and the Treasury. For the first time in months gold coin is seen in free circulation, and daily contact with it cannot fail to restore the lost tone of confidence. One of the best proofs of returning confidence is found in the resumption of many of those national banks which had recently failed. According to Comptroller Eckels, but one bank was closed during the last three weeks of August, while 72 were closed in July. In the last two weeks not less than 32 banks have resumed, and without doubt many more resumptions will take place in September. Application has been made for national bank-notes to the extent of \$32,000,000, which, allowing for notes canceled, means a net increase of \$20,000,000 in future circulation.

Still another sign of returning confidence is to be found in the small amounts withdrawn from savings banks under the 30-day rule. This requirement was put in force by the New York City banks on July 31st, and the maturities of the notices given on that and the following day fell due yesterday and to-day. The amounts withdrawn were very small, and this will enable the savings banks to increase their deposits in the national banks or enter the market as buyers of commercial notes and other securities.

To-day, September 1st, three New York City banks paid their balance at the Clearance House in cash.

The action of the India Council in allotting telegraphic transfers of rupees on Calcutta, Bombay and Madras at 1s. 3½d. is remarkable when considered in relation to the action taken on June 26th, upon the recommendation of the Herschell Committee. When the mints of India were closed to private coinage and an exchange rate of 1s. 4d. officially fixed, it was believed that a ratio had been established which would be maintained even at some sacrifice. The London "Financial News," in commenting upon the matter, says:

"It was soon discovered that the exchange of 1s. 4d. was not a fixed parity, but simply a maximum. This was a great disappointment to the Indian Currency Association of Calcutta, who had been dreaming of a gold standard for India, and had already discussed what to do and how to deal with the gold after its arrival in India. However, the Association took comfort by insisting that the India Council was master of the situation; that by simply holding back its hand it could dictate the exchange, and thus make the maximum the minimum, and in this way practically establish the parity. Since July 5th the Council has followed this policy, with the result that none of its bills on India were sold. Meanwhile, political economists in this country maintained that this policy of the Council was dangerous; that it allowed others to draw their funds from India at the expense of the Government; and now the Council has broken down, and sold at 1s. 3½d. We must be prepared for a fearful outcry from the gentlemen of the Indian Currency Association; but they have nobody to blame but themselves. They have led the Government into the adoption of a policy which is unscientific, and which was bound to collapse. What further results will flow from this breakdown of the Council it is impossible to foretell, but it virtually nullifies the step which was taken on June 26th, and, logically, must sooner or later lead to the question whether, after all, it is not better for the Government of India to admit the whole of its blunder, and reopen the mints of India to private coinage."

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$.58½	\$.59½
Peruvian soles and Chilean pesos.....	.55	.54
Victoria sovereigns.....	4.87	4.88
Twenty francs.....	3.86	3.89
Twenty marks.....	4.71	4.78
Spanish 25 pesetas.....	4.75	4.86

The United States Assay Office at New York reports total receipts of silver at 91,000 oz. for the week.

Other Metals.

It is with much pleasure that we record the fact that the outlook in general is brighter, but while things now promise well, it must not be forgotten that the wounds inflicted upon the whole community at large have been too severe and gone too deeply to be healed in a short space of time, even although the friends of sound finance showed up so strongly and well in the House of Representatives as to infuse courage and hope into commercial affairs generally. The almost complete disappearance of a premium on currency is another helpful sign, but, we reiterate, that we must not expect too much in a short time.

Copper has, on the whole, been irregular, but the market here has been relieved by the very large sales abroad of both Lake and American electrolytic copper which have been reported as having been made at prices lower than those currently quoted here. That the sales abroad have been enormous is attested by the fact that all outbound steamers, plying to the principal ports to which copper is shipped at any time, have all and more than they can comfortably take care of. The details of shipments are published in this report every week. In contrast with this is the little business that has been done with consumers here: they are not yet in position to take in sizable quantities, but must soon buy more or less as their stocks are being depleted. That demand, when it comes, will no doubt steady the quotations but we do not think it will be sufficient to take up all that is to be had. We quote: Lake at 3½¢, Electrolytic at 9½¢ and casting at 9½¢, but have to particularly point out that these are merely nominal figures, and not those at which large quantities of metal could be disposed of.

In the foreign market, while buyers will not take in anything more except at still lower prices, there has been some speculative demand, causing the price of G. M. B. s to advance to £41 10s. for spot and to £42 for three months prompt, but at such prices the copper cannot be used for consumption, which, in all the countries of Europe, is now very large. We quote: English tough at £44 10s. @ £45; best selected at £45 @ £45 10s.; strong sheets at £53; India sheets at £50 10s. @ £51; yellow metal sheets at 4½d. It will be seen that the margin between common and refined copper is now narrower than almost before known. The statistical figures for the last half of August are not yet in hand.

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

Copper:			
Liverpool—Cufic.....	274 pigs	60,090 lbs.	\$6,000
Hull—San Francisco....	243 casks	30,425 "	34,000
" " " " " "	1,768 plates	98,320 "	10,325
Bordeaux—Panama.....	539 bars	112,070 "	11,800
Havre—La Touraine.....	45 casks	60,177 "	5,450
" " " " " "	11 bars	" "	" "
" Mithy Hall.....	90 barrels	112,500 "	10,200
" " " " " "	13 cakes	2,266 "	200
" " " " " "	281 pigs	99,228 "	9,980
" " " " " "	90 casks	96,320 "	9,717
" " " " " "	196 cakes	" "	" "
" " " " " "	151 bars	56,009 "	5,792
" " " " " "	5 casks	" "	" "
" " " " " "	15 cakes	11,107 "	1,000

Copper:			
Rotterdam—Maasdam....	36 casks	44,800 "	4,300
" " " " " "	283 casks	78,906 "	7,700
" " " " " "	161 pigs	56,202 "	5,000
" Amsterdam.....	225 casks	73,002 "	7,753
" " " " " "	238 casks	292,252 "	31,387
" " " " " "	236 pigs	58,544 "	5,800
" " " " " "	1,040 plates	80,089 "	8,000
" " " " " "	281 bbls.	355,000 }	40,500
" " " " " "	364 bars	49,971 }	" "
" " " " " "	28 bars	4,955 }	500
Hamburg—Taormina....	9 casks	11,200 "	5,000
" " " " " "	113 cakes	47,414 }	" "
" " " " " "	98 casks	" "	" "
" " " " " "	115 cakes	251,507 "	25,150
" " " " " "	1,005 pigs	" "	" "
" Rugia.....	180 bbls.	225,000 "	24,750
" " (scrap).....	32 bbls.	46,600 "	2,796
" Colonia.....	25 casks	22,400 "	2,400
St. Petersburg—Hindoo.	9 casks	11,250 "	1,097
Copper mate:			
Liverpool Cufic.....	4,360 bags	516,911 "	23,500
" Britannic.....	1,870 bags	210,086 "	9,000
Swansea—Landaff City..	65 casks	910,17 "	4,500
" Jersey City..	2,305 bags	241,385 "	10,500

Tin.—The probability of any tariff legislation in the immediate future being so remote, the market here has continued to improve greatly, proving the wholesomeness of the advice given in these columns for months past that the price of the article has been, and still is for that matter, too low, and should be availed of to lay in supplies. To-day we quote spot at 19.50, September at 19.75, and October at 19.75, with hardly any sellers for future deliveries, not even at very handsome premiums over the prices herein quoted for nearby deliveries. The probability now is that we will soon reach the parity of the London market, plus the 4c. per pound duty.

Abroad there has been a continual improvement throughout the week, and prices close at £78 15s. for spot and £79 5s. for three months, prompt. The fact that America will soon again have to buy in the East, in spite of the duty and the imports made in anticipation of it, is evidently dawning upon the people abroad.

The following table shows comparative exports of tin from the Straits Settlements during the half years January 1st to July 1st, in tons of 2,240 lbs.:

	1893.	1892.	1891.
To United States.....	3,409	5,409	4,794
" Great Britain.....	13,119	7,821	9,227
" European Continent.....	2,781	2,803	2,433
" China.....	550	879	890
" India.....	1,004	666	821
Total.....	20,863	17,578	18,165

Lead.—The scarcity of this metal is felt more and more as the weeks go by, for although the consumption has decreased, it has not done so to the same extent as production, and as a consequence sales were made early in the week at 3½¢, but later on nothing was to be had at less than 3.675¢@3.75¢, and now many people are of the opinion that prices here will soon reach the parity of those abroad, and that importations of foreign lead will be made.

The foreign market is somewhat weaker than when we last reported, Spanish lead being quoted in London at £9 15s., and English lead at 2s. 6d. more.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead continues to advance and records a higher level almost daily. The latest sales here are on a basis of 3.57½¢ for East St. Louis. Although pig lead now has advanced half a cent per pound within thirty days, sellers are less anxious to part with their stocks than they were when the metal sold here at 3c.

Spelter has been rather dull, although some sales have been made at very low prices, actually below the price of lead, as little as 3.275¢@3.30¢ East St. Louis having been accepted by the smelters. At such unheard-of figures, a few more orders have come into the markets, but the trade, especially the galvanizing portion of it, is so greatly depressed that consumption will be much restricted for a long time to come.

The foreign market is quoted at £17 2s. 6d. for good ordinaries, and at £17 5s. for specials.

Antimony.—Very little, except in retail quantities, is being done in this metal, and even that is at prices that are nominal. Cookson's we quote at 10½¢, L. X. at 10 and Hallett's at 9.75.

Nickel is without change.

Quicksilver.—The latest quotations are as follows: New York, \$37 per flask; London, £6 6s. 6d. @ £6 7s. 6d.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 1, 1893.

Pig Iron Production.

Fuel used.	Week ending				From Jan., '92	From Jan., '93
	Sept. 1, 1892.	Sept. 1, 1893.	Sept. 1, 1893.	Sept. 1, 1893.		
Anthracite.....	67	29,937	51	23,679	1,208,614	1,088,000
Coke.....	131	118,659	85	80,637	4,649,361	4,338,909
Charcoal.....	41	8,926	31	5,634	3,744,5	298,356
Totals.....	239	156,522	170	110,000	6,220,491	5,746,334

The pig iron market remains about the same as reported in our issue of last week. Offers of iron

are being made for cash which, under ordinary circumstances, would be eagerly snapped up, but owing to the difficulty of getting ready money these offers are seldom accepted and consequently sales are few in number. The agents of the Southern companies are offering pig at remarkably low prices, but these offers are for spot cash and consequently buyers are few in number. Southern pig has been offered at the furnace at a price lower than ever before named, but even then sales in quantity cannot be made. Meanwhile it is reported that a number of Northern furnaces have resumed work. In these days quotations are not of much value owing to the different degrees of shading given buyers, but we may quote as follows: Northern brands: No. 1, \$14@15; No. 2, \$12.75@13.50; gray forge, \$12@12.50. For Southern iron we quote: No. 1, \$13.25@14; No. 2 F., \$12.25@13.25; No. 1 soft F., \$12@13; 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, and it is more than probable that within a short time prices will show a further decline. 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, 1.90@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, 2.50@2.75c.; sheared, 1.85@2.10c.; shell, 1.95@2.10c.; tank, 1.75@1.90c.; 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 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; ear wheels, \$11.50@13.50.

Rail Fastenings.—The market for rail fastenings is dead. 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, 57½, 10 and 5%; butt, galvanized, 50, 10 and 5%; lap, black, 67½, 10 and 5%; lap, galvanized, 57½, 10 and 5%.

Buffalo. August 31.

(Special Report of Rogers, Brown & Co.)

Quite a notable increase in business is to be seen. In the past two or three days orders have been more numerous, although usually for small amounts.

Some buyers have plucked up sufficient courage to make firm offers on large quantities. Iron is being ordered forward more generally than for a number of weeks.

We quote below on the cash basis f. o. b. cars Buffalo: No. 1X foundry strong coke iron, Lake Superior ore, \$13.75; 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, \$16.30@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior charcoal, \$16; Tennessee charcoal, \$16; Southern soft No. 1, \$12.90; Alabama ear wheel, \$18; Hanging Rock charcoal, \$20.50.

Chicago. August 31.

(From our Special Correspondent.)

While there is no general improvement in the iron and steel trades, we note better signs in some branches, notably in merchant and special steels and shapes used by manufacturers of agricultural implements. Jobbers are also ordering steel bars more freely. In structural, indications are more cheerful than they have been for some time, as there is now some promise of larger work. In other departments of finished material the encouraging signs are not so prominent. The demand for rails and track supplies is very disappointing.

Pig Iron.—In crude iron there is no change from the conditions which have prevailed for the past two months. Orders are light for any grade, and while inquiry from smelters is fair, there is little

disposition to close. Local coke-iron is selling in small quantities, and the car load trade is as prominent a feature for Northern as it is for Southern iron. There may be some round lots placed for scattered, extended deliveries during September, but prices for then will be no better than they are now. Some furnace agents believe they will be more favorable to buyers than ever. Lake Superior charcoal is in some inquiry. Furnace agents look for a little stimulus in buying as finances become easier. 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 silvery, No. 1, \$16.50; No. 2, \$16.00; Ohio strong softeners, No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal, No. 1, \$16.50; No. 2, \$16.00; Southern standard car wheel, \$18.50@18.75.

Structural Iron and Steel.—There is an improved demand for small lots of beams and other shapes and the outlook rather more promising. A moderate tonnage of bridge material is being placed. 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.—Business continues quiet. The general demand light. Steel sheets, 10 to 14, \$2.25@2.35; iron sheets, 10 to 14, \$2.20@2.30; tank steel, \$1.90@2; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.25; flange steel, \$2.74@3; boiler rivets, \$4@4.15; boiler tubes, all sizes, 65%.

Merchant Steel.—A very fair tonnage of season's contracts for soft steels was closed last week. Jobbing orders for mill quantities are more frequent and general trade in this line is improving. Tool steel is still very quiet. 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 improvement noted last week continues; small orders are frequent and greater activity is expected in September. Discounts are unchanged at 70, 10 and 5% off on Juniata and 70, 10 and 10% off on charcoal, and jobbing quantities at 70 and 7½% off on the former and 70 and 10% off on the latter.

Black Sheet Iron.—Mill agents report a better demand for the lighter gauges for September and October shipments at 2.05c. for No. 27 common, and 2.90@2.95c. for steel. Jobbers are making more frequent sales, and quote 3c. for iron and 3.10@3.15c. for steel, same gauge.

Bar Iron.—Mill orders are more plentiful in quantities of 50 to 100 tons. There is still a large number of season's contracts to close with the implement trade. Reductions in wages have in all cases been discounted, and 1.48@1.50c. are firm and steady. Jobbers note an improved demand at 1.70@1.80c. for iron and steel bars respectively.

Nails.—Steel cut nails are in better inquiry. Mill lots are unchanged at \$1.20 here, and jobbers quote \$1.35 from stock. Wire nails are in moderate demand in car loads, but round lot orders are still scarce at \$1.50 Chicago. Jobbing price is \$1.55.

Steel Rails.—Negotiations are and have been pending for some time on a number of transactions, and the probabilities are now that they will not be closed in time to prevent the South Chicago Works of the Illinois Steel Company from closing down early next month. Quotations are \$30@31. Track repair material is in very light demand.

Scrap.—The largest dealers refuse to quote on old material offered by railroads, and accumulations are excessive. There is a light demand for cast; all quotations are nominal. Railroad, \$12.50; No. 1 forge, \$11.50; No. 1 mill, \$9.00; fish plates, \$13.50; cast borings, \$5.00; wrought turnings, \$7.50; axle turnings, \$9.25; machinery castings, \$9; stove plates, \$6.50; mixed steel, \$9; coil steel, \$15; leaf steel, \$15; tires, \$14.50.

Old Material.—Several hundred tons of iron rails were traded to a mill in the interior of the State at \$14.50 delivered. Old steel rails are a drug on the market, and \$9@13 are nominal quotations. Car wheels are without change at about \$14, and no sales reported.

Philadelphia. August 31.

(From our Special Correspondent.)

Pig Iron.—So little business is being done in either foundry or forge iron that the market can truthfully be said to be flat. Of course every one is talking up the market and saying the worst is over, the clouds are breaking and that next week business will pick up. The present condition is had. Sellers name quite shading prices. Buyers are not moved by them even if offered. So much rolling mill capacity is idle that forge is not selling except in small lots and \$12.75 is the average price. There is no improvement in foundry and old quotations are repeated at \$14.50 to \$15 for No. 1.

Muck Bars.—No business has been heard of this week. Asking price, delivered, \$23.

Steel Billets.—The fact that sales of Western steel were made two weeks ago in a quiet way at \$22.50 has just leaked out. Western people are making a bold effort to capture what little business is going.

Manufacturers are willing to meet buyers' views for the sake of keeping the mills at work.

Merchant Iron.—Common iron sold this week at country mills at \$1.40. City refined is \$1.60. There is not enough business to keep mills busy.

Nails.—Another drop in nails has been forced by Western competition in neutral territory. The demand has improved somewhat.

Skelp.—While there are great expectations of big business in skelp, present orders are small.

Wrought Iron Pipe.—Eastern mills seem to miss getting their share of the small volume of business going.

Sheet Iron.—This week has been a quiet one. No large orders have been heard of, the mill men say, and only small scattering sales at stores, but the average demand is good.

Plate and Tank.—A disappointing report is made as to actual business, but business in prospect is said to be very promising. The daily business is unimportant, but big orders could no doubt be placed at something under the usual market quotations.

Structural Material.—Very little business is transacted. There is talk of large orders that may be placed next month, but the brokers and agents say they are booking very little new business.

Steel Rails.—There is no news and agents do not feel in a prophesying mood. Standard sections are \$29.

Old Rails.—There is nothing to be reported. More old rails are offered than are wanted.

Pittsburg. August 31.

(From our Special Correspondent.)

Iron and Steel.—The curtailment in the output of pig iron came none too soon, and it is not unlikely that the consumption now is even less than the production, much as the latter has been cut down; nevertheless there is reason to believe that from now on the consumption will begin to increase.

It will not do to expect any great activity at once, but a gradual picking up to one-half or two-thirds of an ordinary fall trade can hardly be avoided, unless, as already intimated, there is to be a violent reaction from one extreme to the other. For the present, however, dealings are on a very conservative basis; consumers take only what they absolutely require, and no more than that, production being on similar safe lines. Prices are low and not strong, because for the moment the supply is slightly in excess of current requirements, but this is due more to recent accumulations than to a disposition to increase the production. The situation is, therefore, likely to become interesting, the output having been put back to not more than 60% of what it was during the first half of the current year, and unless the depression is going to be more extended than even pessimists are inclined to expect it must produce a revulsion sooner or later. When furnaces are once out of blast and ore mines closed they are not likely to be put in operation again until there is some strong inducement for so doing, and as there is no such inducement at current prices stocks will probably be worked up closer than they have ever been before, and then it will be time to look out for the danger signal. Taken as a whole there is a general feeling that the tendency is toward improvement; conditions seem more favorable at all events; money is a little easier, confidence is gaining strength, and in fact the movement is toward a resumption of business in the near future. Many important interests, however, have received such a setback that there is very little chance for them to recover in time to be of much account during the current year. We regret to say that the outlook is not a favorable one, money is scarce and collections very difficult to make.

Coke smelted Lake and Native Ores.		Blooms, Billets and Slabs.	
Tons.	Cash.	Tons.	Cash.
700 Bessemer, Sept.	\$12.30	500 B., Sept., Oct., Nov.	\$20.50
600 Bessemer, Sept.	12.50	at works	20.25
500 Bessemer, Sept.	12.75	230 B., pr't, at works	20.50
500 Bessemer, Sept.-Oct.	12.25		
200 Grey Forge	11.85	200 Neutral, Sept.	21.75
200 Grey Forge	11.50	Sheet Bars	
100 Grey Forge	12.00	150 At mill	26.00
100 No. 1 Foundry	13.75	Charcoal	
100 No. 2 Foundry	12.75	25 Cold Blast	26.50
		25 No. 2 Foundry	18.50

Cartagena, Spain. August 17.

(Special report of Barrington & Holt.)

The prices f. o. b. Cartagena of ordinary 50% iron ore, .05 phosphorus, is quoted 5s. 11d. Special low phosphorus 5s. 11d. at Portman; 6s. 5d. Cartagena; No. 1 manganiferous, 25% iron, 20% manganese, .03 phosphorus, is quoted 12s. 6d. f. o. b. Cartagena; manganese, 35%, at 10d. per unit.

The south of Spain iron ore market continues very dull. Though there has been a little more activity in the shipment of manganiferous ores, the export of iron ore has been very small. During the last two months not more than 18 cargoes of iron and manganiferous ores have been shipped from Cartagena and Portman. Freights continue so high that merchants are unable to ship except at a loss, and are therefore obliged to cease work in some mines till freights go down and allow of shipment. No large contracts for forward delivery are reported. Freights paid have been: Aquilas to

Glasgow, 8s.; Cartagena to Middlesbro', 8s. 9d.; Cartagena to Barrow, 8s. 6d. The export of lead between middle July and middle August has been some 5,420 tons, of which 933 were desilverized, while in the corresponding previous month not more than 2,190 tons were exported, of which 483 were desilverized. Importation of coal and coke during same period was 930 tons, but during the past month it amounted to 5,028 tons. Quotation for silver continues at 4 pesetas per oz. in Cartagena.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 1st.

Statement of shipments of anthracite coal (approximated) for week ending August 26th, 1893, compared with the corresponding period last year:

	Aug. 26, 1893.	Aug. 27, 1892.	Difference.
	Tons.	Tons.	Inc. Dec.
Wyoming region.....	358,792	411,099	Dec. 82,338
Lehigh region.....	145,889	125,979	Inc. 19,910
Schuylkill region.....	215,415	225,884	Dec. 10,469
Totals.....	720,096	762,963	Dec. 72,897
Total for year to date..	27,131,438	26,122,375	Inc. 1,009,063

PRODUCTION OF BITUMINOUS COAL for week ending August 26th and year from January 1st:

	-1893.		1892.
	Week.	Year.	
Shipped East and North:			
Phila. & Erie R. Co.....	577	57,374	56,014
Cumberland, Md.....	80,732	2,662,924	2,409,765
Barclay, Pa.....	415	36,486	123,289
Broad Top, Pa.....	9,734	421,573	380,120
Clearfield, Pa.....	47,465	2,631,629	2,374,659
Allegheny, Pa.....	17,554	825,539	827,792
Beach Creek, Pa.....	33,425	1,038,133	1,608,763
Pocahontas Flat Top.....	62,303	1,810,438	1,561,257
Kanawha, W. Va.....	55,508	2,142,483	1,531,954
Totals.....	307,913	11,626,570	11,064,613
Shipped West:			
Pittsburg, Pa.....	17,516	814,564	833,730
Westmoreland, Pa.....	27,089	1,294,165	1,094,282
Monongahela, Pa.....	7,865	461,931	408,386
Totals.....	52,470	2,571,060	2,336,398
Grand totals.....	360,383	14,197,630	13,401,011

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending August 25th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 26,482 tons; year 3,122,483 tons; to corresponding date in 1892, 3,519,049 tons.

Anthracite.

So far as the market itself is concerned there is little, if anything, new to report. The situation as outlined in our last issue remains practically unchanged. There is little new business doing. It is encouraging, however, to note certain signs of returning confidence as manifested by retailers, and also a lesser disinclination to pay the full circular rates. We are assured on good authority that not more than one-half of the new business done during the past week was at the June prices.

The sales agents met in this city on Wednesday last and recommended an output of 2,750,000 tons for September. The prices were unchanged and remain on the basis of \$4.60 for stove. Both of these steps were wise. There was, indeed, but little probability of an advance, in view of the general condition of the market, and the restriction of the tonnage was to be expected. Nevertheless, operators, individuals as well as companies, have already taken measures having for their object the faithful carrying out of the plan of restriction. Adherence to this will simply show common sense. The depressed condition of trade throughout the country, and the financial stringency tend to make sharp competition among producers more than ever suicidal.

The Lehigh Valley Company and the independent operators along its line have been holding more meetings to come to a definite agreement in the matter of the old contract whereby the latter sold their output on a basis of 60% of the tidewater price. The company emphatically insisted on a reduction to 57½%, and the operators were equally obstinate in their refusal to accept it. They wanted 60% for their coal or a 40% freight rate. At the meeting held in Philadelphia on Wednesday the subject was discussed from every point of view, and we are assured that considerable warmth was displayed. A part of the trouble arose from the belief that the Lehigh Valley would experience some difficulty just now in carrying out the financial part of any arrangement, and the company's propositions did not satisfy the operators.

As the matter stands now the old order of things, viz., 60% of the tidewater price for their coal, will continue for some time. One of the most prominent operators stated to us that he had no doubt that matters would be amicably adjusted and that the Lehigh Valley company would accede to the demands of the operators. There is no danger, he said, of a coal war. The operators feel satisfied that they can dispose of their product in the open market on terms that are at least equal to what they ask from the company, but they will not "fight" the latter even if they should fail to get what they ask. Among the operators who attended this week's meeting were Clarence Simpson and Mr. Watkins, of Simpson & Watkins, Scranton; Charles Parrish, of Wilkes-Barre, representing the Parrish, Newport and Onoro Coal companies; Mr. Fuller, of Scranton; E. B. Leissenring, of Wilkes-Barre; Dr. J. S. Wentz, of Mauch Chunk, and Frank Pattison, of Philadelphia.

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

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash.....	\$4.00	\$4.25	\$4.60	\$4.60
Free white ash.....	3.30	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 monthly statement of the Philadelphia Coal and Iron Company shows that the gross earnings for July were \$3,024,774, and the profits for mining \$42,295. Fixed charges are \$68,000, making the deficit for the month \$25,705. During the eight months ending July 31st, the company has lost \$217,039 in mining anthracite, and as its fixed charges for that period are \$544,000, it shows a deficit of \$761,038 as compared with the deficit of \$239,552 for the corresponding period of the previous fiscal year.

The Reading Railroad system reports that its coal shipment (estimated) for last week, ending August 26th, was 225,000 tons, of which 30,000 tons were sent to Port Richmond and 18,000 tons were sent to New York waters.

Bituminous.

The condition outlined in our last review of the soft coal market has continued, and it has led to the accumulation at shipping ports of the largest amount of standing coal ever known. The railroads all seem to be insisting upon the prompt relief of cars, and charters at the full advanced rates have been freely made. We hear of one concern taking 10,000 tons of vessels at 65c. to Sound ports and 75c. east of Cape Cod. Owing to the recent storms and to the one that is now announced to come at any moment shipowners have been greatly assisted in this matter, and shippers seem demoralized. We learn of a large decrease of mining, and all indications point to the clearing away of the accumulation of coal at the ports at almost any price for freights, and also to the slacking up of production and to a determination on the part of shippers to shape conditions of supply and demand in such a manner that freights will resume normal figures.

Ocean freight rates are higher than last week and are firm, with an advancing tendency. We quote as follows from Philadelphia: To Providence, 65c.; New Bedford, 65c.; Wareham, 85c.; Boston, 75c.; Lynn, 85c@90c.; Salem, 75c.; Newburyport, 85c@90c.; Portsmouth, 75c@80c.; Dover, \$1; Saco, 90c.; Portland, 75c.; Bath, 75c.; Gardiner, 80c.; Bangor, 75c. From Baltimore, Norfolk and Newport News rates are 10c. higher than the figures given above.

The principal coal companies report collections exceedingly good during the financial flurry and up to this week, when some signs of the stringency in the money market began to show themselves among their customers.

The general belief is that matters will improve in a comparatively short time and in view of the lateness of the season an active trade is anticipated for September. A large quantity of coal must be shipped within the coming month or six weeks to supply places which are inaccessible later on, and it is altogether improbable that every one will delay until the very last before securing a full supply of fuel for the coming winter. If freights are high now they will certainly be higher in October and November.

It will interest the trade to know that the Pocahontas Coal Company has received an order for a cargo of their well known coal to be shipped to Las Palmas, Canary Islands. The company has chartered the 4,000-ton steamer "Harewood." An inquiry for a cargo to be shipped to Cape Town, South Africa, has also been received by the same company.

It is pleasant to record what appears to us a decided manifestation that the coal export trade of this country has a bright future in store. There is no reason why we should not ship our coal to many foreign markets. Its quality is established as unsurpassed, perhaps we should say unequalled, for the record breaking trips of the ocean greyhounds have been made with Pocahontas coal.

Buffalo.

August 31.

(From our Special Correspondent.)

Dealers in anthracite expect that business may pick up by the middle of next month. At present trade is very light both for the household and for the small country dealers. Prices are unchanged.

Bituminous coal is quiet for the reason that manufacturers have curtailed operations and so many propellers and tugs are laid up in ordinary waiting better freight rates. Quotations are nominally unchanged, but ready money will obtain concessions from the schedule rates. The stocks of all varieties are ample for trade requirements.

Lake freights continue low, with a light movement, as will be seen by the following statement. Vessel men are hopeful that circumstances will arise which will make the fall trade large and at remunerative rates.

The shipment of coal westward by lake from Buffalo from August 20th to 27th, both days inclusive, aggregated only 36,680 net tons, distributed as follows: 13,120 to Chicago, 12,450 to Milwaukee, 4,000 to Duluth, 960 to Kincardine, 2,000 to Gladstone, 1,440 to Marquette, 1,360 to Toledo, 200 to Bay City, 500 to Green Bay and 600 to Sault Ste. Marie. The rates of freight were 30c. to Milwaukee, Chicago, Toledo, Sault Ste. Marie, Marquette, Bay City and Green Bay, 20c. to Duluth, Superior and Gladstone.

A severe storm was felt all over the lake region last Tuesday, but little damage has thus far been reported. The fact that a large number of craft is laid up at all ports was beneficial to vessel interests. Yesterday there was quite a brisk demand for vessels to take coal to upper lake ports. No advance was allowed in the freight rates, however, when the charters were made out.

Chicago.

August 31.

(From our Special Correspondent.)

The news of the action taken by the sales agents in New York City, August 29th, gives general satisfaction to the dealers here. Trade of all description is very quiet. The continued hard times are causing more consumers, than for 20 years before, to pursue a hand-to-mouth policy, and there will not be anything like the usual deliveries of coal at this season of the year; consequently the yards will be unable to clear out their present stocks and replenish them before the close of navigation. It is stated on good authority that H. M. Benjamin & Co., Milwaukee, have effected a settlement with their creditors and in a few days will again resume business. Several shippers' agents have received most imperative orders to sell no anthracite except at July circular and for September shipment only. In a letter received by a shipper from a traveling salesman the latter says: "There is less anthracite in the West and Northwest than there has been at this time in 10 years, and as the crops are about normal you may look for a good business after September 15th. A destructive fire swept over South Chicago on August 24th, burning the docks of the late A. T. Thatcher, and leased by the Lunday Creek Coal Company. There were 28,000 tons of anthracite, the property of Williams & White, New York, consigned to the Lunday Creek Coal Company, their agents here, also 6,000 tons of Hocking coal, which was fully insured. Complaints are general as to light trade.

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 is still in excessive supply, and consequently prices are more or less irregular on all grades excepting Indiana block. The long continuance of the shutdown of manufacturing plants of all kinds throughout the country, and the limited amount of freight being handled by railroads, have reduced the consumption of coal 5% of their daily requirements, as compared with this time a year ago. Hence shippers and miners of Indiana and Illinois coal cannot find a satisfactory market for their excess of output, and the present glut of nearly all grades of coal is the result. The exception to the foregoing is Indiana block and best Wilmington (Ill.) lump, both of which are in good demand from the country, and on which prices have been advanced. Ohio coal from the Hocking Valley region is liable to become scarce here, as only a few mines are in operation. There is even now some shortage. On the whole, the bituminous coal trade is in a sound, healthy condition. Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.31; Hocking Valley, \$3.10; Younghiogheny, \$3.25; Illinois lump, \$3.70; Brazil block, \$2.75.

Coke of all grades is in very light demand, and, while the feeling in the trade is growing better and there is an improved tone, there is very little coke moving. No further activity can be expected until an improvement takes place in the iron trade. 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 31.

(From our Special Correspondent.)

Coal.—We have little of interest to report of the coal market. The last shipments by water to the lower ports were in May. When the next one will be it is impossible to say. The various ports and the coal landings are crowded with coal loaded and ready to move as soon as the water will permit. On account of the Ohio River being low from headwaters to Cairo it will require several days' rain to make boating water. We had a rise on Wednesday, not sufficient to help the situation. The H. C. Frick Company has purchased a \$64,000 coal property near Mt. Pleasant, Westmoreland County.

Connellsville Coke.—Business is so unsatisfactory that correct information is difficult to obtain. In regard to prices each firm appears to make its own; it seems to be a regular cut-throat game. Coke is said to be selling for \$1.25 up. The Frick company lost some orders last week and some of the smaller operators who have been selling to this company were compelled to shut down as a result. The McClure company will increase orders owing to the resumption of the National Tube Works at McKeesport. The week's production was 27,800 tons, a large decrease compared with preceding week.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, September 1.

Heavy Chemicals.—There is little or no change to report of the heavy chemical market. The conditions which prevailed at the time of our last report remain as then outlined. There is a more hopeful feeling, however, due to unmistakable signs of returning confidence in business and to the resump-

tion of work at the plants of consumers. Gradual though the improvement of trade throughout the country may be, it is certain that the heavy chemical market will heartily welcome any change for the better. Shipments from Liverpool to this country for the first seven months of this year are as follows: Caustic soda, 15,010 tons, against 14,010 tons for the same period of 1892; carbonated soda ash, 40,312 tons, against 30,807 tons in 1892; bleaching powder, 29,476 tons, against 24,297 tons in 1892; crystal carbonate, 1,460 tons, against 1,153 tons in 1892; sal soda, 4,018 tons against 2,900 tons in 1892; salt cake, 7,981 tons against 7,108 tons in 1892. In all cases this year shows increased shipments over 1892.

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. Carbonated soda ash, 48%, 1.25@1.50c.; 58%, 1.15@1.25c. Alkali, 48%, \$1.15@1.20; 58%, \$1.10@1.15, according to package. Sal soda, English, 1@1.00c.; American, 1@1.10c. Bleaching powder, 2.25@2.50c.

Acids.—Very little new business is reported in the acid market, and there is a dearth of features of interest. There is no change either as to general conditions or as to prices; they remain in the same position as they have been for some weeks past. We quote as follows: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.37 1/2; in carboys, \$2.25; muriatic, 18, 90c.@1.10; 20, \$1@1.25; 22, \$1.10@1.35; nitric, 40, \$4; 42, \$4.50@4.75; sulphuric, 80c.@1.15. Mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.50 to \$3.75; glycerine for nitro-glycerine, 1 1/2@12 1/4c., according to quality and quantity.

Brimstone.—This market is exceedingly dull. There are no stocks on the spot, but as the demand is nil their absence makes little difference to any one. Quotations for futures are: Best unmixed seconds, \$17.25; best thirds, \$16.25.

Fertilizing Chemicals.—Great dullness prevails in the fertilizer trade. Nothing new can be reported, unless it be that quotations are a shade lower than at this time last week. The recent severe storm is reported to have wrought great injury to Southern farmers. The extent of the damage cannot be ascertained, but it is to be hoped that first reports have been exaggerated. Charleston manufacturers have, during the past few years, insured their goods and factories against storms

but even if they lose nothing, any misfortunes which the farmers may have suffered this week will naturally prove detrimental to all business interests in that section of the South.

Quotations this week are: Sulphate of ammonia, gas liquor, \$3.30@3.35; bone, \$3.05. Dried blood, \$2.07 1/2@2.12 per unit for high grade, and \$1.35@2 for low grade; azotine, \$2.15@2.20. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P2O5, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18%, P2O5 92@95c. per unit. Acidulated fish scrap, no stocks on hand; dried scrap is quoted at \$25 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$24.50@25.50; low grade, \$22@23. Bone tankage, \$23@24; bone meal, \$24@25.50.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14 1/2; Charleston and Savannah, \$1.17 cwt., basis 48@50%, in 50-ton lots on foreign weights and analyses. Sulphate of potash, 90%-96%, basis 90%; New York and Boston, \$2.07; Philadelphia, \$2.09 1/2; Charleston and Savannah, \$2.127, sulphate of potash, 96-99%, basis 90%, is 4% higher.

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

Muriate of Potash.—No business is reported in this market. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.78; Philadelphia, \$1.80 1/2; Southern ports, \$1.83. During the past week there were no arrivals.

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. Shipments after September 1st, 25c. higher.

Nitrate of Soda.—There is nothing doing in the nitrate market. Quotations are \$1.70 for spot and \$1.90 for futures.

Liverpool. Aug. 22.

(Special Correspondence of Jos. P. Brunner & Co.) Since our last report, our market for chemicals has been affected by the coal strike, prices being advanced in several cases. The position of the coal strike is intensified, and so far, there are no signs of

an early settlement of the difficulty. Soda ash shows no improvement, the demand being still poor. For Leblanc makes prices are unreliable, varying according to market, make, quantity, etc., and the nominal range may be quoted as follows: Caustic ash, 48%, £4 10s.@£5 per ton; 57% to 58%, £5 10s.@£5 15s. per ton. Carbonate ash, 48%, £4 15s.@£5 per ton; 58%, £5 5s.@£5 15s. per ton, net cash. Ammonia ash, 58%, receives little attention and is nominally unchanged at £4 7s. 6d.@£4 10s. per ton, less 2 1/2%. Soda crystals are dearer and now quoted at £3@£3 2d. 6s. per ton, less 5%.

Caustic Soda.—The Lancashire plant having been shut down owing to the fuel difficulty, makers have advanced prices to the extent of 10s. per ton. Quotations vary considerably according to export market, and spot range may be quoted as follows: 60%, £8 10s.@£9 5s. per ton; 70%, £9 10s.@£10 5s. per ton; 74%, £10 10s.@£11 5s. per ton, net cash. For parcels under 10 tons, 5s. per ton extra is charged. Some sales have been made at the advance, but buyers, as a rule, will only buy to fill immediate requirements.

Bleaching powder has also been advanced by 10s. per ton and is now held for £9@£9 5s. per ton net cash for hard wood packages. At present there is not much demand for the article, but the disquieting cholera reports from the Continent may cause buyers to come in, and with the reduced output, owing to the fuel difficulty, a still further advance is not unlikely.

Chlorate of Potash.—There is not much new business reported the last few days, but the position is strong owing to scarcity. Buyers are experiencing great difficulty in getting deliveries against contracts, as makers are a long way behind on their contracts and are returning shipping instructions wholesale. It looks as if there would be considerable trouble between manufacturers and buyers at the end of this month on this account. Nearest quotations to-day are as follows: Prompt, 8 1/2@d. 8 1/4@d.; September, 8 1/4@d.; October and December, 7 1/2@d. Bicarb. soda is up 5s. to-day and is now quoted at £7 per ton less 2 1/2% for one cwt. kegs with usual allowances for larger packages.

Sulphate of Ammonia.—The market is bare, there being practically no sellers for prompt delivery, and £15 per ton, less 2 1/2%, is the nominal figure for good grey 24% in double bags f. o. b. here. Nitrate of soda is in light request at £9 10s. per ton, less 2 1/2% for double bags f. o. b. here. Carb. Ammonia.—Lump 3 1/2@d. per lb.; powdered, 3 1/4@d. per lb., less 2 1/2%.

CURRENT PRICES.

Table listing various commodities and their prices, including items like Acid-Acetic, Commercial, Carbonic, Chromic, Hydrobromic, Hydrocyanic, Hydrofluoric, Alcohol, Alum, Ammonia, Muriate, Aqua Ammonia, Antimony, Argols, Arsenic, Asbestos, Ashes, Asphaltum, Barium, Bauxite, Bichromate, and Bromine.

Table listing various commodities and their prices, including items like Cadmium Iodide, Chalk, China Clay, Chlorine Water, Chrome Yellow, Chromic Iron Ore, Chromalum, Cobalt, Copper, Vitriol, Nitrate, Copperas, Corundum, Cryolite, Emery, Epsom Salt, Feldspar, Fluorspar, French Chalk, Fuller's Earth, Glauber's Salt, Glass, Gold, Oxide, Gypsum, Iodine, Iron, Kaolin, Kieserite, Lead, Litharge, Magnesite, Marble Dust, Metallic Paint, and Mica.

Table listing various commodities and their prices, including items like Mineral Wool, Naphtha, Nitre Cake, Ochre, Washed Nat Oxid, Golden, Oils, Phosphorus, Platine Chloride, Plumbago, Potassium, Bromide, Potassium Cyanide, Pyrites, Quartz, Kotten Stone, Lump, Original cks, Sal Ammoniac, Salt Cake, Salt Peter, Soapstone, Sodium, Stannate, Tungstate, Hyposulphite, Strontium Nitrate, Sulphur, Syvinit, Tale, Terra Alba, and Vanadium.

Table listing various commodities and their prices, including items like Tin, Muriate, Oxymur, Vermillion, Am. quicksilver, Chinese, Trieste, American, Zinc White, Antwerp, Paris, Red Seal, Muriate solution, Sulphate crystals, THE RARER METALS, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucinum, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Potassium, Rhodium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Titanium, Tungsten, Uranium, and Vanadium.

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table containing two columns of mining stock data. The left column lists 'DIVIDEND-PAYING MINES' and the right column lists 'NON-DIVIDEND-PAYING MINES'. Each entry includes the company name, location, and a grid of data for August 26, 28, 29, 30, 31, and September 1, with sub-columns for High (H) and Low (L) prices. A 'SALES' column is also present for each.

*Ex-dividend. *Debit in at New York Stock Ex. Unlisted securities. Assessment paid. Assessment unpaid. Dividend shares sold, none non-dividend shares sold, 500. Total shares sold, 540.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations. It follows the same format as the New York table, with columns for company name, location, and price data for August 25, 26, 28, 29, 30, 31, and September 1. A 'SALES' column is included.

Dividend shares sold, 1,925. Non-dividend shares sold 885. Total shares sold, 2,810.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Detailed table of mining stock data, organized into two main sections: 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each section contains a list of companies with columns for Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total levied, Date and amount of last), Dividends (Total, Date and amount of last), and Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total levied, Date and am't of last).

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Assessments, Dividends, and Shares. It lists numerous mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The 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 \$2,390,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug. 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. 26, Aug. 28, Aug. 29, Aug. 30, Aug. 31, Sept. 1, and Sales. Lists various coal and railroad stocks with their respective prices and sales figures.

Total shares sold, 96,870.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Names, Aug. 26, Aug. 28, Aug. 29, Aug. 30, Aug. 31, Sept. 1, and Sales. Lists industrial and trust stocks with their respective prices and sales figures.

Total sales, 393,900.

CALIFORNIA. San Francisco.

Table with columns for Stock Names, Aug. 25, Aug. 26, Aug. 27, Aug. 28, Aug. 29, Aug. 30, Aug. 31. Lists California stocks with closing quotations.

Colorado Springs. Aug. 26.

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

Denver.

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

Total sales, 50,000.

COLORADO. Aspen.

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

MONTANA. Helena.

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

MARYLAND. Baltimore.

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

MINNESOTA. Duluth.

Aug. 18. LISTED STOCKS.

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

UNLISTED STOCKS.

Table with columns for Stock Names, Bid, Asked. Lists Minnesota Duluth unlisted stocks with bid and asked prices.

London Quotations.

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

Paris.

Table with columns for Stock Names, Bid, Asked. Lists Paris quotations with bid and asked prices.

New York Mining Stocks.

(Latest quotations.) Aug. 1.

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

ASSESSMENTS.

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

MISSOURI. St. Louis.

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

PENNSYLVANIA. Philadelphia.

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

Pittsburg.

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

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, R. C.

Air Compressors and Rock Drills
American Diamond Rock Boring Co.
Bullock, M. C., Mfg. Co.
Bullock, M. C., Mfg. Co.
Clayton Air Compressor Works.
Hasenzahl, W.
Ingersoll-Sergeant Rock Drill Co.
Morris County Machine & Iron Co.
Norwalk Iron Works Co.
Pann Diamond Drill & Mfg. Co.
Rand Drill Co. (See Diamond Drills.)

Aluminum
Cowles Electric, S. & A., Co.

Amalgamators
Bucyrus Steam Shovel & Dredge Co.
Denver Separator & Amalgamator.
Gat Iron Works.

Architects and Builders
Berlin Iron Bridge Co.
Pencoy Bridge & Const. Co.
Pennsylvania Steel Co.
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons.

Arms and Ammunition
Hartley & Gr. am

Assayers' and Chemists' Supplies
Ainsworth, Wm.
Baker & Adamson.
Baker & Co.
Berger, J. & H.
Bullock & Crenshaw.
Denver Fire Clay Co.
Henry Hill Chem. Co.
Hoakins, Wm.
Overbrook Chem. Co.
Penn Sm. & Ref. Wks.
Penn. Salt Mfg. Co.
Queen & Co.

Bankers and Brokers
Bandell, E. H.
Bieber & Sohne.
Billings, Robt. & Co.
Chisolm, A. R., & Co.
Cochran, A. M.
Gelder, Bailey & Co.
Grant, E. R.
Handy & Harman.

Belted
Hendrie & Bothoff Mfg. Co.
Jeffrey Mfg. Co.
Link Belt Machinery Co.
New York Belting & Packing Co., Ltd.

Blasting Caps and Fuse
Lan, J. H., & Co.
Macbeth, James & Co.
Metallic Cap Mfg. Co.

Blowers
Foss Mfg. Co.
Sturtevant, S. F. Co.

Boiler Compound
American Fluoride Co.

Boilers
Babcock & Wilcox Co.
Maine Safety Boiler Co.
Lidgerwood Mfg. Co.
Orr & Sombower, Inc.
Pollock, Wm. B. & Co. (See Machinery.)

Brake Shoes
Sargent Co.

Brick Machinery
Freshe, E. M., & Co.

Bridges
Berlin Iron Bridge Co.
Pencoy Br. Co.
Scaife, Wm. B. & Sons. (See Machinery.)

Calculators
Smith, R. C.

Carbous
Bishop, Victor, & Co.

Car Wheels
Whitney, A. & Co.

Chain and Link Belting (see belting.)

Chemicals
Baker & Adamson.
Bullock & Crenshaw.
Henry Hill Chem. Co.
Overbrook Chem. Co.
Vandenbergh Laboratory

Coal
Berwind-White Coal
Mg. Co.
Caster & Curran
Consolidation Coal Co.
Coxe Bros. & Co.
Haddock, Shonk & Co.
Ward & Clyphant.

Coal Cutters
Ingersoll-Sergeant Drill Co.
Jeffrey Mfg. Co. (See Machinery.)

Coke
Haney, W. J.

Concentrators, Crushers, Pulverizers, Separators, Etc.
A. H. S. & Co.
American Ore Machinery Co.
Bocket Foundry & Machine Co.
Bake, Theo. A.
Bradley Fertilizer Co.
Colorado Iron Works.
Copeland & Bacon.
Denver Separator & Amalgamator.
Dimon & Adams.
Fraser & Chalmers.
Frisbee-Lacop Mill Co.
Frue Vanner Concentrator.
Gates Iron Works.
Hendrie & Bothoff Mfg. Co.
Krom, E. R.
Niagara Pulverizer.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Ridson Iron Works.
Sturtevant Mill Co.
Totten & Hogg Foundry Co.
Walburn-Swenson Mfg. Co. (See Machinery.)

Copper Dealers and Producers
Abbott, Jere., & Co.
American Metal Co.
Atlantic Mining Co.
Balbach S. & Ref. Co.
Baltimore Cop. Wks.
B. & C. S. Co.
Boston & Mont. Mfg. Co.
Canadian Copper Co.
Central Mining Co.
Copper Queen Mfg. Co.

Contractors' and Miners' Supplies
Bucyrus Steam Shovel and Dredge Co.
Carpenter, Geo. B., & Co.
Lidgerwood Mfg. Co.
Pollock, Wm. B., & Co. (See Machinery.)
Pratt & Whitney Co. (See Machinery.)
Corrugated Iron
Berlin Iron Bridge Co. | Scaife, W. B. & Sons.
Desks, Chairs, Etc.
Andrews, A. H. & Co.

Diamonds
Bishop, Victor, & Co.

Diamond Drills
American Diamond Rock Boring Co.
Bishop, Victor, & Co.
Bullock Mfg. Co., M. C.
Hanzahl, W.
Penn. Diamond Drill & Mfg. Co.
Sullivan Machinery Co. (See Air Compressors and Rock Drills.)

Dredges
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Dump Cars
Hunt Co., C. W.
Thacher Car & Con. Co.

Dynamos
National Electric Mfg. Co.

Educational Institutions
Corcoran Scientific School
Correspondence School of Mines
Harvard Univ. (Lawrence Scientific School)
Michigan Mining School.
Ohio State University.
Pennsylvania Military College.
State School of Mines.
Woodside Seminary.

Electrical Machinery and Supplies
General Electric Co.
Jeffrey Mfg. Co.
Okonite Co., Limited.
Thomson-Houston International Co.

Elevators, Conveyors and Hoisting
Brown Hoisting and Convey. Mach. Co.
California Wire Works.
Cooper, Hewitt & Co.
Davis, F. M., Iron Works.
Hunt, C. W., Co.
Jeffrey Manufacturing Co.
Lidgerwood Mfg. Co.
Link Belt Machinery Co.
Orr & Sombower, Inc.
Scaife, Wm. B. & Sons.
Union Wire Rope Tramway Co.
Vulcan Iron Wks. (See Wire Rope Tramway and Machinery.)

Emery Wheels
New York Belting & Packing Co., Ltd.

Emery Mill Stones
Sturtevant Mill Co.

Employment Bureaus
Engineering Employment Bureau.

Engineers, Chemists, Metallurgists
Kanda, Reij.
Kendall, E. Dwight.
Kennedy, Julia.
Kent, William.
Kerr, Mark B.
Keyes, W. S.
Kirby, E. B.
Lammers, T. I.
Langub, Werner.
Lavagnin, G.
Ledoux & Co.
Leggett, Thomas H.
Loring, Frank C.
MacTeague, J. J.
Mariner & Hoskins.
Maynard, George W.
McCulloch, E. A.
McDermott & O'Donnell.
Modjeski & Nickerson.
Moore, Gideon A.
Newberry, W. E.
Nicholson, Frank.
Olcott, Eben E.
Osgood, J. O.
Page, Wm. Hyrd.
Penrose & Barringer.
Peters, Edward J.
Phillips, W. B.
Platt, Joseph C.
Poole, Robt., & Son Co.
Porter, J. A.
Potter, William B.
Price, Thomas & Son.
Radford, Wm. H.
Randolph, John, C. F.
Raymond, Rosser W.
Raymond, R. M.
Rickard, T. A.
Ricketts & Banks.
Russell Process Co.
Rothwell, John E.
Rothwell, Richard P.
Saunders, W. L.
Schwartz, Theodore E.
Shapleigh, W.
Shaw, Thomas.
Skewes, Edward.
Smith, F. H.
Smith, R. C.
Squire, Jos.
Stolber, E. G.
Taylor & Brunton.
Thies, A.
Vandenbergh Lab'ory
Van Slooten, Wm.
Vermeule, C. C.
Vezin, H. A.
Wannemaker, J. F.
Wills, J. Lalson.
Wilson, J. Howard.
Woodman, Durand.
Wyatt & Saabach.
Young & Park.

Engineers' Instruments
Alteneder, T. & Son.
Brandt's Sons.
Bullock & Crenshaw.
Everhardt, J. M.

Engines
Barr Pump Eng. Co.
Buckeye Engine Co.
Bullock, M. C., Mfg. Co.
Lidgerwood Mfg. Co.
Morris Co. Mach. & Iron Works.

Excavators
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Fire-Brick and Clay
Denver Fire-Clay Co.

Forges
Foss Mfg. Co.

Furnaces
Hoskins, Wm. (See Machinery.)

Furniture Office, Etc.
Andrews, A. H. & Co.

Gas Works
Pollock, Wm., B. & Co. | Wood, R. D. & Co.

Gauges, Recording, Etc.
Bristol Mfg. Co. | Everhardt, J. M.

Grease, Graphite, Etc.
Dixon, Jos., Crucible Co.

Hose, Rubber
New York Belting & Packing Co., Ltd.

Hotels
The Cochran. | Owen House.

Inspection and Tests
Hunt, The Robert W. Co.

Insulated Wires and Cables
Crescent Insulated Wire & Cable Co.
Okonite Co., Ltd.

Insurance Companies
Hartford Steam Boiler Inspect'n and Ins. Co.
Mutual Life Insurance Co.

Lamps, Miners'
Everhardt, J. M.

Locks
Young Lock Nut Co.

Locomotives
Hunt, C. W., Co. | Porter, H. K., & Co.
Thomson-Houston International Co.

Lubricants
Dixon, Jos., Crucible Co.

Manganese Steel
Taylor Iron & Steel Co.

Mats, Rubber
New York Belting and Packing Co., Ltd. Machinery.

Dealers in Mining, Milling, and Other Machinery
Allentown Foundry & Machine Co.
Allis, Edw. P., & Co.
American Ore Machinery Co.
Beckett Foundry & Machine Co.
Bullock, M. C., Mfg. Co.
Carbon Steel Co.
Chicago Iron Works.
Colorado Iron Works.
Copeland & Bacon.
Davis, F. M., Iron Works Co.
Dimon & Adams.
Fraser & Chalmers.
Fulton Iron Works.
Griffith & Wedge Co.
Hendrie & Bothoff Mfg. Co.
Jeffrey Mfg. Co.
Lidgerwood Mfg. Co.
Mechanical Gold Extractor Co.
Mecklenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
National Electric Mfg. Co.
Oil Well Supply Co.
Orr & Sombower, Incorp.
Penn. Diamond Drill & Mfg. Co.
Pierce & Miller Engineering Co.
Pollock, Wm. B., & Co.
Poole, Robt., Son & Co.
Ridson Iron Works.
Scaife, Wm. B., & Sons.
Sullivan Machinery Co.
Thomson-Houston International Co.
Totten & Hogg Foundry Co.
Trenton Iron Co.
Turner & Catlin.
Vulcan Iron Works.
Walburn-Swenson Mfg. Co.
Webster, Camp & Lane Machine Co.

Metal Dealers
Abbott, Jere., & Co.
American Metal Co.
Am. Zinc-Lead Co.
Baker & Co.
Cookson & Co.
Cowles Elec. S. & Picher Lead Co.
Aluminum Co.
Eureka Co.

Metallurgical Works and Ore Processors' Processes
American Zinc Lead Co.
Baker & Co.
Balbach Smelting & Refining Co.
Baltimore Copper Works.
Boston & Colorado Smelting Co.
Canadian Copper Co.
Cowles Elec. Smelt. & Aluminum Co.
Kansas City S. & Ref. Co.
Ledoux & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennsylvania Salt Mfg. Co.
Ricketts & Banks.
Russell Process Co.
St. Louis Sampling & Testing Works.
Walburn-Swenson Mfg. Co.

Mining and Land Companies
Atlantic Mfg. Co.
Boston & Mont. Mfg. Co.
Central Mfg. Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.
Eureka Co.

Nickel
Canadian Copper Co.

Ore Cars
Star Boiler & Sheet Iron Works.

Ore Sacks
Morrison, T. J.

Ore Testing Works
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Ricketts & Banks.
Snelson, W. H. Assaying & Engineering Co.

Packing and Pipe Coverings
Grant, Randolph. | New York Belting & Packing Co., Ltd.
Jenkins Bros.
Kessov, Robt. | Wyckoff & Son, A.

Patents
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Perforated Metals
Clinton Wire Cloth Co.
Harrington & King Perforating Co.
Mundt & Sons.

Periodicals
Financial Times.
Iron & Coal Trades Review.
Electrical Plant & Electrical Industry.

Phosphates
Trenholm, Paul C.

Phosphor-Bronze
Phosphor-Bronze Smelting Co.

Picks, Miners'
Collins & Co.

Pile Drivers
Lidgerwood Mfg. Co.
Bucyrus Steam Shovel and Dredge Co.

Platinum
Baker & Co.

Powder
Egna Powder Co. | Ladin & Rand P. Co.
Atlantic Dynamite Co. | Macbeth, J., & Co.

Pumps
Barr Pump Eng. Co.
Bake, Geo. F., Mfg. Co.
Boston & Lockport Co.
Block Co.
Cameron, A. S., Steam Pump Works.
Jeanesville Iron Wks.
Knowles Steam Pump Works.

Publications
Allison Couron Co. | Electrical Plant & Arms & Explosives.
Bartlett, Wallace A. | Financial Times.
Coillery Engineer Co. | Iron & Coal Trades Rev.
Pyrites
Adams W. H.

Quarrying Machines
American Diamond Rock Boring Co.
Ingersoll-Sergeant Rock Drill Co.
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Union Wire Rope Tramway Co.

Quicksilver
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Hunt, C. W., Co. | Young Lock Nut Co.
Porter, H. K., & Co. (See Machinery.)

Refrigerating Machines
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Regulators, Damper, Heat, Etc.
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Eddy Valve Co. | Powell, Wm., & Co.

Rock Drills. (See Air Compressor.)

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Lee Composite Co. | Phelps, Dodge & Co.
Pencoy Bridge and Const. Co. | Scaife, Wm. B., & Sons

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Sacks, Ore
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Screen Plates
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