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WHILE the railroad demand for iron and steel is not quite as important a factor as it was in the iron trade 25 years ago, owing to the great increase in the use of iron and especially of steel in other construction; it is interesting to note that the mileage of new railroads built this year promises to be under 2,500 miles, or less than has been recorded for ten years past. The demand for repairs on older lines promises to be large next year, when renewals can be no longer postponed.

THE present crisis has struck the railroad interest in the West with almost the same force as it has the mining industry. The transcontinental roads have suffered severely, as the receiverships of the Northern Pacific and Union Pacific plainly show. Their difficulties, however, are not altogether due to the stringency of the times; both companies are suffering from competition, over-expansion and the extravagant construction of branch and tributary lines. In prosperous times matters have been carried along, though the embarrassments of both companies have been a matter of common talk for some time past; but the present crisis has brought out the weak spots there as elsewhere.

THE affairs of the Reading have come to another crisis, caused just now by the maturing of the SPEYER loan and other installments of the floating debt, which the receivers have been unable to meet. The latest statement is that an arrangement has been made by which the Finance Company of Philadelphia will advance sufficient money to pay off the SPEYER loan, thus preventing the sacrifice of valuable collateral which seemed probable a day or two ago. Meantime talk of action on the part of the bondholders increases, and should no agreement be reached shortly as to another plan of reorganization, it is quite possible that proceedings for the foreclosure of the general mortgage may be begun. The report of Mr. LITTLE, the expert accountant who has been examining the affairs of the company, has not been published in full, but some indication has been given of its general tenor and it seems probable that its full text will not increase the respect of the bondholders for the late management or their confidence in the present receivers.

THE October reports of the blast furnaces show a continued decline in production, and the number of furnaces in blast is now less than half of that a year ago, and less, indeed, than at any time within 50 years. The present production is at the rate of about 4,000,000 tons per year, which is a sad falling off from the 9,000,000 tons output in 1892. It seems probable, however, that the downward movement has nearly reached its lowest point, and it is to be hoped that the remaining months of the year will show at least a slight improvement. Prices, are not showing any increase; indeed, in the East they are still on a down grade, for while market quotations have shown little change for several weeks, there seems to be an increasing tendency to sell at any price that can be obtained. It is not very long ago that the prophet who predicted a price of \$6.50 per ton at furnace would have been laughed at, but gray forge has actually been sold at some Southern furnaces for a trifle under \$6.50, and as to the prices at which white and mottled iron are sold, "the Lord only knows, and he won't tell," as an unfortunate producer informs us.

THE reports of the consuls of the United States, which are published monthly by the Department of State for the benefit of those engaged in commerce, manufacture and trade, are, on the whole, a valuable series of public documents. They are not so good in some respects as the corresponding publications of the English Foreign Office, but in some ways they are better. Without criticising the plan of either of these series, however, we think that the American statistics would be much improved by proper editing, the lack of which leads often to mistakes. Thus in Report No. 153 (June, 1893), in an article on the "Metal Production of Germany," which the author evidently obtained from the German official statistics, the word "Hütte" has been translated "foundry," and "Bleiglanz" is made "potter's ore." We are informed, consequently, that "in Germany lead is produced chiefly from potter's ore, which generally contains silver," while "in 1891 there were 13 lead foundries" in operation. There are some other equally naive statements in this otherwise satisfactory report. The disregard of the rules of English grammar in many of the papers in these volumes does not reflect credit upon our consular corps or on the editors in the State Department.

THE rumors of a compromise on the silver question are again current as we go to press, but they are evidently of the same origin as many previous reports to the same effect. There has really been nothing to show that the Administration is prepared to recede from the firm stand it has taken on this point. The continuous filibustering in the Senate to prevent the repeal of the silver purchases has created and is intensifying a disgust with the whole silver question among many who were the friends of the white metal, and is turning from us many whose assistance will be

needed to secure action leading to international co-operation. The silver senators and Populists are injuring the cause of bimetallism more than all the so-called "gold bugs" and "enemies of silver" have ever done or can do. Presently, if their course continues, there will be no "friends of silver" left, and any agitation in its interest will become impossible. We already hear its former friends say: "We have had enough of silver now; we want the thing settled by stopping purchases, and let it stay there. We will not have any more of these obstructionists, who care nothing for the interests of the country, but seek only their own personal advantage."

In Denver, Colorado Springs, Leadville, Butte, Helena and others among the more enlightened places of the far West there are courageous people who differ from the views of the majority on the silver question, and who yet are allowed to live in peace. In many of the small mining camps, however, it is decidedly unpleasant for non-believers in the free and unlimited coinage of silver, as the following clipping from the "Enterprise" of Silver City, N. M., shows:

"J. R. JOHNSON, the Arizona goldbug, left for his bonanza at Casa Grande by Tuesday's train. He was advised either to leave town or keep his mouth shut, and as he could not well do the latter he chose the alternative."

The bitterness with which this question is discussed in New Mexico is amusing, considering that its pecuniary interest in it is so small. The total production of silver in the Territory in 1892 was only 1,075,000 ounces, valued at \$935,000, while the output of gold was valued at \$950,000. A few years ago when there was a wild cry to exclude Mexican lead ore from the United States its most vociferous advocates were the miners of New Mexico, who were then producing less than 5,000 tons of lead per annum. The tariff was imposed and next year the production of the Territory increased 1,800 tons, but since then it has been decreasing 1,000 tons per year, last year amounting to only about 4,100 tons, notwithstanding the "protection" which the industry enjoys.

Intense earnestness in belief is excellent, but it should be tempered by a recognition of and respect for the rights of others to their opinions. No man or aggregation of men has a monopoly of wisdom, and it would have been more in conformity with our free institutions and with the traditional hospitality and fairness of our Western miners to have invited this particular "goldbug" to give publicly "the reasons for the faith that is in him," and have a "silver bug" reply to him than to "run him out of camp" because he differs from his neighbors as to what is for the good of the country.

NICKEL AND SILVER.

A brief colloquy in the course of the speech of the Hon. J. P. JONES, in the Senate, on October 14th, was cut too short, for it aimed at the real reason for the depreciation in the value of silver. Mr. JONES asserted that there would not be the slightest danger of a panic in case of free coinage, remarking that the silver of France is selling now for \$1.32 per ounce. "In gold?" asked Senator ALDRICH, incredulously. "Yes; of course, in the price of everything," replied Senator JONES. "Silver bullion, in France, sells at the same price as in the United States," said Senator ALDRICH; and he added: "We have nickel, which sells (when coined) for 100 times its market value in the same way as the Senator (Mr. JONES) speaks of silver in France." This prompted Senator HOAR to inquire why there should not be free coinage for nickel. "Because there is too much of it," responded Senator JONES; "and I am trying to find out whether anybody knows where there is too much silver."

As a matter of fact it was not until 1891 that the production of nickel began to exceed that of silver, and even now it is not very much superior. The world's production of nickel in 1890 was only about 2,650 short tons (of 2,000 lbs.); the silver product for that year was about 4,560 tons. In 1891 there was a great increase in the demand for nickel; the supply being abundant and a new, cheap method of nickel-winning being introduced, the requirements of the market were met without difficulty and at a lower price than in the previous year. The output of nickel in 1891 was 5,164 tons; the output of silver was 4,953 tons. In 1892 the price of nickel continued to fall, but the production increased to 6,077 tons, while the production of silver increased to 5,215 tons, also in face of a falling market.

The reason why nickel of the best quality sells for 50 cents and fine silver at \$10.94 per pound avoirdupois is because the cost of producing nickel is less than the cost of producing silver, but the fluctuations in the prices of the two metals are governed by the same laws. The supply of nickel is large, and its yield could be increased very much if there should be need for it, but the distribution of silver is wider than that of nickel. If there were to-day universal free silver coinage at the existing coinage ratios there can be little doubt the production of the metal would much exceed the present production of nickel. In any event if the relative abundance of this metal is the only reason that can be given why nickel should not have free coinage, and silver should, we have to go back but two years to show that

ground to be badly taken; and if relative values of product be taken, nickel is much the rarer metal to-day; the value of the world's product last year of nickel being worth, say, \$6,000,000, while that of silver at coinage rates was nearly \$200,000,000.

The important difference between the metals is that the markets for nickel, being dependent on its uses in the arts which are based on its physical properties, are widening as its cost diminishes, while silver has practically but two markets, that for coinage and that in the arts, based on its value as money and not upon its physical properties alone. The cheaper it becomes the less will be the demand for it in coinage and also in the arts, where it is used almost exclusively because its possession is an evidence of wealth.

Should silver lose its artificial value in the general money of the world—and nothing short of international co-operation can prevent that—then its value for industrial purposes would reduce its uses to what could be produced as a bye-product, for its cost of production would necessarily limit its uses based upon its physical properties.

A PROPOSED ENGLISH COAL TRUST.

The almost unprecedented length and obstinacy of the great strike of the English coal miners, and the consequences both to trade and domestic economy which have been so severely felt, have called out many propositions for the settlement of the present trouble and the prevention of similar ones in the future. The most remarkable of these is a plan proposed by Sir GEORGE ELLIOTT, a man of much weight and influence, for a combination of all the coal interests of the United Kingdom in a great trust, to be operated for the benefit of all parties. This plan is stated by the English papers as follows:

"The coal lessees of the United Kingdom shall amalgamate their existing interests in a co-operative company, charged with the entire working of the coal deposits of the country, taking payment in the form of one-third debentures and two-thirds stock. All stock shall be interminable. A reserve fund shall be formed for opening further collieries to take the place of those annually exhausted, and to provide for extensions and sinkings; an insurance fund for workmen shall be set aside, and a sinking fund for the redemption of capital shall also provide the means for rendering the consolidated property permanent. All further earnings will be applied, first, in paying interest on the debentures at 5 per cent.; secondly, in paying a minimum dividend of 10 per cent. upon the stock. In view of the exceptional nature of the property concerned, it is believed that the dividend upon the stock need never be less than 10 per cent., but the profits shall not exceed 5 per cent. more without the approval of the Board of Trade, and such 5 per cent., if paid, shall be divided equally between the lessee and the workman. In the event of the Board of Trade sanctioning an advance in price sufficient to yield any interest beyond 15 per cent., the whole further profit will then be divided equally in thirds between the workmen, the coal lessees and the purchaser. As in such an arrangement the purchaser pays the whole difference, and only receives back a third in the form of discount, the interest of the workmen and the coal lessees will manifestly be to bring pressure to bear on the Board of Trade to sanction an advance in price. The interest of the public will be to bring pressure to resist an advance. Between these two fires the Board of Trade is called upon by the terms of the scheme to protect the several interests of all parties concerned. If upon consideration it should be found that the political composition of the Board of Trade would render it inexpedient in the public interest to invest it with ultimate powers of control, it is proposed to substitute referees, who shall be appointed by high judicial authority, say the lord chief justice."

The proposition has been very seriously taken in England and has called out a great amount of comment, both favorable and unfavorable. The difficulties and objections which would attend its formation will readily suggest themselves. The risks attending the placing of an interest like the coal trade, which affects every other industry in the country, in the hands of a single management are very great. Should the power of regulating prices be given to the Board of Trade, that body would become virtually the arbiter and controller of the industries of the kingdom and would be vested with a greater power than Englishmen have usually shown themselves willing to entrust to any one, and the same reasons would apply were the ultimate decision left to the chief justice or his appointees. The pressure for higher prices from the trust and its employees would be incessant and probably more urgent and better organized than the opposition, and the opportunities for corruption would be very great.

Much is said of the economies in operation which could be secured by a consolidated management. This has a familiar sound to us in this country, but we know well by experience how little this argument is worth, and how the real tendency has always been and always will be in the other direction.

The difficulties in the first formation of the trust would certainly be very great, and would involve almost endless controversies over the share to be awarded to each coal property. While there are many profitable collieries there are also unprofitable ones, and the adjustment of their several claims would be a task no one would willingly undertake. The fixing of the total amount of stock or interest would in itself be a matter of no small difficulty. It is impossible, indeed, to go over all the objections in the limits of a single article.

But, should such a combination be formed, would it last? Would it not carry in itself the seeds of dissension and final dissolution? All experi-

ence seems to prove that it would. Probably no great industrial interest was ever more favorably situated for combination than our own anthracite coal trade. Compact, with clearly defined limits, and controlled by a few strong companies, the success of a combination would seem to be easily secured—far more easily than that of a union of the scattered and disjointed coal trade of Great Britain. Yet what has been the fate of the different combinations? One after another they have gone through the different phases of apparent success and final failure. Sixteen years ago, in its comments on the anthracite coal trade in 1876, the ENGINEERING AND MINING JOURNAL pointed out the elements of weakness in such combinations in terms which might be used to-day with hardly an alteration, and which would apply with greater force to the English trust.

It is noticeable that most of the English papers speak of a coal combination in that country as if it were something new there, and do not seem to be aware of the old union of the coal proprietors of the north, the existence and conditions of which were also pointed out by the ENGINEERING AND MINING JOURNAL, in the article above referred to, as follows:

"As early as the year 1665 the annual production of coal was between 500,000 and 600,000 tons. This quantity seems to have overstocked the market, and on April 27th, 1665, there was held a meeting of the coal dealers at Newcastle, when an agreement was signed by 22 coalowners that they would mine no more coal till the large stocks then on hand were disposed of; and 25 coalowners signed an agreement at the same time for raising the price to 13s. per chaldron (53 cwt.). About 100 years later, in 1771, we learn there was formed a combination among the coal-owners who shipped their coal by the three rivers, the Tyne, the Wear and the Tees, to raise the price of coal to consumers by restricting the quantity supplied. This combination, known as the 'limitation of the vend,' lasted, with but a few temporary interruptions, until 1845. It is clear they had no newspapers in those days. A committee appointed from among the coalowners held its meetings regularly in Newcastle and fixed the price at which coals of various qualities might be sold when sea borne for consumption within the kingdom. They also assigned the quantity of coal which, during the space of a fortnight following each 'issue' or order, individual collieries might ship. "Upon opening a colliery, the first thing to be determined was the 'basis' or rank which that colliery was to take. The coal trade Committee appointed one referee, and the coalowner another. These men, taking into account the extent of the coalfield secured, the size of the pits, the number of steam engines employed, and other matters which indicated the amount of capital, fixed the proportionate quantity which the colliery would be permitted to furnish toward the general supply. This system necessarily led to various schemes for securing the largest possible 'basis.' The proprietors burdened themselves in various ways, as by securing a royalty extending over five to ten times the surface which they intend to work; as by sinking pits at great cost, which they had no idea of using; as by building twice the number of cottages which they required for the colliers, and by wasteful expenditure in every direction.

"This Newcastle committee met 26 times in the year, and according to the prices in London determined the quantity which might be issued during the following fortnight. The restrictions enforced by the 'limitation of the vend' did not apply to coal shipped to foreign ports. The consequence of this was that coal was frequently sold to foreign market 40% under the prices in the London market, and English coal could sometimes be purchased in St. Petersburg at half the price of the same coal in the river Thames. The competition of the coal from the Midland counties seems to have broken down this plan of regulating trade, and though various attempts were afterward made to maintain combinations of this kind, they all failed in the same manner."

A curious point brought out by the approval of Sir GEORGE ELLIOTT'S plan in some unexpected quarters is the existence in England of a current of socialistic opinion; not pure socialism of the French or German type, but rather a socialism modified by British idiosyncracies—socialism on trade principles, or trade on socialistic principles—which is comparatively a new development. But this is a point somewhat outside of our subject and cannot be considered here either fully or appropriately.

NEW PUBLICATIONS.

AN INTRODUCTION TO THE STUDY OF CHEMISTRY. By Ira Remsen. Third edition, revised and enlarged. New York; Henry Holt & Co. 1893. Pages 435.

This is a thoroughly revised edition of a well known textbook first published seven years ago. The experiments for practice have been altered in order to make them as clear and suggestive as possible, and a style of type different from that of the text has been adopted for them. Aside from these the principal changes in the book are the addition of two chapters on the common compounds of carbon, and a chapter on qualitative analysis. The latter is, of course, very brief, but it gives the beginner an idea of the methods by which analytical work is performed. The periodic law of Mendeleeff and Newlands is presented in the new edition of Professor Remsen's book before the systematic study of the elements is taken up, and the elements are classified and treated in accordance with this law. As to the merits of this "Introduction to the Study of Chemistry" it is unnecessary to add anything to what has already been said. It is one of the best elementary textbooks that we have.

BOOKS RECEIVED.

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

The Canadian Ice Age. By Sir J. William Dawson, C. M. G. Montreal; Wm. V. Dawson. Pages 302; illustrated.

Assaying. By C. H. Aaron. Second Edition. San Francisco, Cal.; Dewey & Co. Two volumes. Pages 132 and 160; illustrated.

Notes on the Testing and Use of Hydraulic Cement. By Prof. Fred P. Spalding. Ithaca, N. Y.; Andrews & Church. Pages 108. Price \$1.

Continuous Current Dynamos and Motors. By Frank P. Cox. New York; the W. J. Johnston Co., Ltd. Pages 272; illustrated. Price \$2.

Geological Survey of Canada Report of the Division of Mineral Statistics and Mines for 1891. Elfric Drew Ingall in charge of Bureau; H. P. H. Brumell, Assistant. Ottawa, Can.; Public Printers.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Cyanide Process at the Mercur Mill Utah.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: By an inadvertance of mine the location of the Mercur mill was omitted in my article published in the "Journal" for October 7th. It is, however, at Fairfield, Tooele County, Utah.

NEW YORK, Oct. 14, 1893.

LOUIS JANIN, Jr.

Taxing Silver and Other Imports.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Referring to my article printed in your issue of September 30th last, I have to say that, judging from the headlines you give it, the article does not express the idea intended to be conveyed with sufficient clearness.

My suggestion "to lay an ad valorem tax on all imports from European countries failing to adopt our coinage ratio" was intended to mean that we place an ad valorem tax on all merchandise of every kind and description that Europe sends us. If the same should be in amount, say, 25% or 50%, or even 100% ad valorem, it would place all Europe at a big disadvantage in our markets, with the result that France would probably open her mints again to silver, and England and Germany would have to follow suit or surrender our market to France. How could Europe retaliate? What does she take from us to-day that she can possibly buy elsewhere? Practically nothing!

On the subject of the cost of gold production: Since the article above referred to was written I have been enabled to get the figures from the Kennedy mine, Amador County, California, which is to-day one of the largest gold producers in the State. Last year they paid about \$500,000 in dividends, and it cost them \$6.20 per oz. to produce gold; 94.64% of their output in value was gold and 6.36% silver. The Kennedy is a close corporation.

SAN FRANCISCO, Oct. 9, 1893.

X.

Gold as a Standard of Value.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The following is an attempt to test the suitability of gold for use as a standard of value in the light of the declining prices of commodities and of the increasing productiveness of labor. Our desires constantly demonstrate to each of us the necessity of the exchange of the products of our own labor for the products of the labor of other men. Through the diversity of production direct exchange long ago became rare. Two commodities, gold and silver, on account of certain qualities, came into use in early times by general consent as standards of value for indirect exchanges, thus, in other words, becoming the money of the world.

In this connection it is important to remember that gold and silver are commodities in their use as money as well as in their other uses. In the phrase of John Stuart Mill, as applied to metal money: "Money is a commodity, and its value is determined like that of other commodities, temporarily by demand and supply, permanently and on the average by cost of production." Briefly defined, "value is power in exchange."

All economists are agreed that there is no such thing as a general rise or fall of values. The proof is simple: If one commodity, in the course of exchange, rises in value, other commodities fall correspondingly in terms of it; this being true of all exchanges, there must be a constant average level of values. A prime requisite, therefore, in a standard of value, or a medium which is to express the prices of commodities, is that it shall bear as nearly as possible a constant relation to this average level, that is, it shall possess stability. This prime requisite, however, has never been perfectly attained. Balfour, in his recent Mansion House speech, assumed that, if stability cannot be attained, it is better for the community at large that the standard should depreciate than that it should appreciate. The average man would be likely to decide this question from his own standpoint, and the majority, having more debits than credits, would probably agree with Balfour; but mankind would be a unit that stability would be better than either an appreciating or depreciating standard. A widespread disbelief in the stability of gold as a standard of value has grown up of late years, but this is so stoutly contended against by many able men that the public mind cannot be said to be made up. As an illustration of the prevalent and confused thinking on this subject, the June "Century," published before the recent appalling shrinkage of prices, replying to a correspondent and quoting David A. Wells, may be cited. It says: "Cotton, wheat, corn, leather and pig iron, have touched, during the past year, the lowest prices known in history. If the appreciation of gold had been the cause of this decline in price it ought to have affected all prices. This has not been the case. There has been no common ratio of decline. Some prices have fallen, but others have risen. Among the latter are those of labor, which is bought and sold more than anything else on the face of the globe." Valuables cited as having risen in price are horses and other domes-

tic animals, cigars, hand-woven lace, cut glass, pictures, diamonds, malt liquors and house rents. It will be seen that these examples are valuable to the production of which machinery is either inapplicable or applicable only in a limited way. House rents depend, as stated by the "Century," largely upon the price of land. The other examples also admit of satisfactory explanation. The revenue tax cuts a great figure in the price of malt liquors. Diamonds are in fashion and of limited production. The application of machinery to making cut glass cannot go beyond a certain point, and the labor involved accounts for continued high cost. The other commodities cited continue to be produced, as they always have been, without the application of machinery. The decline in the price of material commodities as they average is ascribed to cheapened production and distribution through the introduction of labor-saving machinery and of improved methods, a view so generally accepted that it may be considered established. We shall see that this means the appreciation of gold. As other examples of confused thinking, Bourke Cockran's recent speech (August 26th) in Congress may be given, arguing the advance in wages as offsetting the decline in commodities; and even Soetbeer, hereafter cited, seems to fail to recognize the unfairness of including wages in his investigation of the value of money. He devotes several pages to data proving the increase of wages, with the obvious purpose of offsetting his statistics demonstrating the decline of commodity prices in judging of the purchasing power of gold.

To show the fallacy of these examples, which I think fairly represent the prevailing misconception among those who should think carefully on this question, the economic differences between personal services and commodities need illustration. Personal services are causes of which material commodities are the effects. The former produce, the latter are products. The primary factors besides labor entering into the production of commodities are appropriate natural objects and forces. Secondly, capital enters to complicate the problem. In so far as the so-called "unlimited" natural objects and forces, as rain, light, gravitation, etc., enter into production, they may be disregarded, being alike free to all producers. As to "limited" natural objects and forces, justly or unjustly monopolized by man as society is at present constituted, they are for our present purposes the same as capital. Capital is stored labor re-entering into production. With a stable standard of value any given capital should be a constant, receiving as its share of commodities produced the current rate of interest or profit. The wages of labor should be the value of the commodities produced, less interest or profit on the capital. In the concise language of Professor Perry ("Principles of Political Economy," page 235), "Profits and wages are reciprocally the leavings of each other, because the aggregate products created by the joint agency of capitalists and laborer are wholly to be divided between the two. There can be no other claimant even." It would be strange, indeed, for wages not to increase, with capital and labor thus dividing their joint product—production all the time involving less and less expenditure of labor. It would therefore seem to be clearly illogical to include wages with the prices of commodities in any averaging process intended to arrive at a trustworthy estimate with regard to the rise or fall of gold (commodity) prices. This conclusion may be made clearer by further illustration. Labor and commodities have the common characteristic exchange value, but important points of difference in addition to those above mentioned. As to the buying and selling of labor, it is due to its power of creating commodities, and is strictly incidental and subordinate to the real object of all exchange, namely, the desire for commodities themselves. Labor, though "bought and sold more than anything else on the face of the globe," is never exchanged, merely as labor. The labor expended in digging a hole in the earth without purpose, or in trying to bale out the sea, would not be exchangeable. It is only exchangeable when so applied as to be productive of material commodities or of utilities, and only then is it entitled to, or does it receive, wages. When so applied, however, it may be said to be a participating commodity, and its productiveness limits its possible wages.

The proposition that the productiveness of labor limits its wages and in some degree determines them is a fundamental one, and however much obscured in discussions on the rate of wages, is tacitly understood by all. Every laboring man knows that if he would neither beg nor starve he must work, and that he will be better paid the better he works. Capital is no more and no less than a product of past labor, and as it is the only claimant beside labor to share in their mutual product, increasing wages and increasing production must, on the whole, go hand in hand. In concrete cases it is not denied that this relation is much obscured and modified by the temporary condition of demand and supply, both in the labor market and in the market for products, but that it is the ultimate and limiting cause of every lasting improvement in wages is undeniable, and every step toward a more just system of distribution increases the certainty and the clearness of the relation. David A. Wells ("Recent Economic Changes," page 417) recognizes this connection. He says: "Wages, as a rule, are paid out of product. If production is small no employer can afford to pay high wages, but if, on the contrary, it is large, and measured in terms of labor, is of low cost—which conditions are eminently characteristic of the modern methods of production—the employer is not only enabled to pay high wages, but will, in fact, be obliged to do so, in order to obtain . . . the most efficient labor." The question whether wages are paid directly from the products of labor or from a wage fund is of no concern here, for those who claim that wages come from and are determined by a wage fund must concede that the wage fund increases with the productiveness of labor, and therefore the demand for labor is increased—a condition of increasing wages. In like manner, if the question is looked at from the standpoint of wages being determined by supply and demand, the answer is that the increasing productiveness of labor furnishes capital demanding labor more rapidly than population furnishes laborers, while the rising standard of living tends to keep the demand for commodities up to the total product.

A relation of cause and effect having been established between the

increasing productiveness of labor and increasing wages, establishes an inverse tendency between the possible increase of wages and the expenditure of labor required to produce commodities. Or, what is the same thing, increased effectiveness of labor tends to cause higher wages, and conversely, higher wages are the effect of the reduction of labor incident to improvements in the production of commodities. Obviously the accuracy of a balance cannot be tested if the act of loading one pan unloads the other, and equally futile is any attempt to test the stability of gold by averaging the wages of labor with the price of commodities. Fundamentally it involves the bad logic of mixing up cause and effect.

Authorities are agreed that in spite of periods of reduced wages like the present there has been a general upward tendency in wages for a half century or more. An appreciating standard would obviously tend to cause a decline in wages. The inference, therefore, to be drawn here is that if gold has appreciated it has not appreciated enough to overcome the tendency to higher wages resulting from better methods of production.

No example has occurred to me that seems to fail to admit of explanation in the light of this reasoning. The increase in the rate of wages in progressive countries is the logical result of the increasing productiveness of labor. In such countries the increase in wages of the labor employed in progressive industries, cotton spinning, for example, is a direct result; and the increase in the wages of the less progressive labor, as of domestics, is an indirect result by way of reduced competition, owing to the development of other more attractive fields for labor. With a standard of value and its substitutes expanding in volume with the increase required by the increase of production and population, and with an increase of production of all commodities equal in proportion to the demand, prices would not vary; but without such a standard and with unequal change in production, besides the change in the opposite direction to that of the standard, prices change inversely with the changed productiveness of the labor engaged in producing each commodity. The assumption of the editor of the "Century" that if the appreciation of gold had been the cause of declining prices it ought to have effected all prices equally, is therefore utterly misleading. Having investigated the nature of personal services and of commodities in order to know whether both are pertinent for the purpose of arriving at a trustworthy estimate of the rise or fall of gold prices, and having eliminated the wages of labor as the result of such investigation, we may now proceed to the evidence to sustain the statement of the general decline of prices.

The evidence all being in one direction, the conclusions of a few leading authorities only need be adduced. David A. Wells ("Recent Economic Changes," page 122) says: "Comparing the data for 1885-86 with those of 1866-76, the decline in the wholesale prices of most of the staple commodities of the world's commerce has been extraordinary, and has extended to most countries; and (that) the estimate of M. Sauerbeck (before referred to) of 31%, as the average measure or extent of this decline, is not excessive."

Edward Atkinson was commissioned by President Cleveland during his first term under provisions of successive acts of Congress, "to visit the financial centers of Europe in order to ascertain the feasibility of establishing, by international agreement, a fixity of ratio between the two precious metals in free coinage of both." With his report, made in October, 1887, Mr. Atkinson submitted a copy of Dr. Soetbeer's statistical work "customarily accepted as of the highest authority." Professor Soetbeer, before giving the results of his own investigations, quotes conclusions from other European sources, in substance, as follows: Statistics carefully gathered by the London "Economist" with regard to 22 representative commodities, and official French trade statistics with regard to a similar number, each taking the average prices for the years 1865-69 as par, indicate a decline of 24 to 30% down to 1885, and a decline of 20% down to 1883, respectively. Soetbeer's own investigations are brought down in the mentioned translation to 1886. He derives his most reliable statistics regarding prices of commodities from the official trade statistics of the free port of Hamburg, saying of them that these statistics furnish "material which is complete and trustworthy to a higher degree than any known to us." His conclusions, taking the average prices for the years 1871 to 1875 as a starting point, with regard to the prices of 100 leading commodities, which he divides into seven groups, are as follows: Agricultural products had declined in 1886 31%; animal products, 23%; southern products, 7%; tropical products 12%; minerals and metals, 40%; textile materials, 24%; miscellaneous products, 32%. "For all the 100 articles the comparative prices show a fall in 1886, compared to 1871-75, of 22%."

The average annual decline in commodity prices for more than a decade prior to 1886 is thus seen by a fair agreement of authorities to have approximated $1\frac{1}{2}$ or 2% per annum. That this decline has continued to the present year is certain. Carefully gathered data being unavailable, we need only to refer again to the foregoing quotation from the "Century," which states a conceded fact, and the statement might have been made more general, "Cotton, wheat, corn, leather and pig iron have touched during the past year the lowest price known in history." Now, proving the serious decline of commodities in gold price, due to improved machinery and methods, is equivalent to proving that the production of gold itself has not responded to such improvements in the degree required in a commodity to be used as a standard of value. In other words, gold has appreciated in just the degree that other commodities have on the average declined. There is too little of it to constitute the basis of money for the world on the present system.

For 20 or 25 years following the gold discoveries of California and Australia the range of commodity prices proves that the gold production equaled, or even exceeded, the demand for it as a stable standard; but for the last 20 years the demand for gold has been in excess of the supply, as shown by constantly falling commodity prices. The widespread and increasing use of the various forms of bank credits has often been cited as a new factor in the question of the supply of the

precious metals required for monetary purposes, and as tending to offset the effect of the reduced gold production of the past 20 years. Aside from its weakness in a time of need, as exemplified throughout the United States the past summer, whatever bearing this element may have, it is proved to be insufficient, by the ultimate and practical test of stability in commodity prices. It is evident that exact statements cannot be made as to the amount of gold required annually to render it a stable standard under the present system. It can, however be said with perfect confidence that it should be such an amount as will keep its value in a constant relation to the average level of commodity values, referred to at the beginning of this paper.

Prof. F. W. Taussig, of Harvard University ("Silver Situation in the United States," page 107), concedes that gold has appreciated, but tries to prove that improvements in production have more than compensated debtors, saying: "It is true that the creditor gets more commodities than he gave; but he gets the product of the same amount of labor as he devoted to the commodities originally lent; and why should he not share with the rest of the community the benefit of a general increase in the productiveness of labor?" Further on he says the fall in prices has "been due chiefly to the general improvements in production; they have not been accompanied by a fall in money incomes, and they cannot be said to have caused an increase on the burden of debts."

The question whether the creditor shall share the increase of the productiveness of labor is a serious one. The importance of such an investigation as the present one centers upon who is entitled to the benefits of the increasing productiveness of labor. The question with regard to the creditor is more frequently implied than frankly asked. Fortunately the answer is unequivocal.

For the purposes of this paper capital may be considered as of two kinds, loaned and invested or productive. The owners of loaned capital are intent upon safety of principal and regularity of income, and do not assume the risks of business. The owners of other capital assume the risks of business for the chances of profit. From the nature of human society a large proportion of the world's capital is loaned. Justice is done to it as far as concerns the principal when repayment is measured by a standard that will buy the same number of commodities as the standard in use represented when the loan was made. Any other view ignores both the practical and the theoretical conceptions of value, and is untenable. The borrower pays interest to the lender as compensation in full for the use of his capital. The rate of interest is determined by the demand and supply. There is no reason of expediency why the lender should receive more than interest, as owing to the increased productiveness of labor, the aggregate capital, and, therefore, loaned capital increases more rapidly than population. If the creditor is to get a share of the increase in the productiveness of labor it should be in the open market, and should be determined by supply and demand. Whatever this share would amount to, the creditor is certainly not entitled to the insidious and lurking advantage of an appreciating standard.

The conclusion is unavoidable that when loans are repaid, as now under an appreciating standard, it forces an unjust division between the borrower and the lender entirely at the expense of the former. Overpayment results, depending, of course, upon the period of the loan. The borrower may be an individual, and great wrong thus results to individuals. In frequent cases, however, many persons are involved, and the loss is indirect, as in the case of city, county and national indebtedness. Many other cases of the indirect hardship and injustice due to an appreciating standard will occur to any thinking man. One of the most important, the bonded indebtedness of railroads, payable in gold, needs mention. The public, which is entirely at the mercy of the railroad management in such matters, is forced to overpay incalculable sums as passenger and freight rates on the gold basis of some past time. In the case of all active business enterprises conducted as most business is, partly on borrowed capital, the loss falls upon the capital taking the risks of business and the labor it employs. A stable standard would increase the chance of profit of such capital by some proportion of the present loss due to the appreciation of gold. The balance would go to labor, the active agent of production.

Unless the above reasoning is fallacious, the necessity of either discarding gold altogether or so supplementing it as to secure a stable standard of value is seen to be most urgent, if the desire for justice between debtor and creditor is to prevail.

As bearing upon the question of whether an increase has been caused on the burden of debts, the decline proved is in wholesale prices. While it indicates the decrease of the amount realized by producers for their products, it by no means indicates a reduction in living expenses. Owing to the increase of wages and to the increase of rents, retail prices have not fallen in the same degree as wholesale prices. This fact, taken in connection with an increase in the standard of the living of all classes, has resulted in an actual increase in living expenses. This, however, is a side question, although an important one, upon which the question, Who is entitled to the benefits of increased production? does not depend.

To return to the main line of thought, there is no question that a stable standard, as above set forth, would be an improvement in distribution. Loaned capital is sure of interest, and its owner is free from the worries of production. Inasmuch as lenders, as such, do not contribute to the causes which lead to the increased productiveness of labor, being unproductive members of society, they are not entitled to the benefits resulting, except in so far as the law of supply and demand grants them interest. On the other hand, capital engaged in business enterprise, sustaining labor through all attempts to increase production, and labor itself by right of being the source of all wealth and the designer of all methods of producing it, should divide as profit for the risks of business and as wages for services rendered, in addition to what is at present received, the proportion of profit which now goes to loaned capital through the appreciation of gold.

Those interested in the possibilities of the human race attaining the

higher level to which the increased productiveness of labor of itself tends, might be filled with discouragement but for the fact that despite the appreciation of gold and despite the many other advantages of the wealthy and the privileged classes comforts are actually getting more and more general; and every step toward a clear realization of the causes diverting to the fortunate and favored classes an undue proportion of the world's production ought to result in such changes in transacting business as will help to preserve to the active agents of production the full share to which they are entitled.

With regard to remedy: As the standard should bear a constant relation to the average level of commodity values, some modification of the multiple standard of Jevons, capable of universal application, is the ideal to be sought. The general prejudice in favor of the precious metals, which an extensive application of the multiple standard, as generally proposed, would displace as money, is the chief difficulty in the way of its adoption, aside from the powerful interests that are favored by the present standard. A modification which would not involve displacing the precious metals, would be more practicable, such as leaving to a competent national or international commission the periodical determination of their purchasing power, and varying the number of grains in the unit of each accordingly, enforcing the acceptance of the new unit as the standard of settlement for obligations at the time existing. Gold and silver then would not be coined, but certificates based on bullion would be issued. To prevent the withdrawal of the gold bullion, the reduction in the unit would be gradual, based upon the findings and authority of the authorized commission. Unlike the original system proposed by Jevons, no more computation would be necessary to money transactions than now. Further than the general interest of all classes in the careful work of the commission the only ones who would need to keep posted in the weight of the precious metal units would be those engaged in selling or buying the metals in the course of their production or consumption, or in the settlement of international balances. This plan would furnish an expanding currency to meet the demands of commerce, because as fast as gold appreciated the weight of the unit would be reduced, and more certificates would be issued based upon the bullion in the treasury vaults; and in the possible, though exceedingly improbable, exigency of an increase in the gold supply of the world causing an increase in the weight of the unit, either the issuing power would buy more bullion or retire the excess of outstanding certificates. The principle would be the same in regard to silver. However much production of either metal might at any future time be curtailed, every nation that had its fair proportion of the world's supply at that time would have enough for its currency basis. The cry of not enough gold or silver, as the case might be, to do the business of the world never could be raised. To the objection that a perfect system has not yet been devised for arriving at the average price of commodities, making due allowance for the importance of each, the answer simply is, that enough progress has been made to that end to furnish a far more stable standard than that furnished by the precious metals, one or both; and the establishment of the multiple standard would furnish all the conditions for rapidly perfecting the methods of gathering and dealing with data for ascertaining average prices. The further objection that the standard of value might somehow become the puppet of politicians is worthy of consideration, but if properly undertaken, danger from this source need not exist, and especially if an international commission could be agreed upon, the success of the plan would be assured. In any case, in view of the great present evil, steps ought to be taken at once to provide for carefully gathering necessary data looking to the establishment of such a standard on a practical basis, national, if necessary, to start with, but international, if possible. We are frequently told that this country cannot afford to adopt a different standard than that in use by the creditor nations. A uniform standard is certainly exceedingly desirable, provided it is a right standard; but the view that this country can afford to pursue a course independent of the creditor nations until they adopt a just uniform standard, can rest on the principle that all changes must be in the direction of the right, instead of in the direction of a system involving such manifest injustice as to defeat its important end. The multiple standard remedy, however, will require years of education, and there is at hand, in the tendency of the price of silver to keep along with that of all commodities, except gold, a solution making bimetallism, of which all the world has some understanding, the plain and logical way to the proposed multiple standard.

An impression held by many is that silver has depreciated more rapidly than other commodities in gold price. If the conclusions of the best authorities, some of whom are cited above, that the decline of commodities for 20 years or more has been at the average rate of 1½ to 2% yearly is to be taken as a basis for computation, the excess of the decline of silver is slight; and having all occurred since its demonetization by this and other countries about 20 years ago, it can reasonably be ascribed, entirely or in large degree, to the resulting lessened demand. At any rate the divergence from commodities has been clearly less than that of gold and the stigma of instability attaches to gold with the greater force. The adoption of bimetallism would still permit the creditor to retain a part of his advantage due to the appreciation of gold, but if payments of half gold and half silver were to be established as the only legal tender, this advantage of the creditor would be reduced by more than half, and would be a long step in the right direction. The object in view being a stable standard, it would be better attained by bimetallism if the average annual decline of commodity prices is somewhat lower than indicated by the data. On the other hand, if the decline is actually at a greater rate, the necessity for at once adopting bimetallism and hastening preparations for the multiple standard is increased. In either case the argument is against the single gold standard.*

DENVER, Colo., Sept. 23, 1893.

OSCAR J. FROST.

* For another modification of the multiple standard reference is hereby gratefully made to an article on "A New Basis for Money," in the "American Journal of Politics" for July, 1893, written by Arthur I. Fonda.

MINING AT THE COLUMBIAN EXPOSITION.

Specially Reported for the Engineering and Mining Journal.

THE IDAHO MINERAL EXHIBIT.

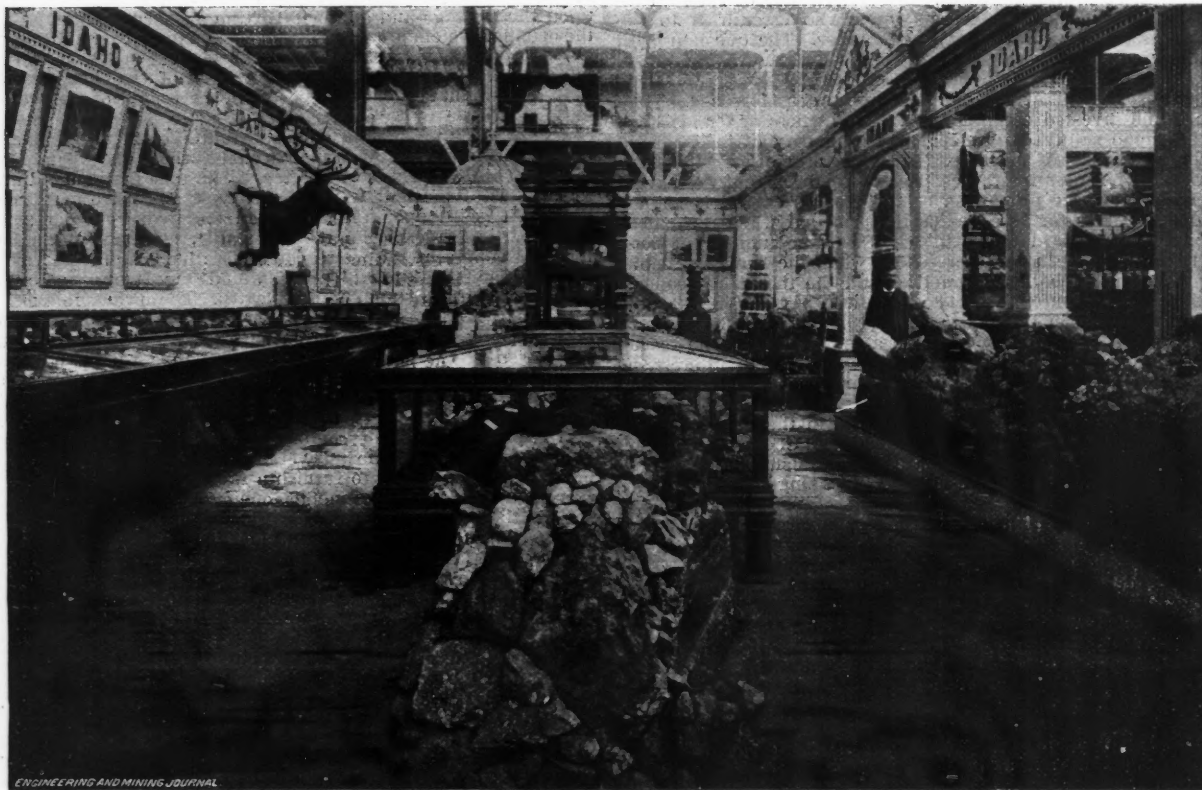
Idaho has displayed in its exhibit in the Mines Building a remarkable collection of ores. Every district in the State is represented, for there is not a single district where mines of some kind do not abound. In silver ores the De Lamar mine in Owyhee County displays several pieces of native silver. This mine is the largest producer of silver in the State, having paid in dividends alone upward of a million dollars. The Poorman mine is another of this district's producers. Of the silver districts of Idaho, in active operation at the present day, the Coeur d'Alene is the most important. The ores of this district are chiefly silver-bearing lead ores, occurring in wide veins, some of which have been operated to considerable depths with much success. The ores run 50 to 60% lead, and from 30 oz. up in silver. A writer in the "Mineral Industry" for 1892 says: "The Coeur d'Alene region is the most favorably situated for producing lead—the silver being almost a by-product—that I know of in the country. The mines are not yet compelled to do much pumping, and the ore is cheaply mined, while the numerous streams afford ample water power. I think these mines can operate at a profit with the price of the white metal so low that most of the mines in the country are compelled to shut down." This

a general view of the State exhibit. The superintendent in charge is Mr. F. B. Schemerhorn, or Boise City.

THE MINERAL EXHIBIT OF JAPAN.

The interest the Japanese have taken in the Exposition and the general exhibit is quite generally commented upon. In almost every building, large and exceedingly attractive exhibits have been made. Nowhere, however, has a more representative display been made than in the Mining Building. The Japanese are entitled to respectful consideration in a mining exhibit, since this industry in Japan is as old as civilization itself, and along with the progressive extension of its arts and sciences there has been in that country a wonderful development of the mining and metallurgical industries.

The Japanese section in the Mining Building is located at the main west entrance, and consequently is observed by the streams of people that disembark at the railroad stations and make the east and west aisles through the building a principal passageway. The court is surrounded and closed by a series of flat cases filled with mineral collections. This line of cases is interrupted by the two entrances formed by a narrow section of Japanese mine timbering. The Mikado's colors droop gracefully over both entrances. The preparation of the exhibit was left entirely in the hands of the Mining Bureau and the Imperial Geological Survey. The minerals and ores and economic products were secured and arranged by Messrs. T. Matutira,



THE IDAHO STATE EXHIBIT AT CHICAGO.

opinion is supported by the following statement from the same work, showing the wonderful growth of lead mining in this district:

| | Silver, oz. | Lead, lbs. | | Silver, oz. | Lead, lbs. |
|-----------|-------------|------------|-----------|-------------|------------|
| 1886..... | 116,246 | 3,009,000 | 1890..... | 1,499,663 | 55,000,000 |
| 1887..... | 340,000 | 11,960,000 | 1891..... | 1,823,765 | 68,000,000 |
| 1888..... | 554,000 | 16,000,000 | 1892..... | 1,503,000 | 73,000,000 |
| 1889..... | 1,095,265 | 35,000,000 | | | |

The total production of the State in silver for 1892 was in the neighborhood of 3,250,000 oz., the Coeur d'Alene furnishing nearly two-thirds of it, and a considerably higher percentage in lead.

Idaho, during 1892, produced nearly 100,000 oz. of gold, chiefly from the rich placer fields that abound in the State. Of the central part of the State but little is known; frequent rumors as to its richness in gold are heard.

Idaho has mines of antimony, cinnabar iron, coal and many other minerals within her borders, many of them being worked at a profit. In precious stones the Idaho opal is to be mentioned. The Owyhee opal mine is situated in Owyhee County, 15 miles west of Nampa, on the Union Pacific Railroad. This mine was discovered 15 months ago by a couple of ranchers in search of cattle in the foothills, and is now worked by Mr. P. B. Host and H. C. Anchor, both of Boise City, who bought the property. The opal is found in a vein of andesite, averaging 25 to 40 ft. in width. This vein has been developed for a distance of 400 ft. on the surface. No great depth has been reached, but enough has been done to show that the stones improve in hardness and brilliancy as depth is attained. In hardness the stones are from six to seven. Most of the gems so far taken out are as yet in the rough. About 500 carats have been cut and polished, fully 60% of which have turned out first class gems, and the remainder of fair quality. On exhibition at the Fair are 3,000 carats of rough stones, several weighing over 30 carats each; one weighs 50.8 carats and seems to be a perfect gem in every respect. The accompanying illustration gives

H. Tejima, and K. Yamataka. Mr. Wada Tsumashiro, Director of the Mining Bureau, has published an official volume to accompany the exhibit, explanatory of the main sources of the exhibit material, which has already been noticed in this Journal. This valuable work combines the statistical with the descriptive account of ancient and modern methods of metallurgical reduction; of the distribution of ore deposits; and, in detail, of the leading mines and collieries of the country. The maps, which we give herewith, and which show the location of all the important mines, were taken from this work.

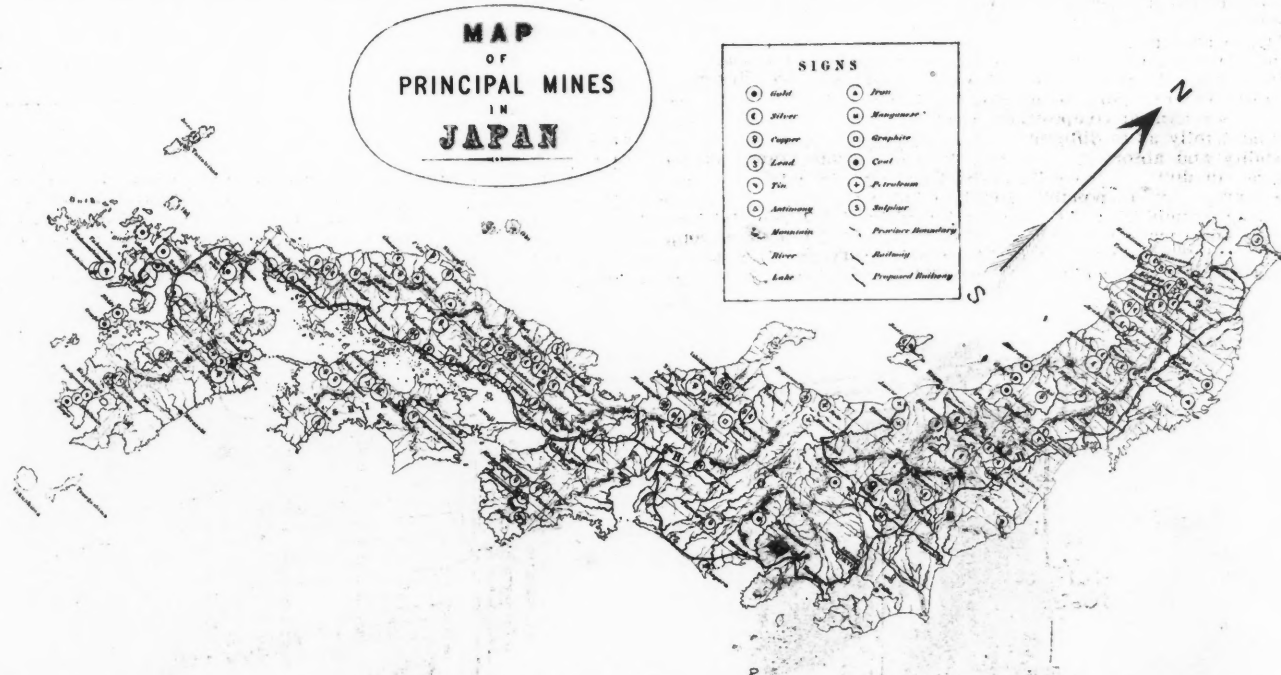
The exhibit, to some extent, illustrates the historical periods into which mining in Japan falls: First, previous to the ascension of the Mikado, 25 years ago, when mining was conducted without other implements than picks and hammers, transportation was by baskets, and torches were used for lighting; and when the principal method for metallurgical reduction was liqutation hearths with hand-bellows. A model on exhibition shows a section of an ancient mine and the primitive appliances in use, as well as the state of mine engineering at this time. The period since the restoration is marked by the introduction of foreign machinery and the employment of foreign professional knowledge. The Government at first undertook the management of the leading mines, and adopted all modern improvements in developing them. A mining and engineering school was also established and Mr. John Milne made Professor of Mining. The Government mines soon became models for all private mines, and the main object in view having been accomplished, in 1884 the Government yielded up control of its mining properties, selling them or placing them as concessions. During the present epoch compressed air drills, wire rope tramways, magnetic separators and water-jacket furnaces have come into general use, and the increase in total production was doubled in nine years.

The mineral collections in the fronting cases are very attractive. The topaz crystals excel in size and are mounted in Japanese style.

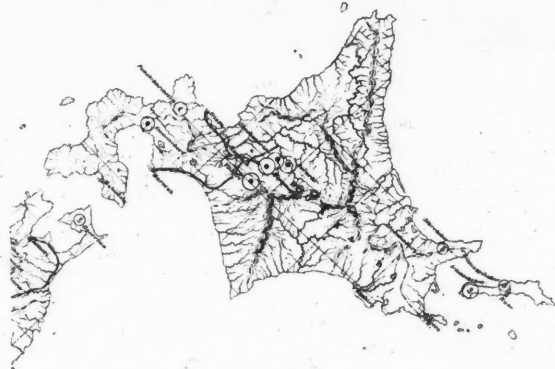
A number of cabinet collections of minerals are exhibited, and one rock crystal nearly 2 ft. in length is valued at \$1,000. The specimens of crystallized stibnite are very beautiful. These prismatic crystals are in some cases a foot high, acutely terminated, and in many cases branching or radiating. The specimens are from Ichinokawa, on the Island of Shikoku. The antimony mines, whence these specimens are derived, were discovered some 11 centuries ago, and were at one time worked by the Provisional Government, but at present are under the control of a private company.

Copper ranks first in the metal production of Japan, and a great variety of copper ores are exhibited from the leading copper mines, such as the Ani, the Ashio, the Ogoya, the Besshi, the Osaruzawa and others. These ores are pyrites, cuprite in quartz gangue and native copper. The Ashio is the most extensive copper mine, and was worked as far back as 1610. It is now managed by a company with a capital of \$22,000,000. This mine has introduced electric lighting, electric rock drills, holsts and blowing engines. An interesting set of

thousand years ago, but not now producing in large quantities, owing to the foreign importations. Dr. Tsunashiro states that the methods of reducing the iron sands is still primitive. They are thrown alternately with charcoal into a furnace of clay, high in silica, and about 5 ft. high. The molten iron is run off into reservoirs to cool, and then is broken into pieces convenient for handling. The furnace becomes exhausted in three or four days, and is then broken up, and a new one built. A quantity of the pig and wrought iron is shown by the Neu works, and raw steel by both the Neu and Yoshida works. The story of the method of converting cast iron into wrought iron and of the manufacture of steel is interesting chiefly because it affords a striking contrast with the monster plants and extensive outputs of America and Europe. Wrought iron is manufactured by a modified cementation process. The pieces of cast iron are roasted until they adhere, when the resulting mass is repeatedly forge-heated, and finally manipulated under heavy hammers. At the Yoshida works the crude steel is produced in the furnace hearth con-



models showing the different hearths used in the early processes of reduction 25 years ago, illustrates the marked advancement made by Japan in copper metallurgy. Here is the smelting hearth, with its primitive hand-bellows at the rear, for reducing copper matte; also the old hearth for leading and for the formation of liquation residues, for toughening, and for cupellation. Since 1890, an improved furnace with a rectangular shaft has been adopted, and has supplanted both the Japanese and Pilsy furnaces, previously in use. This



THE ISLAND OF HOKKAIDO, JAPAN.

furnace is surrounded by a water jacket, but requires enormous quantities of fuel for roasting and smelting. In the improved Mabaki method, a Bessemer-like converter is used, having a wrought iron shell with a refractory lining. This takes a charge of 2 tons at a time, and yields 700 kwamme of ingot copper per hour. Although specimens of electrolytic copper are exhibited, the refining is done at present in Europe. Upon the wall hang a number of framed pictures of the principal copper mines, with interior views of their associated metallurgical establishments; such as of the great works of Ashio, Ani and Besshi. The absence of labor-saving devices, as exhibited by these illustrations, is quite noticeable. It is stated by the Japanese representative at the exhibit that, although the large mines have adopted modern improvements, the majority are yet dependent for profitable results upon the low rate of wages, which, for unskilled labor, amounts to only 25 or 30 cents per day.

Japanese ironworking is exhibited, illustrated by a variety of iron ores, magnetic and iron sands in particular. The iron sands exhibited are from the great iron mines of Neu and Yoshida, discovered more than a

temporarily with the pig iron, and is then sorted out from the latter after the furnace is broken up. It is then hardened and sent to the market.

Gold and silver ores are exhibited in abundance. The famous Sado mine and the Handa silver mines are the principal contributors. In these mines the pulverizing of ores by hand hammering has been replaced by California stamps, and for the early liquation and cupellation hearths there have been substituted water-jacket furnaces with all modern accessories of blowers, calciners and kilns. At the Handa mines the Freiberg barrel amalgamation process is utilized in conjunction with a dry ten stamp battery.

In fuels a series of blocks of coals are exhibited by the collieries of Miike. These mines, which are in the Islands of Kiushiu, were discovered in 1469, and have been worked by the Government since 1873, convict labor being utilized for developing them. At the present time they are operated by private parties as a concession, and the labor is supplied by some 1,600 convicts. Pictures of the various workings of the Miike, and also of the Ishikari coal fields are framed and hang upon the section wall. The analyses of the coals from the latter fields run as high as 66% in coke and as low as 0.292 in sulphur, the average being about 58% for the former, and 0.50 for the latter. Most of the coal is produced on the Island of Hokkaido, at the extreme northern end of the empire; and a kind of Indian Reservation, the peoples inhabiting it being a wild aboriginal race. Anthracite is shown from the Kobe mines and soft coal from Karatsu on the Island of Kiushiu.

In the line of industrial minerals, the Mining Bureau has selected for exhibition some interesting examples. The salt, as prepared for the market, in the grades of table and dairy salts, are unique, to say the least. It is molded into cracker shapes and packed in curious little Japanese boxes that add much to its generally inviting appearance. A medicinal tooth powder is manufactured out of this salt as a base. Ranged along the central booth of the exhibit are to be seen in succession Japanese emeries, mineral pigments, graphites, clays, mineral waters and sulphurs.

The attention of the scientific visitor is attracted principally by the exhibit made by the Geological Survey. In perhaps no one thing is the progressiveness of the Japanese people more markedly demonstrated than in the organization and results of its Geological Survey. The maps upon the wall of the exhibit, bound in neat and artistic frames of the characteristic bamboo, display surprising proficiency in their preparation. There is shown a progress map of the geological, of the topographical and of the agronomic surveys, as well as maps made upon general and special surveys. The Japanese Government early saw the necessity for securing definite information concerning the country's physical appearance and structural features, and as early as 1862 engaged foreign experts to make reports on isolated regions. It was not until 1878, however, that the plan of Dr. Naumann, Professor of Geology at the University of Tokio, was adopted and the Imperial Geological Survey established. This survey, through

field and office work, now presents the geology of the country in maps upon a scale of 1:200,000, and has formed a museum of rocks and fossils. The collection of minerals shown in the Japanese Section contains some 125 varieties, was prepared by the Survey, and includes every species found in Japan. They have been carefully arranged according to Naumann's system. The collection of rocks in the exhibit has been arranged in the geological succession of Japan, and contains some 217 specimens of the most typical rocks. A collection of fossils also accompanies the exhibit. In the preparation of maps the country has been divided for purposes of convenience into five grand divisions and 97 sections. Of these sections 37 (one third of the area) have thus far been surveyed; and in addition special surveys have been made of different coal and oil districts, of the Bay of Tokio for the construction of a harbor, and of the provinces recently shaken by severe earthquakes.

The work of the Agronomic Section is illustrated in the collection of soils showing the gradations and natural manufacture of fine soils from the original mother rock. The specimens are all taken from the districts covered by the agronomic survey. A surface soil, for instance, of a fertile mulberry ground, is traced back to the hard crystalline archaean schistose rock. The derivation of other important arable soils, such as of the sugar-cane fields of the island of Amakusa and of various hemp, rice and tea districts, are illustrated in the same manner. Each sample of soil is examined in three ways; first, as to mechanical composition; secondly, as to chemical constituents, and thirdly as to different physical properties, such as weight, permeability and absorptive power. The aim of this branch of the Survey is "to divide the soils derived from various kinds of rocks into as many types as possible, and to judge therefrom the relative values or capabilities of these soils for cultivation." The divisions of the sheets are made not by longitude and latitude, but by the boundaries of prefectures; 27 out of 71 have been surveyed, and a vast amount of information obtained, exceedingly useful in scientific agri-



FIG. 1.

with the combustion chamber and the flue plates, give large heating surface, and the weight, in proportion to capacity, is small.

The water flues open at either end into open water compartments, and the side water chambers extend below the flue line, where there is no circulation, forming mud chambers from which accumulations of sediment can be blown off as often as required.

Two of these boilers, each of 17 H. P. capacity, have recently been built for the Andes Gold and Silver Mining and Smelting Company, to be used in the mines in the vicinity of San Juan, in the Argentine Republic.

COAL PRODUCTION IN INDIANA.

We are indebted to Mr. S. S. Gorby, State Geologist of Indiana, for the figures given below, showing the output of the Indiana coal mines for the first half of the current year. The mines are classed under the two divisions into which the State is districted for inspection purposes. The production for the half year was as follows:

| | Screened. | Run of mine. | Slack. | Total. |
|------------------------|-----------|--------------|---------|-----------|
| Northern Division..... | 977,690 | 1,126,707 | 263,084 | 1,374,981 |
| Southern Division..... | 296,867 | 336,380 | 114,165 | 747,412 |
| Total..... | 1,274,557 | 1,463,087 | 377,249 | 2,114,893 |

From the mines of the Northern Division the largest proportion, 71.1%, was shipped as screened coal, while from those of the Southern Division run-of-mine coal was 45% and screened coal 40% of the total.

The Northern Division is in charge of Mr. Thomas McQuade, Chief Mine Inspector, who reports 4,320 as the average number of operatives. In his district there are in all 31 companies, operating 57 mines or openings. The largest are the Brazil Block Coal Company at Brazil, with nine mines, the Crawford Coal Company at Brazil with five, and the Coal Bluff Mining Company at Terre Haute, with

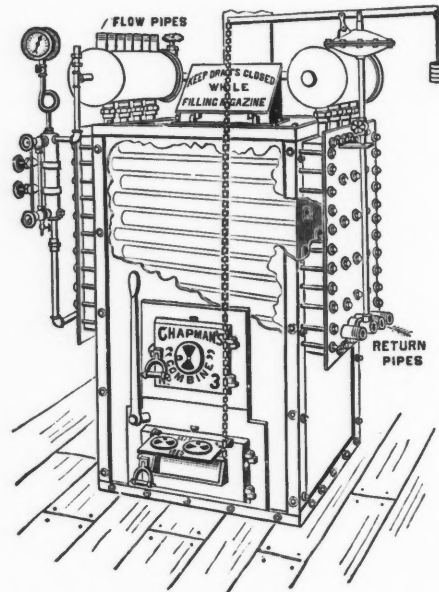


FIG. 2.

THE CHAPMAN COMBINE BOILER.

culture. The important relation of geology to economic ends has thus been established in a highly successful manner. The Reconnaissance map of the Topographical Section shows that 53 sheets of the 97, or over one-half, have been surveyed, and 29 issued. Magnetic observations have been carried on by this section at four prominent stations. The Chemical Section, which conducts the laboratory and makes all analytical investigation in rocks, economic minerals and soils, co-operates chiefly with Agronomic and Geologic Sections. These surveys are at the present time entirely managed and equipped by native scientists, all vacancies in the official staff being filled by appointment of graduates from the University of Tokyo.

The exhibit in the Mining Building is under the supervision of Mr. Akayama, Secretary of the Imperial Japanese Commission, and Mr. Sakai has been placed in immediate charge. Both of these gentlemen maintain the reputation of their people for courtesy, and are always ready to furnish information concerning the exhibit of their Country.

CHAPMAN'S COMBINE BOILER.

In Section O, Block 3, Space 31, in the Manufactures and Liberal Arts Building, there is on exhibition a portable sectional magazine boiler of original design. It is known as "Chapman's combine boiler," and the chief aim in its construction has been to secure, with a magazine fuel feed, large heating surface, thorough and rapid circulation of water, to avoid the accumulation of sediment, and to make the settling chambers and the water flues easily accessible. Small air pipes between the firebox and end plates admit oxygen into the combustion chamber above the fuel. This arrangement is made to secure freer combustion by conveying the oxygen to the gases generated in the firebox heated to a sufficient degree to insure their union and complete ignition. The water flues open at each end into a common water chamber. The inventor claims that this boiler can use coal, wood, gas or oil for fuel. It is possible to sectionalize it to such a degree that the parts are capable of mule-back transportation. The interior arrangement of the water tubes, in connection

four mines. The average output for the half-year was 318 tons to each operative.

The Southern Division is under charge of Mr. Wellman Lackey, Assistant Inspector, who reports the average number of operatives at 1,693, the average production having thus been 441 tons each. In this division there were at work 23 companies, having 33 mines. The more important concerns were Cable & Co., with four mines; the Island Coal Company, with two mines, and the Summit Coal Company, at Summit, with one mine of large output. The mines in this division were not, as a rule, worked so regularly during the half-year as those in the Northern Division.

The total coal production of Indiana for 1892 was 4,494,811 short tons, so that the reports given above indicate about the same output for the present year.

Variations in the Intensity of Gravity.—A report upon a memoir by M. Defforges entitled "The Distribution of the Intensity of Gravity at the Surface of the Globe" was recently read before the Paris Academy of Sciences by MM. Fizeau, Daubree, Cornu, Bassot and Tisserand. This memoir, submitted to the judgment of the Academy by the Minister of War, summarizes the theoretical and experimental researches made during eight years in the geographical service of the French army, with the object of determining the absolute intensity of gravitation for a small number of primary stations, and the relative intensity for a large number of secondary stations, with simplified apparatus. The latter were determined by means of the "reversible invertible pendulum," invented by M. Defforges, which easily gives an approximation to within 1 part in 100,000. The anomalies extending along a line from Spitzbergen through the Shetlands, Scotland, England, France and Algiers considerably exceed any possible experimental errors, and the excess of gravitation on the islands and its defect on the continents are well established. The report, which was adopted by the Academy, advises the Government to supply M. Defforges with the means to extend his work to the islands of the southern hemisphere, and especially the Pacific.

METALLURGICAL LEAD EXHIBITS AT THE COLUMBIAN EXPOSITION.

Written for the Engineering and Mining Journal, by H. O. Hofman.

(Continued from Page 397.)

AMERICAN AND FOREIGN EXHIBITS.

The description of the American exhibit will necessarily be short owing to the meagerness of the material. Of Mississippi Valley producers Wisconsin shows about 60 bars of soft lead, Kansas is satisfied with a hexagonal column of about 120 bars from Galena; Missouri has a few small specimen bars from the St. Joseph Lead Company, and a series of samples of the products obtained in working the Lewis-Bartlett process by the Piche Lead Company from Joplin, to which reference will be made under the third head of processes.

Of the argentiferous lead producers only two are represented: Utah by a few bars of base bullion and refined lead from the Mingo and Germania works, and Colorado by a set of metallurgical specimens collected by the State School of Mines from the principal smelting works of Denver, Pueblo and Leadville. Denver is represented by the Omaha & Grant Smelting and Refining Company and the Globe Smelting and Refining Company; Pueblo by the Pueblo Smelting and Refining Company, the Colorado Smelting Company and the Philadelphia Smelting and Refining Company, and Leadville by the Harrison Reduction Works and the American Smelting Company; the products of the American Zinc-Lead Company of Canyon City will be discussed under processes. The specimens are quite numerous and might be very interesting if a key to them were given to the visitor, but this is missing; the collection is labeled just as an individual might label his private collection for his own use, but an exhibit for the World's Fair ought to have been treated differently.

The foreign exhibitors have done infinitely better. They have as a rule made the information which a visitor would be likely to require easily accessible. The German exhibit represents the lead industry of the Upper and Lower Hartz Mountains and of Upper Silesia. It consists of specimens, charts explaining the processes, drawings and models of apparatus and a series of pamphlets. The specimens in

of zinc oxide, lead oxide and shots of rich lead assaying from 360 to 540 oz. silver per ton. The rich lead is cupelled and any resulting dore silver parted with sulphuric acid. The oxides are treated with dilute, warm sulphuric acid, the zinc sulphate formed is concentrated in lead-lined pans, purified and crystallized and sold to manufacturers of lithopon, a white paint which is an intimate mixture of barium sulphate and zinc sulphide formed by the action of solutions of barium sulphide and zinc sulphate upon each other. The paint has a good color and body; the details of the process, however, are kept secret.

The zinc remaining in the desilverized lead is oxidized by steaming, and the resulting powdery substance, after it has been washed to remove shots of lead, etc., and dried, is sold as a yellow paint. The refined lead, with 99.98% lead, goes straight to the market; some second-class lead with 99.94% lead is also made. The antimony contained in the base bullion is worked for hard lead with about 16% of antimony. The following analyses give the composition of the various products of the refinery.

The matte with about 10% of lead, 4% of copper and 10 oz. silver to the ton has the following composition: Pb, 12.44; Cu, 3.49; Sb, 0.13; Ag, 0.035; Fe, 48.64; Zn, 4.31; Mn, trace; NiCo, 0.11; SiO₂, 1.22; CaO, 0.5; MgO, 0.05; K₂O, 0.13; Na₂O, 0.10; S, 25.65; O, 2.03; total, 100.355. It is repeatedly roasted in heaps and smelted in low shaft furnaces until it is concentrated into black copper. This is refined in a reverberatory furnace and then desilverized either by vitriolization or by electrolysis according to the prevailing market price of blue vitriol. The residual mud containing lead and silver is worked up in cupeling the rich lead or goes back to the blast furnace.

The slag with less than 1 oz. of silver to the ton and 1% of lead goes to the dump. The following analysis shows its character: SiO₂, 31.09; BaSO₄, 0.51; Pb, 1.70; Cu, 0.21; Sb, 0.22; Ag, 0.002; FeO, 40.64; Al₂O₃, 6.98; P₂O₅, 0.79; ZnO, 8.01; MnO, 0.86; NiCo, 0.03; BaO, 1.04; CaO, 4.39; MgO, 0.05; K₂O, 0.58; Na₂O, 0.35; S, 3.55; total, 101.002.

The ores of the Lower Hartz are principally sulphide copper ores; they contain, however, some sulphide lead ores rich in zinc, as seen

| | Zinc-crust. | | Rich lead. | | Rich oxide. | | Flue-dust. | Corroding lead. | | Second class lead. | Hard lead. | | | Wash. poor Oxides, Paint. |
|-----------------------------------|-------------|-------------|------------|-------------|-------------|-------------|------------|-----------------|-------------|--------------------|-------------|----------|-------------|---------------------------|
| | Altenau. | Lautenthal. | Altenau. | Lautenthal. | Altenau. | Lautenthal. | | Altenau. | Lautenthal. | | Lautenthal. | Altenau. | Lautenthal. | |
| Pb..... | 77.675 | 77.820 | 96.3448 | 95.1404 | 37.84 | 30.06 | 0.71 | 99.96334 | 99.98480 | 99.94000 | 78.83 | 82.65 | 76.39 | ..... |
| PbO .. | 4.75 | 4.00 | ..... | ..... | 32.14 | 36.87 | 2.28 | ..... | ..... | ..... | ..... | ..... | ..... | 33.40 |
| Bi..... | ..... | ..... | 0.0142 | 0.0169 | ..... | ..... | ..... | 0.02213 | 0.00529 | 0.00323 | 0.06 | ..... | ..... | ..... |
| Bi ₂ O ₃ .. | 1.72 | 0.37 | ..... | ..... | 0.43 | 0.44 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cu..... | 1.12 | 0.82 | 0.8779 | 0.4645 | 1.12 | 1.24 | 0.17 | 0.00012 | 0.00080 | 0.04178 | 0.55 | 0.61 | 0.70 | ..... |
| Ag..... | 1.855 | 2.420 | 2.4100 | 3.6500 | 1.245 | 1.855 | 0.03 | 0.00050 | 0.00035 | 0.00200 | ..... | ..... | ..... | ..... |
| As..... | trace | trace | ..... | ..... | ..... | ..... | trace | ..... | ..... | ..... | 0.60 | ..... | 1.33 | ..... |
| As ₂ O ₃.. | ..... | ..... | ..... | ..... | trace | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sb..... | ..... | ..... | 0.3914 | 0.7201 | ..... | ..... | 0.17 | 0.00739 | 0.00796 | 0.01079 | 19.94 | 16.75 | 21.83 | ..... |
| Sb ₂ O ₃ .. | 0.63 | 0.98 | ..... | ..... | 1.06 | 0.57 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fe..... | ..... | ..... | 0.0054 | 0.0044 | ..... | ..... | ..... | 0.00177 | 0.00100 | 0.00073 | 0.02 | trace | 0.02 | ..... |
| Fe ₂ O ₃ .. | 1.87 | 1.04 | ..... | ..... | 1.44 | 3.82 | 0.34 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Zn..... | 11.78 | 12.11 | 0.0027 | 0.0023 | 1.35 | 1.90 | 0.12 | 0.00094 | 0.00092 | 0.00030 | trace | trace | trace | ..... |
| ZnO..... | 0.60 | 0.44 | ..... | ..... | 23.37 | 23.24 | 35.60 | ..... | ..... | ..... | ..... | ..... | ..... | 67.60 |
| Cd..... | trace | trace | trace | trace | trace | trace | ..... | 0.00046 | 0.00088 | ..... | ..... | ..... | ..... | ..... |
| Mn..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Ni..... | trace | trace | 0.0036 | 0.0040 | trace | trace | ..... | 0.00033 | ..... | 0.00117 | 0.02 | trace | trace | ..... |
| Co..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Al ₂ O ₃.. | ..... | ..... | ..... | ..... | ..... | ..... | 0.24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Insol..... | ..... | ..... | ..... | ..... | ..... | ..... | 0.42 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

the cases are numbered to correspond with the products indicated in the charts.* From the Upper Hartz the five silver-lead smelting and refining works are represented. The ores treated are galena concentrates running from 55 to 60% lead and from 23 to 30 oz. silver to the ton. An average sample of all the ore smelted at Clausthal in 1889 showed the following composition: Galenite, 74.09 (Pb 64.13, S 9.91); argentite, 0.10 (Ag 0.085, S 0.015); stibnite, 0.80 (Sb 0.58, S 0.22); chalcopyrite, 1.15 (Cu 0.40, Fe 0.35, S 0.40); sphalerite, 7.46 (Zn 5.00, S 2.46); pyrite, 0.60 (Fe 0.28, S 0.32); siderite, 2.27 (FeO 2.41, CO, 0.86); rhodochrosite, 0.48 (MnO 0.30, CO, 0.18); magnesite, 0.35 (MgO 0.17, CO, 0.18); calcite, 1.71 (CaO 0.96, CO, 0.75); gypsum, 1.92 (CaO 0.62, SO₃ 0.90, H₂O 0.40); barite, 0.00; alumina, 1.32; silica, 8.57; total, 100.77. The ores are smelted raw in circular and oblong blast furnaces 16½ ft. high from center of tuyeres to charging door and 3½ ft. wide at the tuyere level, with a pressure of 1 in. quick-silver. Water-jackets are not used as yet. The base bullion, with about 40 oz. silver to the ton, has the following composition:

| | Clausthal. | Lautenthal. | Altenau. | Andreasberg. |
|------------------------|------------|-------------|----------|--------------|
| Bi..... | 0.0048 | 0.0082 | 0.0039 | 0.01955 |
| Cu..... | 0.1862 | 0.2878 | 0.2399 | 0.34730 |
| Sb..... | 0.7203 | 0.5743 | 0.7685 | 0.33353 |
| Sn..... | ..... | ..... | ..... | 0.17149 |
| As..... | 0.0664 | 0.0074 | 0.0009 | 0.06520 |
| Ag..... | 0.1412 | 0.1431 | 0.1400 | 0.08300 |
| Cd..... | ..... | trace | trace | ..... |
| Fe..... | 0.0664 | 0.0089 | 0.0035 | 0.06544 |
| Ni..... | 0.0023 | 0.0068 | 0.0028 | 0.00630 |
| Co..... | 0.0016 | 0.00035 | 0.0002 | ..... |
| Zn..... | 0.0028 | 0.0024 | 0.0025 | 0.00161 |
| Pb, by difference..... | 98.80934 | 98.96475 | 98.8378 | 98.90153 |
| | 100.0000 | 100.0000 | 100.0000 | 100.0000 |

It is desilverized by the Parkes process, without being softened. The liquated zinc-crusts from several charges, assaying from 500 to 700 oz. silver per ton, are heated in a cast iron desilverizing kettle to a bright red, and decomposed by introducing through a curved cast iron pipe superheated steam. A rich lead results, assaying from 700 to 1,060 oz. silver per ton, with so-called rich oxides, a mixture

* The analyses given in this paper are taken in part from the literature on the subject; in part from private notes collected on the spot in 1890.

by the following average rational analysis: Blende, 36%; pyrite, 24%; barite, 16%; galenite, 14%; chalcopyrite, 1.5%; gangue, 8.5%; total, 100.0. They are roasted in heaps and then leached with water in revolving wooden barrels to extract the zinc sulphate formed, which is treated as above. It has the following composition: ZnO, 25.45; MnO, 2.32; FeO, 0.47; SO₃, 29.54; H₂O, 41.67; CuO, trace; total, 99.45. The leached ore containing 9% PbO, 25% ZnO, 25% Fe₂O₃, 5% S, 20% BaSO₄, 0.75% Cu and 0.015% Ag is smelted in blast furnaces for base bullion and matte to be treated as above and slag of a very peculiar character: SiO₂, 16.90%; FeO, 35.05%; ZnO, 19.64%; BaSO₄, 10.24% (= 8.13% BaS); Al₂O₃, 6.31%; CaO, 6.05%; Pb, 0.50-0.75%.

Upper Silesia is represented by the smelting and refining works of Tarnowitz. The ores are a mixture of lead sulphide and carbonate, and have a calcareous gangue. They are rich in lead and zinc and very poor in silver, and are worked in the well known Tarnowitz reverberatory furnace for base bullion and rich residue. This is then smelted in a blast furnace with ore not suited for the reverberatory furnace. The resulting base bullion and matte are treated in a way similar to that used in the Upper Hartz. Special provisions are made at these works to draw off all the lead fumes. This became necessary because, with increased production, their bad effect on the health of the operatives became conspicuous.

England has only one case 4 by 8 ft., which contains the products of the Dee Bank Lead Works; Walkers, Parker & Co. Ores are there smelted both in the Flintshire furnace and the blast furnace. The Pattinson as well as the Parkes process is in use for desilverizing base bullion. Both are represented by their intermediary and end products; the applications of lead are found in samples of sheet lead, lead pipe and shot; the lead compounds made by the firm are seen in the exhibits of litharge, red lead, orange lead and dry white lead; the process of manufacture of the last by a pate of lead before and after corroding.

France shows only a few bars of lead from Laurium produced by the Compagnie Francaise des Mines du Laurium, which are better discussed under the Greek exhibit, where they are duplicated.

Spain has only a few bars of lead and some bags of shot. Greece has a very interesting metallurgical exhibit of 22 samples, representing the industry of Laurium on the east coast of Attika. A

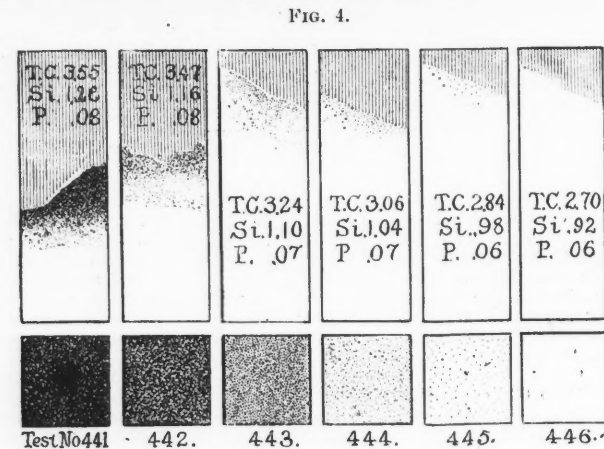
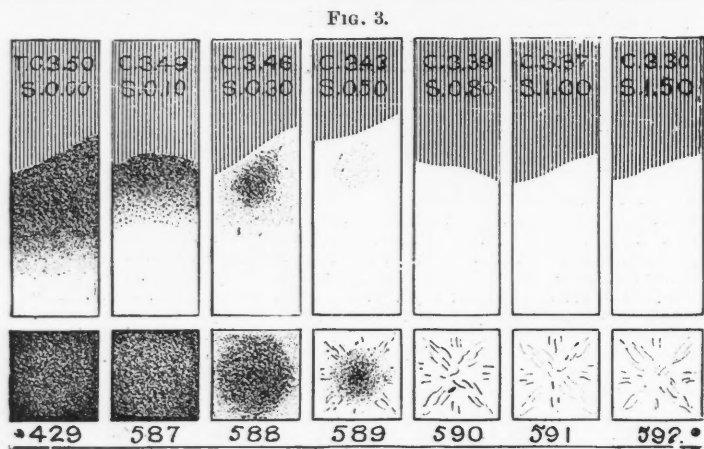
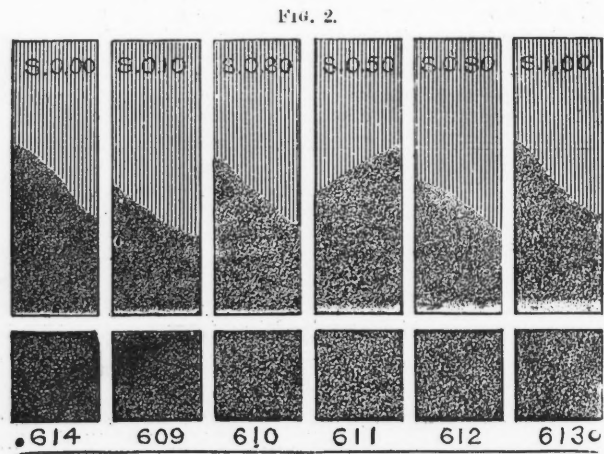
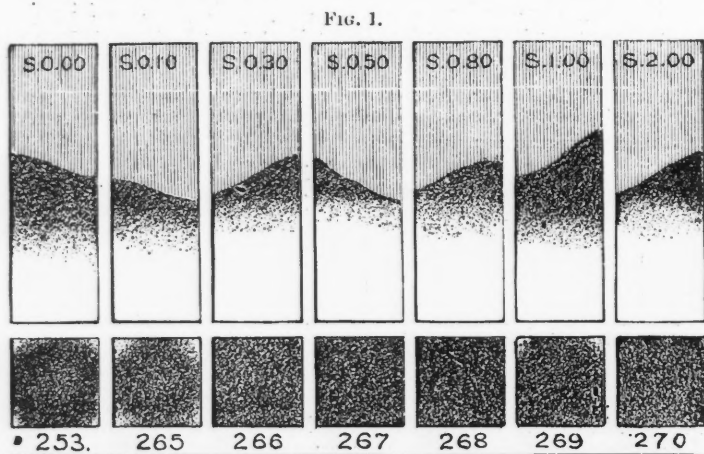
pamphlet by Mr. A. Cordella, the general manager of the Greek Metallurgical Company gives the subjoined table of analyses:

formed by the action of the sea water on the lead-slugs containing metallic lead and lead sulphide. Litharge is rep-

| No. | Metallurgical Products. | Pb % | Ag ozs. p. l. | Fe % | SiO ₂ % | Zn % | CaO % | Al ₂ O ₃ % | As % | Sb % | Cu % | Mn % | Ash % | Fixed Carb. % |
|-----|---|-------|---------------|-------|--------------------|-------|-------|----------------------------------|--------|-------|--------|-------|-------|---------------|
| 1 | Ancient land slags from Barbakli. | 10.70 | 17.78 | 11.90 | 33.80 | 5.40 | 13.80 | 3.9 | | | | | | |
| 2 | Sea slags from Brysaki. | 11.50 | 13.12 | 12.30 | 26.50 | 5.60 | 14.70 | 3.60 | | | | | | |
| 3 | Sea slags conglomerated. | 8.56 | 13.99 | 10.30 | 27.00 | 4.80 | 14.30 | 3.40 | | | | | | |
| 4 | Sea slags with lead and litharge. | 13.59 | 11.37 | 10.50 | 32.00 | 5.00 | 13.00 | 3.80 | | | | | | |
| 5 | Slags with laurionite. | 10.00 | 11.23 | 10.50 | 30.00 | 5.00 | 15.00 | 3.80 | | | | | | |
| 6 | Litharge. | 65.00 | 3.59 | | | | | | | | | | | |
| 7 | Old slimes. | 10.30 | 53.90 | 10.55 | 42.50 | 5.95 | 6.30 | 4.50 | | | | | | |
| 8 | Yellow ecolovades. | 7.30 | 43.19 | 15.75 | 36.50 | 3.20 | 5.30 | 1.70 | | | | | | |
| 9 | Ecolovades Souriza. | 3.60 | 98.17 | 3.50 | 15.00 | 6.50 | 25.00 | | | | | | | |
| 10 | Coarse sand Products of modern concentration works. | 31.65 | 126.70 | 5.55 | 21.50 | 7.20 | 18.10 | | | | | | | |
| 11 | Fine sand. | 32.65 | 82.63 | 7.05 | 11.00 | 7.20 | 17.30 | | | | | | | |
| 12 | Fine slime. | 5.25 | 62.41 | 9.64 | 42.29 | 4.30 | 8.00 | 6.70 | | | | | | |
| 13 | Prepared bricks. | 10.20 | 72.91 | 10.35 | 20.00 | 4.30 | 15.50 | 3.00 | | | | | | |
| 14 | Unroasted arsenical fumes. | 38.50 | 3.83 | | | | | | | | | | | |
| 15 | Roasted fumes. | 50.00 | 3.00 | | | | | | 35.00 | 3.50 | | | | |
| 16 | Iron ore for shipping. | | | 37.97 | 3.80 | 1.20 | 5.50 | | | | | 15.25 | | |
| 17 | Iron ore for smelting. | | | 6.50 | 65.18 | 29.50 | 6.00 | 1.40 | | | | 5.30 | | |
| 18 | Base bullion. | | | 73.50 | 0.014 | | | | 0.374 | 0.713 | 0.31 | | | |
| 19 | Spise. | | | 4.00 | 91.43 | 56.00 | | | 24.00 | | 5.00 | | | |
| 20 | Refined lead. | | | 0.58 | 0.049 | | | | 0.0236 | 0.250 | 0.0079 | | | |
| 21 | Smithsonite. | | | | | 42.00 | | | | | | | | |
| 22 | Lignite. | | | | | | | | | | | 11.60 | 49.50 | |

The exhibit is of historical as well as practical interest in that the dumps of the waste products show the character of the work done by the ancient Greeks, and form to a large extent the raw material for the modern works, of which the other ores, market and intermediary

represented by No. 6. The old slimes (No. 7), which are so rich in silver, show that the ancients were not aware of the great losses of silver that are liable to take place in washing carbonate ores. Yellow ecolovades (No. 8), from dumps of ancient mines, and ecolovades



EXPERIMENTS ON SULPHUR IN CAST IRON.

and waste products are also shown. Mining began at Laurion at a very early date in the world's history, and flourished especially under Perikles and Themistokles in the fifth century B. C., when as many as 20,000 slaves were kept at work. The production then gradually decreased, and came to a stop about the first century A. D., when the old dumps had been worked over again and the mines were considered to have been exhausted. In the sixties a French company was formed to work up the dumps from the ancient mines and concentration and smelting works, and also to open up again the mines from which the old Greeks had not only not extracted all the sulphide and carbonate lead ores, but had left untouched the zinc and manganese iron ores which form to-day such an important part of the products of the four companies of the region. They give employment to 7,000 men, and produced, from 1864 to 1892, 250,000 tons of base bullion averaging 57 oz. silver to the ton; 550,000 tons of manganese iron ore, and 500,000 tons of zinc ore (roasted smithsonite).

The ancient land slags (No. 1) come from the slag dumps of the old Greeks and go straight into the modern blast furnaces; the sea slags (No. 2), worked in the same way, are recovered by means of steam dredges from the sea; often they form a loose conglomerate with limestone (No. 3) and contain lead and litharge (No. 4); in some cases a new mineral, Laurionite Pb Cl., Pb (OH)₂ (No. 5), has been

Souriza (No. 9), from dumps of ancient dressing works, are both passed through modern concentration works, of which Nos. 10 to 12 are the samples. Bricks, No. 13, represent the brick slimes ready to be charged into the furnaces. The arsenical fumes are collected in a flue of 4,000 ft. length and 96 sq. ft. section; their annual amount is from 3,300 to 3,900 short tons. They are purified by roasting in a small reverberatory furnace whence results a residue (roasted lead fume No. 15) that goes to the blast furnace, and a refined white arsenic ready for the market. Nos. 16 and 17 are some of the ores mined by the companies to-day. The smelting is carried on in 14 circular blast furnaces; the base bullion (No. 18) is for the most part sold to English, French and German refining works, a small amount being desilverized at the works by the Parkes process to furnish sufficient soft lead (No. 20) for the home market. The spise (No. 19) formed is sold to a small extent, the bulk being worked up at intervals. Smithsonite (No. 21) is roasted before being shipped to reduce its weight. The last sample of the table is a lignite (No. 22), which is used in the roasting furnaces and under the boilers.

Japan has an interesting collection of models of furnaces used for smelting, liquating and enpelling.

(To be Continued.)

SULPHUR IN CAST IRON.*

By W. J. Keep.

In this paper the author says that he had long accepted without question the statements as to the injurious effects of sulphur on cast iron. A large number of experiments and the results, however, lead him to correspond with those who had had experience with sulphurous iron ores. Their replies, without exception, were that only a very small percentage of sulphur could be made to remain in carbonized iron, and that it was very difficult, if not impossible, to introduce sulphur into gray cast-iron or into any carbonized iron. He goes on to state his position thus: "The conclusion finally reached was, that percentages of sulphur that could be retained by gray cast iron cannot materially injure the iron except through the increase of shrinkage. Again, the testimony is, that most of the sulphur contained in the pig iron is lost in remelting; and we think it would be impossible for carbonized iron to absorb any damaging amount of sulphur from the fuel. The higher the carbon, or the higher the silicon, the smaller will be the influence exerted by sulphur. In wrought iron, containing practically no carbon or silicon, a small amount of sulphur is said to do great harm, and such iron will take up large quantities of sulphur. In steel, containing less than 1% of carbon and practically no silicon, it is stated that a few hundredths of 1% of sulphur is a decided injury. As carbon increases to saturation, as in white cast iron, not more than 0.5% of sulphur can

be retained; and as silicon increases, turning the carbon into graphite, it is still more difficult to find sulphur in the iron, and such iron will not absorb it from the outside.

The influence of sulphur on all cast iron is to drive out carbon and silicon and to increase chill, to increase shrinkage, and as a general thing to decrease strength; but if in practice sulphur will not enter such iron, we shall not have any cause to fear this tendency. In everyday work, however, it is found at times that iron which was gray when put into the cupola comes out white, with increased shrinkage and chill, and often with decreased strength. This is caused by decreased silicon, and can be remedied by an increase of silicon."

In the paper are given a large number of tests to support the opinions stated, and these are accompanied by sections showing the fracture and chill of the iron. The tests were made chiefly with a Swedish gray charcoal pig iron containing 1.24% silicon and 0.187% manganese. In the experiments the iron was melted in a crucible and sulphur added, as noted. The tests made were on square bars, 0.5 x 0.5 x 12 in., and flat bars 0.1 x 1 x 12 in. in size. The strength is the actual strength of a bar 0.5 in. square, broken transversely; chill and deflection in inches actual measurement, and shrinkage in inches per foot.

In the series (Fig. 1) brimstone was added to the molten metal by putting in a hollow wooden plug which carried the sulphur down to the bottom of the melted iron. In No. 253 the iron was free from sulphur; in the others, 265-270, the percentage was gradually in-

FIG. 5.

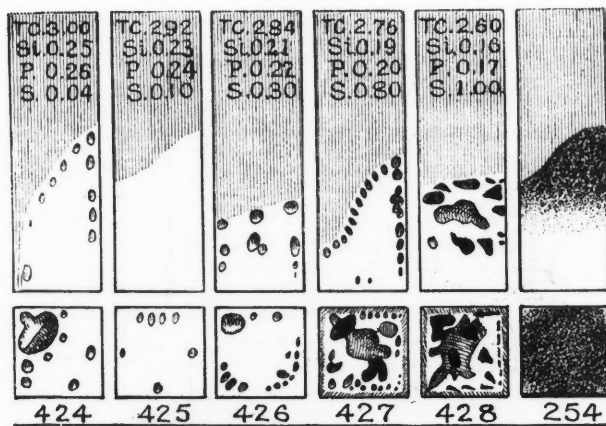


FIG. 6.

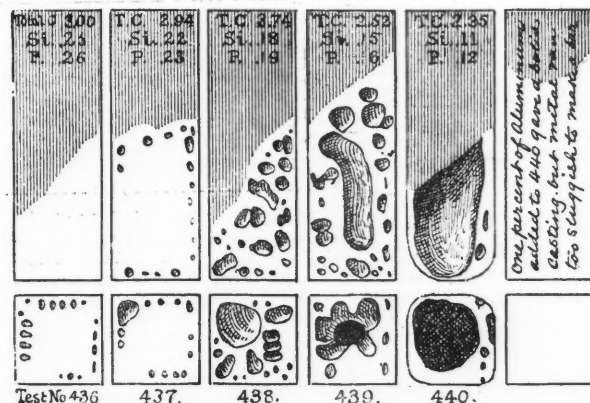


FIG. 7.

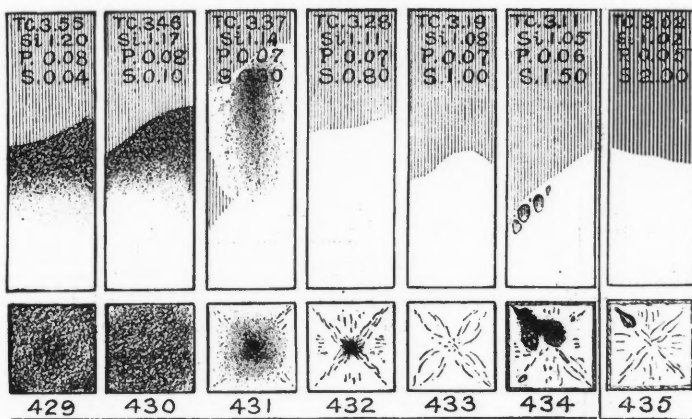
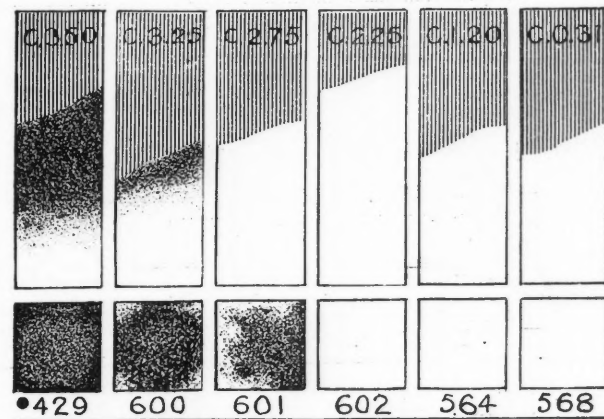


FIG. 8.



EXPERIMENTS ON SULPHUR IN CAST IRON.

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creased, as shown by the figures in the cut. The result showed, as the sulphur increased, a gradual but somewhat irregular decrease in strength from 413 in No. 253 to 341 in No. 270; an increase in shrinkage from 0.168 in. to the foot to 0.194 in. The depth of drill and evenness of grain were not affected sensibly.

In Fig. 7 are shown the variations in chill and grain obtained by using the same gray iron as in the first experiments, adding the iron sulphide and keeping the silicon at 1.25% in each case. In this series, as the silicon did not vary, there was only one element of uncertainty, the carbon-content which was reduced to 3.30 in No. 592. To ascertain the effect of such a reduction of carbon with no reduction of silicon and without sulphur, three crucible-tests were made with the same iron, adding wire to reduce carbon, but keeping silicon uniform. The resulting grain, etc., are shown in Fig. 8. By comparing No. 592 (3.30 carbon) with No. 600 (3.25 carbon) it would appear that 1.50% sulphur reduced strength 77 lbs., turned the iron white, and increased the shrinkage 0.75 in. Another comparison, with 3.22 and 3.25 carbon, showed that 2% sulphur reduced strength 50 lbs. and increased shrinkage 0.77 in. The reduction of carbon did not turn the iron white until it reached 2.25%, as shown in Fig. 8.

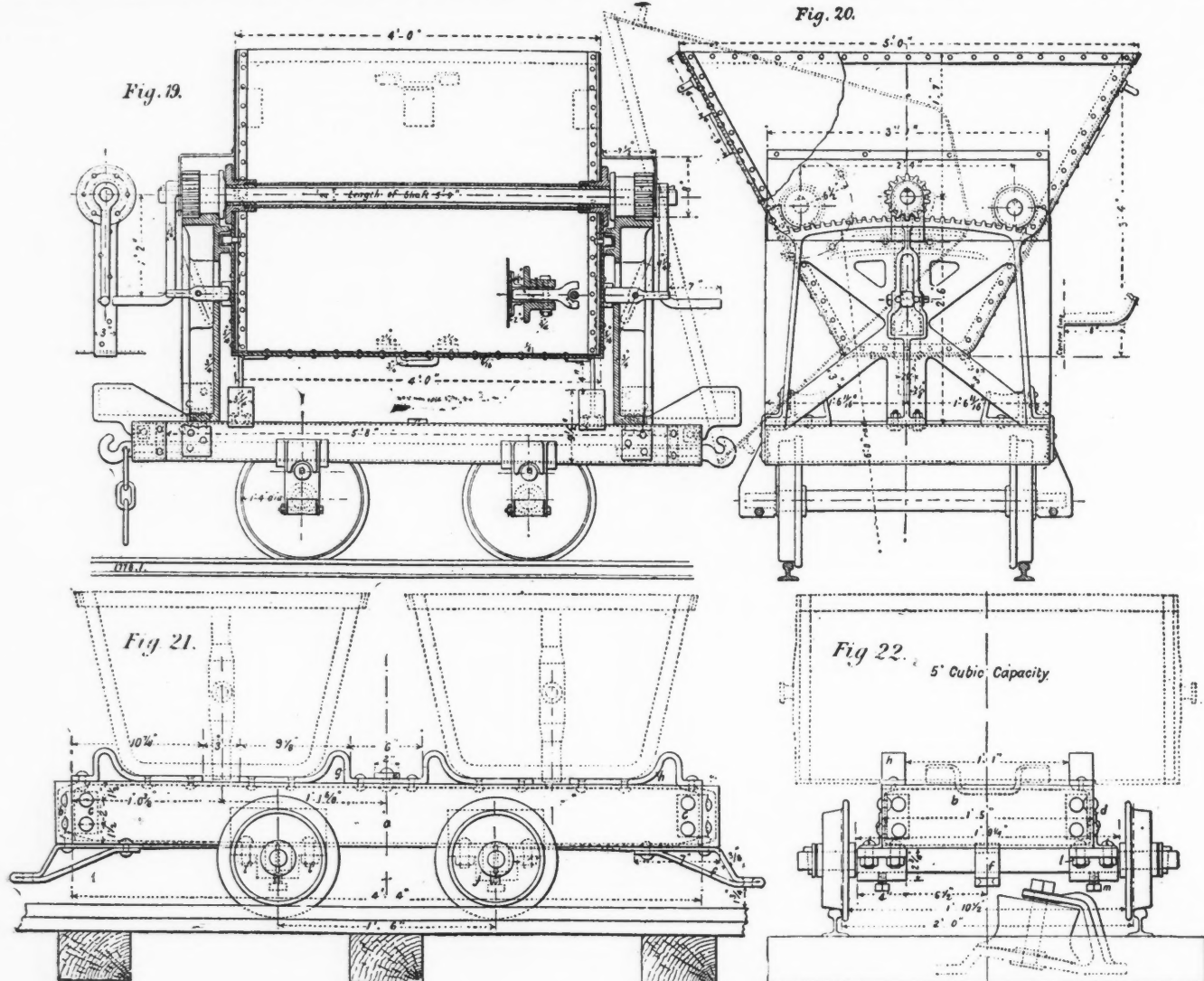
The preceding were each made with 10 or 15 lbs. of material, and were conducted as in ordinary foundry work, and the sulphur was in contact with the melted iron fully as long as would be possible in cupola melting, and in several of the series very much longer. The result of these and other experiments, Mr. Keep thinks, show that "the rapid melting of pig-iron in a cupola, in which the coke is largely desulphurized before it reaches the point where the iron is melted, cannot possibly much increase the sulphur-content of the pig-iron, and much testimony goes to show that a considerable part of the sulphur already in the pig is driven off during remelting. The

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

pig-iron will never contain more than 0.10%, and probably will never have one-half that amount of sulphur. Examining the experiments with a view to ascertaining the influence of 0.50% of sulphur, we must at once conclude that this amount will not exert any appreciable deleterious influence, and that what little is done in this direction is at once corrected if we slightly increase the silicon.

"Remembering that the only noticeable effect of these small percentages of sulphur would be to slightly raise the shrinkage, the above conclusion seems to be also proved by the fact that in a cupola running on a substantially uniform mixture, and returning from 25 to 40% of its iron to the cupola to be remelted over and over again each day, the castings will almost invariably have a less shrinkage than the average of the pig-iron used, and yet we think, as a general thing, the castings will contain more sulphur than the average of the pig-iron, and the silicon will always be less than the average of the silicon in the pig-iron. The depth of chill does not seem to be in-

Trenton company include the single-rope systems of Hodgson and Hallidie; aerial inclines of very steep grade; cable hoists and conveyors, the most remarkable example of which is that crossing the Susquehanna River at Glen Union, Pennsylvania, which is used for carrying loaded railway cars up to 15 tons' weight, across the river where the width is 735 ft. It was intended to build a bridge for the purpose; but the offer of the Trenton company was accepted, and the work was completed at less than one-fifth the cost. The cars are carried on a platform cage, the rails on which correspond with those on the track; the cage is hung to a fall block suspended from the carriage, which rests on a double line of main cables 2 in. in diameter. Other specialties are log skidders and cableways. The former are for logging operations, and consist of lines of cable stretched from tree to tree in such a way as to be easily shifted; this supports a running carriage moved by a tail rope wound round the drum of the hauling engine. The skid rope is wound round another drum, passes over a sheave at-



MINE CARS MADE BY THE TRENTON IRON COMPANY.

fluenced by these small percentages of sulphur, and there is no testimony to show that there is any relation whatever between the sulphur-content and the strength in pig-iron or in ordinary castings."

THE TRENTON IRON COMPANY'S TRAMWAY EXHIBIT AT CHICAGO.*

(Continued from Page 396.)

Besides the Bleichert, the Trenton Iron Company makes several other classes of light tramways, also exhibited at Chicago. One of these is the "Acme" steel tramway, in which two lines of flat steel bands are suspended between the supports and form the track for the cars, which are hauled by an independent rope. The flat bands can be laid double, or even treble, if the weight to be carried requires it, and they pass over curved blocks at the head of the supports (see Figs. 13 to 15); spans up to 250 ft. are adopted on this system. The cars, which can be used of one ton capacity, are of the form shown in Figs. 24 to 27; the supporting wheels are at the top on each side; the hauling rope and its grip are in the center, and it will be seen that the bottom of the car is fitted with four wheels for transporting it from the quarry or mine on surface tracks, to the elevator of the overhead tramway. The bottom of the car is hinged so that the contents can be dumped when desired. Several lines on this system are in successful use. The other types of rope transportation exhibited by the

tached to the carriage, and has a pair of hooks for holding the log at the end.

Figs. 19 to 23 are drawings of two types of mine cars made and exhibited by the Trenton Iron Company; they form part of their underground hauling plant, which has been introduced to a considerable extent in American coal mines. The larger of these wagons is hung upon trunnions, on each end of which is a pinion that gears into a curved rack on top of the end standards of the wagon frame. They can be tipped in either direction by traversing the pinion on the rack by means of the hand levers, until the pinion comes against the curved stops on the frame. The smaller cars are mounted in pairs on a four-wheeled underframe. They are provided with trunnions by which they can be hoisted and tipped.

Electro-Magnetic Separation of Blende and Spathic Iron.—A plant for this purpose is in operation at the dressing works of the Ludwigsee mine, in the Burbach Bergreviere, Germany. The blende-spathic iron concentrates from the jigs are heated to redness in a reverberatory furnace, and after calcination are cooled and elevated to a bin in the separating house. The separating machine consists of two magnetized chains passing over wooden rolls, which drag the oxide of iron away from the blende. The blende falls back into a bin, while the iron is removed from the chain by a brush, against which it rubs. The machine used at the Ludwigsee mine treats 50 kilograms of ore per 24 hours, and makes a zinc product with 35 to 40% metal.

* Abstract of article in London "Engineering."

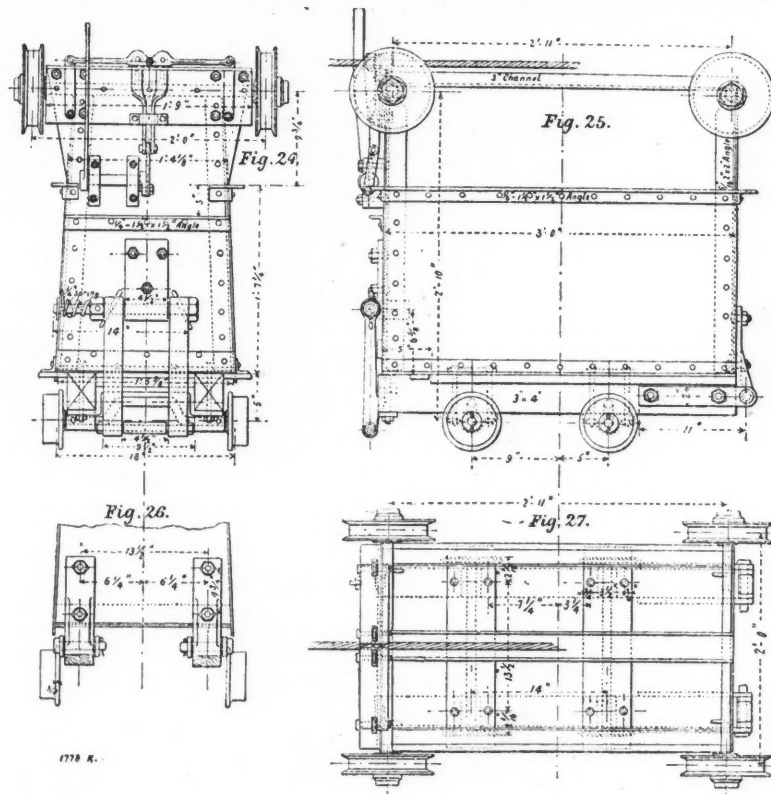
Copper in the Congo Free State.—Near Minduli, in the vicinity of Comba, on the Loango-Brazzaville route—not far from the springs of Ludima-Niodi, south of Stephanleville—in the southern part of French Congoland, copper carbonate in workable quantity is found in micaceous sandstone. From 300 to 350 laborers are occupied there in the dry time of the year. The mineral zone, so far as it has yet been traced, has a longitudinal extent of 2 kilometers. In a silicious cap, on the carbonate zone are found malachite and willemite.

The Nicaragua Canal.—Mr. Doolittle, of Washington, has introduced in the House of Representatives a resolution, which was referred to the Committee on Commerce, requesting the Secretary of State to inform the House of the amount of work at this time performed on the Nicaragua Canal and the approximate amount of money already expended in the construction of the canal; what steps the Government of the United States has taken, or is taking at the present time, to protect the interests of American citizens and investors in the canal, and the present status of the American company chartered by Congress. The resolution speaks of the importance of the work to commerce and American interests, and in concluding says that it is a matter of exceeding importance that it be ascertained what obstacles, if any, prevent this Government from immediately taking up and thoroughly considering the entire subject of the Nicaragua Canal, with a view to its speedy solution.

Coal Mines of Servia.—In a consular report just published it is

The current from the dynamo is taken to a high tension, double-pole switch on the main switchboard. From the switch the current is conveyed down the pit through cables covered with highly vulcanized india rubber. The cables are run all the way in-by on insulators, and are kept well in sight, so that, should a fall of stone occur, the damage can be quickly discovered and set right. The main cables are run to a point at a distance of 1,000 yards from the generator; and then from this point branch cables are run to the different junction boxes, of which there are six to each drill, commanding twelve working places.

The Manufacture of Borax.—Mr. H. N. Warren, of Liverpool, England, writes to the "Chemical News" about a new process for manufacturing borax from commercial boracic acid and common salt, discovered by him. The process consists of subjecting the mixture of salt and boracic acid to the action of superheated steam in clay retorts at considerable heat. The method is based on the fact that if boracic acid is melted at a low red-heat in a crucible or retort, as long as aqueous vapors are discharged, volatilization of the boracic acid is perceptible until about 70% of the water present is discharged, while the remainder of the water is expelled in an almost pure condition. Boracic anhydride is almost entirely fixed at elevated temperatures, while boracic acid is one of the most feeble of acids. The retorts used by Mr. Warren are composed of acid resisting material, and the tops are tubulated to allow the steam to be introduced. After the retorts have been charged with an intimate mixture of well ground salt and boracic acid, the neck of the retort is then connected



CARS FOR "ACME" STEEL TRAMWAY.

stated that the amount of coal extracted from the various Government and private mines in 1891 was 100,263 tons. The coal or lignite has hitherto been chiefly taken from the surface of the mines, and, when not quite worthless, often emits an unpleasant odor during combustion. The high price of firewood and its increasing scarceness in Servia must, however, press forward the inevitable adoption of the cheaper fuel. Among the coal mines worked by companies or private capitalists, the best known, perhaps, is that of Vrška Chuka. This property is in the hands of the Servian Industrial Company, of Brussels. It covers an area of 262 mining fields (26,200,000 square metres). In 1891 the company extracted 20,434 tons of coal, and manufactured 20,293 tons of briquettes. These are chiefly used on the Lower Danube, where much difficulty is experienced in competing with English coal. The number of boats at the disposal of the company is said to be insufficient for the transport of their output. The total area of private coal mines in Servia in 1891 was 964 mining fields; 876 workmen were employed in coal mining, and 600 workmen in other mines—in all 1,476 miners. The total sum expended during that period on the different State and private mines was £7,320.

Electric Drills in English Mines.—At the Carlin How iron mine, in the Cleveland District, England, electric drills are now generally used. The work done averages 10 holes per hour, against 8 by the compressed air drill, the holes being about 4¼ ft. deep. The current for working the drills is generated at bank by a compound-wound dynamo, having an output of 20,000 watts, and capable of furnishing a current of 50 amperes at a pressure of 400 volts, when running at 900 revolutions per minute. The current required to drive each drill varies of course with the hardness of the stone; but, under ordinary conditions, and when the voltage at the drills is 300, the current absorbed per drill-motor is about 15 amperes, which is about 6 electrical horse power.

with a refrigerator for the purpose of condensing the acid given off. Directly the retorts are heated to low redness, hydrochloric acid is disengaged in large quantities. The heat is then slightly raised, and the supply of steam so regulated that water in the form of steam is allowed to enter through the tubulure in sufficient quantity to condense in the refrigerator the hydrochloric acid formed. The result is a quick and complete decomposition of the salt, with the production of anhydrous borax, which remains in the retorts, while a dense and pure acid collects in the condenser. When the reaction is completed the contents of the retort are ejected, while still red hot, into cold water. It is allowed to remain in the water for two days in order that it shall all be dissolved. After that time it is recrystallized out in the form of ordinary borax.

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 OCTOBER 7TH, 1893.

- 16,592 of 1892. Concentrating Gold Ores. R. H. Gray, London. (F. W. Grey and W. Marsh, Ooregum, India.)
- 17,694 of 1892. Recovering Bismuth, Etc., from Flue Dust of Copper Works. J. W. Kynaston, Liverpool.
- 18,297 of 1892. Coal Sizer. A. Hegener, Cologne.
- 18,900 of 1892. Manufacture of Cuprous Oxide. Dr. C. H. W. Hoepfner, Gressen, Germany.
- 20,055 of 1892. Manufacture of Bleaching Powder. W. J. Fraser and L. M. Fraser, London.
- 20,284 of 1892. Manufacture of Chlorine. P. de Wilde and A. Reyckler, Brussels, and F. Hurter, Widnes.
- 20,485 of 1892. Miners' Safety Lamps. T. O. Robson and M. W. Brown, Gateshead
- 20,578 of 1892. A-bestos Lining for Metallurgical Furnaces. B. Richards, Swansea.
- 21,162 of 1892. Soldering Aluminum. R. Haddan, London. (F. Singer, Breslau.)
- 19,811 of 1893. Rock Drills. T. Reunert, Leeds.
- 14,946 of 1893. Deep Boring Apparatus. A. Raky, Durrenbach, Germany.

PERSONALS.

Mr. M. W. Burt has resigned his position as superintendent of the Newport & Royal Iron mines of Ironwood, Mich.

Hon. W. A. Clark recently returned to Butte, Mont., after a trip to the East in the interest of the Bi-Metallic Association.

Capt. N. Cates has been elected manager of the Bone Valley Phosphate Company of Florida, in place of Colonel Beatty, resigned.

Mr. Richard Eames, Jr., has retired from the management of the Gold Hill mines, in Rowan County, and assumed charge of the Nugget gold mine, at Georgeville, N. C.

Mr. E. H. Miller, formerly assistant to Professor Ricketts in the Assay Department of the Columbia School of Mines, is shortly to be made instructor in assaying in the institution.

Prof. P. de P. Ricketts, formerly professor of assaying in the Columbia College School of Mines, has been made professor of analytical chemistry in place of Dr. Elvyn Waller, resigned.

Mr. E. B. Howell, a lawyer of Butte, Mont., has an article on the "Evils of an Appreciating Currency" in the "Review of Reviews" for October, showing a careful study of one phase of the present currency situation.

Mr. Wm. H. Van Arsdale, vice-president, and E. F. Eulich, general manager of the Chicago & Aurora Smelting and Refining Company, have been visiting Leadville, Colo., to consider the situation with regard to their works there.

Dr. Peter T. Austen, who has for some time past been at Rutgers College, New Brunswick, N. J., has been appointed professor of chemistry at the Brooklyn Polytechnic Institute. Dr. Austen has a high reputation as a scientific teacher and lecturer.

OBITUARY.

We regret to announce the death of John H. Avery, general purchasing agent of the Rookery, Chicago.

Samuel S. Earle, treasurer of the Aspen Mining and Smelting Company, died in this city, October 14th, aged 50 years.

H. L. Reed, assistant general manager of the Crown Point Iron Company, died suddenly in Port Henry, N. Y., October 14th. He was buried in Burlington, Vt., two days later.

Zachariah Dederick died suddenly of heart disease in New York, October 19th, aged 73 years. He was for many years a gold and silver refiner, but retired from business a few years ago with a considerable fortune.

John O. Hughes, senior member of the firm of Hughes & Patterson, iron manufacturers, of Philadelphia, Pa., died suddenly in Chicago October 18th. Mr. Hughes was born in Denbigh, Wales, in 1822, and when a young man emigrated to this country. He became identified with the iron trade and entered the firm of Hughes, Morgan & Caskey, by which, in 1870, the Delaware Rolling Mill in Philadelphia was erected. The firm afterward became Hughes & Patterson, and in 1875 Walter Hatfield was admitted to an interest. The Philadelphia Rolling Mill was purchased by the firm in 1889 and added to the plant, the total output of the whole being 27,000 tons a year.

SOCIETIES AND TECHNICAL SCHOOLS.

Mining Institute of Scotland.—A general meeting was held in Glasgow, October 11th, when Mr. James S. Dixon's paper on "Work Done by Stanley Heading Machines at Hamilton Palace Colliery," and Mr. James Hamilton's paper "On the Report of the Royal Commission on Mining Royalties" were discussed. Papers were read by Mr. Robert Martin on "The Midlothian Coal Basin," and by Mr. John Hogg, on "Coal Washing at North Motherwell Colliery." Mr. V. C. Doubleday described the Sussmann miners' electric safety lamp.

American Bankers' Association.—At the meeting in Chicago, October 19th, papers were read by George E. Leighton, of St. Louis, on "Currency Reform"; James H. Thorp, of Marathon, N. Y., on the "National Banking System"; and Horace White, of New York, on "An Elastic Currency." Addresses were made by Joseph Johnston, of Birmingham, Ala.; E. E. Lindemuth, of Clearfield, Pa.; F. C. Dillard, of Sherman, Tex., and others. In the evening a reception to the members of the Association was given at the Union League Club.

On the second day addresses were made by Mr. E. O. Leech and others. The following officers were elected: President, M. M. White; vice-president, John G. P. Odell; members executive committee, Dumont Clark, J. B. Fargan, M. B. Hepburn, M. H. Rhawn, John B. Branch, T. B. Day and F. W. Hayes. A vice-president from each State was also chosen.

California Miners' Association.—The third annual convention was held last week in San Francisco. One of the most important matters considered was the bill introduced in Congress by Senator Stewart, which is considered to be inimical to drift gravel mining. Further steps, also, had to be taken in order to give full effect to the Caminetti bill, and the report of the government engineers appointed under the Biggs act. The committee recommended that, in order to more fully carry out the provisions of the Caminetti act, a bill be presented to Congress providing for an appropriation to aid in building works to impound tailings, on the Sacramento and San Joaquin rivers. Several of the oilmen of Ventura County joined the Association.

Jacob H. Neff, of Placer County, was re-elected president of the Association by acclamation; S. K. Thomson was elected vice-president; W. C. Ralston, secretary; W. W. Rodchaver, assistant secretary; Julian Sonntag, treasurer. The report of Secretary Ralston showed the receipts to have been \$4,070 and the expenditures \$3,987.

International Irrigation Congress.—The meeting of this body began at Los Angeles, Cal., October 11th, with nearly 200 delegates present. The following officers were reported by the committee on permanent organization: President, Judge J. O. Emery, Lawrence, Kan.; vice-presidents, I. S. Vanderwerker, Arizona; T. B. Comstock, California; J. M. Lee, Nebraska; W. S. Stone, Utah; T. D. Babbitt, Idaho; Dr. G. A. Miller, Washington; John E. Jones, Nevada; C. Kneck, Montana; E. R. Moses, Kansas; S. P. Heintzelman, New Mexico; W. E. Allen, Illinois; R. T. Cox, Oregon; for the American Society of Irrigation Engineers, J. E. Schuyler, of California; secretary, F. L. Attes, Los Angeles; assistant secretaries, J. H. Gregory and L. A. Hicks. The committee recommended that a permanent executive committee be named by the delegation and reported through their chairman to the convention, consisting of one member from each of the States and Territories represented. The report was adopted. On the second day a resolution was offered that where States or Territories did not have an irrigation department or bureau, steps be taken at once to have the legislatures establish such. Another resolution sets forth that settlers on semi-arid lands of the government should have government aid in reclaiming water supplies, and some part of the money received by the government for the land should go in establishing water basins and other water supplies. T. H. Newell, of the Interior Department, read a paper on government investigations. Col. John P. Irish read a paper on the need of unity of action and the compilation and publication of irrigation matter. A number of other papers on irrigation were read and discussed.

INDUSTRIAL NOTES.

Potts Brothers' Rolling Mill, at Pottstown, Pa., closed October 14th, until further orders.

The Bethlehem Iron Company will start the steel mill on October 23d. The mill will run for several weeks on orders at present on hand.

A reduction of 10% in wages has been announced by the Atlantic Iron Works, Arethusa Iron Works and the Wire Nail Mill, all of Newcastle, Pa.

The National Lead Company's directors voted October 19th that it was prudent to postpone consideration of the payment of dividends on the common stock.

The Flemington (N. J.) Iron Foundry, which had been idle for nearly a year, started up on full time on the 12th inst. The plant was bought by John Foran, of Quakertown, Pa. The foundry employs 60 men.

Among the iron and steel plants at Pittsburg, Pa., which started October 16th, were the Sligo mill, where 300 union puddlers went to work. The sheet mill of the Clinton Iron and Steel Company, was started with 100 men.

There is a general resumption of work at the Edgar Thomson plant of the Carnegie Steel Company. At the Homestead works several more departments were started. Eight more puddling furnaces were started at the Six-mile Ferry plant of the Monongahela Iron and Steel Company.

What is said to be the biggest steel casting that ever came to this country arrived on the steamer "Nomadic," from Liverpool, this week. It weighs 65 tons and is part of the new hydraulic forging plant which the Carnegie Steel Company, Limited, is importing to manufacture armor plates.

The Amalgamated Association of Iron and Steel Workers, after a long conference on October 19th, agreed to accept the scale of wages proposed by the Joliet branch of the Illinois Steel Company, and the fires in the mill will soon be lighted again. The scale will be 11 cents an hour for day laborers, and 33% reduction on tonnage.

The Belmont Nail Works, a part of the Wheeling (Va.) Iron and Steel Company's plant, started up on the 16th inst., after an idleness of five months, giving employment to over 500 men. The Bessemer furnace, of the same concern, will resume within a few weeks. Since it was closed, last July,

it has been practically rebuilt and its capacity increased by nearly one-half.

Among the sales recently made of the Stirling water tube safety boiler, are: 250 H. P. to Adriance, Platt & Co., Poughkeepsie, N. Y.; 300 H. P. to Simpson & Watkins, Scranton, Pa. (second order); and 250 H. P. to Lutz, Lilly & Co., Philadelphia, Pa. In the West Farms station of the Union Railway Company, New York City, 500 H. P. has recently been put into service, and an additional 500 H. P. ordered.

James Lefel & Co., Springfield, O., recently shipped a very large turbine to Niagara Falls for the water power there. It is a double discharge turbine rated at 1,200 H. P., and will work under 130 ft. head. The wheel is 67 in. in diameter and will run at 225 revolutions per minute. The entire weight of the wheel and casing is 30 tons. Water will be conducted to the wheel by an 8-ft. pipe entering the casing from below. The shaft will be connected directly to the powerful wood-grinding machinery of the Cliff Paper Company. This company already has one wheel of the same pattern in operation. The Lefel company has also just completed a new design of wheel plant for another New York company. It includes four wheels in one system, making a quadruple wheel to operate under 40 ft. head and intended to give 1,000 H. P. The combination is entirely original.

The Foss Manufacturing Company, Springfield, O., were awarded three first medals at the World's Columbian Exposition, at Chicago, on crushing mills, attrition mills and safety device, the latter applying especially to feed mills.

The board of directors of the Wellman Iron and Steel Company, of Chester, Pa., October 18th, voted to place the affairs of the corporation in the hands of a receiver, and an application to that effect was at once made. William B. Broomall, the company's attorney, has been appointed receiver, and he will take charge of the establishment at once. Messrs. John B. Roach, Col. William C. Gray and William S. McMann were appointed appraisers. The \$1,000,000 stock in the company is chiefly held by local capitalists, although Philadelphia parties connected with the Baldwin Locomotive Works are also large holders. Mr. S. H. Chauvenet, vice-president of the company, represented the interests of the Baldwin people. The Wellman syndicate, headed by Samuel T. Wellman, the president of the company, had a majority of the stock. Mr. Wellman is a well known metallurgist. He built the great Otis Steel Works, at Cleveland, O., and was a consulting engineer for the Illinois Steel Company, at Chicago. There are enough contracts on hand to keep some of the departments of the works in operation for several weeks. The general impression is that the company will be reorganized and that there will be but little delay in the work. The statement made in the application for a receivership shows that the total issue of bonds amounts to \$583,000, and the statement further sets forth that the company is otherwise indebted in the amount of about \$550,000, making the total liabilities, including the mortgage bonds, about \$1,133,000. The plant represents an investment of close on to \$2,000,000.

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.

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GENERAL MINING NEWS.

The Bureau of Statistics, Treasury Department, reports the exports of mineral oils for the month of September as follows, in gallons: Crude oil, 10,232,036; naphthas, 1,694,422; illuminating, 62,656,791; lubricating oils and paraffin, 3,772,075; residuum, 13,062; total, 78,368,406 gallons; an increase of 13,094,977 gallons, or 20% over September, 1892. For the nine months of the year to September 30th, the total exports were 641,146,760 gallons; an increase of 116,936,601 gallons, or 22-7% over the corresponding period last year.

ALABAMA.

Cleburne County.

(From our Traveling Correspondent.)

Sutherland Mine.—This mine has been worked the most extensively with incline shafts; one is about 40 ft. deep, another 25 and a third about 15. These openings are all on the same ledge, but whether this is a vein or a deposit is yet undetermined, for no well defined walls have been exposed, and at one point two strata of gray ore occur separated by decomposed slate. These have apparently come together near the third opening where the ore body prospects for a thickness of 12 ft. The outcrop of this ledge can be traced

by float and at irregular intervals rock in place, both in a northeasterly and southwesterly direction for a distance of at least two miles each way. Ore from this property has been milled in a temporary stamp mill constructed of wood throughout except clumsily made iron shoes, the stems being made from 4x4-in. lumber; the cam shaft also being of wood with wooden cams attached, and wooden stakes set in augur holes bored through the stems to act for tappets. At present this curiosity is shut down because the engine and boiler had been leased out previous to the erection of the mill for ginning cotton at a gin in the vicinity. The owners of the mine are so well satisfied that they propose erecting a modern plant for the treatment of this ore.

Wise.—This property, situated four miles to the eastward from Arbacochee, is at present not being operated, because the option which was held by N. P. Truener expired. During the existence of this option ore was mined and milled at a cost of about \$1 a ton and the ore treated in an old 10-stamp mill yielded \$2 a ton, or 25% of the average assay value. With increased crushing capacity and systematic amalgamation, the cost could be decreased, and the value saved increased. The ore body on this property shows at one point, about 20 ft. below the surface, where a cave has recently occurred, a thickness of 30 ft., with the question as to whether either wall has been encountered undetermined. No cross-cut has been run at water level, but the drift was mined a width of 18 ft. without exposing the hanging wall, and the foot-wall uncertain because in timbering; ore, which prospected, was found beyond the footwall. The ore on this property is a decomposed quartz, and the outcrop can be traced in a southwesterly direction for a distance of eight miles, although so little prospecting has been done that its value is undetermined beyond the line of the Wise property, consisting of 800 acres, until the northeastern line of the Eckles property is reached.

ARIZONA.

Cochise County.

F. A. Huntington has bonded the Silver Cave and Sacra gold properties, and the Silver Cave mill site near Dos Cabezas for \$32,000.

Gila County.

Old Dominion Copper Company.—The Globe "Silver Belt" of a late issue has the following account of this company's property: An improvement, invented by John Murphy, the head smelter, and recently applied to the furnaces, consists of an auxiliary windbox encircling the crucible. The air from the blower pipe, upon entering the auxiliary windbox, makes the circuit twice before entering the furnace, which serves to raise the temperature of the air about 50°, and effects a saving of fuel amounting to 5 lbs. on every charge, or over 950 lbs. of coke per day. The product of two furnaces is now about 16 tons per day. The Bleichert cable tramway delivers about 120 tons of ore and 25 tons of lime per day, and has a capacity of about 250 tons daily. The second level tunnel is being pushed toward the northeastern limit of the company's ground, and will soon be half a mile long. The ore bodies on the seventh level are looking well; the ore is of a good grade, and new ground is being continually opened up. In the second level the slope is 150 ft. wide. The ore on the second is rich, though streaked with barren rock. Most of the ore that goes to the smelter is from the second and fifth levels.

Yuma County.

Harqua Hala Gold Mining Company.—The return for September shows 2,700 tons crushed; gold produced, \$32,000; expenses, \$11,200; profit, \$20,800; to which is to be added \$1,500 miscellaneous receipts, making \$22,300 for the month. A dividend of 9¢ per share has been declared for the quarter ending September 30th; payable in London November 10th.

CALIFORNIA.

(From our Special Correspondent.)

Mining assessments falling delinquent during the current month amount to \$19,000.

Amador County.

Veta Madre Mining Company.—This company was recently formed in San Francisco for the purpose of developing the Bright and the Shober mines, located south of Jackson Creek, upon that division of the Mother lode on which are found the Kennedy, Argonmit and Alma mines, says the Jackson "Ledger," and has been worked by prospectors in former years who mined and milled ores to the water level 50 to 70 ft. in depth. The Shober covers about 900 ft. along line of lode, and the croppings of a valuable ore body have been worked about 200 ft. in length, and at one point more than 20 ft. in width. The Bright mine adjoins the Shober on the south, and is about 900 ft. long along its lode line. Shafts have been sunk on this mine, four of which have reached a depth of from 24 to 70 ft., and several lots of ore milled; one of 100 tons milled by the owner gave returns of \$7 per ton, and these excavations, with many open cuts, show a continuous working of over 300 ft. Work of development will soon be commenced.

Nevada County.

Waho Mining Company.—The directors of this company held a meeting in Grass Valley on the 4th inst., and declared dividend No. 277 of \$9 per

share. This is one of the largest dividends the company has paid for some time. It was paid from the reserve fund and from the payments made by the Maryland company under the terms of agreement made last May. The mine is looking well, says the Grass Valley "Tidings," and at the present rate the Maryland company will be able to pay for it within a year and take possession.

Placer County.

(From our Special Correspondent.)

Columbia Gold and Silver Mining Company, Ophir.—A new shaft is being sunk on the property now owned by this St. Paul corporation. New hoisting works, to be run by water power under 350-ft. pressure, are to be erected, and a complete Ingersoll compressor drill plant will be put in. An 80-stamp mill is talked of, and among other improvements will be a 250-light dynamo for lighting purposes.

Plumas County.

Plumas-Eureka.—A good strike is reported at this property, at Johnsville. The mine, it is said, had not been paying well lately, and the company had intended to close down shortly for the winter.

San Francisco County.

(From our Special Correspondent.)

In addition to companies previously mentioned as having made application to resume hydraulic mining, Secretary Ralston reports the following having applied to the U. S. Debris Commission for a license to mine:

The Kelly Gold Gravel and Mining Company, Big Butte Creek, Butte County.

The Omega mine, Scotchman Creek, Nevada County.

The Farrel mine, Columbia Hill, Nevada County. After examination by the commission this mine was granted a license to mine by the hydraulic process, and is now at work using its old hydraulic pit for dumping-ground.

Trinity County.

(From our Special Correspondent.)

La Grange Hydraulic Mining Company, Weaver-ville.—The contract for 4,000 ft. of iron pipe for two inverted siphons on the company's new ditch has been given out. The pipe will be 26 to 29 in. in diameter; the vertical pressure will be 575 ft., and the pipe will carry 2,000 in. of water.

COLORADO.

Conejos County.

Mammoth & Revenue Mining Company.—It is reported from Platoro that this company has encountered an 18-in. body of high-grade gold ore in the 200-ft. level.

Dolores County.

Enterprise Mining Company.—This company is working with two-thirds the usual force. Men will be added until the full force is again working. The company will renovate the Adams concentrator, says the Rico "News," for the purpose of handling the product of the Laura mine.

Rico-Aspen Consolidated Mining Company.—Over 100 men are at work on this property. A good quantity of high-grade is being shipped.

The following items of Rico and West Dolores mining news are from the Rico "News":

Iron.—This mine is working a small force of men on ore, which is being shipped to Durango.

Golden Age.—Mat O'Loughlin and partners made a shipment last week from the Golden Age. The ore is high-grade.

Little Emma.—A carload of high-grade ore was shipped from the Little Emma recently. The mine is being worked under lease by Geo. Parshall.

El Paso County.

A strike of good ore is reported from the Pike's Peak No. 2, a lease on Pike's Peak ground adjoining the famous producer on the west.

Many sales of mining property are reported from Cripple Creek. Last week: The Hart group of four claims were sold to W. S. Loan, of Aspen, for \$40,000. The Ida May and John A. Logan claims on Bull Mountain were bought by Kissel, Otis & Connor, of Colorado Springs, for \$30,000. The Little May, Lawrence and the Australia were sold to Comt Parrales, of Colorado Springs, for \$49,000. Senator Dorsey bought the Providence mine for \$30,000. W. E. Guyette bought the Camilla for \$15,000.

Appie Allen.—H. P. Barbour, of Duluth, who recently purchased the Trail, has also bought the Appie Allen at Cripple Creek, paying \$15,000.

Bonanza.—This mine, on Squaw Mountain, has a three-foot vein of ore, and a streak on the hanging wall that assays \$260.

Cripple Creek, to judge from all reports, is just now the leading mining camp in Colorado, so far as production and number of working properties are concerned. The mining columns of the Cripple Creek "Crusher" daily contain many items of interest. We extract the following from a late issue of that paper: Another strike is reported to have been made on Bull Mountain, on the south side. The Deerhorn shaft is now down 170 ft. whence connections are being run to the old workings. Very little except dead work is being done on this property at present. Encouraging reports come from the Little Emma, on Mineral Hill, the prop-

erty of Chambers & McHenry. A large vein of fine quartz is being opened that prospects well. In the face of the west drift, on the Wichita, 9 ft. of vein matter is disclosed, more than half of which is good ore. Nearly 200 tons of ore have been sent to the Rosebud mill during the past month. There are two well defined pay streaks in the vein. Very little stopping has been done. The Isabella company is sinking a new shaft east of the old one, on the Lee property. Belief is now that the Victor vein runs north of and parallel to the Lee and Smuggler vein. A strike of rich ore has been made on the north side of Mineral Hill. Jacob Abbott is one of the owners. At 40 ft. a 10-in. streak has been discovered, that shows free gold. A shipment was made last week to one of the mills. The J. C. claim, southeast of the C. O. D., on the right fork of Poverty Gulch, is showing up nicely. At 35 ft. a large vein has been disclosed in a cross-cut which shows quartz and some sylvanite. The J. C. is owned by J. C. Williams and the World Mining Company. It is one of the few wet mines in the district. Brown Pullin has given a short option on the Sunset, adjoining the Eclipse, in Requa Gulch, to McIntyre, Jackson and Pueblo parties, for \$15,000. A force of miners were put on last week and at 7 ft. from the surface a lead of promising quartz was uncovered. Development is being pushed on the property.

Jay Bird.—This mine, situated on the west slope of Bull Hill, between the War Eagle and Amanda claims, has a shaft down 14 ft., all of it in ore.

Pharmacist Mining Company.—This company is putting in its fifth station, and soon a force of men will be driving in opposite directions in this level.

Pike's Peak.—At this mine 45 men are working and about three tons of ore are now being mined daily, one-half of which goes to the smelter and runs about \$500 to the ton. The shaft is now down 110 ft.

Princess Gold Mining Company.—Eleven men are at work taking out some good ore from the Mattie D. claim.

Queen of the Hills.—The lessees of this property on Battle Mountain have been cross-cutting for some time from the bottom of a shaft on the upper end of the claim. They have cut through a good sized lead, which, however, is not high-grade.

Raven.—This mine is now shipping regularly from five to ten tons of good grade ore daily.

Wichita.—Several of the men interested in the Rosebud mill have banded the Wichita mine from the Cripple Creek Syndicate Mining Company, for a large sum and take possession and begin work on the property next week. James Murray, now superintendent of the Deerhorn, will have the management of the property. The Wichita is only slightly developed, but has produced a large quantity of milling ore.

Work Mining Company.—This company reports the following returns from its recent shipment of ore to Denver: 4.67 ozs. gold and ½ oz. silver, or \$77.15 per ton, making the net receipts \$1,445.48.

Fremont County.

United Oil Company.—The final papers in the sale of 250 acres of oil land belonging to the Colorado Coal and Iron Company to the United Oil Company were placed on record at Canon City, October 6th, and the price, which is said to have been about \$100,000, paid over. The deal includes the partially completed refinery erected by the Colorado Coal and Iron Company two years ago. This will be gradually torn down and the material used in the connection with the new purchasers' large refining plant near by.

Hinsdale County.

Ute & Ulay Mines, Limited.—Messrs. Otto Mears, S. M. Greene, of Milwaukee, Wis.; Fred Walsen, of Denver; William Bayly, of Denver; Dan. O. Kirby, superintendent of the Enterprise mine, at Rico, and J. F. Mitchell, of Durango, were last week in Salt Lake City, for the purpose of making a settlement with the creditors of the Ute & Ulay mines, and starting the mines up again.

Lake County.

Chrysolite Silver Mining Company.—This company will hold its annual meeting for the election of trustees in this city on November 1st, as per notice printed elsewhere in this issue. In a circular to the stockholders the president says: Notwithstanding the great fall in the price of silver, the operations of the year have nearly paid the expenses of the company, the balance in the treasury on October 31st, 1892, having been \$17,049, and the estimated balance at the end of the present month being \$15,657. The company has shipped during the year about 3,241 tons (dry weight) of ore, from which it has received, after paying the share due to the lessees, \$4,912. This ore was all mined by lessees. In view of the present uncertainty concerning the future of silver mining, it was deemed unwise to do more at present than to continue work so long as it will pay the expenses of taking care of the property. Underground prospecting is still going on, although so far without encouraging results.

Silver Placer.—J. J. McGowan has sold to P. W. Bunce a one-eighth interest in the Silver Placer lodes Nos. 1, 2, 3, 4, 5 and 6, and one-fifth

interest in Elk lodes Nos. 3, 4, 5, 6, 7 and 8. Consideration not stated.

(From our Special Correspondent.)

Lime King.—Fire this week destroyed the shaft house and ore bins, and burned down into the shaft some 20 ft. The loss is about \$5,000 with no insurance.

Marian.—Work on the shaft goes steadily forward, and when completed it will be nearly 1,000 ft. in depth. They are working in porphyry and have about 150 ft. of that to go through yet before reaching the contact.

Small Hopes.—A report was sent out to Eastern papers this week that the Emmett shaft of this property had been flooded. The report is untrue and gained currency from the fact that one of the water pipes broke, and the water rose slightly before the break could be repaired and work carried on as usual.

Ouray County.

Arrangements are pending by which the great group of mines at Guston and Red Mountain can be kept open and at work during the coming winter and the Silverton railroad running.

Pitkin County.

Mollie Gibson Consolidated Mining and Milling Company.—A dispatch from Colorado Springs states that Mr. J. J. Hagerman, president of this company, denies the statement that the Mollie Gibson is filling with water, which cannot be controlled. He is quoted as saying that the report is spread by one who desires to depress the price of the stock.

Summit County.

El Dorado.—This group of 12 mines at Breckenridge have been sold for \$80,000 to J. H. Jewett, of Green Mountain Falls, who, it is said, will push the work of development at once and will erect a stamp mill.

FLORIDA.

Polk County.

Whitaker Phosphate Company.—This company at Homeland is actively engaged and is filling many orders, principally from the Northern and New England States. The company has works for grinding the natural phosphate and sells it in that condition.

Sumter County.

Netherlands Phosphate Company.—This company has kept its works at Pemberton Ferry steadily at work throughout the year without any shut-down and reports orders on hand sufficient to run throughout the winter.

GEORGIA.

Lumpkin County.

Lockhart Mine.—Work is shortly to be begun on the large body of tailings which have accumulated at this mine during a number of years. These tailings have been decomposed by long exposure to the weather, and some recent tests made show that a considerable number of them can be worked at profit.

Turkey Hill.—The Dahlonega "Signal" reports that a controlling interest in this mine has been sold to Chattanooga parties and work is to be resumed under the direction of Mr. F. B. Pratt. A large steam pump is to be put in to raise water from the creek below the mine.

Wells Mine.—The 10-stamp mill on this property at Auraria is being kept busy. Only a small part of the gold in the ore, however, is saved in the mill and the tailings are being stored up for future treatment.

IDAHO.

Alturas County.

Phi Kappa Mining Company.—This company has just completed its 50-ton concentrator in Cougar Gulch and expects to run it all winter.

Red Elephant Mine.—The force at work on this mine has been doubled and is to be still further increased. The mill is now running on full time instead of half-time, as has been the case for some months past.

Idaho County.

The Clarke placer claims on Dixie Creek have been sold to Dr. O. J. West and others, who are preparing to work extensively in the spring. The same parties are negotiating for the Blaine claims on Crooked Creek to increase their territory.

Lemhi County.

Lemhi Mining Company.—The annual meeting of the stockholders of this company was held in Colorado Springs, Colo., on the 9th inst. The following directors were elected: J. B. Grant, B. M. Hyman and A. G. Woods, of Denver; J. J. Hagerman, Percy Hagerman and W. P. Bumright, of Colorado Springs. The report of A. J. Bowie, the consulting engineer, who is now at the placers, was read. He detailed the work of the past few months, which has largely been preliminary, getting ready for the work next year. In all, over 300,000 cu. yds. of earth have been removed, much of it of value, and the net result of the clean-up has been \$15,000. The meeting adjourned until this week, when Mr. Bowie was expected to be present in person.

Owyhee County.

De Lamar Mining Company.—The return for September shows 3,354 tons crushed; bullion pro-

duced in mill, \$81,052; ore sold to smelters, \$5,000; miscellaneous, \$710; total revenue, \$86,762. The expenses were \$39,465, leaving \$47,297 profit for the month. An interim dividend of 1s. per share for the quarter ending September 30th has been declared.

Shoshone County.

Advices from Wardner report that the Canyon Creek mines and the Gem and the Frisco mines, near Wardner, will start up at once, with a full force of men. The Miners' Union has practically won the fight for \$3.50 per day to be the uniform scale of wages.

Oro Fino Mining Company.—This company, with a capital stock of \$500,000, has filed articles of incorporation. The office is at Wallace. The directors are: James Mahon, president; Henry R. Allen, secretary; Bert Park, treasurer; and C. W. Riley.

Oro Grande.—A number of placer locations have been made on Oro Grande Creek, near Pierce City. There is abundant water here and the working is easy. While little can be done this season the workings in the spring promise to be on an extensive scale.

INDIANA.

Vermilion County.

Crescent Coal and Mining Company.—This company, of Chicago, has purchased the Norton Creek Coal and Mining Company's mines and plant, near Clinton. The sale includes the new vertical shaft No. 4 which at present has a capacity of 500 tons daily taken from the second vein. The new owners will at once commence sinking to the third vein which will give them a capacity of 1,000 tons daily. This coal is of excellent quality. The present owners will also prepare this coal for domestic use as well as steam purposes, it being admirably adapted for that purpose.

INDIAN TERRITORY.

Savanna Coal Mine.—This mine, near McAlester station, on the Missouri, Kansas & Texas Railroad, is to be reopened and cleared out ready for working. Some six years ago there was an explosion in the mine, and it has not been worked since.

KANSAS.

Labette County.

Katy Coal Company.—This company has been incorporated to mine coal near Parsons. The capital stock is \$10,000, and the directors are: L. E. Weekes, E. A. Weekes, Lillian Weekes, Parsous; M. E. Serat, S. S. Serat, Kansas City, Mo.

MAINE.

Knox County.

Fox Island Graute Company.—This company at Vinal Haven has secured a heavy contract which will keep its quarries busy all through the winter.

MICHIGAN.

Copper.

The report of Capt. Josiah Hall, Mine Inspector of Houghton County, says that with the exception of the accident at the Red Jacket shaft, the number of fatal accidents occurring was less than either of the preceding years since the appointment of a mine inspector. In 1890 there were employed in the mines of Houghton County 7,310 men; lives lost, 36. In 1891 the number of men employed were 7,702; fatal accidents, 28. For 1892, men employed, 7,640; fatalities, 21. During 1893, 7,591 men have been employed. Outside the accident at the Red Jacket shaft, May 14th, at which time 10 men lost their lives, only 13 fatal accidents have occurred under ground, or less than 2 per 1,000 men employed, as against 36 in 1890, 28 in 1891 and 21 in 1892.

Of the deaths reported the Atlantic furnished two cases. One was by a man attempting to get on the skip when in motion, and the other man was one blasted. The Calumet & Hecla lost 14 men. One was caught by a revolving shaft, one fell down a shaft, ten by being hoisted to the top of the shaft house, one was caught by an ascending skip, and one by a fall of hanging wall rock. The Quincy and Osceola each lost one man by being blasted. The Tamarack mine reported six deaths. Three were killed by a fall of hanging rock, one by rock rolling on him, one walked into the shaft, and one was blasted.

Atlantic Mining Company.—This company has completed a railroad direct to the Salmon Trout River and is making preparations to build a dam across the river where a fall of 50 ft. can be secured.

Calumet & Hecla Mining Company.—The Red Jacket shaft is now passing through an amygdaloid belt, which contains considerable copper. It is believed that this will be rich enough to continue the working. The shaft has not yet reached the footwall, so that the width of the belt is not yet ascertained.

Mesnard & Pontiac Mining Company.—Proceedings have been begun to wind up the affairs of this company under the law. No work has been done for some time.

Porcupine Mountain.—A new vein has been found by Alexander Meads at this place, according to the Hancock "Copper Journal." The new vein was discovered in test-pitting, and was found only 3 or 4 ft. from surface; it is an amygdaloid vein with the gray trap for the hang-

ing wall and well filled with heavy chunks of copper from 3 to 20 lbs. It is the only vein yet found in that district carrying heavy copper.

Iron—Gogebic Range.

Newport.—This mine, near Ironwood, has finally closed down for the season. It has been running steadily on contracts all the season, and has employed about 250 men.

Iron—Marquette Range.

Salisbury Mine.—The chasm caused by the caving in at this mine has been entirely filled with rock, timbers, etc., and the company is preparing to pump the water out of the mine with a view to starting work as soon as possible.

Iron—Menominee Range.

Mansfield Mine.—The investigation of the disaster which cost the loss of 27 men on the night of Sept. 28 was brought to a close by the jury returning a verdict placing the blame for the accident upon the Mansfield Iron Company, and individually censuring President W. S. Calloun, of the company. The verdict concluded as follows: We find that death was caused by the caving in of the Mansfield mine, caused by the criminal act of the Mansfield Iron Mining Company in neglecting to fill the mine as the ore was being moved out. We further find that the local management of the mine was acting upon instructions from the general manager (president) of said Mansfield Iron Mining Company, and was in no way to blame for the accident.

Whether or not criminal action will be instituted depends upon the action of Judge Stone, of the Twenty-fifth Judicial Circuit, who ordered the investigation.

MINNESOTA.

Duluth County.

(From our Special Correspondent.)

Iron ore shipments for the week were 22,303 tons from the Vermillion range and 44,000 tons from the Mesaba. By mines shipments from the two ranges have been as follows for the season: Two Harbors docks, Vermillion range, Minnesota, 327,222 tons; Chandler, 384,030 tons; Zenith, 12,998 tons; Mesaba range, Franklin, 28,110 tons; Canton, 24,412 tons; Cincinnati, 9,939 tons; Hale, 2,176 tons; Duluth docks, Biwabik, 83,000 tons; Mountain Iron, 55,000 tons; Oliver, 68,000 tons; Commodore, 70,000 tons; Duluth, 38,000 tons; Minervas, 12,000 tons. Total for two Minnesota ranges, 1,105,000 tons to October 10th. Total shipments from Minnesota for 1892 were 1,170,000 tons. A rise in lake freights to \$1 a ton has had but little effect on the ore shipments, especially, as much of the Mesaba ore going forward is simply to pay debts or to get the product of the new Consolidated Company into furnaces before next spring.

Mesaba Range.

(From our Special Correspondent.)

Commodore.—The mine has decreased shipments largely, its orders being about filled. It will probably carry on work underground all winter.

Oliver.—This mine, which pays a royalty of 25 cents a ton to the State, covered into the treasury \$13,280 for the 90 days ending with September 30th last.

Vermillion Range.

(From our Special Correspondent.)

Chandler.—Not a man is at work underground and the stockpile crews are very small. The few men at work are paid \$1 per day only.

Minnesota.—Less than half a dozen men are underground and less than 200 on the surface. Some old machinery is being repaired and moved to the Canton mine at the Mesaba.

Pioneer.—Not only has work been suspended, but the pumps are out and the mine is flooded.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Oct. 16.

The past two weeks has made a wonderful change in this lead and zinc mining district, and this morning the indications are that the bottoms are about to fall out of the lead and zinc ore markets. Two weeks ago the mines throughout the district were generally resuming operations and everything looked favorable for zinc ore being in demand at not less than \$20 per ton, but the downward current in price came with a crash during the early part of last week, and many operators refused to sell, so that this week opens with the ore bins full. The zinc ore market closed Saturday evening at an average of \$17 per ton, the top price being but \$18.50 per ton. Lead ore declined from \$19.50 to \$17.50 per thousand. It is reported that a number of the largest operators in the district have decided to close down and wait for the ore market to advance.

Following are the total sales from the district for the week ending October 7th: 4,037,390 lbs. of zinc ore and 1,482,600 lbs. of lead; total value of the lead and zinc belt, \$66,553.

Following are the sales of ore from the different camps for the week ending October 14th: Joplin mines, 1,396,810 lbs. of zinc ore and 265,280 lbs. of lead; value, \$17,561. Webb City mines, 144,890 lbs. of zinc ore and 67,550 lbs. of lead; value, \$2,532. Carter-

ville mines, 1,352,380 lbs. of zinc ore and 201,760 lead; value, \$16,140. Zincite mines, 170,730 lbs. of zinc ore and 9,320 lead; value, \$1,736. Oronogo mines, 66,220 lbs. of lead ore; value, \$1,158. Alba mines, 4,200 lbs. of zinc ore; value, \$40. Granby mines, 231,000 lbs. of zinc ore and 50,050 lead; value, \$2,753. Galena (Kan.) mines, 765,000 lbs. of zinc ore and 84,000 lead; value, \$7,500. District's total value, \$49,480. Aurora, Lawrence County, mines, 756,000 lbs. of zinc ore and 215,000 lead, value, \$8,825. Lead and zinc belt's total value, \$58,305.

The Rex Mining and Smelting Company.—This company is still operating some of the mines, and last week sold 305,910 lbs. of zinc ore and 32,930 lead, and still has some of its ore bins full. During the dull times the company is doing considerable prospecting by sinking drill holes on undeveloped parts of the land and some large deposits of lead and zinc have been found, but will not be developed until the ore market is in a more settled condition.

MONTANA.

Jefferson County.

Elkhorn Mining Company.—The following is the return for the month of September: Mill worked 28 days and crushed 1,097 tons; bullion produced in the mill, \$23,800; 173 tons of smelting ore sold, \$17,000; total produce, \$40,800; total expenses, including \$2,000 on account of new pumping engine, \$24,900; estimated profit for the month, \$15,900.

Madison County.

The Butte "Inter-Mountain" reports some excitement from new placer mines on Rock Creek, where some 50 men have already located.

Missoula County.

Chicmain Mining Company.—This company has just completed an 8-stamp mill on Lo Lo Creek, which started up October 8th. According to the Anaconda "Standard" development work has been carried on for two years on this property. Two tunnels, one 280 ft. and the other 403 ft. long, have been driven and are connected by a 65-ft. raise. As far as developed the ledge is 2 1/2 ft. thick and satisfactory assays have been made.

Quartz Creek.—In the placers on this creek work for the season is now being closed up and the returns reported are generally satisfactory, the different companies having made at least fair wages for their members. Near the head of the creek four new quartz locations have been made. The ledges so far as exposed run from 12 to 18 in. wide, showing gold-bearing ore of good quality.

Trout Creek.—Work on the big ditch on this creek has been suspended for the season. In the spring it is expected that machinery will be put in and the ground will be worked on a large scale. On the tributaries of Trout Creek—Line, Cement and Snow Shoe gulches, placer mining is being closed up for the season and fair profits are reported.

Silver Bow County.

Montana Company.—A temporary injunction was recently obtained by the St. Louis Mining Company to prevent the Montana Company from taking ore from the ground within the limits of the Nine-Hour claim pending a decision of the question of ownership now at issue between the two companies. On hearing, however, the injunction was dissolved, the court stating that while the defendant could not be restrained from exploring the property and keeping its works in good condition the decision would not determine any issue as to the legal ownership of the property.

(From our Special Correspondent.)

Alice.—The annual report recently filed gives capital \$10,000,000, and indebtedness \$27,792. Signed by J. R. Walker and L. H. Farnsworth, president and secretary.

Gagnon.—This mine, the principal producer of the Colorado company is now working a few men.

Glengarry.—The annual statement required by law shows, as filed, stock \$1,000,000; indebtedness, \$10,170. Signed by W. R. Kenyon, C. S. Warren and H. C. Carvey.

Glengarry No. 2.—This is being worked by the Heinze company, with a force of about 70 men, and yields probably one-half of the ore for the smelter, the rest coming from the Rans and Gambetta.

Heinze Smelter.—In the neighborhood of 140 men are employed in the concentrator and smelter. The converter plant continues to run smoothly, with but a few small stoppages incidental to a freshly opened plant.

Lexington.—There have been a good many tributers at work in various parts of the mine, and the mill will soon start up 20 stamps on their ore.

Ponlin.—Swank & Co. have renewed their lease on this property, which is owned by McNamara. The shaft is a vertical one 350 ft. deep, and there are two leads in the property. The claim is in the copper belt, east of the Moscow (Parrot Co.) and northwest of the Estella.

Syndicate Mines.—Small forces have been put on at almost all of these mines, as well as at the Anaconda. Since the recent lay-off ore shipments have been but little, if any, diminished.

NEVADA.

(From our Special Correspondent.)

The assessments falling delinquent during the current month will aggregate \$83,760.

Elko County.

Following are copies of the latest weekly letters received from Tuscarora mines: Navajo—The stopes above the 350 ft. level are looking about the same as at last report, yielding the usual amount of ore. Belle Isle—No. 2 raise, 250 ft. level, extended 8 ft., looking poor in the top. South intermediate extended 9 ft., looking a little better.

Nevada Queen Mining Company.—At the recent annual meeting of this company the old officers were re-elected by a vote of 28,355 shares out of a total of 34,470 shares outstanding. The company has \$482 in its treasury.

Storey County—Comstock Lode.

Potosi Silver Mining Company.—The bullion report for September shows that there were 1,124 tons of ore crushed at the Nevada mine. The gross product in bullion was \$19,808; the cost of reduction, \$6,744; net proceeds, \$13,064. The assay value per ton was \$2,234; gross average per ton, \$11.62. The mine worked 78.8%.

Consolidated California & Virginia Mining Company.—This company has received \$35,428 in gold coin from the Carson Mint, as the net proceeds of bullion of the gross assay value of \$43,833 deposited during the month of September.

Hale & Norcross Mining Company.—The latest weekly official letter says: On the 1,300 level, we have advanced the east crosscut from the winze a total length of 34 ft. The east face of the crosscut has reached the east clay. Sinking was resumed in the winze 28 ft. Extracted 8 cars of ore; average assay value per car samples, \$25.67 per ton.

Savage Mining Company.—The latest weekly official letter says: From the 1,100 level we are extracting ore of fair grade from the 13th up to the 19th floors. We hoisted 209 cars of ore during the week. Shipped to Nevada mill 210 tons and milled 235 tons. Car samples average \$30.32, battery samples average \$22.57. Bullion yield for the week, \$3,701. Shipped to the United States mint at Carson, 375 lbs. crude bullion. The east crosscut from the south drift 170 ft. south from the shaft on the 950 level is now in 43 ft.; face in porphyry and low grade quartz.

(From our Special Correspondent.)

At last the question whether the miners on the lode will consent to be mulcted of a certain portion of their wages has been definitely settled. Final action was taken by the Virginia and Gold Hill unions by agreement, and a vote taken on joint ballot. There were 416 votes cast, 229 to maintain the present rate of \$4 per day and 187 to accept the reduced rate of \$3.50.

The following is the weekly tabulated statement of ore hoisted from Comstock mines and milled, with the car and battery assays, bullion shipments, etc.:

| Mines. | Ore Hoist'd | Car Sample Assay. | Ore Milled. | Av. Bat'y Assay. | Bullion for Week. | Total. |
|-----------------------------|-------------|-------------------|-------------|------------------|-------------------|-----------|
| Con. Cal. & Va. | 161 | \$39.29 | 415 | \$35.20 | ..... | 16,035.30 |
| Hale & Norcross | 82 | 25.67 | ..... | ..... | ..... | ..... |
| Potosi | 188 | 32.31 | 208 | 28.61 | ..... | 342 lb. |
| Savage | 209 | 30.38 | 235 | 22.57 | \$3,701.25 | 375 lb. |
| Occidental | 10 | 35.00 | ..... | ..... | ..... | ..... |
| 124 Cars. 35 Crude bullion. | | | | | | |

Hale & Norcross Silver Mining Company.—The special meeting called to decide what should be done with the 26,541 shares lying in the treasury met this week and was very stormy. The bonanza clique desired to dispose of the stock, and offered a resolution to the effect that the stock be divided among the stockholders in the shape of a dividend. J. H. Tingman, of the Mining Stock Association, followed with a resolution to the effect that the stock be retained in the treasury until the market was in a healthier condition. This was the commencement of a series of objections, which did not reach a culminating point until a third resolution was offered that the stock in the treasury be sold. After a stormy and highly personal debate 62,738 shares were voted to sell the delinquent stock; 3,685 shares to divide it among the stockholders, and 4,670 to retain it in the treasury. Heman Zadig offered a resolution that the stock be not sold for less than 50 cents, which was carried.

NEW YORK.

Saratoga County.

Malta Ridge.—A press dispatch says that the second natural gas well has been tapped by an artesian drill on the land of Rev. Samuel McChesney, at Malta Ridge, four miles east of Ballston, at the same depth as the one discovered three weeks ago. Gas flows with force equal to that of the first well and burns freely. Drilling will be continued through the hard pan in which gas is found and to the bedrock to a depth of 2,000 ft. unless gas in commercial quantity is reached sooner.

NORTH CAROLINA.

McDowell County.

(From our Special Correspondent.)

This county continues to produce regular but small quantities of placer gold. This has been the case since the discovery of gold there about 1840. Many of the rarer minerals are found in these placers, together with monazite which is becoming something of a new industry at present, as about 50 men are engaged in producing it.

Several wagon loads of mica from Mitchell and Yancey counties have been shipped from Marion station the past month.

Mecklenburg County.

(From our Special Correspondent.)

Surface Hill Mine.—The vein is showing some rich deposits as three pans of ore gave 550 dwts. of gold one day last week. Several parties have been out to see the property with a view to purchase and operate. As yet nothing has been done other than grinding the ore up in a mortar and washing the gold out.

Montgomery County.

(From our Special Correspondent.)

The Ophir Gold Mine.—This mine is being equipped by C. H. Taylor, of Montreal, Can., now superintendent. He has purchased the Reimer mine 80-H.P. boiler and is erecting the same at his gold mill which he expects to have in operation this month.

Standy County.

(From our Special Correspondent.)

On October 7th a nugget weighing 4 1/2 ounces together with several smaller ones weighing from 1 dwt. to 10 dwt. were found on the farm of W. S. Ingram; 30 or 40 men are engaged in placer work and making good pay.

OREGON.

Union County.

C. T. Bradley Mining Company.—This company has sold its mines near Union to the Union Investment Company, for \$100,000. The deal includes quite a number of prominent mining claims of the Sanger district, among them the Golden Eagle, Summit, Last Chance, Apex, Rob Roy, Imogene, Augusta, Nos. 1 and 2, Nellie Grant, Buffalo, and a third interest in the Hogen placer claim. Five mill sites are included, with the machinery and appurtenances of the Bradley company. These mines have been worked for many years and are among the richest in eastern Oregon.

PENNSYLVANIA.

Anthracite Coal.

Connell Coal Company.—This company, says the Wilkes-Barre "Record," expects soon to begin sinking a new shaft in close proximity to its other workings at Durycia, but closer to the side of the mountain. In addition to this a large breaker is to be erected. Thomas Howell will begin boring next week to the lower veins near the old shaft, by which the surface water will have access to the latter, thus saving additional pumping machinery at the new opening.

Philadelphia & Reading Coal and Iron Company.—It is said that a careful examination is being made of this company's collieries, with a view to concentrating work as much as possible at those which can be worked most economically and with the smallest possible expenditure for repairs.

Woodward.—This colliery, says the Wilkes-Barre "Record," now hoists about 1,000 cars a day, and it is now expected by the first of the year to raise 1,800 cars. A large tunnel is being driven, and also a deep slope which has already been driven down 2,000 ft. and has yet 1,060 ft. to go. In this slope there is a large pump worked by electricity. The colliery belongs to the Delaware, Lackawanna & Western Railroad.

SOUTH CAROLINA.

Charleston Mining and Manufacturing Company.—The officers of this company are now as follows: President, Charles W. Trotter; vice-president and manager, H. Cavalier Smith; superintendent, W. M. Wallace; secretary and treasurer, James Emlen; assistant to manager, C. A. Merriam; assistant superintendent, Henry Dotterer.

SOUTH DAKOTA.

Brule County.

From an artesian well sunk at this place, which has reached a depth of 900 ft., a piece of coal 14 in. long was brought up one day this week, indicating that the drill had cut through a coal bed. The coal is of similar quality to that of western Iowa.

Lawrence County.

Bald Mountain Consolidated Mining Company.—A press dispatch from Deadwood says that this company has sold its interests to an English syndicate. The sale embraces 80 acres of valuable mining ground and a 50-ton chlorination plant.

Bullion.—The superintendent is working two shafts on this property, operations being confined to drifting in from the south tunnel on the formation, says the Deadwood "Pioneer." The hoisting plant and pumping outfit are in place and working.

Deadwood-Terra Mining Company.—At this property there has been a complete cessation of

work. The pumps have been taken up, says the Deadwood "Pioneer."

Gold Mountain.—Shipments of ore from this group situated in Two Bit gulch have been temporarily suspended, owing to the late storm, which made the roads impassable. The owners of the property are now at work building a road to an adjoining group of claims, owned by them, and known as the New District. They are fairly well developed by means of open cuts, tunnels and shafts, exposing a similar ore body to that found in the Gold Mountain group and of greater extent, but not so high-grade. This section, says the Deadwood "Times," is overlaid with a blanket vein of porphyry, varying from 9 to 15 ft. in thickness and highly mineralized, carrying from \$2.50 to \$18 in gold per ton.

Hawkeye.—This mill will resume operations next week.

Keystone.—Affairs at the Keystone mill having been satisfactorily adjusted, operations will resume on October 20th.

TENNESSEE.

Morgan County.

Harriman Coal & Iron Company.—This company has sold 9,000 acres of land to the Tennessee Prison Commission for \$80,000. The tract is to be used for penitentiary purposes and the convicts employed in mining the coal. The purchase is conditioned on the completion of the Harriman Railroad to a point on the tract.

TEXAS.

Lee County.

Lexington Coal Mines.—This property, near Lexington, has been purchased by A. B. Kerr, of Flatonia, who intends exploring for coal. It is said also that there is iron ore on the property.

UTAH.

Beaver County.

Annie.—John Kelly recently made a shipment of ore from this mine.

Hoosier Boy.—This mine, in the Star district, recently made a shipment of 60 tons of ore. The mine was an old producer and was one of the main shippers to the old Shantie smelter, near Milford. The mine produced about 4,000 tons of ore at that time, but has lain idle for the past 12 years. The ore was taken out by leasers, who have since quit work and the mine is again idle.

Mammoth.—This mine, owned by Cullen & Ryan, has a small force of men at work.

Monitor.—O. T. Clark has a force of men at work on this property, and has a large amount of ore on the dump.

Eureka County.

Bullion-Beck & Champion Mining Company.—Only 30 men are now employed at this property.

Juab County.

Eureka Hill.—This mine has closed down entirely.

Mammoth Mill.—The new 20-stamp mill at Mammoth is rapidly nearing completion, says the Tintic "Miner." Superintendent Robinson expects to have it in operation by the coming new year. Over 50 men are working on it. The amalgamating process will be used, and the mill, later on, will be increased to 40 stamps. A Salt Lake grading outfit is at work on the pipe line to Death Creek, which will be completed this fall, but the pumping station will not be put in until next spring, the company having water enough to run the mill this winter.

Millard County.

Detroit District.—Work is going on upon several claims in this district. On the principal one, known at present as No. 3, a tunnel has been run in 60 ft. The ore carries gold and is free milling, assaying about \$10 to the ton. About 100 tons are now on the dump. Another shaft, 20 ft. deep, at a distance of about 1,000 ft., has struck the vein which is at that point 4 ft. wide, and samples assay \$18.

Morgan County.

Morgan Gold Mining and Milling Company.—This company has filed articles of incorporation. The incorporators are: Charles Stewart, John B. Cummock, John B. Bell, Francis Fowler and Thomas S. Fowler. The officers are: John B. Cummock, president; Charles Stewart, vice-president; Thomas S. Fowler, secretary; John B. Cummock, treasurer. The capital stock is \$1,500,000, divided into 150,000 shares of the par value of \$10 each. The company owns four claims in the Morgan mining district. The general headquarters will be in Salt Lake.

Piute County.

Sevier Mine.—The tunnel is now in 720 ft. and arrangements have been made for continuing work all winter. Nothing is to be done to the mills, however, until the tunnel has been run 100 ft. further and the character of the vein fully developed.

Salt Lake County.

The receipts of ore and bullion at Salt Lake City for the week ending October 11th, inclusive, were to the aggregate value of \$142,252, of which \$92,052 was in bullion and \$50,200 in ore. For the previous week the receipts were \$170,568, of which \$98,276 was in bullion and \$72,332 in ore.

For the week ending October 7th shipments of bullion from Salt Lake City amounted to 929,504 lbs. For the same time shipments of silver and lead ores were 1,404,340 lbs.

Summit County.

Creole.—Some carbonate ore has recently been taken out which promises well, and arrangements are to be made soon.

Eureka Hill Mine.—The management has decided to put up a 40-stamp mill to work the ores from this mine and the Keystone. Work is to be begun at once.

Lavary.—This group includes 14 claims in Dutch Canyon, and is owned by A. L. Dahlgren and partners. An incline shaft has been sunk on the vein to the depth of 70 ft., at which point there is an ore body 2 ft. wide between well-defined walls. Assays of average samples have shown 19% copper, 17 oz. of silver and \$4.60 in gold to the ton, with a considerable proportion of ore. As far as explorations have gone the value of the ore increases with depth and the owners intend to run the tunnel in at least 250 ft.

Woodside.—Mr. Charles Gitsch has a small force employed cleaning up old drifts and inclines and has begun taking out some ore which looks well. Arrangements have been made to work this property under lease.

VIRGINIA.

Culpeper County.

Culpeper Gold Mine.—This mine, including a tract of 623 acres, was sold at judicial sale in August last and bought in by the trustees. It is now offered for sale by them to parties who may be willing to work it.

WASHINGTON.

Stevens County.

There have been reports of rich placer deposits on some of the upper tributaries of Kettle River. The reports, however, are very contradictory, and another account says that nothing has been found worth further examination or development. Further and more definite accounts will be needed.

WEST VIRGINIA.

Kanawha County.

McKell Coal Company.—This company has been incorporated by Thomas McKell and others to mine coal at Glen Jean.

Cedar Grove Coal Company.—A controlling interest in this company was recently sold to A. G. Duncan and others, and the following officers were appointed for the company: President, H. V. Helwig; secretary, John Baumister; treasurer, A. G. Duncan. A new railroad trestle is to be built and the mine developed with the view of increasing its output.

Harrison County.

Sardis Coal Field.—Mr. B. W. Brown has sold this tract for \$72,000 to H. A. Will, J. A. Sparks and others, of Pennsylvania. It includes 3,070 acres on Ten-mile, Isaac and Flag creeks. The purchasers intend to work the coal.

WISCONSIN.

Iron-Gogebic Range.

All the mines on this range in Wisconsin are now closed down. The number of men out of work and unable to leave has become a serious problem to the local authorities, and various plans for helping them through the winter are suggested.

WYOMING.

Albany County.

Douglass Consolidated Placer Mining and Milling Company.—At a meeting of the trustees held in Laramie last week John R. Roots, who has been manager of the company since its organization, was removed from that position. It is understood that a number of parties in Laramie have taken an interest in the company.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

Slocan District.

(Reported for the Engineering and Mining Journal)

Kootenay Hydraulic Company.—This company, on Pend d'Oreille river, intends to work until the close of the year if possible.

Trai Creek.—The Le Roi is shipping regularly, and nearly all the other properties are being developed.

Kettle River.—A strike of rich placers is reported from Kettle River, about 12 miles from the mouth of Rock Creek, Osoogoo District, South Yale Division, but no definite or reliable details are at hand as yet, save that gold exists in rather more than the usual quantities in the sand on this river.

Noble Five Group.—A new find has been made on the Bonanza, one of this group, the first claims located in the country. In making a tunnel for development, a 7-ft. vein was struck which assays high in silver, and shows traces of copper and antimony.

Rico.—The rumor that the bond had been dropped was incorrect. The bond does not expire until November. At present no work is being done on the claim.

Spokane & Great Northern Mining Company.—In connection with a note in the issue of September

16th, where an account of smelter returns on ore from the Providence, Skylark and others in Washington was given, it must be said that the claims owned by this company are on Boundary Creek in British Columbia, immediately north of the Colville reservation, and not in Washington.

GREAT BRITAIN.

Most of the collieries in Lancashire, Derbyshire and Yorkshire were reopened October 16th for the men willing to accept 15% reduction in wages. The men made no response. Only the collieries where the old wages are paid are working.

A late cablegram from London says that the Birley collieries at Sheffield, employing 2,300 men, reopened October 19th. The old rate of wages will be paid. The Mine Owners' Federation met in Manchester October 18th, and after refusing to resume work at the old rate of wages, reaffirmed the offer to resume at a reduction of 15%, and resolved to offer to meet the men with an independent chairman to discuss the justice of the proposed reduction.

The strikers at Haydock, near St. Helens, in Lancashire, made an attack with stones upon the police guarding Evans & Co.'s colliery. The police dispersed the rioters after several persons had been severely injured.

MEXICO.

State of Vera Cruz.

A press dispatch says that reports regarding the discovery of coal in the Huasteca district continue to be excellent, and a company will probably be organized in Europe and in the City of Mexico to work the mines, a trial of whose products have been made with good results.

Tepic.

Gold and Silver Mines of La Yesca, Limited.—This company, the successor of the Silver Mines of La Luz, seems to be following the old policy of doing little or nothing in the development of its property, says the "Mexican Financier." Since Mr. H. A. Hilton was superseded in the management last November, the total development has been 10½ meters of drift and no ore body has been opened. Work was entirely suspended September 10th. Samples of ore from the mines are in the hands of Mr. Luis Blanco, of Guadalajara, for testing under the Ortega process. The history of this company has been a most striking instance of the possibility of fortunes being made by the manipulation of mining stock, without anything being done in the development of the mine itself, though the property, as in the present case, may be a good one. The salary paid to the present manager, since he took charge, would have completed the mill, but he has had to spend his time principally at Guadalajara attending to lawsuits which seem continually to hang over the company. Results such as these tend to bring legitimate mining enterprises in Mexico into disrepute.

Zacatecas.

Richmond & Zacatecas Gold Mining Company.—This company has filed articles of incorporation at Charleston, W. Va., the object being to work mines in the States of Zacatecas, Mexico. The capital stock is \$5,000,000.

NEW CALEDONIA.

The French Ministry of Mines has issued a decree suspending for the present the payment of royalties on the New Caledonia nickel mines. This action is taken in consequence of the severe losses inflicted upon the companies by the cyclone of March last, and the suspension covers the whole of the present year.

NOVA SCOTIA.

Caledonia Gold Mine.—Mr. R. R. McLeod has a bond on this mine at Molega, says the "Gold Hunter," and is now pumping out the old shaft in preparation for work.

Fifteen Mile.—At this old mine, near Caledonia, a steam pump has been put in, and a new effort is to be made to find the vein.

Mabou Coal and Gypsum Company.—Several attachments have been taken out against the cash and other property of this company on deposit in New York. The mines of the company are at Mabou, N. S., but its principal office is in New York, where most of the stock is owned.

ONTARIO.

Thunder Bay District.

(From our Special Correspondent.)

Rabbit Mountain.—This mine, under option by a Duluth company, has been closed after shipping a carload of picked ore, the result of the season's work. It was the last of the Thunder Bay mines to remain in operation.

SOUTH AFRICA.

Transvaal.

Mooiplaats.—At this place on the Hennops River, eight miles from Pretoria, a considerable body of decomposed quartz with free gold has been found. Cuttings made show the existence of a vein below running east and west and dipping to the south. This vein is quartz, carrying free gold, but its extent is not yet determined.

Zululand.

Nondweni Goldfields.—This district shows several quartz veins which promise well. There is a good supply of water all the year, and the climate is healthy. A syndicate has been formed to work the mines.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 20.

Statement of shipments of anthracite coal (approximated) for week ending October 14th, 1893, compared with the corresponding period last year:

| | 1893. Tons. | 1892. Tons. | Difference. |
|-----------------------------|----------------|----------------|--------------|
| Wyoming region..... | 532,676 | 505,938 | Inc. 26,738 |
| Lehigh region..... | 163,956 | 157,668 | Inc. 6,288 |
| Schuylkill region..... | 307,165 | 301,081 | Inc. 6,084 |
| Totals..... | 1,003,797 | 964,687 | Inc. 39,110 |
| Total for year to date..... | 33,230,444 | 32,525,045 | Inc. 705,399 |

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending October 14th and year from January 1st:

| | 1893. | | 1892. |
|--------------------------|---------|------------|------------|
| | Week. | Year. | Year. |
| Shipped East and North: | | | |
| Phila. & Erie R. R..... | 806 | 64,294 | 69,033 |
| Cumberland, Md..... | 92,730 | 3,27,418 | 2,92,032 |
| Barclay, Pa..... | 435 | 39,412 | 55,910 |
| Broad Top, Pa..... | 7,502 | 474,485 | 484,241 |
| Clearfield, Pa..... | 65,117 | 3,044,187 | 3,126,778 |
| Allegheny, Pa..... | 24,662 | 989,400 | 1,004,833 |
| Beech Creek, Pa..... | 46,572 | 2,248,412 | 1,847,632 |
| Pocahontas Flat Top..... | 61,760 | 2,178,001 | 2,054,925 |
| Kanawha, W. Va..... | 50,859 | 2,546,970 | 1,932,313 |
| Totals..... | 350,433 | 14,855,569 | 13,556,997 |

* Week ending Oct. 7.

| | 1893. | | 1892. |
|-----------------------|---------|------------|------------|
| | Week. | Year. | Year. |
| Shipped West: | | | |
| Pittsburg, Pa..... | 23,816 | 947,060 | 998,914 |
| Westmoreland, Pa..... | 35,500 | 1,501,706 | 1,353,551 |
| Monongahela, Pa..... | 16,929 | 548,054 | 514,351 |
| Totals..... | 75,345 | 2,996,810 | 2,866,816 |
| Grand totals..... | 425,828 | 17,852,409 | 16,423,813 |

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending October 14th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 35,796 tons; year 3,342,421 tons; to corresponding date in 1892, 4,235,848 tons.

Anthracite.

We do not have anything new to report of the anthracite coal market this week. The conditions noted in our previous report prevail more or less at the present writing. Consumers are not desirous of accumulating stocks, and they are buying only enough to supply immediate wants. While some of the heaviest producers continue to report a fairly steady business, the majority of sellers state that the market has been quiet during the week. However, while the coal trade may not be "booming," there are certainly no grounds for much complaint. The public has made the trade wait for a longer time than usual before buying, but it has at last come into the market, and we shall for several weeks to come have a strictly "weather market."

The probabilities are that the output of 3,500,000 tons for October, recommended by the sales agents at their last meeting, will be exceeded. From some of the prominent coal carrying roads we hear complaints of a scarcity of cars, which may or may not be an excuse for stocking up coal.

The rumors of another "combine" to embrace the Jersey Central and the Delaware, Lackawanna & Western, and perhaps Reading also, have been unusually numerous of late. As usual, people who should know state that "there is nothing in it." It is scarcely to be presumed that the factors in such a movement would take everybody into their confidence if they really contemplated such a step. The coal trade has had enough of "coal combinations," and may possibly think that New Jersey law as Chancellor McGill has interpreted it may prove a serious difficulty in the way. That there is a strong party interested in both Jersey Central and Delaware, Lackawanna & Western has been an open secret for years.

The Reading Railroad reports that its coal shipment (estimated) for last week, ending October 14th, was 315,000 tons, of which 38,000 tons were sent to Port Richmond and 35,000 tons were sent to New York waters.

The Bureau of Anthracite Coal Statistics issues the following statement of shipments for September and the nine months ending September 30th:

| | Sept., 1893. | Sept., 1892. | Year, 1893. | Year, 1892. |
|-----------------|--------------|--------------|-------------|-------------|
| Wyoming..... | 1,961,570 | 2,059,818 | 17,446,135 | 16,763,710 |
| Lehigh..... | 589,931 | 578,244 | 5,012,290 | 4,552,665 |
| Schuylkill..... | 1,062,995 | 1,216,590 | 8,733,556 | 9,178,257 |
| Totals..... | 3,614,496 | 3,754,482 | 31,221,981 | 30,474,632 |

The stocks of coal on hand at tidewater shipping points September 30th were 796,019 tons; August 31st they were 860,175 tons; decrease, 64,156 tons or 7.5% during the month.

The September shipments show a decrease of 139,986 tons, or 3.7%. The Wyoming region lost 98,278 tons, or 4.8%, and the Schuylkill one of 53,345 tons, or 4.8%; while the Lehigh gained 11,097 tons, or 2.0%. For the nine months the increase is 747,349 tons, or 2.5%. While the Wyoming region gained 682,425 tons, or 4.1%, and the Lehigh 489,625 tons, or 10.8%, the Schuylkill should a decrease of 424,701 tons, or 4.6% in its shipments. For this year the Wyoming region has furnished 56%, the Lehigh 16% and the Schuylkill 28% of the total shipments, against 55%, 15% and 30% respectively in 1892. The other regions are growing at the expense of the Schuylkill; that is, of the Reading company.

Bituminous.

The Eastern soft coal trade is suffering just now from a lack of coast-wise vessels at the shipping

ports, which, as we have previously stated in this column, were detained by adverse winds, and accumulated in a great fleet on this side of the Cape. These vessels have now reached the discharging ports, at which there is a great demand for empty cars. Owing to this cars have been loaded and are on the way to ultimate destination, leaving the discharging ports bare of cars. This will handicap consignees, and will cause a great amount of demurrage on vessels. It will also have the still worse effect at this time of delaying a great number of these vessels in returning to the loading ports, and it will affect the soft coal trade considerably by not giving facilities for removing the coal from the lower ports. On account of the lack of vessels at shipping ports there is a great quantity of coal in cars standing there now. To such an extent has this gone that the railroads have put an embargo on further shipments from many of the coal companies. The lower ports have suffered from the winds and storms to a much greater extent than the New York harbor shipping ports, where the tows to and from New York discharging wharves have not been affected.

Orders for shipment have accumulated. The car supply is good considering the accumulation of loaded cars at shipping ports. The freight market is suffering from the scarcity of vessels noted above. Rates are advancing daily. We quote ocean freight rates as follows from Philadelphia: Boston, 85c.; Salem, 85c.95c.; Bridgeport, Allyn's Point, New Bedford and Providence, 70c.75c.; Wareham, 90c. @ \$1.; Lynn, \$1 @ \$1.10; Newburyport, \$1; Portsmouth, 85c.90c.; Bath, 90c.; Gardiner, 90c. @ \$1 and to wares; Bangor, \$1.10. Baltimore, Newport News and Norfolk are 10c. above these rates. It is anticipated that vessels will not return in large enough quantities at one time to reduce materially these rates.

The Vessel Owners' and Captains' National Association has established the following rates of freight to go into effect on November 1st, 1893: Baltimore and Georgetown, D. C., to points west of Cape Cod, \$1; points east of Cape Cod, \$1.10; Portsmouth, \$1.15. Hampton Roads and Philadelphia to points west of Cape Cod, 90c.; point east of Cape Cod, \$1; Portsmouth, \$1.05. New York to points west of Cape Cod, 65c.; point east of Cape Cod, 75c. Portsmouth, 80c. All alongside. Alongside below bridges, 3 cts. per bridge. Rebates for discharging 600 tons in two days, 1,200 tons in four days and one day extra for every additional 400 tons, 5 cts. Twenty-four hours allowed for reporting.

Buffalo.

Oct. 19.

(From our Special Correspondent.)

The anthracite and bituminous coal trade continues without appreciable variation in stocks and demand, with quotations unchanged. Household are more freely giving orders so as to fill their coal bins, manufacturers confining themselves to supplying their immediate requirements, which are small.

The shipments of coal westward by lake from Buffalo from October 8th to 14th, both days inclusive, aggregated 79,085 net tons, distributed as follows: 35,450 tons to Chicago; 18,500 to Milwaukee; 2,525 to Toledo; 1,500 to Ashland; 6,030 to Duluth; 500 to Tawas; 8,400 to Superior; 2,480 to Green Bay; 600 to Port Huron; 600 to Detroit; 500 to Marinette, and 1,000 to Gladstone. The rates of freight were as follows: 25c. to Chicago and Milwaukee; 15c. to Duluth, Superior, Ashland and Gladstone; 30c. to Manitowoc, Tawas, Marinette and Escanaba; 20c. to Detroit and 35c. to Port Huron. Shipments curtailed at end of week by storm.

The severe storm of Friday and Saturday last, with wind at times from 58 to 62 miles per hour, did much damage on land and water in this locality.

Included in the disaster was the steam barge "Hecla," owned by the George Hall Coal Company, valued at \$75,000. She is likely to prove a total loss.

About 800 ft. of our new breakwater was destroyed by the storm of Friday and Saturday. The contractors will lose the cost of 200 ft., the other 600 having been accepted by the United States Government only a few days before.

The steamer "Wokoken" foundered off Long Point, Lake Erie, during the storm, laden with 1,800 tons of coal from Ashtabula to Duluth. The barge "J. G. Masten," laden with coal, is ashore 50 ft. south of Racine Harbor, and is full of water. Twenty-nine other vessels are reported on the beaches or waterlogged.

Chicago.

Oct. 18.

(From our Special Correspondent.)

The return of Indian Summer has knocked the bottom out of the anthracite coal trade again. City retail trade is very light and \$6.75 for all domestic sizes is freely quoted.

A well defined rumor is gaining ground that there appears to be a feeling among many of the independent operators that they ought to be represented more fully at this distributing center and do their marketing of anthracite as the larger and more prominent companies do. Be this as it may, it is credibly reported that representatives of some of them have been quietly looking over the ground with a view of procuring docks and yard facilities. What effect, if any, this will have on the market remains to be seen, but it is said that some of them expect to be in shape to commence all-rail shipments next month and so secure a share of the trade this season.

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

egg, \$6.75 @ \$7; small egg, range and chestnut, \$7 @ \$7.25.

Bituminous coal of nearly all descriptions and grades is in much the same condition as regard demand and new business as anthracite, though in a lesser degree. It must be, and probably is, borne in mind that the field for the consumption of bituminous coal enlarges in a greater proportion than does that for anthracite. New factories and mills and other plants of various kinds are constantly being added to the consuming capacity so that the increase from this source is continually gaining. Hence, while production increases in much the same ratio, probably somewhat in excess, still it is not so great as to seriously affect prices. There is, however, no great amount of coal moving on new orders, and some railroads have reduced their daily car receipts 20 to 25%. Country orders for domestic coal are somewhat lighter than they were several weeks ago, attributable to the warmer weather, but on the whole the trade is fairly healthy and gives promise of being strong. Prices of bituminous per ton of 2,000 lbs. f. o. b. Chicago are: Pittsburg, \$3.35; Hocking Valley, \$3.35; Youghiogheny, \$2.25; Illinois lump, \$2.70; Brazil block, \$2.25.

Coke, both foundry and crushed of Connellsville make are in moderate demand, and while the increase is slow it is steady, and prices remain firm. Quotations are: \$4.10 furnace; \$4.35 @ \$4.40 foundry, crushed; \$4.40 Connellsville. West Virginia: \$3.90 furnace; \$4.10 foundry. New River: Foundry, \$4.40. Walston, \$4.10 furnace, \$4.35 foundry.

Pittsburg.

Oct. 19.

(From our Special Correspondent.)

Coal.—Trade remains in a very unsatisfactory condition. There is a falling off in shipments by rail, particularly to the lakes, with a falling off also in the coal trade. Taken as a whole, the coal trade is in a very demoralized condition. On Tuesday we had a few feet of a rise in the Ohio, but not sufficient to be of any particular value, although there were 50 light barges sent out, containing, all told, 510,000 bushels. There are fully 24,000,000 bushels of coal loaded waiting for water. The entire coal shipments from here since June to the lower ports amount to 760,000 bushels only. Certain coal men are of the opinion that there will be no good water until we have snow.

Connellsville Coke.—There is a continued improved demand for coke, with an improved outlook. Many of the plants are still complaining about the scant supply of water. Shipments exceeded the production very considerably, as the operators are clearing their yards of stock coke, which also cut down the number of ovens drawn. The operators continue to keep pace with the furnace men in clearing up stock, and the yards will soon be clear of coke. Of the 85 plants in the region, with 17,308 ovens, 33 plants have 5,551 active ovens, and the remaining 52 plants, with 11,797 ovens, are entirely idle. Among the 33 plants in blast, 15 ran 6 days, and 18 ran 5 days. The week's shipments aggregated 59,400 tons, distributed as follows: To Pittsburg, 1,700 cars; to ports east, 700 cars; to ports west, 900 cars; total 3,300 cars. Western shipments increased 26 cars; eastern shipments even with previous week, while Pittsburg shipments increased 307 cars; total increase 306 cars. Present rates for various kinds are: Furnace coke, f. o. b. cars at ovens, \$1.35 per ton; foundry coke, f. o. b. cars at ovens, \$1.65 per ton; crushed coke, f. o. b. cars at ovens, \$1.75 per ton. Add 70c per ton and you have the price of coke delivered at Pittsburg.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Oct. 20, 1893.

Pig Iron Production.

| Fuel used. | Week ending | | From Jan., '92. | From Jan., '93. |
|-----------------|----------------|----------------|-----------------|-----------------|
| | Oct. 20, 1892. | Oct. 20, 1893. | | |
| Anthracite..... | 70 | 29,810 | 34 | 15,450 |
| Coke..... | 128 | 120,650 | 53 | 54,800 |
| Charcoal..... | 43 | 9,640 | 28 | 5,690 |
| Totals..... | 241 | 160,100 | 115 | 75,940 |
| | | | | 7,417,133 |
| | | | | 6,310,310 |

Pig Iron.—We note an improvement in the pig iron market. The same conditions prevail that we have been reporting for some time past. Trade has been devoid of any features, and the outlook for speedy relief is no brighter than it has been—which is to say, not bright at all. The only consolation that an iron man can derive nowadays is that the market is not worse. The dilatory and exasperating tactics of the silver senators have put a damper on the hopes of business men, who had reason to believe that the repeal of the Sherman act would do much to improve the commercial situation throughout the country. The pig iron market suffers much from the inaction of "the most august deliberative body in the world." The production, as will be seen from the above table, has been greatly reduced and the demand has dwindled down proportionately—if not more. Certainly, we cannot see any improvement in the demand, nor any inclination on the part of consumers to abandon their policy of buying from hand to mouth. There is little probability of a sudden rise in value, and they do not see the necessity of laying in greater stocks than are actually necessary to supply their immediate requirements. A very dull market is the result. The tidewater prices of the Thomas Iron Company are as follows: No. 1, \$14.50 per ton; No. 2, \$13.50; No. 3 or

No. 2 plain, \$12.75. For regular brands we quote as follows: Northern brands; No. 1, \$14@14.50; No. 2, \$12.50; gray forge, \$12. For Southern iron we quote: No. 1, \$13.25@14; No. 2 F., \$12@13; No. 1 soft F., \$12@13; gray forge, \$11.75@12—all at tide-water. Scotch irons are quoted: Coltness, \$21.50@22; Eglinton, \$19.50@20; Summerlee, \$20.

Billets and Rods.—Dullness and incapacity prevail in this market. Prices can't well go much lower than they are at present. We quote: Steel billets, tidewater, \$21@23; foreign, \$27.75@28.50; wire rods, domestic, \$29.50@30.50; foreign, \$30.50@34.

Manufactured Iron and Steel.—This market continues dull and featureless. We do not hear of any sales of consequence. Prices continue low. We quote Angles, 1.75@1.9c.; axles, scrap, 1.80@2.10c.; delivered; steel, 1.75@2c.; bars, common, 1.45@1.60c.; refined, 1.60@1.85c. on dock; beams, up to 15 in., 1.70@2c.; 20 in., 2.10@2.30c.; car truck channels, 2@2.10c.; channels, 1.85@2c. on dock; steel hoops, 1.8@1.9c.; delivered; links and pins, 1.70@1.80c.; plates, flange, 2@2.10c.; firebox, 2.5@2.8c.; flange, 2.10@2.25c.; marine, 2.50@2.75c.; sheared, 1.85@2.10c.; shell, 1.95@2.10c.; tank, 1.70@1.9c.; universal mill, 1.70@1.90c.; tees, 2@2.10c., all on dock.

Merchant Steel.—This market continues quiet. There is no change in prices to report, and we quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20. Bessemer bars, \$1.60@1.70; open hearth machinery, \$2.25@2.30; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

Old Material.—We do not hear of any business in this market. Nominal quotations are unchanged at \$13@14 for old iron rails and \$9@10 for wrought scrap.

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

Spiegeleisen and Ferromanganese.—There is nothing of interest 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 nothing of interest doing in the rail market. There is no demand to speak of and the production has decreased enormously. Prices are nominally unchanged at \$29 at mill, but there are rumors of the willingness of some of the mills to "shade" these figures.

Tubes and Pipe.—There is nothing of interest to report of this market, which continues quiet. 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. Oct. 19.

(Special Report of Rogers, Brown & Co.)

A quiet and slow market continues to prevail. Judging from shipments, there is something less than half the usual amount of pig iron being consumed in the field tributary to this point. On the other hand, production of pig iron has practically stopped in New York and New England. To the latter fact and the lessened output everywhere is probably due the steadiness of prices. There are no lots pressing for sale, and while concessions are made to secure desirable orders the schedule of prices here given is quite generally the basis of sales. We quote on the cash basis, f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$13.75; No. 2 X foundry strong coke iron, Lake Superior ore, \$13.25; Ohio strong softener No. 1, \$14; Ohio strong softener No. 2, \$13.25; Jackson County silvery No. 1, \$16.80@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior ore, charcoal, \$15.75; Tennessee charcoal, \$16; Southern soft No. 1, \$13.15; Alabama car wheel, \$18; Hanging Rock charcoal, \$20.50.

Chicago. Oct. 18.

(From our Special Correspondent.)

In every branch of the iron trade at this center there has been during the past week a marked quietude. Not only is the dullness in excess of the previous week, but there is a continued weakness in prices, which is regarded as ominous. The only exception to this is the demand for iron and steel of all kinds for the agricultural implement trade, but even in the latter there is a distinct falling off, and buyers are purchasing on very conservative lines, the reason for which is obvious, as at all distributing agencies managers report large unsold stocks, and much the same is noted with the retailers. In some branches of the implement trade the tonnage taken for this season will range from 25% to 40% less than last year, but will approximate that of 1891. Still there has been a sufficiency of orders taken to insure ample work for the steel manufacturers during the winter and spring months, as many of them have not yet resumed operations.

Pig Iron has been characterized by a general dullness during the past week, and much of the inquiry which it was believed would lead to business has been quietly dropped. The foregoing applies alike to Southern as well as Northern iron. Transactions in the latter have been light as regards new business, orders running mainly to earloads, but shipments and deliveries on contracts already booked are increasing, owing to the resumption of work by implement makers. General

foundry trade is quiet, particularly the structural works, which are lightly employed. Southern iron appears to have lost the little strength it did have several weeks ago. A sale of 500 tons of No. 2 soft was made last week at less than \$11.35 f. o. b. at Chicago. In less than two months many furnaces will be cold unless the market improves. 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@14.50; American Scotch, \$15.50@16.00; Southern coke, foundry, No. 1, \$13.50; No. 2, \$12.00; No. 3, \$11.50; Southern coke soft, No. 1, \$11.75; No. 2, \$11.50; Ohio silveries, No. 1, \$16.50; No. 2, \$16.00; Ohio strong softeners, No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal, No. 1, \$16.50; No. 2, \$16.00; Southern standard car wheel, \$18.25@18.75.

Structural Iron and Steel.—Specifications for a new office building of colossal proportions are in the market—skeleton steel construction. Ornamental iron work for the New York Life and Champlain buildings was let last week, aggregating \$50,000. General structural material is very quiet. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$1.70@1.80; tees, \$1.95@2.05; universal plates, \$1.70@1.80; sheared plates, 75c.@1.85; beams and channels, \$1.75@1.85.

Plates.—Business in mill lots or warehouse orders is very quiet. Some mill agents are much discouraged at the inaction. 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, \$1.25@1.55; flange steel, \$2.74@3; boiler rivets, \$4@4.15; boiler tubes, all sizes 65%.

Merchant Steel.—Jobbers are replenishing their stocks of soft steels and a very fair sprinkling of orders was secured from this source last week. Inquiry from the carriage makers for tire and other steel is coming up since the close of their convention a week ago. The tonnage will be lighter than usual on account of the depression. Quotations are: Tool steel, 6.50@6.75c. and upward; tire steel, 1.85@1.90c.; toe calks, 2.20@2.30c.; Bessemer machinery, 2.05@2.15c.; Bessemer bars, 1.70@1.80c.; open hearth machinery 2.10c., open hearth carriage spring, 2.10@2.20c.; crucible spring, 3.50@3.75c.

Galvanized Sheet Iron.—Quite a falling off in tonnage account is noted at agents' warehouses and some weakness is developing. Discounts are a little irregular 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 for quick delivery is in better demand and price is fairly steady at 2.75c. for No. 27 common. Jobbing demand is fair at 2.95@3c. for same gauge for iron, and steel sheets are about 10c. higher per 100 lbs.

Bar Iron.—Business was much lighter than the week previous largely accounted for by the uncertainty as regards the situation generally; prices, too, show a weakness which is discouraging to manufacturers. Prices on mill lots are easy at 1.40c. for local mills and some car iron is reported at 1.35c. flat. Eastern mills quote 1.43c. Chicago. Jobbers note a light movement at 1.65@1.75c. respectively for iron and steel bars.

Nails.—Steel cut nails are in better demand from mill and easy at \$1.20. Jobbers quote \$1.35 from stock. Wire nails are \$1.40 here and what demand there is for prompt shipment from mill. Jobbing trade is fair at \$1.50.

Steel Rails.—The rail situation is unchanged, orders for light or heavy sections being equally scarce. Quotations, however, remain steady at \$30@31.

Scrap.—Large dealers complain of an exceedingly dull market at nominal prices. Railroad, \$11.00; No. 1 forge, \$11; No. 1 mill, \$7.50; fish plates, \$12; cast borings, \$4.50; wrought turnings, \$7.50; axle turnings, \$7.25; machinery castings, \$9; stove plates, \$6.50; mixed steel, \$7; coil steel, \$14; leaf steel, \$14; tires, \$13.50.

Old Material.—Some small sales could be made if sellers would accept \$14; asking price is \$15@15.50. Steel rails are very dull at \$8@10 as to condition, etc. A sale of car wheels is reported at \$8.75; dealers ask \$9.75@10, and \$10.50 in car lots.

Pittsburg. Oct. 12.

(From our Special Correspondent.)

Raw Iron and Steel.—The market since our last has undergone but little change. There is little demand for either crude or finished forms of material, and when sales are made they are almost entirely in small lots to tide them over immediate necessities. Producers fail to find much encouragement in the future, either in the prospects of an increased demand or in higher prices. In pig iron the market shows little change as compared with prices a week ago. Business continues to be restricted to small lots, sales not being sufficient to absorb the current output, even at the present low rate of production. The sheriff's sales of 23,100 tons of mill and foundry irons have interfered with prices in this market very materially; the holders being anxious to realize have disposed of several lots below what city furnace iron can be obtained for. The result is that leading furnaces have refused to sell at prices at which the Sharpville iron can be obtained for, and until that metal is disposed of sales in this market will be restricted. In some depart-

ments of trade there has been a fair inquiry, but it has not been possible to count upon a steady volume of business, and the trade has therefore been unsettled and irregular. Efforts to secure business have resulted in many instances in lower prices being made, the reduction in the cost of labor having been given to the consumer. But in steel billets and slabs there has been a largely increased inquiry during the past 10 days. We understand that parties from the East have made offers for large blocks. A sale of 12,000 tons of rod billets has been reported very freely this week at \$17.60 at a Pittsburg mill; the sale and tonnage, we understand, was obtained by canceling an old contract at high prices for much smaller tonnage, but actual prices were over figures named.

| Coke Smelted Lake and Native Ore. | | 500 Billets, prompt, at mill..... | |
|---|---------|--|------------|
| Tons. | Cash. | 400 Billets, Oct., at mill..... | 18.50 |
| 1,500 Bessemer, Oct., Nov., Dec..... | \$11.75 | 300 Billets, Oct., at mill..... | 18.40 |
| 1,200 Bessemer, Oct., Nov., Dec..... | 11.80 | Muck Bar. | |
| 1,000 Bessemer, Oct., Nov..... | 11.85 | 500 Neutral, Oct., Nov..... | 21.25 |
| 1,000 Bessemer, Oct., Nov..... | 11.75 | 300 Neutral, delivered, 21.10 | 21.00 |
| 750 Bessemer, Oct..... | 11.80 | Skelp Iron. | |
| 300 Bessemer, Oct..... | 11.80 | 900 Sheared..... | 1.50 4 m. |
| 2,600 Gray Forge, Valley June, Oct., Nov..... | 10.00 | 775 Narrow Grooved..... | 1.37½ 4 m. |
| 500 Gray Forge..... | 11.00 | 600 Wide Grooved..... | 1.37½ 4 m. |
| 500 Gray Forge..... | 11.00 | Skelp Steel. | |
| 300 Gray Forge, Oct..... | 11.00 | 750 Wide Groov'd..... | 1.5 4 m. |
| 300 Gray Forge, Oct..... | 10.75 | 250 Neutral, Oct..... | 21.00 |
| 150 No. 1 Foundry..... | 13.25 | Sheet Bars. Cash. | |
| 150 No. 2 Foundry..... | 12.25 | 100 Tons, at mill..... | \$4.50 |
| 50 No. 1 Silvery..... | 15.50 | Steel Wire Rods. | |
| 50 No. 2 Silvery..... | 13.50 | 1,000 5 gauge American, at mill..... | 26.00 |
| 50 No. 3 Foundry..... | 12.25 | 250 5 gauge American, delivered..... | 26.85 |
| Charcoal. | | Blooms, Billets and Bar E-nds. | |
| 50 Cold Blast..... | 25.00 | 1,250 Delivered next three months..... | 12.50 |
| 50 Cold Blast..... | 25.00 | Scrap Material. | |
| 50 Mill Iron..... | 15.00 | 500 No. 1 Wrought, net..... | 10.00 |
| 50 No. 2 Foundry..... | 18.00 | 500 Cast Scrap, Gross, 11.00 | 11.00 |
| 25 Cold Blast..... | 24.50 | 100 Iron Axles, net..... | 16.00 |

Philadelphia. Oct. 19.

(From our Special Correspondent.)

Pig Iron.—Pig iron makers are thoroughly disheartened over existing conditions. Buyers refuse to make purchases, and even those for current requirements are restricted to the smallest possible dimensions. One reason given by consumers for this course is that selling prices will probably go a little lower. The probability is—although they do not see it—that a vote in the Senate will put prices up 25 cents before they know where they are. Standard brands of gray forge are held at \$12.50, but there is no difficulty about getting a fair brand at \$12. No. 2 iron is not selling, but quoted at \$13 to \$13.50. No. 1, \$14 to \$14.50.

Muck Bars.—Two or three sales of muck bars were made at \$22 at mill.

Steel Billets.—Small sales, ranging from 100 to 500 tons, are being made every day at \$19@20. It is intimated that offers are being made now for large lots at \$19. Western Pennsylvania quotations control this market.

Merchant Iron.—More inquiries are coming in for merchant bar, and there will probably be an increase in business for common iron, which brings 1.45@1.50 at interior points. There will be a sharp struggle for whatever business can be stirred up.

Nails.—Nails are quoted at \$1, car-load lots at mill.

Skelp Iron.—No new transactions in skelp are reported. Quotations, 1.50.

Sheet Iron.—Additional inquiry is reported for heavy sheets; a good deal of business must soon be transacted if contemplated work is to be prosecuted. It is impossible to give quotations. Every transaction has its own price.

Merchant Steel.—There is a better demand, but in very small lots, for crucible, tire and spring steel. The very low quotations made last week in answer to inquiry are given as a reason.

Plate and Tank.—Millowners are able to run single turn and all the iron made is shipped away, so that business must be better than is reported by office men. A good deal of new building work is to be taken care of soon. Manufacturers of plate and tank say that there will be an unusual amount of winter work done, if things go right at Washington, to make up for the dullness of the past few months. Tank steel is quoted at 1.50c.; heavy plates, 1.60c.; shell, 1.70c.; and flange, 1.90c.

Structural Material.—A disheartening condition of things is reported this week by all who are familiar with this branch of the iron trade. Between three and four thousand tons will be wanted within the next month or two, for city building work in vogue under way. There is but little encouragement at present for large orders, although the undertone of the market is that the winter will be satisfactory. Quotations cannot be given with any degree of accuracy, and private quotations do not properly represent the market.

Steel Rails.—Steel rails are likely to drop, in sympathy with the decline in billets and blooms, but there is a hesitancy among railmakers about

saying much in reference to the subject. There are statements made, which cannot be traced to any reliable source, that large orders are likely to be placed soon. The only assurance we have is that there is a good deal of work in contemplation, but there is no hurry to do it. Quotations are nominally \$29, but a good deal less money than that will buy rails when the big orders begin to come in.

Old Rails.—The quotations for old iron rails are \$15@16.

Scrap.—No. 1 scrap is quoted at \$12; machinery, \$10.

METAL MARKET.

NEW YORK, Friday Evening, Oct. 20, 1893.

Prices of Silver per Ounce Troy.

| Oct. | St. Ex. | London Pence. | N. Y. Cts. | Value of sil. in \$. | Oct. | St. Ex. | London Pence. | N. Y. Cts. | Value of sil. in \$. |
|------|----------------------------------|--------------------------------|--------------------------------|----------------------|------|----------------------------------|--------------------------------|--------------------------------|----------------------|
| 14 | 4'85 | 33 ³ / ₄ | 72 ³ / ₄ | 563 | 18 | 4'84 ¹ / ₂ | 33 ³ / ₄ | 73 | 565 |
| 16 | 4'85 | 33 ³ / ₄ | 73 | 565 | 19 | 4'84 | 33 ³ / ₄ | 73 | 565 |
| 17 | 4'84 ¹ / ₂ | 33 ³ / ₄ | 73 | 565 | 20 | 4'83 ³ / ₄ | 33 ³ / ₄ | 72 ³ / ₄ | 566 |

The silver market is quiet, with no pressure to sell and no eagerness to buy. The volume of production for the next 60 days has been largely placed, and the amounts coming on the market seeking a price are not large. Buyers take but little interest, and are not at all inclined to advance their bids to any great extent.

The United States Assay Office at New York reports the total receipts of silver for the week to be 93,000 ounces.

Gold and Silver Exports and Imports at New York, Week Ending October 14th, 1893, and for Years from January 1st, 1893, 1892.

| Week | Gold. | | Silver. | | Excess of Ex. or Imp. |
|---------|------------|------------|------------|-------------|-----------------------|
| | Exports. | Imports. | Exports. | Imports. | |
| 1893... | \$49,387 | \$64,984 | 2,535,600 | \$44,534 E | \$479,469 |
| 1892... | 70,116,728 | 57,840,336 | 25,050,415 | 2,975,902 E | 34,260,935 |
| 1892... | 58,786,833 | 7,031,454 | 16,937,944 | 2,130,821 E | 65,352,522 |

The gold exported for the week went to the West Indies, the silver to London. The imports of gold and silver for the week were all from South America. The gold imports exceeded the exports by \$15,597.

During the five days ending October 20th the exports and imports have been as follows: Exports: Gold, \$2,819; silver, \$608,473. Imports: Gold, \$100,234; silver, \$11,222. Of the gold exported \$219 was Spanish coin, the remainder being American coin. Of the silver exported, \$48,700 was Mexican bullion; all the rest was American dollars.

The Treasury Department, on October 19th bought 25,000 oz. of silver at prices tendered, and 207,000 oz. at its counter offer of 73 45c. per oz., making 2,200 oz. in all. The purchases so far this month amount to 398,000 oz. out of 2,259,000 oz. offered.

NOTES OF THE WEEK.

We are unable to report any progress toward the repeal of the silver purchase law. The minority in the Senate still continues its obstruction and the majority still gives in. Several plans have been suggested, but nothing has been done since the failure of the continuous session plan last week. The strong feeling aroused then seems, however, to have made any compromise difficult, if not impossible, notwithstanding the rumors of compromise that are sent out. The effect of the delay and uncertainty on the business of the country continues to be very bad, and the reaction toward better times, which had apparently set in, is checked.

If the Senate's delay can be said to have had any good effect at all, it has served to consolidate public opinion on the repeal bill and to enforce the pressing necessity of its passage. Criticisms of the Senate and pronounced opinions in favor of repeal are coming from all quarters, including some from which they were not expected.

The latest weekly statement of the New York banks shows increases of \$5,267,325 in surplus reserve; \$2,374,200 in loans; \$6,006,700 in specie; \$2,325,700 in legal tenders; \$12,260,300 in deposits, and \$16,800 in circulation. The total reserves are \$137,010,100, or \$33,896,650 in excess of the legal requirements. The amount of outstanding loan certificates issued by the Clearing House has been reduced to \$2,780,000.

The United States Treasury balance, which has been falling steadily during the week, is now below \$100,000,000. On Thursday, 19th inst., the balances in excess of outstanding certificates were \$99,883,843, divided as follows: Gold, \$82,966,473; silver, \$8,772,290; United States notes, \$5,923,536; treasury notes, \$2,221,944. The gold balance is thus over \$17,000,000 below the limit. The silver dollars and bullion on hand under the act of 1890 were \$152,327,831, against which there are \$152,195,280 treasury notes outstanding.

On Friday, the 20th, the gold reserve was still further reduced to \$82,325,799, which is near the lowest point ever reached. Measures for increasing the reserve are under discussion, and it is said that

some of the banks are ready to transfer gold to the treasury in exchange for legal tenders, but no actual movement of the kind has been made.

A report from the Finance Committee of the Senate containing a communication from the Secretary of the Treasury, in response to a resolution of the Senate, was submitted on Thursday. The Secretary says that the actual expenditures for the three months July 1st-September 30th of the fiscal year were \$98,000,000, being \$21,000,000 in excess of the receipts. The Secretary says a definite forecast for the whole year is impossible, but, should present conditions last, a deficit of \$50,000,000 for the year is probable.

The Bank of England reports for the week an increase of £150,000 in its reserve. During the week £351,000 in gold were exported to Egypt, Holland, Denmark and Austria, while £84,000 were received from South Africa and £240,000 from Australia. The net balance of exports was thus £25,000. The bank's specie holdings are now £26,474,639, against £25,220,342 one year ago.

The Bank of France on Thursday reported its specie holdings, in sterling, at £68,049,840 in gold and £50,757,163 in silver; an increase, as compared with the corresponding date in 1892, of £1,094,054 in gold and a decrease of £589,484 in silver. For the week there was an increase of £415,920 in gold and £13,360 in silver.

The conference of the Latin Monetary Union has agreed on a plan for the nationalization of the Italian silver coinage, and is now considering the details of the plan, the general features of which have been approved.

The London "Economist" reports that the Russian government is still accumulating gold. It is reported in London that heavy purchases of Australian and South African gold recently made, nominally for Berlin and Amsterdam, are really for Russia, though a part is credited to the Austrian government also, which is still on the lookout for gold. The price for fine bar gold has risen in London to 78s. per oz., standard.

A recent statement of the Austrian Minister of Finance in relation to the currency reform in that country shows that the government of Austria now has 120,000,000 fl. in gold ready, the Hungarian mint 82,000,000 fl., and the Austro-Hungarian Bank 130,000,000 fl., a total of 332,000,000 fl. There are 312,000,000 fl. in notes and 100,000,000 fl. silver coin to be redeemed, or 412,000,000 fl. in all, so that 80,000,000 fl. more in gold will have to be provided. The government is buying all the gold it can secure to make up this amount.

A Calcutta despatch says that the import of silver has been stopped in the markets of Kandahar, Ghuzni, Jellalabad and Kabul, in Afghanistan.

The absorption of silver by India appears to be lessening, and it is expected that the government will shortly be called on for council bills to take the place of the silver heretofore shipped to India.

The English Consul-General at Shanghai has sent to the Foreign Office a report on the silver question as affecting China. He gives his conclusions after exhaustive investigation, and says that China never has been an absorber of silver. Between 1870 and 1880 she took about £3,000,000 sterling yearly, but since 1880 the process has ceased, and recently she has even exported a small amount of silver. The reduction in the price of silver has had little effect on the prices of commodities produced and consumed in China, but has stimulated exports, which under present conditions, however, cannot attain large dimensions, as the capability of China to absorb silver depends on the excess of exports over imports. There is no reason to expect that she will take much silver off the foreign markets at all events, within the next few years.

A report recently noted of the British consul-general in which he says that China is not now absorbing silver to any extent, and is not likely to do so, is severely criticised by the London papers. Most of the authorities hold that China will continue to absorb silver as long as her exports exceed her imports, and point to recent shipments, including those of silver dollars from San Francisco, which we recently noted in this column.

The Peruvian Congress is considering a bill to establish the gold standard and to prohibit the importation of silver.

It is reported that the Currency Commission of the Straits Settlements are equally divided on the currency question, half of the members favoring free silver upon the recommendation of the Chinese bankers, the other half favoring a token money. The amount of full tender silver is stated to be \$130,000,000, \$26.32 per capita, the population being about 3.3 millions. There is no gold or paper money in circulation.

The Vienna correspondent of the London "Economist" says that the premium on gold on the Bourse is still 5% higher than the ratio mentioned in the new standard laws. The effect of large amounts of inland stocks having returned to the country from

foreign investors is still acutely felt. It was strange that enough capital had been saved in the country during late years to enable the Vienna market to take up all these returned securities without causing prices to fall much. But the rise of the premium on gold was a together inevitable.

A new feature of the monthly summaries of imports and exports issued by the Treasury Department, October 4th, is the table of comparative prices. We understand that the idea originated with Mr. W. C. Ford, Chief of the Bureau of Statistics. The import and export prices of what we may call custom-house commodities are quoted. Mr. Ford thinks, and in this we agree with him, that a regular series of prices ascertained by uniform methods of the same article will be of great value to political economists and those dealing with revenue and other statistical returns. The summary further shows a balance of trade in our favor for the first time in some months, the exports for August being \$71,123,764, while the imports were only \$58,640,719. This wipes out the small adverse balance of July and leaves a net balance in our favor for the two months of the present fiscal year.

The Director of the Mint has prepared a statement which shows that during the first quarter of the present fiscal year the Treasury Department, acting under authority of the Sherman silver act, purchased in July in fine ounces 2,218,982, cost \$1,583,230; August, 3,934,497, cost \$2,907,344; September, 2,769,629, cost \$1,988,423. If the full amount of 4,500,000 oz. had been purchased each month, the silver purchases for the first quarter of the present fiscal year would have been 13,500,000 oz., instead of 8,923,108 oz., which, at an average of 74c. per ounce, would have made the Treasury notes issued against the purchases foot up \$9,900,000 instead of \$6,479,002.

The London "Statist" calls attention to the fact that according to the notice given last May the International Monetary Conference stands adjourned until early in November. No action has been taken, but there is still a possibility that a meeting may be called for.

Domestic and Foreign Coins.

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

| | Bid. | Asked. |
|---------------------------------------|----------------------------------|--------------------------------|
| Mexican dollars..... | \$35 ³ / ₄ | \$36 |
| Peruvian soles and Chilean pesos..... | 53 ³ / ₄ | 54 ¹ / ₂ |
| Victoria sovereigns..... | 4.84 | 4.88 |
| Twenty francs..... | 3.6 | 3.89 |
| Twenty marks..... | 4.71 | 4.78 |
| Spanish 25 pesetas..... | 4.75 | 4.80 |

Other Metals.

Copper.—The market has been very flat again and the demand from home consumers continues to be very small indeed, but fortunately there is no great pressure by the producers to sell, or else prices would be rather lower. Exporters have not done much either, as Europe will not buy except at the low prices which ruled a few weeks ago. Thus, things are practically at a standstill, and we have to quote lake copper nominally at 9³/₄@9¹/₂; electrolytic copper at 9¹/₂@9¹/₄ and casting at 9c. Some business is reported to have taken place in Arizona pig copper, guaranteed 96%, at private terms. The production seems to continue to be heavy and exports are very large indeed.

A good consumptive demand is reported from Germany and England, but very little can be done in France. The statistics for the first half of the month show a decrease of 100 tons, which, considering the tremendous shipments from the United States, is a very good showing.

G. M. B.'s were easy in the early part of the week, but have since advanced, and are closing at £41 17s. 6d. @ £42 for spot, and £42 5s. @ £42 7s. 6d. for three months. For refined and manufactured we quote: English tough, £45 @ £45 5s.; Best Selected, £45 15s. @ £46; Strong Sheets, £53 10s. @ £51; India Sheets, £51 10s. @ £52; Yellow Metal Sheets, 4¹/₂.

The following figures give the production, in tons of 2,240 lbs., of copper in the United States and also by the chief foreign mines, and the exports of fine copper from the United States for the month of September, and the nine months ending September 30th:

| | September. | Nine mos. |
|---|------------|-----------|
| Reporting mines in the United States..... | 11,750 | 97,014 |
| Pyrites and outside sources, U. S..... | 1,042 | 9,604 |
| Reporting foreign mines..... | 6,393 | 60,538 |
| Total, long tons..... | 19,095 | 167,128 |
| Exports from U. S. (fine copper)..... | 16,131 | 52,850 |

The exports from the United States continue very large, as well as the production. The exports of copper from the port of New York during the past week were as follows:

| Copper: | | | | |
|----------------------------|--------------|------------|----|--------|
| Liverpool—Runic..... | 1 cask | 1,250 lbs. | \$ | 120 |
| " Majestic..... | 45 casks | 56,250 " | | 5,625 |
| " Arizona..... | 129 casks | 161,250 " | | 16,800 |
| " Lucania..... | 628 plates | 100,498 " | | 10,000 |
| " Swansea—Bo-ton City..... | 36 casks | 45,000 " | | 4,700 |
| " " | 637 bars | 225,904 " | | 20,331 |
| " " | 30 pigs | 9,156 " | | 810 |
| " Landaff City..... | 639 bars | 226,119 " | | 20,351 |
| Hull—Martella..... | 18 casks | 22,500 " | | 2,500 |
| Havre—La Gascogne..... | 135 casks | 152,320 " | | 25,300 |
| " " | 722 bars | 100,871 " | | |
| " " | 606 pigs | 82,440 " | | 7,260 |
| " " | 2,941 plates | 120,075 " | | 10,708 |
| " Brima..... | 90 casks | 112,500 " | | 11,250 |
| " " | 64 cakes | 11,333 " | | 1,130 |
| " La Bretagne..... | 207 casks | 258,750 " | | 27,150 |

| | | | | |
|--------------------------|----------------|------------|---------|--------|
| Leghorn-Italia..... | 180 bars | 56,022 | " | 4,830 |
| Rotterdam-Rotterdam.. | 412 casks | 515,040 | " | 52,585 |
| " | 4,423 plates | 161,245 | " | 15,900 |
| " | 637 bars | 88,066 | " | 8,807 |
| " | 36 pigs | 11,208 | " | 1,080 |
| " | Veendam..... | 836 plates | 205,602 | 20,300 |
| " | 54 bbls. | 67,200 | " | 6,610 |
| " | Loch Morce.... | 18 bbls. | 22,500 | 2,250 |
| " | 661 pigs | 162,696 | " | 16,100 |
| " | 1,397 plates | 98,347 | " | 9,800 |
| Hamburg-Toormina..... | 36 casks | 45,000 | " | 4,700 |
| " | Moravia..... | 6 casks | 5,730 | 560 |
| Stettin-Italia..... | 44 bbls. | 55,040 | " | 5,500 |
| St. Petersburg-Franisco | 537 bbls. | 671,250 | " | 6,313 |
| " | 37 casks | 26,820 | " | 2,680 |
| Copper matte: | | | | |
| Liverpool-Britannia..... | 6,388 bags | 797,911 | " | 36,235 |
| " | 3,370 bags | 377,400 | " | 18,870 |
| " | Arizona..... | 4,284 bags | 493,039 | 20,800 |
| " | Majestic..... | 169 casks | 216,299 | 9,500 |
| " | Lucania..... | 1,021 bags | 118,204 | 6,300 |
| London-Mohawk..... | 263 bags | 37,498 | " | 2,000 |

The exports of copper from Baltimore for the week ending October 19th were as follows:

| | | | | |
|--------------------------|--------------|--------------|-------|--|
| Copper: | | | | |
| Liverpool-Sedgemoore.... | 1,826 bars | 358,906 lbs. | ..... |  |
| " | 369 cakes | 70,280 | ..... |  |
| Hayre-Thos. Anderson.. | 5,616 plates | 112,000 | " | |
| " | 8,990 ingots | 125,000 | " | |
| " | 1,743 | 25,000 | " | |
| " | 3,286 bars | 282,913 | " | |
| " | 645 cakes | 112,611 | " | |
| " | 35 casks | 45,842 | " | |
| Copper matte: | | | | |
| Liverpool-Sedgemoore.... | 6,377 sacks | 708,011 | " | |

The export is also noted of 163 bbls.—164,816 lbs.—of zinc dross to Liverpool per steamer "Sedgemoore."

Tin.—The market is firm and steady and good business has been done at from 20.90 up to 21.10. The consumption is not as large as it ought to be, but nevertheless the deliveries continue on a fair scale, and stocks, by the end of the month, will be below 2,000 tons, so that it is fair to assume that the present stocks will be consumed by the middle of December.

The foreign market has been quiet but steady. London ruled at from £73 2s. 6d. to £73 5s. for spot and £78 12s. 6d. to £78 15s. for three months. No tin can be imported from the other side below £21 3s. 8d. to £21 1s. 2d. ex-ship.

Lead.—Not much business has been done, and with the additional pressure from the West prices declined somewhat, and business is reported to have taken place at 3.35@3.40, but the transactions have been limited. Thus, the market has again arrived at the lowest price recorded, but it is impossible that these prices can be maintained for any length of time, as they leave a heavy loss to the producers. The foreign market is a trifle better, Spanish lead being quoted at £9 11s. 3d. @ £9 12s. 6d., and English lead 2s. 6d. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead continues depressed, and prices are slowly assuming a lower level. Latest sales are at 3.07½c. At this figure we might call the market steady, and fairly active at the close.

Spelter is lower again and must be quoted at 3.55@3.60. Consumption in this country is very light, and as additional furnaces have been started lately there is rather a surplus, but foreign prices for spelter do not as yet allow export. The London market for spelter is weak at £16 15s. for good ordinaries and £16 17s. 6d. for specials.

Antimony is dull. Cookson's is quoted at £10 1s. 8d. @ £10 1s. 4d.; L. X. at £9 7s. 8d., and Hallett's £9 5s. 8d. @ £9 3s. 4d.

Quicksilver.—There is no change to report of this market. It continues quiet. Prices remain as last quoted, namely; \$38 for New York and \$6 9s @ \$6 10s for London.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Oct. 20.

Heavy Chemicals.—There is practically nothing new to report of the heavy chemical market. It continues to exhibit the same quietude and lack of interesting features which have characterized it for some time past. Caustic soda is unchanged as to prices, with a better outlook for the near future, owing to the gradual breaking up of the great English coal strike. Deliveries on contracts are being made with more promptness. Carbonated soda ash has been in fair inquiry, but not much actual business is reported. Alkali is quiet.

Quotations are nominally as follows: Caustic soda, 60%, 3.05@3.20c.; 70%, 2.80@3c.; 74%, 2.82½@3.05c.; 76%, 3@3.10c. Carbonated soda ash, 48%, 1.15@1.25c.; 58%, 1.10@1.20c. Alkali, 48%, \$1.10@1.20; 58%, \$1.05 @ \$1.15, according to package. Sal soda, English, 1.10c.; American, 1@1.10c. Bleaching powder, 2.25@2.50c.

Acids.—Very little that is new can be reported of the general acid market. Business, on the whole, remains practically unchanged as to volume and prices. We hear, however, of some inclination to name low figures for contracts extending over the next few months. We quote acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.87½; in carboys, \$2.25; muriatic, 18, 90c.@1.10; 20, \$1@1.25; 22, \$1.10@1.35; nitric, 40, \$1; 42, \$1.50@1.75; sulphuric, 75c.@1. Mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.50 to \$3.75; glycerine for nitro-

glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—This market continues quiet. Prices remain unchanged from last week, and we quote: October-November shipments, best unmixed seconds, \$17.75; thirds, \$10.75. On the spot, best unmixed seconds have sold for \$18.50.

Fertilizing Chemicals.—There is a fair, steady consumptive demand for fertilizers, but on the whole the market is quieter than a fortnight ago. No speculative tendency is displayed by buyers, and prices remain unchanged and fairly firm. Our quotations this week are as follows: Sulphate of ammonia, on the spot, gas liquor, \$3.65@3.70; bone, \$3.30@3.35. Dried blood, \$2.70@2.80 per unit for high grade, and \$2.40@2.50 for low grade; azotine, \$2.70@2.75. 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 bone-black, 17% to 18%, P₂O₅ 92@95c. per unit. Acidulated fish scrap, \$15@16, and dried scrap, \$25@25.50 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$20@27; 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, \$12; Philadelphia, \$11.4½; Charleston and Savannah, \$11.75 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, \$2.00½; Charleston and Savannah, \$2.127, sulphate of potash, 96-99%, basis 90%, is 4% higher.

Phosphates.—Quotations f. o. b. Charleston are \$5@5.50. Freight is \$2.25.

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

Kainit.—Quotations for shipments are as follows: New York, Philadelphia and Boston, \$9 for foreign invoice weight and test, and \$9.25 for actual weight; Charleston, Savannah and Wilmington, \$9.75 for invoice weight and test, and \$10 for actual weight.

Nitrate of Soda.—Owing to the reasons given in our last report, namely, that all the nitrate here is now in store, prices have advanced and nitrate on the spot is now quoted at \$1.90@1.92½. To arrive is quoted according to position. August-September shipments have been sold at \$1.80.

Liverpool. Oct. 11.

(Special Correspondence of Joseph P. Brunner & Co.)

The coal strike still continues to hamper business, and the dispute has not yet been arranged, although outside mediation has been resorted to with a view to a settlement. So far, however, the efforts to arrange this coal difficulty have not been attended with much success. As regards our market for heavy chemicals, the position is unsatisfactory and there is very little trade to report.

Soda ash is still very dull, and for Leblanc makes quotations are unreliable, varying according to quantity, make, market, etc. Quotations are quite nominal and may be quoted about as follows: Caustic ash, 48%, £4 10s. @ £5 per ton; 57%, 58%, £5 10s. @ £5 15s. per ton. Carbonate ash, 48%, £4 15s. @ £5 per ton; 58%, £5 @ £5 5s. per ton, all net cash.

Ammonia ash, 58%, is weak, and lower at about £3 15s. @ £4 per ton, less 2½% for prompt and forward delivery.

Soda crystals are unchanged, being still maintained at £3 5s. @ £3 7s. 6d. per ton, less 5%, and supplies are very limited.

Caustic Soda.—Quotations continue on an artificial basis, owing to scarcity, and nominal figures for prompt delivery are about £10 @ £10 5s. for 90% and £11 @ £11 5s. for 70%, all net cash. Owing to high business is practically stopped.

Bleaching powder is dull and easier. Quotations to-day are about £8 15s. @ £9 per ton, net cash, hardwood packages, while resale parcels are obtainable at less money.

Chlorate of potash, owing to demand having fallen off, is weaker, and nominal quotations are about 8¼d. to 8½d. for prompt delivery. For October-December we quote 8d. @ 8¼d., and for all 1894 7½d. per lb. is asked.

Bicarb. soda is in demand at from £7 per ton, less 2½% for cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia receives very little attention at present, and nominal spot quotations are about £13 5s. @ £13 10s. per ton, less 2½% for good gray, 24@25% in double hogs. f. o. b. here.

Nitrate of soda is not active, but at the same time prices are still maintained at about £9 10s. per ton, less 2½% for double bags, f. o. b. Liverpool.

Carb. Ammonia.—Lump 3¼d. per lb.; powdered, 3¼d. per lb. less 2½%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 438, 439 and 440.]

NEW YORK, Friday Evening, Oct. 20.

Owing to the continued favorable reports from San Francisco there has been more inquiry for mining stocks of late. Now there has been no news possessing much intrinsic value from California, but rather a revival of the usual rumors of an impending

"deal"; yet, it has been sufficient to infuse hope into our mining brokers. The mining stock market here had sunk into such a condition of stagnation that the slightest report is magnified a hundredfold and proves enough to reawaken interest to some extent.

Although there has been some inquiry during the past week, actual sales have not been very large. Compared with a month ago Comstock stocks certainly show improvement, but compared with a year or two ago they are exceedingly quiet. Consolidated California & Virginia opened at \$2.75, declined to \$2.50 and sold at the close for \$2.65; total sales for the week amounted to only 300 shares. Opir shows transactions of 300 shares at \$1.90@1.40; of Sierra Nevada 200 shares changed hands at 50@75c.; Chollar shows a sale of 200 shares at 35c. Comstock Tunnel was the most heavily traded in during the week; 1,300 shares changed hands to-day at 7c. Other sales were: 300 shares of Mexican at 75@80c.; 550 shares of Potosi at 45@60c., and 100 shares of Union Consolidated at 30c.

Of the California stocks Bodie Consolidated showed sales of 200 shares at 20 to 25c.; of Brunswick Consolidated 300 shares were sold at 6c. The superintendent of the Brunswick Consolidated Gold Mining Company writes as follows from Grass Valley under date of the 9th inst.: The ledge in the drift is 12 in. thick, full of sulphurets and showing free gold. In the upraise the ledge is about 4 in., and the rock shows gold and a fair amount of sulphurets.

Horn Silver was quiet but firm; only 100 shares were sold at \$3. The quarterly financial statement of the Horn Silver Mining Company for the three months ending September 30th, 1893, shows a most wholesome state of affairs. The receipts were as follows: Sales of ore, \$88,841; interest and sundry amounts, \$3,289; balance on July 1st, 1893, as per last quarterly report, \$305,734; total, \$307,864. The disbursements for the same period were: Mining, \$25,226; concentrating plant, \$3,638; mine account (purchase of Dumbarton lode, adjoining the present property), \$3,000; general expenses, \$2,637; smelter expenses, \$84; New York office, \$3,853; dividend No. 31 of 12½c. per share, \$50,000; balance cash on hand, \$309,426. It must be borne in mind that the cost at the concentrating plant and the purchase of the Dumbarton lode represent property purchased; otherwise the surplus would show an increase of over \$10,000, instead of \$3,692, as compared with the balance last July. This company may well be proud of its record and of the way its finances are managed. Few silver mining companies can show a balance on hand of \$309,426. Mr. A. C. Washington, president of the company, has just returned from the property and reports it to be in a first-class condition.

Of the Colorado stocks Leadville Consolidated shows sales of 1,400 shares at 10@12c. Lacrosse continues in demand and the price has advanced; during the week 1,500 shares were sold at 4@7c.

NOTES OF THE WEEK.

The Standard Consolidated mill at Bodie has again started up, with electricity as a motive power, and at last advices had run successfully for 46 hours.

Final returns on September account from the Consolidated California & Virginia Mining Company show a cash balance of \$61,544, with all expenses for the month paid in full.

The Witwatersrand report gives the September production at 129,585 oz. gold, against 130,069 oz. in August and 107,850 oz. in September, 1892. The reduction in August was chiefly due to scarcity of labor, which is felt all over the Transvaal.

During the month of September the ore shipments from White Pine District, Nev., aggregated 327 tons. The shippers were as follows: From J. B. Mathewson, 154 tons; McEllin, 83 tons; F. Paul, 47 tons; A. Muir, 29 tons, and Zoanni Brothers, 14 tons.

The latest weekly official letter from the superintendent of the Bulwer Consolidated Mining Company says: During the week we crushed 305 tons of an average battery sample of \$22.21; tailings, \$8.87. Bullion valued at \$8,029.69 was shipped as the result of the run.

The Boston & Montana Consolidated Company receives proposals to-day at its Boston office for the sale of its 7% first-mortgage bonds to an amount sufficient to absorb the sum of \$25,917, set aside in accordance with the terms of the mortgage to buy the bonds. The price asked must not exceed 110 and accrued interest.

The Bulwer Consolidated Mining Company's latest weekly official letter says that the usual quantity of good ore is being taken from this company's mine. The mill is being kept running steadily. The average battery assay of the ore crushed during the week ended September 25th was \$33.04 per ton. The tailings averaged \$9.31 per ton.

For the month of September the shipments of ore from Silver Plume were greater than for August by 25 cars. In September the shipments were as follows: Mendota, 14 cars; Stevens, 15 cars; Dunderburg, 9 cars; Burleigh tunnel, 5 cars; total, 43 cars.

The ore from the Dunderburg and a part of that from the Mendota went direct to Denver.

Improvement is officially reported in one of the upraises from the 1,100-ft. level of the Yellow Jacket mine, and also in winze below the 1,300-ft. level of the Hale & Norcross mine, in which sinking has been resumed. It is stated officially that a width of 11 ft. of good ore is showing in the bottom of the winze. All these official facts have had no beneficial effect upon the stock market either here or in San Francisco.

The gross receipts of the Philadelphia & Reading Coal and Iron Company for August were \$1,701,185, and the gross expenses \$1,613,096, leaving a profit from mining of \$88,089. One-twelfth of the current year's fixed charges, \$68,000, deducted from this, left a surplus for the month of \$20,089. Compared with the same month last year there is a decrease of \$53,330. For the nine months of the company's fiscal year ending August 31st the expenses exceeded the gross earnings by \$128,949. The fixed charges, \$612,000, added to this, show a deficit of \$740,919. Compared with the same period last year there is an increase of \$297,881.

The Eureka & Palisade Railroad Company received at Eureka, Nev., in transit for Salt Lake and the Selby Lead and Smelting Company, of California, during the month of September, 1,737 tons of ore as follows: From Eureka District, from the Eureka Consolidated mine, 465 tons; Jackson mine, 221 tons; Richmond, 215 tons; Hamburg mine, 160 tons; Dunderberg mine, 72 tons; Pioneer mine, 65 tons; McGarry mine, 55 tons; Williamsburgh mine, 53 tons; Bullwhacker mine, 30 tons; Diamond mine, 15 tons; Phenix mine, 12 tons; Lord Byron mine, 10 tons, and sundry small lots, 37 tons. From White Pine County, 327 tons.

Boston.

Oct. 19.

(From our Special Correspondent.)

The market for mining stocks continues to rule extremely dull and prices generally show but little change. There is nothing in the situation to warrant an advance, and traders are not disposed to sell short to any extent, so the market drags heavily along and attracts but little attention. There has been a little more trading in Boston & Montana, which has held quite firm at about \$22, with some sales a fraction below and above that figure, but there is no special feature regarding the company, and purchases have been confined principally to the

short interest. Butte & Boston was rather heavy and declined to \$7, with later sales at \$7 1/4.

Calumet & Hecla has been very quiet this week, with only sales of six shares at \$275, a gain of \$2 1/2 for the week. There has been some intimation that the company would not earn \$20 per share the ensuing 12 months, unless there should be an advance in ingot copper, which does not seem likely; but as the company has a large surplus to draw on in case of need, it is quite probable that the present rate of dividends will be maintained.

Tamarack, which at the close of last week was quite strong at an advance of \$9 to \$134, declined to \$123 to-day for a round lot, and to \$126 for two shares. The company paid \$12 in the year ending June 30, 1893, and \$16 the previous year, but the dividend prospects for the next 12 months are not very encouraging.

Quincy declined from \$108 to \$105 on small sales. Franklin also declined from 1/2 to \$10 for 50 shares only.

Centennial declined from \$2 1/2 to \$2 1/4, and Kearsarge from \$6 1/2 to \$6.

A small lot of Osceola sold at \$25, a decline of \$1 1/2. Tamarack, Jr., declined to \$16 1/2, and subsequently advanced to \$18, with \$17 1/2 bid, and none offered. The prospects for this mine are reported to be growing more favorable as development work progresses. Atlantic declined to \$8 1/2 for 50 shares, a loss of \$1 since previous sale. Allouez sold at 35c., and the balance of the list was neglected.

San Francisco.

Oct. 13.

(From our Special Correspondent.)

The mining stock market, after remaining in a state of collapse for several weeks, has shown signs of renewed activity during the past six days. The probability that the directors of the Consolidated California & Virginia Company will permit "Jim" Rule to take charge of one mine and anchor the "bonanza," of which he says he has certain knowledge, stimulated the stock. It rose to over \$2.00 and then the reaction set in. Many outside speculators remembered that this same personage promised once before to uncover an ore body in the Gould & Curry and received \$5,000 on the strength of the representations made.

The market has been so long inactive that when a few of the trusting contingent began to buy the bonanza stock the shorts slipped in to cover and for a couple of days things were quite active. The balance of the Comstock list also showed gains of several points in sympathy.

The mining assessments falling delinquent during the current month in this city aggregate \$157,700.

distributed as follows: Arizona, \$5,000; California, \$19,000; Nevada, \$83,760, and South Dakota \$50,000.

Yesterday and to-day the market has displayed the symptoms of another dull spell. Consolidated California & Virginia sold to-day down to \$1.55, Ophir to 80c., Mexican to 55c., Sierra Nevada to 45c., and Union to 25c.

Of the middle group of Comstocks Best & Belcher sold for 50c., Chollar for 20c., Gould & Curry for 25c., Hale & Norcross for 35c., Potosi for 50c., and Savage for 25c. The sales of these stocks were light.

The north end and Gold Hill stocks have been dull and not in much demand. Alpha sold for 5c., Belcher for 25c., Challenge for 10c., Confidence for 45c., Crown Point 25c., Overman 10c. and Yellow Jacket for 45c. At the above prices the north end stocks have sold freely, but the remainder of the market continued to sell light until the close.

SAN FRANCISCO, Oct. 20 (By Telegraph).—The opening quotations to-day are as follows: Best & Belcher, 95c.; Bodie, 15c.; Belle Isle, 5c.; Bulwer, 15c.; Chollar, 30c.; Consolidated California & Virginia, \$2.15; Gould & Curry, 40c.; Hale & Norcross, 50c.; Mexican, 80c.; Ophir, \$1.30; Savage, 45c.; Sierra Nevada, 70c.; Union Consolidated, 35c.; Yellow Jacket, 60c.

DIVIDENDS.

Harquahala Gold Mining Company, Limited, dividend No. 1 of eighteen cents per share, payable November 10th at the office of the company, No. 6 Draper's Gardens, London, E. C., England.

Homestake Mining Company, dividend No. 183 of ten cents per share, \$12,500, payable October 25th at the office of the company in San Francisco, Cal., or at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York City. Transfer books close October 20th and reopen October 26th.

De Lamar Mining Company, dividend No. 10 of twenty-five cents per share, \$100,000, payable October 24th at the office of the company, No. 6 Draper's Gardens, London, E. C., England.

MEETINGS.

Boston & Montana Consolidated [Copper and Silver Mining Company, at the office of the company at Butte City, Mont., October 26th, at 12 o'clock noon.

Chrysolite Silver Mining Company, at the office of the company, No. 13 Burling Slip, New York City, November 1st, at 12 o'clock noon.

CURRENT PRICES.

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

Table listing various commodities and their prices, including Acid-Acetic, Commercial, Carbonic, Chromic, Hydrobromic, Hydrocyanic, Hydrofluoric, Alcohol, Alum, Ammonium Chloride, Ammonia, Antimony, Argon, Arsenic, Asbestos, Ashes, Asphaltum, Barium, Bismuth, Borax, Bromine, Cadmium, Calcium, Carbonate, Chloride, Chromate, Cobalt, Copper, Cyanide, Fluoride, Gypsum, Iodine, Iron, Kaolin, Lead, Litharge, Magnesia, Manganese, Mercuric Chloride, Nitrate, Potassium, Silica, Soda, Strontium, Sulphur, Talc, Tellurium, Thallium, Titanium, Tungsten, Uranium, Vanadium, Zinc, and various salts and minerals.

Table listing various commodities and their prices, including Cadmium Iodide, Chalk, China Clay, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Chromalum, Cobalt, Copper, Vitriol, Nitrate, Copperas, Corundum, Cryolite, Emery, Epsom Salt, Feldspar, Fluorspar, French Chalk, Glycerine, Glauber's Salt, Gold, Kaolin, Kieserite, Lead, Litharge, Magnesia, Manganese, Mercuric Chloride, Nitrate, Potassium, Silica, Soda, Strontium, Sulphur, Talc, Tellurium, Thallium, Titanium, Tungsten, Uranium, Vanadium, Zinc, and various salts and minerals.

Table listing various commodities and their prices, including Mineral Wool, Naphtha, Nitre Cake, Ochre, Washed Nat Oxid, Golden, Domestic, Oils, Phosphorus, Platine Chloride, Potassium, Bromide, Chlorate, Chlorate, Carbonate, Caustic, Iodide, Nitrate, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone, Pyrites, Quartz, Rotten Stone, Sal Ammoniac, Salt, Saitpeter, Soapstone, Strontium, Sulphur, Flour, Sulphuric, Talc, American No. 1, American No. 2, Terra Alba, English, American No. 1, American No. 2.

Table listing various commodities and their prices, including Tin, Muriate, Oxymur, Vermillion, Am. quicksilver, Chinese, American, Zinc White, Antwerp, Paris, Muriate solution, Sulphate crystals, Arsenite, Barium, Bismuth, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Germanium, Glucium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Potassium, Strontium, Strontium, Tellurium, Thallium, Titanium, Tungsten, Uranium, Vanadium.

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, Oct. 14, Oct. 16, Oct. 17, Oct. 18, Oct. 19, Oct. 20, SALES, and Name and Location of Company, Oct. 14, Oct. 16, Oct. 17, Oct. 18, Oct. 19, Oct. 20, SALES. Lists various mining companies and their stock prices.

*Ex-dividend. †Dealt in at New York Stock Ex. ‡Unlisted securities. §Assessment paid. ¶Assessment unpaid. Dividend shares sold, 2,579 Non-dividend shares sold, 4,250. Total shares sold, 6,730.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Oct. 13, Oct. 14, Oct. 16, Oct. 17, Oct. 18, Oct. 19, SALES, and Name of Company, Oct. 13, Oct. 14, Oct. 16, Oct. 17, Oct. 18, Oct. 19, SALES. Lists various mining companies and their stock prices.

Dividend shares sold, 2,879.

Non-dividend shares sold, 833.

Total shares sold, 3,712.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California has paid \$1,320,000 in dividends, and the Cons. Virginia \$42,390,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ‡‡ This company acquired the property of the Raymond & Fly Company which had paid \$3,075,000 in dividends. **** Previous to this company's acquiring Northern Belle, that mine paid \$2,400,000 in dividends against \$425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for stock names, dates (Oct. 14, 16, 17, 18, 19, 20), and sales. Includes stocks like Am. Coal, Balt. & Ohio, and various railroad stocks.

Total shares sold, 98,432.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for stock names, dates (Oct. 14, 16, 17, 18, 19, 20), and sales. Includes stocks like Adams Express, Am. Cotton Oil, and various industrial trusts.

Total sales, 192,183.

CALIFORNIA.

San Francisco.

Table of closing quotations for San Francisco stocks, including Alpha, Alta, Belcher, and others.

COLORADO.

Aspen.

Table of prices for Aspen stocks, including Argentin Junlata, Aspen Contact, and others.

Colorado Springs. Oct. 15.

Special Report by McIntyre & Hayden.

Table of prices for Colorado Springs stocks, including Alamo, Anaconda Gold, and others.

MARYLAND.

Baltimore.

Table of prices for Baltimore stocks, including Balt. & N. C., and others.

MONTANA.

Helena.

Table of prices for Helena stocks, including Bald Butte (Mont.), and others.

MINNESOTA.

Duluth.

Table of listed stocks for Duluth, including Biwabik M. Iron Co., and others.

UNLISTED STOCKS.

Table of unlisted stocks for Duluth, including Adams Iron Co., and others.

MISSOURI.

St. Louis.

Table of closing quotations for St. Louis stocks, including Adams, American & Nettie, and others.

PENNSYLVANIA.

Philadelphia.

Table of prices for Philadelphia stocks, including Bloomington C. & C., and others.

Pittsburg.

Table of prices for Pittsburg stocks, including Bridgewater Gas Co., and others.

London Quotations.

Table of London quotations for various stocks, including Alaska Treadwell, and others.

Buyer, Seller, & s. d.

Table of buyer and seller prices for various stocks, including Big Creek, Nev., and others.

New York Mining Stocks.

Table of New York mining stocks, including Albee, Alta, and others.

ASSESSMENTS.

Table of assessments for various companies, including Amador, Cal., and others.

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, R. C.

Air Compressors and Rock Drills
American Diamond Rock Boring Co.
Billock, M. C., Mfg. Co.
Briehz Rock Drill Co.
Clayton Air Compressor Works.
Lawson, W.
Ingersoll-Sergeant Rock Drill Co.
Morris County Machine & Iron Co.
Norwalk Iron Works Co.
Penn 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.
Gates Iron Works.

Architects and Builders
Berlin Iron Bridge Co.
Peacock Bridge & Const. Co.
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Son.

Arms and Ammunition
Hartley & Graham.

Assayers and Chemists' Supplies
Alinsworth, Wm.
Baker & Adamson.
Baker & Co.
Berre, J. & H.
Bullock & Crenshaw.
Denver Fire Clay Co.
Henry Hill Chem. Co.
Hoskins, Wm.
Overbrook Chem. Co.
Penn Sm. & Ref. Wks.
Penna. Salt Mfg. Co.

Assayers and Chemists' Supplies
Queen & Co.
Richard & Co.
Roessler & Hasselacher
Chemical Co.
Sargent, A. H., & Co.
Snelson, W. H., Assay.
& Engineering Co.
Solvay Process Co.
Taylor, John, & Co.
Troemner, Henry.
Voland & Van Zelm.

Bankers and Brokers
Bandell, E. H.
Bober & Sohne.
Billings, Robt. & Co.
Chisolm, A. R., & Co.
Cochran, A. M.
Gelder, Bailey & Co.
Grant, E. B.
Handy & Harman.
Hyde, Geo. A.
Matter, E. C. & Co.

Belting
Grootzinger & Sons.
Hendrie & Gouthroff Mfg. Co.
Jeffrey Mfg. Co.
Link Belt Machinery Co.
New York Belting & Packing Co., Ltd.

Blasting Caps and Fuse
Lau, J. H., & Co.
Macheth, James, & Co.
Metallic Cap Mfg. Co.

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

Boiler Compound
American Fluoride Co.

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

Boilers
Scaife, Wm. B. & Son.
Star Boiler & Sheet
Iron Works.

Brake Shoes
Sargent Co.

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

Bridges
Berlin Bridge Co. | Scaife, W. B., & Sons.
Pancoyd Br. Con. Co. |

Buckets
Scaife, Wm. B. & Sons.
(See Machinery.)

Calculators
Smith, R. C.

Carbous
Bishon, 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.

Coal
Maryland-White Coal
Mg. Co.
Castner & Curran
Consolidation Coal Co.
Coxe Bros. & Co.
Haddock, Shonk & Co.
Coal Cutters
Ingersoll-Sergeant Drill Co.
Jeffrey Mfg. Co. (See Machinery.)

Concentrators, Crushers, Pulverizers, Separators, Etc.
Allis, Ed. P. Co.
American Mining & Milling Machinery Co.
American Ore Machinery Co.
Beckett Foundry & Machine Co.
Blake, Theo. A.
Bradley Fertilizer Co.
Colorado Iron Works.
Copeland & Bacon.
Denver Separator & Amalgamator.
Fraser & Chalmers.
Frue Vanner Concentrator.
Gates Iron Works.
Hendrie & Bolthoff Mfg. Co.
Krom, S. R.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Seymour Concentrator Co.
Sturtevant Mill Co.
Totten & Hogg Foundry Co.
Walburn-Swenson Mfg. Co. (See Machinery.)

Copper Dealers and Producers
Abbott, Wheelock & Co.
American Metal Co.
Atlantic Mining Co.
Balbach S. & Ref. Co.
Baltimore Cop. Wks.
Boston & Col. 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.
Pollock, Wm. B., & Co.
Pratt & Whitney Co. (See Machinery.)

Corrugated Iron
Berlin Iron Bridge Co. | Scaife, W. B. & Sons.

Dermagutline
Grootzinger & 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.
Hasenzahl, W.
Penn. Diamond Drill & Mfg. Co.
Sullivan Machinery Co.
(See Air Compressors and Rock Drills.)

Drawing Materials
Heller, Chas. S.
Queen & Co.

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

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

Educational Institutions
Corcoran Scientific School.
Harvard Univ. (Lawrence Scientific School)
Michigan Mining School.
Pennsylvania Military College.
Woodside Seminary.

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

Elevators, Conveyors and Hoisting Machines
Brown Hoisting and Convey. Mach. Co.
California Wire Works.
Cooner, Hewitt & Co.
Davis, F. M., Iron Works.
Hunt, C. W. Co.
Jeffrey Manufacturing 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
Young & Park.
Adams, J. N.
Adams, W. H.
Argall, Philip.
Askew & Russell.
Baker & Co.
Blandy, John F.
Blauvelt, Harrington.
Boggs, W. R., Jr.
Boss, Clarence M.
Boss, M. P.
Brodie, Walter M.
Burlingame, E. E.
Butters, Charles.
Campbell-Fraser R.C.
Carpenter, Franklin R.
Carv, J. Stockly
Cazin, Franz.
Chandler, W. H.
Chanun, J. Parke.
Chatard, Thomas M.
Clark, C. H.
Clark, Ellis.
Clement, Victor M.
Collins, J. H., & Sons.
Cramer, Stuart W.
Darling, L. B.
De la Bouglise, Geo.
Dewey, Frederic P.
Dickerman, Alton L.
Dickinson, H. P.
Donald, J. T.
Emmens, Stephen H.
Everette, Dr. W. E.
Farish, John B.
Farish, Wm. A.
Fearn, Percy L.
Fisk, W.
Fiebold, Francis T.
Froehling, Dr. Henry.
Furlonge, W. H.
Genth, F. A., Jr.
Godfrey, W. S.
Gould, James H.
Hahn, O. H.
Hall Bros.
Hammond, John Hays
Hampton, W. Huntley
Hardman, John E.
Hastings, John B.
Hedburg E.
Herndon, J. H.
Hofman, Ottokar P.
Hollibaugh, J. B.
Hooker & Lawrence.
Hunt & Robertson.
Inne, F. W.
Jennings, E. P.

Engineers' Instruments
Gurley, W. & L. E.
Heller, Chas. S.
Queen & Co.

Engines
Buckeye Engine Co. | Orr & Sombower, Inc.
Bullock, M. C., Mfg. Co. | Union Iron Works.
Morris Co. Mach. & Iron Works. | (See Machinery.)

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

Fire-Brick and Clay
Denver Fire-Clay Co.

Forges
Foss Mfg. Co.

Furnaces
Hoskins, Wm. | Moore, S. L., & Son Co.
Pollock, Wm. B. & Co. | (See Machinery.)

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

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

Ganges, 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 Coal Ltd.

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

Lamps, Miners'
Everhardt, J. M.

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

Lubricants
Dixon, Jos., Crucible Co.

Manganese Steel
Taylor Iron & Steel Co.

Maps, 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 Mining & Milling Machinery Co.
American Ore Machinery Co.
Beckett Foundry & Machine Co.
Buckeye Engine Co.
Bullock, M. C., Mfg. Co.
Carbon Steel Co.
Colorado Iron Works.
Copeland & Bacon.
Davis, F. M., Iron Works Co.
Fraser & Chalmers.
Hunt Iron Works.
Hunt, C. W. Co.
Hendrie & Bolthoff Mfg. Co.
Jeffrey Mfg. Co.
Mechanical Gold Extractor Co.
Meckenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
Oil Well Supply Co.
Orr & Sombower, Incorp.
Penn Diamond Drill & Mfg. Co.
Pierce & Miller Engineering Co.
Pollock, Wm. B., & Co.
Scaife, W. B., & Sons.
Seymour Concentrator Co.
Sullivan Machinery Co.
Thomson-Houston International Co.
Totten & Hogg Foundry Co.
Trenton Iron Co.
Union Iron Works.
Vulcan Iron Works.
Walburn-Swenson Mfg. Co.
Webster, Camp & Lane Machine Co.

Metal Dealers
Abbott, Wheelock & Co. | James & Shakspeare.
American Metal Co. | Johnson, Matthey & Co.
Am. Zinc-Lead Co. | Lewisohn Bros.
Baker & Co. | Mathison Sm'ling Co.
Covies Elec. S. & Phelps, Dodge & Co.
Aluminum Co. | Heber Lead Co.
Eureka Co. | Pullman, J. W.

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.
Covies Elect. Smelt. & Aluminum Co.
Kansas City S. & Ref. Co.
Ledger & 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. | Mollie Gibson Con. Mg. & M. Co.
Boston & Mont. Mg. Co. | Onocela Con. Mg. Co.
Central Mg. Co. | Quebrada R. H. L. & C. Co.
Copper Queen Mg. Co. | Tamarack Mg. Co.
Detroit Copper Mg. Co. |
Eureka Co. |
Canadian Copper Co. |

Nuts, Lock
Star Boiler & Sheet Iron Works.

Ore Cars
Star Boiler & Sheet Iron Works.

Ore Testing Works
Hunt & Robertson. | Ricketts & Banks.
Ledoux & Co.
Snelson, W. H., Assaying & Engineering Co.

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

Patents
Cadin, Benj. R.
Atkins, J. L.

Perforated Metals
Harrington & King Perforating Co.
Mundt & Sons.

Periodicals
Arms and Explosives. | Financial Times.
El Minerio Mexicano. | Iron & Coal Trades
Review.
Electrical Plant & | Indian Engineering.
Electrical Industry.

Phosphates
Trenholm, Paul C.

Phosphor-Bronze
Phosphor-Bronze Smelting Co.

Picks, Miners'
Collins & Co.

Pile Drivers
Bucyrus Steam Shovel and Dredge Co.

Pipes
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Platinum
Baker & Co.

Powder
Etna Powder Co. | Lafin & Rand P. Co.
Atlantic Dynamite Co. | Macbeth, J., & Co.

Pumps
Blake, Geo. F., Mfg. Co.
Cameron, A. S., Steam
Pump Works.
Grootzinger, A., & Sons
Jeanesville Iron Wks.
Knowles Steam Pump
Works.
Publications
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Rand Drill Co.
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Union Wire Rope Tramway Co.

Quicksilver
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Railroad Supplies and Equipment
Carpenter, Geo. B., & Co. | Robinson & Orr.
Hunt, C. W., Co. | Young Lock Nut Co.
Porter, H. K., & Co. (See Machinery.)

Refrigerating Machines
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Regulators, Dampers, Heat, Etc.
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Lunkenheimer Co. | Powell, Wm., & Co.

Rock Drills. (See Air Compressor.)

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Southern & Co.

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Chester Steel Cast. Co. | Sargent Co.
Chroms Steel Works. | Whitney, A., & Sons.
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Surgical Instruments
Sargent, A. H. & Co.

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Tyler, W. S., Wire Works.

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