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Table with 2 columns: Mining News and Markets. Includes 'Alaska', 'Arizona', 'California', 'Colorado', 'Georgia', etc.

GERMAN papers deny the correctness of the statement recently made in some financial newspapers to the effect that the German Imperial Bank has received offers to purchase its stock of silver.

WE publish in this issue the complete list, so far as it has been received by the local committee, of the members of the British Iron and Steel Institute and of the Verein Deutscher Eisenhüttenleute.

entertainment while in New York. We have already published the programme of the meetings of the two societies, but may here state again that the meetings in this city will be held in Chickering Hall.

PROF. EDWARD ORTON, the Ohio geologist, in discussing before the American Association for Advancement of Science, at its Indianapolis meeting, the probability of the exhaustion of the supply of natural gas.

In this connection it is interesting to note that the Pennsylvania Company has taken the step of refusing to sell natural gas in Erie, Pa., except by meter, charging 22 1/2 cents per 1,000 cubic feet.

A REPORT has been going the round of the press that the great Kinzua viaduct on the line of the New York, Lake Erie & Western Railroad is to be removed on account of its not being strong enough to carry the modern heavy locomotives and cars.

Mr. BONZANO states that the viaduct is one of the most important railway structures in the world, and is of recent construction, having been built in 1882. It is 2,052 feet long, 301 feet at its greatest height.

WE have received a prospectus of the North Carolina Steel and Iron Company, which owns about 1,730 acres of mineral lands 40 miles south of Greensboro, and about 2,200 acres of land for manufacturing and town site purposes in and adjacent to Greensboro.

THE "steel-eating worm" is still going the round of the press. We thought that the bad name "ferrivorous paradoxides solubilis," which was given to it by a correspondent of the JOURNAL in our issue of February 1st, was sufficient to kill it.

may live a long time yet in newspaperdom for the edification of the easily gullible.

The newspapers, however, are not satisfied with threatening destruction to our steel industry by the metallivorous worm—they have discovered a plant which has a similar depraved appetite. According to another story which is going the round of the press, Prof. SCHWELISCH, of Bavaria, while traveling in Africa, discovered a shrub with steel-colored foliage, the branches and leaves of which were practically composed of iron, exhibiting all the strength of that metal.

He tried to buy the plant of the natives by giving them a handful of copper coins, which they dropped in a hole at the root of the plant, but would not allow him to take it away. The next day the professor returned to the plant, the natives being absent, and found it had changed to copper color and had absorbed copper from the coins, that were still in the hole, they being more than half eaten away. At the base of the Nkomabakosi mountains a perfect forest of the metal-eating plant was discovered, and the professor secured a number of specimens to take back to England.

The story does not state why he is going to take the specimens to England rather than to Germany, his home, but it is probable that he is an enemy of the former country and expects the plant will propagate itself with the rapidity of the Australian rabbit, and destroy all the metallic wealth of England. If Germany's steel rails are to be eaten up by a worm, no doubt he thinks it will preserve the balance of power to have England's rails devoured by a plant.

THE ARMOR-PLATE TESTS AT ANNAPOLIS.

The results of the tests made on foreign armor plates at the Annapolis proving grounds on September 18th by the United States Naval Board have more than a national significance.

The plates were three in number. A Schneider (Creusot) all-steel plate, a Schneider nickel-steel plate containing between three and five per cent. of nickel and a Cammell (Sheffield) compound plate. This latter is constructed of two sections, the steel face, which comprises one-third of its thickness, being welded on to a wrought iron backing. All were 10½ inches thick. The gun used was a modern high powered six-inch rifle, constructed expressly for the trial, 35 calibres (17½ feet) in length. The 100 pound projectiles used were manufactured in Unieux, France. They were made of forged steel with points of chrome steel, and were 17 inches long. The initial velocity, using 44½ pounds of powder with a chamber pressure of 15 tons to the square inch, was 2,075 feet per second.

Four shots were fired at different points on each target. The Schneider all steel plate was penetrated by each shot, but in no case was it cracked. One of the shots was imbedded, two rebounded and the fourth was broken, a portion remaining in the plate. The projectiles all penetrated the nickel-steel plate with almost the same results which attended the tests of the all-steel plate. The Cammell composition plate was shown to be utterly incapable of standing the fire. The first shot went through the plate and into 11 inches of the backing, splintering the face around the point of entrance in a very irregular manner and scattering fragments.

The second shot resulted as did the first, and, in addition, badly cracked the plate. The third shot penetrated the plate and iron backing, setting fire to the wooden stays, and causing additional cracking. The fourth shot passed through the plate and backing, causing the steel face to peel off like wood veneering.

In these tests the projectiles proved equal to the demands made upon them, consequently the comparative tests of the armor were complete. It was expected that, under the conditions, the projectiles would pierce all the plates, and the results shown by the two Schneider plates are highly satisfactory. The Cammell compound plate was a most complete failure. It is stated that many of the English battle ships are lined with this make of armor, and that thousands of tons of it are ready to be put on vessels now in process of construction. Just how English naval authorities feel over the results of the test can be more easily imagined than described.

THE UTILIZATION OF NIAGARA FALLS.

A contract was awarded on Saturday last to Rogers & Clemens, of this city, to construct a tunnel parallel to Niagara river for the Cataract Construction Company. The consideration involved is not announced. A bond in the sum of \$300,000 has been executed by the firm. Work will be commenced immediately and must be finished in January, 1892. In 1886 the Niagara River Hydraulic Power Server Company was incorporated by a special act of the state legislature. At various times the charter was amended, and the name finally changed to that of "The Niagara Falls Power Company." In July, 1889, this company awarded the Cataract Construction Company the contract to construct at Niagara Falls works which will develop 119,000 horse power. Since that time the contractor has been preparing plans and specifications for the work; the sub-contract just awarded is the first decided move which proves to the public that the preliminaries are nearly finished, and that it is certain the works are to be built. A the present time the contractor has a commission in Europe studying

plans of plants of a similar nature with a view of ascertaining the most practical method of constructing the Niagara plant. Up to date plans for any portion of the plant, excepting the tunnel, have not been adopted. Consequently the manner of connecting the tunnel with the upper river is not known. There will, however, be a canal either with or without a series of traverse surface conduits, which will conduct the water to penstocks and thence upon turbine wheels. The tunnel, which is to be merely a tail race, will receive the water from the turbines conducting it below the falls. The details upon which this tunnel is to be constructed are at hand. It is to start at a point below the falls under the suspension bridge, extending through the rock to the upper river to a point 6,700 feet from its mouth, where a head of 120 feet will be obtained. It will be 28½ feet high, 18 feet wide, with a semi-circular top of 9 feet radius, and straight sides. The fall will be 86 feet to the mile.

The company owns 225 acres of land along the river suitable for mill sites, 75 acres under water adjacent to said land, and 1,100 acres lying back from the river about midway between La Salle and Niagara Falls. It has been estimated that the flow of water over the falls amounts to 12,785,455 cubic feet a minute. To develop 119,000 horse power with a 120 foot fall would require but one-fifth of one per cent. of this volume. From these figures it will be seen that the power is almost inexhaustible. If this plant soon to be constructed, proves to be a success, and there is no reason to believe that it will not, the power now running to waste, reaching a figure almost beyond the comprehension of the mind, can be utilized by additional plants of a similar nature.

THE SITUATION IN WALL STREET.

A most remarkable state of affairs existed in Wall street recently. Last week there were rumors of a financial stringency which would shake the business of the country to its foundations. Money was loaned on call at a half of one per cent. per day and interest, or at the rate of 187 per cent. per year. The most alarming predictions were made as to the damage which would ensue if the stringency were not relieved, and there was no end of causes assigned to account for the condition. Among these was the usual one at this time of the year, the withdrawal of money to the West and South to move the crops; but there were special causes acting at this time only which were considered equally important, such as the hoarding of money by the importers with which to pay duties on the exceedingly large imports recently made in anticipation of the MCKINLEY bill, the absorption of money by the Treasury receiving it for duties and not paying it back so that it could get into the channels of trade, the speculation in silver, etc. It was, however, "a condition and not a theory" which confronted business men, and the fact was that money was tightly locked up so that it could not be got for immediate needs on any kind of collateral without paying the enormous interest charges above named.

In a few hours, however, the whole stringency disappeared as if by magic. Secretary WINDOM made a visit to New York on Saturday last, had a conference with some of the leading bankers, published a statement to the effect that the Treasury had not been hoarding money at all, but that, on the contrary, it had paid out during the year \$41,000,000 more than it had taken in, and that the disbursements since July 26 had exceeded the receipts by nearly \$19,000,000. It was also shown that the expected amounts of duties to be paid on the passage of the MCKINLEY bill had been greatly exaggerated. There was no unusual amount of speculation visible, so the whole catalogue of causes of stringency was reduced to the one which we always have with us at this time of the year, the moving of the crops.

The Secretary on the same day issued a call for bids to sell to the government \$16,000,000 of its 4 per cent. bonds, falling due in 1907, in order to relieve the market. Almost immediately after the conference, and long before the opening of the bids and the actual purchase of the bonds, at about 26½ per cent. above par, the stringency disappeared, and money was quoted on call at 6 to 7 per cent. It has since dropped to 3 to 5 per cent.

It is certainly a remarkable comment on the sensitiveness of loanable capital to the slightest causes that the mere issuing of a financial statement and an offer to buy \$16,000,000 worth of bonds should have caused the price asked for the use of money on call to drop from 187 per cent. to 6 per cent. It is not long ago that money was such a drug in the market that it could not be loaned on call at over 2 per cent.

Fortunately these ups and downs in Wall street have but little effect upon the solid business of the country. Throughout the country banks were lending to their customers upon the ordinary security of mercantile paper at the usual rates, and permanent securities and government bonds and real estate remained uninfluenced in values. Still there is some thing alarming in the fact that a business man may be called on to pay 187 per cent. for the use of money at any time, merely on account of a financial scare in Wall street. There should be a governor or balance wheel of some kind applied to that street, such as we apply to steam engines and other motors. There is great need that our Congressional engineers turn their attention to the invention of such a balance wheel.

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.

Information Wanted.

EDITOR ENGINEERING AND MINING JOURNAL:
SIR: Can any of your readers give me some specific information concerning the Express Group Mining Company at Ashcroft, Pitkin County, Colo.?
PACIFIC.

Mr. Keep's Tests. A Remonstrance.

EDITOR ENGINEERING AND MINING JOURNAL:
SIR: I beg leave to remonstrate against the graphical system which Mr. W. J. Keep uses. Mr. Keep appears to have valuable results to offer us, and it is to be hoped that he may continue to give us more and more results from year to year; but there can be no reason why he should use the graphical method in which he clothes them instead of that already in universal use, and understood by all. It is the duty of every writer to use language which others can readily understand, and not, except for the most weighty reasons, to invent words whose meaning will not be readily understood at a glance. Our graphical method of ordinate and abscissa is part of our language; not only every technical man, but almost every man with a high-school education understands it. It is common to all languages.

Now comes along Mr. Keep, and, instead of using the language which we all understand, he would compel us to learn a new language in which he finds it easier to express his thoughts. If he will pardon the simile, which is meant in all kindness, it is quite as if, in writing on technical subjects, he were to use some words coined in his family and not understood by others; or to use words already in use but in a sense unknown to the rest of mankind, and employed only locally by a small knot of his associates, or slang.

Or, it is like introducing additional letters in the alphabet, and using them in his words; or using some kind of phonetic system, unknown to others.

No further comment on the clearness of his graphical method is needed than his taking about a page of text in a subsequent paper to explain its use in his first. A sonnet should need no index, an epigram no preface, a graphical method no more than a brief "legend." Its essential value must be its clearness; it must speak to those who run.

If he has accustomed himself to these graphical methods rather than to the method of ordinate and abscissa, I think that he must see on reflection that, in addressing the technical public, it behooves him to put himself to the trouble of familiarizing himself with that public's current modes of expression, rather than to attempt to compel the public to study out and familiarize itself with a method which is familiar only to him; to conform to the public's convenience, not to attempt to force the public to conform to his.

If he has a new graphical method which he thinks better than the old, let him, in special papers, lay its advantages before us; and, if its advantages are generally admitted by others to be considerable, then let it come into use. But meanwhile let us beseech him to address us in language which we know, assuring him that the simple ordinate and abscissa, or, if he must have three variables, the triaxial diagram of Professor Thurston will, if used intelligently, enable him to express himself unmistakably. And why will he perplex us by calling diagrams "tables," and stress "weight"? and is Keep's test a test or a graphical method? If the latter, why call it a "test"?
KICKER.

Another Remonstrance.

EDITOR ENGINEERING AND MINING JOURNAL:
SIR: Mr. Keep, in his paper on "Aluminum and Other Metals Compared," says:

"The set in the cast iron is caused by a change in the shape of the molecules of the metal," and further on:

"The peculiar internal spring of the atoms of the metal does not cause the deflections to be exactly proportional to the stresses."

This assumes a knowledge of the shape, of the possibility of change of shape, and of the internal spring of atoms and molecules far beyond what we actually possess. The set, the absence of a well-defined elastic limit, and the curved form of the initial portion of the diagram of cast iron are sufficiently accounted for by internal strain, caused by the shrinkage of the metal in cooling, without making it necessary to suppose any change in the shape of the molecules. It would be difficult to explain why the application of stress would cause the molecules of cast iron to change their shape, while it causes the molecules of wrought iron merely to flow or slide upon each other.

On page 17 he says the diagram of a bar $6 \times \frac{1}{2} \times 1$ inch should be the same as that of a bar $12 \times \frac{1}{2} \times \frac{1}{2}$ inch. The strength should be the same; but as the diagram is made by plotting both strength and deflection, and as the deflection varies as the cube of the length, and inversely as the cube of the depth, the deflection and therefore the diagram should not be the same.

$$\text{Thus deflection} = \frac{C l^3}{b d} = \text{for the first } \frac{C 6 \times 6 \times 6}{1 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}}$$

$$\text{for the second } \frac{C 12 \times 12 \times 12}{\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}}$$

or twice as much as the first. W. K.

Peruvian Prospects.

EDITOR ENGINEERING AND MINING JOURNAL:
SIR: To those who have studied the difficult and deep question of international trade there can be little doubt that the principal cause of the present decadence of Peru is to be attributed to hampering laws checking industries, and to oppressive import dues, almost prohibi-

ing the importation of those foreign products which would tend to home development, as well as to the expansion of the foreign trade of Peru.

Here there are resources to be developed. Here immigrants are surrounded by as many safeguards and considered in the same manner by all as in the United States. Here there are railroads, mines, steamship lines, and a thousand large and small business houses which are exclusively in the hands of foreigners.

The house in which your correspondent writes is owned by a Frenchman and leased by an Austrian, while an Italian organ grinder is annoying me with piccolo runs. A Chinaman now follows with a selection of his peculiar melodies. After him comes a Central American, who offers, in a loud voice, lottery tickets for sale.

Readers may assert that this is a strange conglomerate out of which to form a commercial article, but the thinking commercial man will understand that where there exists a basis for foreign labor there must exist a basis for foreign trade. There are few countries in which the inventor has such a field open to him as in this country at present, or in which one who does not seek to make a sudden fortune by the investment of a small capital can invest money with the same feeling of certainty that he would experience here.

This country, if it could once obtain intercourse with the leading commercial centers in the United States, would commence a new career. Ores which are now shipped hence by a few tons at a time to Hamburg might be sent to California for treatment at a profit much greater than can be obtained on wheat or corn. Experts from the United States who have recently been here and who have visited the old *relane* works, the *detritus* washings from the mines worked under the Spanish rule, declare those *relanes* to be richer to-day in ore than the amount which was originally obtained from the mines, and yet but slight efforts are made to make those old *relanes* of value, while the main lodes remain next to untouched.

Imports from the United States are now at a lower grade than that at which they stood when the fostering mind of Henry Meiggs looked to all corners in order to achieve and maintain his enterprises, and when, at length, abandoned by those he had almost created, he broke down. Since his death there has been no one here to imagine how to achieve, much less to dare to attempt, the gigantic works which his daring talent, seconded by able supporters, left behind him unfinished when he died broken-hearted in Lima.

Peru is only partly inhabited and cultivated, and only few of its mineral resources are known to the mining world. The Cerro de Pasco silver lodes have been worked, yet round those very workings there lie millions of tons of earth and rock to be re-worked, and in the center of the old lodes there are other veins which have not yet been touched.

What is needed is the introduction of machinery and inventions which nowhere have reached a higher standard than in the United States. Just now, when the idea of reciprocity is under debate, it is worth noticing that if only arrangements be reached under which ores can be shipped on satisfactory terms to the United States for treatment, many owners of now idle mines would without doubt at once get out metal for shipment.

The gold-bearing quartz in the Carabaya region in the south has scarcely been touched in modern times, although the Incas worked there for centuries. The gold-bearing river beds and the quartz lodes on the banks of the Amazon tributaries remain up to the present day unworked by any modern machinery, as, unfortunately, those appliances which meet all the requirements, and are made in the United States, remain next to unknown here.

The systems of "silver catching" here are, as a rule, so evidently unfit for the work that to see them would disgust any practical miner. They afford ample explanation of the fact that the mines of Peru do not now sustain their ancient fame.

Strongly refractory high grade ores require refractory treatment, and the writer, uninterested as he is in a single mine in Peru, is convinced that when some mineralogist determines to start machinery or plant in the United States for the reduction of Peruvian ores, he will increase the output of Peruvian mines to such an extent that he will accumulate a fortune for himself, and immediately occasion an augmented export of products of the United States to this and the adjacent Republics, resulting in a continuous and direct expansion of business and friendly relations.
N.
LIMA, PERU, August 16, 1890.

SURVEYING BY VERTICAL ANGLES.

In a communication to the Institution of Civil Engineers which has recently been published, Mr. Wilfred Airy, B. A., M. Inst. C. E., gives an account of some experiments he has recently made on the probable errors to be expected in surveying by "vertical angles." In this method of surveying the distance of a staff from an observer and its level is determined by means of two observations on an ordinary theodolite. The staff has two or three bold well-defined divisions painted on it at known heights, and the distance is determined by sighting the telescope of the theodolite first on one division and then on the other, and noting the two vertical angles. The level can be deduced from the same observations. The work can be effectually done with a five-inch theodolite, and though the office work is somewhat heavier in reducing the observations than with a tacheometer, the field work is somewhat lighter. In order to try the method fairly, Mr. Airy set out 24 stations in Greenwich Park, forming a circuit of rather more than $1\frac{1}{2}$ miles, and determined the distances and levels of these stations on four different days, and under different conditions as to weather, the instrument used being an ordinary five-inch theodolite. The staff was an ordinary level staff, which was, however, fitted with a small circular level to guide the staff-holder in keeping it level. The ground was very favorable for trying the method, as some parts were steep and others level, and there was a rise and descent of 118 in the complete circuit. The stations were from four to six chains apart, and the theodolite was set up at alternate stations, so that the reading distances also varied from four to six chains. After the fourth set of observations had been obtained, the line was carefully chained and leveled, and on comparing the results of this with former observations it was found that the probable error of distance amounted to 3.64 feet per mile, and in level of 0.33 feet per mile. By shortening the sights both these errors can be largely reduced.

THE CORPUS CHRISTI AND SOUTH AMERICA RAILWAY.

A railroad is now under construction between the cities of Corpus Christi and Brownsville, Texas, the latter being at the extreme southern corner of the State near the mouth of the Rio Grande and opposite the city of Matamoras in Mexico. In the JOURNAL of August 23d we published an article describing the project, which is now in progress of completion, for securing deep water at Corpus Christi for the purpose of making it the future great seaport of Texas and the surrounding country in the southwestern portion of the United States and in northern Mexico. The new railway will be a most important feeder to the seaport. From a prospectus recently issued by the railway company we abstract the following:

The long-talked-of Pan-American Railway has been begun. Ground was broken in Corpus Christi, Tex., on the 4th of July, 1890. On the 10th of the same month ground was also broken on the Rio Grande, 150 miles distant. Construction parties are now at work at both ends, building toward a common center. At Corpus Christi the line connects with the standard gauge railway system of the United States and Canada. At Brownsville, on the Rio Grande, it will connect with the shortest line of railway possible of construction from that boundary river to the city of Mexico, and thence to the northern boundary of the Republic of Guatemala. A bill is now before Congress authorizing The Corpus Christi & South American Railway Company to bridge the Rio Grande between these two border cities. The Mexican Government has already given permission for such a bridge.

The Pan-American railway enterprise is vaster in its scope than any railway line which has ever been constructed. The great Pacific railways of the United States furnished railway connection merely between two portions of one country, the western portion of which, at the time of their construction, was but sparsely settled, and furnished but limited commerce; yet these four railways have added enormously to the development and wealth of the sections thus connected, and have furnished opportunities for the acquirement of wealth and the distribution of population which have given to them a fame scarcely equaled by any other railroads in the world. Yet the Pacific railways gave no such promise of business as the railway now under construction to South America.

The governments of seventeen Republics stand behind this single railway. South of the Rio Grande important subventions and valuable franchises have been promised by nearly every government through whose country the road passes. The Pan-American Congress pledges the neutrality of the road in time of war. All materials used in its construction and maintenance are admitted into all the countries free of duties and taxes. The railway from end to end is under the protection of all of the governments south of the Canadian line.

It connects seventeen different nations, having a population south of the Rio Grande about equal to that of the United States itself. These nations have a widely varied product of fields, mines and woods, and all of them are buyers, to an annually increasing extent, of the product of our American manufactures. They are likewise heavy consumers of American flour and other farm products.

South America is the natural market for the United States. Since the war we have not been able to compete successfully with Great Britain, France or Germany upon the high seas. Whether the changing policy of Congress will build up a greater ocean traffic with these South American countries yet remains to be seen. But it cannot be expected that such a result can be accomplished, to an important extent, in less than half a generation. The countries named have already well established steamship lines, giving frequent service to South American ports. The facilities offered by such frequent intercourse give European merchants and manufacturers great advantages over the producers of similar goods in America. [When recently an American steamer from New York arrived in Rio de Janeiro after a voyage of 23 days, there swept in beside her the French steamer "Portugal," which had left Bordeaux fifteen days before, and carried letters only twenty-five days old from New York—letters which had been sent across the Atlantic to Liverpool, thence to London, over the channel to France, along the railroad to Bordeaux, and thence to Brazil.] The tendency in mercantile life is to more and more frequent purchases, at short and shortening intervals, of small invoices of goods, instead of the old-fashioned one of laying in many months' supply at each purchase. A given amount of capital is thus enabled to handle a much larger business, turn itself over more frequently and make larger profits. All things else being nearly equal, the retailer now buys where he can get goods with the greatest frequency and on the shortest notice.

Now, give to the American merchant and manufacturer a daily railway service, whereby his South-American customer may receive small invoices with regularity, certainty and dispatch, and the trade of South America becomes ours. We shall then enjoy the same advantage over Europe which now, by reason of its more frequent steamship service, it enjoys over us.

The bulk of this traffic must always, for geographical reasons, pass over the line now under construction from Corpus Christi to Brownsville and Matamoras.

An air line drawn from St. Louis, New Orleans or Chicago to the city of Mexico, passes through the Gulf of Mexico, east of Corpus Christi. This means that the closer a railway line between these points runs to the city of Corpus Christi, which is situated upon the westernmost sweep of the Gulf of Mexico, the shorter will be the mileage of the railway. Nearly all the traffic with South America originates, and will continue to originate, at St. Louis or points east of the Mississippi. Corpus Christi and Brownsville are therefore placed, by the necessities of commerce, upon the line of the great future highway between the continents of North and South America.

The line now under construction between Corpus Christi and the Rio Grande being upon the shortest line which it will ever be possible to construct, must do the bulk, if not all, of the carrying trade over this portion of the route. The distance from St. Louis to the City of Mexico, by the way of El Paso, is from 1,100 to 1,200 miles longer than the Corpus Christi and Brownsville route. The distance from the same point, by the way of Eagle Pass, is between 700 and 800 miles longer than the Corpus Christi route. The distance between the same points by the way of Laredo is 300 to 400 miles longer than the Corpus Christi route. These

facts, taken in connection with the singularly favorable topographical features of the route selected by the Corpus Christi & South America Railroad Company, mark that line as one with a future, in point of traffic and business, such as no other South American line can ever hope to secure or enjoy.

The country traversed by the first division of this railway, 150 miles in extent, lying between Corpus Christi and the Rio Grande, is one of the greatest fertility. The lands now furnish as fine grazing as the world contains, and are owned by the largest and richest cattle raisers in America. Pending the settlement of the country by farmers, which has just now begun, and which will continue rapidly under the stimulus of important railway communications, this railway will receive a very large and profitable business from the shipment of cattle. The four counties for which this railway will be the outlet are the four richest cattle counties in Texas or in any part of the southwest.

This country is now attracting great attention from Northwestern farmers and from those in the northern part of Texas. Several hundred small farms were sold in the neighborhood of Corpus Christi during the first six months of the year 1890. The attractions of this country for farmers are fast being understood. The growing season is 11 to 12 months long against five in the North and Northwest. No small portion of the farm product of the North is annually consumed in carrying cattle through the long winter season; while here winter feeding is almost entirely unknown.

The soil is very rich and produces heavily. Vegetable and fruit growing is just getting a foothold and proving to be of extraordinary profit. A grower of grapes on Corpus Christi Bay has recently sold his vineyard at a price amounting to about \$1,000 per acre. Fresh vegetables are shipped all winter long to Northern cities and yield handsome profits.

On the Rio Grande, where a sugar plantation has lately been started, as much as 2,500 pounds of sugar has been produced from a single acre with inferior methods of extraction. All this is done without the use of a single pound of fertilizer.

Coal and lime both are found along and near the line of this railway. The woods abound in ebony and mesquite, a wood of very great value, and there is also much mahogany. Some idea of the quantity of ebony in this region may be gathered from the fact that it is sold for fire-wood at Brownsville, at the rate of \$3 per cord.

How much this country in some other respects will be benefited by transportation may be inferred from the fact that the president of this railway was shown upon the sugar plantation just mentioned two immense tanks of prime molasses holding several thousands gallons each, which was being fed to the pigs, because the cost of transportation by the old methods would not warrant shipment; many thousand gallons had previously been allowed to run to waste.

The line of the Pan-American Railway extends southward through the richest agricultural region in Mexico, but one which has only been partially developed for the reason that it has hitherto been without railway communication with the rest of the world. The rich lands grow every variety of temperate and sub-tropical productions. The entire distance from Corpus Christi to the Guatemala line, about 1,400 miles, is capable of building up and sustaining an important local traffic and a large population.

The contrast, in the possibilities of local traffic and settlement, between the lands along the Corpus Christi & South America Railway, and those of each of the other three railways piercing the heart of Mexico, is very marked. Long stretches of dry and dusty land are the most prominent characteristics of each of the other lines, and where these do not occur the country is largely made up of bare and rugged mountain ranges, alike incapable of agriculture or grazing on any profitable scale.

The topography of the country traversed by the Corpus Christi & South America Railway is equally favorable by contrast with the other lines. The changes of elevation in all the others are great and severe, ranging from 500 to 7,000 feet above the sea. The lines wind in and out among the mountains, forming loop after loop, wasting both time and material to an extent hardly known in any part of the United States. Surveys projected by the Corpus Christi & South America Railway Company bring out the remarkable fact that the entire distance from the Rio Grande to the Guatemala line passes over a grade in no case exceeding an altitude of 600 feet above the sea level, except upon the short line running up to the City of Mexico. This again marks the line of this railway as being one most highly favored by natural conditions.

The entire route from Corpus Christi southward, as far as the surveys have gone, has been laid out with special reference to the securing of a line which could never be surpassed or equaled when the business between North and South America shall have grown to proportions which will tax the capacity of any single railway line.

The first division of the Corpus Christi & South America Railway, extending from Corpus Christi to Brownsville, 150 miles, is stocked at \$10,000 per mile, making the capital stock of the company \$1,500,000. Its first mortgage and only debt is at the rate of \$15,000 per mile, for which 30-years 6 per cent. gold bonds are issued, with the Holland Trust Company of New York City as trustees. These bonds are issued in sections of ten miles as the road is constructed.

It is proposed to finish the first division of the railway in nine to twelve months from the date of commencement. It is also expected to commence operating the road from both ends anterior to its completion as a whole.

The question may arise whether, in the possible event of a future revival of the depressed shipping interests of the United States, the trade would still go by rail. Experience shows that wherever railways can come into competition with waterways, these take the business. This experience is repeated up and down the Atlantic coast; up and down the Mississippi, Ohio and Missouri rivers, and even to a large extent along the lordly Hudson.

But this is not all. South America is sadly deficient in good ports, a fact which must forever act adversely upon her maritime trade.

In a report of Henry G. Davis and Andrew Carnegie, delegates from the United States to the Railway Committee of the Pan-American Congress, they said:

"The attention of the people of the United States has been for years directed to the desirability of securing closer commercial relations with the States of Central and South America.

"For want of regular and quick transportation between these countries, trade is carried on almost wholly by sea with Europe; mail matter, passengers and goods are compelled to cross the Atlantic twice before reaching their destination. Although united geographically, close commercial relations do not exist; neighbors, though we are, for want of regular transportation facilities, we are widely separated.

"With quick and regular communication—which Europe has enjoyed, and we have not—she has more than successfully competed with us for the trade of these countries; but if rail communication were opened from the United States southward, such would not be the case, as we should then have the advantage of communication with land, which Europe could not obtain. This is proved by an examination of the effect of rail communication between the United States, Canada, and Mexico."

The report then goes on to show that as soon as rail communication was established between the United States and Mexico, it absorbed nearly all

and Pacific Oceans, the United States, Canada and other countries have performed works of equal and greater magnitude than will probably be required to establish unbroken rail communication with all the republics south of us.

"From every point of view it seems clear to us that immediate steps should be taken to ascertain whether advantages of such transcendent importance, as direct and unbroken rail transportation would give to all the republics of this continent, are really within our reach by the granting of reasonable concessions to capitalists who would undertake the construction and operation of the necessary railway and give satisfactory security for the fulfillment of their engagement.

"We must believe that a work which would confer such manifold advantages to all the countries interested, would so strongly commend itself as to induce them promptly to give it such encouragement and to take such measures as would lead to its early completion."

SAND MOLDING MACHINE.

Mr. F. G. Leeder, foundry manager at the Singer Manufacturing Company's works, Kilbowie, has devised a machine for preparing molds for casting, the description, as well as the appended illustration, of which we borrow from *Industries*:

The machine is designed to produce a complete mold at one operation, and thus to replace skilled hand labor in making molds from pattern plates. The pattern is formed or fitted partly on the upper side and partly on the lower side of the pattern plate. The mold is formed in sand contained in two flasks or mold boxes, which are placed one over and the other under the pattern plate. The sand is pressed within the mold boxes by the action of hydraulic rams, which also serve, upon the removal of the pattern plate, to eject the sand molds from the mold boxes. A base piece carries two hydraulic rams or pillars, and an entablature or top plate connected with the pillars serves to resist the pressure of the rams when pressing the sand. The hydraulic rams are placed one within the other, and the plunger of the outer one acts as a cylinder for the inner one. The plate on the outer ram head carries the lower flask or mold box. The mold boxes are fitted to slide on the guide rods or pillars, and the pattern plate, which is situated between the upper and lower box, is centered or pivoted on one of the pillars so that it may be swung out of the way or into position between the mold boxes.

In operation, the lower mold box is filled with sand whilst the rams are down and the pattern plate swung out. The pattern plate is then swung into position, and the upper box lowered on to it and filled with sand. The rams are then raised by operating on lever handles, which admit water to the ram cylinders. The mold boxes, and the pattern plate between them, are pressed up against the entablature to ram the sand. The rams are then dropped; the lower mold box drops with the pattern, while the upper box is retained by a notch or catch; the pattern plate slips down to a midposition in which it is clear of both boxes, and is swung out of the way. The upper box is then lowered, or the lower one raised, to bring the parts of the mold together, and the inner ram is put into action to press up and eject the sand mold from the boxes.

About 50 of the new machines have been put in operation in the works of the Singer Manufacturing Company, the Carron Company and elsewhere, with very satisfactory results. A lad can operate the machine, with the assistance of a laborer, and is able to ram and mold as many as 1,000 boxes a day.

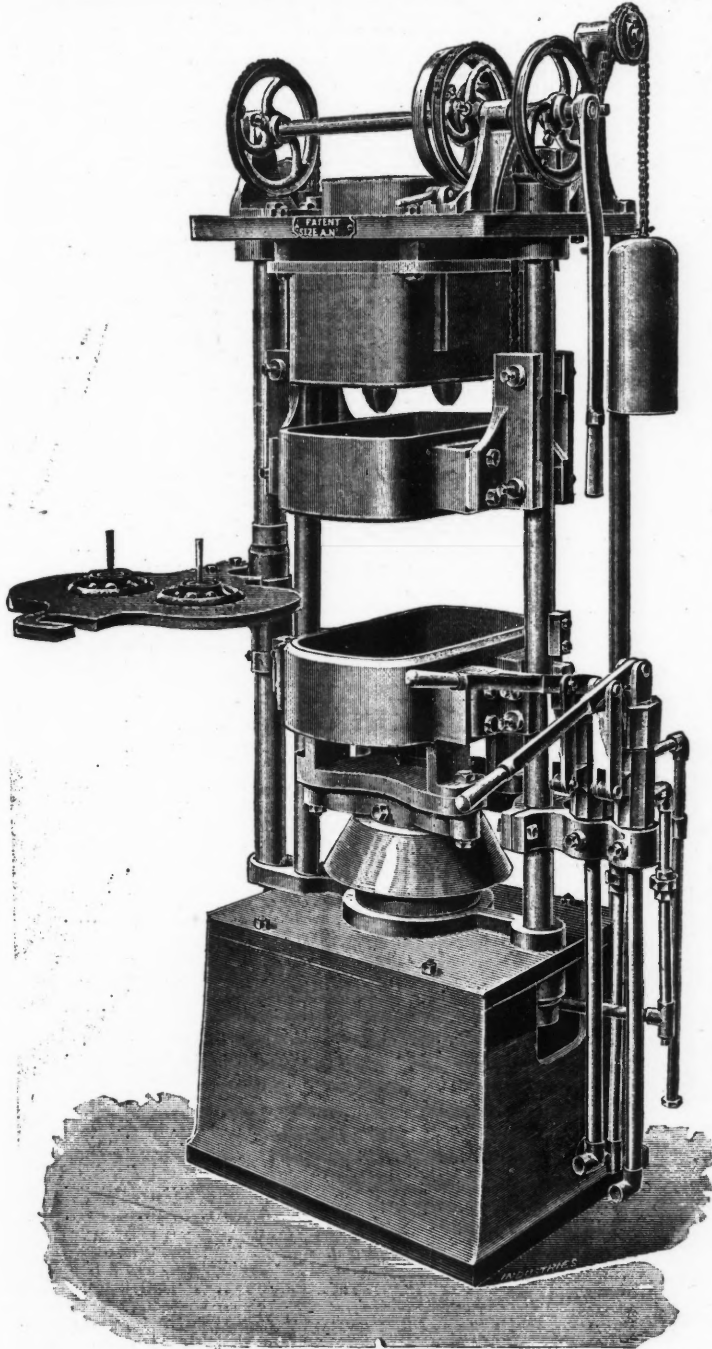
THE MONARCH MAGNETIC ORE SEPARATOR.

A working model of this machine, a cut and description of which appeared in our issue of 6th inst., is now on exhibition at Room 60, 45 Broadway, this city, where a representative of the *JOURNAL* recently saw it in operation. It was shown separating Lake Champlain ore from its gangue, which is chiefly silica with some phosphate of lime. The crushed ore was rapidly separated into three portions: First, the clear crystals of magnetite, which under a strong glass showed but very slight traces of gangue, and this only in the shape of small particles firmly attached to the crystals; second, what are called middlings, consisting of crystals of magnetite, with pieces of gangue, which can be detached by a second crushing, attached to them, and, third, the tailings, which consist chiefly of the gangue, with but little iron. From the working of the model it would appear that the claims made for the machine are not unwarranted. Messrs. H. E. Collins & Co., of Pittsburg, the agents for the machine, furnished us the following analyses, showing what results have been obtained:

Benson Mines Ore. (Little River.)	Iron.....	40.51	68.62
	Phos.....	.19	.0106
	Silica.....	28.31	4.18
	Sulphur.....	.86	.34
Chateaugay Tailings from Jigs.	Iron.....	11.80	68.365
	Phos.....		.008
Port Henry. New bed.	Iron.....		70.9
	Phos.....		.0089
Port Henry. Old bed.	Iron.....	58.70	71.1
	Phos.....	2.25	.037
Croton Mines, N. Y.	Iron.....	42.99	69.86
	Phos.....	.153	.021
	Sulphur .....	.30	.04
Republic Magnetic.	Iron.....	66.6	71.465
	Phos.....	.075	.043

The concentration of low grade iron ores which this machine accomplishes makes a variety of savings possible, such as the following:

1. In freight upon the barren gangue of the ore.
2. In labor at the furnace.
3. In fuel and lime now wasted in melting silica, etc.
4. In labor in slag.
5. In converting low grade non-Bessemer ore into rich Bessemer quality.



SAND MOLDING MACHINE.

the traffic which had formerly been carried by steamships. It makes the same showing with regard to rail vs. steamship communication with Canada.

"It is a significant fact that almost all the trade between these countries is transported by rail. Not one regular line of steamships plies between the United States and Canadian ports.

"This experience would, no doubt, be repeated upon international lines, as these are constructed and bind together the republics of Mexico in their grasp.

"Examination of the subject of continuous rail communication between South and Central America, Mexico and the United States is most encouraging. Judged by what has already been accomplished, the task cannot be deemed stupendous. In opening railways between the Atlantic

THE GUESTS OF THE AMERICAN ENGINEERS.

We have received the following complete list of those foreign members of the Iron and Steel Institute who have notified their intention to participate in the fifty-seventh meeting of the American Institute of Mining Engineers, to be held in the United States, October, 1890: President, Sir James Kitson, Bart. (Serbia); Past President, Sir Lowthian Bell, Bart. F.R.S. (Serbia); Vice-Presidents and Members of Council: Sir John G. N. Alleyne, Bart (Serbia); P. C. Gilchrist (Majestic); Edward P. Martin (Serbia); E. Windsor Richards (Serbia); G. J. Snelus, F.R.S. (Serbia); William Whitwell (Serbia).

Table with columns: NAME, ADDRESS, STEAMER, DATE OF SAILING. Lists names and addresses of guests, such as Adamson, Joseph; Allan, James; Andrew, F.; Armstrong, George; etc.

Table with columns: NAME, ADDRESS, STEAMER, DATE OF SAILING. Lists names and addresses of guests, such as Hallbauer, J.; Haniel, Hugo.; Harrison, Edward.; etc.

NAME.	STEAMER.	ADDRESS.	DATE OF SAILING.
Salter, Geo.	W. Bromwich	Majestic	Sept. 17.
Sauer, Franz	Cannon Street, London		
Saunders, James	Wolverhampton	Servia	Sept. 20.
Scarf, F.	W. Bromwich		
Schlink, J.	Mulheim-on-Rhine, Germany	Servia	Sept. 20.
Schrodter, E.	Dusseldorf, Germany	Lahn	Sept. 18.
Seocular, George	Hensingham, Whitehaven	Servia	Sept. 20.
Seaman, Frederick	Sheffield		
Seehouse, H. P.	Cockermouth	Servia	Sept. 20.
Senior, George	Ponds Forge, Sheffield		
Service, A. G.	St. Vincent Place, Glasgow	Ethiopia	" 18.
Shanks, Wm.	Johnstone, N. B.	Servia	Sept. 20.
Sharp, T. B.	Birmingham	"	"
Shipman, J. W.	Sheffield	"	"
Siddell, George	Roewood, Pitsmoor, Sheffield		
Simpson, H. C.	Horsehay, R. S. O., Shropshire	Servia	Sept. 20.
Simpson, J. S.	Harrington, Cumberland		
Smith, Chas.	St. Albans		
Smith, Frederick	Halifax, Yorkshire	City of Rome	Sept. 20.
Smith, G. J.	Lyde Steelworks, Sheffield	Servia	" "
Smith W. Ford	Ordsal Lane, Salford		
Sochor, Baron F.	Leeds	Gallia	Sept. 23.
Soldenhoff, R. de	St. Mary Street, Cardiff		
Solvay, A.	Brussels		
Sparrow, John W.	Beckminster, Wolverhampton	Servia	Sept. 20.
Spencer, J. C.	Newcastle-on-Tyne	"	"
Spencer, John	Globe Tube Wks, Wednesbury		
Squire, E. L.	Coalbrookdale, R. S. O., Salop	Servia	Sept. 20.
Squire, L. R. L.	St. John's Wood Park, London		
Squire, W. S.	St. John's Wood Park, London	Majestic	Sept. 17.
Stanley, E. L., The Hon.	London, W	City of Rome	" 20.
Stead, J. E.	Middlesbrough	Servia	" "
Steel, James	Colinton Road, Edinburgh		
Steel, Wm.	Ickles, Sheffield	Servia	Sept. 20.
Sterne, L.	Victoria Mansions, S. W.	"	"
Storey, Sir Thomas	Lancaster	"	"
Storr, Frederick	The Groves, Chester	"	"
Strick, G. H.	Swansea	Majestic	" 17.
Summers, John	Staleybridge	Servia	" 20.
Sykes, E.	Marsh, near Huddersfield	"	"
Tannett, J. C.	Chapeltown, Leeds	Gallia	" 23.
Taylor, J. S.	Birmingham	Servia	Sept. 20.
Thackray, W., Jun.	The Avenue, Sunderland	"	"
Thielen, A.	Ruhrort, Prussia	Lahn	" 18.
Thomas, R. B.	Lydney, Gloucestershire	Servia	" 20.
Thomas, Wm.	Aberdare	"	"
Thomas, Wm.	Wednesbury	"	"
Thwaites, E. H.	Bradford, Yorks.	"	"
Tozer, Wm.	Phoenix Steelworks, Sheffield	"	"
Walker, Henry	Wear Commission, Sunderland		
Walker, W. H., Junr.	Sheffield	Servia	Sept. 20.
Walton, Joseph	Zetland Bldgs., Middlesbrough		
Warburg, F. E.	Porchester Terrace, W	Majestic	Sept. 17.
Ware, C. W.	Newcastle-on-Tyne	Servia	" 20.
Watts, E. H.	London, E. C.	"	"
Webb, Henry	Bury, Lancashire	Servia	Sept. 20.
Whitwell, J. F.	Saltburn-by-the-Sea	"	"
Whitwell, Wm. F.	Stockton-on-Tees	"	"
Wilkinson, Geo. W.	Lowther Street, Whitehaven	"	"
Williams, John W.	Deansgate, Manchester		
Williams, James	Newport, Monmouth		
Williams, Wm.	Swansea	Arizona	Sept. 15.
Williamson, R.	Workington	Servia	" 20.
Wilson, Alfred	N. Grange, Horsforth, by Leeds	"	"
Wilson, R. T.	Middlesbrough	"	"
Wood, B. G.	Wardensd Steelwks., Sheffield	City of Rome	" 20.
Wood, Percy	Halifax	"	"
Woolcock, H.	Rickerby House, St. Bees		
Wragg, J. D.	Burton-on-Trent	Servia	Sept. 20.
Wrightson, T.	Norton Hall, Stockton		
Young, John	Glasgow		
Younger, John	Glasgow	Ethiopia	Sept. 18.

UTILIZATION OF WATER POWER AT GENEVA.

Whether the Niagara shall ever be harnessed to the wheels of machinery or not, the Rhone has actually been made to furnish motive power to the industries of Geneva. Indeed, this was done on a small scale long ago. As early as 1708 a hydraulic motor was constructed for pumping water, and fifty years ago another larger one was provided for the same purpose. The work of these, however, was simply to supply water to the city; and ten years ago they were discontinued and steam power put in their place. Meantime many plans had been considered for making more extensive use of the water power of the swift river, and in 1882 the municipal authorities of Geneva commissioned Col. Turrettini, the engineer of the St. Gothard tunnel, to undertake the job. In the course of the next year he perfected his plans, and, on their approval, the work was begun. It has now been completed, and so successful is it that a very considerable extension of it is soon to be made.

The river, as it passes through the city, is divided into two channels by an island covered with buildings. Col. Turrettini proposed that the right arm of the river should be reserved for running off the water, while the left arm, transformed into an industrial canal, was to conduct the water into a building to be constructed in the bed of the river, and in which would be placed, as they were required, 20 turbines with 4,400 net horse power. The whole of this work is now done, except that only half the turbines are in use. The method of distributing the motive power gave rise to a good deal of discussion, but as Geneva does not possess any large manufacturing works for which transmission by cable is suitable, the system of transmission by hydraulic pressure was adopted, and the municipality decided to make two canalizations, one with low and the other with high pressure, the latter with an ascending force of 460 feet.

A curious feature of this work was the successive emptying of the two channels of the river. While each was dry nearly the entire population of the city flocked into it, led by curiosity. Several great public banquets and other festivities were held in each of the river beds. The channels were then made deeper and a uniform slope made from the mouth of the lake down to the turbines. Opportunity was also taken to construct upon the banks of the stream large sewers, which run along the two banks of the lake and of the Rhone for a distance of more than three miles. These sewers empty into the Rhone below the town, and thus prevent the water, which is used by the inhabitants, from being contaminated. From a hygienic point of view, this has been most successful, the number of deaths from typhoid fever last year being only nine out of a total population of 73,000.

As an industrial enterprise the work is a great success. At the commencement of this year there were no less than 216 industrial motors with a force of 1,565 horse power. All kinds of trade and industry make use of the water power, while the amount of force varies very much, the minimum being a third of a horse power for sewing machines, and the maximum, up to the present, 625 for an electric light company. The total cost of the work has been \$1,420,000, of which about \$1,000,000 has been for the account of the municipality, while the gross return upon the sale of water in 1877 reached \$115,000, or 150 per cent. more than it was nine years before, which, after deducting all the cost of maintenance, staff, interest and paying off the capital invested, leaves a clear profit of \$27,500. The demands for more motive power are steadily increasing, and it is anticipated that in a few years' time all the turbines will be in use, and that the municipality will have to fall back on the opportunity of obtaining, at an island some way down the Rhone, a fresh motive force of 7,000 horse power and transmit it to Geneva by electricity.—Correspondence to *New York Tribune*.

The following are the members of Verein Deutscher Eisenhuettenleute who expect to be at the meeting:

Name.	Steamer.	Name.	Steamer.	Date of departure.	Date of departure.
Bischoff, Felix	Columbia	Merker	Eider	Sept. 25	Sept. 25
Bleichert	Lahn	Meyer, Bendix	Columbia	" 25	" 25
Bloem, Dr.	Eider	Mischke, Carl	Lahn	" 17	" 17
Brauns, H.	"	Moos, von Ed.	Columbia	" 25	" 25
Bredt, Rud.	"	Mueller, Paul	Lahn	" 17	" 17
Buescher, H.	"	Narjes, Theo.	Eider	" 20	" 20
Duessen, Huerten	Columbia	Nolda	Columbia	" 25	" 25
Esser, Wilh.	"	Niedt	"	" 25	" 25
Faher, Joh	"	Peltzer, Alf.	Elbe	" 13	" 13
Grass, Dr.	"	Pfeiffer	Lahn	" 17	" 17
Gregor, George	Eider	Piedbouf, Gustav	Elbe	" 13	" 13
Grillo, Aug.	"	Piedbouf, Paul	"	" 13	" 13
Hahn, Oscar	Columbia	Piense, H.	Columbia	" 25	" 25
Haniel, Hugo	Elbe	Poensgen, Arthur	Eider	" 20	" 20
Herbertz, F. A.	Eider	Poensgen, Emil	Eider	" 20	" 20
Hoette, Emil	Columbia	Reinhardt	Columbia	" 25	" 25
Huessener, A.	Eider	Remy, Heinr.	Eider	" 20	" 20
Huldshinsky, Edwin	Columbia	Reuss, Herm.	Columbia	" 25	" 25
Imperatori, Luigi	Eider	Rheinhaven, v.	"	" 25	" 25
Juengst	"	Roechling	Eider	" 20	" 20
Jung, Gust.	Lahn	Sachsenberg, Gotth.	Columbia	" 25	" 25
Kaltenbach, Jos.	Elbe	Schiele, F.	"	" 25	" 25
Kiefer, Jos.	Eider	Schies, Ernst	Eider	" 20	" 20
Kiesselbach	Columbia	Schilling, Alf.	"	" 20	" 20
Klein, Ernst	Lahn	Schlink, J.	"	" 20	" 20
Klein, Rob.	"	Schrodter, Emil	Lahn	" 17	" 17
Klingelhofer, Dr.	Eider	Schulte, W.	Columbia	" 25	" 25
Kloenne, Aug.	"	Simmersbach, F.	"	" 25	" 25
Krabler, E.	"	Senff	"	" 25	" 25
Kuopper, C.	"	Spannagel, A.	Lahn	" 17	" 17
Kusenber, Dr.	Lahn	Thielen, A.	"	" 17	" 17
Leist kow	Columbia	Tschersich	Columbia	" 25	" 25
Liebrecht	Eider	Volkman, R.	Eider	" 20	" 20
Lindenber	Columbia	Wandeleben	"	" 20	" 20
Lueg, Dr. Paul	Eider	Weber, Julius	Lahn	" 17	" 17
Luehrmann, Fr. W.	"	Wedding, Dr.	Eider	" 20	" 20
Macco, H.	Lahn	Withoeff	"	" 20	" 20
Magery, Moritz	Elbe	Zapp, G.	Columbia	" 25	" 25
Mauritz	Eider	Zurborn, Julius	"	" 25	" 25

New Optical Glass.—Phospho-boric glass for microscopes is a new kind of optical glass, which contains phosphoric acid and boracic acid, and is designed specially for the construction of object glasses. The *Photographic News* says it is asserted that by means of this new glass, lately produced in Germany, the one-hundredth part of a millimeter can be distinctly recognised.—*American Machinet*.

NOTES ON THE BRITISH ALKALI TRADE, ITS BIRTH AND DEVELOPMENT

Written for the Engineering and Mining Journal.

(Continued from page 308.)

The use of chlorine for bleaching appears to have been first discovered by Scheele in 1774. In 1785 Berthollet found that chlorine could be combined with an alkali and yet retain its bleaching property. Watt, the engineer, is said to have introduced the use of chlorine to the manufacturers of Glasgow. The chlorine, evolved from a mixture of salt, sulphuric acid and manganese, was passed into the water, and this chlorine water was sold in carboys. Berthollet in 1790 prepared an improved bleach liquor in which a solution of caustic potash was used to absorb the chlorine; this solution was known as Eau de Javelles, from the bleach-works where it was extensively prepared. Charles Tennant, of St. Rollox, Glasgow, in 1798, patented the use of lime, in the water, in place of potash, and in the following year he patented the use of dry slaked lime for absorbing chlorine; this plan proved the most practicable means of giving an efficient bleaching material, namely, bleaching powder, or what is often called chloride of lime.

This material had the advantage of being more suitable for transit than the bleach liquors hitherto used. Tennant prepared the first bleaching powder with chlorine generated from the mixture given above; but, as the soda manufacture developed, hydrochloric acid, instead of being run to waste, causing nuisances, was gradually utilized for the preparation of bleaching powder; the acid being decomposed by its reaction with manganese dioxide.

The first bleaching powder made on the Tyne was manufactured at Walker, by Losh, Wilson and Bell, in 1830; the chlorine for its preparation was obtained by decomposing hydrochloric or muriatic acid of 30 degrees Twaddell with ground English manganese.

Having described the first invention of the main processes of Leblanc alkali works, let us note how these inventions were turned to account by those manufacturers who have been the pioneers in this great industry. About 1814, as before stated, Losh, on the Tyne, was the first to introduce the Leblanc process into England. He was followed in 1819 by Charles Tennant, who commenced the erection of chambers for acid, to decompose salt, at St. Rollox, Glasgow. In 1823 James Muspratt commenced the manufacture of black ash on a large scale at Liverpool, and in the same year Cookson & Co. erected chambers and furnaces in the middle of South Shields, but removed a few years later to a site near Jarrow Slake, where large works, now the property of the Jarrow Chemical Company, were erected. In 1897 John Allen started at Telling Shore,

on the Tyne. In 1828 James Muspratt and J. C. Gamble commenced the erection of the Gerards Bridge Works, near St. Helens, Lancashire. In 1829 Anthony Clapham commenced at Friar's Goose, and in 1830 Chas. Attwood at South Shore, on the Tyne. These two works are still in operation; the former are now owned by the Jarrow Chemical Company, while the latter are the largest alkali and bleaching powder works in existence and are owned by the Newcastle Chemical Company, Ltd., late C. Allhusen & Sons). In 1834 H. L. Pattinson & Co. commenced operations at Felling, on Tyne, and many other firms followed, the Mersey and Tyne districts being the chief centers.

The following tables of prices and production of soda crystals, alkali (including soda ash, etc.) and bleaching powder are of great interest alike to the student of political economy and to the man of commerce:

PRICES OF SODA CRYSTALS IN ENGLAND.

Year.	Price per ton.			Authority.
	£	s.	d.	
1800.....	44	10	0	T. Bell and R. C. Clapham.
1810.....	39	1	0	"
1820.....	36	10	0	"
1830.....	18	5	0	"
1840.....	10	2	6	"
1850.....	5	10	0	"
1860.....	6	15	0	"
1868.....	4	2	6	"
1878.....	3	12	6	E. K. Muspratt.
1886.....	2	15	0	"
1889.....	2	2	6	Newcastle Daily Chronicle.

PRODUCTION OF SODA CRYSTALS IN GREAT BRITAIN.

Year.	Tons.			Authority.
	Lancashire district.	Tyne district.	United Kingdom.	
1800.....	.....	23	.....	R. C. Clapham.
1810.....	.....	66	.....	"
1820.....	.....	121	.....	"
1830.....	.....	3,300	.....	"
1852.....	3,500	.....	61,044	C. Allhusen.
1861.....	3,840	.....	.....	Schunck, Smith & Roscoe.
1866.....	24,978	86,000	110,978	E. K. Muspratt.
1878.....	47,697†	123,175	170,872	Alkali Manufacturers' Association returns.

† Includes West district and Scotland.

PRICES OF ALKALI (SODA ASH) AT LIVERPOOL. (E. K. MUSPRATT.)

Year.	Price per ton.		Strength Soda (Na ₂ O).
	£	s. d.	
1830.....	16	10 0	35 per cent.
1835.....	16	10 0	48 to 50 per cent.
1839-40.....	15	0 0	48 per cent.
1878.....	5	10 0 to 6 0 0	"
1886.....	4	0 0 to 4 10 0	"

PRODUCTION OF ALKALI (SODA ASH) IN GREAT BRITAIN.

Year.	Tons.			Authority.
	West district, Lancashire and Scotland.	Tyne district.	United Kingdom.	
1852.....	26,343	.....	71,193	C. Allhusen.
1861.....	93,600	.....	.....	Schunck, Smith & Roscoe.
1866.....	87,314	74,000	161,314	E. K. Muspratt.
1878.....	120,939	87,053	207,992	Alkali Manufact'rs Ass'n.
1883.....	.....	.....	220,034	"
1887.....	.....	.....	255,272	"

PRICES OF BLEACHING POWDER IN GREAT BRITAIN.

Year.	Price per ton.		Authority.
	£	s. d.	
1799.....	168	0 0	J. Tennant and R. C. Clapham.
1805.....	120	0 0	"
1815.....	80	0 0	"
1830.....	23	0 0	"
1840.....	21	0 0	"
1850.....	13	15 0	"
1860.....	11	0 0	"
1868.....	10	12 0	"
1878.....	5	0 0	E. K. Muspratt.
1886.....	5	17 6	"

PRODUCTION OF BLEACHING POWDER IN GREAT BRITAIN.

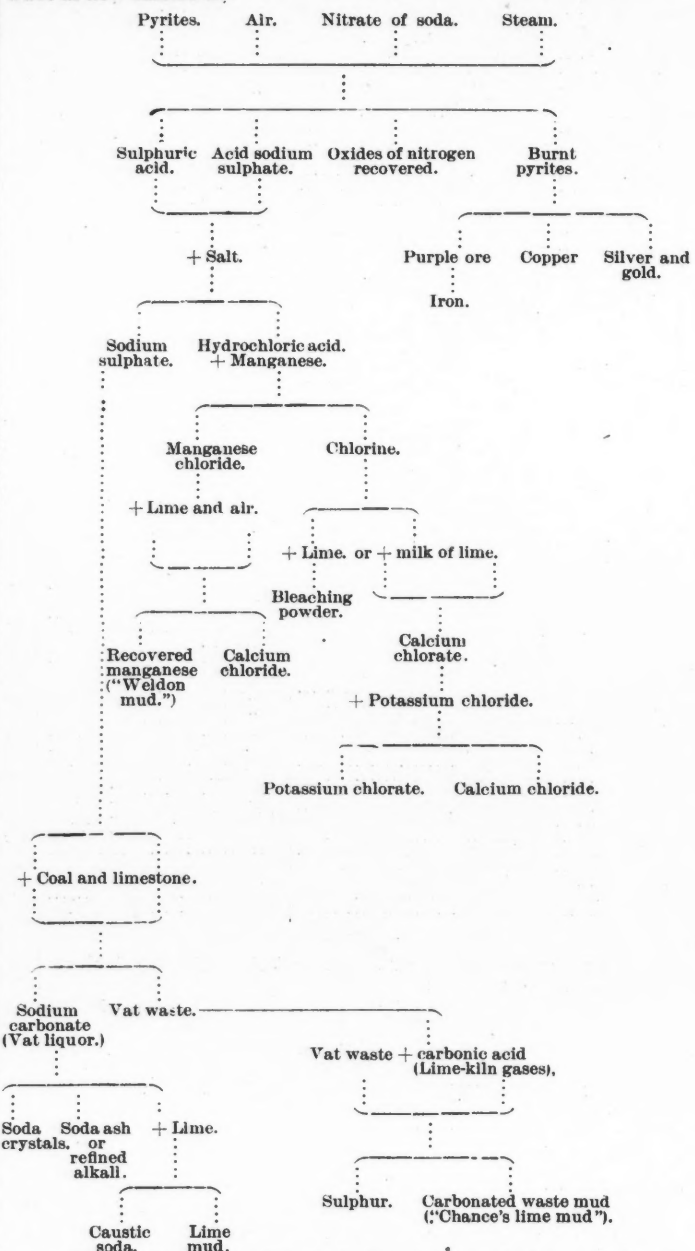
Year.	Tons.			Authority.
	West district, Lancashire, etc.	Tyne district.	United Kingdom.	
1831.....	.....	37	.....	R. C. Clapham.
1841.....	.....	370	.....	"
1852.....	1,250	.....	13,100	C. Allhusen.
1861.....	8,060	.....	.....	Schunck, Smith and Roscoe.
1866.....	20,006	27,000	47,006	E. K. Muspratt.
1878.....	77,100	27,944	105,044	Alkali Manufacturers' Association.
1887.....	105,249	34,676	139,925	"

A glance at the tables given will show that, in the past period of sixty to eighty years, there has been a very great increase in the production of what are now called "heavy chemicals," and that there have also been great reductions in the selling prices of these products.

The soda trade up to about fifteen years since, despite the troubles caused by litigation, through escapes of acid gases, was decidedly a profitable one. The large profits reaped by early manufacturers attracted many capitalists to the business, and the result was a greatly increased production; about the year 1875, we fear, it became a case of over-production. The increased production was got largely through the introduction of improved plant. Alkali makers vied with each other as to who could obtain the highest yields and turn out the largest batches of the various products, and machinery was substituted, where the labor had previously been manual, with the object of attaining continuous and more regular work, of obviating the strikes which in the "seventies" were very numerous, and of putting through more material. These inventions will be dealt with later on; but chief among them we may name the introduction of Gay Lussac and Glover towers, whereby great economy in the use of niter was obtained; the use of improved hand decomposing furnaces, such as Deacon's and Gamble's, and of mechanical decomposing furnaces, such as those of Jones and Walsh, Mactear and the St. Bede Chemical Company; the invention of the revolving black-ash furnace and of Mactear's carbonating furnace.

Another great cheapening factor has been the competition caused by the ammonia-soda process, introduced on the Continent in several works by M. Solvay and extensively carried out in England by Messrs.

Brunner, Mond & Co. Indeed, this factor has quite altered the aspect of the alkali trade, so that soda, which was formerly the main product, has been cut down in price until it can only be regarded as a product of secondary importance. Bleaching powder, formerly the by-product (or not made at all in many alkali works), has become the staple article, from the sale of which the Leblanc soda maker must recoup himself for the expenses of manufacture. Before concluding this article we give a scheme (arranged somewhat after the manner of a genealogical tree) showing the various raw materials, intermediate and finished products of the alkali trade as now carried on:



The alkali works of Great Britain find employment for large numbers of men; not only do they find this, but their products enable other industries to extend, thus wet-copper, glass, and soap works are to be found in the alkali-making districts. Paper makers (with whom a supply of suitable water is probably the first consideration), though their works may be further removed, yet draw their supplies of bleaching powder and caustic soda from the alkali works. The growth of the Lancashire alkali industry is aptly illustrated by the following extract, which we quote from Mr. E. K. Muspratt's address: "It has, of course, attracted round it other industries, such as the manufacture of glass and soap, but these are now principally in St. Helens, Warrington, and Widnes, whereas in Liverpool, where there were seven or eight soap works in 1827, there are now only two small ones. At St. Helens, in 1829, the first alkali works were erected, and there were then only five small glass works; now there are eight alkali works and nine large glass works, four of them manufacturing plate glass. Of copper smelting works there was only one in 1829; to-day there are five, and two copper-extracting works, and the population has increased from 14,251 to 61,472 at the last census.

"In Widnes the progress has been still greater, as its rise as a manufacturing town dates from about 1848, and it now contains fifteen alkali works, most of them of large size, four copper works and the large soap works of Messrs. W. Gossage & Sons."

On Tyneside the Leblanc process was introduced, as we have said, about the year 1814. We have seen how the first works were commenced and developed. In 1879 there were 23 alkali works at work, exclusive of copper works, in the Tyne district; to-day there are only 10. The chief cause of

* J. Soc. Chem. Ind., 1883, p. 413.

diminution in the number has been undoubtedly the production of soda at a cheaper rate by the ammonia process. The 10 works now carrying on operations probably give employment to over 3,000 men. To supply the demand for cheaper salt for these Tyneside alkali works, the working of the salt field around the mouth of the Tees has been developed of recent years. To show the rate at which this industry is growing, the quantity of salt produced in the Tees district in 1887 was 186,267 tons; whereas last year, 1889, the production had risen to 392,300 tons.

PLATE-FLATTENING AND STRAIGHTENING MACHINE.

To *Engineering* we are indebted for the illustration representing a machine made by Messrs. Rushworth & Co., Sowerby Bridge, Yorkshire, for the Lancashire & Yorkshire Railway Company, for their new works at Horwich, near Bolton. This machine is to straighten plates of any length, and from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch thickness, and 6 feet 6 inches wide. This machine is self-contained on one fountain plate the full length, thus requiring little or no under-foundation. The rollers are 12 $\frac{1}{2}$ inches in diameter, five of steel and two of a special mixture of cast iron. The four top wheels can be raised together by the large handwheel and bevel gear, and the two outside top rolls separately, as shown in illustration, by worm gear. The machine is very powerfully geared, and all wheels are shrouded to the pitch line. The gear on the roller ends and carrier pinions are of steel. The capstan handwheel for starting and reversing is placed close to the stop valve of the engine, so that the workman has full control of the machine without moving. The weight of the machine

the ordinary use of explosives, although not altogether inadmissible, may at times be attended with danger. Although those results are still far from receiving the amount of application which might reasonably be hoped for, there are several coal mining districts where the use of gunpowder has almost entirely given place to the adoption of blasting agents or methods of blasting, the employment of which is either not, or only very exceptionally, attended by the projection of flame or incandescent matter into the air where the shot is fired.

The mining public is specially indebted to German workers for much of the success which has been obtained in this direction, and also to the eminent French authorities, Mallard and Le Chatelier, for their thorough theoretical and practical investigations bearing upon the prevention of accidental ignition of fire damp during the blasting operations. Having arrived at the conclusion that fire damp and air mixtures are not ignited by the firing of explosive preparations which develop by their detonation temperatures lower than 2,220 degrees C., they found that ammonium-nitrate, although in itself susceptible of detonation, does not develop a higher temperature than 1,130 degrees C., while the temperatures of detonation of nitro-glycerine and gun-cotton are respectively 3,170 degrees and 2,636 degrees. The admixture of that salt with nitro-glycerine or gun-cotton in sufficient proportion to reduce the temperature of detonation to within safe limits allows, therefore, of the employment of those explosive agents in the presence of fire-damp mixtures without risk of accident, and this fact has led to the effective use of such mixtures as safe blasting agents in coal.

The fearful dangers arising from the accumulation of inflammable

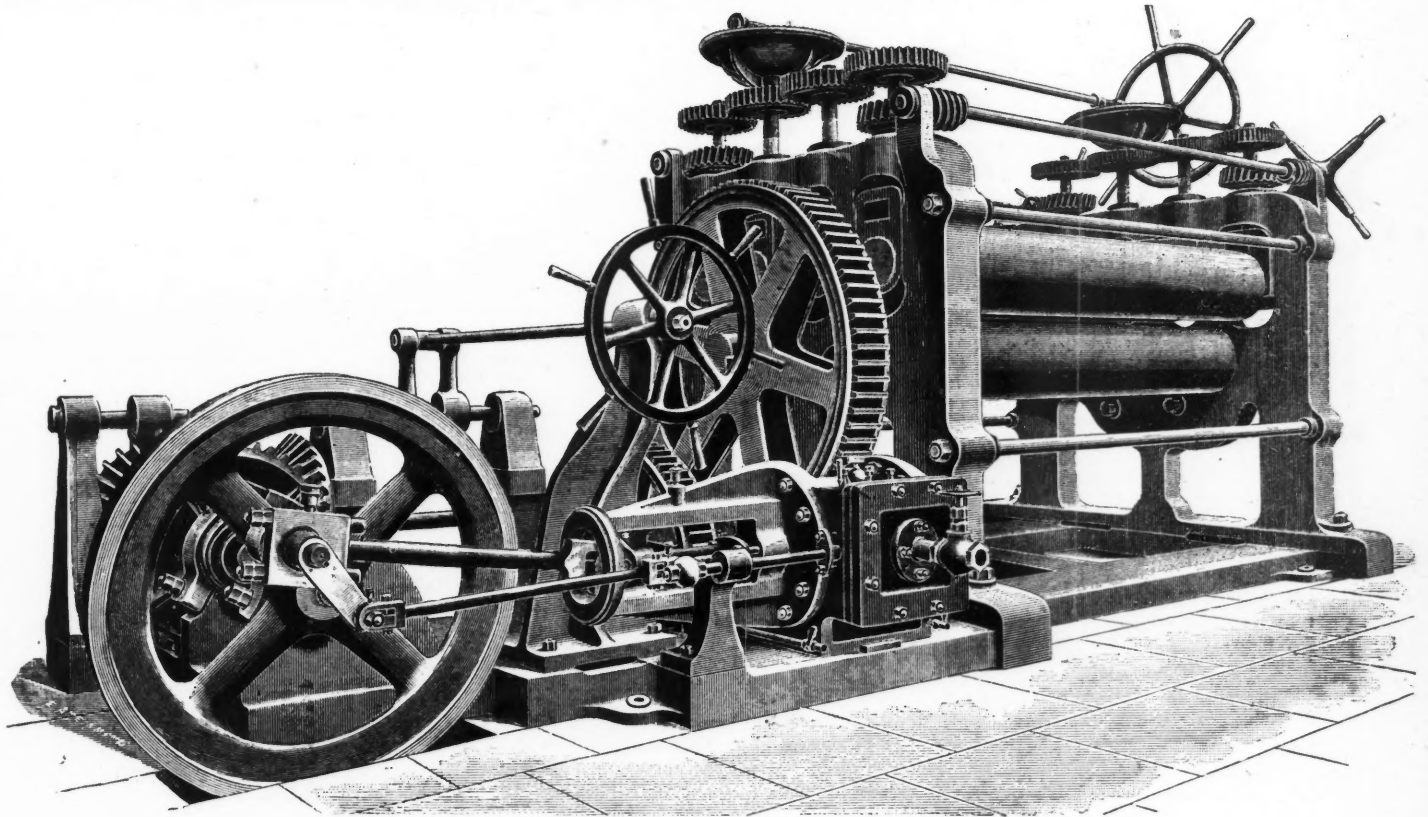


PLATE-FLATTENING AND STRAIGHTENING MACHINE.

is about 19 tons. About 30 of these machines are in practical operation, some of which are driven by belting, but those of the larger size, such as that we illustrate, are coupled to an independent engine.

PRECAUTIONS AGAINST EXPLOSIONS IN MINES.

At the British Association's meeting lately held at Leeds, Sir Frederick Abel, the distinguished authority on explosives, delivered the inaugural address. That part of his paper which especially bears on recent improvements in mining, reads, in abstract, as follows:

Although the subject of the development of explosive force for purposes of war has of late received a somewhat predominating share of attention, the production of new explosive agents for mining and quarrying purposes has been by no means at a standstill. For many years the main object sought to be achieved in this direction was to surpass, in power or adaptability to particular classes of work, the well-known preparations of nitro-glycerine and gun-cotton, which, during the past 20 years, have been formidable competitors and, in many directions, absolutely successful rivals of black powder. It is interesting to note, however, that this object has, especially since the publication of the results of labors of English and foreign commissions on the causes of mine accidents, been prominently associated with endeavors to combine, in an explosive agent, efficiency with comparative unsusceptibility to explosion by friction or percussion, and effective operation with little or no accompaniment of projected flame. Safety-dynamites, flameless explosives, water-cartridges and other classes of materials and devices connected with the getting of coal, the quarrying of rock, or the blasting of minerals, have attracted attention; in some of these directions the practical results obtained have been beyond question important, as regards the great diminution of risks to which men need be exposed in those coal mines where

dust in coal mines, and the equality of mine dust with fire damp in propagating explosions, which may sometimes even be, in the first instance, established entirely through its agency, have now been long recognized as beyond dispute; and it is satisfactory to know that permission to fire shots in mine workings which are dry and dusty has, by recent legislation, been made conditional upon the previous laying of the dust by effective watering. In some mining districts, moreover, the purely voluntary practice has been extensively adopted of periodically watering the main roads in dry and dusty mines, or of frequently discharging water-spray into the air in such roads. The encouragement given to the application of the combined resources of ingenuity, mechanical skill, and knowledge of scientific principles has resulted in the provision of lamps to the hand of the miner, which combine the essential qualities of safety, under the most exceptionally severe conditions, with good illuminating power, simplicity of construction, lightness, and moderate cost. Very important progress has also been made, since the first appointment of the late Accidents in Mines Commission, towards the provision of thoroughly serviceable and safe portable electric lamps for use in mines. Of those which have already been in the hands of the miner, several have fairly fulfilled his requirements as regards size, weight, and illuminating power of sufficient duration; but much still remains to be accomplished with respect to durability, simplicity, thorough portability, and cost before the self-contained electric lamp can be expected to compete successfully with the miners' lamps now available.

The recent legislation in connection with mines is certainly deficient in decisive measures for excluding from mine workings certain forms of lamps which, while fairly safe in the old days of sluggish ventilation, are unsafe in the rapid air currents now frequently met with in mines. Within the last two years, however, the unprotected Davy, Clanny, and Stephenson lamps have been generally abandoned. In one important

respect recent improved legislation has failed to effect a most desirable change, namely, in the substitution of safety lamps for naked lights in workings where small local accumulations of fire damp are discovered from time to time. There appears little doubt that one of the three fearful explosions which have occurred within the last 12 months—the explosion at Llanerch Colliery, near Pontypool—was caused by the continued employment of naked lights in a mine where inspection constantly revealed the presence of fire damp.

THE PROPOSED TUNNEL FROM STATEN ISLAND TO BROOKLYN.

The scheme to connect Staten Island and Long Island by a tunnel under New York Bay at the narrowest point of the channel is beginning to take definite shape. A bill to authorize its construction has been introduced in Congress by Representative Covert, of New York, and referred to the Committee on Commerce. The object of the tunnel is to give the trunk lines now centering on the Jersey shore a Brooklyn terminus.

Mr. Erastus Wiman, the president of the company, says: The physical features of the enterprise have been thoroughly investigated, and there is no doubt about the feasibility of the scheme. The route of the railroad across Staten Island is from the Arthur Kill bridge to Stapleton, on the east shore. The route is about six miles long. The point where it is intended to begin tunneling is about a mile back of Stapleton, and it is stated that the descent to the lowest point under the bay can be made very gradual. The water is only thirty-five feet deep at the deepest spot, so that the tunnel need not be greatly depressed. The material nearly all the way is believed to be a hard soapstone, which is easily worked, but very strong, and will not require much artificial support. The point of egress on the Long Island side is designed to be a short distance south of Bay Ridge, whence the route contemplated is: Across Gowanus Bay and thence to the Fulton Ferry house, where nearly all of the elevated and surface railroads terminate. From Fulton street it is proposed to run along Water street in a northeasterly direction, to the mouth of Wallabout Bay, and, after crossing it, proceed to Newton creek. From this point the road is designed to run along the water front until it meets the projected East River tunnel.

Mr. Wiman says that the cost of the tunnel proper—about two and one-half miles long—would be about \$1,250,000 per mile, and that the total cost of construction would be about \$6,000,000, according to the estimates of Heman Clark. He affirms that the necessary capital will be forthcoming, and that the work will be completed three years after it is begun. Mr. Wiman is very sanguine about the enterprise. He estimates that the saving in cost of coal which Brooklyn burns would in itself pay the interest on the cost of construction. He says:

“Over two million tons are annually consumed in these cities, and fifty cents per ton on half of this amount could be saved by the economy possible from avoiding its delivery by water and hoisting it out of canal boats. No special connection is contemplated with any one road. The idea is simply to afford trackage for the eight or nine trunk lines which in New Jersey converge near the Arthur Kill bridge on their approach to New York. Of course, if this scheme could be still further extended so as to include a bridge across the East River a perfect connection could thus be afforded with the Eastern States.”

ELECTRIC WELDED PROJECTILES.

The process of electric welding, invented by Professor Elihu Thomson, has now been applied to the production of certain munitions of war in a very remarkable manner. The problem in making a shell for armor-piercing purposes has been to select a grade of steel with a view to its possessing the hardest point for armor-piercing purposes consistent with a chamber whose walls shall not be so hard as to crumble on striking a heavy mass. The metal selected for such purposes has been very naturally the result of a compromise in the endeavor to procure a metal which would give as hard a point as feasible under the circumstances, and yet the limitations of all materials are such that neither object has been perfectly accomplished, and the excessive hardness of the inside of ordinary cast-steel projectiles renders the work of clearing out the interior of the chamber very expensive. This application of the electric welding process to the production of shells has reached very satisfactory results, entirely beyond those achieved by methods of manufacture hitherto carried on. The armor-piercing point of the shell is made of hard steel shaped in the conical form suited for such a purpose; to this is attached a tube of mild steel forming the chamber. The plastic state of the metal when the two pieces are pressed together in the act of electric welding forms a slight enlargement without cutting away any of the walls of the chamber. The butt of the projectile is made of a piece of mild steel, which is somewhat harder than the cylindrical walls of the chamber, and is shaped to a cup form by hydraulic forging. The slight exudation of the metal at the walls on the inside produces an exterior ring, which is a material increase in the strength of the projectile. For shrapnel, the thin metal screen between the charge and the bullet case is placed in position before the head is welded to the cylindrical chamber of the projectile and readily joined in place in the act of welding. This new application of the electric welding process was invented by Lieut. W. M. Wood, of the United States Navy, who has received a year's leave of absence from the government, and is in the meantime associated with the Thomson Electric Welding Company.—*Engineering.*

THE NOVA SCOTIA SHIP RAILWAY.

Sir Benjamin Baker, one of the constructors of the great Forth Bridge, chief engineer of the Hudson River tunnel and also of the Nova Scotia ship railway from the Bay of Fundy to the Gulf of St. Lawrence, is now in this city for a short stay to inspect the work on the tunnel. In the course of an interview with a *Tribune* reporter he gave some interesting information concerning the ship railway, which we give below:

The project of a ship railway is by no means new. It has been mooted many times within the last thirty years. Captain Eads, of Mississippi jetty fame, proposed it many years ago as an alternative to the Panama Canal. M. Eiffel, who built the great exhibition tower, and has contracts

for locks on the Panama Canal, lately consulted with me as to the feasibility of converting the Panama Canal into a ship railway.

The earthworks and masonry of the docks of this ship canal are being constructed by an American firm of contractors, Messrs. Dawson, Symes & Usher. The machinery, including powerful hydraulic lifts, each capable of hoisting to a height of 40 feet the total weight—3,500 tons—of a ship and cradle, is being manufactured by Easton & Anderson, of London. About two-thirds of the railway and docks are finished. Nearly the whole of the machinery has been made, and the greater part of it shipped to this country.

The railroad will be about 17 miles in length. The locomotives for hauling the ship over the railroad are exceptionally powerful, being eight-wheeled tank engines, each weighing 80 tons. The saving of time in transit will be enormous, considering that it now takes a ship three days to go from the Bay to the Gulf, while the time occupied on our road will be about two and a half hours. We have now 1,400 men at work and hope that the railway will be opened in the spring of 1892, if not earlier. The Canadian Government has guaranteed the company \$170,000 a year for 20 years.

DUPLEX GAS ENGINES.

By Elmer A. Sperry.

It was Prof. Fleeming Jenkin who first gave to the world the mathematical demonstration of the increased economy attending triple and quadruple expansion in the steam engine.

Prof. Thurston, in this country, in his recent paper on steam engines for electric lighting, has pointed out the extremely high theoretical attainment of the latest forms. He says that in fact these have now arrived “to so perfect a condition that the range for further improvement is probably very narrow, and the gain still to be made must come slowly.” The first named eminent authority has further made the statement that “the actual achievement of the steam engine has nearly reached the limit of the possible.”

The efficiency of the steam engine when taken as a measure of the recovery of power from the total power-equivalent of the heat employed, following the most improved methods, is only about ten per cent. when large units of power are considered. To compare this performance with that of the gas engine, it is but fair that we take equal units in either case. In the comparison of the two motors as heat engines, size for size, the actual performance of the gas engine is over two hundred per cent. better than that of the steam engine, with a vast unexplored region beyond in the case of the gas engine, giving promise of great improvement and higher economy than the most excellent performance yet recorded.

In considering the great problem of transforming heat energy into mechanical and electrical energy it may be well to investigate the laws of operation and working of a system that has already realized so much in direct transformation of heat into mechanical motion.

The gas engine is a hot-air engine in which the air as it is drawn into the cylinders is charged with a substance which may at the proper moment yield the heat required to increase its bulk, the confining of which develops the pressures utilized in moving the piston. This increase of bulk on ignition, and the corresponding pressure of the air, is from four to five times. Thus if the air or mixture in the cylinder at the time of ignition is 40 pounds, the pressure resulting from ignition is about 200 pounds. The ignition does not cause an explosion, as is usually supposed, but on the contrary the inflammation goes forward until a certain pressure and temperature are reached, when it is arrested, and further inflammation is developed as the piston goes forward and the pressure thereby tends to decrease. The writer has seen cards from gas engines in which constant pressure was developed throughout nearly the entire stroke. This is especially the case with lean mixtures, or below $11\frac{1}{2}$ to 1 of ordinary illuminating coal gas.

This system of transferring the furnace, wherein the energy is primarily developed, into the cylinder of the engine itself, and there utilizing directly the benefits of combustion, is undoubtedly the greatest step of the present half century in the direction of high economy and efficiency. There is no doubt but that the engine of the future is to have its furnace in its cylinder, thereby eliminating the gigantic waste attending latent heat which is encountered in the case of steam. The high performance of 1.4 pounds of coal per horse power per hour in a 10 horse power engine compares favorably with that of from 7 to 13 in the steam plant of equal size.

This being true, the question is asked, “Why are not gas engines more sought and employed for ordinary power purposes?” The answer to this question can only be found by a study of the performance of the present gas engine, noticing the difficulties encountered, the limited application to the more exacting power consumers and the devices resorted to in the attempt to overcome some of these difficulties. The greatest evil of the present method and cycle of operations in the gas engine is the want of uniformity of speed in the power developed. This is owing to the fact that usually but one out of four—frequently one out of eight—of the strokes or units of power is available for producing effective results. The others are not only non-productive, but actually consume the energy developed in the one. It is true that engines have been produced that make every other stroke an effective one; but this system at best produces irregularity that renders it objectionable for driving more delicate machinery, especially electric generators for lighting purposes. It is true that dynamos may be driven by existing engines to supply storage batteries with some degree of success; but where direct illumination is required the noticeable irregularity and throbbing prohibit general adoption.

The gas engine of to-day undoubtedly stands in the same position as the steam engine in 1860 when Charles T. Porter first proposed to develop double or triple the power from the same weight of material for the same weight of engine by increasing the number of its power-producing elements per minute from 50 strokes, as was the practice, to 250; or, to follow history in steam engineering still further back, in the days of Newcomen and Crawley, when all cylinders were single-acting and a multiplication of cylinders were required to increase the number of power strokes.

The commercial gas engine of to-day has a single-acting cylinder. The difficulties of packing against the high temperatures have been found, and

probably will remain, insurmountable. French engineers have sought in vain, through long continued and expensive experiments, to find methods of packing a piston rod against the high temperatures of the cylinder, and thus to produce a double-acting gas engine. The American engineers have heretofore tried, but thus far have failed, to produce a double-acting gas engine.

The most successful practice in gas engines has been followed in producing the engine illustrated herewith, that is, single acting combustion cylinders are used which are placed opposite to each other and form a single mechanical element. Midway between them is a cylinder of larger bore performing the office of a pump for transferring the mixtures to their proper destination before combustion. The compound piston, which reciprocates in these three cylinders, is also a single mechanical element, the two ends, of similar size, forming plunger pistons operating in the combustion cylinders, in the middle of which is an annular enlargement *D*, which fits the larger bore of the pump cylinder. The differential area so produced between the combustion piston and the pump cylinder is the area which is available for transferring the gases and forms the piston area of the pump cylinder. It is to this element, namely, the annular shaped pump piston, that the main piston rods *E*, two upon each side, are attached, as may be seen in Fig. 1, thereby eliminating the necessity of packing against the high temperatures; the only packing required in the piston rods is against the low pressures of the cold mixture within the pump. It will be seen in Fig. 2 that the two

screws beneath the induction valves, and thereby automatic regulation is obtained which is found in practice to hold the engine within three per cent. from full load to zero.

The actual performance of the engine is very high, being from 19 to 21 cubic feet per horse power. The perfect uniformity of speed is owing to the fact that every stroke is effective, and a comparatively small weight of engine is required to the horse power. Chief among its merits is its low cost of manufacture.

A 13 horse power engine of this make weighs only about 1,900 pounds and requires but a small fly wheel, and for purposes of driving dynamos the fly wheel may be used for band wheel, about the same practice being followed as in steam engineering in determining the weights of these elements.

The engineering department of the Patent Office looked upon the case with unusual interest, owing to the fact of its being the first system of construction which rendered the double-acting gas engine feasible, and a patent containing some 65 claims was granted upon same.

SOUTH AMERICAN BESSEMER IRON ORES.

We have recently received specimens of iron ore from a deposit in the valley of the Orinoco river, South America, owned by George Turnbull, of New York City. The mines were opened about two years ago, and the shipments to the United States since that time have amounted to

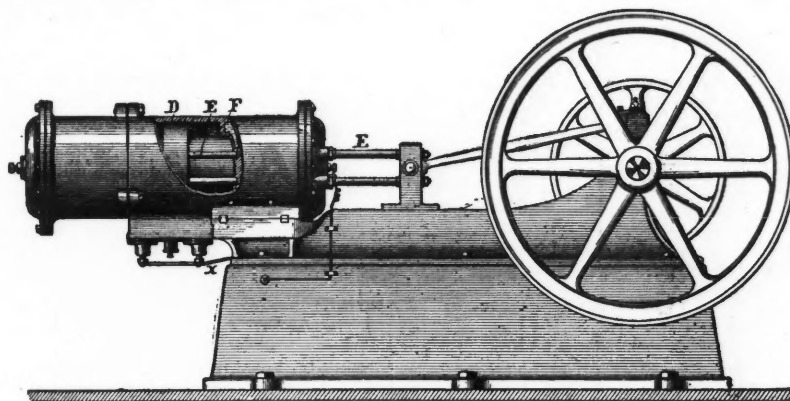


FIG. 1.—DUPLEX GAS ENGINE.

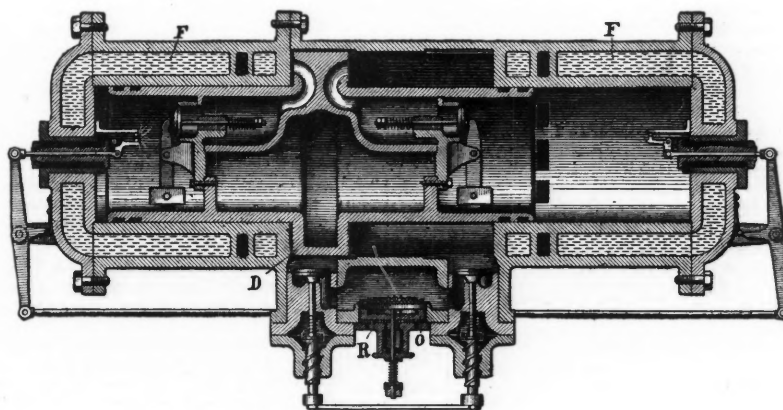


FIG. 2.—DUPLEX GAS ENGINE.

combustion cylinders are at opposite ends of the compound cylinder. The water jackets are shown at *F*. Along parallel to the front cylinder are the cored passages *G* in which the two piston rods *E*, connecting with the cross-head, reciprocate, see Fig. 1. The packing glands *I* are required to pack only against the small pressures of the gases in the pump cylinder. This pressure is so slight as to be wholly disregarded.

The law of operation or cycle of the engine is as follows: The pump is double acting, and is provided at either end with an induction valve, below which is a screw, by turning which the seating of the induction valve may be varied. This varies the pressure within the pump, and therefore the amount of mixture transferred into the combustion cylinder previous to ignition. The ignition is performed by the electric spark, the two igniters being coupled in a multiple arc. The mixing device is peculiar, extremely simple, and consists of a valve *O* covering both gas and air passages in a perforated plate. This valve is so large as to nearly fill the circular space in which it is contained, leaving only a very narrow circular slot at its periphery. To the gas and air as they are drawn through this narrow slot is imparted a very high velocity by the suction of the pump at either end. A wire-gauze diaphragm *R* stands immediately in front of this passage, and completely breaks up the rushing gases as they emerge from the slot. These as they reunite form a most intimate and complete mixture. Experiment has shown that this mixture attains almost theoretical perfection, aiding materially in the combustion and economy attending the operation of the engine. The compression of the engine is from 35 to 45 pounds before ignition when the engine is working near its capacity, and from this figure down to atmospheric pressure when working less than its rated capacity. A governor on the axle is connected by rod *X* to the two

about 2,000 tons. It is stated that a lack of mining and shipping facilities has prevented larger shipments. The sample in our possession shows the ore to be of a large-grained specular character, and rich in metallic iron. Numerous analyses made in this country and abroad show that the ore contains from 65 to 69 per cent. of metallic iron; silica, ranging from 1.76 to 8.58 per cent.; lime, from .12 to .75 per cent.; sulphur, from a trace to .181 per cent.; and phosphorus, from a trace to .045 per cent. The majority of the samples analyzed show the percentage of phosphorus to have been less than three one-hundredths of one per cent. The ore is readily smelted, and is practically self-fluxing.

Concerning the extent and character of the deposit, Mr. S. Norton, furnace manager of the Troy Steel and Iron Company, who has visited the mines, states that the ore is located upon a spur of the Imataca mountains, 54 miles from the mouth of the Orinoco river, and is reached by vessels drawing 18 feet of water. The point at which the ore is at present being mined is two miles from the Orinoco river, a small arm of the same passing around and forming an island called Corisimo. This arm or branch of the Orinoco has an average width of 350 feet and is 30 feet deep, large vessels being able to come within 50 feet of the shore at any point, and at some places still nearer. The ore is 1,600 feet from and 200 feet above the river, both river and mountain running in the same general direction, namely, west to east. Boulders of iron ore weighing from 100 pounds to 100 tons cover the top of the hills for a distance of 3,000 feet in length and 100 feet in width, there being in sight from 150,000 to 200,000 tons of Bessemer ore. The true vein shows an average thickness of 12 feet, and samples taken at widely-separated points show an unchanging character. The boulders of iron ore are to be found at points 6, 33 and 35 miles to the westward. A

PERSONAL.

Mr. JAMES DREDGE, editor of *London Engineering*, arrived in New York last week, and is being entertained by some of our local engineers. He expects to attend the meetings of the American Institute of Mining Engineers and of the British Iron and Steel Institute on the 29th inst.

H. L. Webster, resident manager of the Langlaagte Estate and Gold Mining Company, situated in Johannesburg, Transvaal, South Africa, is on a tour of inspection of the different mining districts of the United States, studying the different methods of working minerals by American machinery. The African mine with which he is connected produces from 5,000 to 6,000 ounces of gold per month. It is a stratified deposit in conglomerate formation. They have two leads running parallel, 4 x 10 feet each, and they average one ounce of gold to the ton. The company has at present 60 stamps at work. Mr. Webster has just ordered 100 more from an American firm.

The faculty of the Michigan Mining School, Houghton, Mich., is to be as follows for the ensuing year: M. E. Wadsworth, A. M., Ph. D., director, professor of mineralogy, petrography and geology; A. E. Hoynes, M. S., M. Ph., late of Hillsdale College, Mich., professor of mathematics and physics, secretary of the faculty; Harry F. Keller, B. S., Ph. D., late of the University of Pennsylvania, professor of chemistry and assaying; Fred F. Sharpless, S. B., instructor in chemistry and metallurgy; Fred W. Denton, C. E., instructor in mining and engineering; Alfred C. Lane, A. M., Ph. D., instructor in petrography and geology; Arthur E. Serrian, assistant in mineralogy.

OBITUARY.

Joseph Bell died suddenly on the 13th inst. in Cincinnati of apoplexy. He was distinguished as a builder of machinery and as the first man to take a steamboat across the Gulf of Mexico. He introduced steamers in the rivers of Mexico.

Capt. H. D. Bannister, of Chicago, chief engineer in the Western department of the Loomis Gas and Electric Company, died suddenly at the Depot Hotel, Ottumwa, Iowa, on the 7th ult. He was one of the most accomplished gas and electrical engineers in the country. He entered the army while yet a minor, and served during the war of the rebellion as aide on the staff of Major-General Blunt.

On the 27th ult. Prof. Thomas Carnelley died in his thirty-eighth year. He occupied successfully the Chemical Chair at Firth College, Sheffield, and at the Universities of Dundee and Aberdeen. His work included especially the further development of the periodic system of Newlands and Mendeleeff. Up to his death he was engaged upon a great work on the chemical and physical constants, in which he was tracing out relations and uniformities not previously detected.

INDUSTRIAL NOTES.

The Illinois Furnace and 800 acres of adjacent land, located near Elizabethtown on the Ohio River, has been leased for a term of 25 years by T. T. Wood, of Chicago. A stock company is to be formed, and the furnace started at once.

The Rockville, Conn., Gas and Electric Light Company will place at its works the largest gas engine ever built in this country. It was made by the Otto Gas Engine Company, of Philadelphia, and is 100 horse power, weighing 30,000 pounds.

The Bonzano Metallic Railroad Tie Company has been chartered in New Jersey, with a capital of \$1,000,000, to manufacture steel railroad ties under the patents of M. F. Bonzano, Assistant General Superintendent of the Philadelphia & Reading Railroad.

The suit by George Westinghouse, Jr., vs. The Chartier's Valley Gas Company, for the alleged infringement of the former's patent for pipe line joints, has been decided against the complainant, which results in throwing the use of this device open to all who are pleased to use it.

Of the 36 iron furnaces now under construction in the United States 25 are in the South, 9 being in Virginia, 7 in Alabama, 3 each in Kentucky and Tennessee, 2 in Maryland and in Georgia. Moreover, while there are few or no other new furnaces projected in other parts of the country, there are probably at least 20 that will be put under contract in the South during the next few months.—*Ec.*

Messrs. H. E. Collins & Co., of Pittsburgh, Pa., agents of the Magnetic Separator Company for the United States, have opened a branch office, of which the inventor, Mr. Ch. Ball, will be in charge, at 60 Aldrich Court, 45 Broadway, N. Y., where the "Monarch" Ore Separator can be seen in operation until the 29th inst., when it will be removed to Chickering Hall during the meetings of the American Institute of Mining Engineers and the British Iron and Steel Institute.

The vapor stove manufacturers of the United States closed a two days' annual session at Cleveland on the 28th ult. A general price list was

adopted making the prices upon single generators and individual burner vapor stoves \$1 less than last year. The failure to agree upon a pool is ascribed to the appearance upon the field of the new process stove of the Standard Lighting Company, which sells at a price slightly higher than the others, and whose patentees refuse to enter into the scheme.

Says a Chattanooga dispatch of September 17th: The most important event in the industrial development of the South occurred here yesterday, in the successful casting of steel from Southern material by the basic process. The result clearly demonstrates that the Southern iron will make steel, and explodes the notion that the iron contains too much phosphorus to be used for that purpose. The first cast of 22 tons resulted in a superior soft, low carbon steel, finely adapted for structural work. A second furnace will be put in operation within 30 days. The great importance of this event is the fact that it affords a market for the lowest grade of Southern iron.

The Berlin Bridge Company is now executing several extensive contracts at different points. At Buffalo, N. Y., it is putting up a plant for the Lake Erie Engineering Company. The machine shop will be 180 x 185 feet, the foundry building 180 x 225 feet. The Midvale Steel Company is having built a casting shop 135 x 285 feet with two 50-foot wings. Through the center of this structure will be run 50-ton traveling cranes. At Madison, Me., it is constructing for the Manufacturing Investment Company, of New York, a digester building 62 x 220 feet, four stories; a machine shop 72 x 172 feet, and a washing room 74 x 182 feet. These different structures will be of iron.

The American Manufacturer of September 5th says: The Edgar Thomson Steel Works again broke the record on Monday night last. During the night turn 81 heats were made in twelve hours, with a total output of raw steel of 850 tons in the converting mill. The blooming mill made 73 heats, and the rail mill over 2,500 rails. Tuesday the next highest run was made, amounting to 75 heats in the converting mill, 2,106 rails. The highest record previous was 74 heats, made during last March. The Allegheny Bessemer Steel Works, at Duquesne, last month, made the largest run of its history. It made 16,814 tons of rails, 20,000 tons of raw steel in the converting mill, and 17,000 tons of blooms. The improvements in the converting mill and the new blooming mill will be completed in about three weeks. The output will increase steadily to 20,000 tons of rails per month.

The largest gas engine ever built in this or any other country has recently been shipped by the manufacturers, Schleicher, Schuman & Co., Philadelphia, to Rockville Gas and Electric Light Company, of Rockville, Conn. It is of the Otto type, 100 H. P. capacity, and has double cylinders, one above the other, connecting rods from both cylinders driving the same crank. The cylinders are 56 inches long, the diameter 14 1/2 inches, length of stroke 25 inches and diameter of crank shaft 5 1/2 inches. The engine occupies 16 feet by 6 feet 9 inches. Its total weight is 30,000 pounds. This, as all the Otto gas engines, can be run with coal gas, water gas, producer or fuel gas and national gas, and charges can be ignited by using coal gas or by an electric spark generated by a cell battery or brought from a dynamo.

The annual meeting of the stockholders of the Thomas Iron Company was held at Hokendauqua, Sept. 11. The annual report sets forth the following facts: All the furnaces were in average blast forty-eight weeks, and the average production was 336 17-120 tons per week per furnace, the total production being 175,170 16-20 tons, an increase of 19,505 tons as compared with the previous year and the output in the history of the company. The deliveries of iron were 183,133 tons, against 143,166 in the preceding year. The net income from all sources was \$420,065, or about 21 per cent. on the capital stock of \$2,000,000. The surplus carried forward was \$160,944, making the total surplus \$1,782,591. The 7 per cent. bonds due July 1st have been retired, and new 5 per cent. bonds issued to the amount of \$300,000. Besides the regular cash dividend, a 25 per cent. dividend in scrip was distributed during the year.—*Pottsville (Pa.) Evening Chronicle.*

CHICAGO INDUSTRIAL NOTES.

(From our Special Correspondent.)

By the time the World's Fair is inaugurated the tallest building in the world will have been built in this city. Its height is to be eighteen stories. The topmost will be occupied as a masonic temple. Materials used will be entirely steel and terracotta, with veneerings of stone. The cost will be \$3,000,000. Foundations upon which this giant is to rest are now being laid.

If the plans of certain large Chicago and Eastern capitalists are carried out, Chicago will have a supply of natural gas long before the opening of the World's Fair. The Indiana Natural Gas and Oil Company, which has just been chartered with a capital stock of \$5,000,000, is building a pipe line from the nearest available Indiana gas fields. The line has already been built southeast from the Indiana State line at Chicago through three or four counties. It is the intention to supply the business and residence portion of Chicago.

The improvement of the Calumet River bed, now in progress, indicates that the Government realizes the importance of this water-way and the increasing requirements for transportation facilities of the section through which the Calumet River flows. During July 113,000 cubic yards of earth were dredged from the upper channel of the river, and during August 64,000 cubic yards were removed from the river bed. The plan consists in clearing the channel south of the South Chicago harbor to a depth of 16 feet, and giving it a width of 200 feet from bank to bank. The estimated cost of the entire improvement is \$1,000,000.

The Westinghouse Electric Manufacturing Company, of Pittsburgh, is negotiating with the Pullman Palace Car Company relative to the erection of shops at Pullman for use in its electrical motor business. The object for this change of site is said to be for the purpose of lessening the cost of turning out fully equipped electric motor street cars. If negotiations are successful, works costing \$500,000 will be erected at Pullman.

SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

The Atlanta Street Railway Company is considering the advisability of substituting electricity for animal power. It is now stated that the change will be made at an early date.

It is said that an English syndicate (with a few American capitalists included) has just purchased 285,000 acres of land near Murphy, North Carolina, for the purpose of development. The neighborhood is well known to contain large deposits of marble, talc and iron.

The Western Carolina Land and Improvement Company has been organized at Anderson, South Carolina, with a capital of \$300,000. The object is to build a town at the crossing of the Savannah Valley and the Georgia, Carolina and Northern roads on the Savannah River. It is to be known as Calhoun; factories are to be built at the falls of the river, where it is claimed that 24,000 horsepower can be obtained.

The L. P. Grant Land Company, of Opelika, Ala., has been organized with a paid-in capital stock of \$50,000. The "Grant land" has been purchased and will be improved for manufacturing and other purposes. L. P. Grant, of Atlanta, is the president, and J. A. Kirkpatrick, of Opelika, secretary and treasurer.

The fires have been started in the Augusta (Ga.) glassworks. This marks the era of a new enterprise for this section. Thirty skilled laborers have been secured from the north, and more are in demand.

The Reidsville Railroad Company has been chartered for the purpose of building a short line connecting Reidsville, Ga., with the Savannah & Western Railroad. Its length is to be about six miles. The company proposes to spend about \$35,000 in construction.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

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

GOODS WANTED AT HOME.

1,063. A ten-ton ice plant. Mississippi.

1,064. A 500-electric light plant. Mississippi.

1,065. Bids on cast iron and cement water pipe. Colorado.

1,066. Plans and estimates on water-works. Colorado.

1,067. One three-pound mixer, one brake, one former, one cracker-cutting machine, and one reel oven with eight shelves for a steam power cracker bakery. Maryland.

1,068. A small saw mill and carriage; also shafting and belting. Florida.

1,069. Correspondence with parties able to furnish artesian water under guarantee. Texas.

1,070. A large iron cylinder saw 3 feet at one end, 2 1/2 feet at the other and 4 feet long. Florida.

1,075. Engine, hoiler, clay tons, brick presses and all machinery necessary for fire brick works. Kentucky.

1,076. Electric light plant, North Carolina.

1,077. A small planer and matcher. North Carolina.

1,078. Brass furnaces, both reverberatory blast; also traveling cranes, etc. Wisconsin.

1,079. Cotton mill machinery, including spinning and weaving. North Carolina.

1,080. Bids on one 100 horse power boiler, one 95 horse power engine, 500 feet shafting, hangers, pulleys, etc. Virginia.

1,081. Electric plant to pull coal out of coal mines. Tennessee.

1,082. Bids on an electric light plant. Virginia.

1,083. Prices on about 5,000 lineal feet of 4-inch curbing, both on 14 and 16 inches wide, in lengths not less than 4 feet. Florida.

1,084. Illustrated catalogues and price lists of manufacturers of charcoal retorts whereby a by-product is made, such as alcohol and acetate of lime. Louisiana.

1,085. Rails, cars and all other necessary equipment for a street railway three miles long. South Carolina.

AMERICAN GOODS WANTED ABROAD.

1,071. A circular saw about 24 inches in diameter to be driven by one or two mules. Mexico.

1,072. Communication with manufacturers of agricultural implements; also catalogues and price lists of same. Australia.

1,073. Prices on cotton hose pipe for hydraulic gold mining up to eight inches in diameter, and to carry pressure up to 40 pounds per square inch. Brazil.

1,074. Estimates on plant for granite quarrying and polishing machinery. Canada.

GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including September 10th were as follows:

	Tons. 1890.	Tons. 1889.
Marquette, Marquette District	958,505	1,031,754
St. Ignace	55,911	34,405
Gladstone, Marquette District	6,133	679,275
Menominee	46,332	13,515
Escanaba, Marquette	897,393	28,732
Menominee	1,402,572	1,149,490
Gogebic	204,366	195,626
Ashland	1,532,679	1,092,438
Two Harbors' Vermillion District	633,469	634,663
Total tons	5,737,430	4,860,896

On the 10th inst. Senator Morgan introduced a resolution directing the Senate conferees on the land grant forfeiture bill to insist that all mineral lands granted the Northern Pacific except coal and iron lands be disposed of under the mining laws the same as if they were part of the public domain. Whenever the Northern Pacific shall relinquish its title to any of these mineral lands it shall receive its lieu thereof an equal amount of agricultural timber land. Conferees are instructed further to insist upon a provision declaring that the United States reserves the right to amend the act or to hereafter declare a further forfeiture of Northern Pacific lands. He also introduced a resolution calling upon the Secretary of the Interior for full information respecting the number of suits between settlers and the Northern Pacific; the proceedings taken in them; whether the railroad company changed location of any part of its roads; whether lands were reserved along the line of this new section of road and whether any part of the road was definitely located within the time fixed in the charter.

A despatch from Greensboro, N. C., says: For some days it has been rumored that oil has been found near town, but the location of the discovery was kept a profound secret. Now, however, it has become known that the discovery was on a small farm belonging to John J. Phoenix, one and a quarter miles from town. Hundreds have visited the place and every one is convinced that oil has been found.

Phoenix has sunk a shaft to a depth of 30 feet, and the oil indications have grown stronger with the depth. He proposes continuing the shaft to a depth of 60 feet, and will then arrange for a boring plant. The "find" seems to be in a split in the granite formation which runs through in this section. The split is perhaps a mile in width. Among those who visited the shaft were several experts, who pronounced the oil "white sand petroleum" of good quality, and expressed the opinion that it will be found to be in abundant quantity.

The discovery of oil on the Phoenix place has revived interest in the reported oil find near Germantown, N. C., some time ago. Here was found a deposit of flexible sandstone and oil, but the work of developing was never prosecuted. At the foot of the Suaratown Mountains, 30 miles from there, a joint stock company erected a derrick in 1867, and bored for oil with good prospects. After reaching a depth of 900 feet, the drill broke off and the work was abandoned.

ALASKA.

The following mining notes are compiled from recent issues of the Alaskan Free Press:

On August 22d a bond was executed between Edward Ayleward, John McLaughlin and Thomas Smith, of Juneau, and Thomas J. Sunny, of Cali-

fornia, to Karl Koehler, L. L. Williams and C. S. Johnson, of Alaska, and R. A. Dolph, of Portland, for the Ophir group of claims, situated in the Berner's Bay district. This group comprises the Northern Bell, Ophir, Seward, Seward No. 2, Elmira, Kensington, Bear, Eureka, Savage and Yellow Jacket lode locations, and the Seward No. 1, Bear and Ophir mill sites. The purchase price of this group of claims is \$80,000. The veins are well defined, and so far as development work has been shown, carry free milling quartz. The prospectors are surrounded by natural conveniences, such as timber, water power, etc.

It is said that work of development will be commenced there immediately, and the value and working character of the ore bodies fairly proven before the erection of machinery will be commenced. Should all this prove satisfactory, then a large plant of machinery, tramways etc., will be erected, all of which will probably be in running order at the close of the season of '91. Men and supplies have left Juneau to commence work on the property.

SHUCK PLACERS.—A bond was recently given by Messrs. Sylvester McMahon, Max McMahon and Peter Rocco to Messrs. Williams, Johnson, Koehler & Dolph for the McMahon placer mine, comprising about twenty acres of ground, and situated in Shuck bay. The consideration of the bond is \$6,000, \$1,500 of which is paid down. During last winter and spring the original locators opened up this ground by tapping the basin with a tunnel, and from a short run about \$1,000 in gold was taken out. The new company have commenced work to prospect the ground thoroughly preparatory to putting in an extensive placer mining plant early next season.

SUNNY SIDE.—Recent development work done on this property at Sum Dum bay goes to show that it is likely to soon develop into a very valuable mine. A cross-cut tunnel run shows that the streaks of rich peacock ore which are exposed on the surface enter into the ledge, and under the surface the entire ore body begins to show lead and pockets of peacock in a manner to indicate that within a short distance the entire body will be pay ore. In cutting across the vein some of the peacock streaks produced ore that was rich in native silver and worth several thousand dollars per ton. Mr. Andy Anderson, who is a good judge of mines and minerals, and who was one of the workmen there, expresses a decided opinion that the mineral chute has come from below, and that a large body of peacock ore is liable to be encountered at no very great depth, and advises the sinking of a shaft as the quickest means of reaching this ore chnt.

ARIZONA.

PINAL COUNTY.

SILVER KING MINING COMPANY.—On August 21st all the mill hands were discharged, the result of the 37-day run of the mill not being satisfactory to the directors. One man has since been employed in the clean up. At the 980-foot level the northeast drift is still in hard porphyry and in a distance of 242 feet. The drift has been discontinued and a cross-cut started in a southerly direction at a point 42 feet from the face of the drift, for the purpose of finding if there is a connecting link to the ore body. At the Bilk shaft the rock is a grayish porphyry, with occasional small stringers of quartz.

YAVAPAI COUNTY.

Los Angeles Express of recent date states that a 220-acre onyx quarry located near Mayer's station has been purchased from Albert McCann et al., by Mr. Smith, of Nolan & Smith, of Los Angeles, for \$250,000. The property which lies in a district which was supposed to be thoroughly prospected was only recently discovered. It is said to be of a red, green, blue, old gold, pink, white, black translucent variety, and to extend to an unknown depth.

CALIFORNIA.

GRANITE MINING DISTRICT.

(From our Special Correspondent.)

A recent visit to the granite mining district, Pine Creek Valley, by your correspondent was filled with interest.

DEL MONTE.—This mine was discovered 16 years ago when Sparta was a booming placer camp. The gravel had been washed off disclosing the vein which seemed to run under the Joss house of the Chinese miners. Hence its name, "Joss Mine." Nothing of importance was done for a number of years, different parties abandoning and others relocating until Dr. Lewis got possession and began work in earnest. He has run a tunnel some 400 feet and sunk a shaft some 300 feet. The vein varies from 2 to 12 feet in width, and the ore carries from \$8 to \$150 per ton, a specimen assayed by the writer, carrying \$156 in gold per ton. Hoisting works and a 20 stamp mill will be placed on this property the coming spring.

GOLD RIDGE.—This is a promising piece of property, developed by two tunnels tapping the ledge 200 feet, and by an incline 70 feet. There is also an incline a little over 100 feet in depth. The average of the ore is claimed by the company to be worth \$20 per ton. A plant will be placed upon this mine if the development continues to show as favorably as heretofore.

MARROTTE.—This property is destined to be a valuable one, at present the curse of all mining camps, litigation, is upon it. Two companies claim the same ground; nothing is being said so long as development goes on, but let either attempt to work the ore and that moment the stand will be made. Both parties seem to have good titles to the outsider and are equally determined to hold to their rights.

OREGON GOLD MINING COMPANY.—This company's mill is located one-half mile from the town of Cornucopia. It was constructed on queer principles and, therefore, so far not so successful as it might. It is 20 stamps, with copper plates for saving free gold. Then there are eight Frue vanners for saving the sulphurets. Next in the line of equipment are the grinders, the amalgamating pans and the settlers. There is no furnace, and the concentrates have accumulated until it is estimated there are \$30,000 on hand. Why were the pans put in at an expense of \$20,000 unless the sulphurets were to be roasted and amalgamated? And how roast them without some kind of a furnace? It is said that half a million dollars of the company's money was spent before a clean up was made.

RED JACKET.—This mine has 8,000 feet of tunnels and shafts. It has produced about \$64,000 in free gold and \$30,000 in sulphurets. The reported rich strike is in a winze about 60 feet below the lowest tunnel and in 10 feet of a ledge. It is a heavy sulphureted ore, all of which shows free native gold. There are thousands of tons of the ore in sight.

SANTA BARBARA COUNTY.

At Summerland, a suburb of Santa Barbara, three months ago a two-inch well, put down for sulphur water, struck a strong flow of gas, which has since been used for lighting and domestic purposes in Summerland. About three weeks ago a syndicate of Santa Barbara and San Luis Obispo capitalists leased the property, and commenced to put down a ten-inch pipe. Gas in considerable quantities was struck at 28 and 34 feet, according to Pacific Lumberman, and at a depth of 49 feet a gusher was struck. The noise was so great that it could be heard for blocks, and the flow could not be capped. It is estimated that the daily flow is at least 3,000,000 rivet, exceeding any well west of the Mississippi river.

The syndicate proposes to pipe the gas at once to Santa Barbara, and it will offer special inducements to manufacturers. Already propositions have been received for the establishment of manufacturing industries.

SAN BERNARDINO COUNTY.

WATERLOO MINING COMPANY.—This company is running its 60-stamp and 15-stamp mill day and night, receiving 200 tons of ore per day from the Waterloo mine and 20 tons per day from the Silver King mine.

COLORADO.

GUNNISON COUNTY.

A few days ago the lessees of this mine struck a body of iron and galena ore 2½ feet in thickness, says the White Pine Conc. The ore is similar to that found in the Mason, an adjoining mine, worked by Monarch parties, and runs from 50 to 65 per cent. lead and 40 to 50 ounces silver per ton. The mine is situated on the apex of Clover mountain, and is in the great lime belt which extends to Aspen.

MAY-MAZEPPA CONSOLIDATED MINING COMPANY.—Development work to the amount of over 500 feet has been done on the mine during the past month. The main incline has been driven 21 feet. A level (No. 9) has been started north from the same at a point 53 feet from the eighth level, and has been run 21 feet and a cross-cut of 12 feet made into the hanging wall. The eighth level south has been extended 15 feet and a drift run north from first upraise 25 feet. The eighth level north has been extended 31 feet, the cross-cut extending 20 feet and another 19 feet in length run, an upraise of 13 feet made and the upraise made during July extended 28 feet to connect with the seventh level north. The cross-cuts in the seventh level north have been extended 25 and 18 feet respectively, and a new one 50 feet in length made. The sixth level north has been extended 20 feet, the cross-cut extended 18 feet, another 25 feet in length run, and the upraise extended 25 feet. With the exception of a cross-cut 10 feet in length no development work was done in the fifth level. What work was done was confined to stoping and timbering. Work to the amount of 30 feet of drifting was done in No. 7 shaft; work has stopped on it for the present. No. 10 tunnel (the Prospect tunnel) started at bottom of hill has been driven 35 ft. Another tunnel (No. 11) has been started on the south end of the property and is 20 feet under cover. An open cut, 20 feet in length was made at entrance. What ore was shipped during the month was taken from the fifth, sixth and seventh levels and the ore bodies continue to improve as the development work progresses. About the same number of persons has been employed during the month as in July. But little stoping has been done, most of the ore shipped during the month being knocked down in extending the different drifts and tunnels. The total shipments for the month consisted of 70 carloads, containing 1,386,854 pounds.

Concerning this property the Solid Muldoon

says: "The May-Mazepa is now being managed by the Colorado Mining Investment Company, of Boston, and is being widely advertised in the East. To numerous inquiries as to whether the stock is worth anything or not, the *Muldoon* will say that we know nothing of it. It was made one of the hoem strings that pulled Denver's Mining Exchange, but whether its promoters made anything out of the stock or not we know not."

LAKE COUNTY.

Leadville's August output reached the figure of 1,763, an increase of 200 tons over that of July. The various sections of the camp that contributed to the output and the amounts mined are as follows:

	Tons. per day.
Fryer Hill.....	230
Yankee Hill.....	60
Breece Hill.....	155
Iron Hill.....	487
Carbonate Hill.....	398
Rock Hill.....	52
Mt. Sherman.....	49
Long and Derry Hill.....	23
Within city limits.....	138
St. Kevin district.....	60
Other mines and leases.....	120
Grand total.....	1,763

The work of the smelters was but little different from that during July. They treated 10,250 tons of ore, which produced 1,250 tons of bullion.

OURAY COUNTY.

TERRIBLE AND VIRGINIUS.—This company is putting in an extensive electric power plant, says the *Ouray Plaindealer*. It will consist of a power house 30 x 60 feet, at the confluence of Imogene and Sneffles creeks, and two dynamos of 400 horse power each. The motor is to be two large Pelton wheels, which will be supplied with water conducted through a pipe line a mile long and having a head of 600 feet. The electric current will be conducted 19,000 feet to the mine. All the mining and milling machinery of both the Virginius and Terrible mines will be generated by this plant. A new Knowles pump, with a capacity to raise a 6-inch column of water 700 feet, is to be put in and operated by the new plant. These two mines have been using daily 13 tons of \$20.80 coal. The new plant will save this expense.

YANKEE GIRL MINING COMPANY.—This company has been in operation eight years. Work was begun on the large ore chimney in November, 1882, and from sinking the first 50 feet 1,000 tons of ore were shipped, worth from \$60 to \$120 per ton. The ore was shipped to St. Louis, and after paying the cost of mining, treatment and cost of transportation, the whole vein netted \$60 per ton, the lead giving as high as 60 per cent. At 50 feet the adit of No. 1 level was run, and here was discovered the wonderfully rich stromeyerite, many rich pockets or deposits of which have made up the \$20,000 and \$30,000 car loads. The production during the past year has been nearly double that of any former year. It is said that there is more ore in sight.

PITKIN COUNTY.

LOUD GROUP.—This property lies across the gulch between the Deane and Argenta groups. It is the intention to sink a 200-foot shaft. It is thought this distance will reach the contact. This will virtually be the deepest working in that section, and the enterprise is warranted by surrounding developments. A shaft 4½ x 9 feet will be put down with the expectation of eventually sinking it much deeper.

SCHILLER MINE.—Much money has been spent in developing this property. At first the shaft sinking was so retarded by water as to necessitate machinery to handle the flow. The shaft is now 600 feet deep. An incline has been run to the vein, a distance of 330 feet. A contact was disclosed where the incline cut the vein but the mineral was low grade. Drifts were started both ways from the incline in hopes of disclosing an ore chute. They are in several hundred feet and Mr. Morris thinks it is only a question of time when an ore chute is uncovered.

SMUGGLER.—This property has temporarily suspended shipments pending repairs on the drainage tunnel, says the *Aspen Times*. The ore that is now being mined is taken out just over the main level with which this connects, and is sent out to the railroad through the tunnel. The latter needs retimbering, and it has been necessary to suspend until this can be done. The work will be finished this week. The mine shipped 1,260 tons during August, but when production is resumed the daily output will be nearly doubled. The annual election of the company was held a short time ago, the old officers being retained, excepting the secretary. The present officers are: C. J. Hughes, Jr., president; D. M. Hyman, vice-president; Albert Smith, secretary; Charles A. Hallam, general manager. S. I. Hallett remains in direct charge of the property.

RIO GRANDE COUNTY.

ETHEL, HOLY and PHOENIX.—Says a Del Norte dispatch of the 11th inst: A mining sale was consummated at Del Norte this week whereby the Holy mine at Creed camp, near Wagon Wheel Gap, passed into the hands of George C. Simmons, of El Paso county, representing an English syndi-

cate, the consideration being \$65,000. The Ethel mine, in the same camp, was sold to D. S. Cotton, of Salida, also the Phoenix to the same party.

An exchange gives us the following details concerning the extent of a smelting at Denver:

"The Grant-Omaha people run ten stacks in Denver and eight in Omaha. They own three other plants, namely, four stacks at Salt Lake, one at Glendale, Mont., and one at Clayton, Idaho. Their Denver output for April last was nearly \$2,000,000. Since starting, eight years ago, the Denver works have paid out \$41,000,000 for ores and shipped nearly \$45,000,000 in bullion. In June last they bought \$800,000 worth of ores. It is not unusual for them to have \$1,000,000 in ores on one floor, awaiting their turn to be smelted. The buildings are interlaced with railroad tracks, and ore is piled up everywhere. It takes 450 men to move the works, and they carry about 600 men on the pay roll. They pay out for fuel and labor and some incidental supplies \$72,000 a month. The works reduce 400 tons of ore per day, of which 150 tons have to be roasted; 100 tons of limestone, and, of all materials inclusive of fuel, nearly 700 tons a day pass through the furnaces. A good part of the tailings and base ores from everywhere is roasted to the point of fusing, the product retaining three to four per cent. of sulphur; 45 tons of matte are broken up and re-roasted per day. All roasting is done in reverberatory furnaces. One per cent. of the ore is caught in the dust chambers. The higher ores, carbonates, etc., are made to carry about 10 per cent. of the base ores. There is more money invested in the roasting plant than in the smelting plant. Fifty tons of bullion are run out per day, carrying at present 300 ounces silver and five ounces gold per ton.

Colorado is to have a mining exchange. The bonds, \$250,000, have been placed at par with New York capitalists. The building will be constructed at Denver immediately.

SAN JUAN COUNTY.

Last week a one-half interest in the Syracuse Pride mine, owned by John J. and Robert Crooke, was sold to Henry B. Cromwell and George J. Freeman for the sum of \$50,000 cash. Messrs. Crooke still hold one-half, and have leased it to the purchasers. In running 100 feet of drift 50 tons of ore have been shipped, which averaged over 100 ounces silver per ton. Stopping is now begun, and next week the product will be 5 tons daily. Twenty men will be employed all winter opening new ground, and the force will be increased to 50 men April 1.

PRIDE OF THE WEST.—A Western exchange reports the sale of this property by Joseph Gibbons to D. M. Hyman *et al.* The consideration in deed was \$120,000. Mr. Gibbons retains an interest in the property.

SUMMIT COUNTY.

LEADVILLE AND PENNSYLVANIA.—This property consists of 7 patented lodes in the Peru district. The Hall lode is the heaviest producer. It is 7 feet wide, carrying 40 ounces of silver to the ton. A cross cut will be driven from the Hall for the purpose of intersecting the Paymaster and Pennsylvania veins.

GEORGIA.

(From our Special Correspondent.)

CHEROKEE COUNTY.

GEORGIANA GOLD AND SILVER MINING COMPANY.—This company, which is of recent origin, is reported to be doing very well. The force of hands averages about sixteen. The mill is of the Huntly type, and it treats about eight tons per day, as the ore is hard. The ore is said to contain 20 pennyweights per ton. The erection of three more mills is contemplated in the near future. It is owned and operated by New Orleans parties.

HALL COUNTY.

Mr. Thomas Byrd has been prospecting about a mile and a half from Gainesville with good results. Some of the nuggets which he obtained went from 12 to 39 pennyweights. It is reported that the place is to be opened up on a large scale.

LUMPKIN COUNTY.

In the lower part of this county, near the Chastee river, a property has been purchased by Dr. David A. Nunn, Jr., W. W. Murray and Warren Smith, of Nashville, with a view of development. They propose the immediate erection of a stamp mill of probably 10 stamps.

HAND GOLD MINING COMPANY.—In the article on this company, published September 6th, the address of Manager H. D. Ingersoll, Dahlonega, Ga., was omitted. He invites prices on concentrators.

PICKENS COUNTY.

GEORGIA MARBLE COMPANY.—This company is now operating its quarries on a large scale and is steadily increasing the capacity. The oldest quarry is now about 100 feet deep and 100 in the opening. It is to be opened to 400 feet at once. Several hundred men are employed, operating six quarries. The marble is a favorite for columns, wainscotings, stairways, etc. A new public building in New York City is to be decorated with this material. The company has nearly 175 car-loads ready for shipment.

IDAHO.

OWYHEE COUNTY.

DE LAMAR.—Four years ago the Wilson mine was purchased by J. R. De Lamar. At the time it was a mere prospect. To-day it is said to be one of the best mines in the State. A tunnel has been run 1,200 feet, reaching a depth of 400 feet and cutting first a vein 15 feet wide; second, 19 feet; third, 26 feet, and fourth, 77 feet, while there are several veins from 5 to 6 feet each between these. From this tunnel numerous drifts have been run and levels cut. A second tunnel 200 feet lower than the main one is now being run. The ore averages \$35 per ton in gold and silver, and there is said to be enough of it in sight to keep 100 stamps running for years. The formation is in andesitic porphyry with a hanging wall of iron and clay. The clay is rich in iron pyrites and silver. The management thinks of converting this clay into brick and then milling to extract the silver.

The main bodies of ore are composed of clean variegated quartz, easily extracted by the pick and shovel. The mine is well ventilated. The group covers a space one half mile wide and one mile long, or did a short time ago; but since then a large lot of claims, aggregating about 120 acres, known as the Sommercamp group, has been added by purchase at a cost of \$50,000. This gives Mr. De Lamar in all about 450 acres, embracing almost the entire hill, and so situated that his workings can extend entirely through it, with waste dump on one side and milling facilities on the other. He has secured a large number of mill sites on the creek, and controls its waters by owning a strip of land 300 feet wide and one mile long. On one of these sites, 700 feet below the mouth of the tunnel, is a 20-stamp mill, connected with the mine by a 2,350 foot tramway. The stamps reduce four tons each per day by the wet process, forcing the slime through 10 mesh screens. The pulp goes into a long tank, and from there is drawn into the eighteen 5-foot combination pans, thence into the nine 9 foot settlers. There are tanks and pumps for handling the quicksilver. The arrangement of the mill is such that a force of five men handled it during the day and three at night. The actual cost of mining ore is about \$1 per ton, and for milling \$3.50 or \$4.50 per ton from the mine to the bars of bullion.

At present the property is producing \$75,000 per month at a cost of less than \$30,000, including all costs of operating and developing. The owner intends to add next spring 100 more stamps. The equipment of the mine has kept pace with its development. At first ore was hauled up hill nine miles to Silver City to be worked and thoroughly tested in value and processes. Then came the building of the mill, at a cost of \$125,000, the tramway \$25,000, hotel \$25,000 and other improvements running up to an outlay of over \$225,000 in all, beside the work inside the mine.

Last January Mr. De Lamar bought the two-thirds interest of his partners, Wahl Brothers, of Chicago, for \$500,000.

IDAHO & PITTSBURG MINING COMPANY.—This company is getting ready to put in a stamp mill with thirty-five stamps. Their new tunnel on the Black Jack tapped a body of ore at a depth of 1,000 feet on the vein.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending September 13th the output of ore from the mining district of Galena and Empire City was: Rough ore, pounds milled, 1,336,980; zinc ore, pounds sold, 502,000; lead ore, pounds sold, 100,000; sales aggregated, total value, \$7,218; total value of output, \$8,500.

MICHIGAN.

GOGEBIC COUNTY.

IRON.

(From our Special Correspondent.)

HURLEY, Sept. 15.
ANVIL MINING COMPANY.—A large ore body has been proved up on the eastern part of this property, toward the Eureka. This ground had received little exploration previous to last winter. Nearly all the ore shipped this season has been taken from this part of the property. The dike, which cuts out the ore on the west has not been reached and is supposed to lie about 100 feet below the present workings. No work has been done under this dike which runs through the Palms, Anvil and Eureka properties. It is only a matter of time, however, when it will be necessary to pierce the dike and find new ore bodies beneath in order to ensure its life. Probably one, at least, of these properties will develop land under this dike the coming winter.

ASHLAND MINING COMPANY.—The cave which has been expected all summer has taken place without serious accident, and except for a few days' delay in shipping, the mine will suffer no loss. A new railroad spur is under construction, and the old tracks are being removed.

COMET MINING COMPANY.—The property of this company, formerly called the Eclipse, was added to the Wisconsin Central Syndicate group this spring and has been put in excellent condition. It lies two miles east of Wakefield, on the extreme east end of the range, and is the continuation

of the Brotherton and Sunday Lake lease. This ore is a high-grade Bessemer. The Lake Shore Railroad is running a spur to the shaft. The lense averages 15 feet in width, and has been opened up by drifts a length of 565 feet. Several thousand tons of ore have been raised in this development worked from drifts and cross cuts, but no mining, strictly speaking, has been attempted. The property is equipped with two upright portable boilers of 125 horse power each; two four-foot drums, with double engines complete the outfit. It is not expected that ore will be shipped before next season, although everything will be completed preparatory thereto before the close of navigation.

EUREKA MINING COMPANY.—This company has secured control of the property lying east of the Eureka, the option on which has been in dispute. The terms of the compromise have not been divulged.

NORTH PABST.—Ore is claimed on this property at a depth of 650 feet in the diamond drill hole, which has been driven vertically from the bottom of the shaft. The value of the find is not assured at the present time; but, should the ore be merchantable, this development will be of the greatest importance. It will increase the supposed limits between which all ore bodies were supposed to lie on this range, and will give a new impetus to explorations.

PENOKEE & GOGEBIC DEVELOPMENT COMPANY—COLBY MINE.—Mr. W. J. Olcott, formerly assistant manager of the Wisconsin Central Syndicate, has received the position of superintendent of this mine.

PITTSBURG MINING COMPANY.—The property of this company lying just north of the Comet, has been prospected by a diamond drill to the depth of 450 feet, without finding more than a narrow vein of ore. It is feared that the property lies too far north to catch the vein developed on the Comet. Further work is to be confined to the west end of the property.

VALLEY MINING COMPANY.—This property is under option to the Metropolitan Iron and Land Company. Present developments are very encouraging, and the prospects for a shipping mine next season are excellent.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Sept. 15.

The heavy rains of last week proved detrimental to many mines, causing them to suspend operations. Hence the sales of ore are below the average. Lead ore was in good demand at \$23.50 per thousand; zinc ore ruled at about \$24 per ton. Several tracts of undeveloped land were sold to newly organized mining companies. Following are the sales of ore made by the different camps.

Joplin mines, 1,142,231 pounds zinc ore and 161,590 lead; value, \$17,845.

Webb City mines, 720,910 pounds zinc ore and 88,030 lead; value, \$10,424.12.

Centerville mines, 538,650 pounds zinc ore and 39,130 lead; value, \$7,437.97.

Zincite mines, 200,650 pounds zinc ore and 11,230 lead; value, \$3,456.25.

Carthage mines, 501,000 pounds zinc ore; value, \$6,262.50.

Oronogo mines, 44,000 pounds zinc ore; value, \$560.

Galena, Kans., mines, 502,000 pounds zinc ore and 101,700 pounds lead; value, \$7,218.

All districts, total value, \$53,203.84. Watkins and De Graf's mine on the Holden land, 110,790 pounds of zinc ore.

Lea Holden, 17,630 pounds zinc ore. It was taken from a new prospect that bids fair to open up a large body of ore.

The Little Josie mine on the Windsor Mining Company's land, 13,000 pounds of zinc ore.

The Manhattan and Little Nugget mines on the Sterling Lead and Zinc Company's land, 39,300 pounds zinc ore.

One of the most important land sales of the week was made by Geo. H. Huchison & Co., that of the old Miller farm, four miles east of Joplin, to Kansas City parties.

Doctor King, of St. Louis, arrived in Joplin Saturday to look after his mining interests on Silver Creek and the Petra mine on the Empire land.

HORSE SHOE MINE.—This famous property on the Holden land has been recently started up, and prospecting in new ground has opened up a good body of ore.

MURPHY.—The owners of this property are preparing to open up some new ground west of the old workings. This is the property recently sold to Chicago parties for \$100,000.

OLD LEADVILLE HOLLOW.—This property located northwest of the city is being operated by Mr. Brockmeyer, of St. Louis, who is opening up some fine bodies of lead and zinc ore.

THE SOUTH JOPLIN LAND COMPANY.—A meeting was held last Friday and dividends to the amount of \$550 each to each stockholder were declared. The aggregate amount was \$17,600.

ROWING SPRINGS LAND AND MINING COMPANY.—Mr. T. H. Heist, of Harrisburgh, Pa., arrived in

Joplin last week, and will spend some time in looking after his interests. He is largely interested in this property. It consists of several good mines four miles southwest of Joplin.

NEWTON COUNTY.

Last Friday, your correspondent, in company with Mr. F. T. Crellen and Mr. Dorsey, of Joplin, and Mayor Agnew, of Kansas City, started on a tour of inspection of some large tracts of undeveloped lands in the wilds of Newton County. A drive of four and one half miles due south from Joplin brought us to the Shoal Creek Valley. Turning to the east and following the valley line, we passed many fine farms butting up against the limestone and flint bluffs. We found the general character of the country rough and broken, caused by breaks and depressions, all leading into Shoal Creek. At some points there are formed wide, open basins utilized as farming land, and surface indications, pointed strongly to the fact that the land will prove valuable for mining purposes at no distant day.

Lead mining, as I am reliably informed, has been carried on almost continuously in the Granby Camp for the past 40 years, and within the past two years new development has proved the ore bodies to extend in a northwest direction, or in other words there is a central mineral belt extending from Granby, on the southeast, to Lehigh, on the northwest, a distance of 35 miles.

MONTANA.

The visit to Montana of the Granite Mountain and Bi-metallic magnates is said by the Butte (Mont.) *Miner* to be for the purpose of formulating plans for increasing the reducing capacity of both the Granite Mountain and Bi-metallic works. It is said that as depth is attained in the Granite the ore becomes baser, and it is for the purpose of treating this ore to a higher percentage that increased facilities are to be added. There are at present at the mines L. M. Rumsey, president of the Granite Mountain; Paul A. Fusz, president of the Bi-metallic; A. B. Ewing, Charles Clark and J. M. Merrill.

CLARKE COUNTY.

MONTANA COMPANY.—Following is a statement of the Drum Lummon's operations for the month of August:

50-stamp mill, 3,716 tons crushed	\$35,400
10-stamp mill, 588 tons crushed	23,700
60-stamp mill, 2,900 tons crushed	26. 00
Total	\$87,000
Working expenses	56,000
Balance	\$30,500

MADISON COUNTY.

APEX AND ORO CACHE MINES.—Work on the tunnels that are being run to strike these mines at Summit is progressing very satisfactorily. The one on the Apex will tap the level at about 75 feet below the deepest work on the old shaft. The ore lies in three separate veins, the two extremes about 100 feet apart, and the center in nearly equal distance from each of the others, and the tunnel will cut all three.

MEAGHER COUNTY.

BIRENS COAL MINES.—In the 190-foot tunnel there is a solid breast of coal of 30 feet. As a smelting factor for the mines of Castle this coal field will be a large item. A bed of fire clay adjoins the coal deposits. It is from 2 to 20 feet thick, and so hard that it can be whittled. On being tested by a United States assayer it was pronounced to be perfect fire clay.

QUEEN OF THE HILLS.—This company has recently been incorporated. The capital stock is \$3,000,000 in 300,000 shares. The trustees are C. P. Downing, C. E. Conrad and Mr. Heitman. The claims owned by the company consist of the Queen of the Hills, Homestake and O'Brien. The first named property is penetrated by a 500-foot tunnel, all in ore, and a 250-foot upraise to the surface, showing ore from the grass roots. Another tunnel is in about 200 feet. There are also several shafts and a 100-foot tunnel on the O'Brien. It is also stated that fully 3,000 tons of 30-ounce ore is already on the dumps. Estimates say that there is \$250,000 in sight. On the lower Homestake tunnel there is a body 3 feet wide and 300 feet long, and in the same tunnel there is a cube of solid ore 8 feet wide and 40 feet long.

SILVER BOW COUNTY.

BOSTON AND MONTANA MINING COMPANY.—Though they are not all being worked, the Boston and Montana Company owns about thirty good mines and prospects within a mile of the city limits, says the Butte *Miner*. The principal properties from which the company's smelters now receive ore are the Mountain View, having a 1,000 foot shaft and containing two bodies of ore, each of which is from 30 to 40 feet in width; there are nearly 1,000,000 tons of ore in sight in this one mine alone; the old Harrison-Lloyd property, which is showing up immense bodies of high grade copper ore; the East and West Colusa, which are producing the bulk of the ore now being treated by the two smelters. The underground workings of the two latter are very extensive, each containing two large bodies of high grade copper-silver. The Moose, the ore of which is chiefly silver bearing, is also a large producer. Even after the company's smelter at Great Falls is completed the

production of about six claims will keep the whole works running, leaving about twenty-four more claims from which the company can obtain a supply.

NEVADA.

ELKO COUNTY.

COMMONWEALTH MINING COMPANY.—The stopes have improved a little during the week ending September 6th. Ore was hoisted during the week to the amount of 411 car loads. At the mill 85½ tons were worked, battery assays averaging \$200. At the concentrators 207 tons were banded, making 37,000 pounds of concentrates. The Union mill is running nicely; it crushed 166 tons, battery assays averaging \$106.50 per ton. The company shipped \$26,530.26 of crude bullion. There is on hand about \$12,500.

NORTH BELLE ISLE MINING COMPANY.—The stopes on the 150-foot level continue to produce a fair grade of ore. No. 1 crosscut, near the Belle Isle line on the 400-foot level, has been extended 11 feet. The north drift from the crosscut on the 500-foot level has been extended on the vein to the Nevada Queen line. From the same crosscut a drift has been extended 30 feet south on the ore, which is improving in width, and is high grade. The east crosscut from the top of No. 3 upraise from the 600-foot level has been extended 8 feet. No. 2 upraise from the same level is extended 13 feet; the face shows some fair-grade ore. The management started a raise on the ore in the north drift on the same level, which is looking very well.

STOREY COUNTY—COMSTOCK LODGE.

CONSOLIDATED CALIFORNIA AND VIRGINIA.—The shipments of ore to the Eureka mill for the week ending September 6th were 939 tons. The average assay value of the 960 tons worked was \$22.11 per ton. Bullion valued at \$35,871.72 was shipped. Little work was done in the mine during the week owing to necessary repairs to the hoisting and other machinery. Operations in all parts of the mine were resumed on the 8th.

OPHIR.—The winze sunk from the 1,300-foot level has reached the 1,465-foot level and has been connected with an old east cross-cut. The work of exploring the ore vein which the winze from the 1,300-foot level passed through will soon be resumed.

NEW MEXICO.

GRANT COUNTY.

(From our Special Correspondent.)

A movement is on foot to raise funds by private subscription for the purpose of carrying out an economic geological survey of Grant County.

One of the most important cases in mining litigation which has been known in New Mexico, the case of Bell & Stevens vs. Skillecorn & Snyder, resulted in a verdict for the defendants on September 6th. This was an apex case, involving the Pacific lode, or rather the south extension of the Pacific lode, owned by Bell & Stevens. Skillecorn & Snyder own an adjoining lode, the Pacific No. 2, under a location dating back to 1867, recently they effected a connection with the vein claimed and worked by Bell & Stevens, stopping out several hundred tons from the same, claiming that the Pacific No. 2 vein enters and occupies the fissure of the Pacific vein for a considerable extent to the exclusion of the latter.

ALHAMBRA MINE.—In the Bullard's peak district a remarkably rich lode of native silver ore associated with *Skutterudite* is now being worked by the Alhambra Mining Company, of Chicago, Ill.

SANTA FE COUNTY.

Arrangements are now being made to work the placer mines of Santa Fe County on an extensive scale. The depth of the placer ground there is greater than in any other part of the Territory, in some places being nearly 100 feet. Some of these places were worked by the early Spaniards.

SOCORRO COUNTY.

HARDSCRABBLE MINE.—This property is situated near the north end of the Magdalena range, 25 miles northwest of the city of Socorro, on a branch of the Atchison, Topeka & Santa Fe Railroad. It is now shipping 150 tons of silver-lead ore per day to Pueblo, Colorado.

NORTH CAROLINA.

GUILFORD COUNTY.

(From our Special Correspondent.)

NORTH CAROLINA STEEL AND IRON WORKS.—The directors have reduced the capital stock to \$350,000, and re-organized the company. Contracts for the erection of the furnaces are to be let and the work commenced at once. The officers have not yet been elected.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From our Special Correspondent.)

BION PYRITES MINE.—The introduction of pyritic smelting into the hills has brought into prominence mines rich in iron pyrites, the value of that ore being based on its fluxing qualities. While iron pyrites exists in almost every mine in the Hills, yet in but few has it been found in large enough quantities to establish a value for the property based on that ore alone. The Bion, which I visited a few days since, is probably one

of the most remarkable lodes of this ore found in any country. The regular dip, well defined hanging wall, as it is exposed in the tunnel, stamps it as a permanent vein. In the outcroppings on a level with the creek bed and a few feet below the level of the mouth of the tunnel the foot wall of a granitic slate is also clearly defined. It indicates that the vein is at least 75 to 80 feet wide. The workings consist of a main tunnel about 100 feet in length, at the end of which a cross-cut has been started to expose the width of the vein. The hanging wall at this point is clearly defined, and a solid vein of pyrites having a regular dip, exposed for a width of about 30 feet, but the foot wall which was apparent in the outcroppings had not been reached although all the work was being prosecuted in that direction with the view to ascertain the exact width of the ledge. The fact that iron pyrites is found here in such veins as the Bion is important, and will undoubtedly play a leading part in the approaching development and promised erection of smelters in this country. Last year the Deadwood & Delaware Smelting Company paid at the rate of \$5 per ton for the pyrites from this mine, \$3 for the hauling from the mine to the smelter and \$2 to the mine owners, leaving them a little over \$1 per ton after expense of mining was paid. In the near future the Black Hills and Fort Pierre Railroad will be built down Virginia and Bear Butte gulches, and directly in front of the Bion dump, surveys having already been completed. These pyrites can then be mined and shipped for \$1 a ton. In this mine between the pyrites and hanging wall is found a narrow casing of white quartz, showing some traces of pyrites, and in the chamber from which ore has been mined, a distance from the roof to floor, on a level with the tunnel, of about 20 feet, the ore increases in solidity and weight very perceptibly, thereby showing clearly increasing richness in minerals as depth is gained. The value of these pyrites for fluxing alone can be easily estimated, but the prospective value of the property of course depends largely on the richness of the pyrites in precious metals.

GOLDEN REWARD.—On this property I found working day and night shifts of miners to the number of twenty-five. The ore is being taken and treated at the chlorination works in Deadwood. The formation is a flat or blanket, pay ore being found between the grass roots to bed rock. The exact thickness cannot be stated, as the miners had not sunk to bed rock. The ore is found in chutes divided by porphyry dykes. In an open cut on the south end of the Golden Reward is a face of ore nearly 80 feet in length, and of average thickness of about 8 feet. A main tunnel about 500 feet in length has been driven from east to west, cross cutting three distinct chutes of ore and exposing the presence of a fourth chute, at which point work has been stopped and a winze started to determine the depth of bed rock. This tunnel almost cross cuts the entire distance between the side lines of the two claims forming the Golden Reward property. A large quantity of ore has already been mined from the first and third chutes, which have been stoped from the cap rock down. But in the second chute only a small quantity of ore has been mined because it carried nearly equal proportions of gold and silver, and the works at present only treat gold ore, losing the silver.

The average thickness of the ore bodies in these chutes, so far as developed, is about 12 feet, while the three chutes measure a total length of about 300 feet along the line of tunnel. The ore body exposed by the open cut is apparently the same as that in the third stope, judging from the direction, which is from southeast to northwest, the same as is followed by most all the ore bodies discovered in these camps up to the present time. A drift running about 85 feet into the hill from the northeastern end of the claim has not yet entered any ore body, although the outcroppings at the mouth of the drift indicated that one would be encountered. The grade of the drift, though, is very steep, and the impression among the old miners is that the drift is being driven below the deposit. The average yield of the ore from the Golden Reward has been at out \$22 a ton; but little work has been done until during the present year. Four thousand tons were shipped to Omaha for treatment last year, with satisfactory results.

THE GOLDEN WEDGE.—This fractional claim extending from the north end lines of the Reward, and located in the form of a cross across those end lines, is being worked and the ore treated at the same works. A shaft has been sunk 30 feet deep, but not to bed rock. At the bottom the deposit has been cross-cut by a drift 80 feet long, 30 feet of which drift cut through a porphyry dyke. The ore bodies exposed so far as work goes at present shows an average thickness of about 8 feet, and the ore so far has yielded richer than the Golden Reward.

The chlorination works has received its second barrel, and under the superintendency of J. E. Rothwell is now being set in place. This will increase the capacity of the works to forty tons daily.

PENNINGTON COUNTY.

SULLIVAN CONSOLIDATED GOLD MINING COMPANY.—A Huntington mill, having a capacity of 10 stamps, has been shipped to this company. The timber and lumber for the building is on hand, and as soon as the site is selected the mill will be

constructed. The motor power will be water. If the present Huntington mill proves to be a success, others of the same capacity will be added, until the capacity of 60 stamps is reached.

PENNSYLVANIA.

COAL.

CLEARFIELD COUNTY.

CLEARFIELD BITUMINOUS COAL CORPORATION.—This concern has just completed an electric pumping plant at its "Grass Flat" mine at Peale, says an exchange. This mine is opened by three drifts, Nos. 9, 10 and 11; the headings of Nos. 9 and 10 are parallel, but distant from each other about 1,200 feet. On the surface a stream runs between these two headings and affords no cover for their connection and without offering the necessary level for a water drift. Three thousand feet from the drift mouth heavy dips in both drifts were met, producing large quantities of water. To meet the difficulty by steam power would have necessitated the sinking of two 100-foot shafts, and the location of two pumps and boilers inside of mine. To obviate this, expedite the work and to avoid large first cost the electric plant was put in with marked success. The apparatus consists of an eight horse power Weston compound dynamo, a five horse power Weston motor for the pump in No. 9, and the same make of motor of one and a half horse power for the pump in No. 10.

The dynamo, with engine and boiler, is located at the mouth of the drifts and furnishes power to both pumps. The five horse power motor located 3,000 feet from the dynamo is running a Gould rotary bronze pump with a capacity of 15,000 gallons per hour, elevating the water 22 feet for a distance of 520 feet, whence it flows off by natural drainage. The smaller motor in No. 10 will control a centrifugal pump with a capacity of 2,400 gallons per hour, elevating 15 feet for a distance of 400 feet. The larger pump is in daily operation, running when needed to its full capacity and giving complete satisfaction. The small pump will be put in on completion of some connections in the mine. The system is said to have been attended with great success.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to September 12th, were as follows:

	1890.	1889.
	Gals.	Gals.
From Boston.....	2,036,952	3,289,317
Philadelphia.....	106,818,530	104,624,149
Baltimore.....	9,176,360	4,355,433
Perth Amboy.....	10,773,329	12,886,673
New York.....	298,474,844	324,473,008
Total.....	427,280,015	450,233,580

UTAH.

The shipments out from Salt Lake City for the week ending September 6th, inclusive, were as follows:

8 cars bullion.....	226,440 lbs.
49 cars silver and lead ore.....	2,051,830 lbs.
3 cars lead.....	81,426 lbs.
60 cars.....	2,359,686 lbs.

The receipts of the minerals in Salt Lake City for the week ending the 10th instant, inclusive, were to the total value of \$327,921, of which \$248,420 was in ore, and \$79,501 was in bullion. For the previous week the receipts were valued at \$304,884.26, of which \$149,251 was in bullion, and \$155,633.26 was in ore.

PARK RECORD.—Suit has been commenced by Morris Dosseldorf against Nicholas Treweek in the Third District Court to recover \$114,500, which is the amount of damages alleged to have been sustained by plaintiff by reason of defendant having, as alleged, failed to comply with a certain agreement, in consequence of which plaintiff was prevented from organizing a stock company in England to develop the Addenda, Victoria, Emma Jane, Othello, Iago, Hamlet, Ophelia, Appollo, Cleveland, Hendricks, Bayard and Manning mining claims, which are alleged to be owned by the plaintiff, defendant and R. C. Chambers, J. J. Daly, A. Hanauer, C. B. Rustin and L. A. Van Praag, and situated near the old Sampson Mining Company's ground.

BEAVER COUNTY.

HORN SILVER MINING COMPANY.—Ore sales of this company average \$1,200 a month. It goes mostly to Colorado.

SUMMIT COUNTY.

ONTARIO SILVER MINING COMPANY.—The product for the week was from ore sales, \$17,916.18; bullion, \$22,653.50 fine ounces, an approximate total of \$40,569.68.

The output during the first eight months of the current year included 649,468 ounces of bullion ores sales amounting to \$422,857, and during this time \$600,000 in dividends have been paid.

WASHINGTON.

OKANOGAN COUNTY.

FOURTH OF JULY.—John Welch, superintendent of this property, makes an encouraging report of its prospects. He states that a 14-inch streak of ore was struck a few days ago in the south drift

of the 100-foot level, and that from five samples taken from the ore knocked out by the first shot put into the vein the average was 355 ounces of silver per ton. The shoot is now 20 feet in length, and the face of the drift looks very promising. The shaft is now more than 150 feet deep and will reach the 200 mark by the 20th. The stock is owned by St. Louis, Helena and Butte parties.

WISCONSIN.

ASHLAND COUNTY.

(From our Special Correspondent.)

HURLEY, Sept. 15.

GERMANIA MINING COMPANY.—The disastrous fire occurring this spring in this mine has prevented, until recently, any work on this property. Development work is being carried on, and the shipments will be light for this season. The property, barring accidents, will be in excellent shape before navigation opens next year.

OLD NAKOMIS.—A lense of ore has been struck on this property, at a depth of 50 feet, in a new shaft near the railroad track. At the present writing, the extent, and therefore the value, of the find is unknown.

WYOMING.

SHERIDAN MINING DISTRICT.

A mining district has been organized at the head of the Tongue river in Wyoming, the scene of the recent placer stampede. The locality was christened Sheridan mining district and E. M. Thurmund was elected president with Frank Jenks recorder. It is said that unless an early winter is at hand to impede the work there will be a thousand men in the camp before December.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

(From our Special Correspondent.)

NELSON, Sept. 13.

EAST KOOTANIE DIVISION.

Although prospects are looking well in the mining districts around Golden and development is being vigorously carried on in many cases, it is extremely difficult to obtain reliable information of interest to outsiders. On the south fork of the Spillimachene river the Wellsaylmer Company is shipping galena ore—worth about \$300 per ton—from the Vermont claim to the carbonate landing on the Columbia. The Maggie McRae, on Jubilee mountain, is doing the same thing.

The smelter at Golden is nearly completed. The construction has taken somewhat longer than was anticipated, owing to delays in forwarding brick and other material. The smelter company is said to be endeavoring to secure the output of the Vermont mine.

Considerable excitement has been caused by the discovery of rich placer ground on Perry creek, a branch of St. Mary river. Three men are reported to have washed out \$624 in one day. The creek has been known to be auriferous since 1867. In that and the following years a large number of the claims yielded on an average one ounce a day per man. Much work was done in 1869, in which year \$1,500 worth of gold was obtained from 8 square feet of ground in the deeper layer of gravel which occurs below the "clay bed-rock." Water, however, greatly hindered work on this lower layer. Since 1869 mining has been carried on, from time to time, but only in a half-hearted fashion.

WEST KOOTANIE DIVISION.

BIG BEND DISTRICT.

COLUMBIA RIVER HYDRAULIC COMPANY.—The company is at work on Smith's creek, which joins the Columbia from the west opposite Gold creek, and satisfactory results are being obtained. More than enough gold dust is regularly obtained to pay for labor and supplies. A large clean-up is expected at the close of the season.

CONSOLATION MINING COMPANY.—This company, working on French creek—the chief center of the Big Bend excitement of 1866—has moved the shaft house, etc., from the old to the new shaft. Connection has been made with the drain tunnel, and the men are now driving toward the pay streak, which they will probably reach before this is in print.

LAST CHANCE.—The tunnel is now in about 920 feet; the face is sometimes in gravel, sometimes in clay and gravel.

OPHIR.—Men are at work on this claim; results not yet known.

HOT SPRINGS DISTRICT.

The wagon road to the mines from Ainsworth has been completed as far as the Kras claim, and will probably be extended this fall by the owners of other important claims. The construction of the railroad from Sproat on the Columbia river to Nelson is making but slow progress, owing, it is said, to the starvation wages paid the men. This is unfortunate, for upward of a thousand tons of ore are lying on the dumps at Hot Springs awaiting the completion of the railroad. The belief that the line will not be available this fall is likely to cause the suspension of much development work.

EMPIRE CONSOLIDATED MINING COMPANY.—The constitution of this company, recently or-

ganized at Spokane Falls, is as follows: A. E. Davidson, president; Simon Oppenheimer, vice-president; Martin Cooney, secretary. P. J. Nason, general manager; Lewis Craner, A. Nichols and M. Moloy, trustees. Ore from the Dictator, the claim upon which work is being done, runs from \$30 to \$90 per ton. The property of the company will be listed on the Spokane Falls Mining Exchange as soon as it has been placed on a paying basis.

FOURTH.—This claim has just been sold for \$7,000, the purchasers being connected with the Pacific Bullion Mining Company, of Spokane Falls. The claim had not been located two months ago.

REVELSTOKE MINING COMPANY.—This company will start up the Number One mine this week and will keep a full force on at the United claim. At the former mine a drift will be run north from the tunnel, which is now in about 400 feet, and connection will then be made with the incline shaft. The work is expected to drain the mine to a depth of 300 feet. Fully 500 tons of ore are lying on the United dump, and large quantities are also in reserve in the mine.

NELSON DISTRICT.

The force of the royalty clause in the "Act in aid of certain Railways," passed at the last session of the Legislature, seems to be generally misunderstood in the western mining centers of the United States. The clause reads: "The lieutenant-governor in council may grant to the company, upon condition of its complying with its act of incorporation, and with this act, and upon and subject to such regulations as may be made by order in council, the right for 25 years from completion of the railway, to exact and collect a percentage not exceeding 5 per cent. over and above working expenses, on gold and silver extracted from ores which may be found upon any of the lands granted by the lieutenant-governor in council to the company; but such percentage shall not apply to mines which may have been acquired before, and are held by mining companies or individuals at the time of the filing by the railroad company of its map or plan under the 'Railway Act,' showing the line of the proposed railway, nor shall such percentage apply so long as such mines are held by such mining companies or individuals, or their lawful successors in title." Not one of the railway companies has hitherto filed a map of its proposed road, and the clause is, therefore, inoperative at present. Not only this, but the feeling in the province is so strong that the clause will probably be repealed at the next session of the legislature.

Dr. A. R. C. Selwyn and Prof. Macoun, of the Geological and Natural History Survey; Chief Justice Begbie, Deputy Attorney-General Irving and other distinguished visitors spent a few days here recently.

EAGLE CREEK GOLD MINING COMPANY.—The company is now the owner of the White mine, bonded to it some time ago for \$35,000. The property is well situated for the purposes of the company, and in character generally resembles the Poorman, the ore from which is now supplying the Eagle mill. Only the oxidized portion of the ledge is now being milled, and the vanners, therefore, are idle. The new tunnel on the Poorman ground will be started north of the present workings, and after running 450 to 500 feet is expected to tap the ledge at a depth of 300 feet. The work will be done by machine drills. The power will be furnished by a Peiton wheel on Eagle Creek.

FORTY-NINE CREEK.—D. B. Huntley, formerly mill superintendent of the Poorman, and three other parties, have a force of men at work on Forty-Nine Creek putting in a hydraulic plant. The ground is about 9 miles west of Nelson and is in the center of the district where a number of gold quartz ledges have been located this year. From the tests already made, the pay on bed-rock is known to be good. "Five Dollar" placer ground has also been recently located on Bird creek, which runs into the Kootanie river $1\frac{1}{2}$ miles west of Forty-Nine Creek.

KOOTANIE BONANZA MINING COMPANY.—It is not yet known in what way the death of R. D. Atkins will affect the work of this company. No changes have occurred at the mines and it is probable that no important alterations will be made.

ROYAL CANADIAN.—The tunnels run on this property, lying between Eagle and Forty-nine Creeks, have shown up the ledge in good shape (although no depth has been attained owing to the slight inclination of the hill), and outsiders are endeavoring to secure the property. Future development must be done by a shaft and hoist, for tunneling is out of the question.

TOUGHNUT.—Work on this claim is proceeding but slowly, the owners being desirous of obtaining a "Crown Grant" before much further development is done. The owners of the Morning and Evening claims have filed an adverse, alleging that the Toughnut survey covers some of the ground included in their claims. A settlement of the dispute (in reality a trivial one) is not imminent. Mr. J. Campbell, of the Revelstoke Mining Company, visited the property recently, and is said to have made an offer for it; the amount is not known.

Several claims have been located along the line of the railway from Sprout to Nelson, but they are apparently of no importance.

CANADA.

(From our Special Correspondent.)
PROVINCE OF NOVA SCOTIA.

It is reported that English capitalists are arranging to purchase the Steel Company, of New Glasgow, a very prosperous concern, and to take over the ore and freehold and railway rights of the New Glasgow Coal, Iron and Railway Company, and to engage extensively in steel making, using the Pictou County iron ores.

CAPE BRETON.

COAL.—Much satisfaction is expressed at the purchase by the Dominion Government of a large and powerful transfer ferryboat for the Strait of Canso. By this means there will be an opportunity for the coal mines to ship coal during the winter.

GOLD.—The Windsor Junction Gold Mining Company, of Waverley, has started its mill for a working test. The first crushing of the Fifteen Mile Stream new mill gave 200 ounces.

CUMBERLAND COUNTY.

COAL.—Prospecting work, which has been quietly carried on for a year or so, has resulted in an important addition to the resources of the Springhill district. I. S. Hickman and others, of Amherst, have proved, over three square miles of the fifteen they control, five fine seams of coal, varying in thickness from three to nine feet. The seams are advantageously situated, being only three miles from the Intercolonial railway. The quality of the coal is good.

ZINC.—A discovery of zinc ore is reported from Pugwash in Cumberland County. No details are yet available as to the extent or value of the deposits. Zinc has long been known mineralogically in this district.

NEW BRUNSWICK.

A small crusher has been put up on the Tobique river to test some quartz veins. The manganese deposits at Markhamville are being worked steadily.

PROVINCE OF ONTARIO.

(From our Special Correspondent.)

PORT ARTHUR, Sept. 15, 1890.

Numerous sales of mining properties have taken place during the last week, principally to Duluth, St. Paul and Minneapolis investors, notably Savigney's locations, 17 and 18, containing 400 acres each, within four miles of Port Arthur; also several mining locations in the township of McIntyre.

Oliver Daunais has located eight miles of iron lands on the western extension of the Aticokau River along the projected line of the Ontario & Rainy River Railroad.

ATICOKAN IRON.—Mining locations R 403, R 404, and 212 X on the Aticokan River have been purchased by H. Pattison, Judge Miller and F. Bishoff, of Superior, Wis., and James Pickands, of Chicago; consideration, \$15,000 cash. This property will be placed under development at an early date. At the present date two railways have been projected into the Aticokan iron range. One, the Aticokan Iron Range Railway, from Carlstadt, on the Canadian Pacific Railway, a distance of about 40 miles. The other, the Ontario & Rainy River Railway. It has running powers over the Port Arthur, Duluth & Western Railway from Port Arthur to Sand Lake, a distance of 60 miles. From this point it will form an independent line to Rainy River through Moss township, traversing the entire length of the Aticokan range. Mine owners and operators on the range are, in all probability, to be favored within two years at the most, with not only good railway facilities, but keen competition between the roads.

AUGUSTA.—This very promising property is situated in the Silver Mountain group of mines, and comprises 80 acres. Some development work was done on it two years ago by explorers A. Gereaux and Silas Griffith. It showed the vein to carry argentite, zinc blende, and galena, giving good assays in silver. Mr. S. A. McLean, of Bay City, Mich., has recently purchased an interest in the property, and is erecting buildings, etc., preparatory to operations on a large scale.

KING MINE.—This property is situated in the Whitefish Lake group of mines, and is composed of the north half of lot 12, third concession of the township of Strange; it comprises 320 acres. There are six parallel veins on the property, only one of which has been opened. The surface outcropping of this vein is two feet wide. At a depth of eight feet, it widens to four feet, and maintains a uniform width from that point to the bottom of the 26-foot shaft. Assays of samples taken from different parts of the vein down to a depth of eight feet, gave results of from 40 up to 3,000 ounces of silver to the ton. The silver is principally in the form of native and argentite. The pay streak in the bottom of the shaft is eighteen inches wide. The Whitefish River runs along the southern boundary of the property, having a fall of 125 feet in passing from the west to the easterly limit. It

would furnish ample power for all mining purposes. The Port Arthur, Duluth & Western Railway passes within one mile of the property. As soon as it is completed to that point, which will be in November next, the first shipment of high grade ore will be made. It is the intention of the owner, Mr. Dunfield, of Petrolia, Ont., to test all the veins on the property and commence operations on an extensive scale at No. 1 vein.

OGEMA.—Professor Hillé, M. E., has just returned from the Black Bay district, where he examined this property. The vein is a very strong one, running parallel with a high granite ridge, and occurs along the line of contact of the granite bluff, and the gneiss that forms the valley below. The vein outcrops about half way up the bluff, and is partially covered by fallen rocks and debris. Its strike is a little north of east, and south of west. The pay streak is about fourteen inches wide at the surface, and nearly solid galena. About twenty feet below the outcropping an adit has been run, cutting the vein at this point two feet in width, and carries richer ore than at the surface. The galena is of a very high percentage. Assays from the surface outcropping showed it to carry 24 ounces of silver to the ton.

SILVER STAR.—The vein in No. 2 shaft is holding out its width and richness. The shaft is down 40 feet. A drift has been commenced from No. 1 shaft on the vein. Everything taken out is good pay ore, and as soon as machinery can be transported to the mine, over the Port Arthur, Duluth & Western Railway, the work of development will be greatly facilitated.

TERRACE BAY GOLD MINING COMPANY.—Arrangements are being made to begin active mining operations on this company's property. It consists of four locations of 400 acres each. Capt. Andrews and W. Roland, M. E., have completed an examination and tests of the different lodes. Assays yield from \$9.50 to \$17.50 per ton in gold, and from three to thirteen ounces in silver to the ton. Concentration tests made by C. Romer, chemist, Beaver Mining and Milling Company, go as high as \$500 to the ton. Twenty new veins have been discovered in the course of the development and exploratory work done by Messrs. Andrews and Roland.

TRANSVAAL.

Baron Eugene Oppenheim has recently visited the Transvaal for the purpose of founding a bank there. The Volksraad has ratified the concessions made Mr. Oppenheim by the government, and a company is started in Paris with a capital of 50 million francs. This fact, in view of Mr. Oppenheim's reputation as a very shrewd financier, seems to corroborate what is repeatedly stated about the natural resources of the country, that methodical working and capital are all they need to prove their vastness.

MEETING.

Scotch River Hydraulic Mill and Ditch Company, at Room 62, No. 309 Montgomery Street, San Francisco, Cal., September 24, at 1 P. M.

Utah Oil Company, special meeting for the purpose of increasing the capital stock, will be held at No. 126 South Main Street, Salt Lake City, Utah, September 27, at 12 o'clock noon.

DIVIDENDS.

Daly Mining Company, Dividend No. 43, of twenty-five cents per share, \$37,500, payable September 30th at the office of Lounsbury & Co., Mills Building, New York. Transfer books close September 25th and reopen October 1st.

Homestake Mining Company, Dividend No. 146, of ten cents per share, \$12,500, payable September 25th, at the office of Lounsbury & Co., Mills Building, New York. Transfer books close September 20th and reopen September 26th.

Ontario Silver Mining Company, Dividend No. 172 of fifty cents per share, payable September 30th at the office of Lounsbury & Co., Mills Building, New York. Transfer books close September 25th and reopen October 1st.

ASSESSMENTS.

COMPANY.	No.	When levied.	Dl'ng't in office.	Day of Sale.	Am't per share.
Alt., Nev.	39	Sept. 1	Oct. 7	Oct. 29	.50
Best & Belcher, Nev.	47	Aug. 21	Sept. 25	Oct. 17	.25
Big Hole Placer, Nev.		July 31	Sept. 4	Sept. 25	.01
Goodman, Nev.	8	July 23	Aug. 25	Sept. 25	.35
Humboldt, Nev.	1	Aug. 16	Sept. 29	Oct. 25	.01
Kentuck	22	Aug. 18	Sept. 22	Oct. 14	.30
Leigh Gravel, Cal.	1	Sept. 3	Oct. 13	Nov. 3	.25
Live Oak D. Gravel, Cal.	12	Sept. 3	Oct. 9	Oct. 31	.05
Locomotive	8	Aug. 13	Sept. 18	Oct. 7	.05
Mayflower, Gravel, Cal.	48	Aug. 4	Sept. 6	Sept. 29	.20
Occidental	7	Aug. 5	Sept. 11	Oct. 7	.25
Peer	9	Aug. 7	Sept. 12	Oct. 3	.10
Peerless	15	Aug. 14	Sept. 23	Oct. 14	.15
Teresa, Mex.	2	Aug. 13	Sept. 18	Oct. 8	.05
Utah Con.	10	Aug. 5	Sept. 15	Oct. 25	.25
Weldon, Nev.	3	Sept. 3	Oct. 9	Oct. 30	.10

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 353 and 354.

NEW YORK, Friday Evening, Sept. 19.

The mining stock market this week, in common with its neighbors on 'change, has felt the effect of the light money market. This effect has not manifested itself in an effort to realize on holdings, but has rather deterred buyers from entering the market.

The sales this week were 45,108 shares against 119,965 shares the week previous. Of this number 17,278 were dividend and 27,830 non-dividend stocks. The transactions were fairly well distributed among stocks. Notwithstanding this depressed condition of the market the dividend paying stocks have held the prices of last week. In almost every case where sales were made prices have held their own, and in not a few instances toward the latter part of the week under review, made a perceptible advance.

Coppers were dealt in to quite an extent on small sales. Of these we note 500 shares of Atlantic at \$23.75; Boston & Montana, 50 at \$58.38; Calumet & Hecla, 10 at \$309.13; Franklin, 50 at \$23.50; Kearsarge, 200 at \$19.13@19.38; Quincy, 20 at \$126.88; Osceola, 50 at \$44.63; Tamarack, 28 at \$205.50@206.25. These shares have not appeared on the board for some time, and as they are all dividend paying stocks, it looks as if even in these dull times there was money seeking investment.

Alice was on light demand, being called on Thursday at \$2.65 and closing to-day at \$2.50-10c below the point reached a week ago. Bulwer sold quite extensively at 30c., against 28c. last week. Caledonia was neglected at \$1.90. Catalpa was active at 45c., an increase of 2c. in a week. Consolidated California and Virginia was light at \$4.60. Eureka held its own at \$4.50; so also did Hale & Norcross at \$2.40. Horn Silver was active at \$3.00@3.65, the closing price of last week. This company has declared a dividend of 22 cents a share, payable September 30th, the books closing from September 23d to October 1. Leadville Consolidated leads the list in point of sales, there being transactions in 3,800 shares at 15c., the ruling price of last week. Little Chief opened at 40c., a falling off of 9c. over last week's prices, and closed at 43c., after having reached 45c. on Thursday. Ontario dropped \$2 per share, a single transaction of 50 shares taking place on Tuesday at \$48. Ophir closed last week at \$5.13, opened at \$5 and closed at \$4.95. Quicksilver Preferred opened at \$43.50, an advance of \$3.43, and closed at \$42. The Consolidated opened at \$8, dropped to \$7.50 and rallied to \$8.50. Savage tumbled from \$4 to \$3.80, with a single transaction on Monday. Sierra Nevada opened at \$2.70, a drop of \$1.30, and closed at \$2.95. Yellow Jacket maintained the price of last week, \$3.45.

The non-dividend paying stocks seemed to hold their own even better than their dividend paying brethren, although they were in less demand. Buyers confined their operations to favorites. This feature was marked throughout the week. Of the 53 stocks on the list, transactions are recorded in but 29, and of these sales many did not reach the figure of 500 shares.

Alta opened the week at \$1.20, an advance of 5c., went to \$1.40 and closed at \$1.35. Barcelona was quiet at 25c., an advance of 5c. Brunswick, an ever popular stock, was active; sales to the amount of 1,200 shares are recorded at 11c., 12c. @ 13c. Chollar closed at \$3.40 against \$3.50 of last week. Comstock T. was in light demand at 19 @ 18; there was no call for the bonds or scrip. The ruling price of Crescent was 20 @ 21c.; sales moderately active. El Cristo opened the week at 80c. and closed at 75c., last week's figures. La Cross was recorded with one sale of 2,300 shares, at '08c. Mutual Smelting and Mining Company developed a little strength on an active demand, closing at \$1.45. Occidental was traded in on Wednesday for \$2, dropping to \$1.85 on Thursday on small sales. Phoenix, of Arizona, was the most active stock on the list. It opened at \$1.10, dropped to 98c., and closed at \$1. Transactions of 10,200 shares are recorded. Potosi secured a single small sale at \$7, 25 cents below last quotations. Sullivan Consolidated was in fair demand at \$1. Sutter Creek was a favorite at the one figure, \$1.40. Utah was picked up in small lots at slightly advanced prices, closing at \$1.25.

Boston. Sept. 18.

(From our Special Correspondent.)

Copper stocks have felt the depressing influence of dear money the past week, and although prices have not materially declined the market has lapsed into a condition of dullness and inactivity which is not agreeable to operators. The strong position of ingot copper both at home and abroad does not indicate any serious decline as likely to occur in the near future of the stock market, and as stocks are well held by parties who have paid for them and who can afford to wait until more favorable conditions are present, we think they will not have to wait long or be disappointed.

There has been very little current gossip the past week regarding the Lake properties under development, but such reports as have come to hand are of an encouraging nature, and indicate that more of the same sort will be forthcoming.

Early in the week a dispatch was received from the Allouez, saying that the shaft house was destroyed by fire, that the loss was small and but little delay would be caused, but possibly the month's product might be somewhat reduced. The report had but little effect on the market. This stock is now in strong hands who believe in it, and who expect to get big prices for it in the future. Sales at \$8 1/2 @ \$8 3/4.

Arnold declined to \$1 1/2, but was not pressed for sale.

Atlantic sold at \$24 @ 22 1/2, but closed firm at \$23. A report was current that the lode was lean toward the north end of the mine, but the mining captain at the Atlantic says their drifts going north are as good as in any part of the mine.

Boston and Montana declined to \$57 1/2, but rallied to \$58 1/2, which was the closing price to-day.

Butte and Boston, although quiet, has ruled very steady at \$19 1/2 @ \$20. Some small sales early in the week were made at \$21.

Calumet & Hecla sold at \$305 1/2 @ \$309, closing sale at \$306.

A dispatch from Captain Johnson Vivian says of the Centennial "that the drift north of No. 6 shaft, first level, is showing a vein 9 feet wide, 7 feet of which will yield 3 per cent. of ingot copper." The report caused a demand for the stock, and it was rushed up to \$30 before all orders could be filled; later it declined to \$26 1/2, at about which price it is steady.

Franklin dropped from \$25 to \$23 with recovery to \$24 1/2. The Franklin is said to have a life of five years fairly assured, regardless of any new discovery of copper-bearing rock in its territory.

Kearsarge has been extremely dull at about \$19. Holders of this stock are anxiously awaiting developments of the mine, hoping soon to have good news.

Osceola is very firm at \$44 @ \$45. There is nothing new in regard to the mine, but previous good reports are confirmed.

Very little doing in Quincy, which sold at \$129 1/2 @ \$130 early in the week, and a small lot to-day at \$126. Tamarack sold as high as \$208, with later sales at \$205.

Huron has had a bad week, selling down from \$7 to \$5 1/2, with recovery to-day to \$6. The delinquent stock is advertised for sale on October 12th, and it is current report that an effort is being made to depress the price for the purpose of buying in the stock at about the assessment price.

National sold at \$2 1/2 @ \$2 1/4. Humboldt at 60c., Santa Fe at 67 1/2 @ 62 1/2 c., Tecumseh at \$4 1/2 @ \$4. Ridge at \$1 1/2. Silver stocks dull and lifeless. Catalpa sold at 40c. and Dunkin at 50c.

3 p. m.—Centennial sold up to \$27 this afternoon, and Franklin to \$24 1/2. Huron sold at \$6 1/2—closing, \$6 bid, \$6 1/2 asked.

Kearsarge advanced to \$19 1/2. The market closed with a fairly good demand for the whole list.

By Telegraph.—Calumet & Hecla, \$308; Tamarack, \$206; Osceola, \$46 1/2 bid; Boston and Montana, \$58 bid; Centennial, \$27 bid; Allouez, \$8 bid; Kearsarge, \$18.

Kansas City.		Sept. 15.			
Company.	Opening.	H.	L.	Closing.	Sales.
Argonaut.....	11	10	10	10	100
Bates-Hunter.....	4	4	4 1/2	4 1/2	5,000
Fig Six.....	9	10	10	10	100
Brownlow.....	.....	.....	.....	.....	.....
Cash Gold.....	14	14	14	15	2,000
Clay County.....	41	41	39	39	300
Diamond B.....	6 1/2	6 1/2	4 1/2	4 1/2	700
Hard Money.....	5 1/2	5 1/2	5 1/2	5 1/2	.....
Hunkl Dori.....	11 1/2	11 1/2	10 1/2	10 1/2	6,400
Iron Clad.....	17	17	16	16 1/2	700
Kansas City M. & M. Co.....	2.57 1/2	2.57 1/2	2.55	2.57 1/2	320
Kansas City, Col.....	11 1/2	11 1/2	10 1/2	11	1,100
King Jack.....	.....	.....	.....	.....	.....
Leavenworth.....	52	53	52	53	3,200
Little Nugget.....	1.04	1.05	1.01	1.01	1,800
Little Rule.....	64	65	64	65	.....
May Mazzeppa.....	74	80	74	80	3,200
Minnequa Zinc M. Co.....	16	16 1/2	15 1/2	16	1,800
Monte Cristo.....	6 1/4	6 1/4	6 1/4	6 1/4	5,000
Morning Glim.....	28 1/2	28 1/2	27 1/2	28	3,700
Pay Rock.....	5 1/4	5 1/4	5 1/4	5 1/4	300
Pelican.....	30	30	30	30	.....
Potosi.....	11 1/2	16 1/2	11 1/2	16 1/2	.....
Running Lode.....	17	17	17	17	.....
Sylph.....	17	19	17	19	.....
Total.....					36,200
Pit sales.....					600

†Bid. ‡Asked. * Buyer 30. † Seller 30. ‡ Seller 60. § Buyer 60.

Denver. Sept. 15.

(From our Special Correspondent.)

The return of President Taylor from Boston and the placing at par of the Mining Exchange Building Bonds have had a beneficial effect upon the home market of stocks, showing an increase in orders, sales, and prices. The general tone for the past few days indicates more confidence and greater interest from brokers, miners, and investors.

A meeting of all the members was held on Fri-

day night to celebrate the phenomenal success of President Taylor. The Exchange Building will be pushed as rapidly as possible. The question of the best method to pursue in regard to influencing greater interest and larger investments by capitalists, investors, speculators and other exchanges in the properties listed here received considerable attention. A number of schemes were agitated and some will be adopted. Undoubtedly the Exchange and the first class dividend paying mines listed will receive the attention they merit, as it can easily be seen that outsiders are showing more attention to our main industry. There is hardly a camp in the State to which has not been given new life in the past two or three months by preparations for operation or the working of long deserted claims, principally owned in the East and South. This is due partly to the advance in silver and lead, a great deal to new and cheaper methods of treatment, and lower rates by our railroads on low grade ores.

Prices and sales for the week ending September 13th:

Company.	Open- ing.	H.	L.	Clos- ing.	S.
Alleghany, Colo.....	12b	11 1/2	13	13	860
Amity, Colo.....	63b	64 1/2	64	64 1/2	1,600
Bangkok, C. B., Colo.....	10 1/2	9 1/2	9 1/2	9 1/2	15,200
Bates-Hunter, Colo.....	47	49	47	48	3,100
Brownlow, Colo.....	63 1/2	69	63 1/2	68 1/2	1,200
Calliope, Colo.....	34b	36b	33b	34	.....
Cash.....	40a	11b	10b	10	.....
Clay County, Colo.....	33 1/2	41	38	39 1/2	3,100
Hard Money, Colo.....	64 1/2	64 1/2	64 1/2	64 1/2	3,100
Little Rule, Colo.....	68	68	68	68	6,500
Matchless, Colo.....	200b	200b	150b	200	.....
May-Mazzeppa, Colo.....	76b	80	76	79	4,400
Mollie Gibson, Colo.....	50a	30b	25b	25	.....
Oro, Colo.....	50b	55a	100b	50	.....
Pay Rock, Colo.....	65b	65 1/2	65	65 1/2	10,500
Puzzler, Colo.....	12 1/2	12 1/2	11 1/2	10 1/2	1,300
Reed-National, Colo.....	70b	71	71	70	400
Running Lode.....	17b	18 1/2	16	18 1/2	600
Silver Cord, Colo.....	30b	30	30	31	1,400
Whale, Colo.....	22 1/2	25	23 1/2	23	1,400
Prospects:					
Argonaut, Colo.....	32b	32 1/2	23 1/2	27 1/2	10,400
Aspen United, Colo.....	65b	65	65	65	2,000
Big Indian, Colo.....	10b	11	11	10 1/2	2,000
Fig Six, Colo.....	6	7	6	6 1/2	3,400
Century, Colo.....	20b	20b	20b	20	.....
Claudia J. Colo.....	67 1/2	69	67 1/2	69	800
Nat. G. & O. Co.....	15b	16 1/2	15 1/2	16 1/2	800
Jiamond B., Colo.....	63 1/2	64 1/2	64	64	7,800
Emmons, Colo.....	23 1/2	23	24	24	9,500
Golden Treasure, Colo.....	16 1/2	16 1/2	16	15 1/2	1,000
Ironclad, Colo.....	17b	19	19	17 1/2	1,400
John Jay, Colo.....	15 1/2	17b	15	16	900
Justice.....	10b	12 1/2	10b	12 1/2	.....
Legal Tender, Colo.....	63b	63 1/2	63 1/2	63 1/2	1,000
Morning Glim, Colo.....	25 1/2	30	25	30	4,400
Park Consolidated.....	19b	19b	17b	18 1/2	.....
Potosi, Colo.....	69 1/2	69 1/2	69	69	5,600
Rialto, Colo.....	51b	54	52	50	400
Total for the week.....					102,900

*Buyer 60 days. †Seller 60 days. ‡Seller 30 days. §Asked. b Bid.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

Name of company.	Par value.	Bid.	Asked.
Asbland Iron Co.....	\$25.00	\$25.00	\$60.00
Aurora Iron Co.....	25.00	7.50	8.50
Champion Iron Co.....	25.00	115.00	125.00
Chandler Iron Co.....	25.00	41.00	43.00
Chicago & Minn. Ore Co.....	100.00	116.00	120.00
Cleveland Iron Co.....	25.00	16.50	17.50
Germania.....	25.00	11.50	12.00
Jackson Iron Co.....	25.00	110.00	125.00
Lake Superior Iron Co.....	25.00	68.00	72.00
Milwaukee Iron Co.....	25.00	5.50	6.50
Minnesota Iron Co.....	100.00	86.00	89.00
Montana Iron Co.....	25.00	9.00	10.00
Norrie (Metropolitan).....	25.00	73.00	75.00
Odanab Iron Co.....	25.00	23.00	22.00
Pittsburg Lake Angeline Co.....	25.00	175.00	185.00
Republic Iron Co.....	25.00	41.50	42.50

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Mfg. Co.....	.....	.....	.....
Grayling Gold & Silver Co.....	\$25.00	.....	.....
Michigan Gold Co.....	25.00	\$1.35	.....
Peninsula Gold & Silver Co.....	25.00	.....	.....
Ropes Gold & Silver Co.....	25.00	1.75	\$2.00

* Assessment paid.

Salt Lake City.

Company.	Open- ing.	High- est.	Low- est.	Clos- ing.	Sales.
Alice, Mont.....	2.50 b	2.50 b	2.50 b	2.50 b	.....
Alliance, Utah.....	.....	.....	.....	.....	.....
Anchor, Utah.....	3.50 b	6.00 a	3.50 b	5.50 b	.....
Apex, Utah.....	17 b	19 a	17 b	17 b	.....
Barnes, Utah.....	.04 b	.04 b	.03 b	.03 b	300
Cent.-Eureka, Ut.....	.....	.....	.....	.....	.....
Congo.....	.12 a	.12 a	.12 a	.12 a	.....
Crescent, Utah.....	.25 b	.27 a	.23 b	.23 b	.....
Daly, Utah.....	23.50 b	23.50 b	23.50 b	23.50 b	100
Glencoe, Utah.....	1.25 a	1.25 a	1.00 a	1.15 a	.....
Horn Silver, Utah.....	3.50 b	4.50 a	3.50 b	3.50 b	.....
Malad Con., Id.....	.01 1/2 b	.04 a	.01 1/2 b	.01 1/2 b	.....
Mammoth, Utah.....	3.70 b	3.80 b	3.70 b	3.80 b	100
Nabob.....	.05 b	.05 b	.05 b	.05 b	.....
Northern Spg.....	.....	.....	.....	.....	50
Ontario, Utah.....	47.00 b	47.00 b	47.00 b	47.00 b	.....
Stanley.....	.....	.....	.....	.....	.....
Utah L. & C. Co.....	8.00 b	8.25 b	8.00 b	8.25 b	100
Utah & Mont.....	.05 b	.07 a	.05 b	.05 b	.....
Utah Oil Co., Utah.....	.20 a	.20 a	.12 1/2 a	.12 1/2 a	.....
Woodside, Utah.....	.....	.....	.....	.....	.....
Total.....					650

*Buyer, 30 days. †Seller, 30 days. ‡Assessment paid. a Asked, b bid.

Spokane Falls.

Prices, opening, closing, and sales during the three days ending September 12th, 1890:

Company.	Opening.	Closing.	Sales.
Pacific Bullion.....	15	a10½	10,000
Nesmith.....	b19	a21	17,500
Silver King.....	b11	a11½	3,000
South Bonanza.....	b28	a29	14,500
Old Abe.....	a19	a21	18,600

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The petroleum market continues to be dull and featureless. No speculation is visible either in Pennsylvania or Ohio certificates, and many traders are greatly disappointed at the flat failure of the listing of Buckeye certificates. Easier money may help bull speculation.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 13.....	81½	82	81½	82	32,000
15.....	82½	83¾	82	83¾	142,000
16.....	83½	84½	82½	82½	105,000
17.....	82	82	81¾	81¾	30,000
18.....	82	82¼	81¾	81¾	47,000
19.....	81	81½	80½	81½	50,000

Total sales in barrels..... 406,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 13.....	82½	83¾	82½	83¾	27,000
15.....	83½	84½	82½	84	30,000
16.....	84½	85	82½	82½	37,000
17.....	82½	82½	81½	82½	15,000
18.....	82½	82½	82	82	32,000
19.....	81½	82	81½	81½	52,000

Total sales in barrels..... 193,000

BUCKEYE PIPE LINE CERTIFICATES.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 13.....	34	34	34	34	5,000
15.....	34½	34½	34½	34½	45,000
16.....	34	34	34	34	5,000
17.....	33¾	33¾	33¾	33¾	5,000
18.....	33¾	34¾	33¾	33¾	5,000
19.....	34	34	33½	34	36,000

Total sales in barrels..... 101,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 13.....	33	33½	33	33½	2,000
15.....	35	35	34½	34½	4,000
16.....	34½	34½	33½	33½	8,000
17.....	34	34	34	34	3,000
18.....	34	34	34	34	3,000
19.....	33½	33½	33½	33½	5,000

Total sales in barrels..... 22,000

COAL TRADE REVIEW.

Statistics.

NEW YORK, Friday Evening, September 19. Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending September 13th, 1890, compared with the same period last year:

Regions.	Sept. 13, 1890.	Sept. 14, 1889.	Difference.
Wyoming Region.Tons	405,239	380,249	Inc. 24,990
Lehigh Region .. "	135,173	124,616	" 10,557
Schuylkill Region. "	259,949	255,597	" 4,352
Total.....	800,361	760,462	Inc. 39,899
Total for year to date..	23,387,431	23,901,092	Dec. 513,661

STATEMENT of anthracite coal shipments for month of August 1890, compared with same period last year, compiled from returns filed by the mine operators:

	August, 1890.	August, 1889.	Difference.
Wyoming Region.Tons	1,749,217	1,880,836	Dec. 131,619
Lehigh Region .. "	578,770	617,208	Dec. 38,838
Schuylkill Region .. "	964,064	1,127,637	Dec. 163,573
Total.....	3,291,051	3,625,681	Dec. 334,630

	For year, 1890.	For year, 1889.	Difference.
Wyoming Region.Tons	11,333,073	11,334,304	Dec. 571,231
Lehigh Region.....	4,041,830	4,057,249	Dec. 15,419
Schuylkill Region .. "	6,562,789	6,408,533	Inc. 153,927
Total.....	21,937,692	21,800,090	Dec. 437,723

The stock of coal on hand at tide-water shipping points, August 31st, 1890, was 760,811 tons; on July 31st, 1890, 751,231 tons; increase, 9,580 tons.

PRODUCTION OF BITUMINOUS COAL for week ending September 31st and year from January 1st:

WESTERN SHIPMENTS.			
	1890.	1889.	Difference.
Pittsburg, Pa.....	11,768	575,283	438,827
Westmoreland, Pa.....	10,511	831,299	1,011,614
Monongahela, Pa.....	12,177	350,872	283,272
Total.....	34,456	1,757,454	1,736,713
Grand Total.....	323,898	12,578,276	10,471,041

EASTERN AND NORTHERN SHIPMENTS.

	1890.		1889.
	Week.	Year.	Year.
Phila. & Erie R.R.....	1,654	92,457	49,331
Cumberland, Md.....	*81,749	2,650,873	2,150,841
Barclay, Pa.....	3,118	106,253	77,918
Broad Top, Pa.....	10,610	352,036	224,392
Clearfield, Pa.....	67,458	2,635,198	2,159,131
Allegheny, Pa.....	21,634	911,934	552,808
Beach Creek, Pa.....	33,430	1,310,441	1,046,408
Poahontas Flat Top.....	36,254	1,332,595	1,269,914
Kanawha, W. Va.....	133,445	1,428,975	1,263,555
Total.....	289,352	10,820,822	8,734,328

* Estimated.

† Week ending Sept 7.

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending September 13th, and year from January 1st, in tons of 2,000 lbs.: Week, 90,667 tons; year 3,715,910 tons; to corresponding date in 1889, 3,016,864.

Anthracite.

The consumer has at last appeared in the market, and retail dealers state that they are beginning to cart away to cellars their large stocks of hard coal bought at summer prices. In several quarters it is stated that the trade in broken coal is dull, indicating a falling off in consumption. All the other sizes are moving well, egg especially. Up to September 13th, the output for the year, as compared with the corresponding period of last year, shows a decrease of 513,661 tons, although the output for the week ending on that day was 39,599 tons more than for the corresponding week of 1889. In view of the better feeling prevailing, little is now heard of selling under the agreed scale.

The sales agents will meet on the 25th inst., when it is expected the scale prices will be increased. They are for September: Stove, \$4.15; egg, \$3.90; chestnut, \$3.75; broken, \$3.50. Egg and buckwheat continue weak at varying prices.

Bituminous.

The market is fairly full of soft coal and there is plenty on the way. Business, outside contract supply, is dull and prices are inclined to be weak. The uneasiness about expected labor troubles in the Clearfield region does not seem to have been entirely allayed by the agreement arrived at by the joint convention of operators and miners at Altoona last week. One large soft coal operator in New York this morning received a dispatch from the mines, advising that as much coal as possible be mined at once, as there was a probability that more trouble was brewing among the miners. The strike which has now been on for three months at the mines of the Westmoreland and the Pennsylvania gas and coal companies' mines, has assumed a different phase during the week. The mine owners have notified the men to remove their tools and vacate the companies' cottages. Several hundred green men to work the mines are to be shipped at once from New York.

Vessels are plentiful from Baltimore to all points East at former rates, while from Philadelphia to Boston at 70 cents they are five cents lower than ever before.

It is admitted on all hands that no one is getting the scale prices agreed on, which are: At Baltimore, \$2.40@2.50 f. o. b.; Philadelphia, \$2.50@2.60; in New York harbor, \$3.25; alongside, \$3.50.

Boston.

(From our Special Correspondent.) Sept. 19. The anthracite coal market continues to improve and is now very good. After many weeks the situation favors sellers of coal, but stocks are still so large that agents are all free sellers at or close to their asking prices. For good stove coal \$3.90 is a bottom figure f.o.b. at New York, and it is only occasionally that anything desirable is offered in this market at less than \$4, while some of the companies are firm at \$4.15. There is talk now of an advance October 1st of 25 cents on stove and 10 cents on other sizes, but it is doubtful if much coal is sold at more than present circular rates, and the advance, if made, will be for the purpose of enabling companies to sell closer to the present circular. The prospects of an advance are likely to cause an improved demand for the rest of the month. Steam sizes, both large and small, are not so strong as domestic sizes.

The market for soft coal is without important movement this week. If coal only came along to tidewater more rapidly this would be a model season for the bituminous coal men. About every other condition is favorable to the shippers. The prices remain at from \$2.25 to \$2.40 f.o.b. The price on board cars at this port is about \$3.60@3.70. The cargo demand for soft coal is not very large, but there is some business doing all the time.

The very low freight rates continue, although charters from Philadelphia and Baltimore are not the lowest of the season. New York rates are down to 50 cents; Philadelphia 75 cents; Baltimore \$1. Retail trade is rushing again now that the long storm is over. Rates are unchanged, and no advance is likely so long as the combination is as loosely held as at present. This will more plainly appear, however, if wholesale prices are advanced October 1st.

The receipts of coal at this port for the week have been as follows:

	For the week.		For the year.	
	1890.	1889.	1890.	1889.
Anthracite.....	36,973	8,638	1,171,068	1,103,128
Bituminous.....	26,902	15,375	684,757	677,245
Total.....	63,875	22,073	1,855,825	1,780,373

Buffalo.

Sept. 18.

(From our Special Correspondent.) Quotations are unchanged. The supply of both hard and soft varieties is ample.

For the fiscal year ending June 30th, 1890, the exports of coal to Canada were of the value of \$4,768,549, as compared with \$5,366,643 for corresponding period in 1889.

The bids for coal at Toronto last week for elty use were \$5.50 for anthracite (size not mentioned), \$5.50 for Briar Hill and \$5 for bituminous lump perton.

Would it not be a good idea for the producers and dealers in bituminous coal to bend their energies looking to the solving of the problem of consuming the smoke produced by the burning thereof, and thereby silence the complainants of the smoke nuisance?

Scarcity of coal cars is the cry of many handlers. Why this should be is a mystery in view of the fact of the many large orders for them that have been filled lately, and the lessened movement of grain, etc., for many weeks past.

On Saturday last 2,000 tons of coal were loaded from chutes into a propeller in two hours.

Lake freights quiet and steady at unchanged quotations, except to Superior, the rate for which declined 10c. To-day and yesterday there was no demand for Lake Superior boats. The shipments of coal from this port by lake from September 11th to 17th, both days inclusive, were only 50,450 net tons, distributed about as follows: 30,100 to Chicago, 10,960 to Milwaukee, 2,400 to Toledo, 4,350 to Superior, 300 to Sault Ste. Marie, 600 to Kincardine, 800 to Kenosha and 850 to Racine; total thus far this season, 1,257,635 net tons. The rates of freight were 60c. to Chicago, 50c. to Milwaukee, 30c. to Superior and Toledo, 40c. to Saginaw and Gladstone, 60c. to Racine, 70c. to Kenosha, 65c. to Sault Ste. Marie and 50c. to Kincardine.

Coal movement by canal for second week in September: Receipts 1,369 net tons; shipments 693 net tons.

Chicago.

Sept. 17.

(From our Special Correspondent.) The movement of coal has begun in earnest in the Chicago market and with strengthening prices. Owing to the unprecedented scarcity of cars for moving all grades of coal and coke, virtually it is useless at present to send orders from the West. Stocks in this city are rapidly diminishing in consequence, and the shortage, now estimated at 150,000 tons, is daily increasing. Fears are entertained that sufficient amounts cannot be brought forward in time to meet near future requirements. Prices are unchanged, but will, of course, be advanced unless the conditions of supply and demand are brought into greater harmony.

We quote as yet: Large egg, \$6.25; small egg, range and chestnut, \$6.50 at retail, on cars f.o.b. Chicago grade, \$5.25; stove, range and chestnut, \$5.50; Lehigh lump, \$7.

The trade in bituminous is suffering from the same causes. Demand is good, and business would be in good condition if cars were plentiful. Operators are far behind with their deliveries, and to make matters worse, the miners of Brier Hill coal have gone on a strike, and no output from there is coming forward. The increasing demand cannot be met much longer unless relief is quickly afforded; prices are firm but unchanged. They are, per ton of 2,000 pounds: Green and Sullivan County (Ind.), shaft, \$2.25@2.40; Jackson Hill, \$3.25; Hocking Valley, \$3.20; Ohio Central, \$3; Erie, Brier Hill, \$4.25; Indiana Block, \$2.45@2.50; Youghiogheey, \$3.40; Sunday Creek, \$3.20. An increasing demand is also reported for coke, and is met by an inadequate supply, caused by the difficulties in transportation already referred to. Prices at ovens are: Furnace coke, \$2.15; foundry, \$2.45; crushed, \$2.65; all per ton of 2,000 pounds f.o. h. cars. In this market there are no changes in quotations. Connellsville 72 hour, \$5.20; domestic crushed; \$4@ \$4.25; Elk Lick, \$4.25.

Pittsburg.

Sept. 18.

(From our Special Correspondent.) Coal.—The demand for local purposes is on the increase. Prices are steady, with an increased transaction. Large consumers of natural gas are still calling for more. The second coal shipment by the Ohio River will exceed 3,000,000 bushels. Prices in the lower markets have declined one cent per bushel.

Nominal rates in pools:
Per 100 bushels. | Per 100 bushels.
1st pool.....\$4.75 | 3d pool.....\$3.90
2d pool..... 4.50 | 4th pool..... 3.25
Railroad coal, \$5.00@5.50.

Connellsville Coke.—Market is very firm since the weather has become cooler. The demand exceeds the supply which coke men can furnish, owing to the scarcity of cars. Production keeps pace with the demand. The stock in the yard continues to accumulate. These car famines are getting very numerous. Last week's shipments averaged 983 cars per day, as follows: Points west of Pittsburg, 3,400 cars; Pittsburg and river points, 1,450 cars; east of Pittsburg, 1,050 cars; total, 6,000 cars, an increase of 50 cars over previous week. August output was 28,510 cars.

The rates were for 2,000 pounds f.o.b. cars at ovens: Blast furnace coke, \$2.15; foundry coke, \$2.45; crushed coke, \$2.65.

Freights to Pittsburg 70c. per ton; Mahoning and Shenango Valleys, \$1.35; St. Louis, \$3.35; Cleveland, \$1.70; Chicago, \$2.75.

METAL MARKET.

NEW YORK, Friday Evening, Sept. 19.

Prices of silver per ounce Troy.

Sept.	Sterling Exch'ge.	London Pence.	N. Y. Cts.	Sept.	Sterling Exch'ge.	London Pence.	N. Y. Cts.
13	4.84	53	1.15	17	4.84	53½	1.16
15	4.84	53½	1.15	18	4.84	53 7-16	1.16
16	4.84	53½	1.15½	19	4.84	53½	1.15½

Council Bills advanced 3/4d. on Wednesday. Silver market has been steady and advancing in London, but our tight money market here has caused some liquidation on Exchange in certificates which has tended to depress silver. Stock of certificates outstanding has decreased some 700,000 ounces this week.

The United States Assay Office at New York reports total receipts of silver for the week to be 40,000 ounces.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	H.	L.	Sales.
Sept. 13	115 3/4	115 3/4	165,000
Sept. 15	115 3/4	115 3/4	363,000
Sept. 16	116 1/4	115 3/4	225,000
Sept. 17	116 1/4	116 1/4	230,000
Sept. 18	116 3/4	115 1/2	270,000
Sept. 19	116 1/4	115 3/4	202,000
Total sales			1,455,000

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount and it remained at 4 per cent. During the week the bank lost £496,000 bullion, and the proportion of its reserve to its liabilities was lowered from 45.48 to 44 per cent., against an advance from 42.29 to 42.52 per cent. in the same week last year, when its rate for discount was 4 per cent. September 18th the bank lost £237,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 11,000,000 francs gold and a loss of 2,000,000 francs silver. The weekly statement of the Imperial Bank of Germany shows a specie loss of 7,140,000 marks.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	87	90
Mexican dollars	89	91
Peruvian soles and Chilean pesos	81 1/4	82 1/4
English silver	4.82	4.86
Five francs	.94	.95
Victoria sovereigns	4.84	4.93
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.78	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.15 3/4	1.16 1/4

Copper.—We have hardly anything of interest to report. The market is quiet, but very firm, with quotations unaltered, Lake copper being 17c., Arizona ingot copper 15 1/2@15 3/4c., and casting copper 14 1/2@14 3/4c. There is no pressure on either side to sell, and while deliveries are going on at a very fair rate, there are nowhere any surplus stocks worth speaking of.

Our cable reports from London show an increase in the visible supplies for the first half of the month of 500 tons, but at the same time it is expected that by the end of the month a small decrease will be shown. Chili bars, which we reported last week at £60 17s. 6d. @ £61 for spot went up early in the week to £61 10s. to £61 12s. 6d., but afterwards a slight reaction set in, and prices closed again firmer at £61 7s. 6d. @ £61 10s. spot and £61 15s. @ £61 17s. 6d. futures. For manufactured sorts our quotations are as follows: Best selected, £67 10s. @ £68, strong sheets, £73 @ £73 10s.; English tough, £64 10s. @ £65; India sheets, £68 @ £69, and yellow metal, 6 1/2d.

The exports of copper during the past week were as follows:

To Have.	Copper.	Lbs.	Value.
S. S. La Bretagne	376 pigs	113,248	\$17,000

Tin.—The past week will probably be long remembered by everybody in the trade. For several weeks past we have reported that stocks were very low, but evidently no one anticipated them to be as low as they have now proved themselves, and while it cannot be said that the market was "cornered," nevertheless it is a fact that the market "cornered itself." Stocks, it appears, are in the hands of a few, and we learn that during the week a prominent firm was buying all that could be had for spot or September, and, as a consequence, the market became excited and large advances in prices took place daily. Sales were made on Sat-

urday at 22:20, and the 23c. limit was reached on the 17th; 23:30@23:50 was paid on the 18th, and to-day 24 was paid. Early October delivery has been sold at 24, and our closing quotations are spot and September 24 1/2 @ 24 1/2, early October 24, second half October 23 1/2, November 22 1/2, and December 22 1/4.

A similar state of things has existed in London, where there is also a great scarcity of spot and near delivery tin, and in consequence prices have advanced to £101 10s. @ £101 15s. spot and £99 10s. @ £99 15s. for three months, or about £2 cheaper. At the higher prices no doubt shipments from the east (which have been light for some months past) will increase, but it is evident that for some weeks to come we shall see a great scarcity of this metal.

Lead.—The week opened with a very firm tendency and at greatly hardening prices, and when it transpired that the old stocks of lead had entirely disappeared, and that one holder, who was supposed to have about 5,000 tons of lead in store in New York, was partially sold out, the market quickly advanced to 5c., and even at that figure no more lead is obtainable. In the meantime prices had risen in the West, comparatively, much quicker than here, and St. Louis already reported 4:90 when prices had not touched 5c. It is now established beyond doubt that there is such a scarcity of lead that we shall be compelled to import foreign lead. This state of affairs is undoubtedly brought about by the deplorable act of Congress in shutting out Mexican ores. We quote for spot and October 5:10 buyers with scarcely any sellers. As no foreign lead can be imported below 5:15@5:20, it looks as though prices would advance still further.

Chicago Lead Market.—Everett & Post telegraph us as follows: Lead has been scarce in this market all the week, and for this reason trading has been light. There has been a fair inquiry, but the bid price, 4:90, has brought out but little lead. The closing is very firm and offerings light. The market is quiet at 5c.

St. Louis Lead Market.—John Wahl & Co. telegraph us as follows: Lead is as scarce as ever and spot lead practically unobtainable, except at rates equal to New York prices. Spot and September lead is selling at \$4.95; October lead sold lightly at \$4.90.

Spelter.—There is also a scarcity of this metal, and makers are almost all sold out up to the end of October, and we have to quote prices 5:60 @ 5:65c.

Antimony remains firm with Cookson's at 22 1/2 @ 23c., Hallett's 20 @ 20 1/4c., and L. X. at 20 1/2c.

Nickel.—There is no alteration.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, September 19.

The past week has brought not the least improvement in this iron market, and little remains to be said of it except that buyers and sellers are a good distance apart in every branch except structural iron and pipes and tubes. The busy season is unusually late coming along, and the reason is not clear. In some quarters it is attributed to the indecision concerning the tariff, while in others the stringency in the money market gets the credit for the existing state of affairs.

American Pig Iron.—Although most people in the trade quote a latitude of \$1 in the price of all grades, and although there is practically nothing to do, there is very little to be had at anything short of the higher figure. Sellers try to get yet another dollar a ton for named brands for early delivery, but buyers fight shy. The market is in such a peculiar condition that the oldest dealers admit themselves unable to account for it. With every reasonable ground for expecting an early rise, and with unusually short stocks, sellers have been awaiting buyers, and buyers have been keeping religiously away as though expecting an early slump in prices, or tacitly admitting that consumption has temporarily fallen off. It is stated that the disturbance in the building material market by the brick imbroglio has had considerable effect on the demand for pig iron, the use of which for structural iron in buildings has been increasing so rapidly of late. Certain it is that despite the scarcity of No. 1 Southern and No. 1 Northern sellers cannot get a cent a ton more than when it was plentiful, and the attempt scares buyers away at once. We quote: No. 1 Southern, \$17 @ \$18; \$16.25 @ \$16.50 for No. 2, and \$15.25 for No. 3. Southern carwheel iron, Nos. 3 and 4, brings \$20.25, with nothing doing of any importance. In Northern pig iron little is doing, but quotations are made of \$18 @ \$18.50 for No. 1, and one dollar less for No. 2.

Scotch Pig Iron.—Very small quantities are arriving, and very little is asked for at present prices, which show a tendency to rise on the other side. Prices nominally are: No. 1 Coltness, \$24.50; Dalmington, \$22; Eglinton, \$21.25.

Spiegeleisen and Ferro-Manganese.—The stocks on hand indicate that dealers provided themselves last year when prices were low, as scarcely any of either metal is arriving now. The demand is, if anything, lower than it has been for some months, though prices remain firm at last

week's figures, which were: For 20 per cent. German spiegeleisen, \$32.50; English, \$33.25. For 80 per cent. ferro-manganese, \$70 @ \$74.

Steel Rails.—Steel rails are a shade weaker, and cannot be quoted any longer at \$31, the price which has prevailed for several months. A large order for Western delivery is reported at \$30. At this figure the market is anything but strong, and the absence of expected winter orders—or, indeed, of any orders of any volume—makes the outlook for the immediate future anything but cheerful.

Rail Fastenings.—This market maintains its long-time dullness. Prices have weakened two to three per cent., and dealers report an entire lack of business. We quote, nominally: Spikes, 1.95 @ 2c.; angle plates, 1.72 @ 1.76c.; bolts and square nuts, 2.70c.; hexagonal nuts, 2.90 @ 2.95c.; complete joint, iron and steel, according to weight.

Tubes and Pipes.—Business is reported good, though nothing exceptional has occurred during the week. Ruling discounts on car lots: 47 1/2 per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47 1/2 on lap, galvanized; 40 on 1 1/2-inch boilers; 50 for 2 to 4-inch and 52 1/2 on larger than 4-inch casing, all sizes, 50 per cent.

Merchant Steel.—The week has brought with it an improvement in business, with inquiries from quarters which indicate that the summer dullness is over. Prices, which have recently been weak, have stiffened, though not changed. An early rise is looked for. Prices remain: Best English tool steel, 15c. net; American tool steel, 7 1/2 @ 10c.; special grades, 13 @ 20c.; crucible machinery steel, 5c.; crucible spring, 3 3/4c.; open-hearth machinery, 2 3/4c.; open-hearth spring, 2 3/4c.; tire steel, 2 3/4c.; toe calks, 2 3/4c.; flat file, 4 1/2c.; mill file, 5 1/2c.; taper file, 7 1/2c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—The active demand which has almost emptied the market during the summer has ceased. Buyers seemed to have abandoned this market for the time being, and small stocks which have been held for an expected rise to \$26.50 or \$27 can now be secured at \$25.25 @ \$25.75, which is the ruling price, though not a single transaction at these or any other figures is reported for the week.

Structural Iron and Steel.—The trade is now beginning to feel the effect of the lack of brick in building. The expected stoppage in many large building operations has had the result of slowing down the activity which has prevailed this year. It is expected that deliveries will in many quarters be temporarily stopped, and if so the manufacturers must necessarily feel the effect. In other respects business continues good and the market is firm. Universal plates, 2:20 @ 2:28c.; bridge plates, 2:15 @ 2:20c.; angles, 2:10 @ 2:15c.; tees 2:65c.; beams, 3:10c.

Chicago, Sept. 17.

(From our Special Correspondent.)

The demand for iron and steel in this market surpasses anything ever before experienced in Chicago; but for all the remarkable activity in this direction there can be brought forward no cause other than solid legitimate business prosperity. The demand is evenly distributed, absorbing the immense output without special requirements from any one source of consumption. All indications point to a healthy market during the remainder of the year.

Pig Iron.—The past week does not show a heavy amount of purchases, but the heavy consumption goes steadily on. Very few concessions are being made, for the reason that but a limited amount of pig is now changing hands. Softeners are in good request for small lots. Most prominent Southern furnaces are instructing their agents here to reject orders for future delivery, not caring to be loaded up too far ahead at present figures. Prices are firm, without alteration from last week. We quote to-day for cash per ton of 2,240 pounds, f.o.b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, \$20 @ \$21; Lake Superior coke Bessemer, \$18.50; Lake Superior coke Bay View No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$17; No. 3, \$15.50 @ \$16; Southern coke No. 1, \$16.50 @ \$17; No. 2, \$16 @ \$16.50; No. 3, \$15.50 @ \$16; Southern charcoal, \$19 @ \$19.50; standard Southern car wheel, \$22 @ \$24.50; Ohio softeners, Hanging Rock, \$18.50 @ \$19; Jackson County, \$18 @ \$19; Hanging Rock cold blast, \$26 @ \$28; warm blast, \$23 @ \$25; No. 1 Scotch, according to brands, \$26 @ \$27; American Scotch, \$19 @ \$20; Bay View Scotch No. 1, \$18; No. 2, \$17; Chicago Scotch No. 1, \$17; No. 2, \$16; Emma Scotch, \$19 @ \$19.50; black band, Hubbard Scotch, \$19; Haselton, \$19; soft silvery, \$18; Wellston No. 1, \$19; No. 2, \$18.50 @ \$19; Hamilton No. 1, \$19.25 @ \$19.75; Norton No. 1, \$17.75 @ \$18.25; Zanesville No. 1, \$18.75 @ \$19.25.

Structural Iron.—Supplies from mills are now coming forward more promptly, demand for all classes of material continues heavy and business operations active; prices are firmly maintained. We quote: For car lots, f. o. b. Chicago iron and steel angles, \$2.35 @ \$2.40; Universal plates, \$2.55; sheared plates, \$2.50; tees, \$2.75 @ \$2.85; beams and channels, \$3.20. Store prices are: Angles, \$2.50 @ \$2.60; tees, \$2.80 @ \$2.90, and beams and channels, \$3.50 @ \$3.70. The use of iron in construction is generally

growing into form in this city. The consumption for this purpose is enormous.

Bar Iron.—Inquiry somewhat lighter than in August, but prices remain very firm, \$1.90 is named by local mills for deliveries in October.

Black Sheet Iron.—It is now very difficult at mills to obtain work on orders for prompt delivery at 1 1/2 c. f. o. b. Chicago for No. 27.

Galvanized Sheet Iron.—Orders are filled with difficulty on account of the delay in shipments from mills, otherwise there are no new features to note.

Merchant Steel.—Implement steels remain in good request; prices are firm throughout the general list and a good business is reported.

We quote as follows: Tool steel, \$7.75@8.8; specials, \$12@25; open-hearth machinery, \$3; Bessemer machinery, \$2.50@2.70; open-hearth spring steel, \$2.75@2.80; tire, \$2.50@2.60; toe calk, \$2.70@2.80; sleigh shoe, \$2.40@2.50; cutter shoe (T. & B.), \$2.65@2.70; crucible sheet steel, \$7@10; crucible spring, \$3.75.

Plates, Tubes, etc.—Business is reported of greater magnitude than at this time last year. Trade from stores is good, and mill orders large. Store prices are really lower than the market warrants, considering the advances made at mills, and the late increased freight tariff.

Nails.—The nail market has undergone no specific change since our last report; a good demand is the ruling feature. Prices f. o. b. mill is \$1.85, at stores in Chicago from \$2.03 1/2 to \$2.05 by cart lots, \$2.10 in smaller quantities.

Steel Rails.—In the Chicago market several good sized contracts are reported closed. Most of the business done is in small lots for early delivery.

Railway track supplies are in excellent request and prices are very stiff. Spikes have again advanced. Otherwise prices are unchanged. The figures are: Iron fish plates, \$2.02@2.05; steel fish plates, \$2.10@2.25; bolts, square nuts, \$3; hexagon nuts, \$3.10@3.20, according to quantity; spikes, \$2.20@2.25.

Scrap Iron.—Wrought grades of the better classes are still in some demand, but the cheaper kinds and cast show less inquiry, and are comparatively dull. We quote as follows: Country mixed scrap, \$15.50@16.50, according to condition; No. 1 mill, \$14@14.50; light wrought, \$9@9.50; horse-shoes, \$19@19.50; axles, \$26; cash machinery, \$13@14; stove plates, \$9.50@10; borings, \$9.50@10; wrought turnings, \$13.50; No. 1 railroad, shop or forge, \$21.50; track scrap, \$19.50@20.

Old Wheels and Rails.—Old iron rails are in better demand and the supply fair; \$26.75@27 are the usual quotations; old steel rails are in moderate request only, and prices are easier at \$19.50@22.50, according to length, condition, etc.; old car wheels are dull at \$19.50@20.

Cleveland. (From our Special Correspondent.)

The Cleveland Iron Mining Company, which owns extensive high-grade iron ore mines in Marquette County, Michigan, writes the ENGINEERING AND MINING JOURNAL as follows:

"Some sales of ore are being made all the time, and in view of the constant inquiries, ore men are in better spirits, for if the present demand keeps up the amount of ore unsold at the close of navigation will be by no means large.

"The hard high grade ores are beginning to find more favor with Eastern consumers. Transportation charges are too high to make it advantageous for them to buy lean hard ores, or even high grade soft ores, containing as they do 10 per cent. to 15 per cent. of free moisture.

Average rate, mines to Lake..... \$0.70 per ton. Upper lake foot to Buffalo... 1.25 " Rate, Buffalo to Eastern furnaces... 1.65 "

Total..... \$3.60 " "This charge of \$3.60 per gross ton is, of course, the same on a poor as a good ore, hence the in-

creasing favor with which Eastern men regard our more costly high grade hard ores, which are free from moisture.

"Quotations are as follows:

Table with 2 columns: Description (e.g., Bessemer, 66@69 per cent.) and Price (\$6.50@7.25, 5 00@ 6.00, etc.)

Table with 2 columns: Description (e.g., Bessemer, 62@65 per cent.) and Price (\$5.25@6.00, 4.50@ 5.00, etc.)

"Above prices are delivered on docks at Lake Erie ports. Bessemer are at present least in demand, and prices on Bessemer hematites have declined."

Louisville. Sept. 16.

(Special Report by Hall Bros. & Co.)

Since our last reports there have been some round lots of gray offered in this market on basis \$12.75 and \$13 at Louisville, but little sold, 1,000 tons going at \$13.25, special quality. There has been offered by different furnaces about 10,000 to 12,000 tons of mill and soft irons for deliveries through this year and 50c. advance for deliveries next year; the bulk of these offers was from one or two of the leading furnaces, and it would seem to indicate a contradiction of former reports of firmness, though these offerings should not necessarily affect the future.

Hot Blast Foundry Irons.—Southern coke, No. 1, \$15@15.25; No. 2, \$14.25@14.50; No. 3, \$14@14.25. Mahoning Valley, lake ore mixture, \$17.75@18.75; Southern charcoal, No. 1, \$17@17.50; No. 2, \$16.50@17. Missouri charcoal, No. 1, \$18@18.50; No. 2, \$17@17.50.

Forge Irons.—Neutral coke, \$13.75@14; cold short, \$13.75@14; mottled, \$12.75@13.25.

Car Wheel and Malleable Irons.—Southern standard brands, \$22@23; other brands, \$18@19. Lake Superior, \$22.50@23.

Philadelphia. Sept. 18.

(From our Special Correspondent.)

Pig Iron.—About the only point of real interest in the pig iron market during the past two or three days has been the prospects of making a number of large sales of forge iron, and the prices at which these large orders would be placed. Makers are quite determined on the matter of price. They believe iron will tarden as the season progresses. Buyers hold a different belief. There is very little iron in the hands of consumers, and, for that matter, among furnace people. Very little new business has been done in foundry irons.

Foreign Material.—Spiegel is quoted at \$30.50, and ferromanganese, in small lots, at \$70.

Steel Billets.—Shadings are the rule. Manufacturers show some anxiety for business. Sales are being made every day below \$32@33 for billets. Slabs have weakened, and two lots were sold to-day at \$31.50.

Muck Bars.—A good many offers are under consideration, ranging from \$29.25 to \$29.75.

Merchant Iron.—Buyers have become somewhat frightened at the financial flurry and less new business has come to hand during the past week than for some time. No change in price. The situation is all right.

Nails.—At a recent meeting nails were advanced nominally to \$2.

Skelp.—There is nothing new to add.

Wrought Iron Pipe.—Some buyers have been obliged to put up with delays in receiving stock for mills when promised. A great deal of work is being offered and prices of course are at the highest notch.

Sheet Iron.—A few more large buyers have placed orders this week for early winter work. Prices are firm and business crowding capacity.

Plate and Tank.—The most urgent demand prevails especially for steel plates, and as mills are overcrowded concessions are neither asked nor granted. Bridge plate \$2.35 for iron and \$2.50 for steel.

Structural Iron.—As manufacturers are unwilling to make desired concessions on winter work, there has not been very much business of this character placed. Angles continue strong at 2'20@2'30; plates at 2'35; tees, 2'70, and beams and channels, 3'10.

Steel Rails.—Prices are likely to weaken, if they have not already, and it is not improbable that

winter business will be done at \$29.50, though this statement is not indorsed by makers. Small lots sell at \$31.

Old Rails.—Quotations are given at \$25.50. Scrap.—No. 1, \$21@21.50 and active. Other kinds dull.

Pittsburg. Sept. 18.

(From our Special Correspondent.)

Raw Iron and Steel.—We can report a fair trade demand for certain leading descriptions; there are, however, few changes to note. Holders of well known brands refuse to make concessions, in order to effect sales; holders of brands not so well known will occasionally shade prices for round lots. Bessemer sales reported were generally at last week's figures; the heavy sales made since September 1st have evidently furnished consumers with sufficient for immediate wants. Muck bar is much fancied; sales show confidence of buyers, particularly those parties who are willing to purchase for January, February, and March of next year, or else they have contracts extending to April 1st, and are contracting for a sufficient amount of the raw material to meet their engagements. The demand for grey forge was not large, consumers seem to be supplied for the present; prices show no quotable change; old iron rails are very firm and find ready sale at outside prices. Billets and slabs show no change in values; the demand was less active, although a fair business was done. Skelp iron finds ready sales at prices that ruled last week. Scrap material—Prices remain firm at figures that ruled since the first of the month, while there are indications of a better demand and improved prices as the fall trade continues. The stringency of the money market has to a certain extent affected the iron trade, interfering with purchases for future requirements, and rendering sellers more cautious about new contracts. While all branches of the manufactured iron trade continue active, the bar plate and structural mills are being pushed to meet their engagements. A leading iron man has this to say: "There is a heavy business in sight, and several large contracts under negotiation. Consumption continues large; the amount of iron available at the present time is apparently sufficient to meet all requirements, so that prices remain steady." The condition of the furnaces on September 1st show that production is increasing, the capacity of the furnaces in blast being greater than during the latter part of the month of August. A number of coke furnaces of large capacity have been put in operation during August, and a further increase in the amount of iron produced is likely to occur during the present month, owing to the resumption of a number of stacks that have been undergoing repairs. Notwithstanding the increased production of all grades, there is no oversupply in sight at present.

On the whole, it is a matter for congratulation that the trade generally is in a strong financial position. Business has been handled skilfully and economically for some years past, and when the reaction does come it is not expected that there will be much dead wood.

Coke Smelted Lake and Native Ores.

Table with 2 columns: Description (e.g., 5,000 Tons Bessemer, Oct., Nov., Dec.) and Price (18.25 cash, 18.35 cash, etc.)

Charcoal.

Table with 2 columns: Description (e.g., 100 Tons Cold Blast) and Price (28.00 cash, 23.50 cash, etc.)

Muck Bar.

Table with 2 columns: Description (e.g., 4,000 Tons Neutral, Oct., Nov.) and Price (30.00 cash, 30.75 cash, etc.)

Steel Billets and Slabs.

Table with 2 columns: Description (e.g., 3,000 Tons Billets, Oct., Nov.) and Price (30.00 cash, 30.25 cash, etc.)

Steel Wire Rods.

Table with 2 columns: Description (e.g., 500 Tons American Fives) and Price (43.00 cash, 69.00 cash, etc.)

Ferro-Manganese.

Table with 2 columns: Description (e.g., 730 Tons Sheared Iron) and Price (2.25 4 mo, 1.95 4 mo, etc.)

Skelp Iron.

Table with 2 columns: Description (e.g., 1,000 Tons Bloom Ends) and Price (21.50 cash, 32.50 cash, etc.)

Bloom Ends.

Table with 2 columns: Description (e.g., 1,500 Tons American T's Valley del) and Price (28.25 cash, 28.00 cash, etc.)

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Sept. 19.

Heavy Chemicals.—The fact that chemicals generally are said to be short here makes many in the trade look with some anxiety toward the progress of the proposed chemical union in England. That nothing definite has yet been settled about the proposed combination has had some perceptible effect on the volume of operations here, which has been very considerably reduced, awaiting advices. It is said in the trade that some persons in this market have been advised that the new combination will without doubt be perfected. Our advices, as stated last week, show that nothing will be finally concluded before three or four weeks, and a representative of the ENGINEERING AND MINING JOURNAL was unable to locate any of the advices which are reported to contain later information.

Caustic soda is in strong request, and stocks are light. Sales of 600 drums of 60 per cent. for October shipment are reported at 3-37 1/2 to 3-40c, which is a small advance on last week's quotations. Higher test grades are also in active demand at a slight advance, 74 to 76 being quoted at 3-10 for shipment and 3-15 on the spot.

Caustic soda ash is rather more active than during the preceding week, though prices remain where they were, at 1-45@1-50c. for shipment.

Carbonated soda ash continues in strong demand, with sales of 300 tons of 48 per cent. at 1-50@1-55c. Smaller sales of 58 per cent. are reported at 1-45@1-50c.

Sal soda being very light in stocks operations have been mostly confined to shipments and future delivery, for which demand has been unusually strong. Prices quoted, for domestic, are rather better than last reported, at 1-12 1/2@1-15.

Bleaching powder has been in good demand at 1-55@1-60c., with a slight stiffening in the bigger limit, though some sales are rumored at 3c. and 4c less.

Acids.—Manufacturers report an unusually active week, and those outside the combine state that the volume of their business is now much greater than before the beginning of the keen competition started by the combine. Prices quoted are not reliable, as sellers will shade and vary on each side of the contest to take business away from the other. Both the members of the combine and the manufacturers outside state that the prices given below rule the market: Acetic, \$1.72 1/2@ \$2.20; muriatic, 18-degree, 80c.@ \$1.20; muriatic, 20-degree, 90c.@ \$1.50; muriatic, 22-degree, 90c.@ \$1.75; nitric, 36-degree, \$2.75@ \$3.25; nitric, 40-degree, \$3.25@ \$4.50; nitric, 42-degree, \$3.75@ \$4.75; sulphuric, 60-degree, 70@80c., and sulphuric, 66-degree, 80c.@95c.

Fertilizing Chemicals.—Business is moving a little more briskly than last week, though the

prices have not visibly appreciated. The sales, generally, have been small. Sellers, however, anticipating an early demand for fall, are asking better prices, which buyers decline to pay: High grade dried blood, \$1.75@ \$1.85. For the low grade the price is \$1.70; Azotine, \$1.90@ \$1.95. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, \$19@ \$20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, \$18.25@ \$18.75. Fish scrap, \$20@ \$20.50 per ton f. o. b. factory. Sulphate of ammonia, prime gas liquor, \$3.35; prime bone liquor, \$3.15. Concentrated tankage, \$1.67 1/2@ \$1.70. Refuse, bone black, guaranteed 70 per cent. phosphate, \$18 per ton. Dissolved bone black is nominally 95c. per unit; for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, \$20@ \$23; ground, \$25@ \$26.

Charleston rock continues short with a consequent upward tendency. Quotations: Undried, \$6 per ton; kiln-dried, \$7 per ton, f. c. b. vessels and cars, \$6.50@ \$7.25. Freight by rail from Charleston to New York, \$2.75@ \$3.50 per ton. Charleston rock, ground, \$11.75@ \$12.25, ex-vessel at New York.

Sulphate of potash 48 to 52 per cent. is quoted at \$1.12 1/2 per 100 pounds; manure salts, high grade, basis 90 per cent. have been in good request at \$2.35 per 100 pounds.

Muriate of potash.—Sales are reported at \$1.75 @ \$1.80, with a firm market and good demand. Kainit is dull, with prices given at \$9.25.

Nitrate of soda continues dull, with no business of any account reported, prices being \$1.70.

Brimstone.—The demand has been small and the market featureless and no stronger than last reported. Nominal quotations are: On the spot, best unmixd seconds, \$21.50 and 50c. less for thirds; to arrive, \$21 for best seconds and \$20.50 for best thirds.

Liverpool. Sept. 10.

[Special Report by Messrs J. P. Bonner & Co.]

There is a good demand for caustic soda, and owing to scarcity prices continue to move upward.

Soda ash is very scarce for prompt delivery, and manufacturers are well sold to the end of the year. In some cases American orders have had to be refused for prompt delivery, owing to manufacturers being unable to deliver. Nearest spot values to-day are 1 1/2 d. @ 1 1/2 d. for caustic, and 1 1/2 d. @ 1 1/2 d. for carbonated, according to brands.

Soda crystals are in moderate demand at £3 5s. @ £3 7s. 6d. per ton.

Caustic Soda.—For September, the market is very bare, and all second-hand parcels offering for this month have been readily picked up. In 70 per cent. everything offering up to £11 has been cleared, and same price paid for a large quantity for October. There is an order in the market this

afternoon for 650 drums, which cannot be filled, as there are no sellers at the close. 60 per cent., £10 5s. @ £10 10s.; 74 per cent., £12 @ £12 5s.; 76 per cent., £12 10s. @ £13. This article is now in small compass for October delivery.

Bleaching powder.—Hardwood is very scarce at £5 15s. up to £6 per ton, but it is doubtful if any thing could be found at the lower figure.

Chlorate of potash is quoted at 5d. per pound and upward, and manufacturers are well sold for this month.

Bicarh. soda has advanced and £6 is now the lowest price for one hundredweight kegs, with the usual allowances for larger packages.

Sulphate of ammonia continues in limited supply at £11 17s. 6d. @ £12 per ton, nearest spot values for good gray 24 per cent. in double bags, f. o. b. here. There is less inquiry however.

With regard to the "Chemical Union" there is no fresh news to report. A general meeting of the chemical manufacturers is to be held on the 12th inst., when possibly some information may leak out as to this scheme.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Sept. 19.

Brick.—The situation is not quite so strained as it was last week. Plenty of boycotted and other brick is coming into the market. Only boycotted brick is openly offered for sale, though there is a strong suspicion that what is now termed the "sucker" brick is selling here and there. Both sides are on the alert, however, and both deny that the other is selling brick. The manufacturers have taken no further steps during the week. Quotations are nominally the same: Haverstraws, \$6.25@ \$7; uprivers, \$6@ \$6.75; Jerseys, \$5.75@ 6.50; pale, \$3@ \$3.25.

Lime.—Demand is very good just now, but the supply is far short of what the market would take. There is a moderate quantity close at hand, however, and this will be exhausted at once. Manufacturers are running under restrictions. Several of them have shut down two-thirds of their kilns, notably the Rockland. This state of things will continue as long as the embargo on the brick business continues. Last week's prices continue unchanged, as follows: For Rockland common, \$1@ \$1.20; St. John, common and finishing, 90c. @ \$1; Glen Falls, common and finishing, 90c. @ \$1.10.

Cement.—Though dealings in cement are much smaller than usual, owing to the general disturbance in the building material market, the time is fast approaching when winter stocks will have to be laid in, and this will offset the present dullness. As cement is wanted before brick and lime in building operations, an early stiffening of the market is confidently looked for. The average quotations are: Rosendale, 90c. @ \$1; Portland, American, \$2.15@ \$2.45; foreign, \$2.40@ \$2.50; special brands, \$2.60@ \$2.85; Roman, \$2.75@ \$2.95; Keene's coarse, \$4.50@ \$5.50; Keene's fine, \$7.25 @ \$8.50 per barrel.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM SEPTEMBER 6 TO SEPTEMBER 13 AND FROM JANUARY 1.

Table with multiple columns: Imports (Spelter, Pig Lead, Tin, Tin Plates) and Exports (Steel and Iron Rods, Iron Ore, Copper, Copper Matte). Includes company names, quantities, and values.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, and NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS. Lists various mining companies and their financial details.

Gold, Silver, Lead, Copper, Non-assessable, This company as the Western, up to Dec. 10th, 1881, paid \$1,400,000. Non-assessable for three years. The Deadwood previously paid \$78,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation in Aug., 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia, 240,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid \$1,350,000 in dividends. \$1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, divided into Dividend-paying and Non-dividend-paying mines. Columns include Name and Location of Company, dates from Sept. 13 to Sept. 19, Sales, and Share prices.

*E. 41/100. †Dealt in at the New York Stock Ex. ‡Unlisted securities. §Assessment paid. ¶Assessment unpaid. Dividend shares sold, 17,278. Non-dividend shares sold, 27,880. Total New York, 45,158.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, dates from Sept. 12 to Sept. 18, sales, and share prices.

Boston: Dividend shares sold, 11,758. Non-dividend shares sold, 22,930. Total Boston, 34,688.

COAL STOCKS.

Table of Coal Stocks, listing company names, par values, dates from Sept. 13 to Sept. 19, and sales.

**Sales in New York, 43,900; in Philadelphia, 44,103. Total sales, 277,171.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations from Sept. 12 to Sept. 18.

STOCK MARKET QUOTATIONS.

Baltimore, Md.

Table with columns: COMPANY, Bid, Asked, L. H., L. H. listing various coal and mining companies.

Birmingham, Ala.

Table with columns: COMPANY, Bid, Asked, L. H., L. H. listing various coal and mining companies.

Pittsburg, Pa. Sept. 17.

Table with columns: COMPANY, B, A, Closing listing various gas and oil companies.

St. Louis, Sept. 17.

Table with columns: COMPANY, Bid, Asked listing various utility and electric companies.

Table listing various metals and minerals with prices, including Central Silver, Cleveland, etc.

Trust Stocks. Sept. 19.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange.

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest listing various international companies.

Paris. Sept. 4.

Table listing various international companies and their prices.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

Table listing various chemicals and minerals with prices.

THE RARER METALS.

Table listing various rare metals and their prices, including Aluminum, Arsenic, Bismuth, etc.

BUILDING MATERIAL.

Table listing various building materials and their prices, including Bricks, Cements, etc.

THE ENGINEERING AND

MINING JOURNAL will thank

any one who will indicate any

other articles which might with

advantage be quoted in these

tables or who will correct any

errors which may be found in

these quotations.

Main table listing various commodities, chemicals, and minerals with prices, including Muriatic, Nitric, Oxalic, etc.