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**CONTENTS.**

The Late Election and Our Industries.....	Page. 457
A New Industry for Mexico.....	457
Improvement of Coke.....	458
Labor and Contract.—I.....	R. W. R. 458
Books Received.....	459
New Publications.....	459
The Silver Problem.....	Edward G. Storber 459
The Use of Cyanide Solution in the Battery.....	Almarin B. Paul 459
The Elimination of Sulphur from Iron.....	J. E. Stead 460
* The Late Marcus G. Heilner.....	461
* The Hill Farm-Parrish Mine Fire.....	Frank A Hill 461
* Woodstock Iron Company, Alabama.....	W. M. Brewer 463
Promising Prospecting Enterprise on the Comstock.....	463
* The Basic Bessemer Steel Plant of the Pottstown Iron Company.....	Joseph Hartshorne 464
Seventeenth Annual Report of the State Mine Inspector for Ohio.....	466
The Mineral Product of Queensland.....	466
* Water Softening Apparatus.....	467
Digest of Decisions.....	467
Patents Granted.....	467
Notes: Animal Origin of Petroleum, 459—Portland Cement for Steam Packing, 462—Coppet's Method of Treating Minerals Containing Nickel, 466—A Large Dressed Stone, 466—Estimation of Sulphur in Copper, 466—Price of Gaskohle in Germany, 466—Panama Canal Plans, 467—The Pyrites Deposit of Pilley's Island, Newfoundland, 467.	
Personals—Obituary—Societies—Industrial Notes—Machinery and Supplies Wanted.....	468

\* Illustrated.

<b>MINING NEWS.</b>	<b>FOREIGN:</b>	Chicago.....476	St. Louis..... 480
Arizona.....468	Canada.....473	Louisville.....476	Helena..... 480
California.....469	Mexico.....473	Pittsburg.....476	Deadwood.....480
Idaho.....470	South Africa.....473	<b>COAL:</b>	Coal Stocks..... 480
Illinois.....470	<b>MEETINGS.</b> .....474	New York..... 476	London..... 480
Indiana.....470	<b>ASSESSMENTS.</b> .....474	Buffalo..... 476	Paris..... 480
Michigan.....470	<b>MINING STOCK</b>	Chicago..... 477	<b>CHEMICALS AND MINERALS.</b> .....477
Missouri.....470	<b>MARKETS:</b>	Pittsburg.....477	
Montana.....471	New York.....473	<b>MINING STOCK</b>	
Nevada.....471	Boston.....474	<b>TABLES:</b>	
New Mexico.....472	San Francisco.....474	New York..... 478	<b>CURRENT PRICES</b>
North Carolina.....472	<b>MARKETS:</b>	Boston.....478	Chemicals..... 480
Pennsylvania.....472	<b>METALS:</b> .....474	San Francisco.....480	Minerals..... 480
South Dakota.....472	<b>IRON:</b>	Aspen.....480	Rarer Metals..... 480
Utah.....472	New York..... 475	Baltimore.....480	<b>ADVT. INDEX</b> .... 19
Washington.....472	Buffalo.....476	Pittsburg.....480	

WHILE the Presidential election, which took place on the 8th inst. resulted in the most complete overthrow of the fiscal policy of the government that has ever occurred in this country, and evidently had interested the citizens more deeply than any election in a quarter of a century, yet it was the quietest and least exciting election that ever took place in this country. Business throughout the campaign, and even up to the very day of the election, was uninterrupted and even unaffected. This was no "off year" in business, no one had any fears of the result however it might go, and the complete overthrow of the extra-high protective policy has not yet had any noticeable effect upon business or stocks, except in a few of the "trust stocks," which have declined.

While it appears certain that the fiscal policy of the new administration will tend to greater freedom of commerce, lower tariffs, and free raw materials, yet everyone knows that the enormous expenses of the government, including nearly \$200,000,000 a year of the "pension iniquity" will necessitate the collection of a very large amount of revenue, there can therefore be no very sudden change in the amount of money to be raised by taxation, whether by tariff or otherwise. Our readers know that while the ENGINEERING AND MINING JOURNAL never enters into party politics, it has always advocated low tariffs and free raw materials which we believe will make this country the great workshop of the world. Under this policy the country will grow in general prosperity. While the abnormal profits of a few industries will be reduced, the welfare of the wage earners will increase as our growing industries and widening markets make a larger demand for their services.

**A NEW INDUSTRY FOR MEXICO.**

It is stated that C. P. Huntington, of the Southern Pacific and Mexican International railways, has purchased the Cerro Mercado of Durango, Mexico, and that he intends to erect a large steel and iron plant near Durango City. This Cerro Mercado is an immense mass of iron ore, one mile long, one-third of a mile wide, and rising from 400 to 650 ft. above the level of the plain on which it is situated. Its existence has been known for many years. It was discovered by the Spanish early in the sixteenth century, and in 1558 an expedition was sent out to examine it, owing more to the rumors that it contained large bodies of gold and silver ores than from any belief that an iron property, however rich, could be profitable at that time. No discoveries of the precious metals being made it was abandoned for the time being, and it was not until after the independence of Mexico was declared that an English company acquired the property and the right to establish iron works on it, when actual development work and the production of pig iron was commenced on a comparatively large scale.

Previous to this a small quantity of malleable iron was produced by the agriculturists of the vicinity, metallurgists for the time being, in small Catalan forges.

WEIDNER, who examined the property for the Mexican Government in 1858, estimated the mass to contain 250,000,000 net tons of 50% ore, and Mr. JOHN BERKINBINE, the eminent authority on iron, while disagreeing with WEIDNER's extravagant estimate, pronounced the deposit to be "the most extensive known single deposit of iron ore on the American continent, or, possibly, in the world." He is inclined to the belief that the Cerro Mercado consists of one or more lenses of specular iron ore standing nearly vertical, the walls of which cannot be observed, owing to the detrital talus at the bottom. An average of all the samples, from about 10,000,000 sq. ft. of surface, analyzed by MCCREATH, gave metallic iron 55.8, manganese .079, sulphur .085, phosphorus 1.328. Selected specimens showed but .003 phosphorus, and Mr. BERKINBINE thinks it not improbable that large quantities of Bessemer ore could be mined.

In late years the property has been in the hands of American capitalists, who, it is to be regretted, have not made any profits on their investments, but this is to be ascribed rather to the want of fuel and the small and local demand than the failure of the deposit itself to meet the requirements of a successful venture. At the present day the conditions are changed as the Mexican International Railroad is at Durango. Instead of being obliged to rely upon the insufficient supply of charcoal brought in by the burro-load, coke of fair quality can be hauled to Durango by rail, and the production instead of being limited to the requirements of the immediate vicinity can be extended to supply the entire Republic.

Not only will this company have a virtual monopoly of the production of pig and wrought iron in Mexico, for there is but one other locality, Zimapan, which produces this metal to any extent, but it will be protected by a tariff on the importation of the crude metals, and further, on the 1st of January, 1893, by an import duty of 1c. per kilo on various manufactured articles of iron and steel, which heretofore have been free. It is safe to say that if these duties should prove insufficient to allow Mr. HUNTINGTON to make a profit, others still higher will be decreed. Altogether, with this immense body of high grade ore, cheap fuels from his own mines hauled over his own railroads, and a strong protective duty, it seems most probable that MR. HUNTINGTON in his latest venture will prove more successful than his predecessors.

## IMPROVEMENT OF COKE.

The increasing demand for better coke is reacting upon the producers of bituminous coal in a manner at once surprising and gratifying. It is surprising in that it comes so late into action, and gratifying in that it comes at a time when it is much more sure of a careful consideration than at any time, perhaps, within the past ten years. The economies that have, in a measure, been forced upon the producers of pig iron have extended to every department of the industry, so that it is probable that at the present time pig iron of all grades is being made more cheaply than ever before in the history of the country. This has been brought about partly by the natural desire of manufacturers to limit their expenditures as narrowly as possible, and partly by the low prices that have prevailed during the last two years. The economies practiced have arisen, therefore, in part voluntarily and in part through outside pressure.

Manufacturers of pig iron are demanding and securing a better quality of ore, and lower transportation rates and lower furnace charges per unit of iron are the consequences. They are demanding and securing greater skill in the management of furnaces, and the betterment of the quality of the iron is the consequence. But in the fuel employed there has not been so marked an improvement. We do not speak of anthracite furnaces nor of those using the higher grades of coke, such as Connellsville and Flat Top, but of those which are cut off by reason of freight charges from all but second grade coke, and even third grade in a few cases.

Coke that contains on the average over 1% of sulphur and 10% ash cannot be considered strictly first grade, no matter what its burden-carrying capacity may be, whether 400 lbs. per square inch or 1,000. Its use is attended with increased cost, whether we look at the matter from the standpoint of the chemist or that of the furnaceman. It may be stated as an axiom that the greater the content of sulphur and ash the greater the cost of the coke.

Physical betterment of the coke, occasioned by the pulverization or crushing of the coal previous to coking, increases its value. Such improvement is not to be despised, especially in coke destined to much transportation, or breaking of bulk. The ash-producing parts of the coal are more evenly distributed through the coke, there is less danger of powdering, as the coke is firmer and stronger, and when it breaks it does so in pieces of more uniform size.

What may be termed "overheating," that is, coke burned past the point at which combustible matter is given off, which for most coking coals is 48 hours in the beehive oven, sometimes increases the resistance of the coke to crushing strain without otherwise affecting it, so far as was observed. In one case before us the 48 and the 72-hour coke made from the same coal, of the same degree of fineness, showed a difference of 400 lbs. per square inch in crushing strain in favor of the 72-hour, while there was scarcely any difference in chemical composition. The 48-hour withstood 700 lbs. and the 72-hour 1,100 lbs. crushing strain per square inch. In this case there was no gain in continuing the coking process beyond 48 hours, as a coke that will stand 700 lbs. per square inch crushing strain is quite strong enough for any ordinary purposes. Indeed it may be said that an improvement in the physical quality of coke, as regards crushing strain, that is to bring it above 500 lbs. need not be considered.

Of the dry methods for improving coke the only one that seems to be worthy of attention is the pulverization of the coal. A company operating more than 450 beehive ovens informs us that since it began to pulverize the coal to the fineness of meal there has been a marked improvement in the coke, not so much in chemical composition as in structure, a very important item. Then, again, it has been observed that the coking quality of a coal is improved by fine crushing. Some coals that coke badly when charged as "run of mine" or even as "slack" are greatly improved by crushing. This would be the case particularly with slaty or dirty coal, as the comminution of the particles would allow the bituminous or coke causing ingredients to sinter the mass more firmly together. It must be borne in mind, however, that crushing does not remove any impurities from coal. All that is done is to better the structure of the coke. This is very important, but does not affect the fundamental question of purer fuel.

It will be our purpose to discuss this in a subsequent issue.

## LABOR AND CONTRACT.—I.

The "system of contract" does not consist in the making of agreements between individuals, but in the protection by law of the freedom of agreement and the enforcement by law of its obligation. The criminal law punishes violence, fraud, etc., which impair the freedom of agreement; but this form of protection is not peculiar to the contract system. It is an element of all government under whatever social organization. What properly belongs to this system is the enforcement of contracts by civil proceedings.

The "labor question" has been much muddled by those politicians,

professors and philanthropists who confound the punishment of crime with the enforcement of contract. Legislators change the criminal law so as to favor certain classes on account of their civil status; economists gravely include the inevitable results of such favoritism among the "data of sociology," and sympathetic "lovers of mankind" stop to guess at what they call "the merits of the case" (meaning the particulars of a civil contract which they are not competent to understand), before they will venture to condemn without a *nevertheless* organized tyranny, robbery and murder.

The result has been, that the protection of the parties to labor-contracts against actual violence is unequal. The wronged in this regard are the employers, and, in still higher degree, the nominally free workmen who would gladly make contracts, but can do so only at the risk of their lives. We hear a good deal about the uncontrollable spirit of violence for which the labor union do not consider themselves responsible. They let it loose; and then "deprecate" it. But it is significant that these riotous outsiders never, by accident or mistake, mob a "striker." I think the reason is, not that the leaders of the unions, as a general thing, directly incite such crimes, but that, encouraged by a deplorable weakness of public sentiment, they excuse the criminals; aid them, passively at least, to escape from justice; and at all times represent the outrages themselves as no more than the excesses of passionate devotion to a good cause. Sometimes they go further. Here is Mr. POWDERLY, for instance, advocating on the stump the cause of a man convicted of vulgar blackmail, in the pretended interest of "labor," and denouncing the Governor of New York because he does not immediately at the demand of "labor" pardon the convict. As one who never voted for a Democratic governor, and who disapproves of most of the political principles, and the chief political supporters of Governor FLOWER, I wish to say (and I believe I speak for many other Republicans) that I heartily applaud his manly and courageous course in protecting property, preserving order, and defying the imperinent dictation of the rulers of a pretended *imperium in imperio*—a higher sovereignty, within this sovereign State.

The enforcement of contract includes a negative protection of its freedom. That is to say, the courts will not enforce a contract not voluntarily and intelligently made by a competent party and for a lawful object. The purchaser of a railway ticket, for example, is not bound by a contract printed thereon (though he may have read or even signed it at the time of purchase), if he had only the option between accepting that contract and not traveling by the railway. The inferior alternatives of driving or walking to his destination are not adequate to render him free, and therefore responsible. But if the railway company offers him the choice between an "unlimited" ticket at a fair rate and a "limited" ticket at a reduced rate, and he accepts the conditions of the latter in consideration of its lower price, he is held to have exercised a free choice.

It is often asserted that the obligations of contract ought to be modified with regard to wage-earners, because, in fact, they are under duress, so that they cannot act freely in making their agreements. Let us examine this proposition.

1. If true at all, it is not true of the overwhelming majority of wage-earners. Household servants, farm laborers, clerks and others innumerable freely seek and accept employment. The only classes concerning which an exceptional "duress" is asserted are the workers in certain occupations at "starvation wages," and the representatives of "organized labor." Concerning the latter, the assertion is, in most cases, ridiculously untrue. Concerning the former, it contains a truth worth considering.

2. But before proceeding to consider these two classes, let us say that it would be wrong to weaken the obligation of any really free contract, and since the fact of "duress" does not exist throughout the community, or throughout any definable class, it seems to follow that the exercise of any superior authority releasing individuals from contract-obligation on that ground, should be dependent upon proof of that fact. But this is precisely the present law on the subject, so I suppose it will not satisfy those whose creed declares that whatever is, is bad!

3. As to the alleged lack of freedom on the part of "organized labor," justifying special legislation in its favor, it is almost impossible for a business man to comprehend the proposition. A lack of freedom, in one sense, is evident enough, but the tyranny is not that of circumstances or "society," or "capital," but that of "labor" incarnate in the "Walking Delegate." Instances are scarcely necessary, but one or two from personal knowledge may be amusing.

In a western city I went with a friend to see the residence he was building, and, asking about the wages paid, learned that the men I had taken for common laborers, employed in simply carrying boards, etc., to the carpenters, were full-fledged "carpenters" (meaning merely members of the union), and received \$4.50 a day. No carpenter was allowed to accept, at whatever wages, work for which the unskilled assistance was not supplied by the union at the price of skill.

Some time ago, in the city of Brooklyn, I asked a mason at work in my neighborhood if he would step into my house after his day's work an

spend two minutes in stopping a rat hole with mortar. He accepted the job, but only on condition that he might come after dark and that I would promise never to betray him, because he would be expelled from his union and practically deprived of employment in the city if it were known that he had worked "overtime."

Quite recently, in the city of New York, the owner of a new house engaged an artist to paint upon one of the ceilings an original picture. The Walking Delegate found the artist at work, and ordered him to stop because he was not a member of the Union. The owner of the house was threatened with the immediate cessation of all work upon it if this decree was resisted. A humiliating compromise was arranged. The artist nominally joined the Union; the employer paid a handsome "initiation fee" for him, and "labor" was vindicated. Regarding this piece of dirty blackmail I would only point out here that it destroyed the freedom of all the workmen engaged on that house. They would have been forced to repudiate their contracts if the Walking Delegate had not succeeded in his scheme of plunder.

At the close of a prayer meeting at which I was present, a stranger inquired of the pastor whether Christian charity could not do something to keep him and his family from starving. He was referred to me, and after ascertaining his trade I found without difficulty, among the brethren still in the room, one who promised to give him employment immediately. But it then appeared that he would not take work except in a "Union" establishment. There was nothing to prevent his acceptance of "Christian charity," that is to say, cash; but he could not give value in return, except upon conditions. The "dignity of labor" permitted him to be a beggar, but not to earn money in company with workmen who did not choose to share his voluntary surrender of liberty.

I need hardly say that slavery of this sort presents no just claim for the support of the community through special legislation.

As to real compulsion, exerted by one party to a contract upon the other, it is unquestionably, in most cases, at the present time, and in this country, the employer of organized labor who suffers it. Yet nobody asks, and nobody ought to ask, for him, any relief from his obligations as now defined by law. Suppose the Carnegie Company, appalled by the damage and danger to its Homestead property, and unable to afford to prolong a costly defence, had yielded to the demands of the Amalgamated Association; and suppose that, having thus fixed wages for a year to come, the company had repudiated its agreement after three months, alleging that it had been coerced into its promise. Would anybody admit the justice of such a course? Certainly not. We expect employers to take the consequences of their agreements, even though they have been intimidated.

4. Unquestionably all wage-earners are under a certain pressure of necessity, proportional to their poverty. Most of us must either work or starve, and with many the alternative is immediate. This is, however, rarely the case among skilled craftsmen. If it ever occurs, it occurs under circumstances for which class legislation could afford no remedy. The only remedies that have been discovered by the rest of us are thrift, which enables us, by virtue of our savings, to be less dependent upon immediate employment; personal ambition and self-improvement, which make our labor more valuable and less likely to be dispensed with; and personal liberty to look about us and "better ourselves" when we can, or think we can, making such contracts as we choose, and keeping them with fidelity. Organizations assuming to represent "labor," which have forbidden these remedies, or rendered them practically unavailable, have but a sorry claim to be heard when they clamor for other and dangerous cures of the evils they first aggravate and then exaggerate.

This subject will be continued in another article. R. W. R.

#### BOOKS RECEIVED.

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

*Advance Sheets from the 17th Report of the Geological Survey of Indiana.* S. S. Gorby, State Geologist. Palæontology, by S. A. Miller, Aug. 1891. pp. 103, 20 plates. Indianapolis. Wm. B. Burford. Same. 18th Report. September, 1892, pp. 79, 12 plates.

*Spon's Tables and Memoranda for Engineers.* By J. T. Hurst. Eleventh edition. Published by Spon & Chamberlain, New York, 1892. Pages 140. Price 50 cents. Illustrated.

#### NEW PUBLICATIONS.

**A TREATISE ON HIGHWAY CONSTRUCTION.** Designed as a Text Book and Work of Reference for all who may be engaged in the Location, Construction or Maintenance of Roads, Streets and Pavements. By Austin T. Byrne, C. C. John Wiley & Sons, New York; 685 pp., price—.

This work is an excellent compilation from the vast quantity of literature on the subject of roadmaking that has recently appeared in magazines, technical journals, pamphlet reports, together with information taken from standard engineering works. The author gives a list, covering two pages, of the sources from which he has taken extracts. The work treats of pavements, their objects, qualifications, materials, cost, maintenance, etc., including wood, stone, brick, asphaltum, coal tar, broken

stone, and miscellaneous pavements; foundation, resistance to traction, location of country roads, earth-work, drainage and culverts, bridges, retaining walls, etc.; city streets, footpaths, and gutters; reconstruction and improvement of country roads, specifications and contracts, and implements and prices.

The relative merits of different kinds of street pavements are treated of at length. The following table gives in a condensed form the author's opinions as to the relative rank of granite, brick, asphalt and wood pavements for cities, as regards their several qualities. The wood serviceability in the table is defined as its quality of fitness for use, this quality being measured by the expense caused to the traffic, viz., the wear and tear of horses and vehicles, loss of time, etc.

RELATIVE MERITS OF STREET PAVEMENTS.

	Granite.	Brick.	Asphalt.	Wood.
Durability .....	1	3	2	4
Serviceability .....	4	2	1	3
Hygienic fitness .....	3	2	1	4
Service on grades .....	1	2	4	3
Gross annual cost .....	4	2	1	3
Facility for cleansing .....	3	2	1	4

A very complete index is given at the end of the book, occupying about 50 pages.

On the whole, it is the most satisfactory treatise on roadmaking that we have yet seen for the use not only of engineers, but for that large portion of the public who are now deeply interested in the subject of good country roads, including commissioners, farmers, bicyclists, and others. Much valuable statistical information is contained in the book, together with numerous tables of strength of materials, tractive resistances, life of pavements, costs, weights, etc. We notice some errors in these tables, which should be eliminated in future editions of the work, thus: On page 48, referring to the table on the next page, the author says that paving brick vary in absorption of water from 0.14 to 7%, but the table itself gives from .015 to .060%. There is probably a mistake in the decimal point in the table. In the table, page 53, the crushing strength of lead is given at 66,000 lbs. per square inch, which is about ten times too great. Haswell's old figure of 1717 lbs. for Stourbridge fire brick appears here as 1117 lbs.

#### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

#### The Silver Problem.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have for 15 years or more been a reader of your paper. I value it highly, but take exception to the conservative stand you have taken on the silver question, and many of your Western readers are of the same opinion. The monetary conference we consider a campaign measure, to blind the vote of the mining states. What can we hope from the half-hearted arguments of commissioners to said conference, who are opposed to the end to be attained, i. e., universal free coinage? The editorial, "The Silver Problem," in your issue of the 8th inst. I have heard most favorably commented upon by a prominent Colorado mining engineer, as being in the right direction, and we trust many more such will follow. The mining industry in this region is much depressed; many of us are forced to work on at the small profit still remaining to us in the working of our properties, because we are borrowers and must meet our obligations or lose all we have, because we cannot meet them with our mines closed down!

Yours truly, EDWARD G. STOIBER.

#### The Use of Cyanide Solution in the Battery.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: "The direct treatment of ore by the cyanide solution in the battery has been attempted in this country by Almarin B. Paul, at the Calumet Mill, Shasta County, California, but with what results we have not learned."

The above I clip from the JOURNAL. As to results, they are entirely satisfactory. My plan is to crush the ore with the weaker solution, even though the ore should require a stronger one. The weaker solution you always have in store. Should your ore require a higher per cent. of cyanide, after your tank is filled with pulp, and the first solution has percolated below the surface, then introduce your solution of required strength, and follow it up so long as desired, thus you avoid all the dust and disagreeable work attending dry reduction of the ore. Why not crush your ore in solution, when you introduce solution after crushing dry? The loss of cyanide by crushing with it is but nominal, and is greatly overcome by the cheapness of working and completeness of cyanide distribution through the pulp in the tanks. This plan is so satisfactory to me that I am done with dry mills for the future. The mills in South Africa reducing in the solution are the result of my suggestion and work.

ALMARIN B. PAUL.

MIDDLE CREEK, SHASTA CO., CAL., Nov. 3, 1892.  
[We are glad to learn of Mr. Paul's success in this innovation, the more so as when, heretofore, wet crushing has been applied to ores afterward to be lixiviated, and the pulp has been run directly to the leaching tanks, it has packed so hard as to be practically impenetrable to the solution. To the use of the solution in the battery we see no objection if this difficulty can be overcome, but in our opinion there are few ores which can be treated successfully in this manner. Ed. E. & M. J.]

**B. Zalozieki** (Monat. Chem., 1892, S. 498) announces the discovery of pyridin bases in petroleum from Boryslaw. This is likely to be of importance in establishing the animal origin of petroleum, for Engler, in distilling fish under pressure, found pyridin bases, picolin and others, Höfer and others have found nitrogen in the gases from petroleum, even up to 20%. The gases from the Pechelbronn petroleum are especially rich in nitrogen. Taking into consideration also that secondary and tertiary alcohols have been found in petroleum, as also silicon, and that the Thran oil contains no paraffin, it would appear that the chemical evidence for the animal origin of petroleum is now fairly complete.

THE ELIMINATION OF SULPHUR FROM IRON.

By J. E. Stead, Middlesbrough.

(Continued from page 413.)

**Blast Furnace Slags and Their Effect on Iron Containing Sulphur.**—It is a very well recognized fact that the more basic a blast furnace is, other things remaining constant, the greater amount of sulphur will be found in it, and that the greater the quantity of slag the more perfectly will it retain the sulphur. As an instance, the practice in Cleveland may be quoted. In making Cleveland pig the ore contains 0.3 to 0.5% sulphur, and the quantity of slag per ton of pig thrown off amounts to about 30 cwt., and it is far from being very basic; and yet the metal produced contains no more sulphur than hematite iron made from ores containing practically no sulphur, which, however, is produced with much more basic slags weighing under 15 cwt. per ton.

Sir L. Bell converted white iron into gray by exposing it for a long time under the hot slag which flowed from a furnace making No. 3 iron. I do not remember whether or not analyses of the material before and after treatment are on record; but I should assume that the hot slag must have removed the sulphur from the white iron. Ledebur melted cast iron containing 2.33% sulphur with mono and bi-silicate of lime, and obtained the following result:

	200 Ca·iO <sub>2</sub>	100 pig melted with 200 CaO(SiO <sub>2</sub> ) <sub>2</sub>	200 MgSiO <sub>2</sub>	200 MgO·SiO <sub>2</sub>
Sulphur in pig.....	0.073%	0.357%	0.280%	0.290%
Sulphur in slag.....	1.445%	0.681%	1.069%	0.29%

No mention is made of silicon. From these results it will be seen that the more basic slags removed the greater amount of sulphur, and that lime is a much more powerful desulphurizer than magnesia. Turner melted silicious white iron containing: Silicon, 4.17%; sulphur, 0.446%, but found no change by simply fusing it; but on melting it under Clarence slag the sulphur was reduced to 0.186%.

All these experiments clearly prove what desulphurizing power slightly basic silicate possesses, yet Janoyer found on the large scale in the blast-furnace that "when iron-pyrites existed in sensible proportion even with excess of lime he could not produce good gray iron. The sulphur in the iron was found to diminish in proportion to the amount of lime added ceteris paribus, but it was impossible to add sufficient lime to effect complete desulphurization, and at the same time produce a fusible slag." Unfortunately all the conditions are not recorded, and we are not told what quantity of pyrites was actually present. Howe says that the practice at the Illinois Ironworks proved that when dolomite (magnesium-limestone) was replaced by calcite (ordinary limestone) less sulphur was found in the metal, showing that lime is a more efficient desulphurizer than magnesia.

Magnesium-limestone has never been used successfully in smelting Cleveland iron. Whenever a trial has been made with it, the iron has invariably changed from gray to mottled and white, and the sulphur has been increased in the pig; the slag at the same time changing in character from a free flowing to a viscous material. In the manufacture of Bessemer iron, magnesium-stone has given better results, but in one or two cases after a trial it was abandoned in favor of limestone. There is no objection to its use in furnaces producing spiegel and ferromanganese, as the manganese is sufficient to remove the sulphur, and there is an advantage, in that the slags may be exceedingly basic and yet not disintegrate when cold.

From what has been stated, it is clear that by far the most potent agencies at work in a blast furnace for the removal of sulphur are a sufficiently elevated temperature accompanied by a sufficient quantity of basic silicate of lime. So far as I know, alumina is inert as a desulphurizer, but its presence in the slag causes it to be more fluid, and makes it possible to add a greater quantity of lime without rendering the slag viscous and thick, and although not a direct agent in removing sulphur, it assists indirectly in arriving at such a result.

**How the Sulphur Behaves in the Blast Furnace.**—We must now endeavor to follow the material containing sulphur from the time it is charged at the top of the furnace till it eventually comes out at the base. At first, when the temperature is considerably below redness, the sulphates of lime and baryta, if present, will not be materially affected; when it arrives at the point where the temperature approaches redness, these bodies will be reduced to their respective sulphides, and at a point below this, when the temperature is high enough to produce the lowest quality of white iron capable of being fluid, whether at the tuyeres or at some distance above (the distance depending on the quality of the iron being made), we may presume such fluid iron will have in combination with it all, or practically all, of the sulphur originally present in the ore, whether it existed in barium or calcium sulphates, or as sulphide of iron. As little of the coke is consumed before it comes in contact with the blast near the hearth, the sulphur present in it, in a great measure, may be considered to be so locked up, and that it is not until the carbon is burnt away that the sulphur present in it has a chance of passing into the fluid iron.

Now, in proportion as the temperature is more or less elevated, so also will the reducing power of the coke or carbon be greater or less; and the higher it is, the longer will be the distance above the tuyeres at which fluid cast iron is at first produced, and the greater the distance which such iron will have to travel before it reaches the hearth or well. During such passage it will be exposed to higher and still higher temperature, encountering everywhere surrounding it hot carbon, lime, and basic silicates; under circumstances like these we can readily understand how sulphur passes into the slag. If the reducing power is sufficient, and the necessary quantity of lime or basic silicate is at hand, more or less of these silicates will be reduced, the silicate uniting with the iron, and the base metal be made available for at once removing the sulphur. In this way it will be seen that the conditions which favor the reduction of silica, are also, if bases are present (and they almost invariably are), just the conditions necessary to remove the sulphur. Probably the sulphur from the coke, in a hot furnace, in presence of calcareous slags and intensely-heated carbon, combines with the bases almost at once and never enters the metal; for both free sulphur and sulphurous acid, if passed

over a mixture of carbon and lime at a strong heat, are absorbed, calcium sulphide and carbonic oxide resulting. On the other hand, if the temperature is low, although perhaps half the sulphur may be retained in the slag, the balance will be found in the metal.

In making very low quality pig iron its fusion point must be very near to the tuyeres; for if a furnace working in such a condition is slightly cooled below the already low temperature, the hearth will be closed up by the solidification of the metal and slag, the temperature falling in such case below the melting point of the iron. Further investigations are required to determine definitely and exhaustively the question as to the behavior of sulphur in a blast furnace, at least in so far as the chemical changes are concerned.

DESULPHURIZING IN PUDDLING AND OTHER PROCESSES DEPENDING ON THE ACTION OF FLUID BASIC IRON SILICATES.

Dr. Percy says, with regard to the elimination of sulphur in the puddling furnace, it "is always, as far as my knowledge extends, very imperfect. It may possibly be oxydized with the oxygen of the air, but some of it seems to pass into the cinder in the state of sulphide of iron." (663.) Practically all other investigators have reached in substance the view of Dr. Percy; and nobody seems to have given the question the serious consideration it deserves. Parry states "that in his experience the effect of puddling is to reduce the original sulphur to about one-third." (666.) Mr. Snelus, in his report on the Dauks process, has clearly shown that the amount removed, in a very great measure, depends on the original quantity; and we find that when the sulphur was exceedingly low (0.03 per cent.) there was no elimination whatever, but that when the quantity amounted to 0.76 per cent. the proportion removed reached 90 per cent. Harbord has calculated, from the results given by very many investigators, that on an average 55 per cent. of sulphur passes off, and that the amount greatly depends on the quality of the cinder. My own experience with the ordinary puddling process confirms exactly that of Mr. Snelus.

In the old days it was common to practise to puddle iron containing from 0.50 per cent. to 0.70 per cent. sulphur, and yet the puddle bar rarely contained 0.10 per cent., the average approximating more closely to 0.07 per cent., some of which must have been in the cinder, entangled in the bar, and not combined with the iron. On one occasion, during a strike of limestone men, the furnace manager at Witton Park was reduced to the necessity of substituting blast-furnace slag for limestone. The result, as expected, was pig-iron charged with nearly the whole of the sulphur of the materials, amounting from 1 to 1.25 per cent. It was in fracture a fine silvery white. The silicon had remained normal (at 1 per cent.), and had not increased, as it was expected it would. This pig puzzled the puddler; he could not get it to ball up, and, as was customary in these days, he struck work. Some of the bar, made after a very careful handling at the hammer, contained little over 0.12 per cent. of sulphur; there had, therefore, been an elimination of about 90 per cent.

**The Washing Process of Sir Lowthian Bell.**—This process consisted in acidating together in a suitable furnace molten oxides of iron and fluid iron. The following result was obtained of the iron before and after treatment:

	Before. Per cent.	After. Per cent.
Carbon.....	3.261	1.273
Silicon.....	1.493	0.109
Sulphur.....	0.113	0.024
Phosphorus.....	1.516	0.065

Amount of sulphur removed, 78%.

**Krupp's Process.**—This process, very similar to Bell's, but patented two months later, depends on the action of an oxide of iron and manganese lining in a rotary furnace, upon molten iron, which action is discontinued before the carbon is materially acted upon. Analyses given by Holley show that at Krupp's works the following changes were effected—:

	Pig used. Per cent.	Refined Iron. Per cent.
Carbon.....	3.30	3.32
Silicon.....	0.39	0.023
Phosphorus.....	0.74	0.105
Sulphur.....	0.09	0.029
Manganese.....	2.32	0.058

The oxides used amounted to about 14 per cent. Had all the sulphur remained in the slag, it should have contained about 0.42 per cent., whereas analysis recorded only 0.08 per cent. Amount of sulphur removed, 68 per cent. The large amount of manganese present in the iron is probably responsible for the elimination of part of the sulphur.

**Henderson's Process.**—In this process the base or hearth of the furnace was covered with a mixture of fluor-spar and oxide of iron, both in powder, and upon this cast-iron was poured. The heat of the metal melted the mixture, which, passing upwards, removed silicon, sulphur and phosphorus, and part of the carbon. The amount of sulphur removed appeared, by the analysis given, to vary; but indicates a sulphur-elimination, between none, in very pure iron, to about 99 per cent. in iron high in sulphur. It would appear that in this process the oxide of iron is responsible for the elimination of the sulphur; but it is probable that the fluor-spar may have had some effect.

Practically, then, all these processes depend upon the action of fluid oxides of iron or of basic silicates of phosphates of iron; for we may take it for granted that in these cases where the liquid iron is heated in contact with the solid fettling, the latter is actually fused before it can have much effect. The chemical changes we may therefore consider to be the same in each. We must note, however, as before mentioned, that the very high percentage of manganese in the Krupp metal, must have itself effected a considerable desulphurising action, and that in this process the oxides of iron are not alone responsible for the elimination of the sulphur.

(To be continued.)

\* Journal, Iron and Steel Institute, I., 1877.

## THE LATE MARCUS G. HEILNER.

Marcus G. Heilner died at his home, No. 23 West Ninety-third street, this city, on Sunday morning, Nov. 6, in his 79th year, and was interred in Woodlawn cemetery on Wednesday, Nov. 9. In the *ENGINEERING AND MINING JOURNAL* of Feb. 14, 1891, we reviewed the career of Mr. Heilner, showing the prominent part he took in the early development of the anthracite coal field in Schuylkill county. From that article we summarize that . . . his experience covered the development of the anthracite coal trade from the primitive state in which he found it in 1837 to the wonderful development of to-day. . . . Born in Berks County July 2, 1814, he found himself in his early youth in Schuylkill County, and at the age of 23 entered upon an active business career with his father, which led to extensive operations on Wolf Creek, near Minersville, on the Black Heath vein, and at Donaldson. On his father's death he formed a co-partnership with his brother, Percy, and opened up on the Miller tract the red ash veins, known as the Gate vein, Salem vein, Tunnel vein and Black Mine. In 1853 they dissolved, and Marcus G. transferred his operations to Ashland and Silver Creek, where he remained until 1867, when he discontinued mining and came to New York to engage in the wholesale coal trade under the name of Heilner & Son, up to the time of his death. His individuality was so marked that we quote bodily:

"Mr. Heilner's personal characteristics all tended to make him a conspicuous figure during his mining career. Possessed of a strong and active body, a clear and comprehensive mind and an un daunted spirit, he passed through all the vicissitudes of an operator's career, both in the problematical outcome of new mining ventures and the physical dangers to which men of his energy and prominence were exposed during the turbulent and lawless period of the Molly Maguire reign. On several occasions he was in imminent peril from the ruffianism then rampant in the region, and was only saved from actual harm by his well-known coolness and courage.

"From his long experience in every department of this great industry,



THE LATE MARCUS G. HEILNER.

Mr. Heilner was, undoubtedly, one of the best informed authorities on all that pertains to the coal trade. He was a gentleman of the old school, frank, kindly, and with a high sense of honor."

Mr. Heilner's death marks an epoch in the history of the conduct of the coal business, as he is the last of that hardy and adventurous set of pioneer operators who penetrated into the new regions prospecting and opening up new operations—frequently most hazardous undertakings, as is indicated by the numerous physical and financial wrecks that marked the path of development. The difficulties under which these early operators labored were very great, the vicissitudes of startling frequency—few, if any, fortunes being realized in the industry until the great stimulus of war times overtook the trade. These were the men, however, who "spied out the land," made the developments, and nursed into busy life and activity the numerous smaller enterprises which to-day form the immense aggregate holdings of the great combinations. Mr. Heilner's death has a pathetic aspect in that it is the removal of the last link binding the old with the new. With him has disappeared the last of his class, men whose names to-day are merely a memory—Richard Kerr, James Oliver, Henry Guiterman, Lewis Audenried, Joseph Taylor, Potts, Reppier, Bast, Miller, etc.—all hardy, enterprising men, who paved the way for the present order of things. While Mr. Heilner's business career (particularly the early part of it) was one of ceaseless activity and vexation, he was peculiarly fortunate in his domestic life. In his early youth he married Miss Sylvia Butler, of Wilkesbarre, a woman of singular sweetness of character and charm of manner. She is a granddaughter of the gallant Col. Zebulon Butler, of Revolutionary fame, and a daughter of Zebulon Butler and Jemima Fish. Through her father she is also great granddaughter of the Rev. Jacob Johnson, the first minister in the Wyoming Valley. Mr. and Mrs. Heilner had the felicity of living together surrounded by a devoted family of children for over half a century, their golden wedding being celebrated four years ago. Mrs. Heilner, an unmarried daughter, and four sons survive him: George C. and M. Butler, who succeed to the business of Heilner & Son, 1 Broadway; Percy B. who is the general sales agent at New York for the Reading combination, and Walter, a lawyer at Philadelphia.

## THE HILL FARM-PARRISH MINE FIRE.\*

By Frank A. Hill, Dunbar, Pa.

The Hill Farm-Parrish Mine is located in the Conne!sville coke region, in Dunbar Township, Fayette County, Pa., about one mile from Dunbar station, on the Pennsylvania and the Baltimore & Ohio Railways. The mine is owned and operated by the Dunbar Furnace Company, and all the product is made into coke. It is opened by two slopes, the Hill Farm and Parrish, the latter being also called Ferguson. The Hill Farm slope, 4,100 ft. long, is 2,600 ft. northeast of the Parrish. The length of the Parrish at the time of the accident was 3,700 ft. The average dip of the coal is about 8° southwest.

The workings of the two slopes are connected in a number of places, and the gangways and rooms intersect in one general system. The most available connection at the time of the accident, June 16, 1890, was the Ferguson heading, the others being obstructed.

To do away with the disadvantages of carrying steam down a slope 3,500 ft. in length two bore holes were being sunk at the Parrish, one for steam and the other for the water. The steam hole, 8 in. in diameter and 505 ft. deep, was the first one drilled, and it was at the foot of this that the accident occurred. During the five weeks employed in its drilling frequent tests for gas were made, but none was found. At the time of the accident it contained about 475 ft. of water, and the bottom of it was in solid coal about 6 ft. from the rib of the slope. It was finished Saturday, June 15th. On Monday, the 16th, Kerwin, a miner, was ordered to cut into the bore-hole from the face of a small opening about 4 ft. from the rib of the slope. At 11 a. m. the face in which he was working began to "work." He and a companion ran up the slope about 100 ft. where they met the trip wagons with three men.

William Hayes, probably to alarm the men below, ran down the slope with a naked light. As he passed opposite the bore-hole his light ignited a feeder of gas, which blew out about 6 ft. and went back again, but was quickly followed by another, the gas burning as from the end of a pipe.

In an instant a muslin brattice opposite the hole was in a blaze, and in a few moments the slope was on fire. The men ran for a place of safety, making no attempt to tear down the brattice or to move the trip wagons, and the fire spread rapidly from one wooden object to another. An alarm was immediately sounded, and all the men on the left and one on the right side of the slope escaped up the Hill Farm manway. A man was sent to close the mouth of the bore-hole, so as to shut off any current in that direction. The mine boss and his assistant were at the slope mouth when the accident occurred, and started down the slope at once, but were driven back by the smoke.

Later in the day, after having visited all the rooms on the left side, by going down the Parrish slope and crossing to the Hill Farm manway, they, with others, succeeded in getting down, and found, about midway, two dead bodies. Continuous and desperate efforts were made to cross the slope to the men on the right until 10 o'clock at night, but without success. Two fans were then erected, one at the Parrish slope and the other at the Mahoning, which adjoins the Hill Farm on the north and is operated by the Cambria Iron Company. These fans were kindly furnished by Superintendent Lynch, of the H. C. Frick Coke Company, and one of them, with its engine, was put up in 17 hours.

It was evident that the quickest way of getting at the fire was from the Parrish slope, but it was considered the more humane plan to go and drive through the dividing pillar, between Hill Farm and Mahoning mines. A hole 4 ft. high by 6 ft. wide was driven through the tightly packed gob of old workings for 400 ft. and about 150 ft. through the solid coal. After two weeks the Hill Farm workings were partially explored, but no trace of the men was found.

During this period the flames were sweeping with increasing power up the Hill Farm slope to its mouth. As soon as this effort was given up we at once built wooden brattices in the Hill Farm side of the Parrish slope to protect the latter from the gases resulting from the fire and to cut off any supply of air to the fire from the ventilation of the Parrish workings. The mouths of the Hill Farm slope and manway were sealed

\*Abstract of a paper read at Reading meeting Amer. Inst. Min. Engrs., Oct., 1892

with brick and clay brattices, and all crop falls and openings were closed as fast as it was possible. In two days the odor of the leakage of blackdamp in the crop falls was plainly noticeable. This encouraged us, as no fire could burn in such an atmosphere, and we need fear no accumulation of firedamp.

We were now confronted with the question of how to recover the mine. Three plans suggested themselves: Open a new slope to the south of the Hill Farm slope; abandon the Hill Farm openings and hoist all the coal from the Parrish slope and carry it overland to the Hill Farm ovens, or fight our way down through the fire and falls and re-establish the old slope.

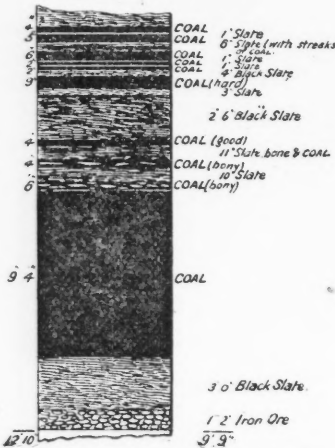
The first plan was set aside, as it would necessitate sinking the new slope through the abandoned workings for over 3,000 ft. with little prospect of excluding from it the fire or its resultant gases. The second plan was tempting as being the easiest and safest, though not most promising in its final results. The fire would remain in an unknown quantity, and would necessitate the transportation of coal over high grade road, making a double haul inside and out. The results would be uncertain and the fire conditions unchanged.

The boldest plan was finally decided upon, viz., to clean up the Hill Farm slope. This was undertaken with some misgivings, the only thing in our favor being the known presence of great quantities of blackdamp and the probable absence of firedamp.

On September 1st the mine was opened, after having been closed for 58 days. Our first thought was to recover the downcast manway entire, and then attack the upcast slope. We reached Kobles flat and found the manway fallen. We found the slope getting hotter and hotter as we advanced, until it was again in a blaze, and the fire encroaching on the workings to the south of the manway. At length the cribbing above us, between the slope and manway, caught fire, and we were compelled to seal up the mine again. Satisfied that we had made a mistake, we decided to cut through the manway into small sections, and clean up everything as we moved down. This general plan was carried to a successful issue.

Our first brattice (A) was erected on the manway, and the air current instead of continuing down the manway took the shorter way through

Section  
of the  
Connellsville Coal Bed  
at bottom of  
Bore Hole No. 1  
Hill Farm Slope



the "cut through" into the slope. Brattice (B) was then put up on the slope. These brattices were made of wood with the joints clayed, and were banked at the bottom with burned ore dust. The course of the air was then down the manway, through the "cut through" and up the slope. These brattices, erected under difficulties, gave us clean ventilation where we wanted it, reduced very materially the supply of air to the fire below and permitted the blackdamp from the old workings and the results of combustion from the smouldering fire below to collect and hold the fire in check. A line of water pipe  $2\frac{1}{2}$  in. diameter was laid along the manway and from it side lines of pipe and hose were laid up the slope. When the fire was watered out sufficiently the fallen material was hoisted to the surface. As each section was cleaned and made safe the slope brattice was first removed and then the manway brattice; the manway brattice (C) for the next section was then put up, followed by the slope brattice (D) and the ventilation thus advanced. This scheme of bratticing was continued until the water which had accumulated at the bottom of the slope was reached.

Several points especially hard to overcome are worthy of notice. On reopening the mine we found a new fall of slate just below "Bevils" flat. It was decided to cut through the pillar and around it. In doing this some of the loose coal was thrown on the fall. Several weeks later smoke and gas burst through the brattices, and we were again compelled to retreat. The fall, when cleared up, was found a mass of fire. I believe this to have been a case of spontaneous combustion.

Our great difficulty was at the "Narrow Timbers." We made two attempts to pass this point without success. We first tried to force our way down the old manway. After running great risks we reached Jacob's Ladder to find everything burning. We again retreated and decided to cut down through the rooms to the left of the manway, thinking we could get to the left of the fire and fight it toward the slope. After struggling through the abandoned rooms and pillars for 300 ft. we found the fire had reached out to our point of intersection with the Jacob's Ladder level. Thoroughly disheartened, we again closed the mine for several weeks.

When we again reopened we drove a new manway in the pillar between the slope and the old manway, and by cutting the "Narrow Timbers" section into very small portions, succeeded in getting through them. The fall here is about 40 ft. high and for protection from falls we were compelled to build cribbings and cross timber as rapidly as the debris was removed. These cribbings frequently caught fire and required constant watchfulness. After three months' work we finally cleared up and rebuilt "Narrow Timbers."

At the "A" and "B" flats we had great trouble with fire in the intercleaved seams of slate and coal which overlie the main bench of coal. We here verified the experience of other mine fires. Here, as at other points, there was no serious fire in the main coal, but in the slate, in its broken and cracked condition, the fire extended several feet into the rib and top. We had great trouble from this cause. We could not reach the fire with water. We could deaden it for several inches from the rib, but on leaving it and advancing it would burst out afresh. The fire was finally blasted out at the top and sides. A hole was drilled and cooled by water. When sufficiently cool dynamite was hurriedly inserted and fired, bringing down the burning slate and coal. It was quickly extinguished with water, and the work pushed on to the lower levels.

When, after numerous difficulties on the 1st of October, 1891, we reached the accumulated water, our anxiety was over and pumping began at once. On March 25th the water was lowered so that "J" or No. 10 flat was entered and the bodies of 23 of the men recovered. On April 12th the mine was dry and the remaining six bodies were taken out. We were able to identify each of the bodies and to give it to its friends for burial.

The immediate cause of the accident was the ignition of gas from the bore-hole, which fired a muslin brattice used to divide the air in the lower slope. This fire extended to the trip of wagons, from the wagons to the wooden overcast, from the overcast to the timbers at the pumps and from them up the slope. There was no explosion and there was no afterdamp. Wood smoke filled the mine and killed the men. There was a peculiar though simple combination of circumstances that fatal morning. Had Hayes delayed his trip down the slope a few seconds longer the gas would have been diffused and been non-explosive. Had the trip of wagons not come down when it did the fire would have burned itself out at the brattice.

The presence of the gas was entirely unforeseen and unexpected. Mr. William Duncan, State Mine Inspector of the Fifth Bituminous District, than whom there is no higher authority, contends that in this case the gas came from the 5-ft. coal bed about 75 ft. from the Connellsville bed. Mr. Duncan considers the 5-ft. bed the great gas reservoir of the district. This is the opinion generally held through the region. The main coal with us discharges no gas.

During the progress of the work we had black-damp and white-damp (carbonic oxide, CO) to contend with. The white-damp was the most insidious danger, as the men failed to recognize its presence until too late to escape its effect. I believe there was no fire-damp in the mine at any time during the work. Frequently in watering the fire we would have a slight explosion of gas which burned with a blue flame.

Our experience showed us that there is little coal destroyed by fire in a bed like the Connellsville seam. The face of the coal is coked and prevents further combustion by cutting off the air. If the fresh air coming in contact with the burning coal is reduced to a minimum, the fire can be held in check, but an infinitely small amount will support combustion in burning wood (our most stubborn fires were sustained by old timber); that the bituminous slate of the Connellsville bed sustains fire better than the coal; that the conditions for the extinguishing of fire have to be such as to insure the practical exclusion of air and the placing of water directly on the burning material. Last but not least, our experience taught us that we could not work on any preconceived idea, but that we were obliged to modify our plans daily, and that from the start to the finish our final success was very uncertain. The mine to-day is in a first-class shape, our only inconvenience resulting from the fire being in the frequent falls of the shattered roof of the slope.

Our experience has shown that there should be stone, brick or non-combustible brattices between all main haulage-ways and airways. All overcasts and air crossings should be made of stone, brick or iron. No steam lines should be permitted on main haulage-way or traveling-ways or airways. Bore-holes through overlying measures should be opened at times when no men are in the mine other than those necessary to perform the immediate work. Men of known skill and courage should alone be trusted to do the work. The mine boss should be on the spot when the work is done. Our experience again emphasizes the uncertainty of mining and the necessity of "eternal vigilance."

The credit for the success of this work is largely due to Robert Lang, our mine superintendent. His undaunted courage, persistent energy and constant watchfulness carried us through the work without the loss of a man or the serious injury of any one. He was assisted by Hugh Doran, William Beane, William Holsing, John Stevenson, shiftman, and John and Charles MacBride, and our employes did faithful work and without their fearless, honest effort this paper could not have been written.

The mine is open to the individual inspection of any one and can "speak for itself."

**Portland Cement for Steam Packing.**—A German inventor of Mayence has discovered that Portland cement can be used as a substitute for rubber and asbestos preparations in the packing of steam-tight joints. From extensive practical trials this cement packing is found to be quite as efficient as the others hitherto employed, and its cost is only a tenth of that of the others. The cement is made into a paste with water and spread in a layer from  $\frac{1}{2}$  to  $\frac{3}{4}$  in. thick over the surface of the metal. The plate or cover to be fixed is then placed in position and the screws are simultaneously screwed down very slowly. After the layer has been compressed to about  $\frac{1}{4}$  in. in thickness the screwing is stopped and the cement is allowed to harden for four hours. The screws are then turned further and the edges plastered again with cement. The joint is completed in eight hours after the making of the cement. This joint is certainly cheaper than those made with rubber or asbestos, but the time wasted in making it by this process is out of all proportion to the saving in first cost effected by its use.

WOODSTOCK IRON COMPANY, ALABAMA.

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

This company was founded in the early seventies in Calhoun County, Alabama, by the late Samuel Noble and brothers with works and ore banks located on the site of the present city of Anniston, which has grown from a furnace and mining camp to a city of about 12,000 population. The Woodstock Company in the meantime has increased its works until to-day they consist of both charcoal and coke furnaces; the plants occupy about 74 acres in the city of Anniston, and were erected at a total cost of \$760,629. The ore washer plant—three double log washers under one roof—is the largest in the South, erected at a total cost, including engine, boiler and all incline tracks complete, of about \$15,000. The company also owns 46,445 acres of land in Calhoun and adjacent counties, among which is included 9,328 acres of red ore land on the Alabama and Great Southern R. R. in DeKalb, Etowah, and St. Clair counties, Alabama, and Dade and Chattooga counties, Georgia. The greatest portion of their brown ore land is situated in and around the city of Anniston, where, since January 1st, 1892, they have already raised for consumption in their own furnaces 40,000 tons of iron ore (in round figures). From the same date to Dec. 31st, 1892, they will have produced 38,636 tons of coke pig iron, should the coke furnace continue in blast to that date. Of charcoal pig iron the production was 6,630 tons to June 28th, 1892, when the furnace was blown out. Of all the southern charcoal iron, none stands higher in the estimation of carwheel manufacturers than the Woodstock carwheel pig iron. I have before me the last report of the stockholders

the erection of the big washer, mining on Washer Hill has been on such a deep face as to preclude the use of the shovels. It is the purpose of the company to work or mine the hill clear of everything to the present grade of the floor of the cut, taking all clay and rocks heretofore left in the banks. The present workings are about 20 ft. deeper than any openings made in the past and tests made to still greater depth show the ore to improve in quality as depth is attained.

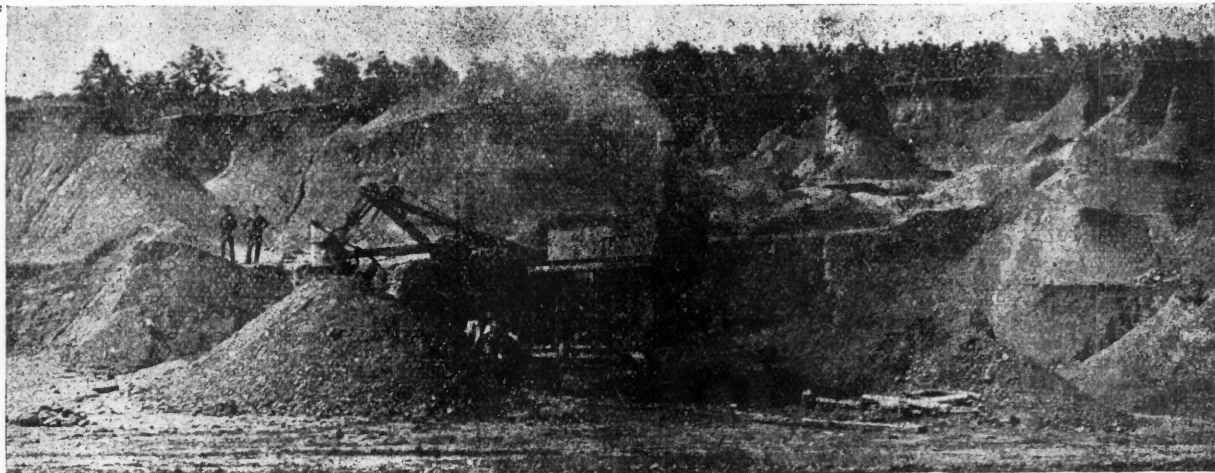
PROMISING PROSPECTING ENTERPRISE ON THE COMSTOCK.

Written for the Engineering and Mining Journal by Dan de Quille.

Two new movements are now in progress on the Comstock lode from which good results may be confidently looked for. One of these is the utilization of the Comstock tunnel in the transportation of waste rock from the lower levels of the mines, and the other the exploration at depth of the Brunswick lode, which occupies the most easterly fissure on the Comstock ore belt.

The Brunswick lode is traceable by means of several prominent outcrops for a distance of over 12,000 ft., and on it are situated the Occidental, St. Johns, Alabama, Bailey, Cosmopolitan, Monte Cristo and several other mines. The two mines first named lie south of the Comstock tunnel and the others to the north of it.

The proposition of sending waste rock out through the tunnel is the first movement toward the utilization of the tunnel for one of the pur-



BROWN ORE MINING AT THE MINES OF THE WOODSTOCK IRON COMPANY.

for the year ending March 31st, 1892, of which I find the following comparative statement of interest to all ironmen:—

CHARCOAL IRON.		Cost per ton of iron.	Difference in favor of 1892. Reduction.
Year ending.	Material used per ton.		
March 31, 1891.....	Charcoal 120 bu at \$3.70 per 100	\$3.04	
March 31, 1892.....	120 " " \$5.95 " "	7.67	\$0.37
March 31, 1891.....	Ore 2.06 tons at 3.13	6.45	
March 31, 1892.....	2.35 " " \$1.12	2.77	3.68
March 31, 1891.....	Limestone 958 lbs. 87c. per ton	.38	
March 31, 1892.....	690 " 69c. " "	.33	.05
March 31, 1891.....	Cost of Charcoal per 100 bu.	6.70	
March 31, 1892.....	" " " "	5.95	.75
March 31, 1891.....	Cost per ton of Ore	3.13	
March 31, 1892.....	" " " "	1.12	2.01
March 31, 1891.....	Average net price of iron per ton	18.89	Difference ag't 91-92
March 31, 1892.....	" " " "	15.62	3.18

Cost of Charcoal iron, year ending March 31, 1891, not including general expense, interest, taxes, etc..... \$17.92  
 Cost of Charcoal iron, year ending March 31, 1892, including above expenses.... 14.31

Difference in favor of year ending March 31, 1892, plus above expenses..... \$ 2.95

COKE IRON.

Cost of iron in 1890-91, not including general expenses, taxes, insurance and current expenses, per ton, \$13.21; cost in 1891-92, including taxes, insurance, current expenses, interest, per ton, \$10.33; difference in favor of 1891-92, plus general expenses, as above, \$2.88.

Coke, cost per ton of iron, 1890-91, \$5.11; cost per ton of iron, 1891-92, \$4.77; difference in favor of 1891-92, 34c. Average net price received for iron, 1890-91, \$11.40; average net price received for iron, 1891-92, \$10.22; difference against 1891-92, \$1.18.

Cost of ores per ton iron, 1890-91, \$3.93; cost of ores per ton iron, 1891-92, \$2.43; difference in favor of 1891-92, \$1.50.

The report also states: "While the operation of this (charcoal) furnace shows only a net profit of \$14,425.33 it must be remembered that the average price received for charcoal iron during the year was \$3.18 per ton less than the average price of the year previous, which would make a difference of \$47,874.90." "The average price for coke iron sold was \$10.22, as against \$11.40 per ton the last year, a difference of \$1.18 per ton, so you will observe that if the average price of coke iron had been the same for the last fiscal year as for the year ending March 31st, 1891, there would have been a difference of \$32,226.42 in the net result, whereas with the difference in price there was a net loss of \$3,689.66." The report goes on to state: "Those who are familiar with the iron market know that during the past 12 months the producers of iron have been constantly expecting a change in the market for the better, but, on the contrary, there has been a gradual depression, and with such over-production, as to almost demoralize the best furnace companies throughout the country." The accompanying illustration of the steam shovels at work on Washer Hill in Anniston will give some idea of the magnitude of the operations of this company. Since

poses for which it was originally intended. Heretofore, its only use has been as a drain tunnel.

In the new departure now just taken the Chollar, Potosi, Savage, Hale & Norcross, Gould & Curry, Best & Belcher, Consolidated California & Virginia, Ophir, Mexican and Union Mines will send their waste rock out through the tunnel, though the Gould & Curry and Best & Belcher cannot at once do so, as their connection with the tunnel was cut off by the great fire of June, 1887, which injured and blockaded the main working shaft (the Bonner) below the 1,300 level. By the terms of a contract between the Comstock Tunnel Company\* and the several mining companies the waste rock is to be carried out through the tunnel for 40 cents a ton. By this arrangement the mining companies will save 60 cents a ton, the cost of hoisting the waste to the surface from the 1,500-ft. level being \$1.00 a ton. It will also be a good thing for the tunnel company.

While work is being done in the mines there will always be waste rock to carry out. The quantity of ore to be handled may be limited, but of waste rock there is no end. Like the poor among the human family, it is "always with us." On the huge dumps below the hoisting works of the leading mines of the Comstock lie millions of millions of tons of waste rock. Had the tunnel company no more than 10 cents a ton for all these mountains of waste, it would give them more than ten times the amount of money their royalty of \$1 on each ton of ore hoisted has ever put into their coffers.

At present the waste is being hauled out through the tunnel by mule-power, but soon trains of cars will be run by electricity. The current for this use can be generated by the Pelton water-wheels and dynamos already in position on the 1,500-ft. level of the Chollar mine. Even with mules as propelling power, the tunnel company are doing very well. Four mules draw a train of 14 cars, each car carrying two tons, a total of 28 tons a trip. The tunnel is a little less than four miles in length, and for each trip made they are now receiving \$11.20 from the mining companies. Let the tunnel people make what they may at hauling the waste, the mine owners have no reason to complain, as on each such trainload of 28 tons hauled out they save \$16.80. Once the tunnel company begin running trains of rock cars by means of electricity, it is thought they will be able to clear about 20 cents on each ton of waste handled.

The amount of waste now being hoisted per month at the mines on the Virginia City end of the Comstock lode, from the Bullion north to the Union Consolidated, is 17,609 tons. This is shown by the average at each mine during six months. The transportation of this waste through the tunnel would amount to \$7,043.60 a month or \$84,523.20 a year; and the saving to the mine owners would be \$11,565.40 a month, or \$126,784.80 a year.

The exploitation of the large front lode, at the croppings of which a number of companies have been nibbling for a quarter of a century, is

\* For additional information concerning this company see the ENGINEERING AND MINING JOURNAL of Oct. 29.

an enterprise that will not only prove profitable to the tunnel company but may also prove a lucky venture for all interested in it, among whom are several of the leading mining men of the Pacific Coast. The exploring drift just started in the tunnel will pass through and prospect the St. Johns mine before reaching the Occidental mine, its objective point. The Occidental Company formerly refused to pay a royalty on the ore extracted by them on the ground of not being connected with the tunnel, but now they have contracted to pay the Comstock Tunnel Company \$12,940 back royalty up to September 1st, 1891, and thereafter \$1 a ton royalty on all ore taken out of the mine, the money paid to be applied to the running of a drift southward in the Brunswick lode. The tunnel people are to run this drift 1,000 ft. or 2,000 ft. at their option, and when the drift is completed the Occidental will pay the same royalty that is paid by other Comstock mining companies.

The object of the new drift is not only to connect the Occidental mine with the tunnel, but also to prospect at depth the intervening St. John's claim. Ground was formally broken in the new drift on the 10th of October, 1891.

The Brunswick lode, where cut by the tunnel, is 113 ft. in width. Its course is almost north and south, and it has a dip to the east of 45°. The tunnel passes through the lode at a depth (on the slope) of about 2,300 ft. below the cropping, and at a vertical depth of 1,361 ft. below the surface. The lode at the tunnel level is a solid body of quartz; and in its center, 11,613 ft. from the mouth of the Comstock tunnel, was started the new drift. As the rock is firm and dry no timbers are likely to be required in the drift, which will be run in a direct line to the Occidental mine.

At the point where it is cut through by the tunnel the vein contains sufficient precious metals to show that it is fertile—that the quartz is of a kind in which ore can "live." No ore that will pay for milling is exposed, yet the vein is so far mineralized that small assays are obtainable in all parts of it, and selected samples have been taken from it that went as high as \$30 a ton. This is a very encouraging feature. That a "bonanza" did not happen to be found at the particular point where the tunnel passed through it does not at all detract from the value of the lode in the eyes of experienced mining men. A "chimney" of ore is liable to be cut into at any time in drifting along on the course of the vein; indeed, ore may exist directly above the tunnel. Had the Sutro tunnel been run into the present Consolidated California & Virginia ground in the early days it would have cut through quartz that would have given no hint of the great bonanza above—the biggest ever found on the Comstock lode.

It is not alone by what is to be seen in this large front lode at the level of the tunnel that we are to judge of its value. At various points along its whole length paying ore has been found at and near the surface. At the Occidental mine bullion to the value of over a million dollars has been extracted; from the St. John's (now Zadig) many thousands of dollars have been taken first and last, and the same is true of the Bailey, Monte Cristo and other mines on the lode, though all the work has been done at and near the surface. Between the surface croppings and the Comstock tunnel level (a distance of over 2,000 ft.) there is room for several first-class bonanzas; and there is ore to begin with at the surface, showing where chimneys exist. It is strange that a drift was not run long ago on this great front vein, considering the advantages afforded by the tunnel; but it would seem that those in possession of means sufficient for the undertaking were intent upon various projects on the main Comstock lode, while the men controlling the mines on this front vein were able only to work them in a small way. All who own claims on the Brunswick lode are interested in the exploitation now commenced. The new drift will tap the Occidental mine at a depth of 1,000 ft. below the level of the lowest tunnel. The connection with the mine will not only give perfect ventilation, but will also afford excellent facilities for working. Small Pelton water-wheels may then be used for driving various kinds of underground machinery. All the waste rock of the mine may be sent out through the tunnel and a great saving made in that way.

Once the drift is in 1,000 ft., cross cutting will be commenced in the Zadig; also "upraises" will be made in the vein. There will be a great body of quartz to explore. Taking the dip of 45° the vein would measure to the top of shaft No. 3 (near at hand), 1,925 ft. Calling it even 1,900 this would give in the first 1,000 ft. of the vein a body of 214,700,000 cu. ft. of quartz to explore.

The Brunswick lode is an immense one. Huge masses of quartz are to be seen along the line of its croppings and the vein is thus plainly traceable through all the locations that have been made on it, and the Keyes mine at the north, and the Buckeye on the south, are undoubtedly on the same lode. This shows the east fissure to be a very strong one—a fissure worthy of constituting the eastern boundary of the Comstock silver belt or "gang-zug," as the Germans would call it.

Many fractures are everywhere to be found in the propylite, but the two great fissures are the most westerly ones, on which are seen the Comstock croppings, and that farthest east on which is the Brunswick lode. The first vein of quartz cut by the Comstock tunnel was what is known as the Silver Star. It is evidently a branch or offshoot of the Brunswick lode, with which it will probably be found to unite in going to the southward.

The Brunswick lode shows all the ear marks of a true fissure. Among these may be mentioned the strength of the croppings, the great distance to which the vein is traceable on the surface, and the heavy clay gouge found next to the hanging wall. Besides this there is to be seen at the Occidental a feature of interest of a kind to be found on the surface in no other place along the Comstock ore belt. This is a section of the footwall that projects about 30 ft. into the open air above the body of the vein. This patch of exposed footwall has been (by attrition) rendered as smooth and polished as a piece of glazed pottery.

Although the Occidental mine was located over thirty years ago, and there has been steam hoisting machinery on it for several years, the greatest depth now attained is only 750 ft. In other claims taken on the lode (the Brunswick) about the same time very much less work has been done. The Monte Cristo has been explored to no greater depth than 150 ft. and in all the other claims there has been mere surface scratching. The exploitation of this great front vein should be of much interest to the mining world. In all this Comstock belt undoubtedly occurred numerous injections of igneous rocks affording the conditions of solfataric action to metalliferous deposits, therefore there is no good reason why this huge vein should not contain some valuable bonanzas.

#### THE BASIC BESSEMER STEEL PLANT OF THE POTTSTOWN IRON COMPANY.\*

By Joseph Hartshorne.

Continued from page 439.

The cupolas in use are fitted with the Greiner attachment, which we estimate effects a saving of about 20% in the fuel. Owing to the necessity for melting very hot, our fuel ratio is higher than it otherwise would be. We have melted as much as 64,000 lbs. of iron in an hour in one cupola. When using coke we have melted 14 lbs. of iron per pound of fuel, bed not included. The Greiner attachment does not appear to have increased the speed of melting; but on this point we cannot yet speak with certainty, as the cupolas have not been pushed to their full capacity for any length of time. They last from 80 to 100 heats on one patching.

Between the cupolas and the vessels stand the ferro-manganese heating furnaces. These furnaces were originally designed to heat lime in their stacks. At the speed at which we are now running we do not find this to be necessary, and we now add the lime cold. The lime, ferro and scrap are hoisted to a platform in the roof, whence they are fed into the vessels by means of chutes.

There are three vessels, two of 10 and one of 13 tons, nominal capacity. They are 10 ft. in diameter at the trunnions, and 17 ft. high from tuyere plate to the nose. The difference in capacity is due to the shape of the vessels. The smaller are drawn in toward the tuyeres below the trunnions, while the larger is straight from above the trunnions to the joint. We find the latter to be the preferable shape.

The average thickness of the lining is 15 in., which is rammed up in the ordinary manner around an iron or wooden "former" or core. The bottom has seven tuyeres, 24 in. long, each of which has seven  $\frac{1}{4}$ -in. holes. The bottom is first rammed up around the tuyeres and put on the vessel. The lining is next rammed up and the core taken out. The vessel is then fired until it is thoroughly hot, and the first heat is taken off of it as soon as possible. After this, the lining will stand for some time (two or three days in summer and longer in winter) without deterioration from atmospheric causes. It takes about 36 hours to ram up a vessel, or about 48 hours from heat to heat.

The average life of a lining is about 150 heats. I do not know the average life of a bottom. We have stopped keeping any accurate record of them. We have had several which have run over 1,500 heats, and I should say that our average for the past year was between 800 and 1,000 heats. The bottoms now on the vessels have run 353, 266 and 104 heats, respectively. When it is necessary to repair the linings the bottoms are removed, and when the vessels are ready for relining they are replaced in the same condition as they were taken off, no work having been done to them in the meantime. The last bottom was lost by its sticking to the joint as it was being taken off to repair the lining.

During the six months ending June 30th, 1892, we used an average of 1.9 tuyeres to a blow. At present the average since July 1st is 1.17 to a blow.

After each blow the bottom plate is taken off and the tuyeres examined. If any are too short, they are knocked out by means of a long bar run in from the nose, and new ones are put in their place. The plate is put on again and gentle blast is turned on the vessel. "Slurry," consisting of crushed brick and tar is thrown in, until the holes around the tuyeres are filled up, and the bottom has been brought up to the original level. Strong blast is then turned on and the vessel is allowed to stand a short time for the "slurry" to set. A full set of tuyeres can be changed and the bottom built up, in 20 minutes or less. This is shown by the fact that we have made 25 heats in 11½ hours. This means intervals of 25 minutes between blows or 50 minutes between blows on the same vessel, since we always have two in service at the same time. We have not yet reached the capacity of our vessels.

In front of and between the vessels stand two hydraulic cranes. These cranes raise, swing, rock in and out, and tip the ladle by power. They are used for charging the vessels and taking the steel away from them.

The steel ladle is placed by the cranes on a traveling casting crane, drawn by a locomotive, which runs along the side of the pit. The latter is straight and at right angles to the converting house. It is served by three ordinary Holley cranes, and one Wellman crane for handling the ladles. The ladle repair shed is at the opposite end of the casting house from the vessels. The hot molds are placed upright upon cast iron cars and are shifted out of the mill, while the ingots are sent over to the blooming mill in an upright position. The average weight of our ordinary ingot is 5,500 lbs. They are 17½ in. × 12½ in. at the bottom and 6 in. × 20 in. at the top, by 78 in. long. We are obliged to use many different sizes of molds, which run from 12 in. × 12 in. to 24 in. × 24 in. in squares, and from 12 in. × 16 in. to 10 in. × 31 in. in rectangles. The heaviest ingots weigh about 7,000 lbs. each and the lightest 3,000 lbs.

The blooming train is 36 in. between pinion centers. The rolls are 30 in. in diameter on the collars, with 2 in. deep grooves. They have 32 in. rise, so that a 36 in. slab can be edged up, if necessary. This is somewhat hard upon the mill, however, as the spindle is a little short for so great a rise. The grooves in the set commonly used are 10 in., 7 in., 5 in. and 4 in. in width, with a 30 in. "bull head" in the middle. On these rolls we have rolled squares from 4 × 4 in. to 15 × 15 in., and flats from 12 × 1½ in. to 28 × 4 in. Train is driven by a 40 × 48 in. Southwark reversing engine.

The ingots are heated in three upright or Hainsworth furnaces. Two of them have two pits each, while the other has four pits. The ingots from No. 3 furnace are swung directly from the pit into a tilting chair, which places them on the table. They run down this table by gravity until they reach the driven roll tables. These roll tables are much too light for the ingots they are now handling, and will soon be replaced by heavier ones. They were originally designed to handle ingots weighing not over 3,000 lbs. each. The new tables will have rollers 12 in. in diameter, and 1½ in. thick, with 6 in. journals cast on them. The journals will run in cast iron bushings, slipping into square boxes, which latter are dropped into recesses cast in the roller housings.

At present we have but 53 ft. from the rolls to the shears, but with the new tables we will have 163 ft. The shears are of the geared guillotine

\* Read at the Reading Meeting of Amer. Inst. Min. Engrs., Oct., 1892.



type, with two speeds. They were guaranteed to cut a slab 6 in. x 30 in., or 180 sq. in. area, but will not stand such heavy work. We, therefore, limit ourselves to 100 sq. in. of section. To remedy this drawback, and for other purposes, we propose to put in a hot saw capable of cutting a square 15 in. x 15 in. or a slab 36 in. x 7 in. in size.

We are also erecting, in connection with the new tables and shear location, a wire rope billet and slab conveyor, built by the Trenton Iron Company. It is similar in general design to the one built by them for the Wellman Iron and Steel Company, which was designed by Mr. S. T. Wellman. This conveyor will cover about 700 ft. available loading space. The slabs and blooms will be loaded on to the cars by Yale & Towne locomotive cranes (one of which is now in operation). It is also proposed to load the nail slabs for our own consumption directly from the conveyor on to iron cars.

The blacksmith shop is situated at the southwest corner of the blooming mill. It contains nine fires, one 650 lb. Morgan hammer and one 1,000 lb. Sellers hammer.

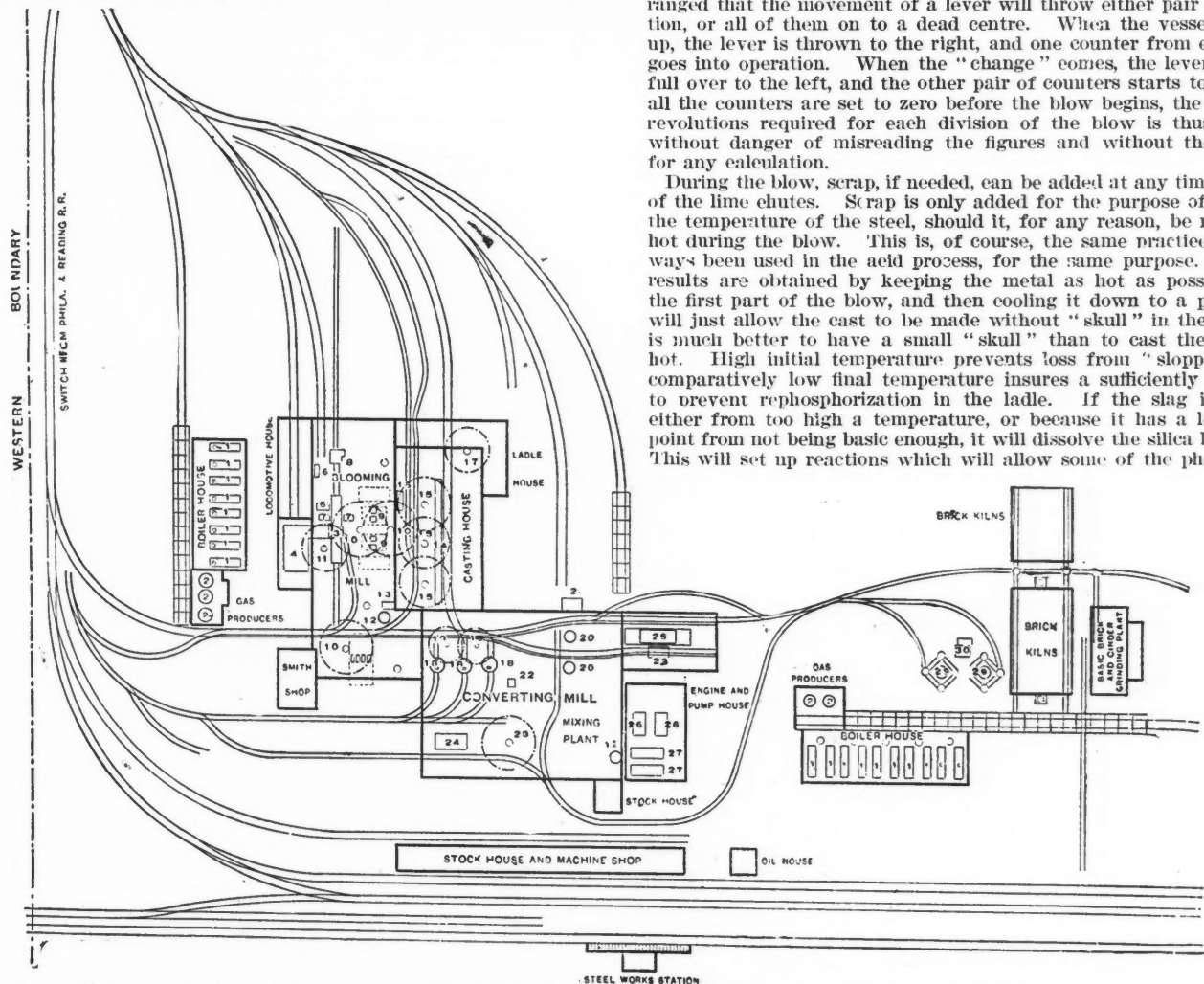
The last building in the line is the blooming mill boiler and prodner house. It contains three Wellman producers and eight return tubular boilers, similar in most respects to those already described. The only dif-

creased. On the other hand, it is decreased if we are running too hot. After the bed has been put in the cupola, the fuel is charged in 1,000-lb. lots, the amount of metal charged being then regulated by the rapidity of melting, and the initial temperature of the melted iron. The iron should be charged into the vessel as hot as possible, as the tendency to "slop" is thereby greatly reduced.

The lime, of which we use from 11.5% to 13.0%, is charged cold into the vessel, and the iron is poured directly upon it. The lime used for the basic additions must be as pure as possible.

The two blowing engines are run at fifty revolutions per minute. A boy sits at the throttle of each engine, and keeps them at a regular and similar speed, by means of the speed indicator on each engine. This is done to insure accurate counting of the revolutions, and could, of course, be avoided if the engines were coupled together. We have attained such regularity, however, that the engines do not vary from each other more than five revolutions in a thousand. The blast pressure is maintained at about two atmospheres, or from 28 to 30 pounds per square inch. Each engine is connected with two revolution counters, placed in the blowing pulpit. These four counters are so arranged that the movement of a lever will throw either pair into operation, or all of them on to a dead centre. When the vessel is turned up, the lever is thrown to the right, and one counter from each engine goes into operation. When the "change" comes, the lever is thrown full over to the left, and the other pair of counters starts to work. As all the counters are set to zero before the blow begins, the number of revolutions required for each division of the blow is thus obtained, without danger of misreading the figures and without the necessity for any calculation.

During the blow, scrap, if needed, can be added at any time by means of the lime chutes. Scrap is only added for the purpose of regulating the temperature of the steel, should it, for any reason, be running too hot during the blow. This is, of course, the same practice as has always been used in the acid process, for the same purpose. The best results are obtained by keeping the metal as hot as possible during the first part of the blow, and then cooling it down to a point which will just allow the cast to be made without "skull" in the ladle. It is much better to have a small "skull" than to cast the metal too hot. High initial temperature prevents loss from "slopping," while comparatively low final temperature insures a sufficiently viscid slag to prevent rephosphorization in the ladle. If the slag is too thin, either from too high a temperature, or because it has a low melting point from not being basic enough, it will dissolve the silica ladle lining. This will set up reactions which will allow some of the phosphorus to



GENERAL PLAN OF BASIC BESSEMER STEEL WORKS, POTTSTOWN IRON COMPANY, POTTSTOWN, PA.

ference is that these boilers have a separate stack each, while the others have one stack to each pair. For these boilers, buckwheat anthracite coal is used exclusively. One of them is fitted with a McCleave grate. With the Sheffield grate we have evaporated 10.37 lbs. of water with one pound of combustible, while with the McCleave grate we have evaporated 9.63 lbs of water with one pound of combustible, from and at 212 deg. Fahr.

The above description, taken in connection with the general plan, will serve to give a fair idea of the design of the plant and part of the practice. I will only further trespass on your time by adding a few words as to our practice in conversion. This practice is largely built upon that developed by Mr. Ernst Bertrand, now director of the steel works and rolling mills of the Prager Eisenindustrie Gesellschaft at Kladno, Bohemia, and formerly superintendent of the steel works of the Teplitzer Walzwerk. Mr. Bertrand acted as our consulting engineer for several years, and we are deeply indebted to him for much very valuable information and suggestion, both in the design of the plant and in the carrying out and development of the process.

The pig-iron we use has about the following composition:—Silicon, from 0.5% downwards; sulphur, from 0.02% to 0.04%; manganese, about 0.8%, and phosphorus, from 2.50% to 3.00%. The cupola mixture is so arranged as to contain about 0.3% or less of silicon; 0.03% or less of sulphur; 0.8% of manganese, and phosphorus as required by circumstances. Phosphorus is, of course, our principal heat giving element, and the amount of it in the charge is regulated on that basis. If, for any reason, such as slow running or cold melting, we need more heat at the pit, the phosphorus content of the charge is in-

pass back from the slag into the steel. This fact has been proved by taking samples from the vessel before pouring, and others from the ingots as cast. If the slag is too thin, the latter are invariably higher in phosphorus. It is also shown by the fact that, in the rare cases where there is any difference between the ingots, the last one is invariably the higher in phosphorus.

The "change" is determined by means of the spectroscope. The length of the after-blow is determined by the amount of air blown through the metal. This amount is measured by means of counting the revolutions of the blowing engines, as explained above. In deciding when to turn down the vessel, we pay no attention to the element of time, nor to any indications given by the smoke or flame.

The average length of the blow, on our present charge of 26,000 lb, is sixteen minutes. The fore-blow averages eleven minutes and the after-blow five minutes, in length. We have had, however, many blows lasting from twenty to twenty-five minutes. The longest blow was fifty-two minutes, and the shortest was eight minutes. The latter was made on a charge of only 18,000 lb. The longest after-blow was eighteen minutes, and the shortest was one minute and eighteen seconds. The latter was made on an 18,000-lb charge also.

As the vessel turns down, the ferro is dropped into it by means of the lime chutes. The ferro passes immediately through the slag, but it is hardly melted before the vessel comes to rest in the horizontal position, the interval being only about two seconds. We use from 0.6% to 0.8% of an 80% ferro-manganese.

(To be continued.)

## SEVENTEENTH ANNUAL REPORT OF THE CHIEF INSPECTOR OF MINES FOR OHIO.

R. M. Haseltine, the Chief Inspector of Mines, has filed with the Governor his annual report for the year 1891. The report takes up all the subjects embraced by the department with a completeness which indicates a careful study of the mining industry of the State.

The harmonious relations existing between the operators and miners during the past few years are still maintained. No occasion arose during the year whereby the aid of the courts was employed to enforce the mining law, and the appropriation made for that purpose was returned unexpended.

The report shows that there were 859 mines in the State, 802 of which were in operation, which is a gain of 78 over the preceding year. The average time worked was thirty-three and one third weeks, which is a loss of three days; 21,081 miners and 2,916 day hands found employment in and about the mines during the year. Sixty-six new mines were opened, 76 remained suspended, and 67 were either worked out or abandoned.

One thousand four hundred and thirty-three inspections were made by the members of the department; 60 sets of scales were tested, and 194 permanent improvements made in the mines. Of these, 53 were new furnaces built, 17 were fans erected, 55 were air shafts sunk, 26 were second openings made, 19 were pairs of safety-catches placed on the cages, 19 were stairways built, and five were speaking tubes placed in shafts where the human voice could not be distinctly heard.

The statistical portion of the report indicates the year to have been one of great prosperity. The coal tonnage of the State was 13,050,185 tons, exceeding that of the preceding year by 1,231,335 tons. This amount of gain has been exceeded but three times since the creation of the department. The counties of Athens, Hocking and Perry, commonly known as the Hocking Valley, produced 36-40% of the entire output of the State. There was also an increase of 1,904 miners as compared with 1890, while the number of day hands decreased 36.

The production of fire-clay amounted to 1,087,560 tons, a gain of 254,401 tons over 1890. The number of persons engaged in mining fire-clay increased 181, and the hands engaged in manufacture, 1,563.

The production of iron ore amounted to 67,980 tons; of this amount, 15,540 tons were of the black band and 52,440 tons were of the hematite variety. This industry for several years has ceased to be much of a factor in the mineral production of the State, as is shown by the fact that the decrease during the past year amounted to 110,104 tons.

In the limestone industry gains were made in six of the nine classifications of stone. The number of hands employed was increased by 844 and the average time worked in each county decreased five weeks.

There were 44 fatal, 66 serious and 152 minor accidents during the year, from which we derive the fact that 296,595 tons of coal were mined to each life lost; 197,750 to each serious accident and 118,638 tons to the total number of both serious and fatal casualties. The causes of the accidents are attributed to three sources, viz.: Falls of coal, falls of roof and coming in contact with the mine cars, which causes furnished 70-50% of the total number of accidents.

Light carburetted hydrogen gas was found in 27 mines in the State, but no fatal accidents were reported from this cause.

The introduction within the last two years of large numbers of unskilled miners is severely criticised by the inspector, as a large number of the casualties are attributable to this cause.

The increase in the number of mines adopting mining machines has fallen short of the expectations at the beginning of the year. The Flushing Coal Company, in Belmont County, was the only one added to the list, while at five mines in which they had been installed at the close of the preceding year their use has been discontinued. Of these, three used electricity and two compressed air as motive power. Mining machines are used in 21 mines in the State. Of these, 13 use compressed air, 6 electricity and in two cases both powers are employed; 1,654,081 tons, a gain of 505,632 tons over the preceding year, were produced by this means, which furnished employment to 900 hands. There are 114 mining machines in use, of which 25 are of the electric type while 89 use compressed air. Coal is transported by electric motors in two mines in the State.

The Chief Inspector handles the subject of machine mining in a manner showing a careful study of the subject to have been made.

A prominent feature of the report is the subject of illuminating oils used in the mines. A table showing the analysis of 38 samples taken in different counties indicates that in almost every instance they were found to be heavily adulterated with mineral oil. This subject has received a good part of the inspector's time and attention.

Another prominent feature, and one which should receive the attention of the General Assembly, is an article on the wasteful methods of mining the coal in the State. The methods of mining and the matter of allowing large quantities of coal to remain unmined in abandoned workings, as is being done almost daily throughout the coal fields of the State, are treated in a critical manner which shows a careful canvass of the subject to have been made. This should receive careful consideration and if possible be remedied.

The report is the largest and most complete ever issued by the department and will be of great interest to all connected with the industry.

The public printer is now ready to begin the work on it and Mr. Haseltine expects to have it ready for distribution in a few weeks.

**Coppet's Method of Treating Minerals Containing Nickel.**—A patent. No. 484,875, has been issued to Jean de Coppet, of Paris, for a method of separating cobalt and nickel from minerals, mattes, speiss and other substances containing cobalt, nickel and copper, by reducing the cobalt and nickel of the mineral to the metallic state and separating the metallic cobalt from the nickel and copper by means of an acid solution of copper.

**A Large Dressed Stone.**—The stoop stone to be laid in front of the Huntington mansion, Fifth avenue and Fifty-seventh street, will be the largest stone ever carried by rail. It weighs 24 tons and measures 22 ft. in length, 15 ft. in width and is 8 in. thick. At the present time it is being dressed at J. J. & F. P. Treanor's stone works, at Hastings-on-the-Hudson, and will be brought to the city shortly on Treanor's patent stone car. In front of the Vanderbilt mansion there is a stone weighing eighteen tons.

## THE MINERAL PRODUCT OF QUEENSLAND FOR 1891.

The production of antimony in 1891 amounted to but 217 tons valued at £3,625; the mines in the Gympie, Palmer and Hodgkinson districts remaining inactive owing to the low price of the metal. At Cocoa Creek, from which the greater portion of the output came, the ore contains a considerable percentage of gold, necessitating an expensive treatment at a distance.

Bismuth was produced to the extent of 117 tons valued at £11,070, against 31 tons in 1890 valued at £1,481. The Carrington Company in the Sellheim district has erected a large plant and has developed the mine thoroughly, making available a large quantity of ore. The demand for this metal, however, is exceedingly limited, so that a large output would lower the price, while the consumption would not be increased. A "combine" has, therefore, been formed to regulate the output. The Mount Biggenden mine, which contains both bismuth and gold, is being actively worked.

The production of coal has decreased from 138,334 tons in 1890, valued at £157,077, to 271,603 tons, valued at £128,198, owing mainly to the decreased production in the Ipswich and Wide Bay regions, the most important coal mining districts in the colony, owing to both labor troubles and slackness in the trade.

Copper is an unimportant product of this colony, only 98 tons of ore, valued at £875, being raised in 1891, against 1-5 tons, valued at £3,000, in 1890. Although large veins are known to exist, so far no profit has been made, owing to the difficulty of transportation of the ore to the seaboard.

The output of gold, which is by far the chief mineral production of this colony, suffered a slight falling off from that of 1890 during 1891, but 576,439 oz., valued at £2,017,536 10s., being produced, as against 610,587 oz., valued at £2,137,054 10s. in the previous year. This was due in a measure to the decreased production of the Mount Morgan Mining Company, Limited, in the Rockhampton district. The production of the Mount Morgan mine fell from 333,582 oz., valued at £1,331,484 18s. 5d. in 1889 to about 220,000 oz. in 1890 and to 143,795 oz. in 1891. The grade of the ore likewise fell from an average of 4 oz. 6 dwt. 4 gr. in 1889 to 1 oz. 15 dwt. in 1891. The cost per ton of ore in 1889 is stated to have been about \$15.

If the Rockhampton district suffered a falling off, Charters Towers made a material increase. The output of gold in 1891, some 223,403 oz., being the largest in its history; 173,789 tons were crushed with an average yield of 1 oz. 5 dwt. 10 gr. per ton, against crushings of 121,406 tons in 1890, with an average yield of 15 dwt. 13 gr. Thus the ore has maintained its grade while its output has been increased 40%.

The Croydon field was prosperous also, production being 65,892 oz. against 60,308 in 1890. The Gympie field, however, shows a falling off from 115,456 oz. in 1889, and 78,044 oz. in 1890, to 60,284 oz. in 1891.

The remainder of the fields, with the exception of the Etheridge remain *in statu quo*. This latter field, operations in which were harassed by bad management, labor troubles and inadequate working capital, shows a decrease of form 24,310 oz. in 1890 to 17,568 oz. in 1891. Gold mining, on the whole, can be considered to be in a most flourishing condition, the high grade of the ore being well maintained and the tonnage increasing, and when reckless management is replaced by efficiency and prudence the large auriferous areas of Queensland will doubtless prove extremely productive and profitable.

Opal mining has been steadily pursued in the Thargomindah district wherever possible. The production in the absence of reliable statistics is estimated at £10,900.

The production of silver-lead fell off from 1,913½ tons in 1890, valued at £56,639, to 875 tons in 1891, valued at £21,879. This decrease was mainly owing to the shut-down of the smelting works at Mount Albion and the close-down of the Ravenswood silver mines. A considerable quantity of ore is still mined and shipped to England, however.

The production of tin is gradually falling off; that for 1891 being 2,236 tons, valued at £116,387, against 2,970 tons, valued at £154,936, in 1890. This was due to the impoverishment of the tin lodes and the scarcity of water for alluvial washing in the Herberton district. Tin mining in the Stanthorpe district is likewise becoming less profitable.

**Estimation of Sulphur in Copper.**—The method generally employed is that of Fresenius, but it is long, difficult and subject to certain errors. By a new method which has been proposed by C. A. Lobry de Bruyn, says the *Revue Industrielle*, which seems more exact, and certainly more rapid, 25 grams of copper are dissolved in nitric acid and the solution electrolysed until 20 grams of copper have been precipitated. The solution is then evaporated until all the nitric acid is driven off, when the electrolysis of the copper is completed. By this treatment, all the sulphur is oxidized to sulphuric acid, and is easily determined in the solution freed from copper.

**Price of Gaskohle in Germany.**—The following table exhibits the maximum, minimum and average price, per metric ton, of what is known in Germany as Gaskohle, at four principal places, during the twelve years ending with 1891. Gaskohle (Gas Coal) is a variety of stone coal, which is, of course, not anthracite. It is a bituminous coal, used for steam and domestic purposes and is not restricted to the manufacture of illuminating gas.

WHOLESALE PRICE OF GAS COALS IN GERMANY AT THE MINE, PER METRIC TON OF 2204 LBS, 1880-1891. 1 M=23'8 cts.

	Breslau.		Dortmund.		Düsseldorf.		Essen.*	
	Year.	Price.	Year.	Price.	Year.	Price.	Year.	Price.
Maximum.....	1890....	\$2.26	1890....	\$3.00	1890....	\$3.54	1890....	3.46
Minimum.....	1885....	1.41	1887....	1.35	1881....	1.43	1887....	1.68
Average for 12 years, 1880-1891.....		1.59		1.74		2.05		2.13

\*1882-1891.

WATER SOFTENING APPARATUS.

Many of the water softening apparatus at present in use occupy too large a floor space, as the settling tanks are generally made of large area. The apparatus illustrated here is economical of floor space, and it also has the advantage that the mixing of the precipitant with the water is conducted automatically. The plant is made by the Water Softening Company, London, and has been tried with success at several places in Great Britain. Among others, Bolckow, Vaughan & Co., of Middlesbrough, have found it useful in softening mine water which contains the bicarbonates of lime and iron in large quantities. The chemicals—lime for the bicarbonates of iron and lime and soda for the sulphates of lime—are mixed in the two upper tanks.

The reagents are mixed in one while the contents of the other are being delivered to the water that is being treated. The two tanks below the mixing tanks receive the reagents and deliver them through ball valves which regulate the flow to the central tank through which the water to be softened passes. The water and reagents then pass into the settling tank at the bottom and as the current rises through this tank of wide area and between the two sloping plates its velocity decreases and consequently the carbonates of lime and iron are precipitated between the plates and the walls. A strainer of shavings at the top of the tank keeps back the last traces of the precipitates. The entire plant measures 18 ft. by 11 ft., and the total height is 17 ft. It is capable of softening 4,000 gallons of water per hour.

DIGEST OF SPECIAL DECISIONS OF THE SECRETARY OF THE INTERIOR.

MINERAL LAND LAWS—STONE LAND—ACT OF CONGRESS OF AUG. 4, 1892.  
(Public—No. 199)

An Act to Authorize the Entry of Lands Chiefly Valuable for Building Stone Under the Placer Mining Laws.

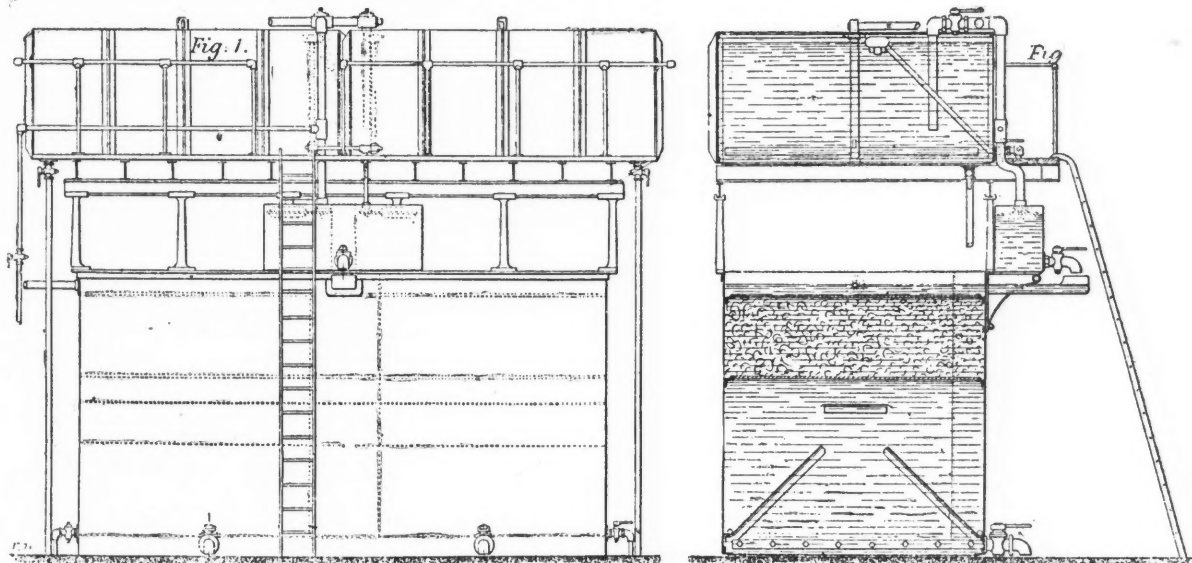
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person authorized to

the liquidator of the Panama Canal Company by which he undertook to form a company to continue work on the Panama Canal in order to prevent the lapsing of the concession granted to the old company by the government of Colombia. The agreement was signed by the liquidator of the Panama Canal Company in July last and will expire on September 30th, 1893. Mr. Hielard's plan for the organization of the company provides that a syndicate with a capital of 180,000,000 francs shall take over all of the existing assets of the old Panama Canal Company and that the latter shall receive 5% of the new capital and one-half of the net profits.

**The Pyrites Deposit of Pilleys Island, Newfoundland.**—In 1888 the writer, says Mr. Edward Jack, was called upon to visit Pilleys Island, Notre Dame Bay, Newfoundland, for the purpose of inspecting a deposit of iron and copper sulphides, which is now being extensively worked, the product being sent chiefly to New York. This, so far as the writer knows, is the most extensive pyrites mine on the whole American coast and this and many others in Newfoundland are able to furnish the sulphuric acid needed for a number of chemical, pulp, fertilizer and other works. Pilleys Island mine is but one among many others. It is within a hundred yards of a wharf at which steamships of 3,000 tons burden can load. When Mr. Jack visited it, a shaft had been sunk to a depth of sixty feet; the deposit, which was a contact one, was seventy-two feet wide, and twenty-three feet of this carried between three and four per cent. of copper. The rest was a remarkably pure iron sulphide, which parted so easily with its sulphur that the residue left after roasting out the sulphur was sold in New York for \$4.50 per ton for iron ore. The following is an analysis of the crude ore:

Copper.....	0.07	Silica.....	0.13
Sulphur.....	51.16	Lime.....	0.22
Iron.....	48.35	Arabic.....	0.012
Antimony, lead, zinc, bismuth, none.			

The mining at Pilleys Island is done by drifting. The drifts there are 8 feet square, giving, according to the estimation at the mine, about eight and a half tons of ore to the foot driven, the cost of driv-



WATER SOFTENING APPARATUS.

enter lands under the mining laws of the United States may enter lands that are chiefly valuable for building stone under the provisions of the law in relation to placer mineral claims: *Provided*, that lands reserved for the benefit of the public schools or donated to any State shall not be subject to entry under this act.

SEC. II. That an act entitled "An act for the sale of timber lands in the States of California, Oregon, Nevada and Washington Territory," approved June 3, 1878, be, and the same is hereby, amended by striking out the words "States of California, Oregon, Nevada and Washington Territory" where the same occur in the second and third lines of said act, and insert in lieu thereof the words, "public-land States," the purpose of this act being to make said act of June 3d, 1878, applicable to all the public land States.

SEC. III. That nothing in this act shall be construed to repeal Section 24 of the act entitled "An act to repeal timber culture laws, and for other purposes," approved March 3d, 1891.

Approved, August 4th, 1891.  
1. The first section of the above act extends the mineral land laws already existing so as to bring land chiefly valuable for building stone within the provisions of said law to the extent of authorizing a *placer entry* of such land. The proviso to the said first section excludes lands reserved for the benefit of public schools or donated to any State from entry under the act.

2. The said act is to control the action hereafter of registers and receivers of the General Land Office in reference to any lands subject to entry under the mining laws.

3. It is not the understanding of the Department, however, that said first section withdraws land chiefly valuable for building stone from entry under any existing law applicable thereto.

4. The second section makes the timber and stone act of June 3d, 1878 (20 U. S. R. S., 89) applicable to all the public-land States.—[Secy. Interior Special. Oct. 12, 1892.]

**Panama Canal Plans.**—M. Hielard, vice-president of the Chamber of Commerce of Paris, entered into an agreement a few months ago with

ing being \$4 per foot. The ore when placed on the piling ground cost for breaking and raising 68 cents per ton. It is stated that much more than 30,000 tons of this ore goes to New York this season.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:  
TUESDAY, NOVEMBER 8th, 1892.

- 485,618. Apparatus for and Process of Refining Copper by Electricity. Franklin Farrel, Ansonia, Conn.
- 485,634. Apparatus for Extracting Sulphur. Leon Labois, Paris, France.
- 485,660. Process of and Apparatus for Washing and Drying Phosphate Rock, Etc. Rufus E. Rose, Kissimmee, Fla.
- 485,720, 485,521, 485,722. Rock Drill. Abraham J. Sypher, Chicago, Ill.
- 485,784, 483,785. Process of Casting Armor. George H. Chase and Henry L. Gantt, Philadelphia, Pa.
- 485,789. Counterbalance for the Discharge Apparatus for Coal or Ore Bins. Richard W. Ericson, Aurora, Assignor to the Pettibone-Mulliken & Company, Chicago, Ill.
- 485,796. Apparatus for Superheating Vapors and Gases. Moritz Honigmann, Grevenberg, near Aix-la-Chapelle, Germany.
- 485,797. Screen for Metallic Fumes. Malvern W. Hes, Denver, Colo.
- 485,840. Method of Bricking Fine Iron Ores. Thomas A. Edison, Llewellyn Park, N. J.
- 485,841. Method of Magnetically Separating Ores. Thomas A. Edison, Llewellyn Park, N. J.
- 485,842. Method of Magnetic Ore Separation. Thomas A. Edison, Llewellyn Park, N. J.
- 485,917. Process of Treating Clay and Products Thereof. Alexander D. Elbers, Hoboken, N. J.
- 485,919. Manufacture of Mandrels for Electrolytic Deposit of Tubes. Francis E. Elmore, Leeds. Assignor to Elmore's American & Canadian Patent Copper Depositing Company, Limited, London, England.
- 485,927. Process of Melting Iron. Henry J. Graf, St. Louis, Mo. Assignor to the Graf Iron Melting and Manufacturing Company, East St. Louis, Ill.
- 485,962. Ore Separator. Carl A. E. Meinicke, Clausthal, Germany.
- 485,972. Ore Concentrator. Thomas T. McNary, Hailey, Idaho.
- 485,981. Art of and Machine for Cutting Flanged Beams. John A. Potter, Munnhall. Assignor of one-half to Robert W. Grace, Pittsburg, Pa.
- 5,982. Rolling Mill. John A. Potter and per T. Berg, Homestead, Pa.

## PERSONALS

Mr. E. D. Parmelee, formerly of the Ludington mine, succeeds Capt. Sakreson at the Biwabik.

Mr. S. A. Ford, chief chemist at the Edgar Thomson Steel Works, has resigned on account of ill health.

Mr. Eben E. Olcott, mining engineer of this city, left on the 10th inst. for Chili where he will be professionally engaged for several months.

Mr. J. C. F. Randolph, consulting mining engineer, has returned from his long absence in Borneo, Mexico and the West, and has resumed business at 120 Broadway.

Mr. J. R. Nelson, of the Denver Society of Civil Engineers, is now surveying the district between the headwaters of the North Platte and the Cache la Poudre Rivers. It is proposed to divert the former into the latter stream by a tunnel through the Medicine Bow range.

## OBITUARY.

Prof. Charles A. Seelye, the well-known chemist, died at Mount Vernon, N. Y., on the 4th inst., aged 63 years.

Col. C. J. Eldredge, of Leadville, Colo., died on the 6th inst., while on his way to California. He was well known as a civil and mining engineer in this country, and has made reports for some of the largest mining concerns in the world. He also represented the British government at the Vienna Exposition, and rendered such valuable service there that Emperor Franz Josef personally decorated him with the cross of the Order of Franz Josef.

Howard Lockwood, of the firm of Howard Lockwood & Co., printers and publishers, and founder of the "Paper Trade Journal," died in this city on the 4th inst. He was born at White Plains, N. Y., in 1846. In 1872 he established the "Paper Trade Journal," from which has grown the large business known as the Lockwood Press. He was an active member of the Typothetae of New York, and represented it at the meeting in Chicago in 1887, which resulted in the organization of the United Typothetae.

## SOCIETIES.

The regular monthly meeting of the Engineers' Society of Western Pennsylvania was held at Pittsburgh, October 18th.

Mr. W. G. Wilkins was appointed a committee to obtain papers from the members for the Congress of Engineers at the Columbian Exposition. Mr. George H. Hutchinson, of the Keystone Bridge Company read a paper, "On Mill Building Construction With Details of practice," in which particular attention was given to the horizontal action of wind and crane loads, for which a new and elaborate analysis was prepared. In the chemical section, Prof. Francis C. Phillips, Western University of Pennsylvania, was elected chairman, vice Prof. John W. Langley, resigned. Mr. Joseph Eastwick read a paper on "Nickel Ores," which was discussed by Mr. Chas. Mixer, Chemist of the Emmens Metal Company, Youngwood, Pa. Mr. James O. Handy, had a paper on his experience with Hundishagin's method of determining sulphur in coal. The results agree with those obtained by Eschka's method and it appears to be no improvement over this. At the meeting to be held November 15th, the Smoke Committee will make its final report. It is expected that Prof. F. C. Phillips and Mr. R. N. Clark will read a joint paper on "Water Purification, and Analysis of Local Waters," before the Chemical Section, November 22d.

The National Academy of Sciences concluded its fall session last week in the physical laboratory of Johns Hopkins University, Baltimore. A meeting was held in the morning and one in the afternoon, both being devoted mainly to the reading of scientific papers. The Academy passed resolutions of thanks to President Gilman and the university authorities, to Profs. Remsen and Rowland, and to the University Club for kindnesses extended. The next meeting of the Academy will be held in Washington on the second Tuesday of next April. Professor Remsen's paper on "Some Curious Double Halides" presented new proofs in support of the simple but important law which governs the composition of these chemical compounds and which was discovered by him about three years ago. When the law was first advocated some apparent exceptions were found, and since that time a series of investigations have been carried on by some of Professor Remsen's advanced students, working under his direction, with the result that the law has been confirmed by the disappearance of the supposed exceptional cases. Among the other papers read were the following: "On the Motion of a Sphere in a Viscous Fluid," by Prof. H. A. Rowland; "Significance of the Follicle of Salpa," by Prof. W. K. Brooks; "On the Vertebrate Fauna of the Blanco Epoch," by Prof. E. D. Cope, of the University of Pennsylvania; "On the Motion of the Earth's Pole," by S. C. Chandler, of Cambridge, Mass.; "The Use of Planes and Knife-edges in Pendulum," by T. C. Mendenhall, of the coast and geodetic survey;

"Recent Improvements in Astronomical Telescopes," by C. S. Hastings, formerly of the Johns Hopkins; "Exhibition of Photographs Illustrating New Methods and Results in Solar Physics," by George E. Hale, a non-member, introduced by C. S. Hastings; "Some Effects of Magnetism on Chemical Action," George A. Squier and Frank A. Wolff, Jr., of Johns Hopkins University, who were introduced by H. A. Rowland.

## INDUSTRIAL NOTES

The Atlas Iron Works, of San Francisco, were destroyed by fire November 7th, with a loss of \$70,000.

It is said that the Bay State Furnace, Fort Payne, Ala., is to be removed to Chickamauga, Georgia.

The contract for the iron buildings of the Muncie Iron and Steel Company, Muncie, Ind., has been let to the Indiana Bridge Company, of Muncie.

The Lehigh Valley Railroad Company, has ordered of the Baldwin Locomotive Works 10 compound consolidation engines, with 54-in. driving wheels and 67-in. boilers.

The first piece of tinplate made at the new works of the Morewood Tinplate Mfg. Company, Elizabeth, N. J., was run through the coating pot, October 28th, by John C. Rankin, mayor of Elizabeth.

The order for 18,000 pressed steel ties, weight 100 lbs. each, given by the New York Central & Hudson River Railroad Company to the Schoen Mfg. Company, Allegheny, Pa., is nearly completed.

The Augusta Mining and Investment Company, Cedartown, Ga., is about to purchase the partially built furnace at Piedmont, Ala., and also to lease the coke stack of the Cherokee Iron Company, Cedartown.

The Dayton Coal and Iron Company, operating blast furnaces and coal mines at Dayton, Tenn., gave notice on the 2d inst. of a 5% reduction in wages, being a reduction of 15% since January 1st. It affects 500 men.

The Curtis Regulator Company, formerly of 63 Beverly street, Boston, has removed to 29, 31, 33 Haverhill street, Boston, where they have extensive salesrooms and offices in a large new building of five stories and basement, measuring 75 x 45 ft.

The works of the Pennsylvania Steel Company, at Steelton, have been very busy recently and are now employing more men than ever before. The Bessemer plant has made a good output. Output made 75 heats, which has not been equalled for some time. The open-hearth department is making a heavy output.

It is said that true bills have been found by the United States Grand Jury against twenty-four iron manufacturers of Pittsburgh for obstructing navigation. The unloading of cinder, refuse, etc. into the Ohio, Monongahela and Allegheny Rivers has occasioned this action. Among those indicted are Carnegie Bros. & Co. L'rd., Park Bros., Isabella Furnace Co. and J. Painter & Sons. The cases will be pushed at once.

The B. F. Sturtevant Company, Boston, Mass., have printed a second edition of 10,000 copies of their 200-page general catalogue, No. 61, which describes the uses of their blowers, exhausters, engines, forges and heating and ventilating apparatus, and they desire to place a copy in the office of every superintendent, purchasing agent, engineer or manufacturer using such machinery. Copies will be supplied on application. All who have not received a copy will confer a favor by applying to the above address.

The B. F. Sturtevant Company, Boston and Chicago, have received orders recently for supplying their system of heating to the large foundries being constructed by the National Malleable Castings Company, Chicago, and the Carnegie Steel Company, Bessemer, Pa. Each of these plants will require a blower over 20 ft. in height and the heater will contain over 3 miles of 1 in. steam pipe. Both these foundries will also be supplied with the Sturtevant cupola blowers, to be driven by direct connected Sturtevant electric motors, and will be the largest of this type of machine that have been installed in this country.

The Mexican Industrial Company has been recently organized to do business in Chihuahua. Its officers are: Mr. Thomas Fletcher, President; Mr. Enrique C. C. Creel, treasurer, and Mr. Frank Fletcher, superintendent, and its paid-up capital amounts to \$500,000. The company was organized in Chihuahua and has been exempted from taxes and contributions for a period of fifteen years. The buildings include a large factory, machine shop, pattern shop, blacksmith shop, rolling mill room, stove department, nail and bolt shop, etc., and are well constructed. In the rolling mill there is a 12-in. train doing excellent work and a 20-in. train is now being erected so as to increase the capacity. The Siemens furnace and gas producers are used. All kinds of machinery are being manufactured by the company—mining machinery in particular. At the present time machinery, merchants' iron, nails, bolts, etc. to the value of \$75,000 per month are being produced at the works, the capacity of which will shortly be doubled.

## 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, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at 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 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.

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

## Goods Wanted at Home.

2.817. Three or four 3 ft. tram cars and a lot of belting, Arkansas.

2.818. Prices, catalogues and circulars of kaolin machinery, Georgia.

2.819. Shaft pulleys and belts, North Carolina.

2.820. Fine wire cloth from 60 to 150 mesh, both brass and iron, North Carolina.

2.821. A hand power elevator, Florida.

2.822. 2,600 ft. 56-lb. second-hand T rails, South Carolina.

2.823. A 30 in. x 12 in. x 15 ft. engine lathe and a 24 in. x 24 in. x 5 ft. or 6 ft. planer; also 45 squares of corrugated iron roofing, a set of blacksmith's tools, forge, a blower for cupola, etc. Florida.

2.824. 1½ to 3 miles of new 40-lb. T rails, or good 50 or 55 lb. second-hand, Georgia.

2.825. A light gang edger; one that will cut from 10,000 to 15,000 per day, West Virginia.

2.826. Rope machinery; also an outfit for making No. 5 cotton yarns; capacity 2,000 lbs. per day, Georgia.

2.827. A saw for splitting siding; also a swing cut-off saw and one for making lathes, West Virginia.

2.828. Machinery to equip a first-class wood working establishment, Alabama.

2.829. Catalogue and price list on prospecting drills, to drill up to 100 ft. in boulder ground; not over 3 in. bit, hand, steam or horse power. Light, compact and portable, Missouri.

2.830. Machinery for canning factory, for manufacturing excelsior, for making handles; also saw mill machinery, Georgia.

## GENERAL MINING NEWS.

## ALASKA.

(From our Special Correspondent.)

Alaska Coal Company, San Francisco.—The property of the company, situated at Cook's Inlet, is to be operated by electricity, and the drawings for the plant, which will cost about \$150,000, are now being prepared. More power than will be needed can be obtained from a waterfall adjacent to the mines which has a head of 200 ft. Part of the plant will be dispatched north next month and by the end of January it is expected the entire works will be in operation. Though the first cost is large it is anticipated that within a year the outlay will have been more than justified.

## ARIZONA.

Cochise County.

Alta Mining Company vs. Benson Smelting and Reduction Company.—The Supreme Court of the United States has confirmed the decision of the Supreme Court of Arizona in the suit of the Alta Mining Company vs. the Benson Smelting & Reduction Company. The suit was begun six years ago in Pima county. Robt. Hatch, sheriff of Cochise county, levied upon the property of the defendants after the judgment of the district court, and execution has been issued. Before the sale the case was appealed to the Territorial Supreme Court and from there to the United States Supreme Court. The amount of judgment was for \$4,769.08 to which must now be added interest and costs. The property will probably be sold very soon by Sheriff Kelton.

Maricopa County.

Phoenix Mining Company.—Mr. Edward C. Chamberlin, president of this company, has issued the following statement to the stockholders: "The property of the company, situated at Cave Creek, about 30 miles northerly from Phoenix, consists of a group of 10 mines, including the Phoenix claim, the mill site, with buildings thereon erected, and all the various machinery and appliances of an active mining camp. The Phoenix mill itself has been worked at different times for a number of years, and, as is generally known, consists of an enormous deposit of gold-bearing rock, which though varying in quality is sufficiently high in grade to insure profitable returns, provided the crushing and amalgamating operations of the company are conducted upon a large scale and at a low rate of expense. The workings, shafts and tunnels are in the aggregate several miles in length and have opened to inspection vast bodies of ore. Not only has the mine been examined by well known experts on many occasions, but stockholders interested in the company and in its management

have satisfied themselves, by personal inspection, of the magnitude of the mine and its capacity for becoming one of the best paying mining properties in the country. Owing to the fact that the mill owned by the company, consisting of 30 stamps operated by steam power, was too small to crush sufficient ore and was necessarily operated at too high a ratio of expense, about 18 months ago, it was resolved to suspend operations until the mill could be enlarged and the property placed upon a more practical footing. The failure of the mine to pay has resulted in the accumulation of debt, and it became necessary to provide capital to purchase additional stamp power and enable the company to make use of the great water power which it controls in Cave Creek, thereby reducing the expenses of milling and amalgamating to a minimum and placing the company upon the best possible basis, as regards the expense of its operations. With the view of carrying out these plans, members of the former board of directors retired and were succeeded by gentlemen representing large interests in the stock of the company. The progress that has been effected during the last year has been the result of careful and constant efforts on the part of the officers and trustees, who are now able to congratulate the stockholders that its finances have been arranged upon a basis which not only protects the rights of the stockholders but will enable the company to discharge its indebtedness from the results of its future operations. Stamp mills with a capacity of 100 tons per day have been purchased and shipped and are now being erected upon the property. In addition to the large stamping plant the company has also purchased a complete concentrating outfit which is also being set up in connection with the stamps upon the property. The company is also provided with a chemical plant for the treatment of the concentrates under a plan known as the "Ferri-Cyanide Process" which has been highly successful in the treatment of the concentrates upon ore taken from this mine. From a long and careful series of experiments it has been demonstrated that above 90% of the gold contained in the Phoenix concentrates can be readily extracted by this economic process. This plant, it is believed, when in operation, will be the largest in the territory. In addition a large amount of dead work has been done upon the mine, tunnel and drifts having been carried into the ore body, thereby lowering the cost of operation while large ore bodies of high grade have been opened and made accessible. To illustrate the difference between the cost of handling ore since the completion of this dead work and the former condition of the mine, careful estimates show that, while the former cost of mining and transporting the ore from the mine to the mill was \$1.50 per ton, the present cost will not exceed 50 cts. The material for the completion of this new plant has all been purchased and paid for, and the work of erecting the same is proceeding with all possible speed. Within about 30 days the mines will again be in active and productive operation, and the management are confident will henceforth show no lack of profitable results. The superintendent of the property, Mr. W. B. Gillingham, who has been in charge of the work, is confident that the amount of ore in sight and the grade thereof, will, with the daily stamping and concentrating capacity of 100 tons, insure profitable results. The president, Mr. Edward C. Chamberlin, who is personally familiar with the mine, purposes to leave shortly for Arizona, and will take charge of the business operations there. The management also desire to direct the attention of the stockholders to the fact that the money for the new plant, including the powerful Marshall stamp mills, with plates and appliances, and the concentrators, together with the cost of some 1,500 ft. of new tunnels and drifts, necessary to put the entire outfit in first-class order, has been furnished without any appeal to the stockholders, while the resulting indebtedness of the company, it has been arranged, may be discharged by an application of a portion from future earnings. It is the intention for the time being, to operate the new mill by steam power, new engines and boilers having been purchased for that purpose, profitable results being rendered possible by the fact that the Marshall mill represents an enormous crushing capacity, combined with a minimum of horse-power. It is however intended, as soon as the new mill is in operation, to take steps for the erection of a dam, the building of a pipe line and the introduction of water power, together with a further increase in the milling capacity of the company's plant. The same interests which have so effectually aided the company in connection with the securing the new mill, have indicated their willingness to extend further assistance until the company's property is provided with a plant commensurate with the extent and value of the mineral deposit of which it is the owner.

The trustees of the company are: Edward C. Chamberlin, Hon. Wilbur F. Lunt, Edward R. Johns, Philip G. Weaver, Henry G. Romaine. The officers are: President, Edward C. Chamberlin; vice-president and treasurer, Henry E. Wallace; secretary, Henry G. Romaine; superintendent, W. B. Gillingham.

#### Mohave County.

(From our Special Correspondent.)

The Flores mill has just made a clean-up of \$20,000, representing a six weeks' run of five stamps.

The G. A. R. Mines, White Hills.—It is reported that this group of mines are about to be sold to a Denver syndicate for \$250,000. Some fine ore is being taken from the Hitchcock shaft, which has been sunk 100 ft., averaging about \$500 to the ton. More ore of the same kind is in sight.

#### Yavapai County.

(From our Special Correspondent.)

The Jones mill at Chapparel gulch, ran only four days during October, but had as a result \$921 gold, and last week another four days' run was expected to make a similar yield. The lack of water prevents any prolonged work at the mill. Work on the Jones crosscut tunnel, 292 ft. in, has cut three veins, one of which has proved a good working ledge the ore netting \$5 per ton and the vein averaging 3 ft. wide. During 1893 the crosscut tunnel, now 165 ft. from the surface, will be carried 800 ft. further when the mountain will be cut in two and the extent of the Jones system fully displayed.

The Little Jessie Mine.—The lessee has sunk 160 ft. and is taking out gold ore from a 9 to 10 in. vein which runs from 8 to 16 oz. per ton. The main shaft on the Little Jessie ledge has been sunk by Mr. Jones, who is down 55 ft., the timbering, compartmenting and other expenses having been covered by the ore extracted. As soon as the rainy season sets in hoisting works will be erected and work extended generally. It is estimated that there is over \$70,000 worth of milling ore in sight. Mr. Wright, the first named lessee, has taken out nearly \$30,000 during his short term and the property gives every evidence of becoming a very rich and valuable one.

#### CALIFORNIA.

##### Amador County.

Bay State Mining Company.—A clean-up was made recently at the Pacific mill at Plymouth, of a crushing of 250 tons of ore from the Bay State mine. The yield was 10½ lbs. of gold, or a trifle over \$9 per ton. The company has ordered a new pump as operations will be started on a more extensive scale than ever in the mine.

##### Butte County.

The Oreville "Register" publishes the following review of the mines at Bangor: "There is a considerable flow of water in the Catskill that is giving some trouble, but the pumping machinery is strong enough to handle the water. The Bishop mine has been running steadily for about two weeks without a clean-up, but the gravel is first rate. The Grove company has its engine and hoisting works in place. The Maryville company will soon have a new engine. The gravel is as good as ever in all the mines and promises excellent returns. Wm. Bishop is sinking a shaft just north of the Bootjack mine and is down 60 ft. and has struck good blue gravel. In the Mansfield mine at Wyandotte, the shaft is down 130 ft. and the gravel is said to be good.

##### Humboldt County.

(From our Special Correspondent.)

Medford River Mining Company, Kleanatto.—The Portland, Ore., syndicate which purchased the property recently are now operating on an extensive scale. Work has been carried on so actively that a large amount of gold is expected to be taken out from the claim, now known as the American Bar, before the winter storms begin.

##### Los Angeles County.

The Inyo "Independent" says: "For years past there has been talk of building a reduction works at Los Angeles. At last, however, work has been begun to clear the ground for a plant, and all the necessary machinery is reported to be contracted for. The works are to have a capacity for working 200 tons of ore per day. Thousands of tons of ore are in Inyo county within 200 miles of the new works, but cannot be sent there until the gap of a little over 100 miles of railroad shall be closed between the mines and Mojave. In the meantime all the ore of Inyo county is hauled over two ranges of mountains and 600 miles to San Francisco."

##### Nevada County.

Brunswick Consolidated Mining Company.—"The prospects at the mine show no material change. The ledge in both drifts and shaft," writes the superintendent, under date of the 2d inst., "show free gold, but not in the whole of it. Total depth of shaft, 670 ft. Total length east drift, 93 ft.; west drift, 96 ft. The ledge is 2 ft. wide in the shaft, 1 ft. in the east drift and 1½ ft. in the west drift."

##### Placer County.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forrest Hill.—Shipments of bullion, valued at \$8,300, have been received at the San Francisco office.

##### Siskiyou County.

(From our Special Correspondent.)

Some rich finds have been made recently on the Salmon River. A quartz ledge on the east of Eddy's gulch, panned out nearly \$1,800 in two days, and as so little work has been done it is not known what the find amounts to. It seems, however, to be a well defined ledge with porphyry and slate contact.

#### COLORADO.

Colorado Fuel and Iron Company.—This company has issued a circular showing that in its fuel

department it owns and operates 16 mines, having a daily capacity of 12,000 tons of coal; 800 coke ovens with a capacity of 1,000 tons of coke; it also controls by contract the output of several other mines which it does not own, and is opening mines at Ruby and Coal Creek, and an addition of 500 ovens to its coking capacity. The coal mines are located at Coal Creek canon, Berwind, New Castle, Rouse, Chandler Creek canon, El Moro, Sunshine, Robinson, Maitland, Sopris, Northern Colorado, Walsen, Santa Clara, Crested Butte, Rock Springs (Wyoming), Lennox, Anthracite coals—Elk Mountain, Ruby; Gas and smelting coals—El Moro, Sopris, Spring Gulch, Coal Basin, Coke—Sopris, Crested Butte, Coal Basin, El Moro, Cardiff. The company owns and operates an extensive plant at Bessemer, including three blast furnaces, converting works, blooming mill, rail mill, merchant bar mill, spike mill, cast iron pipe plant, castings foundry and machine shops; and also owns and operates iron mines at Orient, Calumet and Grape Creek. The board of directors consists of J. C. Osgood, Denver; H. R. Wolcott, Denver; Dennis Sullivan, Denver; W. H. James, Denver; C. H. Toll, Denver; J. L. Jerome, Denver; J. A. Kebler, Denver; E. J. Berwind, New York; E. Thalmann, New York; H. K. McHarg, New York; C. F. Meek, New York; W. L. Graham, Pueblo; Paul Morton, Chicago. The general officers are: J. C. Osgood, president; Henry R. Wolcott, first vice-president; Paul Morton, second vice-president; J. A. Kebler, third vice-president; C. M. Schenck, secretary; A. C. Cass, treasurer; J. A. Kebler, general manager, Denver; A. C. Cass, general sales agent, Denver; D. C. Beaman, general attorney, Denver; C. M. Schenck, general auditor, Denver; R. C. Hillis, geologist, Denver; C. H. Parmelee, assistant secretary and assistant treasurer, New York.

##### Clear Creek County.

Eclipse Mining Company.—The property of this company, consisting of various claims in Idaho mining district, will be sold at auction at New Orleans, La., on the 30th inst., by the liquidating commissioners of the company.

##### Dolores County.

Enterprise Mining Company and Rico-Aspen Consolidated Mining Company.—A prominent stockholder of the Rico-Aspen Consolidated Mining Company stated to a representative of the Engineering and Mining Journal that suit had been commenced by his company not only to restrain the Enterprise company from working on the disputed ground but also to recover damages for Rico-Aspen ore unlawfully extracted by the plaintiffs. It has been decided to push legal proceedings to the bitter end. On the other hand Mr. George Crawford, secretary of the Enterprise Mining Company, said that his company had also secured an injunction restraining the Rico-Aspen from working the ground in question until a counter suit should have been settled. Mr. Crawford also stated that it was all a matter involving a certain tunnel right, and the Enterprise company, owning, as it does, the oldest location, is indisputably in the right. "The company," said Mr. Crawford, "has been permitted by the court to work a certain part of the ground to which our opponents denied us right. In addition to this, the Enterprise is producing from its other properties a greater amount of ore than ever, and is enabled to pay its dividends without interruption. The Rico newspapers, which have been publishing adverse comments regarding us, have been bought by the Rico-Aspen people and their reports are altogether misleading. Our attorneys are confident that we are in the right." The legal papers in the case are in Denver and could not be obtained in this city.

##### El Paso County.

Anaconda Mining Company.—A local paper publishes the following interview: "The Anaconda mine was closed," said Secretary Bettes, "because we are getting a low-grade ore and because we are \$45,000 in debt. For some time the character of the ore we have been getting has been poor, and besides we have poor facilities for handling the product, it not being a paying scheme to ship by wagon. These are the reasons for closing the mine. A meeting of the stockholders will be held on the 5th inst., and the matter will be then fully discussed. 'Have the big stockholders been selling stock?' 'No, I know that the managing stockholders have not sold a dollar of stock. Mr. Moffat has all his stock and so have the others. Of course, if the stockholders do not come to the rescue and raise this \$100,000 the bank will likely foreclose on their claim, which is in notes not yet due.' This is the mine which created such a furor some months ago.

##### Jefferson County.

It is reported that parties from Pittsburg, have secured control of the old slag dump of the Golden smelter. The dump covers over an acre of ground, and is about 18 ft. deep. Assays show that this slag runs from \$200 to \$800 in gold, silver and copper. The pile, it is said, will furnish work for 25 men a year.

##### Lake County.

In a review of the Leadville mines, the Denver "Republican" says: In the Flagstaff a drift has been run from the 350 level, which is expected to catch an extension of the Humboldt chute. Shipments continue steadily from the Continental Chief, the Minnie and Colonel Sellers. Work will soon be resumed on the Grey Eagle. Among the

repairs at present in progress is the placing of a new hoister. When this improvement has been complete shipments will at once actively commence.

In the Silver Cord from 40 to 60 tons of concentrates are milled daily. Preparations are being made for vigorous work in the Carbonate, and to this end a new hoister has recently been placed.

**Chrysolite Silver Mining Company.**—At the annual meeting of this company the old board of directors was re-elected. The balance on hand November 1st was about \$17,000, an increase of \$3,000 in a year. The policy during the coming year will be similar to that of the past and mining operations will be continued. The proved mineral bodies are being exhausted and it is only a question of a few years before mining operations will be suspended unless new ore is uncovered. The company owns valuable real estate in Leadville and an excellent mine equipment. These are its principal assets.

**Fanny Rawlins Mining Company.**—The Black Prince mine, operated by this company, is working to open up the ore chute which has been located by work in adjoining properties. A good body of hermatite ore is reported to have been broken into near the bottom of the shaft. Sinking in this property will be continued until the third contact is broken into.

**R. E. Lee.**—A strike has been made in this mine at Leadville. It is said to be rich in silver and consists of a large body of chlorides. Ore is being taken out of the Maud S. which assays \$300. The Small Hopes continues to ship steadily. The A. T. and Minnie ship an average of 2,000 tons per month of fair-grade ore. Heavy development work is being done in the neighborhood of the Matchless and Maid and Henriette.

**Pitkin County.**  
The Aspen "Times" has the following review of some of the mines of that camp: "The Aspen mine shipped 3,550 tons of ore last month. There is no material change in the work. It is employing altogether 250 people. The Durant tunnel is now in 2,625 ft. from the surface. It has passed the Conamara shaft, the point at which the connections were to be made. This has not yet been done, since the water which will be drained through the tunnel is needed in the Compromise and the Aspen, which have not yet obtained sufficient water for their needs by drilling. The tunnel has cut the great Aspen contact, but as yet has encountered no important ore deposit. They are now drifting on the vein. In the Bi-metallic they have been drifting on the vein for the last two months. Prospecting with the diamond drill was continued for two months with encouraging results. The Ophir Bell tunnel is in 100 ft. Work will be continued there through the winter."

**Aspen Contact.**—The October output of this property, according to the "Times," was 419 tons of ore.

**Aspen Mining and Smelting Company.**—This company's output for October, according to the Aspen "Times," was 4,434 tons, with a total of 33,542 tons for ten months, or an average daily production of 100 tons. The lower levels where large ore bodies have been disclosed are still flooded, and until neighbors begin their pumps there is no prospect of an early rescene.

**Bushyhaacker Mining Company.**—The Aspen "Times" says that the product of this property during October was 560 tons, the dry yielding a general average of 43 oz. silver to the ton, the lead 42 oz. and 18% lead. During the month about 500 ft. of development work was done, the product itself being through this channel with no stopping whatever. Four leases were let on the old workings during the month. The royalties varying from 25 to 50% according to the grade of the ore, the lessees agreeing to do from 40 ft. to 65 ft. of dead work a month as directed by the management and to work from 90 to 120 shifts monthly. The territory under lease is all that above the fourth level, a quarter of the ground being embraced in each lease.

**Della S. Consolidated Mining Company.**—The Aspen "Times" says that the company workings and leases for October show a production of 2,000 tons of good ore. Most of the ore from the company's ground has been from the prosecution of development work, nothing having been taken from the big stopes. Old levels are being put in good shape, and are being retimbered, and the property is said to look well.

**Park-Regent Mining Company.**—The October output of this property, aggregated 650 tons of ore, which ran 72 oz. silver per ton, says the Aspen "Times." At present Manager Bulkley is driving for an economical outlet through the Cowenhoven tunnel so soon as connections are effected. Five leases are now being worked on the property, which last month produced 250 tons of ore running from 25 to 50 oz. silver with an occasional lot exceeding 100 oz.

**Smuggler Mining Company.**—Manager Hallet estimates the October product of this property at about 3,000 tons, the falling off in the tonnage being attributed largely to the late disagreement between Rio Grande Railroad engineers and their company, pending which the Smuggler was unable to procure cars. Meanwhile work on the new drift from the fifth level has gone forward with gratifying results, says the Aspen "Times."

#### Saguache County.

Ore shipments from Creede continue. An average of 18 cars a day is being sent out by the Last Chance and Amethyst mines, and occasional shipments are made from lesser producers. It appears probable that the option given on the Amethyst, Hidden Treasure and Sunnyside properties will be taken up on January 1st under these conditions: The option holders are permitted to take out 150 tons a day and apply the proceeds upon the purchase price of \$5,000,000. The quantity of ore to be taken from the mine in three months is placed at \$2,000,000, leaving the holders \$3,000,000 to raise. A recent shipment of 10 cars of Last Chance ore netted \$90,000, it is said, and represented but two days' output. The Little Maid is receiving an entirely new plant of improved machinery. Development work is being pushed with vigor.

**Holy Moses Mining Company.**—One of the biggest strikes in the history of Creede has been made in the Holy Moses mine. There is a 5-ft. vein of good ore with an 18-in. streak said to run \$1,000 a ton. It is now definitely settled that the Cleopatra property, situated between the Amethyst and Little Maid, has at last encountered the Amethyst vein, and as soon as a little development can be done another shipper can be looked for. Another strike of importance during the week was one on the same vein as the King Solomon in the Nancy Hanks property. Operators in the Spar lode came into a streak of ore on the 29th ult., two samples of which assayed 2,700 and 2,920 oz. in silver to the ton. Another strike was made in the New Discovery, where a 6-in. vein of 40-oz. ore was uncovered. This the operators believe to be the Amethyst vein.

#### IDAHO.

**Prof. A. H. Thompson,** assistant chief of the geological survey of Idaho, states that it has been decided to inaugurate a topographical survey of the entire Snake River valley westward from American Falls on 25-ft. contours. This survey will be begun at the falls in the spring and all the land than can be irrigated with water from the Snake River will be carefully platted, so that the lines upon which ditches may be run will be accurately laid down. It is estimated that 250,000 acres will be covered by the work. During the hot months of summer the general survey of the State will be continued. The work laid out will occupy from five to eight years. W. T. Griswold, who has been in charge of the work here, has been given charge of the three States of Idaho, Oregon and Washington, and will make his headquarters in Portland. E. T. Perkins, Jr., will remain in Idaho and will have direct supervision of the work in this State.

#### Boise County.

(From our Special Correspondent.)

**Belshazzar, Mountain Chief, Centennial, Coyote.**—This group of mines has been bonded by E. J. Field, which bond expires in June, 1893. The proposition as a gold one and some of the mines in this district have been worked in a crude way with old fashioned machinery for the past 15 years. The ore yields about \$8 per ton by amalgamation. It is proposed to put some 20 men at once to work these properties and in the spring to erect a mill and work the mines to their greatest capacity with the latest improved machinery. Most of the work done has been by sluicing. California, Elk City, Idaho County.—This mine has a 400-ft. tunnel, the ledge being 4 ft. wide and running some \$100 to the ton. They have 350 tons on the dump which can be shipped to Denver for \$49 per ton. They will work a night and day shift all winter and in the spring will erect concentrator and concentrate their ores. The wagon road to Elk City has been surveyed by the county and will be built next spring at an expense of \$8,000.

**Maria Mining Company.**—Recently a deal was consummated whereby the Maria, Black Hawk and Silver Bell mines at Mineral, owned by the Maria Mining Company, were bonded for \$150,000 for 90 days to W. Darlington, acting for a company of Colorado capitalists.

**The Silver Mountain Company.**—This company, composed of London men, has decided to abandon the mines at Graham, on North Boise River. Although the mines were undeveloped when purchased, a very fine 20-stamp dry crusher silver mill was erected three years ago. Large sums of money have been expended and no ore found that will pay to work. It is believed that the mill will be moved to Beaver district next spring.

#### Idaho County.

(From our Special Correspondent.)

**Red River Placer Company.**—This company has made a test of their machines which gave good satisfaction. It will be remembered that this company propose dredging and washing the Red River meadows. The sand and soft rock taken from the river is driven through flumes with force pumps. In addition to their dredge they have water tight caissons that can be lowered to the bottom of the river and pumped dry so that men can work in the bed of the river. They expect to realize 40 cts. to the cu. yd. Their steam shovel holds one yd. of dirt and is calculated to handle 3 yds. per minute at which rate it would take 20 years to work their ground provided they worked 24 hours per day and 365 days to the year. Their plans have been submitted to the most critical experts

who give it their approval and stated it is perfectly practical. If this company make a success of their experiment, other claims will be located. Already some have been. Mr. A. F. McKenna has just located 600 acres of meadow upon which he has sunk 36 holes to bed rock, and secured an average of 52 cts. to the cu. yd., and has secured from some of the dirt as high as 25 cts. to the pan. He has also located several gold ledges in the same district.

#### ILLINOIS.

##### Hardin County.

**Pell Lead and Feldspar Mine.**—John R. McLean, of Washington, D. C., brought suit October 24th in equity against Hopkins Loudon for an accounting in regard to the Pell mine, in Hardin County, Ill., in which Loudon was interested with the late Washington McLean. The decedent, it is stated, bought certain properties (25 acres) in Hardin County, Ill. (paying \$40,000 therefor), for the lead and feldspar therein and conveyed one-third interest thereof to Loudon, the consideration therefor being Loudon's services in exploiting the mine. It is further stated that Loudon fraudulently permitted the mine to become involved for delinquent taxes so that one P. J. Howard (cousin, as is declared, with him) might come into possession of it. Plaintiff asserts that advances have been made Loudon during the past 18 months to buy the adjoining lands and that Washington McLean gave him \$10,000 during his life time on that account, and that at least \$15,000 profits are due from Loudon for which he refuses or neglects to account, hence application to the court for compulsory accounting by Loudon.

#### INDIANA.

##### Carroll County.

Great excitement is reported in the Indiana oil field. A well near Camden, on the Griswold farm, was torpedoed on the 6th inst., and a solid stream of oil shot in the air 100 ft. The well is said to be flowing 2,000 bbls. a day. It belongs to Gibson & Giles, of Pittsburg.

#### MICHIGAN.

##### Copper.

**Carp Lake Mine.**—The Ontonagon "Miner" hears from parties who have recently returned from the work at the Carp Lake mine that they are meeting with very good success. They are making some new openings on the outcropping on the bluff and are finding some good pieces of copper and vein rock rich in seams of copper. They are also finding some silver in the vein.

**Quincy Mining Company.**—This company having complied with the requirements of the Boston Stock Exchange, by appointing a trust company as a place of registration for the stock, has been reinstated on the list, and was called on the 1st inst. The output for October was 700 tons against 570.5 tons for the same month in 1891.

##### Iron—Gogebic Range.

**Ludington and Hamilton.**—Preliminary work is being done looking to the speedy unwatering of these mines at Iron Mountain.

##### Iron—Marquette Range.

During the first month's operation of the 8-hour system at Lake Angeline, says the Ishpeming "Iron Ore," there has been a gain of ore produced amounting to 730 lbs. per day, for every man employed in and about the property, miners, trammers, laborers, firemen, engineers, superintendents, the entire force. These figures are placed against the best secured for any previous month in the year. Besides giving the company that much more ore per man it also shows an increased earning to the men of something over \$1,500.

Work at the Escanaba River, Land and Iron Company's mine at Swanzy is being pushed with great vigor. This company is at present engaged in shipping 5,000 tons of ore which was sold the latter end of October. Negotiations are pending for the sale of 5,000 tons more and the company expects to get rid of its stock pile before spring.

**American Mining Company.**—Some time during the latter part of June this mine closed down, owing to the stagnation in the iron market. By the suspension of work there over 80 miners were thrown out of employment with from four to six weeks' wages due them. Since then the miners have tried to collect their just dues but failed, and as a last resource they brought suit to enforce payment of the same. In the mean time the mine owners effected a compromise, they agreeing to pay all claims and costs of court, which will amount to about \$6,000.

#### MISSOURI.

##### Jasper County.

(From our Special Correspondent.)

Joplin, Nov. 7.  
The mines of the lead and zinc belt have been moving along steady for the past three weeks, but the output was somewhat restricted by bad weather for the week ending Oct. 22. The zinc ore market has remained firm, and last week closed with an upward tendency. The price of lead ore is also advanced, and closed \$2.150 per 1,000.

Following are the sales of ore from the different dumps for the past three weeks:

Oct. 24.—Joplin mines, 1,053,720 lbs. zinc ore and 124,400 lead; value, \$13,800. Webb City mines, 501,360 lbs. zinc ore and 45,670 lead; value, \$5,219. Carterville mines, 1,977,810 lbs. zinc ore and 103,900 lead;

value, \$24,042. Zincite mines, 276,450 lbs. zinc ore and 2,100 lead; value, \$3,031.95. Lehigh mines, 43,610 lbs. zinc ore; value, \$495. Oronogo mines, 9,250 lead; value, \$202. Carthage mines, 32,000 lbs. zinc ore; value, \$352. Alpha mines, 85,000 lbs. zinc ore; value, \$935. Galena Kans mines, 767,080 lbs. zinc ore and 113,690 lead; value, \$10,072. Districts, total value, \$58,148.95. Aurora, Lawrence County mines, 359,840 lbs. zinc ore; 294,000 lbs. silicate and 80,000 leads; value, \$7,539. Lead and zinc belts, total value, \$65,687.95.

Oct. 31.—Joplin mines, 1,956,040 lbs. zinc ore and 277,030 lead; value, \$26,533. Webb City mines, 520,510 lbs. zinc ore and 40,060 lead; value, \$6,306. Cartersville mines, 3,135,600 lbs. zinc ore and 93,640 lead; value, \$36,504. Zincite mines, 168,140 lbs. zinc ore and 520 lead; value, \$1,825. Lehigh mines, 43,370 lbs. zinc ore; value, \$495. Oronogo mines, 88,580 lead; value, \$1,904. Carthage, mines, 61,150 lbs. zinc ore; value, \$672. Alpha mines, 40,000 lbs. zinc ore; value, \$1,530. Burch Center mines 14,920 lbs. zinc ore; value, \$125. Galena, Kan., mines, 1,261,770 lbs. zinc ore and 153,440 lead; value, \$16,424. Districts, total value, \$92,318. Aurora, Lawrence County, mines, value, \$14,954. Lead and zinc belts, total value, \$107,272.

Nov. 7.—Joplin mines, 1,778,270 lbs. zinc ore, and 250,790 lead; value, \$24,264. Webb City mines, 442,530 lbs. zinc ore and 58,690 lead; value, \$3,780. Cartersville mines, 2,579,150 lbs. zinc ore and 99,940 lead; value, \$30,450. Zincite mines, 185,890 lbs. zinc ore and 3,480 lead; value, \$1,997. Lehigh mines, 85,960 lbs. zinc ore; value, \$945. Oronogo mines, 171,590 lbs. zinc ore and 69,220 lead; value, \$3,160. Alpha mines, 96,690 lbs. zinc ore; value, \$1,063. Galena, Kan., mines, 1,495,780 lb. zinc ore and 263,580 lead; value, \$22,363. Districts, total value, \$88,022.

Aurora, Lawrence County, mines 442,510 lbs. zinc ore, 749,910 lbs. silicate and 190,000 lbs. lead; value, \$14,543. Lead and zinc belts total value, \$102,565. The above statement represents the output of our lead and zinc mines for 13 days' work, and makes a gross amount of \$275,524.95. The above figures are actual cash transactions, as the miners receive their wages every Saturday night, and the ore buyer settles as soon as a lot of ore is weighed in.

There is a considerable new development made in the last three weeks, particularly on land south of Cartersville, where one strike was made of a zinc ore bed, 30 ft. thick. New development has been made close up to Center Creek just south of Oronogo, and a good deposit of zinc ore cut at a depth of 160 ft. by a drill. This is on land operated by Messrs. Lewis Helm & Allen Hardy, of Cartersville.

#### MONTANA.

##### Beaverhead County.

Polaris Mining Company.—A year ago the Polaris was merely a good prospect. As such, it was sold to a New York syndicate at a good figure. The company immediately began development work and in a very short time was shipping high grade ore. A plant was put in at once and the Polaris is now considered one of the best producers in Beaverhead county. Some 50 men are now at work.

##### Cascade County.

Since the economical smelting of copper ores has been made a success by the gas from Sand Coulee coal, eastern capitalists have been looking in this direction with a view to putting in furnaces to treat the iron ores of the surrounding country. Large deposits of magnetic specular or red hematite, brown hematite or hydrated sesquioxide, and argillaceous iron ores are known to exist in this section.

##### Deer Lodge County.

Royal Gold Mining Company.—Development work is in progress but at the same time the mine is being worked for ore. A new tunnel is being driven 600 ft. below the old tunnel, from the mill to the vein, which was reached at a distance of 243 ft. At that point the vein was 8 ft. wide and has continued at that width for 40 ft., and there is no sign of diminution. Assays of the ore show an average of \$31. The old tunnel is 450 ft. long and has been in ore for 400 ft. of the distance. A force is now engaged in stoping from this tunnel, 300 ft. having been done, and the vein varies in width from 2 ft. to 9 ft. The ore is now being treated in the 10-stamp mill, and the result is a saving of \$25 per ton in gold, the total daily output being from \$400 to \$500. A third tunnel some 500 ft. further up is being driven on the hill and is now in 80 ft. Almost from the start it ran on a vein a foot wide and for the last 22 ft. it has widened to 18 ins., and is still increasing. The rock from the vein on an average assay shows \$50 to the ton. This tunnel is being run under two shafts, a distance of about 600 ft. apart. One of the shafts is at a depth of about 90 ft. and at the bottom is an 8-ft. body of ore assaying \$44. The other is down only 30 ft., but has struck an ore body of equal size and richness as the first. The output is being all handled by seven miners and seven men in the mill, including the superintendent. There are quite a number of other men engaged on the property, but they are doing prospecting or developing work.

##### Lewis and Clarke County.

Penohscot.—This mine is now the property of Mr. J. H. Longmaid, who has purchased it of his father. There are three claims, a placer and several mill sites included in the property. The Longmaids have erected a shaft house, a saw mill, and

are now completing a 10-stamp mill on the Penohscot. The water from the mine will be made to supply the mill and hoilers. The mine will have to be pumped out, there being some 400 ft. of water in it. This is now being done, and in three or four weeks the property will again be a producer of note. Some 30 men will be employed in the mine and mill when mining and crushing are begun.

Whitlatch Union McIntyre Mining Company.—The Huntington improved mill put up by this gold mining company at Unionville, 5 miles from Helena, is being demonstrated a perfect success. Its cost and capacity of 20 tons is so little compared with stamps that it is of interest to the mining world in Montana to know something of it. The second clean-up, 245 oz., showing an average of over \$30 per ton, with very little loss, for a free milling proposition. There is said to be 4 ft. of ore of this grade in the 300 level.

\$30 per ton, with very little loss, for a free milling proposition. There is said to be ore of this grade in the 300 level. Madison County. Avuncar.—This property has not been worked for nearly two years, although it was then considered one of the best properties in that locality. The shaft is sunk to the 150 ft. level, from which point crosscuts have been driven to tap the ledge which is 3 ft. in width and assays from 50 to 60 oz. in silver and 60% lead. A number of men are now at work extracting ore and the first shipment of the season will be made some time next week.

##### Meagher County.

It is stated that a 100-ton custom lixiviation plant will be erected at Neihart, by Messrs. Michener and Lawrence. It will use the Russell process.

##### Missoula County.

Grand Republic Mining Company.—Some two months ago the works were closed down, some of its creditors proceedings against the property. The stockholders of the company, who live at Syracuse, N. Y., sent George H. Sears, a lawyer of that city, out to look into the condition of the company. They decided that, if the title to the property was good, and an extension of time could be had, they would pay off the company's indebtedness, and again start up the mine and concentrator. Mr. Sears came out, looked into the company's affairs, found the titles perfect and got a stay of proceedings on the judgment against the property until January 24th, 1893, and left for home, believing that everything would now be arranged satisfactorily within a short time, and that work on the mine would be resumed at an early day.

#### NEVADA.

##### Elko County.

A telegram received from Tuscarora on the 31st ult. reports the shipment of bullion valued at \$35,000 from the Union Mill, for account of various companies. This makes a total of \$55,000 in bullion shipped on the present run of the mill, and the proceeds when distributed will reduce the indebtedness of the companies.

Commonwealth Mining Company.—The Commonwealth mine and hoisting works were closed down on the 29th ult., says the Tuscarora "Times-Review." There are but two steam hoists at work in the district now, and they are liable to be shut down at any moment.

Following are the latest official weekly reports of the superintendents of Tuscarora mines:

Belle Isle Mining Company.—The stopes above the 350 ft. level are producing as usual.

Navajo Mining Company.—The stopes above the 350 ft. level are producing the usual amount of good ore.

North Belle Isle Mining Company.—No. 1 north drift, south 300 ft. level, extended 5 ft. and connected with south drift. The stopes above this drift are producing good ore. No change in any of the other workings of the mine.

(From our Special Correspondent.)

A shipment of \$35,000 has been made from the Tuscarora Union Mill, making a total to date of \$55,000 on the present run. The cyanide process recently introduced at the mill for the treatment of the tailings has proved so satisfactory that other parties are about to introduce it for a like purpose and on a larger scale.

##### Lander County.

Austin Mining Company.—The Austin "Advocate" reports that work is progressing in this company's new reduction works at the old Manhattan mill site; the Lander machinery is almost in place on the Union shaft; sinking is resumed at the Patriot mine at Yankee Blade, and will soon be resumed at the Union; and plans are being made for the running of the double-track tunnel from Clifton into Lander Hill.

##### Lincoln County.

(From our Special Correspondent.)

Raymond & Ely Mining Company, Bullionville.—The trial run in the tailings from the mine of this company, and also from those of the Mountain Meadow mine, by the cyanide process has been satisfactory. The returns were fully 10½ oz. of silver and about 90% of the gold extracted from each ton. There being in the neighborhood of 150,000 tons of tailings and the working cost in any event not exceeding \$5

per ton, it appears as if a very handsome profit is thus assured. It is intended to increase the plant by the addition of another White & Howell furnace, giving the mine a daily capacity of 100 tons.

##### Storey County—Comstock Lode.

Belcher Mining Company.—The latest official weekly letter says: "The east crosscut from the north lateral drift on the 300-ft. level has been extended to a total length of 97 ft., where it was stopped. It encountered nothing of value. The north drift from the inclined raise above the 400-ft. level is out a total distance of 98 ft., having been extended 45 ft. since last report. The face is in porphyry, with seams of low-grade quartz through it. It has still about 10 or 12 ft. to go to connect with the bottom of the north winze from the 300-ft. level. The north drift on the 400-ft. level has been advanced 31 ft. since last report and is now out 137 ft. north of the raise. The face is in soft porphyry, with streaks of quartz through it. West crosscut No. 2 on the 400-ft. level has been extended 32 ft. during the past week, making its total length 44 ft. The face is in soft formation composed of porphyry and clay.

Confidence and Challenge Consolidated.—The latest official weekly letter says: "The joint north-west drift on the surface level is in 1,173 ft. from the Yellow Jacket shaft, or 315 ft. from the north line of the Yellow Jacket, having been advanced 20 ft. during the week. The face shows quartz having no value. The joint west crosscut No. 6 from the north drift on the same level is out 35 ft., having been commenced during the week. The face shows quartz having no value. The joint west crosscut No. 3 on the 100-ft. level is out 79 ft. The face shows quartz having no value. The joint Confidence and Challenge east crosscut on the same level is out 14 ft. The face shows clay. Some ore is being shipped to the mill for reduction."

Crown Point Mining Company.—The latest official weekly letter says: "The ore streak on the fourth and fifth floors of the west stope on the 160-ft. level maintains its width of from 2 to 3 ft. and which we are following south. The ore is of fair milling grade. In the south stope prospecting is under way north and south on the third floor. In going south the ore maintains its width of above 3 ft., but north it is narrower and poorer. Have shipped to the Mexican mill during the week 101 tons and 1,590 lbs. of ore, the average battery sample of which was \$25.86 per ton.

Justice Mining Company.—The latest official weekly letter says: "The south drift from the north stope on the \$22 level is in 27 ft. Car samples from the face average from \$20 to \$25 per ton. The raise on this level, 150 ft. south of the north stope, is up 45 ft. The top is in quartz giving low assays."

Kentuck Consolidated Mining Company.—Following is the latest official letter from this mine: "We have raised to the sixth floor, above the 160-ft. level, in the east stope on the pay streak, which is from 2 to 3 ft. in width, the face samples of which average from \$20 to \$30 per ton. We are saving from two to three tons of ore per day from the stopes on this level going north."

Ophir Mining Company.—The latest official weekly report from the superintendent says: "1,460 level—From the south drift, 101 ft. below the sill floor of the 1,465 level from the Mexican into the Ophir ground, the west crosscut 2 has been advanced 5 ft.; total length 172 ft., in very hard porphyry formation. From the south drift opposite west crosscut 2 an east crosscut has been started and advanced 12 ft. in a quartz formation. Twenty seven tons of ore have been taken out of this drift and raised to the surface, the assay value of which is \$19.25 per ton.

Overman Mining Company.—The latest official weekly letter says: "Extracted and hoisted from 1,100 and 1,200 levels 307 tons and 725 lbs. of ore; car samples average \$20.53 per ton. Shipped to Vivian mill 316 tons and 1,160 lbs. of ore. Battery samples average \$16.04 per ton."

Savage Mining Company.—The latest official weekly letter says that 562½ cars of ore were hoisted from the 800, 950, 1,100, 1,200, 1,400 and 1,450 levels and 525 tons of ore were shipped to the Nevada mill and milled. The average car sample assay of the ore was \$22.02 per ton, and the average battery assay was \$18 per ton. Bullion yield for the week, \$6,604. The usual prospecting and repair work is being done.

(From our Special Correspondent.)

Keyes Silver Mining Company.—Patrick J. Keyes has instituted suit in the Superior Court against M. Griffith, S. Pains, G. C. Perkins, and D. B. Jackson. The charges embodied in the complaint filed are to some extent similar in character to those which made the Hale and Norcross directors famous. The defendants, who are directors of the Keyes company, are charged with conspiring to wreck the corporation. At a stockholders' meeting held November, 1887, it was decided to turn all the stock over to the directors in trust, with power to sell whenever it was necessary to pay expenses. In 1888 a valuable body of pay ore was discovered, and the plaintiff claims that the defendants at that time commenced a system of fraud upon the stockholders. It is alleged that they caused drifts and shafts in which the rich ore was located to be closed, and worked other territory in order to increase the working expenses. In consequence of this course of action on their

part the levying of assessments became imperative and stockholders were frozen out, until the company became partially insolvent. The plaintiff alleges that his stock was ruined and he suffered damage to the extent of \$55,000, which sum he now claims with costs.

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

Mine.	Tons hoisted.	Av. car sample, as y.	Tons milled.	Av. battery assay.	Bullion produced, for week.	Bullion shipped.
		\$		\$	\$	\$
Crown Point.....	970					
Con. Cal. & Va. ...	25.79	980	22.27			118,325.76
Con. New York. ...	353					
Ocidental.....	172		172	17.25		
Overman.....	37	20.53	316	16.04		
Potosi.....	276	24.32	270	20.90		
Savage.....	562	22.02	525	18.00	6,694.00	
Silver Hill.....	199	22.78	199	19.43		

<sup>1</sup>Total to date on October account, \$55,137.43. <sup>2</sup>Cars; car samples average from \$33 to \$40. <sup>3</sup>Cars

Hale & Norcross Silver Mining Company.—The defendants in the suit of M. W. Fox vs. the directors and others will justify on the bail bond on the 5th. Notification has been given that they would justify before the county clerk, and that looks as if an attempt was contemplated to evade any further contact with Judge Hebbard. Some further light has been thrown upon the Western Surety and Guarantee Company by a fuller knowledge of its make up. Last week allusion was made to Isaac Requa, the former superintendent of the Chollar. Another is a Mr. Lane, who is superintendent of Alvinza Hayward's mine, at Angels Camp, Cal. Mr. Dingee, another director, is a relative of Hayward's, and P. H. Cornwall, yet another director, has been a virtual partner of Hayward's for years. Mention has already been made of Walter Deau, secretary of several companies controlled by Hayward, and of Ramson Wilson, who is attorney for the noted mill owner. Without a knowledge of the laxity prevailing in the San Francisco courts as well as in other branches of the municipal and state government, it is impossible to conceive how any one could have the audacity to attempt to foist a bond for \$2,000,000 on the court by a corporation having a capital of only \$100,000. All the more so when the law specifically states that 80% of a company's capital must be considered as a part of its liabilities; thus, in the instance in question there is just \$20,000 left of the assets by the Western Surety and Guarantee Company to pay a judgment of \$2,000,000.

Ophir Mining Company.—The reports from the mine are encouraging. A new crosscut has been started from the south drift opposite No. 2 west crosscut, 1,465 level, and the face is now in ore ranging from \$17 to \$20 per ton. Twenty-seven tons extracted from the drift last week assayed \$19.25 per ton, and it is hoped a better showing may be made any day.

#### NEW MEXICO.

##### Grant County.

Alhambra.—A carload of good silver ore has been taken out of this mine at Black Hawk, says the Silver City "Sentinel." The ore is as rich as that taken out of the mine by Miller & Dodd three years ago.

Brockman.—The Brockman mill, at Lone Mountain, cannot treat the ore which the mine can produce. The ore exists in such a large body that a few men could keep a mill of much larger capacity than the one now in operation going constantly. The ore body is by odds the largest ever discovered in the Lone Mountain district and will compare favorably with the largest ore bodies in New Mexico. Wm. Brahm has a claim on the same lead as the Brockman mine which he will develop.

Mangas Mining Company.—A contract has been let for the extension of the first level in the mine 40 ft. The level has already been run 335 ft. Altogether there has been about 900 ft. of work done in the mine, which is looking well. There are 1,200 tons of ore on the dump which will average 40 oz. in silver per ton.

Manhattan Gold Mining and Milling Company.—This company's tunnel is now in over 600 ft. The manager expects to strike the main vein within the next 100 ft. The tunnel will strike the vein about 100 ft. below the third level in the mine and will give about 100 ft. of stopping ground. The rock is very hard and progress in the tunnel is slow.

Solid Silver.—The new shaft on this mine, at Black Hawk, is down about 60 feet, says the Silver City "Sentinel." It is about 600 feet from the old shaft and is being put down on an incline of about 70°. It is not expected that the shaft will be completed before the end of next summer.

##### Lincoln County.

Old Abe.—New machinery has been purchased for this mine and development work will be pushed vigorously by the owners.

##### Sierra County.

A correspondent of the New York "Sun" writes: A group of 21 of the zinc mines which were recently discovered near Hillsborough, has been

sold to Gen. Alger, of Michigan, and the first payment has been made. The mines were owned by Nicholas Galles, W. H. H. Llewellyn, E. C. Faulkner, George E. Robin, W. S. Hopewell, S. J. Macy, and Prof. J. C. Carrera. Much of the ore is of the same character as the zinc ore at Hanover, but some of the assays are said to show a higher percentage of zinc than has ever been obtained from any of the Hanover ores. The mines are about 16 miles from the nearest railroad point. Only the highest grade ore can be shipped with the present facilities for transportation, but it is thought that the Lake Valley branch of the Atchison, Topeka & Santa Fe Railroad will be extended to Hillsborough, as the output of that and surrounding camps has increased rapidly within the past year.

According to the Silver City correspondent of the New York "Sun," the output of the mines in the Kingston district is considerably larger now than it was last spring, but there are a number of mines which have not been worked at all this year, and there is little prospect that they will be started up until there is a decided improvement in the price of silver.

#### NORTH CAROLINA.

(From an Occasional Correspondent.)

The Hoover Hill gold mine in Randolph county continues to pay something over expenses, as it has done for the past eight years. The ore is composed of seams of quartz, running through highly crystallized and very hard hornblende slate. They are down over 300 ft., and find but little sulphuretted which is something unusual for this state. The August production was about \$800. September, \$900. Their expenses are \$600 to \$800 per month.

The Moratock mine has produced many tons of a gold ore that is peculiar to that one locality. It is a very hard cherty appearing, fossil bearing substance, although I believe Emmons cites a like occurrence in Montgomery county some miles southeast of the Moratock. The Moratock ore contains a small percentage of curiferous sulphures that do not yield up their gold by amalgamation, in consequence of which they are erecting a cyanide plant, whether according to McArthur-Forest patents, I am not able to state.

Biggers Mine.—Dr. R. M. Eames, of Salisbury, has just returned from this placer, which is the Bonanza of the state at present. But two men have been engaged in working with hand rockers. In three months they have produced nearly \$3,000 in nugget gold, one nugget weighing over 500 dwts. This mine is two miles northeast of the famous Reed mine, where the historical 28-lb. nugget was found. Strange as it may seem, it has been a known footpath for 30 years and no evidence of gold until 4 months ago, when it was discovered. There is no excitement, yet it is believed it will turn out many large nuggets. Other such mines in this vicinity have produced \$500,000 to \$1,000,000. Your correspondent saw and purchased some of the gold. It is very rough and has quartz attached, showing the source to be near at hand.

Gold Hill Mine.—At this mine the 10-stamp mill and amalgamating department are kept in operation two weeks out of every month. The 300-ft. level in the Barnhardt shaft is being driven 700 ft. in order to strike under the Old Field body of ore. When this is attained, prosperous times are looked for by all the miners.

##### McDowell County.

(From an Occasional Correspondent.)

Marion Improvement Company.—This company is now adding improved Frue vanners to its mill, located at Demming. Chlorination works will probably be added in a short time. The company is now taking out ore assaying \$8 in gold, and \$8 in lead. Shafts have been sunk on veins Nos. 1, 2 and 3. The first shaft has a depth of 65 ft., the second shaft 50 ft., and the third shaft 60 ft., with orders to sink the third shaft 100 ft. Altogether 20 veins of gold-bearing quartz have been found, varying in width from 2 in. to 18 in., the assay value of the quartz in gold averaging \$5 per ton free milling until water level is reached, when sulphides are encountered, with an improvement in the ore. One or two of the veins have been prospected for more than a mile, with favorable results. As soon as the Frue vanners are in, and the mill under way again, it is the intention of the company to increase the force now engaged in placer mining, until the material worked up shall be at least 600 cu. yds. per day. This will necessitate the employment of a steam dredge, with the improved modern appliances. The gold yield for September exceeded any month during the past three years. Until recently this company, and a sister organization, were embarrassed considerably by litigations, the principal trouble being a law suit, with many others threatened, on account of the use of a stream wherein the tailings of the hydraulic descended to properties of other parties. These are happily terminated, and the work is now being done without entangling legal difficulties.

#### PENNSYLVANIA.

##### Coal.

Lehigh & Wilkes Barre Coal Company.—This company's collieries at Audenried, under the superintendency of E. H. Lawall and J. R. Roberts, dur-

ing the month of October surpassed all previous monthly shipments made by that company at the Audenried collieries, says the Hazelton "Sentinel." During October, 1891, the total tonnage was 61,300 tons. This year, during the October month, the collieries worked one day less than was worked during the corresponding month last year and had an output of 64,535 tons, or an increase of 3,134 tons over last year's shipments.

#### SOUTH DAKOTA.

##### Lawrence County.

Big Missouri Mining Company.—Thomas H. White is engaged in making some underground surveys of this mine. The ore bodies are looking well and constantly increasing in size as depth is reached. Forty stamps of the Uncle Sam mill on Elk Creek are dropping on the ore, crushing about 100 tons a day.

Golden Reward Mining Company.—The clean up of the chlorination works for the last 15 days of October amounts to nearly 1,300 oz., the largest amount yet produced by the plant in the same space of time, and the stockholders are correspondingly jubilant. The works are now treating 95 tons of ore every day and the fourth barrel will be in place in a few days, which will increase the capacity to over 100 tons.

#### UTAH.

##### Summit County.

Anchor Mining Company.—The annual meeting of the stockholders of the Anchor Mining Company was held in Salt Lake on the 19th ult. There were 113,233 shares represented. Mr. R. C. Chambers was chosen chairman. The report of the manager was read and approved. An election for directors resulted as follows: J. L. Woods, G. W. Pack, J. M. Adams, E. F. Holmes, Francis Smith, E. P. Ferry, D. C. McLaughlin, A. B. Richardson and David Keith.

The report of the manager for the year ending October 1st showed the mine to be in an excellent condition. They are taking out considerable first-class ore, a shipment of over 170 tons having been made this week.

"The work done in the mine consists of sinking the shaft 4 ft. by 12½ ft., clear inside of timbers, a distance of 560 ft. There has been run 3,583 ft. of inclines, raises, winzes and chutes, also 1,127 ft. of levels and drifts. There has been 12,630 cubic yards of stoping done during the year, which, with the large station cut at the shaft on the tunnel level, containing 364 cubic yards, makes a total of 12,994 cubic yards of stoping and excavation.

"The ore stopes have produced 81,000 tons of first-class and 37,333 tons of concentrating ore, producing 12,053 tons of concentrates, which sold for \$81,419.86, less assaying, shipping, sampling, etc., \$13,884.48, making the net proceeds \$267,535.38.

"The cost of extracting and milling are as follows: Labor at mine, \$73,000.33; cost of mules, stable supplies, etc., \$1,538.43; hauling ore from mine to mill and from mill to sampler, \$35,258.18; assaying and concentrating expenses, \$38,291.33; total, \$146,407.32.

"The cost per ton for producing this ore was: In the bins at mouth of tunnel, \$4.42; at the concentrator, \$5.02; entire cost of producing, concentrating, shipping, sampling, etc., \$6.62.

"The cost of mine labor for dead work, consisting of inclines, upraises and crosscuts, is as follows: Crosscuts, \$33,712.99; cost of sinking shaft, \$35,824.22; cost of prospecting, \$30,609.82. The ore stopes still show a considerable amount of ore of the usual grade, but at times is considerably mixed with waste. We recently struck in the shaft incline a body of ore of a much better grade than any before found in the mine. We have taken from this body 81 tons up to October 1st. The extent of this ore has so far not been determined. Am still going down on the vein with this incline, and doubtless further explorations will confirm my opinion that the ore bodies of the Anchor lie below the tunnel level.

"The ore for the past year has been sold under contract, the terms of which are 90% of the lead and 95% of the silver, at New York prices on the day of sale, and \$18 per oz. for the gold; working charges \$24.50 per ton and a deduction of 50 cents per unit for zinc above a basis of 8%. Although this is considered a favorable contract the low price of silver together with the high percentage of zinc have combined to keep the price realized very low, averaging \$23.25 per ton for concentrates."

Ontario Mining Company.—Taylor gas producers are to be used at the mill for firing the Stetefeldt furnaces and rotary dry kilns. The machinery is now being placed in position.

The connecting rod of the large Cornish pump, broken some time ago, has arrived from San Francisco and the pump is now running.

#### WASHINGTON.

##### Okanogan County.

(From our Special Correspondent.)

Belle, Ruby.—This claim has a shaft some 220 ft. and shows up a ledge of some 12 in. The Belle is next to the Denver and near the Arlington, and the ore resembles that of the latter.

Golden Fleece, Loomiston.—This property has two shafts sunk on the vein which they claim to be some 25 ft. wide, at the 100 ft. level they will cross-cut. Messrs. L. Sley, W. R. Robinson and W. E. Hensley are interested in this property and also in the Frankie Girl on which claim they recently encountered some free gold while running a tunnel on the vein.



Ivanhoe, Concomly.—By November 1st the road to this mine will be completed when the mill, recently erected on this property, will start up. The machinery is all in place ready to commence work. The mill has a capacity of from 10 to 15 tons per day and is a combination mill of the Dodge pattern with the Dodge ore crusher and pulverizer. The same as is in use at the Washington Reduction Company at Ruby. The inventor, Professor Dodge will superintend the starting of the machinery.

Keystone Mining and Milling Company, Loomiston.—This company has been opening up their several claims on Paimer Mt. this summer with very satisfactory results. On the Divisadora they have sunk a 50-ft. shaft opening up a strong vein of gold and silver ore. They have shut down for the winter and will resume operations next spring.

The Washington Reduction Company, Ruby.—Professor Dodge, the inventor of much of the machinery recently erected on this plant, has been visiting the works with Mr. D. P. Thompson, of Portland, Ore., one of the largest stockholders of the company. The result of his visit is that the capacity of the mine has been increased from 45 to 55 tons per day. This will necessitate an increase in their drying facilities, as the output of concentrator is greater than was anticipated. It is proposed to push work on the big tunnel during the winter, and they are also considering plans to increase the capacity of the mill. The mill was built for a custom mill, and the company is advertising for ores and is anxious to buy all that are suitable for concentrating. They have contracted for 60,000 ft. of lumber for the purpose of building additional ore bins and will buy and store all the ore they can this winter.

Triune, Loomiston.—The 10-stamp gold mill built by Dexter, Sharpneck & Co., of Chicago, started up on the 21st and is working to the entire satisfaction of the owners.

#### Stevens County.

(From our Special Correspondent.)

Old Dominion, Calville.—Most of the work on this mine is at present done in the upper works where they recently struck a better grade of ore. An extra force of men will soon be put on to drive the lower tunnel for the purpose of striking the main body of ore which developments prove to be very large.

Sullivan Creek Hydraulic Mining Company.—This company is located on Sullivan creek, which flows into the Pend d'Oreille River at Metaline. Their claim embraces fully 1,000 acres, a ditch and flume five miles long is being built to convey the water across the country to their grounds. One mile of this is already finished, and next spring it is expected to have the entire five miles completed when the work of taking out the precious metal will commence and it is claimed they can save five hundred dollars a day.

Young America and Bonanza, Chevelah.—The concentrator is on the former property and is being overhauled and improved so as to save a larger per cent. of the concentrates. They expect to have it running in about ten days when it will be pushed to its full capacity and work will be continued all winter. The ore is not high grade, but there is an immense body of it, and as it is near the surface it can be mined cheaply.

#### Spokane County.

Le Roi.—This mine, though located in British Columbia, is owned by Spokane parties. A contract has recently been let to William Austin, of Kettle Falls, Wash., for the continuation of the shaft of 120 ft., which will give it a depth of 200 ft. They are employing some 12 men, part of them in the shaft and the rest working in the tunnel. The rock is perphyritic syenite, and will assay \$300 in copper to the ton, and also carries paying quantities of gold. The wagon road connecting the Trail Creek and Sheep Creek mining districts will be finished about November 10, when the mines in this section will begin shipping ore by way of the Spokane Falls and Northern Railroad, which is being extended from Northport, Wash., to Nelson, B. C.

### FOREIGN MINING NEWS.

#### CANADA.

##### Ontario.

Y 1 Mining Company.—There are on the Y 1 location four veins the main one of which is between 15 and 20 ft. in width. Running through this vein are two pay streaks, selected samples from these yielded \$223 and \$140 to the ton. One of the smaller veins is a continuation of the West Beaver vein and is supposed to be quite rich. Silver Creek cuts one side of the property, and from the ledge above this stream a force of men are now at work driving a tunnel.

##### MEXICO.

The unofficial telegraphic information of the proposed prorogation of the time for filing titles to mining property under the new mining law, to extend from November next to June 1893, received by several parties here have somewhat pleased mine owners. It is now confidently anticipated that before the last mentioned date there will be such modification of the new law as will render its operations less onerous to mining men in districts where low grade fluxing ores prevail. The discriminating and prejudicial effect in the operation of the new law as it now stands must be ap-

parent to even the most obtuse observer who takes into consideration the simple fact that by its present provisions a low grade fluxing ore mine, being of blanket formation, is taxed a much greater amount than the high grade ore mines which are generally of fissure formation.

The Mexican International Ry. Company have built a branch nearly at right angles with their main line to Durango, which leads close to the mine. They are shipping from this mine above 100 tons of low-grade fluxing ore per day to two large smelters of the Omaha & Grant Company, the one at Denver and the other at Omaha. The ore is extracted from the mine through interior tunneling, and up through shafting by steam power hoists. Another considerable output of these mines is from free milling ore which is treated at the mines by the amalgamating process.

#### Durango.

(From our Special Correspondent.)

In my last letter I wrote very cheerfully concerning the crop prospects in this State, almost all reports being favorable. The rainy season had set in early in July, and during the latter part of that month, the whole of August, and the first fortnight of September, the precipitation had been large, and there seemed to be no reason to suppose otherwise than that the rains would continue until October, as usual. As it happened, however, the next day after my letter was mailed (September 10th) opened clear and bright, with a cloudless sky, and since that time there has not been until to day (October 18th), even a shower worth mentioning. Thus although there has been a heavy rainfall this year, the wet season has been short and the chances of a large crop have, in this State at least, become very doubtful. None of the new corn has yet been harvested and prices are still abnormally high, from \$4.50 to \$5 per "fanega" (about 2½ bushels) being the quotation in the city of Durango. Beans (frijoles) are still held at \$15 per "fanega," and in many places are unobtainable.

One who is unfamiliar with the conditions that affect the mining industry of Mexico will find it difficult to appreciate thoroughly the importance of these food staples. But they are the dependence of the bulk of the population for subsistence, and corn, moreover, in a country where all transportation is necessarily done by mule or wagon-train, and where a large proportion of the mine hoisting engines are "malacates," or horse whims, occupies much the same position as coal in the United States. Hence mining operations are directly affected by a failure of the corn crop, and the consequent high prices of that article.

The event of chief importance in the history of Durango during the past month has been the completion (on October 2d) of the railway from Torreon. The road will not be formally opened for traffic until October 29th, but trains are already running regularly and the long stage journey from Picardias is now a thing of the past. In lieu of two days over a rough and dusty road Durango will now be reached from Torreon in seven or eight hours, and direct railway connection is established between it and El Paso and Eagle Pass in the United States, as well as with the City of Mexico. The advent of the railway has been attended by an influx of Americans, and Durango bids fair to lose its character as a typical Mexican city of ante-railway era and become Americanized like Monterey or San Luis Potosi. What effect the railway will have upon the mining industry of the State remains to be seen.

The main range of the Sierra Madre crosses the State of Durango from northwest to southeast and forms the boundary between it and Sinaloa. In the northern part of the State the Sierra de la Candela splits off from the eastern flank and strikes southward in a parallel line, while a little further to the south the Sierra de San Francisco diverges from the Sierra de la Candela in similar manner and between the two last is the broad Llano de Guatimape, which stretches away toward the city of Durango, a distance of 100 kilometres or more. So far as yet discovered the chief mineral wealth of the State is in the main range, where occur in succession, from north to south, the prosperous silver mining camps of Indé, Guanaceví, Topía, San Andrés, Sapicoris, Gavilanes, San Dimas, Ventanas and others, in many of which American capital is largely interested. It is from these mines that most of the silver output of Durango is coming at the present time, and it is a curious fact that comparatively few important mines have yet been discovered in either of the spur ranges. In the Sierra de San Francisco, near its junction with the Sierra de la Candela, there is the famous Promontorio mine, and this is the only important producer that can be named. Thirty miles further south are the mines of Coneto, which were first opened by the Spaniards in the Seventeenth Century, and are reputed to have made a large output. At all events they were of sufficient importance to warrant the location of a branch mint there, and the mines of an extensive "hacienda de beneficio" are still to be seen. An American company is now engaged in opening one of the old veins below the ancient stopes, but has not yet consummated the work, and the silver output of Coneto is still but trifling. Some 25 miles south of Coneto, at San Lucas, there are other old mines, which an American company is exploiting, so far with indifferent results. These three places constitute the list of producing silver mines in the Sierra de San Francisco at this time.

Eva Mining and Milling Company.—This company (a St. Louis corporation), which is operating at Coneto, is endeavoring to open the old Choix mine below the former works. It is said to have been a large producer in the old Spanish days. A shaft has been sunk to a depth of 250 ft. and a cross-cut driven east from the bottom. Recently, at a distance of 100 ft. from the shaft, the vein was encountered, and a breast of good ore 3 ft. wide was exposed. Drifts were at once started on the vein in both directions, but soon both broke into old stopes, thus indicating that the cross-cut had chanced to strike one of the pillars left by the former operators and that the old works extended to greater depth than 250 ft. Some ore has been won from this pillar and with the accumulations from other mines of the company the five-stamp mill (Boss continuous process) is to be put in motion again.

Promontorio.—The pan-mill and dressing works at this mine have resumed operations, there being an ample supply of water in the reservoir to insure regular running until January or February at least. An Ingersoll Sergeant rock drill plant is about to be installed, and the main working shaft, which is now down 160 meters, is to be sunk deeper. About 50 tons of ore are treated daily in the mills, and it is said that the entire amount comes from development work in the mine, no stopping being done.

#### Hidalgo.

This mine at Real del Monte is doing exceptionally well. Ore has been taken out during the week that assays 70 to 100 "marcos" per "monton." The mine was recently drowned under 20 meters of water, the result of an unusual flood in the Pachuca Mountains.

#### Nuevo Leon.

El Carmen Mining Company.—Mr. Caspar S. Butcher, president of the El Carmen Mining Company, says that his company is now shipping 32 car trains of ore from their mines to the Monterey smelters, at the rate of two trains per week, an average of about 4,200 tons of ore per month.

#### SOUTH AFRICA.

##### Mashonaland.

"Will you give some expression of opinion as to the development of Mashonaland?" was asked of Mr. Cecil Rhodes in a recent interview in London. "Oh, Mashonaland is all right," he replied, "if you will only give it time. People expect too much. There is plenty of gold in Mashonaland. Our experiments have shown us that a yield of 12 dwt. or 15 dwt. can readily be got, and is continuous. The reefs emphatically do not pinch out. But, of course, we have got no machinery at work to speak of." "In that respect the railway will be of great assistance?"—"Naturally, it will. We have now got actually at work on the railway. When it is completed material that has hitherto had to be carted 1,700 miles at a cost of £70 a ton will have to go a quarter of that distance at a cost of nearer £10 a ton. But you really know as much about all this in England as I can tell you."

### MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 478 and 480.]

NEW YORK, Friday Evening, Nov. 11.

The past week, owing to the holiday on Election Day and the excitement incident to it, has been more than usually quiet in the mining market. With the exception of Phoenix of Arizona stocks were neglected and the dullness was extreme. The total number of shares sold, including Saturday sales, amounted to but 6,895 shares—almost the smallest on record.

The Comstocks were neglected and, if anything, lower prices than last week. Consolidated California & Virginia was stationary at \$3, with total sales of 330 shares. Comstock Tunnel stock at 11@12c. shows sales of 1,000 shares. Other sales were as follows: 100 shares of Gould & Curry at 90c.; 100 shares of Hale & Norcross at \$1.45; 200 shares of Sierra Nevada at \$1.15@1.40; 100 shares of Yellow Jacket at \$1; 25 shares of Best & Belcher at \$1.50 and 200 shares of Union Consolidated at \$1.05@1.15.

Of the California stocks Bodie Consolidated shows sales of 250 shares at 25c. and Bulwer Consolidated of 500 shares at 25c. There was a sale of 50 shares of Plymouth Consolidated at \$1. Total sales of Standard Consolidated amounted to 300 shares at \$1.30@1.35. A telegram from the superintendent of this company states that the shipments for October amounted to \$23,200 and the expenses for the same period were \$14,200, leaving a clear profit of \$9,000 for the month of October. No other California stock was dealt in during the week.

Of the Colorado stocks we note sales of 500 shares of Chrysolite at 18c.; 500 shares of Leadville Consolidated at 16c.; and 100 shares of Iron Silver at 50c.

Of the Black Hills stocks Caledonia shows sales of 50 shares at 90c.; of Homestake, which had not been dealt in for some weeks, 65 shares were sold at \$13.50@13.75.

Of Alice 300 shares changed hands at 65c. There was a solitary transaction of 100 shares of Moulton at 25c.—the first sale in months.

Of the Utah stocks Horn Silver was very quiet; only 100 shares being sold at \$3.55. Ontario, for the first time in weeks, shows a sale of 25 shares at \$39.

Phoenix of Arizona was the most active stock in the list. Transactions this week amounted to 1,900 shares at 52c. to 54c. In our mining news columns will be found a statement from the president of this company to the stockholders.

There was a solitary transaction of 100 shares of El Cristo at 20c.

**Boston.** Nov. 10.

(From our Special Correspondent.)

This has been a dull week for copper stocks, incident to the elections and a holiday which always has a tendency to restrict business. The dealings in Boston & Montana have been very light as compared with last week, and prices have kept within the range of \$1 per share. The lowest prices touched was on yesterday morning when it sold at \$31½, but quickly rallied to \$32½ and has ruled steady at \$32½.

Butte & Boston has been neglected, only 200 shares being quoted for the week at \$9½@9½.

The advance in Centennial noted last week to \$9½ was not maintained; the disposition to realize profits brought out too much stock and the conflicting reports from the mine had a depressing influence which carried the stock down to-day to \$7½.

Calumet & Hecla was slightly heavy and on small sales declined from \$230 to \$228.

Tamarack was in good demand and advanced from \$157@160, while Tamarack, Jr., was steady at \$23½@24. There seems to be a growing opinion that this mine will eventually become a large producer, and that the present price of the stock will look extremely low in the not distant future.

There was a good demand for Osceola and a lot of 600 shares was readily taken at \$35, while small lots sold at \$34.

The demand for Quincy since its reappearance at the Exchange has been good, and orders could not be executed except at an advance, and the stock sold up from \$120@140, reacting only \$1 on final sales.

Kearsarge sold at \$12, which is an advance of one fourth over last sales.

Arnold declined to \$1 and Santa Fé to 8c.

Atlantic sold at 10½, same as last week.

There are no reported sales of Franklin, but 13½ was bid for the stock and none to be had at that price.

3 P. M.—The market closed dull, no sales being reported since 12:30 P. M.

**San Francisco.** Nov. 4.

(From our Special Correspondent.)

The interest in the elections has overshadowed the mining stock market this week, and, in consequence, trading has been by no means brisk. J. L. Flood left for the East, ostensibly on a pleasure trip, but really, as it is believed, to confer with Mr. Mackay on the latter's return from Europe. The outlook for the Bonanza Mine, as well as others under the control of the Nevada clique, are not what is desired, and it is anticipated that with Mr. Flood's return a more active policy on the Comstock, and thus indirectly in stocks, will result.

This morning the market opened dull and heavy with light sales. Consolidated California & Virginia sold in small lots during the day steady at \$2.80. Ophir was in better demand at \$2.50; Mexican at \$1.30, and Union Consolidated at \$1.05.

In the middle group of Comstocks, Hale & Norcross at a ruling rate of \$1.30, and Savage at 65 cents have received some attention simply on the expectation of better things to come. These figures are far below what they ought to be if honest methods were followed, but the giving of a bail bond in the Hale & Norcross suit, and the uncertainty supposed to hedge the company around pending the arrangement of matters incidental to an appeal to the Supreme Court has weighted the stock down. Chollar has sold for 70 cents; Gould & Curry for 80 cents, and Potosi for 85 cents.

The South End and Gold Hill stocks have been the most active stocks on the list although they have been so only in a comparative degree. Belcher has continued to lead ruling to-day at \$2.05. Last week the ruling rate was \$2.55, and since then has fluctuated sufficiently to make the "chippers" cheerful. The price broke this morning to \$1.80, when a reaction took place, and the purchase of nearly 4,000 shares strengthened the price and closing at \$1.90. Crown Point has ruled at \$1.35, but opened to-day at \$1.25, and under the sale of 2,000 shares sold down to \$1.15, closing steady at the latter figures. Alpha sold for 23c.; Bullion, 38c.; Con. New York, 25c.; Kentuck, 15c.; Justice, 10c.; Occidental, 11c.; Overman, 30c.; Seg. Belcher, 33c.; Silver Hill, 10c., and Yellow Jacket, 95c.

The Bodies have continued very heavy and in very light demand. Bulwer has sold for 20c.; Bodie Con. for 20c., and Mono for 25c.

Of the Quijotoas Silver King sold to-day on early call for 40c, selling down to 25c. in afternoon session. Crocker at 5c., Peer at 15c. and Peerless at 5c., all bid, brought no sellers.

The Tuscadoras have, in common with other outside stocks, sold only in very small lots. Commonwealth at 10c.; Bel Monte, Grand Prize, North Belle Isle and Nevada Queen each at 5c., and Novajo at 10c. found few buyers.

Of the miscellaneous stocks Monte Diablo sold steady at \$1.00, and Eureka Con. at \$1.50.

**SAN FRANCISCO, NOV. 11.—(By Telegraph.)**—The opening quotations to-day are as follows: Best & Belcher, \$1.45; Bodie, 20c.; Belle Isle, 5c.; Bulwer, 15c.; Chollar, 80c.; Consolidated California & Virginia, \$2.85; Eureka Consolidated, \$2; Gould &

Curry, 85c.; Hale & Norcross, \$1.40; Mexican, \$1.25; Mono, 25c.; North Belle Isle, 5c.; Navajo, 10c.; Ophir, \$2.60; Savage, \$1.25; Sierra Nevada, \$1.05; Union Consolidated, \$1; Yellow Jacket, 80c.

**MEETINGS.**

Occidental Consolidated Mining Co., at the office of the company, No. 309 Montgomery street, San Francisco, Cal., November 21st, at 1 P. M.

Summit Gold Mining Co., at the office of the company, No. 309 Montgomery street, San Francisco, Cal., November 21st, at 1 P. M.

Silver Lick Consolidated Mining Co., at the office of the company, No. 531 California street, San Francisco, Cal., November 15th, at 2 P. M.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	Delinquency in office.	Day of sale.	Am't per share.
Atlas, S. Dak.	6	Sept. 26	Oct. 31	Nov. 21	.001
Bullion, Nev.	40	Oct. 20	Nov. 24	Dec. 14	.25
Brunswick Con., Cal.	4	Sept. 29	Oct. 31	Nov. 17	.02
Carra, Cal.	4	Sept. 28	Nov. 28	Dec. 28	1.00
Con. St. Gotthard, Cal.	6	Oct. 13	Nov. 17	Dec. 7	.05
Dalton, Utah	3	Oct. 7	Nov. 3	Nov. 29	.01
Eureka Con. D., Cal.	5	Sept. 19	Oct. 24	Nov. 14	.07
Exchequer, Nev.	34	Oct. 28	Nov. 30	Dec. 20	.10
Golden Piece, Cal.	18	Oct. 10	Nov. 16	Dec. 7	.800
Justice, Nev.	52	Oct. 14	Nov. 18	Dec. 8	.15
Kentuck Con., Nev.	5	Oct. 5	Nov. 7	Nov. 29	.10
Mexican, Nev.	46	Oct. 13	Nov. 17	Dec. 7	.25
North Belle Isle, Nev.	2	Sept. 11	Oct. 24	Nov. 17	.10
Northwestern, B. C.	5	Aug. 27	Oct. 24	Nov. 19	.20
Occidental, Con., Nev.	11	Oct. 25	Nov. 30	Dec. 21	.25
Overman, Nev.	65	Oct. 5	Nov. 10	Nov. 30	.30
Savage, Nev.	79	Oct. 7	Nov. 9	Nov. 29	.50
Teresa, Mex.	9	Oct. 25	Nov. 29	Dec. 16	.10
Tierakoff, Cal.	9	Oct. 11	Nov. 11	Dec. 20	.02

**METAL MARKET.**

NEW YORK, Friday Evening, Nov. 11, 1892.  
Prices of Silver Per Ounce Troy.

Nov.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$1.	Nov.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$1.
5	186¼	39½	85¼	.652	9	186¾	38¾	84½	.648
7	186¼	39½	85¼	.651	10	186	38¾	84½	.647
8	186¼	38¾	85¼	....	11	185¾	38¾	85½	.649

\*Holiday.

Silver has remained steady since our last report, with a fair inquiry for export. The result of our elections has not had any effect on the silver market. Tendencies are somewhat in suspense, awaited the verdict of the Monetary Conference.

There were sold during the week ending Friday, November 11th, 110,000 ounces in silver bullion certificates, at from 84½ to 85½ cents per ounce.

The United States Assay Office at New York reports the total deposits of silver for the week to be 101,000 oz.

**Government Silver Purchases.**

The Government has purchased during the week the following quantities of fine silver at the accompanying prices per fine ounce:

- November 7th, 875,000 oz. at 85 35c. to 85 40c.
- November 9th, 200,000 oz. at 85 60c.
- November 11th, 380,000 oz. at 84 90 to 85c.

For the month to date: 3,036,000 oz.

**Gold and Silver Exports and Imports at New York for Week Ending November 5th, 1892, and for Years from January 1st, 1892, 1891.**

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week.....	\$114,150	\$184,232	\$370,220	\$ 6,917	\$283,221
1892.....	59,360,087	7,714,368	18,098,970	2,691,333	66,993,356
1891.....	75,670,177	23,933,798	16,667,796	2,194,993	164,749,181

During the week ending November 12th the exports and imports of the precious metals, so far as ascertained, have been as follows: Exports, gold, \$49,950; silver, \$126,090. Imports, gold, \$21,310; silver, \$135,248. The gold exports went to South America and West Indies, the silver, which was Mexican coin, to England. The greater part of the silver imported was Mexican coin which will probably be reshipped within a week.

Some time ago we called attention to the fact that the greater part of the silver exported from this port was Mexican. This movement has continued, and at present but little if any American silver coin or bullion is leaving the country. It is quite plain that at present our production of the white metal is about equal to the demand created by the Sherman Act of 1890. Within the months of September and October England has taken considerable silver for the Indian trade, but the demand has not helped the solution of the silver question in the least. It should be noted that when Mexican coin is shipped its bullion value is given, but when American coin is shipped, its face value is given, because it is redeemed in gold on presentation.

**NOTES OF THE WEEK.**

Senator Allison, Congressmen McCreary and Prof. Andrews, delegates to the Monetary Conference, received their final instructions on November 10th, and

will sail on the 12 inst. for Brussels. The details of the instructions could not be learned but their general scope is to make every effort to secure some agreement with as many European powers as possible, for the extended monetary use of silver.

In England the agitation in favor of bimetalism continues, and it would seem as though the prospects are brighter for some kind of an agreement.

The following table shows the holdings of the principal banks of Europe:

	1892.	1891.
Bank of England.—Gold.....	£24,429,253	£21,868,991
France.—Gold.....	66,919,218	52,661,000
"    Silver.....	51,084,676	50,014,000
Germany.—Gold.....	32,846,250	33,832,500
"    Silver.....	10,948,750	11,277,500
Austria-Hungary.—Gold.....	10,820,000	5,483,000
"    Silver.....	15,890,000	16,777,000
Netherlands.—Gold.....	3,167,000	3,551,000
"    Silver.....	6,997,000	6,085,000
Belgium.—Gold.....	3,081,333	2,730,567
"    Silver.....	1,549,667	1,365,333

Total Gold..... £141,263,084 £120,134,158  
Total Silver..... 86,461,623 85,518,833

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Mexican dollars.....	\$ .66¾	\$ .67¼
Peruvian soles and Chilean pesos.....	.61	.63
Victoria sovereigns.....	4.85	4.50
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.78	4.81

Copper is rather firmer and, if anything, a little higher. There has been hardly anything done by consumers, though what trading has been done has been at full prices. The demand for Lake comes mostly from speculative quarters, and evidently is due to a desire to lift the market, a thing not so difficult to accomplish as the quantities offered are not large, the close of navigation being near at hand and almost everything that can be shipped lake and rail being already sold. In connection with this speculative demand it is interesting to quote from the monthly report of Messrs. James Lewis & Sons, dated November 2d, as follows:

"American producers appear determined to enhance the value of copper, if possible, by restricting the supplies. They are at last realizing the unprofitableness of supplying the world with cheap copper and have ceased mutual rivalry which has led to their doing so. Not content with reducing their production 6% and their exports 35% below the quantity agreed upon for the three months ending September 30th, the Anaconda company have announced that they intend stopping their production altogether for three months from the 10th instant, or to the extent of about 8,000 tons for this period."

From this it appears that the closing of the Anaconda, about which nothing definite is known here, is being energetically worked upon in the European markets as a means of stiffening prices. Considering that late reports have shown that the consumption in Europe leaves a good deal to be desired—a fact which has been confirmed by dispatches recently received—it appears doubtful if the market can be lifted without the demand becoming very much better. For Lake we have to quote 11 85@11 90 for ingots and 12c. for cakes and wire bars. Both the Calumet and Quincy companies are out of the market, it being the smaller ones that are selling at the figures quoted. Casting copper is held somewhat more firmly, and is now quoted at 10½@11c. Arizona is still held at such prices as to be practically out of the market. From Europe come reports of large transactions, 3,000 tons of copper stored since the time of the syndicate and consisting of cakes for rolling purposes, refined ingots, etc., as also of furnace material which now is exceedingly scarce in England, having been exchanged for G. M. B. copper which is more readily marketed. G. M. B. copper has been quiet but steady, and the quotations show hardly any change, the closing prices being £45 12s. 6d. to £45 15s. for spot and £46 5s. to £46 7s. 6d. for three months prompt. Refined and manufactured we quote as follows: English Tough, £49 @£49 10s.; Best Selected, £50@£50 10s.; Strong Sheets, £58@£58 5s.; India Sheets, £53 10s.@£54; Yellow Metal, 5d. At the end of October the statistical position was changed by a decrease of 600 tons, and though some business with India was reported the later decline in silver has put a stop to it.

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

To	Copper Matte.	Lbs.	
To Liverpool—			
S. S. Tauris.....	2,750 bags.	347,200	\$17,200
" Massachusetts.....	2,168 "	242,428	12,000
" St. Pancras.....	1,921 "	234,715	12,000
" Euclid.....	2,220 "	241,465	12,000
To Bordeaux—			
S. S. Tancarville.....	Copper.	Lbs.	
" "	90 casks.	112,500	\$13,400
" "	768 pigs.	241,617	30,000
To Hamburg—			
S. S. Russia.....	Copper.	Lbs.	
" "	90 casks.	112,500	\$14,000
To Rotterdam—			
S. S. Maasdam.....	Copper.	Lbs.	
" "	90 bbls.	112,500	\$12,938
" "	12 bars.	2,049	266

**Tin.**—A great deal of business has been done in this metal. Previous to the election considerable quantities changed hands at gradually hardening prices, which reached 20 90 for spot and 21 ½ for delivery over the next six months, but since then have eased off somewhat, and we close at 20 60 for spot and November, 20 65 for December. Futures are held rather high, the first three months of next

year being quoted at 20'90, and April and June at 21'.

On Monday the English market opened very firm at £94 15s. @ £96 for spot and 10s. higher for three months, but during the past few days prices have declined somewhat, and to-day close at £94 for spot. On the 9th very large transactions were made and 600 tons changed hands.

Lead has been somewhat depressed. Evidently the production is rather large just now, and the prominent Western smelters are persistent sellers. At the beginning of the week pretty heavy quantities changed hands at 3'90, and later on a sale at 3'80 was reported, this presumably in the fear that very soon foreign lead ores will be placed on the free list and the production of lead thus heavily increased. However, this cannot be done in a day or a month, nor probably for nearly a year, but, anyhow, since the resumption of work in the Idaho district, the production of lead has been rather large, and Colorado and Utah, as well as Missouri, are producing heavy quantities of ore. Besides, the time when consumption decreases is now rapidly approaching and in spite of present low prices no attention is paid to the article. We have to quote 3'85 to 3'90. The foreign market is reported as unaltered, Spanish still being quoted at £10 1s. 3d., and English at £10 2s. 6d. Cable advices are to the effect that the strike in the Broken Hill district has been settled and work will be fully resumed.

**Chicago Lead Market.**—The Post Boynton Strong Company telegraphs us as follows: "The market is very dull with no sales except car loads at 3'72 1/2. Later the asking price was 3'70c."

**St. Louis Lead Market.**—The John Wabl Commission Company telegraph us as follows: Lead is still slowly declining with the last sales being made at 3'65c., and at this price there are at the close more sellers than buyers."

**Spelter** is about steady though not much business has been doing. So far production shows no signs of diminishing and the quotation in New York is 4'45. In London good ordinaries are quoted at £19 and specials at £19 2s. 6d.

**Antimony** is rather firm, Cookson's at 12c., L. X. at 11 1/2 and Hallett's at 10 1/2 @ 11c.

**Nickel** is in much better demand and is reported to have sold in quantities at 53 @ 55c.

**Quicksilver.**—The quicksilver market is quiet. Only the regular trade is going on. Quotations are as follows: New York, \$38 @ \$38.50; London, £6 10s.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Nov. 11, 1892.

**Pig Iron Production.**—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, November 5th, 1892, and for the corresponding week ending Saturday, November 7th, 1891. Also the total estimated production from January 1st of each year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of this year. The figures are in gross tons:

**Pig Iron Production During Weeks Ending November 7th, 1891, and November 5th, 1892, and During Both Years to these Dates.**

Fuel used.	Week ending				From	
	Nov. 7, '91.		Nov. 5, '92.		Jan., '91.	Jan., '92.
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite.	87	34,860	69	31,000	1,570,660	1,475,796
Coke.....	162	112,870	133	130,000	3,672,070	5,804,700
Charcoal....	57	12,460	42	9,500	478,387	452,025
Total.....	306	190,190	244	170,500	6,721,117	7,732,521

**Cleveland Ore Market.**—There are no special features in the Cleveland ore market, aside from the piling up of shipments in excess of the record year, 1890. To November 1st, 1890, shipments were 7,440,574 tons; to November 1st, 1891, 6,017,759, and to November 1st, 1892, 7,823,251. Freight from Ashland, \$1.30; from Marquette, \$1.10, and from Escanaba, 80c. Furnaces are taking more ore than at the same period last year, from Cleveland docks alone some 40,000 tons. Shipments from the Mesaba Range to Duluth began last week.

There is nothing of special note in the pig iron market here. Prices remain unchanged.

We quote: Southern iron, ex-steam New York, No. 1 F., \$15.26; No. 2 F., \$14.26; No. 3 F., \$13.76; Gray Forge, \$13.01.

Northern iron, tidewater No. 1X., \$15; No. 2X., \$14; No. 2 plain, \$13.50; Gray Forge, \$13. The quotation of No. 1 F. at \$15.26 may not mean that any considerable quantity has been sold at that price, or that it could be had here now on immediate delivery. We see no reason to change the opinion expressed last week that the stocks of foundry iron are not excessive anywhere, and to this may be added the belief that they will not become so. The industry, generally, is getting into better shape week by week, and the indications are that good iron will command a fairly good price. The increase of output during the month of October was about 13,000 tons, chiefly in coke pig. The decrease of stocks during the same periods was about 75,000 tons, more strongly marked in coke than in anthracite or charcoal pig.

**Spiegeleisen and Ferromanganese.**—Ferromanganese is firm at \$61. Spiegel, \$26.50.

**Steel Rails.**—The market is uneventful. Prices \$30 at mill. There are reports of a coming reduction to \$28.

**Rail Fastenings.**—Prices rule as follows: Fish and angle plates, 1'55 @ 1'65c. at mill; spikes, 1'90 @ 2c.; bolts and square nuts, 2'40 @ 2'70c.; hexagonal nuts, 2'70 @ 2'80c., delivered.

**Merchant Iron and Steel.**—Prices stand: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/2 @ 7 1/4c.; special grades, 13 @ 18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; open hearth machinery, 2'25c.; open hearth spring, 2'30c.; tire steel, 2'25c.; toe calks, 2'25 @ 2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

**Structural Iron and Steel.**—We quote: Beams, 2'3 @ 2'55c., except for 20-in. beams which are 2'75c.; angles, 1'95 @ 2'15c.; sheared plates, 1'90 @ 2'10c.; tees, 2'30 @ 2'60c.; channels, 2'35 @ 2'50c.; universal plates, 2 @ 2'10c.; bridge plates, 2 @ 2'10c.; steel hoops, 1'90 @ 8c. All on dock.

**QUOTATIONS ON SCRAP MATERIAL AT DIFFERENT CENTERS**

	Chi'go active.	Clev'ld active.	St. L'is active.	N. Y. steady.	Phila. steady.	P'tsb'g steady.
Old Rails f. l.	18.75	20.75	19.00	19.00	19.00	20.50
Old Rails s.	13.75	15.50	14.00	15.50	16.00	16.0
1 scrap iron.	16.50	1.16.50	1.16.50	16.50	17.00	15.50 a't
2 light scrap.	11.00	.....	10.50	12.00	12.00	.....
W'r't turn'g.	1.8.50	.....	8.00	12.00	13.00	14.00
Cast borings.	1.6.00	1.7.50	1.6.00	8.00	8.00	7.00
Old fish pl'ts.	17.00	.....	.....	21.00	21.00	.....
Leaf steel...	1.16.00	1.19.00	.....	19.00	.....	20.00
Old car wheels.	15.00	14.50	14.50	15.00	15.00	14.00
Bloom ends.	.....	.....	.....	.....	.....	16.30
M'e'y c't sc's.	11.00	19.50	.....	12.00	11.00	11.00
Old st. ax'les	19.00	20.00	20.00	19.00	.....	19.50

**Buffalo.** Nov. 10.

(Special Report by Rogers, Brown & Co.)

Election has given a little set back to buying, but necessity is causing considerable interest to be manifested in the market. Purchasing is fully up to expectations when the advanced prices and the general situation is considered. We quote for cash f. o. b. cars Buffalo. No. 1X Foundry Strong Coke Iron Lake Superior ore, \$15.25; No. 2X Foundry Strong Coke Iron Lake Superior ore, \$14.50; Ohio Strong Softener No. 1, \$15.50; Ohio Strong Softener No. 2, \$14.50; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$17; Tennessee Charcoal, \$17; Southern Soft No. 1, \$14.40; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

**Chicago.** Nov. 10.

(From our Special Correspondent.)

The spectacle of business continuing uninterrupted in the face of a presidential election is almost unprecedented, and it is evident whichever party wins there will be little disturbance in the iron market—for the next few months anyhow. The past week has witnessed an unusual activity in crude iron, especially for coke, unquestionably due to the firmer front presented by Northern as well as Southern manufacturers. From all of the various consumptive branches of founders and smelters of iron there is an increased inquiry, not the least of which is that of the stove makers, several of whom state that they will require 60 to 75% more pig iron this coming season than they used last. Furnace agents report that they have been approached by speculators who have requested information, etc., but in nearly all cases they have been given the "cold shoulder," as dealers well know that iron sold for speculation is always a disturbing element. Manufactured iron and steel is in fair demand, but it is not brisk in all departments. Plates and bars are somewhat quiet as there is no great amount of new business in sight, but sheets and structurals of every description are still active. Taken as a whole the market is healthy.

**Pig Iron.**—The market during the past week was very active, especially in coke iron of local make, and there was also some little buying of charcoal. The situation is more favorable than it has been at any time this year, and the tonnage sold was the largest for some weeks. There is now no hesitation on the part of consumers in accepting offers of iron at prevailing prices, and some of the contracts closed were for good-sized amounts. Concession, either as regards deliveries or prices, is a thing of the past and several heavy consumers who had options on round lots have been requested to close at once or they would be withdrawn instanter. Southern iron is also in good demand, especially for soft grades and calls have been numerous at the advanced prices. Some of the larger producers are well booked ahead and out of the market on soft iron. Lake Superior charcoal iron is in some demand and the market is very firm at \$16.75 @ \$17. The condition generally is very encouraging.

Quotations per gross ton f. o. b. Chicago, are Lake Superior charcoal, \$16.07 @ \$17.25. Lake Superior coke, No. 1, \$14.25 @ \$14.75; No. 2, \$13.75 @ \$14; No. 3, \$13.25 @ \$13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15 @ \$15.50; American Scotch, \$16.50 @ \$17; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.10; No. 3, \$12.85; Southern coke soft, No. 1, \$13.85; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20 @ \$21.

**Steel Bill-ets and Rods.**—Mills here are sold up to end of year on both these specialties and only small orders can be taken. Billets are firm at \$26 and rods at \$35.

**Structural Iron and Steel.**—Competition on all bridge work offering is keen, and one for the city was secured by a Pittsburg firm at \$177,000. There were seven bidders. Beams are in good demand for quick delivery, and inquiry for the season is good. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2 @ \$2.20; tees, \$2.35 @ \$2.45; universal plates, \$1.95 @ \$2; sheared plates, \$1.95 @ \$2; beams and channels, \$2.35 @ \$2.50.

**Plates.**—From the outside the demand is fair for miscellaneous material in small lots. Warehouse business is moderately good and boiler shops are busy. Steel sheets, 10 to 14, \$2.30 @ \$2.40; iron sheets, 10 to 14, \$2.20 @ \$2.30; tank iron or steel, \$2.10 @ \$2.15; shell iron or steel, \$2.75 @ \$3; firebox steel, \$4.25 @ \$5.50; flange steel, \$2.75 @ \$3.00; boiler rivets \$4.00 @ \$4.15; boiler tubes, 2 1/2 in. and smaller, 60%; 7 in. and upward, 70%.

**Merchant Steel.**—Manufacturers are evidently masters of the situation, and consumers who have not covered their requirements may have to pay more for soft steels. Demand continues good and prices very firm. We quote: Tool steel, \$6.50 @ \$6.75 and upward; tire steel, \$2.10 @ \$2.20; toe calk, \$2.40 @ \$2.50; Bessemer machinery, \$2.10 @ \$2.20; Bessemer bars, \$1.75 @ \$1.80; open hearth machinery, \$2.40 @ \$2.60; open hearth carriage spring, \$2.25 @ \$2.30; crucible spring, \$3.75 @ \$4.

**Galvanized Sheet Iron.**—Mill shipments are slow and stocks much demoralized, owing to the unprecedented demand. Discounts remain unchanged at 70% off on Juniata and 70 @ 10% off on charcoal, and jobbing quantities at 67 1/2% off on the former and 70% off on the latter.

**Black Sheet Iron.**—Light and heavy gauges continue active at \$2.85 @ \$2.90 for No. 27 common. Steel slats are steady at \$3.05 @ \$3.10. Jobbers quote 3 1/2c. for steel and 3'10c. for iron from stock.

**Bar Iron.**—Orders are lighter from many sources and the lack of car orders from railroads is felt by some mills. Slow delivery continues to be noted, showing that mills have not yet caught up. Mill quotation is 1.65c. half extras, f. o. b. Chicago, and some ask 50c. @ \$1 a ton more. Jobbing price is 1'80 @ 1'90c.; rates and movement fair.

**Nails.**—Wire nails are active from mill at \$1.65 base Chicago, and some makers ask more. Jobbers quote \$1.75 from stock. Steel cut nails are in fair demand, both locally and from outside points, at \$1.62 1/2, 30c. average. Jobbers' quotation is \$1.70 from stock in less than carloads.

**Scrap.**—Is in better demand and dealers are quietly unloading some of their large stocks at better figures. No. 1 railroad, \$16.51; No. 1 forge, \$15.50; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel, \$11; leaf steel, \$15.50; tires, \$14.50.

**Old Material.**—Iron rails are steady at \$18.50 @ \$18.75, although in several instances at favorable points of delivery slightly better prices have been obtained. Steel rails are in moderate demand at \$13 @ \$15, according to length, etc. Car wheels are in better inquiry at \$14.50 @ \$15.

**Steel Rails.**—While the market on standard weight sections remains inactive, an increased demand is noted for light weights. Some mills have slightly advanced their figures, and unable to accumulate stock, R. R. Sections are \$31 @ \$32. Repair material is in fair demand in carloads at 1'75c. for iron or steel splice bars; spikes, \$2.05 @ \$2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

**Louisville.** Nov. 5.

(Special Report by Hall Bros. & Co.)

The market remains as last reported. There have been no large sales reported, 2,000 tons being about the heaviest single order placed. No. 2 Soft sold \$9.25, Birmingham, for six months' delivery, beginning January, 1893, and Grey Forge, \$8.75, for same delivery. Prices are very firm, and some firms display a disposition to crowd prices up, while others, more conservative, think present figures should be maintained for some time before asking more. Stocks in first hands are reported light.

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$13 @ \$13.50; Southern coke No. 2, \$12.25 @ \$12.50; Southern coke No. 3, \$11.75 @ \$12; Southern charcoal No. 1, \$16 @ \$17; Southern charcoal No. 2, \$15.00 @ \$15.50.

**Forge Irons.**—Neutral coke, \$11.50 @ \$12.00; cold short, \$11.25 @ \$11.50; mottled, \$10.75 @ \$11.

**Car Wheel and Malleable Irons.**—Southern (standard brands), \$20 @ \$21; Southern (other brands), \$18.50 @ \$19.50; Lake Superior, \$19.50 @ \$20.50.

**Philadelphia.** Nov. 10.

(From our Special Correspondent.)

**Pig Iron.**—The fact that pig iron production has increased so much during the past month is a surprise to the trade. If there is going to be much of an increase it will do harm. During the past few days a good many inquiries were made for winter delivery iron. The supposition has been entertained that the output of iron for the next few months would be barely sufficient for the market require.

ments. It is too soon to say what the effect of this increased output will be, but, speaking generally, it can be said that it will make buyers more cautious. The increase of anthracite iron is too trifling, of course, to have much effect at present. Quotations rule at \$15@15.75 for No. 1; \$14@14.75 for No. 2; the former quotation being the price named for good Southern brands, delivered. A few 1,000-ton lots of forge were taken this week at \$13. Standard Bessemer is \$16 at furnace.

**Steel Billets.**—Makers of billets have refused in three or four instances to make shadings asked for by certain large buyers for delivery between January and April. Our makers claim that billets will, of necessity, advance during the winter. Quotations \$27 to \$27.50.

**Merchant Iron.**—The entire bar iron market is in a healthy condition for the retail trade. The large buyers are out of the market for the present. All the business done ranges from \$1.60 to \$1.75.

**Nails.**—A large amount of business has been done in nails of all kinds from store; factories are running pretty full time, and there is a probability of constant employment for some weeks to come.

**Skelp Iron.**—Large sales have been made within two days at \$1.60.

**Wrought Iron Pipe.**—A steady business is being done in pipes and tubes at the usual prices.

**Merchant Steel.**—Specialties, especially in castings, are in active demand at present, and engineering requirements in this direction are expanding. A good deal of winter work is now being arranged for.

**Plate and Tank Iron.**—A great deal of new business has been promised within a few days. There is a sharp competition between plate mills East and West for some new business recently offered, and there is a little anxiety here lest we may lose some of it, and this has led to a shading of one-tenth for steel plates.

**Sheet Iron.**—All of the mills are in an oversold condition, and prices are firm for everything that can be delivered within 30 or even 60 days. Card rates, \$2.75 to \$3 and \$3.50 for best refined.

**Structural Material.**—This week has been unusually quiet with reference to some new business that our people expected to secure. There is a little delay, but no anxiety over it. Sheared plates are 1.90c; universal plates, 2c; beams, tees and channels, 2.20c.

**Steel Rails.**—There is another rumor that \$30 will be shaded before the year is over, but the rumors come from quarters which do not carry authority with them. The new business is insignificant.

**Old Rails.**—Brokers are finding it no easy matter to secure customers for stocks of rails in sight. They do not bring them to town until customers are found, and then they are shipped direct. Old rails are quoted as high as \$20 delivered, for iron, and \$16 to \$16.50 for steel.

**Scrap.**—Railroad scrap is quoted quiet at \$17 to \$17.50.

Pittsburg, Nov. 10.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The situation in the iron trade continues to grow better steadily although the change is hardly perceptible from day to day. Last week's sales were the largest reported for a long time, many of the sales being for the first quarter in 1893. It is noticeable that the consumption of pig iron is greater than the production and the steady reduction in stocks is beginning to arouse some consumers. For upward of three years the market for pig iron has been growing worse, and purchasers found each lot could be obtained a little cheaper than the preceding one, so that the habit of taking small quantities had become pretty well fixed. This hand-to-mouth fashion of doing business is still in vogue. Producers say they do not care to make long contracts under the circumstance. Some of them refuse to enter orders that extend beyond the last of the year. An advance in prices for good brands on New Year's is regarded as almost certain unless the market should develop sudden weakness, meanwhile remain firm and entirely in favor of sellers. "Cold Short," excellent authority, has this to say: "I have claimed all along that 1893 will offer very much improved opportunities in the iron business and present manifestations are bearing out this opinion, but too much urgency, in the meantime, to dispose of products will so weaken these opportunities during the early stages of their development that mere shadows of what were almost certain assurances will present themselves for utilization and disappointment will ensue."

An Easterner on the situation: "The business situation at present is so thoroughly sound and healthy that evidences of strength and virility crop out on every side. Buyers are inclined to postpone placing orders as far as possible, but their requirements are so urgent that they have to buy something to piece out with, consequently the call for short deliveries are so urgent that pretty nearly everything for early delivery is at a premium. Without being irrelevant it may be said that the fullness of time has come and that the natural shaping of events will be the development of the largest volume of business ever known. This is not given as a prediction but as a statement of fact as regards the general opinion. There was a time when almost any man, if intelligence and experience in the trade could make a pretty correct guess for

three or four months ahead; in fact, opinions in those days were almost unanimous, but the expansion of business has been so great; and its ramifications so widely extended, that it is now almost beyond any man's grasp. As already stated, however, the volume of business is large and of increasing magnitude. This is shown by decreasing stocks, urgent calls for quick delivery and relatively higher prices than for those at a later date. The question of higher prices, however, is the unknown quality."

**Coke Smelted Lake and Native Ore.**

5,000 Tons Bessemer, Nov., Dec., Jan.	\$14.00 cash.
4,000 Tons Bessemer, Nov., Dec., Jan.	14.00 cash.
4,000 Tons Bessemer, Jan., Feb., March, 1893.	14.00 cash.
3,500 Tons Bessemer, Jan., Feb., March, 1893.	14.00 cash.
3,000 Tons Bessemer, Jan., Feb., March, 1893.	14.10 cash.
3,000 Tons Bessemer, Nov., Dec.	14.00 cash.
2,500 Tons Bessemer, Dec., Jan.	14.60 cash.
1,500 Tons Grey Forge.	12.50 cash.
1,200 Tons Grey Forge.	12.50 cash.
1,000 Tons Grey Forge, all ore.	12.75 cash.
1,000 Tons Grey Forge.	12.50 cash.
1,000 Tons off Bessemer.	13.00 cash.
500 Tons Grey Forge.	12.40 cash.
250 Tons No. 1 Foundry.	14.50 cash.
200 Tons No. 2 Foundry.	13.50 cash.
150 Tons No. 3 Foundry.	13.00 cash.

**Charcoal.**

150 Tons Cold Blast.	26.00 cash.
100 Tons No. 2 Foundry.	19.00 cash.
75 Tons Cold Blast.	25.00 cash.
75 Tons No. 1 Foundry.	20.00 cash.
50 Tons No. 2 Foundry.	19.00 cash.

**Steel Blooms, Billets and Slabs.**

5,000 Tons Billets and Slabs, 1st three months, 1893 at mill.	23.80 cash.
3,000 Tons Steel Billets, Jan., Feb., March, 1893.	24.00 cash.
3,000 Tons Billets, Jan., Feb., March, 1893, at mill.	22.85 cash.
2,000 Tons Billets, Dec., Jan., 1893, at mill.	22.95 cash.
1,000 Tons Slabs Dec., Jan., 1893, delivered.	23.75 cash.
500 Tons Billets, spot.	25.00 cash.
500 Tons Billets, prompt.	24.50 cash.

**Muck Bar.**

500 Tons Neutral.	24.75 cash.
500 Tons Neutral.	25.00 cash.
300 Tons Neutral.	24.75 cash.

**Skelp Iron.**

500 Tons Sheared Iron.	1.85 4 m.
4.0 Tons Wide Grooved.	1.85 4 m.
380 Tons Na-row Grooved.	1.62 4 m.

**Skelp Steel.**

350 Tons Wide Grooved.	1.60 4 m.
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**Sheet Bars.**

500 Tons Sheet Bars, at mill.	31.00 cash.
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**Steel Wire Rod, five-gauge American.**

600 Tons, Five Gauge, American, at mill.	33.00 cash.
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**Ferromanganese.**

50 Tons, 80%, Foreign, delivered.	62.75 cash.
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**Old Iron and Steel Rails.**

500 Tons American T's.	20.15 cash.
500 Tons American T's.	20.10 cash.
200 Tons American T's.	20.10 cash.

**Scrap Material.**

600 Tons No. 1 R. R. W. Scrap, net.	16.00 cash.
300 Tons Cast Scrap, gross.	11.75 cash.
200 Tons Old Car Wheels, gross.	13.75 cash.
200 Tons Steel Axles, net.	23.50 cash.
150 Tons No. 1 Wrought Scrap, net.	15.80 cash.
100 Tons Cast Scrap, gross.	12.00 cash.
100 Tons Iron Axles, net.	23.75 cash.

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, Nov. 11.

Statement of shipments of anthracite coal (approximate) for week ending November 5th, 1892, compared with the corresponding period last year.

Regions	Nov. 5, 1892.	Nov. 7, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region....	477,670	599,851	Dec. 32,181
Lehigh Region.....	153,360	130,841	Inc. 12,516
Schuylkill Region....	262,920	330,801	Dec. 67,881
Total.....	893,950	971,496	Dec. 87,546
Total for year to date	35,216,409	32,704,304	Inc. 1,512,105

PRODUCTION OF BITUMINOUS COAL for week ending November 5th, and year from January 1st.

Regions	1892.		1891.
	Week.	Year.	
Penn. & Erie R. R.	3,921	77,611	142,651
Cumberland, Md.	90,285	3,240,355	3,542,205
Barclay, Pa.	897	58,619	161,949
Broad Top, Pa.	14,450	530,973	475,423
Clearfield, Pa.	87,221	3,363,365	3,400,309
Allegheny, Pa.	33,050	1,088,816	1,072,382
Beech Creek, Pa.	32,073	1,941,587	2,040,475
Pocahontas Flat Top.	61,730	2,227,213	1,953,483
Kanawha, W. Va.	57,538	2,109,916	2,047,438
Total	381,195	14,640,485	14,785,814

Regions	1892.		1891.
	Week.	Year.	
Pittsburg, Pa.	25,871	1,073,465	1,076,117
Westmoreland, Pa.	43,971	1,473,484	1,654,844
Monongahela, Pa.	16,800	563,004	506,814
Total	86,642	3,109,953	3,237,775

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending November 5th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 112,739 tons; year 4,567,624 tons; to corresponding date in 1891, 3,623,788 tons.

**Anthracite.**

The last has been rather a broken week in anthracite. Not that any important movements of a nature adverse to current prices have been observed, but only in the way of uniformity of demand has it lacked smoothness. It is not thought that the shading of prices, even by independent dealers, has

assumed serious dimensions, nor is it likely to do so now. In a small way, doubtless, circular prices are cut, but only on grades that play no great part in the general market. It is thought that the net profits of the Reading, whose fiscal year expires with the present month, will be about \$1,500,000 greater than last year, which however, will be largely absorbed in meeting the interest on the preference bonds. This figure is lower than some sanguine people have hoped to see. It may be that the increased cost of mining will account for the difference. Taking everything into consideration, it does not appear that the company has realized as much as 50 cents per ton advance on last year's figures, and this with the additional cost of 15 to 20 cents in mining, does not leave a great bit profit. Whether or not there is room left for such an advance as will run profits a bit higher is an open question that each one can solve for himself, but it seems to us that rather than risk the fierce competition sure to arise under an attempted increase of price the Reading will prefer to follow the general drift of the market. There is some talk of a reasonable advance of not more than 50 cents. Now an advanced market, to be stable, must rest upon an abnormal decrease in production, or a demand becoming more and more active, or upon both. It does not appear that any one of these causes is at present in operation.

The New England railroad situation is still a subject of remark, but the diversion of water freights is a matter that will require much time and a great deal of money. Charters from New York to Boston are said to have been obtained at 40 cents, and from Baltimore and Philadelphia at 50 cents.

**Bituminous.**

The soft coal miners and dealers are, to some extent, still figuring on what has been called "The Soft Coal Combine." A concern to be known as The Coal Agency Company was to receive, handle and dispose of practically all the soft coal east of the Rocky Mountains that was sent to the Atlantic seaboard north of and including Norfolk. The compensation was fixed at 25 cents per ton, and a fixed quota was provided. Extra amounts were to be applied for by the Agency company during the first month of each year. The shares of the common or general capital stock of the company were to be held by the companies and by the agency. The following regions were represented:

- No. 1. Clearfield region of Pennsylvania, including all coal controlled and represented by Clearfield tidewater shippers and that passed over the Pennsylvania Railroad.
- No. 2. Cumberland, including also the Myersdale region.
- No. 3. New River region; coal over the Chesapeake and Ohio Railway.
- No. 4. Flat Top region and Pocahontas; coal over the Norfolk and Western Railway.
- No. 5. Peach Creek region; coal over the Peach Creek, Clearfield and Southwestern Railway from this region.
- No. 6. Reynoldsville region; all soft coal shipped over the New York, Lake Erie & Western Railway.
- No. 7. West Virginia Central & Pittsburg Railway region; coal over that road.

The original plan seems to have been modified somewhat, but it is not known, outside of a favored few, what these modifications are, nor, consequently, how they will effect the enterprise. The formation of a company with the enormous capital that would be required to handle this coal, as the Standard Oil Company handles its products, does not seem to be contemplated. Outside of this, the enterprise would probably stand a fair chance of success. It seems to be quite as much for the benefit of certain railroads as the mines, and there is no objection to this, provided the coal-buying public are not made to pay two profits to the same concern.

Consolidation does necessarily mean an unholy fleecing of the public. It is often the means of reducing prices and it is often the means of raising them. Whether it is the one or other that depends, other things being equal, upon the general state of trade, and whether the greater revenue would arise from the few at a higher or the many at a lower price. Soft coal is pushing anthracite more and more every year, and if there should be a marked advance in the price of anthracite, which, however, does not seem probable, the soft coal men would certainly not wear mourning.

An excellent quality of soft coal can now be had in Philadelphia for \$2.40 commission in water freights from Philadelphia to Boston, Salem and Portland are 80@85c.; to Gardner and Bangor \$1.00 and to Wadsworth and Bath 85@90c. From Newport News and Norfolk to Boston, Salem and Portland, 80c.; and to Sound ports, 70@80c.; from Baltimore to Boston, 85@90c.

The New England States take some 12,000,000 tons of coal a year, about equally divided between anthracite and bituminous. The hard and soft coal men watch each other pretty closely and an advance in prices by either side is apt to be seized by the other. A combination is hardly to be expected between these interests.

Buffalo, Nov. 10.

(From our Special Correspondent.)

No change in the features of the anthracite and bituminous coal trade or in the quotations ruling the latter very firm. Much trouble is experienced in the soft coal mining districts occasioned by the extraordinary scarcity of water; reservoirs have run dry and streams also. Many manufactories

have closed for the same reason, and others have to convey the water necessary for use in wagons from long distances.

In writing about the shipping of our inland lakes Commissioner J. C. O'Brien states that "this branch of our merchant marine, in so far as relates to trade between American ports, is absolutely protected against foreign competition. From this cause and the fact that our domestic trade between lake ports constitutes by far the larger part of the commerce of the Great Lakes, our shipping so employed is enjoying a high degree of prosperity. Our lake tonnage increased from 711,269 tons in 1882 to 1,183,182 tons in 1892. It now embraces a fleet of large steam vessels, models of beauty and nautical efficiency, which offer to shippers and passengers an unsurpassed transportation service."

The gales of the past week resulted in the loss of over a dozen vessels and 25 seamen. The money loss will be about \$500,000, the greatest ever reported for a single storm. Among the lost vessels was the "Glicher," which foundered, laden with 3,000 tons of coal.

The Detroit Dry Dock Company have contracted to build a 4,000-ton steel propeller, 362 ft. over all, 342 ft. keel, 42 ft. beam, and hold 42 ft. deep with double bottom. She should carry 3,000 tons freight through a 20-ft. channel.

The Northern Steamship Company will send its last boats for the season to Duluth and Lake Superior ports on November 19th. Evidences of the near close of navigation are apparent from the news received from all lake ports. Heavy snow here this morning.

Canal movement of coal for first week in November at this port: Receipts, 2,746 net tons; shipments, 196 net tons.

During the month of October canal freights on coal and shipments from Buffalo were as follows: To Lockport, one load at 37½c. net ton and one load at 42c. net ton; to Syracuse, two loads at 55c. gross ton and four loads 65c. gross ton; to Oriskany and Utica, two loads at 75c. gross ton; all free on and off.

The movement of coal westward from this port by lake from November 1st to 8th, both days inclusive, aggregated 97,230 net tons, distributed about as follows: 31,200 to Chicago, 21,600 to Milwaukee, 19,200 to Duluth, 11,350 to Superior, 7,950 to Toledo, 1,500 to Gladstone, 600 to Lake Linden, 50 to Alpena, 1,830 to Detroit, 400 to Menominee and 1,550 to Fort William. The rates of freight were: 75c. to Chicago, 70c. to Milwaukee, 25@35c. to Duluth and Superior, 40c. to Toledo, 50c. to Lake Linden and Gladstone, 25c. to Detroit, 90c. to Racine, 60c. to Menominee and 35c. to Fort William.

Chicago. Nov. 10.

(From our Special Correspondent.)

As stated in the six columns on previous occasions there was reason to believe that cutting was being freely indulged in by all of the shippers not affiliated or directly in the "combine." But now it is well known that circular prices are such in name only. It must be understood also that this same incisive business is on strictly standard grades of anthracite, and not, as some have claimed, inferior coal. Furthermore, the shading of the circular is not solely confined to wholesale quantities, but has extended to retail lots of 25 to 50 tons and upward. The regular retail price is \$7.25 per ton delivered, but small consumers have had hard coal of best quality put into their bins at less than \$6.65, and it can be bought at that price and lower to-day. In other words, sales are made to the best paying class of consumers at less than dealers' prices with cartage added in the yards, which are supposed to be reported as sales to dealers. The point made here is that shippers other than the consolidated companies are united in endeavoring to wrest the best class of the retail trade from dealers to whom it rightfully belongs as miscellaneous distributors to the smaller consumers. This is a hardship to the coal trade at large, and is it any wonder that there is fully as much antagonism by them against the shippers as there is among the consuming public. The fact of the matter is that prices have been pushed up too high for the shippers to be honest to each other or to the interests of their principals. As a natural result of this condition of affairs many of the best dealers are influencing as far as possible their patrons to use crushed coke. This fuel is being sold in this market at \$1 and \$1.50 a ton less than anthracite coal and we hear reports from these dealers that many of their customers are delighted with crushed coke and add that it is more economical than anthracite coal.

The Bureau of Coal Statistics, presided over by H. A. Bisehoff, editor of the *Black Diamond*, of this city, states that on October 31st the visible supply of anthracite coal was 200,000 tons in excess of the corresponding period last year. This includes shipments by lake and rail, and stocks in yards and on dock. It is, in the opinion of those best qualified to judge, that this excess, together with the coal to come forward, will be readily absorbed before the close of the season; if not the whole, at least a very large proportion.

There is very little if any change to note. The colder weather has somewhat stimulated demand from the outside for anthracite, but it is by no means active, nor can it by any stretch of the imagination be called good; indeed, some of the shippers called it quiet, so that even a "fair" demand would seem a strong term to use in regard to wholesale business. With regard to prices the less said the better. Lake

shipments are coming forward in good shape, but all-rail coal, as reported by some shippers, is slow, while others state supplies are good. In any event there is no lack of coal, either dock, yard or rail. Retail trade during the latter part of the week and for the first three days of this week may be termed good, and most of the larger dealers report full work for their teams. The class of consumers now buying are mostly those who put off their purchases to the last moment, or until stress of weather forces them to take in coal.

Bituminous coal is active, both in regard to shipments on contracts and deliveries in and around the city. The chilly atmosphere has made imperative the demand for more steam as well as more domestic coal but, as so frequently stated, the great drawback is the scarcity of cars and consequent irregularity in shipments. The conditions as reported for the past two weeks on the Northern Illinois coal field are not greatly changed, although there has been less coal mined since November 1st, on account of the interest taken in the general election. The same applies also to the Indiana coal districts, and most of the operators have advanced their circular. Cars are very scarce for Western and Northwestern shipments.

Coke for foundry use is in improving demand and best grades of Connellsville have the preference. The market is in good shape. Connellsville crushed domestic is in fair demand and gaining each week.

Quotations are: \$4.65 furnace; \$5.05 foundry; crushed, \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.60@2.75.

Pittsburg.

Nov. 10.

(From our Special Correspondent.)

Coal.—Trade during the week has presented nothing of special interest as regards prices or demand. The coal trade is improving. In regard to the mines in the pools the situation is without change. Both sides may be said to be waiting developments, neither having so far made any concessions. The miners have been unusually silent as to their intentions, and the operators have not departed from their expressed determination of only resuming work at the reduced rates. The dealers, who handle nearly all the river coal mined, are talking of a strong combination to control the distribution of river coal in this district, which will probably be effected.

Cars still continue very scarce. The last coal shipped by water from Pittsburg was in July, 1,948,000 bush, to Cincinnati; 1,410,000 to Louisville. The year's shipment by river has been unusually small. Coal in the lower markets is reported light, with prices on the up grade. During the week there has been a small rise in the Ohio, a number of light tow boats left for the lower ports to bring up empty boats, which on arrival are sent to the ports to be loaded as soon as the miners resume operations.

Connellsville Coke.—A curious feature in the coke trade—when with a large increase in shipments production fell off on account of the scarcity of the water. The increase in shipments was gained by lifting stock coke amounting to 500 cars and the increase was: To the West, 160 cars; to points East, an increase of 140 cars; while the increase to Pittsburg and river points increased 300 cars. The operations and output show for the week 13,700 ovens in blast and 3,553 idle, with a total estimated production of 121,283 tons, an increase compared with the previous week of 1,503 tons. The McClure company increased its active list of ovens upward of a hundred. The active ovens averaged 5.14 days against 5.18 days the previous week. The shipments for the week aggregated 1,264 cars consigned as follows: To Pittsburg and river points, 2,196 cars; points west of Pittsburg, 3,672 cars; to points East, 1,396 cars; being an increase over preceding week 312 cars. Prices unchanged.

## CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 11.

Heavy Chemicals.—The past week has been a very quiet one in the heavy chemical market, owing to the conditions detailed in our last issue, and which still prevail, and also to the excitement provoked by the election. Caustic soda has been quiet. Carbonated sodas are scarce for prompt delivery and most of the business done has been for future delivery. Alkali is in better demand and some sales are reported. The other articles are quiet and show no change from last week: Our quotations to-day are as follows: Caustic soda, 60%, 3.17½@3.27½c.; 70%, 2.95@3.12½c.; 74%, 2.97½@3.15c.; 76%, 3.12½@3.25c.; 77%, 3.12½@3.25c. Carbonated soda ash, 48%, 1.57½@1.60c.; 53%, 1.47½@1.52½c. Alkali, 48%, 1.50@1.55c.; 53%, 1.45@1.50c. Sal soda, English, 1.02½@1.05c.; American, 1.05@1.10c.; bleaching powder, 2.50@2.75c.

Acids.—Business in the acid market continues good. The active demand for acids noted in this column for some time past continues, and considerable trading has been done both for prompt

and for future delivery. No new feature can be reported. There is no change in prices and we quote this week: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2, according to quality; muriatic, 18", \$1@1.25; 20", 90c.@1.10; 22", \$1.25@1.50; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 85c.@1.10; mixed acids, according to mixture; oxalic \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.75; Glycerine for nitroglycerine, 11½@12½c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone has been very quiet. The price for future shipments has declined, and December-January are quoted at \$21@21.50 for best unmixed seconds, and \$20.50@21 for best unmixed thirds. Spot and near by arrivals are very scarce and are held at \$25 for best unmixed seconds and 75c. to \$1 less for thirds, although there is not much demand for them. Cable advices from Europe report large stocks on hand, to which fact the decline must be attributed. The imports of crude brimstone into this country for the nine months ending September 30th, 1892, amounted to 79,899 tons against 94,820 tons for the corresponding period of 1891. The imports for October also show a falling off.

Fertilizers.—The fertilizer market has been quiet during the week, owing in measure to the excitement of the presidential election. Generally, the demand has been only fair, but prices have been well maintained, as we said last week they would be. Some sales of ammoniates are reported but none of great magnitude. We quote this week: Sulphate of ammonia, \$2.90@2.95 for bone goods and \$2.95@3 for gas liquor. Dried blood, \$2.25@2.35 per unit for high grade and \$2.20@2.25 for low grade; acidulated fish scrap, \$14 f. o. b. factory; dried scrap, \$24.50@25; Azotine, \$2.20@2.25. Tankage, high grade, \$23.50@24; low grade, \$20@22, according to grade. Bone tankage, \$22.50@23.50; bone meal, \$23.50@25.50.

Double manure salts are unchanged. The price has been fixed by the syndicate's agents, and has not changed during the week. Quotations are as follows: \$1.13½ cwt., basis 48@50%, in 50 ton lots, on foreign weights and analysis. High grade sulphate, \$2.13 cwt., basis 90% foreign weights and tests.

Phosphates.—Phosphate rock, Florida, 60@90%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.75@5 f. o. b., Charleston.

Kainit.—Prices continue as follows: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—There is no change in the position of this salt. Arrivals during the week have been quite heavy, aggregating 1,175 tons. New sales were 200 tons, for future shipments. Prices are: For 50 tons or over, New York or Boston, \$1.81½; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.83½.

Nitrate of Soda.—Nitrate continues strong and quotations are as follows: Spot are \$2.12½@2.15; near-by arrivals, \$2.12½; Futures, \$1.95. We are reliably informed that owing to the high price of nitrate some is being imported from Europe, and that during the week nitrate has been offered at \$2.07½ in 1,000-bag lots, from store.

Liverpool.

Nov. 2.

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

Since our last, the chemical world has been startled by the appearance in the press of the description of the Brunner Mond process for bleaching powder, which process is and has for some time been worked at Messrs. Brunner Mond & Co.'s works; the bleach so made is going steadily into consumption. To what extent this process may be extended is for the present not disclosed. This week the unwary were excited over the publication in the *North Eastern Gazette* (published at Middlebrough) of the announcement of the discovery of a new and simple process for the manufacture of caustic soda, chlorine and other chemical products, direct from brine by electricity. This has generally been regarded as a stock exchange move and was to some extent successful in depressing the value of the shares in the United Alkali Company, Ltd. Had the article in the newspapers given the names of the prominent "chemists and electricians" who pronounced the new method a "complete success," more credence might have been given to the statement. As it is, if such or any similar method is to be successfully worked the time is not yet come.

Chlorate of potash is the chief article round which interest centers just now in our line. The article has advanced to 8d. per pound, and delivery very difficult to obtain. The idea is that short sales have been made, and sellers are getting squeezed. For next year 7d. per pound has been paid for January to June. Low prices are reported as having been accepted for soda ash for next year's deliveries. Particulars are not allowed to transpire.

Caustic soda is quoted still at £9 2s. 6d. for 60%, £10 5s. for 70%, £11 5s. for 74%, £12 5s. for 76%. Offers are solicited at 10s. per ton less for next year. Soda crystal and bicarb. soda unchanged. Bleaching powder is now offered outside the Union, and here also sales have been made which do not transpire. Nominal prices, £7 15s. per ton for hardwood casks; less would be accepted for 1893. Sulphate of ammonia rather stronger in sympathy with nitrate of soda. Former, £10 5s. f. o. b. double bags for good grey 2½%; £10 10s. for 2½%; latter, £) 5s. @ £) 7s. 6d. f. o. b. double bags.

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

Table with columns for Name and Location of Company, Dividend dates (Nov. 5, 7, 8, 9, 10, 11), and Sales. Includes companies like Adams, Albee, Amador, Atlantic, Belcher, Belle Isle, etc.

\*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 3,670. Non-dividend shares sold, 3,225. Total shares sold, 6,895. † Election Day.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Dividend dates (Nov. 4, 5, 7, 8, 9, 10), and Sales. Includes companies like Atlantic, Bodie, Bonanza Development, Brece, Calumet & Hecla, etc.

Dividend shares sold, 3,235. Non-dividend shares sold, 3,225. Total shares sold, 6,460.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Large table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and amount of last. Includes companies like Adams, Albee, Amador, Atlantic, Belcher, Belle Isle, etc.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,900,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Kly Company which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 in assessments.

STOCK MARKET QUOTATIONS

Aspen, Nov. 3. The closing quotations were as follows:

Table of Aspen stock prices including Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallic, Bishwacker, etc.

Baltimore, Md. Nov. 10. Bid. asked.

Table of Baltimore stock prices including Atlantic Coal, Balt. & N. C., Conrad Hill, etc.

Pittsburg, Pa. Prices highest and lowest for the week ending November 10th:

Table of Pittsburg stock prices including Bridgewater Gas Co., Chartiers Val. Gas, Enterprise Mining Co., etc.

St. Louis, Nov. 9. The closing quotations were as follows:

Table of St. Louis stock prices including Adams, American & Nettie, Bi-Metallic, Central Silver, etc.

Helena, Mont. (Special report by SAMUEL K. DAVIS.)

Table of Helena stock prices including Bald Butte (Mont.), Benton Group, Bi-Metallic, etc.

Deadwood, Nov. 5. The closing quotations were as follows:

Table of Deadwood stock prices including Bullion, Carriage, Golden Reward, Harmony, Iron Hill, Lucille, etc.

Foreign Quotations.

London, Oct. 29. Highest. Lowest.

Table of London foreign quotations including Alaska Treadwell, Amador, Cal., American Belle, Colo., etc.

Paris, Oct. 27. Franes.

Table of Paris foreign quotations including East Oregon, Ore., Golden River, Cal., Laurium, Greece, etc.

San Francisco, Cal.

CLOSING QUOTATIONS.

Table of San Francisco stock prices including Alpha, Alta, Belcher, Belle Isle, B. & Belch, Bodie, etc.

CURRENT PRICES.

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

Large table of current prices for various chemicals and minerals including Acid-Acetic, Commercial, Carbonic, Chromic, Hydrobromic, etc.

Powdered, # lb. Marble Dust, # bbl. Metallic Paint, # ton. Mineral Wool, # ton. Nitric Acid, # ton. etc.

Table of various mineral and chemical prices including Marble Dust, Metallic Paint, Mineral Wool, Nitric Acid, etc.

THE RARER METALS.

Table of prices for rarer metals including Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

COAL STOCKS.

Table of coal stock prices for various companies including Col. C. & I., Cons. Coal, Del. & H. C., etc.

\* Election Day. † Ex-dividend. Total shares sold, 185,280.