

# THE ENGINEERING AND MINING JOURNAL



Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

Vol. LIV. SEPTEMBER 24. No. 13.

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 SOPHIA BRAEUNLICH, Business Manager  
 THE SCIENTIFIC PUBLISHING CO., Publishers.

**SUBSCRIPTION PRICE:**

Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$7.

Monthly Export Edition, all countries, \$2.50 gold value per annum. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

**THE SCIENTIFIC PUBLISHING COMPANY.**

OFFICERS:  
 R. P. BOWWELL, Pres. & Gen'l Mang. / P. O. Box 1833.  
 SOPHIA BRAEUNLICH, Sec'y & Treas. / 27 Park Place, New York.  
 Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition

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The Dolcoath Tin Mine, Cornwall, has been in operation as a tin mine for 50 years. Up to 1890 the total production had been approximately 170,000 tons of hlock tin, valued at £9,000,000. The workings are now down 2,742 ft., and the production, instead of falling off, as might be expected, was 600 tons of tin for the 12 weeks up to September 3d, greater than any return for a similar period of time in the history of the mine. Profits amounting to £11,000 were made.

In 1891 dividends amounting to \$2,510,465 were paid by the gold mining companies of Victoria, Australia. The Star of the East in the Ballarat or Sandhurst district alone declared \$385,704. At the end of the year 25,526 men were employed in gold mining in the colony, of whom 10,520 were in placer mining. Seven hundred and thirty-two thousand nine hundred and sixty-four tons of ore were crushed, yielding 355,715 oz. gold, or an average of 9 dwts. per ton. The highest average product was 19 dwts. 20 grains in the Gippsland district, and the lowest, 5 dwts, was in Ballarat.

MINING in the Indian gold fields seems to be in a prosperous condition and constantly improving. The output of the Ooregum and Balaghat mines having nearly doubled during the past three months over that of a similar period of 1891. In production, the Mysore, as ever, leads the list with a total for the three months of 14,476 oz. from 10,771 tons of ore, or an average of 1.3 oz. to the ton. The Ooregum is next with a total of 13,909 ozs. from 6,375 tons of ore, an average of 2 oz. per ton.

At present there are 185 stamps at work in the field, with 70 more in course of construction, not for new enterprises, but for the increased crushing capacity of existing plants.

IN reduction works using the Patera hyposulphite process or the modern Russell process there has been much complaint of the annoyance and expense of the rapid destruction of the pipes, pumps, valves and plungers and, in fact, of all metal exposed to the action of the solution charged with various salts. Hyposulphite of soda solutions alone are sufficiently destructive, but when charged with various sulphates the life of pipes and pumps is short. So too in copper mines containing sulphide ores. A portion of the copper sulphide is oxidized to sulphate and is washed out by the mine waters. When this solution is pumped, the copper in it is precipitated on the pump column, the iron going into solution and the pipe is eaten away. Various acid resisting paints have been tried, but unsuccessfully, the coating is worn away by attrition from particles of rock brought up with the muddy waters.

One remedy for this destruction, both in reduction works and mines, lies in the use of an alloy containing a large percentage of copper, such as deoxidized bronze, the composition of which is Cu, 82.6; Sn, 12.4; Zn, 3.23; Ph, 2.14. Digesters for wood pulp works made of this alloy have been found to withstand admirably the action of hyposulphite of soda and of sulphurous acid. Copper would not be precipitated upon it, at least in any quantity, and pump columns, plungers and pipes made of this metal should certainly stand the action of mine waters or of the Russell solution. The first cost would not be a drawback, as the saving in a short time would more than equalize matters. It is a matter which should be investigated by both mining men and manufacturers of alloys.

**THE OWNERLESS THREE BARS OF BULLION.**

In July the superintendent of the Consolidated California & Virginia mine reported that three bars of bullion Nos. 4,197, 4,198 and 4,199, valued at \$11,337.01, had been received at the assay office in Virginia City for account of the company.

This report was duly noted and posted in the San Francisco office. On August 5th the superintendent wrote the secretary that he was in error about these three bars of bullion, that they came to the assay office improperly marked, and that they belonged in reality to the Comstock Mill and Mining Company. A further examination of this matter develops a very strange condition of affairs.

The Comstock Mill and Mining Company is the incorporation that owns the mills crushing Consolidated California & Virginia ore. The stock of this incorporation, as shown by the testimony of JOHN W. MACKAY in the Hale & Norcross case, is the property of JAMES L. FLOOD, United States Senator JOHN P. JONES and JOHN W. MACKAY.

The mills owned and operated by the Comstock Mill and Mining Company have been used exclusively for crushing the ore taken from the Consolidated California & Virginia Mine, and no other ore has been reduced at the mills of that company.

The Comstock Mill and Mining Company has no mines producing ore and obtains bullion from Consolidated California & Virginia alone. It is not paid in bullion for its work, but in gold coin. The mills of the Comstock Mill and Mining Company are provided with annexes commonly known as "little jokers," similar to the one exposed in the Nevada mill in the Hale & Norcross suit, and which, it was shown, was used to rob the stockholders of that company.

With these facts before us it is in order to ask: Where did the Com-

stock Mill and Mining Company get these three bars of bullion? What right have they to them? There seems to be but one way in which they could obtain them, and that would be by fraudulently working the ore of the Consolidated California & Virginia Mine and *stealing* the proceeds.

What right had the superintendent of the Consolidated California & Virginia Mine, knowing that the milling company was handling no ore but his, and had no means of obtaining bullion except from that ore, to turn over bullion which bore on its face the marks of stolen bullion? Senator JOHN P. JONES, one of the owners of the mills of the Comstock Mill and Mining Company, is president of the Nevada Mill and Mining Company, which was shown to have stolen a vast amount of Hale & Norcross bullion. Can it be possible that JOHN W. MACKAY and JAMES L. FLOOD are in the same business? Let them come forward and explain to the stockholders of the Consolidated California & Virginia mine where they obtained these three bars of bullion. Let them also explain a number of other bars of bullion of which the numbers can be furnished and which have gone to the credit of the Comstock Mill and Mining Company.

This matter was called to the attention of the "dummy" president of the company by the Mining Stock Association of San Francisco under date of August 11th, 1892. He did not answer the communication, and on personal application to know the reason why he had not replied he said: "Do you think it is a part of my duty to ask the Comstock Mill and Mining Company what they have done with that bullion?" and characterized it as "impudent" that a stockholder should make such a request of him. He testified under oath in the Hale & Norcross suit that he took his orders for the management of the Consolidated California & Virginia Company from JOHN W. MACKAY and JAMES L. FLOOD, and not from the board of directors. This is a sample of the management of the Comstock mines.

The Consolidated California & Virginia mine is not apparently flourishing. Its output for the month of August was not encouraging. Is it not time that a policy of retrenchment should be adopted by cutting down salaries and the cost of wood, water and other supplies controlled by the ring? Let the milling be done honestly and the stockholders will get satisfactory dividends. The bars of bullion that now go astray would then go to the stockholders.

#### LABOR AND WAGES.

There is much loose talk, sincere and otherwise, about the wages system: as a form of slavery; as an antiquated and clumsy apparatus, proving itself inadequate to the work of the modern world; or as a transitional stage, on the road to something better. The last view is probably that of the most sincere, intelligent and disinterested of its hostile critics. It is a handy one to use in speeches and articles; it assails nobody; so long as it is expressed in optimistic generalities only, it cannot easily be refuted, because everybody must admit that everything in the present state of the universe is "transitional"—hence, why not any given feature of the present social order? Finally, it possesses for many good people the irresistible fascination, that it can be stated in terms of "Evolution." Having but recently got over being shocked by DARWIN and SPENCER, they are now turning the tables with a vengeance, and shocking the philosophers by their recognition of evolution everywhere, and their use of it as a basis for social prophecies and theories of reform.

But the real analogies of evolution (even if analogy were a safe guide in this field) do not favor the conclusion thus drawn. DARWIN could have told his amateur disciples that natural selection has never improved upon the vertebrate type of structure; and SPENCER could tell them yet that the highest product of social evolution has been, and will always be, a Man with a Backbone—in other words, individual liberty and responsibility, guaranteed and guarded, but not replaced, by the activity of the State. If the next development of society is to be into "industrial organisms," after the fashion of coral-building colonies, the analogy offered by biological evolution is one of retrogression, not advance. Manhood must first die and decay. Then, perhaps, the millennial polyps may be bred in the general remaining ooze!

To my mind, the system of free and responsible contract among men is the vertebrate type of social structure. It permits infinite varieties of form, provided they are not inconsistent with the type. To the largest extent found practicable hitherto, it reconciles the liberty of the individual with the interest of the community; it makes the future a part of the present; it encourages ambition; it rewards *pertinent* merit (that is, the kind of merit concerned in the competitions it involves); it judges men more fairly on the whole than any learned formula or sage official could do; and it permits the adjustment of men to the inevitable changes of economic conditions with less of incidental suffering and waste than would attend, so far as all precedents indicate, any other social machinery yet devised.

I say these are its natural and proper characteristics. To a much larger extent than seems to be realized by philanthropic reformers, they are its actual results. On every farm, in every household, in the vast majority

of industries of every kind, the system of voluntary and responsible contract is working well. Instances to the contrary, so far as I have been able to investigate them, may be, in my judgment, referred to one of three causes, neither of which constitutes a valid ground for the condemnation of the system. Namely, either one or the other of its two fundamental principles, freedom and responsibility, has been lawlessly violated; or else, their operation has been hampered by foolish legislative meddling; or else, the evils complained of are such as no system could remove, and a different system would be likely to aggravate, rather than relieve.

Let me repeat that the system of contract includes all voluntary arrangements between employers and employes, such as profit-sharing, co-operation, joint ownership, joint management, sliding scales, arbitration of differences, etc. It will be admitted, however, that the payment of simple wages for work is by far the most common form of voluntary agreement, and that it is almost invariably an element in forms which include other features. The reason is obvious. By the payment of a fixed sum as wages, the employer assumes the risk of business losses; and by the acceptance of such payment the employe waives any claim to share in business profits. This is in most cases, and on many grounds, the most acceptable arrangement for both parties.

Perhaps the chief consideration on both sides is, that business men do not like to make agreements, the fulfillment of which involves inevitable delay, difficulty, and perhaps dispute. Especially to the man without capital, it is important to know what can be depended upon, and to be insured against unforeseen losses. Any other kind of contract may be made, if the parties so choose; and it seems to me that the universality of *this* kind is a convincing proof of its fitness, on the whole, to industrial conditions.

To those who think they foresee some coming step of "evolution," which will do away with wages, substituting some better system with the consent of the parties, I can only say that I perceive neither analogy nor indication of such a general voluntary change. To those, on the other hand, who would force the change by law upon unwilling parties, it is sufficient to say, that such a sacrifice of liberty is uncalled for; would be harmful if it were practicable; and is certainly impracticable, because workingmen are overwhelmingly opposed to it. It ought not to be, and it cannot be, forced upon them against their will. R. W. R.

#### NEW PUBLICATION.

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.

WITWATERSRAND CHAMBER OF MINES. THIRD ANNUAL REPORT. Printed by the Argus Company, Limited, Johannesburg, S. A. Pages 96. Price, 2s. 6d.

This report includes articles of association, revenues, members, etc., of the Chamber, and most important of all various reports of its executive committee and a detailed statement of the gold output of the Rand for 1891. During the year the Chamber was instrumental in the adoption of various amendments to the mining law. The most important of these amendments is that giving fixity of tenure, so that owners of gold mines are now able to obtain title deeds and diagrams of their holdings.

Scarcely less important is the enactment which gives a vested right of renewal to all holders of *mynpachts*. Considerable space is given to a report on the dynamite question. The substance of the experiments made we will make the subject of a separate article.

This valuable report closes with a statement of the monthly output of the Transvaal for the year 1891, the part devoted to the Rand giving tons milled, stamps, days milling, tons per stamp yield of gold in gross, per ton, per stamp and values; also number of feet developed in each mine and average number of men employed. From these tables we find that the total yield of gold in the Transvaal in 1891 was 838,347 oz. 16½ dwts., divided as follows: Witwatersrand, 729,238 oz. 6½ dwts.; De Kaap, 66,589 oz.; Lydenburg, 23,903 oz.; Zoutpansberg, 7,926 oz., and Klerksdorp and Potchefstroom, 10,682 oz. 10 dwts.

#### BOOKS RECEIVED.

*Western Australia Blue Book for the Year 1891.* Compiled from official returns in the Registrar General's Office. Published by the Government, Perth, West Australia, 1892. Pages, 246.

#### 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 Miner Boy Mine.

EDITOR ENGINEERING AND MINING JOURNAL.

SIR: Can you furnish me with any information concerning the Miner Boy mine, of Leadville, Colo. A STOCKHOLDER.

SOUTH BETHLEHEM, Pa., Sept., 1892.

[The Miner Boy mine is located on Breece Hill, Leadville, Colorado, but has not been worked for some time. The St. Louis Mining Co., after a tedious lawsuit, absorbed this property, along with the Colorado Prince, lying at the west of the Miner Boy. The Miner Boy Company, of which A. A. McLeod, of the Philadelphia & Reading Railroad, is President, was capitalized at \$500,000, in 500,000 shares, most of which belongs to Mr. McLeod. Some \$40,000 was expended upon the property in sinking three

shafts. Recent strikes of good ore in the vicinity have attracted attention to the possible reopening of the lawsuit. The St. Louis Mine, which at present controls the Miner Boy, is worked under lease, and a small amount of carbonate ore is being stoped from the Miner Boy ground at the first contact.—Ed. E. & M. J.]

Scorification Assays and the Patio Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Among our own countrymen and in our own mills it is very, very common for reports to be doctored and dressed up to make a good showing, but from my observation this country has far the lead in that respect. Every hacienda here claims a far higher percentage than we do, yet the "river workers," of whom there are about 200 men and women, who with horn spoon and bowl, largely catch the tailings from every place except our own, which they avoid like a plague spot. I will admit that this is due more to the saving after amalgamation than by it.

Patio haciendas rely entirely upon their pulp assay and their bullion to compute their percentages, and their assays are invariably made by scorifications, which I believe are universally "overlooked." The following is a comparison of some assays; the crucible assays were made by my own assayer, a careful and competent man, and the scorification by a Zacatecas assayer, whom I consider honest, and from whose assays they have bullion for more than 90%.

Crucible assay.		Scorification assay.		Crucible assay.		Scorification assay.	
Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.
11'90	'74	9'9	'55	51'20	'80	37'32	'59
12'18	'62	9'29	'55	46'36	'64	37'32	'59
12'64	'76	9'95	'62	46'78	'74	40'57	'62
13'46	'94	9'96	'61	45'65	'72	40'57	'62

Yours truly,

M. P. BOSS.

PACHUCA, Aug. 29, 1892.

The Aggregate Molecular Surface in One Cubic Inch.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of Sept. 10, 1892, Mr. E. Walker admits that the fact brought out by Mr. Church is an interesting one, but asserts that "his premises and calculations are by no means correct." Let us see. The first premise was that the molecule in question is a sphere. If it is not, will Mr. Walker please prove it? He has made no attempt to do so. The second premise was not *mis* stated but rather *un* stated. It is, and there are at least 10<sup>23</sup> molecules in a cubic inch. To be precise, as Mr. Walker points out and the writer well knew, the bombardment of the molecules within the limit of a cubic inch, at the mean velocity (as in hydrogen) of 6,097 feet per second proves that, if static and tangent, there would be a great many more of them within that space or, in other words, 10<sup>23</sup> static and tangent molecules would not nearly fill one cubic inch. To determine the space due to the bombardment, involved, as Mr. Walker admits "too long a calculation." To simplify, the writer was driven to the expedient of supposing the molecules tangent and at rest.

This was not an "impossible" supposition in the premises, because the article was not treating of molecules in motion, as in a gas, but as developed in a static quantity. Starting, then, with these safe premises, the writer, by a brief and he contends perfectly correct calculation, determined the aggregate molecular surface in one cubic inch to be (at least) "35.78 acres." The magnitude of this result so astonished the writer that he omitted to call attention to how very conservative his estimate was. It was large enough, as it stood, to answer his purpose, which was not merely to write an article

WALTER S. CHURCH.

GENEVA, N. Y., Sept. 14, 1892.

Variations in the Milling of Gold Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Referring to the article "Variations in the Milling of Gold Ores." by Mr. T. A. Rickard, in the issue of the Journal of Aug. 27, on page 198, 2d column, 9th line from bottom, and in table on page 199, the author states the height of drop of stamps to be from 16 to 18 inches.

Is this drop the actual average drop upon the ore overlaying the die? The average drop of California stamps is from 6 to 7 inches, seldom above 7, but more frequently as low as 4 and 4½ inches. Considering this great variation, I would be glad to see the above statement verified by the author.

G. W. WEPFER.

SAN FRANCISCO, Sept. 11, 1892.

[The height of drop is measured from the shoe, when the stem is raised to its highest position, to the surface of the die when new. In nothing does gold milling vary as much as in the drop of the stamps. It is only in late years that the drop in California has been reduced so low as 4 to 4½ in. If we remember correctly this was first done at the Pacific mill of the Plymouth Consolidated Mining Company. Other companies were not slow to follow, when they had erected new mills with heavy stamps from 900 to 1,000 lbs. in weight. In Grass Valley, the mining camp typical of California practice, the drop averages about 7 in. In Calaveras County, as in Gilpin County, Colo., where refractory ores were treated, the high drop and high discharge was formerly used. This was found after repeated experiments to work to the best advantage on these types of ores. At the present time the majority of mills in South Africa are built for high drop and high discharge, modeled after Gilpin County practice.—Ed. E. & M. J.]

The Silver Question.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Accepting your permission, I wish to offer a few suggestions on the "Silver Question," that neither you nor your able correspondent, R. W. R., have given sufficient weight to.

Conceding the theoretical ultimate advantage of a single standard, in monetary as in other matters, but also acknowledging the injustice of bisecting the measure of values in a short period, say one generation, and further the acknowledged inability of any one nation controlling or attempting to control the monetary basis of the world, it appears to me, as to you, that the subject must be treated by the majority of the commercial nations interested. If the commercial world could be but once convinced that the United States was not going to carry the surplus silver production of the world, and yet were going to use all of their power for the maintenance of some agreed ratio, Great Britain and other nations would be willing to consider the subject more generally than they have. The

course of this country for the past 14 years has not pointed to this determination, nor has it been consistent.

The Secretary of the Treasury is supposed to think that he has the power to issue United States bonds for the purpose of maintaining the existing ratio between gold and silver in our coinage, but that has not the weight that a direct authorization by Congress would have.

In the present political situation the administration may not be expected to commit themselves to any such action, but official expression by any non-partisan intelligent associations would show to foreigners that it is the fixed determination of the influential public to maintain the equality of the existing currency.

There can be no better occasion for the unlimited use of the extraordinary credit that we have than to prevent the catastrophe that would ensue to all commerce if silver were driven from circulation, or that would ensue to ours if we got on to a silver basis.

The mere threat by us to sell one hundred million sterling of United States 2½ gold bonds for the purpose of getting gold would convince all European monetary circles that there was not gold enough to base the world's commerce on, without dangerous over extension of credit.

Yours truly,  
NEW CASTLE, Colo., September 16th.

G. C. HEWETT.

SUCCESSFUL GAS SMELTING OF MONTANA COPPER ORES.

The question is often asked why are not copper ores smelted in the United States with gas? The failure of a few timid attempts has increased the well known conservatism of copper smelters, preventing rational efforts. A trade which still maintains the face color test as the measure of quality admits of few innovations.

In locating the new works at Great Falls, of the Boston & Montana Cons. Copper and Silver Mining Co., the question had to be met by Mr. C. O. Parsons, then consulting engineer of that company. Pennsylvania coke shipped 2,200 miles was expensive, the product of the Western coke ovens limited and indifferent, and the blast furnace poorly adapted for smelting fine concentrates. Mr. Parsons, who had watched the building of the earliest Siemens steel smelting furnaces in this country, is a strong advocate of the gas system, and after an examination of the coal of the Sand Coulee field, adopted fuel gas, employing what seemed especially adapted for this coal, the Taylor Gas Producer. On his resignation from the B. & M. Co., a system not well adapted for the coal was introduced, and reports of another failure of gas smelting have been officially recorded across the water. The question was of such vital importance to the Great Northern Railway Company, who largely control the Sand Coulee field, an arrangement was made with a rival copper company by which an unbiased test could be made, and for several months preparations for experiments have been quietly going on at the old works (now idle) of the Anaconda Mining Company.

For a preliminary test, in the absence of a regenerative furnace, the ordinary low roofed reverberatory designed for coal firing was used. A temporary iron pipe hot blast was improvised, heating the air, to the safety limit of the pipe, probably not over 1,200 degrees F. The gas entered the furnace direct from the producer, probably not over 350 degrees F. The gas was made from Sand Coulee coal in a semi-water jacketed Taylor producer, an improvement of Mr. W. H. Blauvelt, the engineer of the Taylor Producer Company. These producers on this coal, which is inclined to clinker if forced, worked from the start with the simplicity of a base-burning stove, and with less care than a steam-boiler. The gas is clean, rich and luminous, and fills every recess of the old furnace with a hot flame. No figures have been given out by the Great Northern Railway Company, but a very large saving has been proved, even with the improvised arrangements, enough to warrant the consideration of a large expenditure for properly constructed regenerative furnaces.

These experiments are of the greatest importance, showing to the copper trade that a very large reduction can be made in the cost of producing Western copper, and also showing to the metallurgist that the smelting of copper ores in the United States by fuel gas has been practically and successfully accomplished.

Its importance to the young, enterprising city of Great Falls can hardly be measured, lying as it does with its immense water-power, only 15 miles from the largest and most important cretaceous coal fields in the State.

**New Cyanide Process for Gold and Silver Ores.**—Patent No. 482,577 has been issued to Edward D. Kendall, of Brooklyn, for a solution consisting of water, one or more soluble ferri-cyanides and one or more soluble cyanides to be applied to the reduction of gold or silver ores.

**M. A. Dupouchel**, a French engineer, proposes to excavate the most difficult portion of the Panama Canal, such as the Culebra cut, by a development of the principle of hydraulic mining. He claims that the most difficult half of the work, including the damming of the Chagres river, could thus be executed at a cost of not more than 10,000,000 francs. As his ideas have as yet been tried only on a small scale, he suggests that they should be tested by constructing in this fashion a large dam in France, at the head of the valley of the Bayse in the Department of Gers, a work which has long been wanted, and toward which the French government are prepared to advance 2,000,000 francs.

**The Recoinage of Light English Gold Coins.**—The English Parliament in 1891 passed an Act to withdraw the light weight gold coins in circulation for recoinage. It was estimated that there were in circulation £37,000,000 in sovereigns and £16,000,000 in half sovereigns which were light weight and that the average deficiency would be 2.57 pence for sovereigns and 2.65 pence for half sovereigns. Sir Chas. W. Fremantle in a recent address before the British Association stated that up to July 1st of this year there had been withdrawn from circulation £5,150,000 in sovereigns and £3,850,000 in half sovereigns, the average loss in weight being 2.65 pence for sovereigns and 2.93 pence for half sovereigns. The cost of withdrawal has been £10,056 per £1,000,000 for sovereigns and £24,418 for half sovereigns. According to these figures the cost of rehabilitating the English gold coinage will amount to £80,000 or \$4,000,000.

## GROUND MICA INDUSTRY IN NORTH CAROLINA.

Written for the Engineering and Mining Journal by H. B. C. Nitze.

Western North Carolina has for many years been known as one of the principal mica producers of the world. But two years ago this valuable industry came to a sudden termination by the importation of Indian mica. Within the past year, however, many of the mines in Mitchell and Yancey counties, North Carolina, have been reopened, owing to the increased tariff on imported mica—30% ad valorem—and at present the outlook is good for a complete revival of the mica mining operations in this State on a larger and more extensive scale. As is well known, the mining of merchantable cut mica is attended with a great many factors of uncertainty; and particularly when it is carried on, as it has been, without system, and hence without regard to the future developments of the mines. The nature of the deposits, the irregularity of the veins in themselves, and the great irregularity of the vein matter, carrying the large blocks of good mica, such as will do for cutting merchantable patterns, greatly increases the cost of mining; there is much waste and consequently great expense. This waste is now about to be turned to an economical purpose by the grinding of the heretofore almost worthless scrap mica, for use in the manufacture of wall paper and lubricants, particularly the former. For this purpose the powdered mica must be in a floating condition, which is effected by wet grinding. The scrap is first roughly handpicked and washed, after which the general principles of the process consist in a wet grinding, drying, and finally bolting to different sizes or grades. There are at present three mills in Mitchell County, N. C.—at Plum Tree, Hanson's Creek, and Spruce Pine—in the valley of the North Toe River.

The Margarite Mica Company of North Carolina, with New York office at 4 Gold street, is operating a small mill, having an output at present of about ten (10) tons per month; it is hoped to increase this yield in the near future. They grind to five sizes—50, 100, 140, 160, and 200 meshes to the square inch. The quoted prices of these products delivered in New York are respectively 5, 7, 8, 9, and 10 cents per pound. The progress of this industry may be watched with interest, and, in connection with the increased use of the more inferior spotted or discolored mica for insulating purposes in electrical appliances, its importance to the development of this mining district cannot be over-estimated.

## MINERAL ZONES IN MONTANA.

Written for the Engineering and Mining Journal by H. R. Wood.

A short paper by W. P. Blake in the *American Geologist* calls attention to the universality of gold, illustrating the fact by reference to the Cretaceous rocks of California in refutation of Dr. Everett's idea of its greater abundance in Palaeozoic times. He also refers to its absence in the red ferriferous beds of the lower Cambrian series, as well as all beds of whatever horizon stained red by sesquioxide of iron. In continuation of the subject of mineralized belts in various geological horizons I would like to refer to Western Montana. G. M. Dawson, of the Canadian Geological Survey, classifies the mountain ranges of British Columbia with the Rockies distributed over an area of 60 miles as of Devonian, Sub-Carboniferous and Cambrian. West are the gold range of older schists than the Coast and the Vancouver range of more modern age. The western portion of this rocky range, made up of lower Cambrian, is continued south across the line where a break occurs, the rocks being tilted up along an axial line nearly east and west. They, however, assume a northwesterly and southeasterly direction, passing Missoula toward Idaho nearly north and south. The absence of gold bearing veins in this portion of the Cambrian, especially in the red and pink quartzites, sandstones and greenish-gray quartzites, is very apparent.

I examined this series immediately south of the boundary: both the gravels (largely composed of amygdaloidal trap rocks, undoubtedly brought south, from the intercalated eruptive rocks found in the Cambrian cretaceous in southern British Columbia, by glaciers), which are not auriferous, and the quartzitic series of the lower Cambrian, and found them barren. Further south, along the south fork of the Flathead, copper bearing veins have been discovered holding bornite and some galena. Still further south, in the vicinity of Missoula, 100 miles from the boundary, veins of quartz holding copper and some galena have been opened up. This portion of the Cambrian agrees with Mr. Blake's statement concerning the absence of gold in all strata colored by sesquioxide of iron. It, however, carries copper and some galena, and seems to be more particularly a copper bearing horizon (with some silver and gold). The upper Cambrian, further to the east, consisting of dolomitic limestones, shales, etc., is characterized by galena bearing veins, and gold as well, the latter occurring, however, in the granites against which the limestones abut, as at Georgetown.

The gold range of Dawson, which consists of older schist, in many instances highly metamorphosed, extends south along the Kootenai, constituting the Cabinet, Thompson Falls, Coeur d'Alenes and Bitter Root. This range, or series of ranges, flank the Continental nucleus of Archean Age in the Bitter Root range, a bedded quartz porphyry and gneiss coeval with Pilot Knob, of Missouri, in all probability. This great mineralized belt has a trend southeast and is, in Montana, a silver lead range more particularly, but many of the veins, indeed with few exceptions, carry small percentages of gold, free or associated with the mineral sulphides, and the placers which are frequent are the result of the distribution of such. The mineralized region begins west of Missoula 25 miles and southwest 14 and extends more than 100 miles further west through the Coeur d'Alenes.

Dawson says in his "Mineral Wealth of British Columbia": "While metalliferous deposits are individually inconstant and even the best defined lodes can be followed in the vast majority of cases for but a moderate distance, their character is found to depend fundamentally upon that of the inclosing or adjacent rocks in which, under the required local dynamic and other agencies, these deposits are bound to recur with nearly identical features." Undoubtedly the lithological and chemical character

of rocks, as well as the geological horizon, has much to do with the mineral constituents of the veins occurring in them. The Cabinet Anticline which I examined a short time ago is penetrated by veins through its length of 30 miles. Some of the veins are apparently continuous for several miles. They carry galenas, blende and some gold. The rock is thin and heavily bedded quartzites, shales and graphitic beds. This particular horizon seems to correspond with one noted by Selwyn at Illecillewaet.

It was the discovery of placers which eventually led to the finding of galena veins. Such has been the case in many Montana camps. Talcose schists, calcareous shales, further south, as in British Columbia, West Kootenai, are carriers of galenas, with some copper ores, while closely associated with them are veins holding free gold. The Coeur d'Alene region along the boundary line between Idaho and Montana is distinctly a silver-lead bearing range. The gold is then more lightly distributed in the so-called gold range than in British Columbia, and would be more fittingly known as the silver-lead range. The gold is more common in placers along the west slope of the main range of the Rockies proper, and, being chiefly derivable from the disintegration of veins in granite up-throws, copper is characteristic of this range in Montana.

Whether there be anything of correlative value in the character of mineral products of a series of strata or not I am unable to say; it is, however, true that certain beds of various geological horizons are replete with, or free from, such minerals. We do know that the lower Cambrian is frequently copper producing in many portions of America, and that it is productive as well of hematite, also that certain rocks of more remote antiquity, as the Keewatin schists in Huronian shales are productive of iron. In Montana the condition of the metamorphism as well as lithology, geological horizon seems to have had effect in the character of the mineral constituents.

We may then divide Montana from the main range of the Rockies to the western limits of the Coeur d'Alene, a distance of 300 miles or more, into three mineralized belts. The detailed mineral conditions of these horizons would be very interesting and will furnish material for future work.

## PRODUCTION OF PURE IRON AND STEEL.

By Col. H. Dyer.

This paper, read before the Iron and Steel Institute, described two new methods, one for making chemically pure iron and the other for making a steel with high carbon and low phosphorus economically in a basic furnace. To make a pure iron, charges composed of from one-half to four-fifths of good scrap, and one-half to one-fifth of good Swedish pig, were worked very quickly. The following is the analysis of the iron obtained: Combined carbon, trace; silicon, 0.005; manganese, trace; phosphorus, trace; sulphur, 0.015. Great care and watchfulness is necessary in working these charges, as the metal is liable to burst out of the furnace. This iron can only be forged in small pieces, even with the greatest care; it has therefore been impossible to obtain reliable results as regards its mechanical properties.

The principle of the second process consists in melting scrap with carbonaceous material, and the results of the experiments have shown that when a pure carbonaceous material and ferro-manganese free from phosphorus can be obtained there will be no difficulty in producing a pure carbide of iron containing only sufficient manganese for forging. On the bottom and banks of the bath of a Siemens furnace with a basic lining, a layer of coarsely-broken limestone was evenly laid, and on this coke was charged; the scrap was then charged on the top of the coke, and the charge was melted down as quickly as possible. The scrap used in these experiments averaged sometimes as much as 0.07 phosphorus and 0.03 sulphur. The scrap, as it melted, trickled down on to the coke, which not only reduced the oxide of iron formed in the melting, but also carbonized the steel, so that when the charge was melted the metal contained from 1½ to 2 per cent. of carbon. A good furnace, working well, will require about 9 cwt. of coke to 14 tons of metal. When the charge was melted, additions of ore (manganiferous ore for preference) and limestone were made as required, and the charge was worked in a similar manner to a charge in a silica-lined furnace, except that more limestone was used. The amount of slag produced by this process is small, and it usually contains about 15% of ferrous oxide and 25% of silica. It has very little action on the banks of the furnace; the repairs, therefore, to the furnace bottom and banks are much less than when the charge is worked without coke. Indeed the best proof in favor of the process is that it has now been 18 months at work purifying scrap, and there has not been any attempt on the part of the metal to break through the furnace, a somewhat common occurrence in the ordinary basic process. The amount of phosphorus eliminated during the melting of the metal varies considerably in different charges, but usually the greater part passes into the slag at this stage.

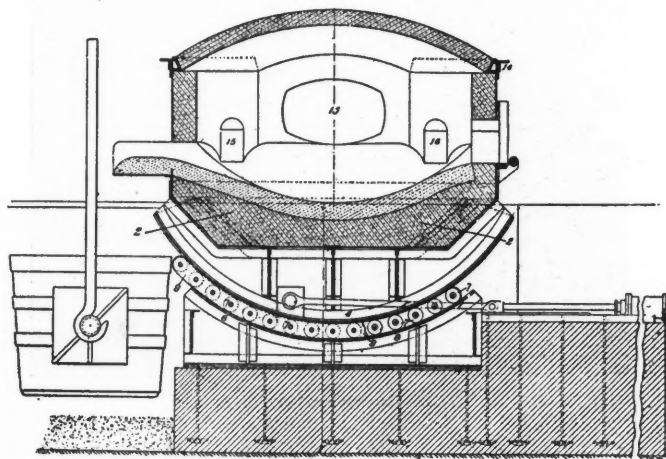
**The Mineral Resources of Newfoundland.**—In a report to the Colonial Office of Newfoundland it is stated that ores of antimony, zinc, molybdenite, manganese, chromite, nickel, hematite, rutile, gold, silver, etc., are all known to exist. During the year 1890 valuable seams of coal were discovered in the vicinity of St. George's Bay. Previous to this St. George's Bay carboniferous area was generally thought to be destitute of workable coal seams, and as being occupied almost wholly by the lower measures, namely, the carboniferous limestone and millstone grit series. Sir William Dawson, however, has given it as his opinion, upon an examination of the fossil plants of the district, that "the specimens sent indicate a development of the coal measures not unlike that of Eastern Cape Breton, with which the beds may be connected under the gulf;" and he adds that the government of this colony would do well "to inform the English Government of the value of the coals on the west coast and their prospective importance to Great Britain and Newfoundland, as well as to other colonies. You have," he adds, "the nearest coal to England on this side of the Atlantic." The investigation in the section of country referred to has brought to light 27 ft. of coal, which is but 10 ft. less than that of the North Sydney section. The analysis of this coal gives a percentage of carbon not inferior to that of Cape Breton coal.

A TIPPING OPEN-HEARTH FURNACE.

At first sight, it seems remarkable that the open hearth steel furnace has never been mounted on a tipping frame, as is the case of the Bessemer converter, but there has always been a hindrance to the adoption of such a construction in the difficulty of regulating the flow of hot gases when the furnace is inclined out of its normal position. Such a construction may have been tried, but not to our knowledge. A rocking open hearth furnace would be useful on the continent of Europe where basic steel is much in vogue, for it would make the removal of the large quantities of slag formed in this process a much easier operation. We draw attention to this subject because a patent has lately been obtained in this country by Messrs. Henry Aiken, Frederick W. Wood and H. H. Campbell for the construction of an open hearth furnace on rockers. As a rule, we do not publish descriptions of bare patents, for we prefer to give our readers the results of actual practice, and not the unformed and untried ideas of inventors. In this case, however, the eminence of the inventors in the iron and steel industry of this country is a sufficient excuse for the departure. Mr. Aiken is a well known engineer in Pittsburg; Mr. Wood is the superintendent of the Maryland Steel Company's works at Sparrow's Point, and Mr. Campbell is connected with the Pennsylvania Steel Company.

We reproduce herewith a vertical section of the furnace from the specification relating to this patent. The hearth is built on metal framework, which has a curved lower side. The rocker bars on the lower side rest on loose rollers, which are confined on the bed foundation. The rollers are not journaled in stationary bearings, but are only held in position by lateral confining plates. The ports, 15, are arranged on either side of the furnace for the admission and exit of the heating gases, and the line connecting them coincides with the axis of oscillation of the furnace, so that the area of the ports never varies. The charging doors are at 16, and at the other end of the furnace there is an opening provided with a tipping spout. The oscillation of the furnace is effected by a hydraulic cylinder as in the Bessemer converter. The great difficulty hitherto has been that no way has appeared for keeping the area of the gas ports constant during tipping. This difficulty appears to have been overcome in the present design.

Labor Hours in Belgian Mines.—The Belgian Superior Council on Labor has adopted the conclusions arrived at by MM. Harze and Paque



A TIPPING OPEN-HEARTH FURNACE.

on working hours. The principle adopted is a working week of 62 hours with a daily maximum of 10½ hours; a midday rest of 45 minutes being provided for. The Council has decided that masters are not to employ at night boys under 14 years and girls under 16 years of age. As regards Sabbath labor, the section is of opinion that the law must be enforced which forbids persons under 21 to be employed on that day.

Production of Ammonium Sulphate in Great Britain.—From the 28th Annual Report of the chief inspector of alkali works in Great Britain, we learn that the production of ammonium sulphate in the United Kingdom for 1891 shows an increase of about 10,000 tons over that of 1890 and 1889. The figures as officially given are:

	1891.	1890.	1889.
Gas Works.....Tons,	107,950	102,138	100,711
Iron " .....	6,290	5,064	6,145
Shale " .....	26,600	24,730	23,953
Coke " .....	2,766	2,325	2,795
Totals.....	143,606	134,257	133,604

The report states that a considerable interest attaches to the gradual advance in these figures as they show an increase of skill and care in many manufacturing processes. The most striking fact developed by them, however, is the almost stationary condition of the manufacture of ammonia from blast furnaces, gases and from coke works. The figures given show an increase for 1891 of only 1,667 tons over 1890 and only 116 tons when compared with the production of 18.9. The report states that nearly £3,000,000 is now invested in Scotland and England in saving the tar, ammonia, etc., from the gases of blast furnaces using raw coal. In Scotland out of a total of 77 blast furnaces in operation in 1891 57 were provided with condensing, scrubbing and distilling apparatus, involving an outlay of capital of £444,600. In one of the large Scotch works 18 miles of 3-inch condensing pipe are in use. In England the tar and ammonia are saved at only one smelting works. It is there employed for the gas coming from three furnaces at a cost of £1,200 per furnace.

BRAIN'S CLOSED UNDERGROUND CONDUIT FOR ELECTRIC CAR LINES.

In our issue of the 10th September we mentioned that a new form of underground electric conduit has been invented by Mr. C. T. Brain, of Liverpool, England. Since then we have obtained complete particulars and drawings. This invention, it is stated, has been subjected to very severe tests, extending over a period of two years under difficult conditions.

The essence of the invention is that a broad slot in the conduit is covered by a flexible steel strip. When a car passes along, the strip is automatically raised so that the collector shoe can always keep in contact with the copper conductor; and the strip is afterward automatically replaced in its position by mechanism on the car. Sections of the top of the conduit and the strip are shown in Fig. 1, with the strip covering the slot and afterward raised. In Fig. 2 the general arrangement is shown. It will be seen that the strip is raised by two small runners at each end of the collector trolley. As the strip passes out through the rear end of the trolley it is pressed down into position on the slot again by the large wheel behind. A similar wheel is placed at the opposite side of the trolley so as to make the car reversible. The trolley runs along on wheels on the side lips of the slot, and the collector shoe (see Fig. 3) is pressed into intimate contact with the conductor by the springs. The wire takes the current up to the motor. The strip is 1¾ in. wide and ½ in. thick, and the slot in the conduit is 1½ in. wide. When the strip is in position over the slot it lies flush with the roadbed, and does not interfere with traffic in any way.



FIG. 1—SECTIONS ACROSS SLOT AND STRIP.

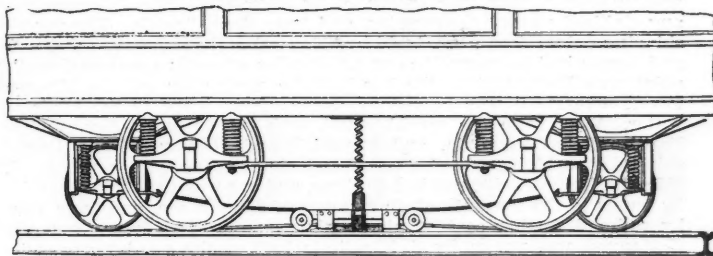


FIG. 2—ELEVATION SHOWING METHOD OF ATTACHING TROLLEY

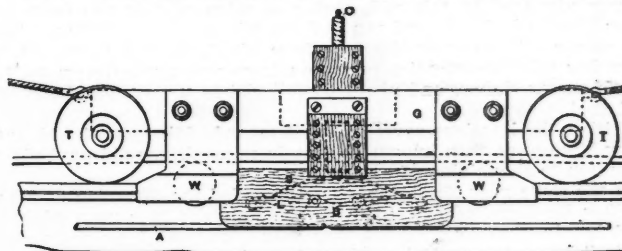


FIG. 3—VIEW SHOWING MANNER OF CONTACT—BRAIN'S CLOSED CONDUIT FOR ELECTRIC RAILWAYS.

The width of the slot is sufficiently great not to cause the collecting apparatus to be weakened by narrow dimensions, and also allows the conductor on the trolley to be properly insulated. The strip prevents dirt and water from entering the conduit and preserves the insulation of the conductor. It is possible to place the conductor right under the slot instead of at one side or under a projecting ledge, so that the cars can be run in either direction without altering the mechanism in the collector. The interior of the conduit is also made very accessible. It would appear at first sight that the raising and lowering of the strip would absorb a good deal of tractive power; but in the tests referred to above it is found never to add more than five pounds to the tractive force required even in a severe frost. Besides the saving in many expenses made possible by this invention such as in flushing, greater simplicity of construction, etc., is more than sufficient to counterbalance this extra expense. Junctions, crossings, sharp turnouts, heavy grades, and sharp turns have all been experimented on, and very simple and effective apparatus have been designed for junctions and crossings.

Gold Mines of Kotschkarsk, Russia.—We are indebted to a private letter for the following information: Embrey concentrators and chlorination works were introduced into the district six years ago by Mr. Eugene de Qelenkoff. At that time he leased the tailings of Ouspensky gold mine, paying a royalty of 1,500 paper roubles or about \$1,125 on each pool of 526.54 oz. of gold obtained. The tailings ran when clean from one to four ounces of gold to the ton, this high amount being due to the fact that the gold was in combination with arsenical pyrites. To treat these tailings Mr. Qelenkoff put up a chlorination mill with six roasting furnaces, concentrating the ore with Embrey concentrators. In three years 17 pools of gold, equal to 8,951.19 oz., were obtained. Since then the Mines d'Or de Kotschkarsk have been purchased at a cost of \$7,500, the ore being arsenical pyrites. During the last three years this mine has yielded 12,637 oz. of gold.

## BUTTE CITY, MONTANA.

Written for the Engineering and Mining Journal by S. E. Raunheim.

Butte City derives its name from a solitary peak called Big Butte (Butte is the French translation of a cone), a conspicuous landmark in the early days, and situated about five miles from the crest of the Rocky Mountains on their western slope in Silver Bow County.

The town proper is situated on its base about one mile east of this butte. The Indian tribes used to call this butte "evil mountain," and, of course, many legends deal with it. In 1855 the present Judge Irvine noticed it while trading with Indians and camping at the present site of the town near a spring (Dublin Gulch).

He likewise noticed the outcroppings of copper ore (peacock copper) on the location, known since as the "Original lode." Of course, he did not then care much about copper; and stopped there but one day. In 1864 two miners from Virginia City, Humphreys and Allison, came up and they were the first discoverers of quartz claims, namely the "Missoula" and the "Original lode." In 1865 Farlin, another miner, discovered the Travonia; The Parrot, Green Mountain, and Gray Eagle lodes were located in the same year.

Just then, rich placer gold was discovered on Silver Bow Creek. This creek passes through Meaderville, at present a suburb of Butte City, and runs toward Silver Bow, 8 miles west of Butte; all along this distance gold was washed out of the gravel, and it paid so well that the quartz claims at Butte were abandoned. More gold was found in the gulches surrounding Butte, and two mining districts were formed by the miners. People rushed in from all parts of the country, and they did well so long as they were able to work out the richest deposits with crude machinery.

The population on the creek is said to have been at one time over 5,000, and at the Butte diggings 3,000. In 1869 the excitement subsided owing to scarcity of water, and exhaustion of the richest placers. After over \$8,000,000 worth of gold was found the exodus commenced and soon there were less than one hundred people; nobody had the faintest idea that the neighboring hills carried millions of tons of ore underneath, nor could miners have done anything with this hidden wealth even if they had known it, on account of the distance from any civilized part of the country, and from the railroads. The nearest shipping points then were Atchison (Kansas) and St. Joseph (Missouri), and teams had to carry it over 2,000 miles of trail; another shipping point was Fort Benton, the head of the navigation on the Missouri River, whereto it was hauled by wagon, from there to St. Louis by water. Very little ore would stand such an expense; nevertheless, Farlin, of the Travonia, and Ramsdell and Hauser, of the Parrot, shipped some high grade silver, gold and copper ores with a profit. In 1878 the Union Pacific reached Corinne, and ore was freighted 400 miles by teams to the terminus at an expense of \$50 per ton, and from there by railroad further east at about \$50 per ton. The first stamp mill (5 stamps), was put up by C. Hendie in 1867 on the site later occupied by the Old Lexington Mill.

A. I. Davis, who died two years ago, worth many millions, had some money advanced on this mill, took possession of it in the same year, after Hendie had left, and ran it for a while, then changing it into a ten stamp mill to treat the ores from his Lexington mine. In 1875 or rather 1876 the attention of some miners was again drawn to Butte City's quartz claims, and about 60 full claims were worked for silver and gold.

Neither the locations covering the Anaconda Mine nor the Mountain View Mine were then known to contain mineral, nor did anybody pay attention to the mining of copper ores.

In the same year Mr. Joshua Clayton called the attention of Messrs. Walker Brothers, of Salt Lake to the Rainbow lode as a silver and gold bearing property. Work was soon commenced by them on the "Alice" Mine, the central portion of the lode.

The Alice mill was started in 1878. The success of the Alice Company gave an impetus to open up the Moulton Mine on the same lode; subsequently Messrs. Clark Brothers built the Moulton mill in 1881. In 1878 the Colorado furnace was built by Superintendent Williams to treat custom ores, principally from the Gagnon Mine, making a low grade copper matte, concentrating therein the silver and gold, and using as flux manganese ores running very high in silver and gold.

In 1878 and 1879 Meader bought and shipped high grade copper ores 400 miles by teams to Corinne and from there to Boston by rail. In 1879 he succeeded in inducing Lewisohn Brothers in New York and their friends to invest in Butte copper mines.

They sent out the writer as their agent, who, reporting favorably, bought the Colusa, Gambetta, Green Mountain and Colusa Parrot from Meader, located or had others locate for him a good many other copper properties, organized as the Montana Copper Company, developed the Colusa and the Green Mountain mines, and built smelting and concentration works of 50 tons capacity. By the end of 1880 the works ran successfully.

The writer bought and shipped thousands of tons of copper ore from the Liquidator, the Ramsdell, Parrot, the Mountain Chief and others. The copper markets in Europe and the East, however, knew but little then about the copper producing capacity of Butte, as the Lewisohn's kept matters as quiet as possible, and never gave any information to newspapers and outsiders. In 1881 Farrell and Cigeon built similar works for the Parrot Mine and commenced soon producing. They also kept their business quiet.

In 1882, in the Anaconda Mine, owned by Haggin & Tevis, which was worked and considered as a silver mine by Marcus Daly, high grade copper ore (copper glance) was struck at a depth of 400 ft., in immense quantities, and the owners soon startled the copper markets and copper consumers by immense shipments of ores containing over 50% copper (25,000 tons in one year). Then the fame of Butte as a copper producer became established, the Lake Superior people, who

thought they had a monopoly on copper production became frightened, and the price of copper dropped from 20 cents to 12 cents per lb.

In the meantime the Union Pacific Railroad, through its branch, the Utah Northern, had reached Butte City, and Butte mines soon became formidable factors in the copper market. In 1883 the Anaconda Smelting Works, the largest in the world, were started 27 miles west of Butte, and the low grade ores were shipped there for reduction. Other copper smelting works were built near Butte, partly for custom ores and partly in connection with numerous newly opened copper mines.

To show what Butte actually produces in an area of a few square miles only the production of copper for the year 1890, by the following copper companies, is herewith given:

	Pounds of copper extracted.	Tons of ore extracted.		Pounds of copper extracted.	Tons of ore extracted.
The Anaconda Co....	64,046,812	525,000	Colo. Smelt. Works..	2,320,000	25,000
Parrot Co. ....	9,000,000	75,000	Butte & Boston Co....	5,457,700	35,300
Boston & Mont. Con. Co. ....	26,693,840	144,700	Others.....	191,648	1,000
Clark's Butte Red. Works.....	3,300,000	25,000	Total, lbs.....	111,010,000	831, 00

or 43% of the total production of the United States.

The production of the United States amounts to about 40% of the world's total production; therefore Butte alone contributes over one-sixth toward the copper production of the whole world. New discoveries of copper ore deposits have lately been made at Butte, and the enlargement of the different plants and new ones planned will swell this product. The prominent silver mills are the Blue Bird, now shut down, the Alice, Silver Bow, Moulton, and Lexington, with a total of 305 stamps. Their silver production in 1890 was about 300,000 pounds in bars, worth about \$4,000,000.

The silver contained in the copper companies' product is not in-



BUTTE IN 1880.

cluded, but it is safe to assume, that it amounts to 700,000 ounces. No record of the gold produced is given out.

At least 5,000 mining claims have been patented, and the population of the town now is 25,000 inhabitants. A more orderly, law-abiding community is rarely to be found. The pay rolls of the different mines and works exceed \$1,000,000 per month.

The wages paid are among the highest in the United States; for instance, miners, for 9 hours' work, receive \$3.50. Six banks carry on a lively business, and large deposits from the population show the general prosperity.

The most prominent and oldest daily newspapers are the "Inter Mountain" and the "Miner." The "Inter Mountain" has been under the same management since 1880, and its able editor, John B. Reed, deserves great credit and praise for predicting and always pointing out Butte's great resources and coming wealth.

Butte is largely indebted to such successful old-timers as W. A. Clark, Marcus Daly, Chas. Warren, and Lee Mantle, Judge De Wolfe, Irvine, Dixon, Knowles, etc., to Mining Superintendents, Hall, of the Alice; Tibbey, of the Parrot; Wartenweiler, of the Lexington; Couch, of the Boston and Montana, and many others who at all times have had the welfare of the community at heart.

It was the writer's privilege to witness the marvelous growth of Butte from 1880 to 1887, and he regrets only that it is impossible, in view of the limited space of this article, to dwell more extensively upon its conservative, energetic labor unions, the different mercantile and industrial establishments, and the large fortunes which have been made during the last ten years. The geology and the ore deposits of the Butte mining region have been described several times in the Engineering and Mining Journal, therefore, we confine ourselves to a few remarks.

The country rock is granite, with the exception of the Anaconda Hills, where several small sized dykes of porphyry occur. The ores are derived from large imbedded masses, in true fissure veins, or rather the ore bodies seem to follow fissured zones in the granite. The veins

run more or less parallel from West to East. The width of these veins varies from 8 to 150 ft. of solid mineral. The deepest shaft sunk is that of the Lexington Mine, nearly 1,500 ft., many others are down to a depth of 1,000 ft. Three railroad lines, the Northern Pacific, the Union Pacific, and the Great Northern, enter Butte, which can be reached from New York in 4 days, from San Francisco in 2 days.

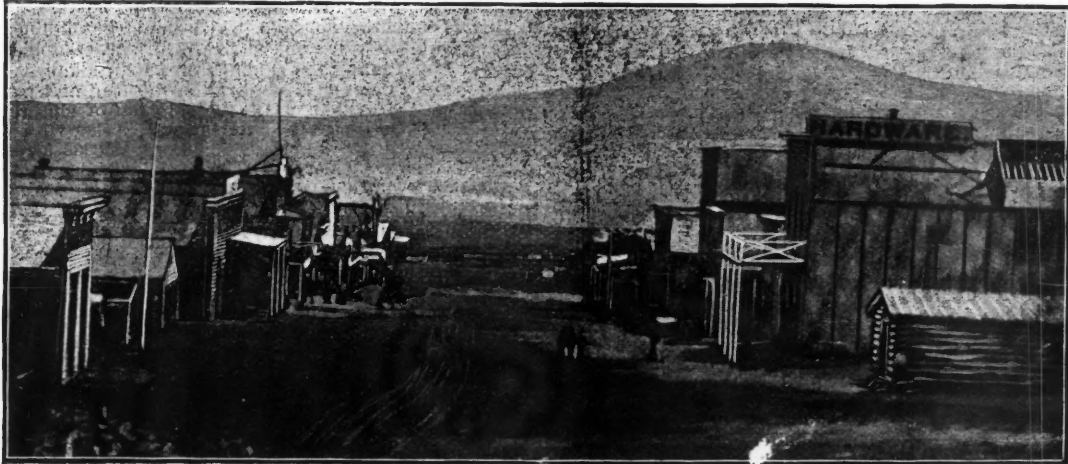
#### THE TREATMENT OF ARGENTIFEROUS ZINC-LEAD SULPHIDES.\*—II

By C. Schnabel,†

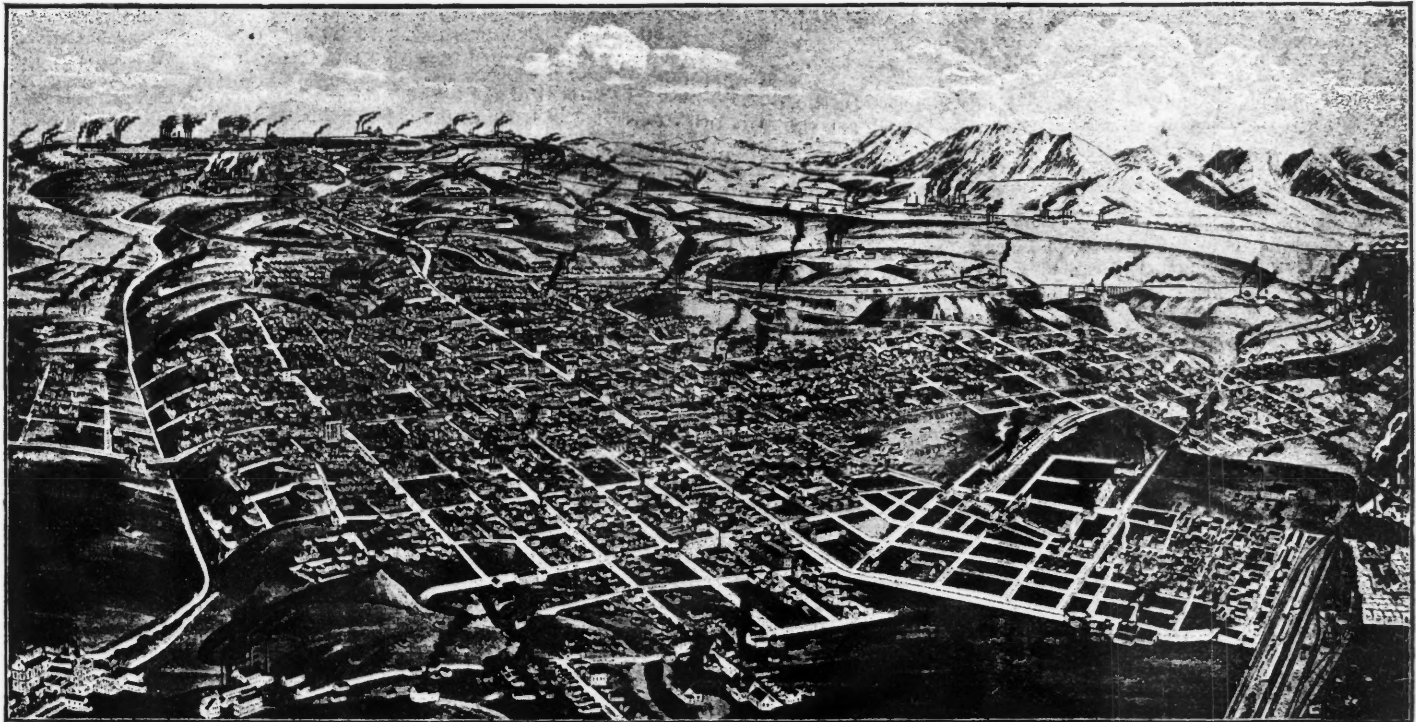
(Concluded from page 269.)

The Production of Oxide of Zinc.—Zinc oxide would be the most marketable of the compounds of zinc. Its market value as a zinc ore is from £7 to £9 per ton in Europe. In case it is poor and has the

zinc and low lead contents of the ore. By this process the zinc is partially reduced and volatilized by the fuel in the furnace and partly carried into the slag. The lead is partly reduced to bullion, partly volatilized and partly carried into the slag. As at the temperature necessary for the reduction of zinc oxide, sulphate of lead is also volatilized, the fumes collected from these furnaces always carry sulphate of lead as well as sulphate of zinc and silver. The loss of silver in the fumes is, however, not as great as is usually thought. The fumes resulting from the treatment of the Broken Hill sulphides according to the above method would, therefore, contain too much lead to be valuable as a zinc ore, too much zinc to be valuable as a lead ore, and would be too impure to be used as a paint. Only part of the zinc would be contained in the fumes, while the balance would be combined with the slag. Owing to the high cost of smelting the roasted zinciferous ores the loss of silver incurred in the volatilization of the



BUTTE IN 1877.



BUTTE OF THE PRESENT DAY

At the top of the cut, on the left hand, are plainly observable the hoisting works and mills of the Lexington, Moulton, Alice, Magna Charta and the silver mines of the Butte & Boston Company. A little below and further to the right is the Chambers syndicate group. At the base of the Pipestone range is the smelting works of the Boston & Montana Company, whose mines, together with the Anaconda Company's, are situated on the rounded hill shown below them. At the extreme right of the cut are the reduction works of the Butte & Boston Company, whose copper mines lie between the works and the Anaconda group. Below the Butte & Boston reduction works a portion of the Parrot works is shown. The mines at the bottom include the Bannister and Star of the West. The Gagnon mine of the Colorado Mining and Smelting Company is shown to the left of Main street near the grade to Walkerville.

necessary covering qualities, it is also a valuable commodity for paint. In this case its value is equivalent to that of metallic zinc. The zinc oxide can be produced either by the dry or by the wet method. By the dry method the oxide of zinc may be produced by one of the following three methods: (1) by volatilizing the zinc during the operation of smelting the roasted ores in a blast furnace, and oxidizing it by the gases of the furnace and by air; (2) by treating the roasted ores, mixed with coal, in a reverberatory previous to smelting in a blast furnace; (3) by the "Bartlett" process, to be described later on.

1. Volatilization.—The treatment of the sulphides of the Barrier Range in the blast furnace is only possible after a preliminary roasting, as the roast and reaction process is excluded on account of the high

zinc, the proportionately small recovery of zinc oxide in the fumes, and the difficulty of utilizing such fumes, this method is excluded in the treatment of the sulphides of the Barrier.

The foregoing method was in operation at the smelting works in the Lower Harz until 1880, when the process was altered to smelting the ores in high furnaces without the recovery of zinc oxide. Formerly the neutral sulphate of zinc was leached out of the ores by water before smelting them in low blast furnaces. The collected fumes were composed of lead and zinc sulphate, lead and zinc oxide and small amounts of silver. After extracting the zinc by means of sulphuric acid the fumes became a valuable lead ore. It was not possible to utilize the fumes for the production of zinc, nor were they suitable as a paint.

2. Reverberatory Furnace.—The second mode of operation was formerly carried out in Freiberg. The roasted ores, mixed with coal,

\* From an exhaustive report on the ores of the Barrier Range, Australia.  
† Director of the Royal School of Mines, Clausthal, Germany.

were heated in a reverberatory furnace to the temperature necessary to reduce the zinc oxide. The volatilized zinc was re-oxidized and collected in chambers. Although the collected fumes were suitable for paint, the process was not a commercial success, on account of the losses of lead and silver, and as the amount of fume collected was not sufficient to pay the cost of treatment; 10 per cent. of zinc, moreover, still remained in the ore. This method is, therefore, out of the question for the treatment of sulphides, or of zinc tailings which might be produced by concentrating the sulphides.

3. Bartlett Process.\*—The "Bartlett process" was first brought into use in the United States to utilize the zinc lead ores, free from silver, found in the State of Missouri. Latterly it is also used for the reduction of the silver-bearing lead ores of Colorado. Reliable information as to the losses of silver is not attained. The losses of lead are very great, the slags of the Lone Elm Works, in Missouri, produced by this method of treatment containing 25 per cent. of lead.

The process is carried out in Missouri as follows: The ores rich in lead and low in zinc are first subjected to a roast reaction smelting in hearths. The zinc and lead are partially volatilized and collected in fume chambers and large cotton bags. This product, however, is too impure to be suitable for paint. It is ignited and forms crusts. These, in connection with the slags from the hearths, which are rich in lead, are re-smelted in low blast furnaces. The fumes are oxidized in the throat of the furnace by a set of extra tuyeres. After passing through a long series of iron pipes to cool them they are collected in large cotton bags. The fumes thus collected are composed principally of sulphate of lead, and form a marketable product for paint. The slags resulting from this second smelting still contain 25 per cent. of lead. The process is necessarily an expensive one, on account of the necessity of two smelting operations; the losses of lead, at least, are very high.

For the sulphides of zinc tailings from the concentration of the same, the process would necessitate a preliminary roasting, as the ores are too poor in lead and too high in zinc to carry out the roast-reaction process, as has been determined by experiments at the Broken Hill Proprietary Mine. The cost of this method of treatment for the Barrier sulphides would, therefore, be still more expensive than when high grade ores are operated on. The actual loss of silver occurring in this process and the cost are not definitely known. The ores treated at Canon City, Colo., are silver-bearing zincblendes and galenas high in zinc and low in lead, and, therefore, closely resemble the sulphides of the Broken Hill mines.

My present views on the matter are that the Bartlett process cannot be carried out with advantage under the existing Australian circumstances, as the produced paint would hardly find a lucrative market in case much of the Broken Hill sulphides were treated by this process.

Humid Methods.—The zinc oxide can be produced by the humid method by leaching zinc out of the roasted ores and recovering the zinc oxide from the solutions. The zinc can be brought into solution by alkalies, as chloride of zinc or as sulphate of zinc. The only alkaline salt suitable as a solvent on a large scale for oxide of zinc is carbonate of ammonia. This solvent is used on a large scale at Hoboken, near Antwerp, for the separation of zinc oxide from lead oxide and bullion. The process as there carried out consists of dissolving the zinc oxide in carbonate of ammonia, and expelling the ammonia and part of the carbonic acid by steam. The zinc is recovered as basic carbonate, and the carbonate of ammonia is regenerated by absorbing the ammonia and carbonic acid in water. To make good the loss of carbonic acid caused by the formation of carbonate of zinc, sufficient carbonic acid is forced into the water used for absorbing the ammonia. By heating the precipitated carbonate of zinc in reverberatory furnaces it is converted into the oxide, and sold as a paint or as a zinc ore. This method is not applicable for the roasted sulphides on account of the sulphate of lead and basic sulphate of zinc always present in the roasted ores. These salts would convert the ammonia into sulphate of ammonia, which cannot be expelled from the solution by means of steam, even in the presence of caustic lime. It would, therefore, cause large losses of ammonia.

The zinc in the sulphides can be converted into chloride by roasting with common salt. The solution of chloride of zinc can be precipitated with milk of lime, producing hydroxide and oxychloride of zinc and soluble chloride of lime. The hydroxide of zinc is converted into an oxide by heating. In roasting the ores with salt a large proportion of the zinc is volatilized as chloride, while a further proportion is converted into an insoluble oxychloride. A large part of the lead and silver is also converted into chloride during the roasting process, and partially go into solution with the chloride of zinc. To recover the silver from the solution would be a matter of considerable difficulty, combined with no small expense.

As the quantity of salt necessary to convert the zinc into chloride is at least equal to the quantity of zinc present, further, on account of the loss of zinc by volatilization, and the formation of oxychloride while roasting, the difficulty of recovering the dissolved silver, and the difficulty of obtaining an oxide of zinc, free from chlorine, on precipitating, leaves little hope of the success of this mode of treatment.

It has also been attempted to volatilize the whole of the zinc as chloride, and to obtain oxide from the solution of the volatilized chloride of zinc as above described. The process, however, proved unsuccessful, on account of the formation of oxychloride of zinc, which was not volatilized.

During the process of roasting the sulphide ores at a low temperature, it is possible to convert as much as 50 per cent. of the zinc into sulphate. The balance may be converted into sulphate by sulphurous acid and air, or by sulphuric acid. The sulphate of zinc, being a soluble salt, may be extracted from the ores by water. This solution can be obtained of such a concentration, that the sulphate of zinc

partially crystallizes out of the solution, while flowing through large conduits which allow a partial evaporation of the water.

To obtain zinc oxide from the sulphate of zinc, the sulphate solution may be precipitated by magnesia. The obtained zinc hydroxide on heating is converted into the oxide (Patent, Storer & Marsh, December, 1891).

The zinc oxide may also be obtained directly by heating the crystals of sulphate of zinc to the necessary temperature to expel sulphuric acid. The sulphate of zinc is converted into zinc oxide, while the sulphuric acid partially escapes as oxygen and sulphurous acid, and partially as sulphuric anhydride. By carrying out this operation in reverberatory furnaces, the gases may be used for dissolving a further quantity of oxide of zinc from the ores. Both methods of obtaining the zinc oxide are practicable, as has been determined by experiments at the Proprietary Mine, and leave a profit which will depend on the value of the produced oxide, if the sulphate of zinc is considered as a valueless by-product.

Other combinations of zinc, which might be obtained, are sulphide of zinc, chloride of zinc, and sulphate of zinc. Sulphide of zinc may be obtained by melting the sulphide ores with alkalies, or the carbonates of the same. During this operation the lead and part of the silver is converted into bullion, while the sulphide of zinc remains in a finely divided state in the slag. By treating this slag with water the alkalies are redissolved, leaving the sulphide of zinc as a residue. The drawbacks of this process are: 1. The zinc-blende does not give up its silver, as was determined by experiments at the Proprietary Mine. 2. Parts of the alkalies are converted into silicates, sulphides, and sulphates. To regenerate the alkali from the silicate is not practicable, while the conversion of the sulphate and sulphide into alkali is expensive. Regardless of this, it is questionable whether the obtained zinc-blende could be exported at a profit. According to the above conclusions, this process could not be recommended.

The chloride of zinc and sulphate of zinc have a commercial value in Europe as long as they are not produced in large quantities. The chloride of zinc is used principally for the preservation of wood, and in the manufacture of aniline colors; the sulphate of zinc is used principally for the manufacture of a white paint, called "Lithopone," composed of sulphate of barium and sulphide of zinc.

As the possibility of using the Bartlett process has not been definitely determined and is very questionable, the only method of obtaining oxide of zinc would be from the sulphate. As the profit to be obtained from the manufacture of zinc oxide is not definitely determined at the present time, and as only part of the zinc in the ores is obtained as oxide, it is deemed advisable to leave the profits which might accrue from this operation out of question in determining the value of the sulphides.

The Treatment of the Ores by Concentration.—The first question for consideration in treating the sulphides is whether it will be profitable to subject the same to a dressing process to obtain a product rich in lead and silver, and poor in zinc, and one poor in silver and lead, containing the majority of the zinc-blende, quartz, and of the silicates.

While it is an easy matter to separate granular mixtures of galena and zinc-blende by concentration without losses of silver and lead, the intimate mixture of the Barrier sulphides makes this operation impossible.

The zinc-blende always retains a considerable percentage of silver and a certain amount of lead, while the silicates also retain zinc-blende, galena, and silver. On the other hand, the galena cannot be obtained free from zinc-blende. The silver is not concentrated proportionately with the lead, the zinc-blende retaining 50 to 70 per cent. of the silver.

Trials of concentration undertaken in Broken Hill and Germany have shown that not over 50 per cent. of the total silver contents of the sulphides can be obtained in the concentrates. Richer sulphides, containing 32 oz. of silver, only showed a concentration of 32 per cent. of the total contents of silver. Of the contents of lead it was possible to obtain from 50 to 65 per cent. In one experiment even 91 per cent. of the lead was obtained.

Taking all the results obtained in the different experiments, 65 per cent. of lead in the concentrates can be considered as a favorable result. By continually rewashing the resulting tailings, it will, of course, be possible to obtain a larger percentage of the lead than above, but the limit is soon reached on account of the increased cost.

The cost of concentrating these sulphides is necessarily high, as the first principle of an economic concentration—that is, to separate as much of the material as possible in a coarse state—cannot be applied in this case. It is necessary to crush these ores very fine to obtain a separation of the different minerals. While in most cases only 20 per cent. of the ore has to be crushed fine, in this case the whole of the ore would have to be pulverized.

All machines for concentrating finely crushed ores have a small capacity, so that a plant of a given capacity would be very extensive and costly. The consumption of water and power required are also very large items, which in the Broken Hills call for serious consideration. The further the concentration is carried, the greater will be the dimensions of the plant and the consumption of water, power, and labor.

It is difficult to make an exact estimate of the cost of concentrating the sulphides to different degrees, as no previous experience of concentrating this class of ore is attained. The cost of concentrating oxidized ores at Broken Hill gives us certain data from which we can form an approximate estimate of the cost of concentrating the sulphides. The arrangement of the Broken Hill plants for cheap working is very complete, as their capacity is about 200 tons a day, while the separation is imperfect. The average cost per ton of oxidized ore is 10s., without taking the interest on cost of plant into consideration. The concentration of the sulphides, if carried to a reasonable extent, would, on account of the more extensive plant and the extra consumption of water, power, and labor, cost more than the concentration of oxidized ores, but it is quite possible that with a

\*See THE ENGINEERING AND MINING JOURNAL, vol. xlix., p. 169.



specially adapted plant, this cost could be reduced, However, this result has not been attained.

The operation can be carried out to produce—(1) concentrates and tailings; (2) concentrates, middlings, and tailings; and (3) so as to remove only the quartz and part of the silicates, leaving all the combined sulphides in the concentrates. The first manner of concentration is the one usually adopted. The second could only come into consideration in case the middlings were to be subjected to a different metallurgical treatment from the concentrates, having advantages which would outweigh the losses of metals in the tailings. It is possible to separate sulphides containing 25 per cent. of lead, 22 per cent. of zinc, and 16.57 ounces of silver into the following products:

10 per cent. of concentrates, containing 69 per cent. lead, 7 per cent. zinc, 28.20 oz. silver per ton; 48 per cent. of middlings, containing 23 per cent. lead, 28 per cent. zinc, and 19.40 oz. of silver per ton; 34 per cent. of tailings, containing 6 per cent. of lead, 22 per cent. zinc, and 7.38 oz. of silver to the ton.

Of the total metallic contents of the ore were present in:

	Lead %.	Silver, oz. per ton.	Zinc, %.
Concentrates.....	48.55	29.95	5.8
Middlings.....	42.40	53.15	60.5
Tailings.....	9.05	14.90	33.7

Thus, the tailings still contain nearly 15 per cent. of the silver. By the third manner of concentration it would be possible to separate nearly all of the quartz in the tailings. The silicate, however, on account of their higher specific gravity, would remain largely with the concentrates, while the tailings would also contain more or less of the metallic contents of the sulphides. Although this mode of concentration will be cheaper than the first considered—the main work consisting in coarse crushing and jigging—it is only feasible in case the ores contain a higher percentage of quartz or of gangue.

At any rate it would be advisable for the definite determination of the cost of connecting the different grades of sulphides to erect an ex-

perimentally adapted plant, this cost could be reduced, However, this result has not been attained.

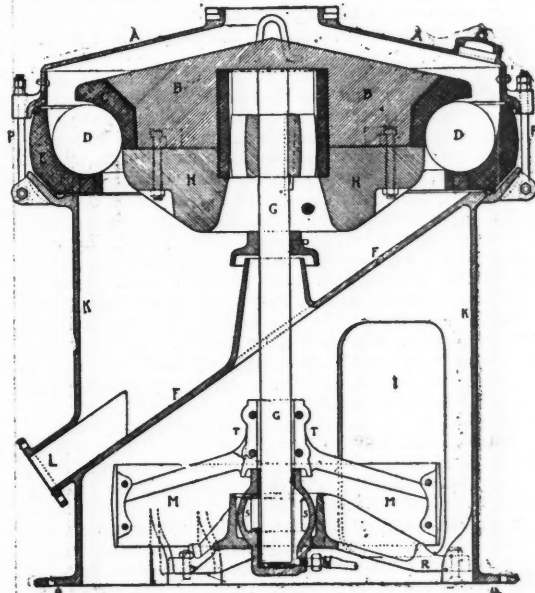
Neither is the concentration of the crude ores, so as to produce concentrates, middlings, and tailings, combined with smelting the concentrates, leaching the middlings with sulphurous or sulphuric acid, and extracting the silver as chloride from the tailings, able to show more favorable results than the direct extraction of the zinc from the crude ores by sulphurous or sulphuric acid.

After the above thorough criticism of the different methods, there is no doubt that, at the present stage of metallurgical knowledge, those methods having for their object the removal of the zinc previous to smelting, are the correct ones to be adopted in the treatment of the sulphides.

THE AMERICAN BALL PULVERIZER.

The American Ball Pulverizer is made by the American Manufacturing Company, of Cleveland, Ohio. It is made in four sizes, Nos. 1, 2, 3, and 4, and the accompanying illustrations give an idea of the outside and internal construction of Nos. 2, 3, and 4. It will be seen that the crushing apparatus is separated from the driving apparatus by the inclined discharge plate F. The crushing apparatus consists of a driving track C, balls D and grinding track E. The only lubrication necessary is at the footstep bearing, and its wearing parts are self-adjusting. The makers also claim that it occupies less space and consumes less power, and is subject to less wear and tear than any other of its kind. The fineness of the ground material can be easily regulated by varying the speed and the feed.

Size No. 1 is adapted chiefly for laboratory and prospecting purposes. It is 1 ft. in diameter from center to center of the balls, and can be



THE AMERICAN BALL PULVERIZER—(VIEW AND SECTION).

permental plant from 30 to 50 tons of daily capacity. In case the experiments proved unfavorable for concentrating the sulphides, the plant could be utilized for concentrating silicious lead ores.

The following are my conclusions on this subject:

1.—That the roast-reduction process, carried out at the seaboard with crude ores, gives favorable results only when high grade ores are treated.

2.—That a preliminary concentration with the above adopted results and cost of ore-dressing does not produce more favorable results of the roast-reduction process.

3.—That the profit resulting from the extraction of the silver from chloridized crude ores is not much less than that resulting from treating the ores by concentration and lixiviating the silver from the tailings, and subjecting the concentrates to a roast-reduction process. The reason for this is that the lead contained in the tailings is lost, while the value of the lead obtained in the concentrates is about equalized by the extra cost of concentration and smelting.

4.—That the profits resulting from the methods which have for their object the extraction of the zinc previous to smelting, largely exceed those of any other methods, and increase materially with the contents of silver in the ore.

The profits resulting from the use of sulphurous acid would be increased by about 2s. per ton, should it prove practicable to produce sulphurous acid from the gases produced by the decomposition of zinc sulphate in a muffle furnace.

5.—That the extraction of the silver as chloride from the tailings of concentrated ores, and the treatment of the concentrates by the roast-reduction process, show less profit than the methods above mentioned.

It is to be remarked that the extraction of the silver from the chloridized ores or tailings is supposed to be accomplished by hypsulphites, as the cost of amalgamating the same would be higher.

6.—That the concentration of the sulphides can only improve the results obtained by the extraction of the zinc from the crude ores

driven by hand or other power. It weighs only 750 lbs., and the heaviest part can be carried on a mule. Four pounds per minute of ordinary quartz can be ground to 100 mesh.

The other three sizes have the following dimensions, etc.: No. 2, 2 ft. from center to center of balls, weighs 2,500 lbs., requires 4-8 h. p., will grind 1 ton of quartz to 40 mesh per hour; No. 3, 3 ft. from center to center of balls, weighs 8,000 lbs., requires 12-20 h. p., will grind 2 tons per hour of quartz to 40 mesh; No. 4, 4 ft. from center to center of balls, weighs 14,000 lbs., requires 25-40 h. p., will grind 3 tons per hour of quartz to 40 mesh.

BALL & WINGHAM'S EXPERIMENTS ON THE ELIMINATION OF SULPHUR FROM IRON AND STEEL

The authors, in a paper read before the Iron and Steel Institute, described some laboratory experiments which showed that an admixture of carbonate of soda will remove sulphur from iron and steel, but not beyond 0.1 per cent., that ferro-manganese will remove half the remainder, and potassium cyanide the whole of the remainder. The results of the experiments show that under certain conditions any amount of sulphur can be readily and almost completely removed from pig iron. Those conditions are the contact of the molten metal with an alkaline or basic slag, and the necessity of having the metal and the surroundings in a perfect state of deoxidation—a basic process in direct contrast to the basic phosphorus process. Indeed, it would not be beyond the bounds of possibility to find that if the conditions of the basic-lined converter were suddenly transformed from highly oxidizing to thoroughly reducing ones, the sulphur would be removed and not the phosphorus. The sulphur is eliminated apparently by metallic sodium with the formation of sodium sulphide, part of which volatilizes while part remains in the slag. Since the sodium is produced in situ, it is obvious that the sulphur will be more easily removed from pig iron, which favors its production, than from blown metal or steel. Their opinion is that it will always be found easier to eliminate sulphur from cast iron than from steel, whatever happens to be the means employed.

## DETERMINATION OF THE EFFICIENCY OF COAL.\*—I.

By Dr. H. Bunte.

With regard to the relations existing between the calorific power of coal and its chemical composition, there have lately been put forward various contradictory views, in consequence of which it appeared to be necessary to make fresh experiments to settle the question. Before describing these experiments, I wish to mention similar ones which have been previously undertaken. Up to about 1865 there were no experiments of any importance recorded on the heat of combustion of coal. On its evaporative power, however, there existed some very elaborate experiments in America, England, Germany, and France; but as there always will be found, to a greater or less extent, a loss of heat inevitable in all boiler plants, owing to radiation and conduction, these experiments showed anything but the true value of the heat stored up in coal.

Taking the calorific power of coal as depending upon its elementary composition, the heat of combustion was calculated after the so-called Dulong formula (or a similar one)—

$$T = C 8,080 + \left( H - \frac{O}{8} \right) 28,800 + 2,500 S - 600 W.$$

According to this, the heat of combustion of any organic compound is supposed to be equal to the different heats of combustion of all its elements together. If a material contained oxygen, as is the case with coal, this oxygen was supposed to have formed water with one part of hydrogen present, which, of course, impaired the evolution of heat. This formula, no doubt, cannot claim to be a thoroughly scientific one, as many of the suppositions under which it has been formed will not hold good. For instance, the carbon of coal is not present as charcoal, the heat of combustion of which is supposed to be 8,080 calories. Moreover, hydrogen is not in a gaseous state; and water is not really formed, as is supposed to be the case in adopting this formula. Consequently, the calorific power of coal, calculated after Dulong, was not much relied upon; but there were no experiments which proved the contrary, and showed the extent of deviation of the ascertained results from their real value.

In 1867, Scheurer-Kestner and Meunier, at Mulhouse, made some experiments on a small scale, to find out the heat of combustion of coal by using an apparatus similar to the calorimeter invented by Favre and Silbermann, which was specially constructed for this purpose. By these experiments the heat of combustion was found to be not only from 10 to 17% higher than was shown by the Dulong formula, but it proved to be even higher than the sum of the heats of combustion of the carbon and hydrogen elements together. In consequence of this, Scheurer-Kestner asserted that the calorific power of coal was only partly dependent on its elementary composition. Thus the chemical analysis of coal, which had hitherto been used to determine its approximate calorific power, lost some of its value; and there was no substitute for it to enable one to ascertain the heat of combustion in a practical way. For Scheurer-Kestner's method was only practicable by using very small quantities of coal (0.3 to 0.5 gramme); on the other hand, it required very exact apparatus, and complicated physical methods, for working them.

In the meantime, doubts were expressed as to the correctness of Scheurer-Kestner's observations; and further experiments to determine the heat of combustion of coal, or its calorific power, by taking larger quantities of the mineral and using them in the same condition as they are burnt under boilers, became very desirable. The Polytechnische Verein in Munich, therefore, established the Munich "Heizversuchsstation," which commenced operations, under my superintendence, in the year 1879. The plant consists of a tubular boiler with inside furnace, in which the coal is burnt as in any other furnace; but there are special arrangements to measure all the heat evolved within. This plant, therefore, represents a calorimeter on a large scale.\* For working the apparatus, from 200 to 300 kilos. of coal were burnt on the fire-bars. In the furnace, as well as about the boiler, brickwork has been avoided, as it would render difficult the measurement of the heat evolved. The latter is either taken up by a current of cold water or absorbed by evaporation. To measure the heat absorbed in the latter way, the amount of evaporated water was not ascertained, as usual, but the steam formed was condensed by a special arrangement with certain quantities of cooling liquid of constant temperature; and the increase in temperature of this liquid was carefully determined. This was done to avoid a mistake that might be made by getting wet or overheated steam out of the boilers. In the former case the results would be found too high; in the latter, too low. To check the quantity of heat calculated by means of this condensing liquid, the condensed water was sometimes stored up, and its volume measured.

A comparatively small part—some 5 to 6%—of the heat evolved is lost, as is the case with all boilers, by radiation and conduction. This loss has been approximately determined by several trials in the same way as with calorimeters. In addition to this loss, there is to be ascertained the portion of fuel which collects unburnt beneath the grates in the ash-pit, and also the quantity of heat which is lost with the escaping gas. The latter is to be calculated from the temperature, quantity, and composition of the furnace gases. These items are added to the amount of heat absorbed by the refrigerators; and the sum will be equal to the calorific power of coal, or its heat of combustion. While the factors which form the heating power of coal may vary according to the conditions which prevail in the experiments, their sum should always be the same with the same kind of coal. Thus in the experimental station in Munich a great number of coals were tested, the results of which contradicted Scheurer-Kestner's assertions. The trials on a large scale proved that the heat of combustion of coal can

be calculated by the Dulong formula to a degree of correctness quite sufficient for practical use. The variation up to 3 or 4% from the theoretically calculated calorific power, high though it may appear, is sufficiently accounted for, considering coal is not a chemically pure substance. On the other hand, the different methods vary by which the theoretical results were obtained. Moreover, while in one case several experiments were made with a quantity of something like 200 or 300 kilos. of coal in a rather complicated apparatus, in the second case about one gramme of coal was burnt in a combustion-tube, and the calorific power of this coal calculated therefrom by the aid of the Dulong formula already mentioned.

(To be continued.)

## THE STRENGTH AND WEATHERING OF ROOFING SLATES.\*

By Prof. Mansfield Merriman.

This paper is based on a careful examination of slates from Northampton County, Pennsylvania. Geologically, these deposits belong to the formation called the Hudson River slates. They dip toward the northwest, and have a thickness of 6,000 ft. perpendicular to the dip. The geological structure of the formation is very complicated. The original planes of stratification are usually marked by seams or ribbons, which traverse the rock in approximately parallel directions, and which differ in color and composition from the slates proper. The planes of cleavage are not parallel to these ribbons, but the angles made vary in different quarries.

The outcrop near the top of the formation, near the base of the Blue Mountain, produces the soft slates used for roofing and school slates. The outcrop near the bottom of the formation, several miles away, produces the hard slates used for sidewalks and steps. In the upper beds the ribbons are soft and of inferior quality to the slate proper; in the lower beds they are often harder than the slates.

The slate deposits are covered with earth and gravel to the depth of from 10 to 50 ft. After removing this and the weathered outcrop, the slate is quarried by drilling holes at right angles to the cleavage planes, and blasting out large blocks, which are broken into smaller blocks about 1 or 2 ft. thick, 2 to 3 ft. wide, and 8 or 10 ft. long. These are removed to shanties, and there split, first, into thicknesses of about 2 in. These are subdivided, and the parts again divided, the process continuing until the required thickness of about 3-16ths of an inch is reached. The rock splits best when damp.

Numerous sizes are made, varying from 6×12 to 14×24 in. In proper roofing, a triple lap of 3 in. is allowed; thus, for a 24-in. slate, 10½ in. of each slate are uncovered, 10½ in. are covered by one thickness, and 3 in. by two thicknesses. The amount of slate required to cover a space 10×10 ft. is called a square.

The best slates are called No. 1 stock. Those with one ribbon crossing them are No. 1 Rib, and those with two ribbons No. 2 Rib. The slates from the Albion quarries at Pen Argyle, and from Bangor (here investigated) are of a dark bluish gray. On exposure to the weather, the ribbons effloresce and show signs of decomposition, due to the sulphide of iron contained. Such slates should not be allowed on permanent work.

The tests detailed in the paper were made for strength, hardness, and porosity. The pieces tested were 12×24×3-16 to ¼ in., and were all free from ribbons, twelve being taken from each of the quarries mentioned. The slates from the Bangor quarry were somewhat more even in surface and slightly darker. In testing, the slates were supported on wooden knife edges 22 in. apart, and the load was supported by another knife edge midway between. The load was applied by means of sand running from an orifice at the rate of 70 lbs. per minute, and the modulus of rupture *S* was obtained in pounds per sq. in. The slates from the Bangor quarries gave values of 8,100 to 10,235, with a mean value of 9,810. Those from the Albion quarries 7,150 lbs.

The ultimate deflection was measured in each case, and gave an indication of the toughness of the specimen, since the greater the deflection the tougher will the specimen be. The deflection of the Albion specimens averaged 0.270 in., and that of the Bangor 0.313 in. The first broke with a squarer rupture, and showed more lamination.

The hardness of the slates was tested by abrasion upon a grindstone under a constant pressure, and for a given number of turns. The loss of weight by the Bangor specimens was 60% more than by the Albion, showing that the latter is best for places where hardness is a requisite, as when it is used for sidewalks.

Absorption tests showed 0.238% of water absorbed in weight by the Albion, and 0.145 by the Bangor, in 24 hours. Tests for corrosion by a 2% solution of equal parts of nitric and hydrochloric acids in water showed somewhat in favor of the Bangor slates.

The following conclusions were reached for the slates tested:

1. Slates containing soft ribbons are inferior, and should not be used in good work.
2. The soft roofing slates weigh about 173 lbs. per cu. ft., and the best qualities have a modulus of rupture of from 7,000 to 10,000 lbs. per sq. in.
3. The stronger the slate, the greater is its toughness and softness, and the less is its porosity and corrosibility.
4. Softness, or liability to abrasion, does not indicate inferior roofing slate, but is an indication of strength and good weathering qualities.
5. The strongest slate stands the weather best, so that a flexural test affords an excellent index of all its properties.
6. The strongest and best slate has the highest percentage of silicates of iron and aluminum, but is not necessarily the lowest in carbonates of lime and magnesia.
7. Chemical analyses give only imperfect conclusions regarding either durability or physical properties.
8. Flexural tests should be required by specification.
9. It is suggested that specifications should require roofing slates to have a modulus of rupture, by flexure, of greater than 7,000 lbs. per sq. in.

\* From the *Journal für Gasbeleuchtung*, through the *Journal of Gaslighting, Heating and Water Supply*.

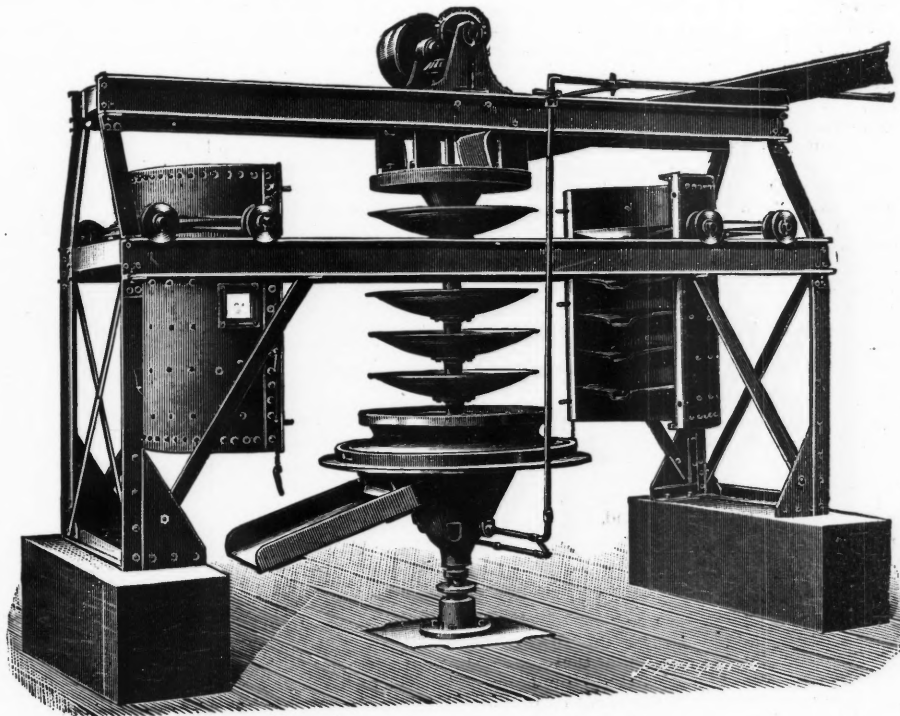
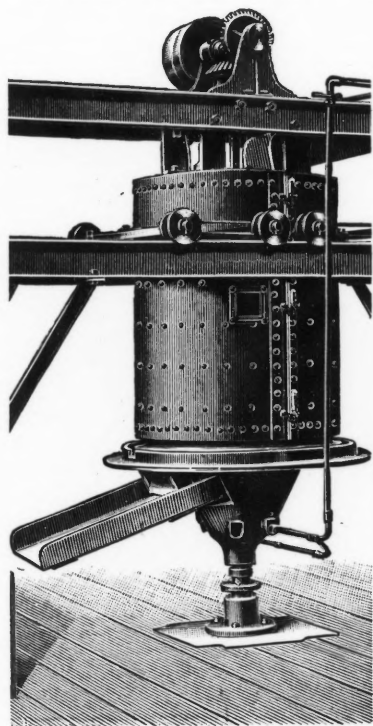
\* Abstract of a paper read at the meeting of the American Society of Civil Engineers September 21st.

JORDAN'S AMALGAMATOR.

Messrs. Fraser & Chalmers of Chicago are introducing a new amalgamator for treating auriferous tailings. It consists, as will be seen in the accompanying illustrations, of a series of shallow amalgamated copper pans fixed one below the other on a vertical axis which is revolved slowly by bevel gearing at the top. Between each two pans there is a circular shelf which projects from the wall of the surrounding casing. The tailings in the form of fine pulp are fed on to the first pan and the centrifugal force of revolution causes the pulp to pursue a spiral course, until, after several revolutions, it gradually falls over the edge on to the shelf below. The pulp then flows back to the center of the machine and on to the second pan.

In this way it traverses the surface of all the pans one after the other and finally falls into a conical separator, which, it is claimed, saves any heavy material and also any loose mercury that has escaped. The circular shelves between each pair of pans is made in two halves, as is also the casing to which they are attached. When the amalgamator is in use the two halves are locked together, so that there is no exposure of the gold to thievishly-inclined workmen.

The process and apparatus have been carefully examined by the well-known expert Mr. C. G. Warnford Lock, who has expressed a very favorable opinion as to its merits. He states that the amalgamation is carried to a higher pitch of perfection than in any other machine. He made a trial of "Edwin Bray" pyritic ore, an ore whose refractory character offered a crucial test. He treated three samples containing 1 oz. 16 dwt. 2 gr. of gold per ton and the average contents of the tailings was found to be 3 dwt., thus showing that 91.7% of the gold had been extracted. The inventor claims that these results are due to two points in the construction



THE JORDAN AMALGAMATOR.

of the amalgamator, the shape of the pans and their speed of rotation give a very lengthened and intimate contact between the gold and the amalgamating surface; the gentle friction of the pulp on the pans keeps the surface always bright and in good condition. It is claimed that the action is so perfect that a very large percentage of gold can be extracted from pyritic ores without calcination or any other treatment, and that the cost is only \$1.25 to \$2.50 per ton.

The following table gives a summary of results whose correctness is vouched for by Mr. Warnford Lock.

Description of ore treated.	Gold contained in ores.	
	Before treatment.	After treatment.
Welsh ore; sulphides of iron, copper, lead, etc.....	\$1.48	\$0.52
Tailings from Transvaal.....	2.28	0.92
"Indian Consolidated" refractory sulphides.....	1.92	0.48
Australian "Black Jack"; arsenical sulphides, very complex.....	29.36	10.64
Tailings from Johnson & Matthey.....	26.12	1.92
"Devala Moyar" complex arsenical pyrites.....	19.48	6.44
"Edwin Bray" pyritic ore.....	40.88	3.00

**The Metric System in Spain.**—By a law passed July 8th, 1892, the use of the metric system of weights and measures is obligatory throughout Spain and her colonies, in private as well as in public contracts.

**Cauricedale Metal.**—This is the name of a new anti-friction alloy lately placed on the market in England by the Cauricedale Company, 8 Trinity House Lane, Hull. It is described as an anti-friction, self-tinning and moldable metal. It has a great affinity for other metals and adheres to brass, iron, steel and gun metal. It fuses at 500° F. and in use it is melted in a ladle over a clear fire. The chief use for it is in coating and relining worn brasses. All that has to be done is to pour it on the parts that are worn, and on cooling it sets hard. As a coating for propeller blades it is said to have proved satisfactory because it is easily laid on, and is not affected by sea water. Severe tests have been conducted with bearings made from this metal and it has been pronounced satisfactory.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Digest of Decisions of the Secretary of the Interior.

MINERAL LAND—STATUTES OF MONTANA—FOREIGN CORPORATIONS—NOTICE PRACTICE—RAILWAY GRANT.

1. Under Montana Stat. a foreign corporation must file with proper officer some designated State resident to accept service for it in actions in State Courts wherein it is a party.

2. Where a railway corporation designates an attorney upon whom all notices and papers relating to the land grant, etc., to it shall be served, jurisdiction is not acquired in proceedings involving title under the grant, in the absence of notice to said attorney, unless such notice shall be waived by the corporation.

3. Under repeated rulings of this department, land, if mineral, no matter when the discovery may be made, is excepted from the railway grant.

4. Before a hearing is ordered to determine the mineral or non-mineral character of a tract of land in an odd numbered section within the primary limits of the grant, the company should be required to make an affirmative showing as to its agricultural character where a showing to the contrary has been made by a mineral claimant.—*Case of O'Connor et al v. Northern Pacific R. R. Co.*, involving certain odd numbered Sec. in T. 8 N., R. 3 and 4 W., Helena L. Dists., Montana. [Dec. Aug. 27, 1892.]

BUILDING STONE—PLACER ENTRY SCHOOL LANDS—DONATIONS TO STATE.

The Act of Congress of August 4th, 1892, permits any person who is authorized to enter lands under the mining laws of the United States to enter lands that are chiefly valuable for building-stone under the provi-

sions of the law applicable to placer mining claims: *Provided*, That lands reserved for the benefit of public schools, or donated to any State, shall not be subject to entry thereunder.—*Case of the Minnekahta Stone Mine*, embracing mineral entry at Rapid City, S. Dak. [Dec. Sept. 3, 1892.]

MINERAL ENTRY—NEVADA SCHOOL LANDS—POLICY OF THE GENERAL GOVERNMENT IN GRANTS TO STATES.

1. The Act of Congress of March 21st, 1864 (13, U. S. R., S. 30) providing for the admission of Nevada to statehood and for a grant of school lands thereto, did not pass title to lands known to be mineral in their character, although the grant does not in terms except such lands therefrom.

2. It has been and is the settled policy of the government to withhold mineral lands in grants to States.

*Case of The Keystone Lode and Mill-site Claim (Carson City, Nevada) v. The State of Nevada.*—[Dec. Sept. 5, 1892.]

DIGEST OF RECENT DECISIONS.

SUBMISSION OF DISPUTES TO ENGINEER.

The two parties to a contract having agreed, in case of disputes or differences as to the construction of their contract, or the sufficiency of the performance of any of the work to be done under it, or the price to be paid, to submit them to the civil engineer in charge, who was to consider and finally decide them, are bound by the measurements made, and by the decision of the selected arbitrator. But the hasty utterances of the arbitrator without knowledge of all the facts cannot be construed as modifying or changing the terms and conditions of a contract; one of the clauses of which reads: "No extension of time or alteration of this contract is in any way to be considered or allowed, unless the same be in writing, properly signed by the parties, and attached to the agreement." *O'Donnell v. Forrest. Supreme Court of Louisiana, 11 Southern Rep., 245.*

## THE RATS OF THE "LOWER LEVELS."

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

When the silver mines of the Comstock were first discovered and white men flocked to the country, the only rats seen were the busy-tailed little animals called "mountain rats." These are not true rats, yet they have a "rat look" about the head. They build houses consisting of piles of sticks, bark and dry weeds, after the manner of the musk-rat, but on high and dry ground, and generally against the trunk of a spreading cedar or scrub pine tree. These so-called rats vanished as soon as the first settlers began to intrude upon their haunts, using them as targets in their pistol practice, applying matches to their houses, and making themselves disagreeable neighbors in various other ways.

Soon the brown rat made its appearance. This is the rat which follows civilization in all parts of the world. Wherever ships go it goes. The first rats were brought to the Comstock from California in freight wagons—principally, most likely, in the big "prairie schooners," stowed away among boxes and crates of goods.

Their rapid increase, after their first appearance on the Comstock, was astonishing. From ten to fourteen young are produced at a birth, and there are several litters each year; besides, a rat is a great grandfather before he is a year old. Then, the rats that colonized the Comstock towns encountered no enemies. There were no cats in the country. Soon stores, barns, warehouses, hotels—the whole town—were swarming with rats. Cats were then brought over from California and the first lots sold for \$20 to \$25 a head. There was a wild rush for them. Soon every prairie schooner that crossed the mountains had slung to it a big cage filled with cats of all colors and kinds. The price went down to \$10, then to \$5 a head, and finally so many cats arrived that they could not be given away. For some time, however, crates and cages filled with cats—or what was left of them after fighting all the way over the mountains—continued to arrive, and no sale being found for them, they were turned loose in the town. Soon the whole place swarmed with cats, and the cat nuisance was worse than the rat nuisance, as it was a thousand times more vociferous.

The rats soon discovered the mines and found therein a congenial home, and a home free from the terrifying presence of members of the feline tribe. Never was a cat seen in any of the lower levels of the mines, though they sometimes prowl about the old surface tunnels. In the first opening of the mines there was no place for the rats, but as soon as timbers began to be set up and cribs of waste rock built they were able to find safe hiding places; also there was room for them everywhere behind the lagging of the drifts. As they increased in numbers there was on all sides an increase of space through the rapid extraction of ore by the miners. They doubtless soon discovered that though man was their enemy on the surface he was their friend down in the underground drifts and chambers. He shared his meal with them and they scampered and capered about him with perfect impunity.

The warmth of the lower levels appears to be very congenial to the rats, both old and young. Cold is a thing unknown to them. It is as though they had been given an immense hot-house in which to breed. Any temperature they desire, from 60 to 120 degrees, is at their command.

Rats are useful as scavengers in mines. They devour all the scraps of meat and other food thrown upon the ground by the miners when at lunch, eating even the hardest bones, thus preventing bad odor. As the decay of the smallest thing is unendurable in a mine, the miners never intentionally kill a rat.

Men working in particular parts of a mine have pet rats that are known to them by some mark—a clipped ear or the loss of a certain portion of the tail. To these they give comical names, and feed and pet them. Such rats are often named after some character about town, some of whose peculiarities the animals are supposed to display. Thus a certain rat that was in the habit of tapping the floor with the stump of tail left him was named after a well-known banjo-player, as in thumping the floor he seemed to be "marking time."

The miners have a high opinion of their sagacity. The rats generally give the miners the first notice of danger; when a big cave is about to occur, they are seen to swarm out into the drifts and scamper about the floors of a level at unwonted times and in an uneasy manner. The settling of the waste rock probably pinches the animals in their dens, causing them to at once leave in search of less dangerous quarters.

In one instance a rat saved the life of a miner. The man had stretched himself upon a plank to take a rest between "passes" in the face of a hot drift, when a big rat suddenly leaped upon his breast from the wall. He bounded to his feet and had no sooner left the plank than down crashed several tons of rock upon it.

All men have antipathies of some kind. Among the miners are men who have more dread of rats than the majority of women. These men are made the victims of many tricks by their fellow workmen.

It frequently happens that live rats are by accident shut up in the dinner-pails of the miners, to presently leap forth to the great consternation of their wives. The waitresses at the boarding houses, whose business it is to refill the lunch-pails, often have tricks played on them by miners, who purposely trap rats for their delectation.

In leaping across the shafts of the mines rats occasionally miscalculate and fall to the bottom, sometimes hitting a miner on the head and knocking him down. When a rat falls from 1,000 to 1,200 feet he explodes wherever he strikes, just as though he had been shot out of a gun.

At times, when a mine has been shut down for a few weeks, the rats become ravenously hungry. Then they do not scruple to devour the young, old, and weak of their kind. During the suspension of work in a mine that is not connected with other mines that are running, everything eatable in the underground regions is devoured; even the spots of candle drippings on the floors. When work is resumed the almost famished creatures are astonishingly bold and fearless. Then they will come out of their holes and get upon the underground

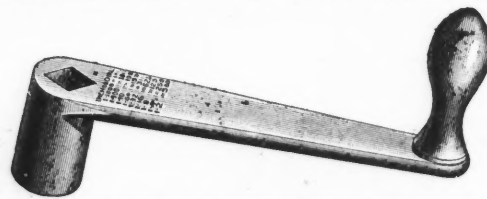
engines (even when they are in rapid motion) and drink the oil out of the oil-cups, quite regardless of the presence of the engineers.

A fire in a mine slaughters the rats by wholesale. Few escape, as the gases penetrate every nook and cranny of the underground regions, and often so suddenly as to asphyxiate them in their holes. However, with the first smell of gas they take the alarm and make for the drifts and open floors. Bushels of the animals have been gathered up after a fire and rush of gas. In September, 1873, there was a fire and several explosions of gas in the Yellow Jacket Mine, with flows of deadly gas into some of the adjoining and connected mines. In the Crown Point Mine the rats had some warning and rushed out of their dens, but were overtaken by the gas driven through the openings by explosions that soon followed in the Yellow Jacket. After the fire (which was on the 1,300 level) a miner stood in one spot on the 1,100 level of the Crown Point and counted lying about him, within range of the light of his candle, no fewer than 82 carcasses of the defunct rodents. Three candle-boxes were filled with the dead rats found on a single floor.

The miners tell many wonderful stories about the tricks and comical pranks of the rats of the lower levels, but the majority of these are to be taken with a large pinch of salt; they are invented for the benefit of the people of the upper world.

## GRADUATED FEED HANDLE FOR MILLING MACHINES.

Upon this handle is stamped various divisions of an inch in fractions and in corresponding decimals. If the operator desires to run the feed



in a fraction of an inch, by reference to the table on the handle he can translate the desired figure to thousandths, and set the feed correctly. The handle is manufactured by the Garvin Machine Company, of New York.

## WOOD'S PROCESS OF MAKING NICKEL-STEEL.

Since the adoption of nickel-steel armor plate by the United States Government, methods of incorporating nickel with steel have been diligently studied. Among those who have taken out patents on this subject is Mr. E. F. Wood, of the Homestead Steel Works, who has, we are informed, assigned his patent rights to the Carnegie Steel Company. This process differs from the open-hearth or Bessemer process only in the manner of introducing the nickel and consists in the reduction of the nickel oxide in the presence of the fused iron or steel either before or after the decarburization of the pig metal. The nickel oxide used may be any of the natural ores or what is described as "artificial" nickel ore, the latter being preferable on account of the small percentage of nickel in the natural ores. The artificial ore contains, iron, 23.87%; nickel, 48.23%; phosphorus, 0.007%; silica, 1.9%; sulphur, 0.26%; and oxygen and earthy matter, 25.72%.

The nickel to be added is prepared by grinding the ore and then mixing it with powdered charcoal or coke, three parts of nickel oxide requiring one part of carbon. The object of the carbon being to reduce the nickel oxide, it is necessary to know the amount of the latter in the ore used. The nickel and carbon being intimately mixed, are made plastic with tar or silicate of soda and then formed into bricks and pressed solid. The object of pressing is to make the materials so coherent that they can be kept immersed in the molten metal, and to further aid this, the bricks should be thoroughly dry. Knowing the percentage of nickel in the ore, that in the bricks can be readily calculated, so that as many bricks may be added as is necessary to produce a product of any required composition. Allowance should be made for the nickel which passes into the slag, which is generally about 10% of that used.

The application of the process to the open-hearth furnace is thus described: The furnace being properly heated, a proper proportion of nickel bricks are placed on the hearth, mixed with the charge of pig metal, which is so placed as to prevent the bricks rising to the surface of the metal as it melts, after which the open hearth process is carried on in the usual way, the decarburization of the pig metal and its subsequent recarburization, together with the addition of spiegeleisen or ferro-manganese, being conducted in the usual manner. The effect of introducing the nickel in the manner described is that the oxide of nickel is reduced in the presence of the melting or melted pig metal, and the metallic nickel thus produced becomes intimately mixed with the iron, while the earthy and foreign matter of the nickel ore is melted and unites with the slag.

The process applies also to the use of the nickel bricks in the basic process of decarburizing pig metal without any other change than the addition of the nickel bricks. It is preferable in the basic process to add the bricks after the addition of the limestone and before charging the pig iron, so as to bring the nickel bricks into more intimate contact with the melting iron or steel.

When used in connection with the Bessemer process, the nickel bricks are introduced into the iron ladle as the molten pig is being charged into the converter, if the iron be hot enough; but as this is usually not the case, it is better to introduce the nickel bricks into the Bessemer converter before the molten iron is charged, no other change in the conduct of the Bessemer process being required; or the nickel bricks may be added to the Bessemer metal in the steel ladle at the end of the process, the steel being blown hot enough to cause the complete fusion of the bricks, in which case the nickel ore will be at once converted into metallic nickel and absorbed by the liquid steel.

## PERSONALS

Mr. Albert R. Wores, E. M., has assumed the management of the smelting plant of the Canada del Oro Company, in Tucson, Arizona.

Mr. J. H. Dangerfield, part owner and general manager of the Standard mines, at Zincite, Mo., has returned to the mines from an extended trip to the East.

Dean Headden of the Dakota School of Mines, has been appointed a member of the Advisory Committee of the World's Columbian Exposition on Geology.

Mr. P. Clark, formerly superintendent of the Coeur d'Alene Silver and Lead Mining Company, is now in the Okanogan country, Washington, examining its resources.

Messrs. W. H. Lewis and M. B. Holliday, formerly of the Laughlin and Junction Steel Company, at Mingo Junction, O., have taken charge of the new works of the Shenango Valley Steel Company, of New Castle, Pa.

Mr. Arthur W. Jenks, metallurgist, who was recently with the Chicago & Aurora Smelting and Refining Company, has been appointed superintendent and metallurgist of the Kootenai Lake Reduction Company, whose works are in process of erection at Pilot Bay, British Columbia.

Messrs. H. C. Frick, of the Carnegie Steel Co., J. C. Morse, Prest. Illinois Steel Co.; H. H. Porter, chairman of the Minnesota Iron Co.; S. Mather, ore broker of New York; H. M. Flagler, of the Standard Oil Co., and B. Brewster and H. Siebert, of New York, have returned from a trip to the Minnesota and Chandler mines, on the Vermillion range, Minn.

## OBITUARY.

Mr. M. A. Lavalley, one of the editors of our contemporary "La Genie Civil," died on the 20th of July, at the age of 72. He was elected Senator of France in 1855, and was President of the Societe des Ingenieurs Civils in 1875.

Mr. Wm. Thaw, Jr., died September 3d, in the city of Cologne, Germany, aged 39. Mr. Thaw was chairman of the Hecla Coke Company, Limited, a member of the Board of Trustees of the Western University and of the Committee on the Observatory. He was a member of the Western Pennsylvania Engineers' Society, and took a deep interest in scientific subjects.

M. Denman Ross, of the firm of Ross, Turner & Co., died September 14th, aged 72. Mr. Ross might be called the father of the Massachusetts Institute of Technology, for it was he who hired and paid for the room where they first gathered before they had a building, and he was connected with the government of the Institute at the time of his death. He was an active member of the Historical Society. He was formerly a member of the Harbor Commission.

David Bruce, the inventor of the typecasting machine, died September 13th, in Brooklyn, N. Y., at the age of 90. In 1838 he took out various patents that covered a typecasting machine run by hand, that would turn out eighty or ninety type a minute. He went to Boston and sold the patent rights, after the machine had been shown to be of practical use. He was not satisfied with the machine, and kept on experimenting until he had perfected one that could be used with steam. He then engaged in the type-making industry.

James B. Francis, of Lowell, the eminent hydraulic engineer, died Sunday, September 18th, at Boston. Mr. Francis was born in South Leigh, Oxfordshire, England, May 18, 1815. He landed in New York April 11, 1833, and soon was engaged in the survey of the New York, Providence & Boston road. In 1837, Mr. Francis was appointed chief engineer by the directors of the Locks and Canals Company, of Lowell, Mass., and gave them fifty years of valuable service. He was appointed consulting engineer of the company upon retiring from active work. He conducted and compiled a work on the hydraulic experiments at Lowell, which is one of the highest authorities on the subject. He had been President of the American Society of Civil Engineers and was one of the commission appointed to examine into the causes of the Johnstown, Pa., disaster.

## SOCIETIES.

The 63rd meeting of the American Institute of Mining Engineers will take place in the Schuylkill Valley, Pa., commencing on Tuesday evening, October 11th, 1892. Headquarters will be established and sessions will be held at the Navesink Mountain Hotel, Reading, Pa. The chairman of the local committee is Mr. Jerome L. Boyer, Reading, Pa., to whom all letters concerning the local arrangements should be addressed. Applications for reserved rooms should be made direct to Mr. Charles A. Stone, Manager Navesink Mountain Hotel, Reading, Pa. The following programme is provisionally announced, subject to later modifications: Tuesday evening, October 11th, opening session. Wednesday, session in the morning; visit to local works and points of

interest at Reading in the afternoon; session in the evening. Thursday, session in the morning; visits to the industries of Pottstown and Birdsborough in the afternoon; social entertainment in the evening. Friday, excursion to the Schuylkill anthracite coal fields. It is expected that a special discussion on the subject of Hot-Blast Stoves will take place at this meeting.

The September meeting of the Civil Engineers' Club, of Cleveland, was held at the club rooms, September 13th. Willard Fuller was elected an active member. Prof. C. H. Benjamin, of Case School of Applied Science, read a paper on "Some Experiments on the Effect of Punching on Soft Steel." The experiments described were made at the mechanical laboratory of the Case School of Applied Science, under the direction of the writer, and had for their objects, first, the determination of the ultimate resistance to shearing of soft steel plate for different forms of punch; second, the determination of the effect of the punching on the elastic limit and ultimate tensile strength of the plate in the various cases.

In every test the material used was Otis steel boiler plate one-quarter inch thick, and stamped 60,000 lbs. tensile strength, the pieces all being cut from the same plate. The experiments showed that the average resistance to punching with the common forms of punch was 50,000 lbs. per sq. in., while with the spiral punch it was only 38,000 lbs. Also, that punching a plate with the ordinary form weakened it 7½%, while the use of the spiral form weakened it 3½%. A considerable change in clearance affected the results but slightly, but good or bad centering of punch and die was very noticeable in its effects.

## INDUSTRIAL NOTES.

The Dunham Nut Machine Company, Unionville, Conn., are putting on the market Dunham's latest improved machines for making cold-pressed nuts.

The labor difficulty between the granite dealers and strikers in the Barre, Vt., district has been settled by an agreement so far as local dealers and the union can settle.

The W. W. & R. M. Keys Company were recently organized under Connecticut laws, and have commenced the business of founders in bronze and manufacturers of Babbitt metals.

The Westinghouse Air Brake Company has re-elected its directors and officers. The gross earnings of the company for the past year have amounted to \$5,000,000 and the net to \$2,400,000, an increase in the latter of \$700,000. The company now has nearly \$1,250,000 in cash on hand.

The U. S. Cold Wire Rolling Company will begin building their mill at Hammond, Ind., in October. The company will manufacture cold rolled copper wire by a process invented by Henry Williams, of Boston. It is stated that the company has large contracts with the Bell Telephone Company.

The Pierce, Butler & Pierce Mfg. Company of Geneva, N. Y., have let the contracts for the construction of their new boiler shops at Syracuse. There will be a group of four buildings, all to be erected of brick, two of which will be 80×200 ft. in dimensions. The contract price for their construction is \$70,000.

The Elmira Electric Illuminating Company are building a new plant at Elmira, N. Y., and have placed the contract for the iron roofs with The Berlin Iron Bridge Company, of East Berlin, Conn. The dynamo room will be 66 ft. wide by 177 ft. long, covered with the Berlin company's patent anti-condensation corrugated iron roofing—the floor space being controlled by a ten-ton traveling crane. The boiler room will adjoin the dynamo room and will be 32 ft. wide by 75 ft. long.

The Denver Steel Rolling Mill Company, with a capital of \$250,000, has been organized. The following officers were elected: President, W. N. Byers; vice-president, E. H. Webb; treasurer, Pine P. Ernest; secretary, Charles D. Cobb; general manager, Edwin A. Beers. The company propose to erect at once a rolling mill, wire drawing mill, nail mill, equipped with ten nail machines and twenty barb-wire machines. They will manufacture barb wire, wire nails, cotton ties and staples, and later on, wire cables, copper rods, copper wire and shovels.

It is stated that the direct casting into a train of molds as now practiced by the Maryland Steel Company, at Sparrow's Point, Md., is to be further expedited by casting into two ingots at once from the ladle. The handling of the latter by traveling cranes has proved a complete success, the ladle having contained as much as 20 tons under exceptional circumstances. Another stripper is to be put in, and additional pit heating furnaces are being built. The arrangement for handling, cutting and shipping billets have been in successful operation for some time past.

The citizens of Youngstown, O., have raised \$25,000 toward purchasing 86 acres of the Hawkins farm site, West Youngstown, as a site for the new steel plant to be erected by the Ohio Steel Company. The company has a capital of \$750,000. Mr. Julian Kennedy, of Pittsburg, is drawing up the plans for the plant, which will produce 800 to 1,000 tons of steel billets per day. The product will be

consumed by the rolling mills of this immediate vicinity. The officers of the steel company are Henry Wick, president; H. O. Bonnell, vice-president; J. G. Butler, secretary, and Myron C. Wick, treasurer.

## 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.

2,782. A hydraulic passenger elevator and hot air heating apparatus for a \$75,000 Opera House, Louisiana.

2,783. A cheap concentrator and mill. Montana.

2,784. A 30- or 40-H. P. engine and boiler. Virginia.

2,785. Spoke machinery; lathes, tenoning, throating, tapering and facing machines; 6 and 18 in. belt sanding machines; also equalizing sawing machines with 2 saws. Virginia.

2,786. Line shafting, 2 3-16 hangers, belting and 1 in. wrought iron pipe. Virginia.

2,787. About 5,000 ft. second-hand 4 in. cast iron water pipe to stand about 100 lbs. pressure. Alabama.

2,788. A 15-H. P. engine and a 20-H. P. boiler; also saw mill for chair factory. Virginia.

2,789. All material necessary to build and equip six miles of electric railway; electricity will be generated from water pressure, which will be low, but with a 200 to 300-H. P. Texas.

2,790. A small car load of 12 lb. second-hand iron rails and 20 or 25 one-ton cars, 14-in. wheel, and 2 ft. gauge. Kentucky.

2,791. A 48-in. swing lathe, 8 ft. between centers, and a 20-in. swing lathe, 14 ft. between centers; also a planer, 28-in. × 28-in. × 6-ft., a drill, 24 in. to center, and a bolt cutter machine. Virginia.

2,792. Prices on 50 miles of 70-lb. steel rails, 3 engines, 3 power houses, electric wire, etc. Texas.

2,793. Engine, boiler and machinery for a cotton mill. North Carolina.

2,794. An outfit for a sausage factory. Virginia.

2,795. Machinery to roll and rivet cotton ties that have been used on cotton bales; also machinery to roll second-hand bagging made of jute. Georgia.

## Goods Wanted Abroad.

2,781. Catalogues of mining machinery, more especially relating to electric coal cutting machines; diamond drills for deep boring, say 2,000 ft., and the best kind of water motors. New Zealand.

## GENERAL MINING NEWS.

## ALABAMA.

(From our Special Correspondent.)

The effect of the labor troubles in Tennessee have been felt here, but only slightly, the reason being that the bulk of brown ore shipped from this county goes to the furnaces of the Tennessee Coal, Iron and Railway Company. Shipments were discontinued for a few days only and have now been resumed. The machinery of the new ore washer at the State line banks of the Tecumseh Iron Company have been tested and found to work perfectly. As soon as rails are laid on the switch connecting the washer with the E. T. V. & G. R. R. track the company expects to commence shipping ore from these banks at the rate of about 100 tons a day. Such a system of tram tracks has been built between the banks and washer as will enable the miners to work the hill containing ore at several points, and thus show a breast about a quarter of a mile in length. The depth of this deposit is unknown, but the floor of the open cut to be worked will be ore. The writer recently visited the property of the Bass Furnace Company, at Rock Run, where their charcoal furnace, one of the first built in Alabama, is situated. The property of this company consists of about 17,000 acres of land in this vicinity, a large proportion being mineral bearing, containing deposits of brown hematite iron ore, bauxite and mica. The last mentioned has never been prospected to ascertain its extent, but outcroppings denoting its existence have been discovered. The bauxite has been encountered principally near the Dike's ore banks, about three miles east of Rock Run, and regular shipments are now being made from one bank owned by the Bass Furnace Company, by the Republic Mining Company, of Philadelphia, averaging from 40 to 50 tons daily. This is hauled with wagons from the bank to the furnace, whence it is transported over the private railroad of the Bass Furnace Company, to the E. T. V. and G. R. R., at Rock Run station, 3 miles distant from the furnace. I visited the bauxite bank and found that

although the work was really only shipping, yet a face of solid bauxite about 50 feet in width and 10 feet in height was exposed, with the floor of the workings solid ore; but to what depth had not been determined. From surface indications and outcroppings as well as the increasing width of the ore body as work progressed, the deposit will probably cover several acres in area. About half a mile distant from this bank are located the banks owned by the Southern Bauxite Company, of Piedmont, Ala., from which several hundred tons were shipped last winter and spring; but from these, shipments were discontinued during the summer, the company at present being engaged in shipping from banks near Rome, Ga., where the haul to the E. T., V. & G. R. R. tracks is shorter. The furnace of the Bass Furnace Company was built originally in 1873, but has been rebuilt and enlarged since. It has a capacity of 50 tons of iron daily; its stack is 44 ft. in height, and 9 ft. in diameter in the bushes. The product is shipped to Fort Wayne, Ind., where it is used at the Bass car wheel works. A large proportion of the ore melted in this furnace is mined on the company's own land, the remainder being shipped chiefly from the State Line banks of the Tecumseh Iron Company. A large stock of ore, limestone and charcoal is kept in stock in the yards, where all the ore is calcined before being treated in the furnace. Stock sufficient to run for eight months is on hand at present in the yards. The company owns its own commissary store, in which is carried a heavy stock of general merchandise, as well as the houses occupied by its employees. Owing to the fact of the product of this furnace being consumed by the same company at the Fort Wayne works, it is one of the few furnaces in the South kept continuously in blast regardless of the state of the iron market.

#### Calhoun County.

The Alabama Mineral Land Company, of which Edward D. Randolph, of New York, is President, and John M. McKleroy, of Anniston, in this county, is general agent in Alabama, is one of the heaviest corporation owners of mineral lands in the United States, having title to about 300,000 acres of timber and mineral lands in the State, extending over fifteen counties. In this county the company has a fine brown ore bank in operation leased to the Woodstock Iron Company, and located about 2 miles from the city of Anniston, the product of which is used at the Woodstock Furnace No. 4. The Woodstock company is operating the recently erected ore washer within the city limits. This is really three double log washers under one roof at which is washed the ore from an extensive deposit of brown ore within the city limits, that has been mined for years, the ore having hitherto been washed in two single ore washers which were found inadequate in capacity to furnish the necessary amount of ore needed after the coke furnaces of the company were put in blast last year. The output from furnace No. 4, the only one in blast at present, for the month of August was 3,500 tons of pig iron. The product of the charcoal furnaces of this company have attained pre-eminence over all Southern furnaces for use for the manufacture of car wheels. The ore used in these furnaces is principally mined from the company's own bank in and near the city of Anniston.

#### Cherokee County.

(From our Special Correspondent.)

I have during the past week visited several prominent brown ore properties in this county. Active operations are at present only being conducted at two banks located near Cedar Town and known as the Ledbetter and Reed banks. The former of these is owned and operated by Messrs. Vandever & Hickman, who have recently erected a McLanahan & Stone washer complete except the jigs, which is working very satisfactorily. The firm purpose using a steam shovel for mining in the future, and are at present shipping to South Pittsburg, Tenn. The Reed bank, owned and operated by the Augusta Mining and Investment Company, is furnished with two double log McLanahan & Stone washers under one roof, furnished with revolving sizing screens and conveyors or elevators, but without jigs or picking tables. A steam shovel is used in the bank on a face of gravel and solid ore about 15 ft. high. These shovels were first used in this section by Mr. Hickman, at the Simpson bank, a few miles distant, in this same county, and while the use may be advocated in a gravel bank free from solid formation, on a face not to exceed 8 or 10 ft. high, yet in such a bank as the Reed, where the gravel is closely associated with the solid formation, it is out of place, for the reason that more time and labor are wasted at the washer in separating and breaking the lump ore which the shovel picks up with the gravel than would be required in the bank were the use of the shovel discontinued; another reason is the liability of breaking shovels and also damaging the machinery of the washer. The ore from this section is of high grade and low in phosphorus and silica; but it has been demonstrated that it rests on the limestone which has been encountered within 16 ft. of the surface at the base of the hill in which the Ledbetter bank is located, thus determining the depth of the ore deposits, which will average about 100 ft. in both the banks I have mentioned, presuming that the limestone lies flat as local authorities claim. In area, the extent of both banks appears very considerable, but being pocket deposits cut off by both clay and rock horses at irregular intervals, the amount of ore cannot be estimated. I am under obligations to Mr. Walter Scott, general foreman for the

Augusta Mining Company, at the Reed bank, for courtesies extended. At Oredell, about 6 miles in a northwesterly course from Cedar Town, in this same county, I visited the property of the Atlanta Mining Company, which is one of the best prospected brown ore properties in this section. It consists of 1,100 acres of land, about 50% being mineral bearing, and has been operated for the past 20 years in a desultory manner; the product of most of the openings, which are numerous and extensive, formerly was shipped after screening. A vigorous attempt was made some years since to obtain water to supply a washer by sinking for an artesian well, but, although a fair supply was obtained, the idea of encountering a supply with force sufficient to raise it to above the surface of the ground was abandoned at a depth of 350 ft., where the water raised to within about 50 ft. of the surface, whence it was pumped through a 3-in. pipe to furnish a single log washer erected about the same time. Since then a good double log washer has been erected on the property, and the present water supply being insufficient, it is proposed by Mr. Ackerman, the resident superintendent, to lay a 12-in. pipe from a spring  $2\frac{1}{2}$  miles from the banks, but owned by the company, which supply will furnish sufficient for the present washer, as well as a new plant the company propose erecting on another site on the property, where the prospect work shows a solid face of ore opened 30 ft. in height, which promises to increase as work progresses into the hill, while the extreme width and depth at present undetermined surface indications point to increasing width. Mr. Ackerman who came to reside on the property recently, is making arrangements to commence operations and ship ore extensively in the near future after the property has lain idle for the past two years. This county is rich in brown ore deposits, but those I have mentioned are the only ones at present in active operation.

The Bass Furnace, at Rock Run, is undergoing repairs. It will be enlarged to 52 ft. in height and 10 ft. bosh instead of 45 ft. height 9 ft. bosh. It will go into blast again about December 1st, it is expected. The delivery of ore from the company's own banks and from the Clay bank, owned by the Bluffton Company, as well as charcoal, is being continued as usual although the furnace is out of blast. During the past week I have been investigating more fully the bauxite deposits, and have interviewed the shippers of this mineral. So far as present developments determine, these deposits exist in Floyd County, Georgia, and Cherokee, Calhoun and Cleburne Counties, Alabama, extending over a territory about 75 miles by 30 miles. The deposits are of a pocket formation, none of which so far as I can ascertain, have been thoroughly tested to determine depth; but in those which have been developed in Cherokee County and from which shipments have been made, the existence of the mineral for a depth of from 20 to 30 ft. has been demonstrated. When the facts are considered that the first shipment of bauxite from this section, was only made in 1889, from Floyd County, Georgia, about 10 miles north of Rome, and from this county last year; also, that up to date only two shippers have embarked in the enterprise, the small amount of development work is not surprising. Since regular shipments have been made, the attention of mining men has been attracted to this mineral, and reports of discoveries of valuable deposits in the counties I have mentioned have been of almost daily occurrence. But on investigation, in many instances, the reports have lacked confirmation. In many cases, too, where deposits have been found, analysis has proved the ore to be of too low a grade to ship while the demand is as limited and the freight rates as high as at present. In a recent conversation with the manager of the company which shipped the first car of bauxite mined in this section in 1889, he expressed regret that some of the journals had issued misleading reports as to the value of this ore, which, owing to the cheap ocean freight rate from foreign countries, can to-day with difficulty be mined and shipped from this section at a reasonable profit to the shippers. In fact were it not for the high grade of ore, he himself ships, competition would be out of the question. For this reason, we cannot look for any very extensive development of bauxite properties in the South, unless a local demand is created for the mineral. Whenever this happens, then the brown hematite ore district of the South will undoubtedly be thoroughly prospected, and it is reasonable to believe that many new discoveries will be made, and until that time the value of hauxite properties, except where the ore is of a high grade will be only nominal as at present.

#### ATASKA.

Alaska-Treadwell Gold Mining Company.—The output of this company for the month of August was \$60,735, derived from 19,000 tons of ore and 469 tons of pyrites. The total expenses for the month were \$26,300, leaving an estimated profit of \$34,435.

The Juneau "City Mining Record," in commenting upon the report that Mr. E. O. Downing has brought suit against the parties interested in the sale of the Bears Nest property in 1888, for his share of the purchase money, says: "The sale of this property for a large sum and its failure to develop into anything except a gigantic fraud has retarded the mining industry in Alaska almost irreparably. The prosecution of the suit will probably bring to light many things connected with this transaction which the public has not yet learned."

Mining in Alaska is progressing to an unusual degree. A shipment of 210 tons of mining machinery is being made to the Douglass Island mines.

Frank Corwin and Thomas Kiernan have returned from an extended prospecting trip to the vicinity of the headwaters of the Yukon. They report finding quartz, but it was of inferior quality, and not well defined. They also report finding placer diggings, which would pay from \$3 to \$4 per day, but owing to the expense of getting in supplies, the work was not profitable. A report reached Juneau about the middle of August that a rich strike had been made on the Yukon below Forty-Mile Creek. The country is now being filled by miners and prospectors. At the Juneau Mining and Milling Company's property the electric plant for the transmission of power is nearly completed. The mill is running regularly and it is the intention of the management to keep it running all winter. At the Connelly and Cadman placers 25 men are employed. In the Basin, the Nowell Gold Mining Company has made considerable progress in its placer work on the flat. The small stratas of blue clay have been washed away and the company now has a bank of gravel from 60 to 80 ft. high. The frame work for the 20-stamp mill is finished and the mill will be put in immediately. At Shuck, all mining operations have closed. Water is scarce on the high placer diggings in the Basin. The "Record" also reports that some development work is being done on the Denver Summit properties at Admiralty Island. At Sundum a force of men has recently been put on the McMahon property, which is bonded to a company at Spokane Falls, Wash. This property makes a good showing and the ore averages well across the vein and along its length as far as uncovered.

The latest news from Alaska is the arrival in Juneau of a British exploring party, consisting of N. B. Gauvreau, Capt. William Moore, and others. The party explored the Sticken River and the country thereabouts to the headwaters of the Takou. The object of this expedition, so far as can be learned, is to select a practical route for a road from the coast to the headwaters of the Yukon, to be built by the Canadian government. This party has now left Juneau to cross the Chilcat Divide to the Yukon.

#### ARIZONA.

##### Yavapai County.

The United Verde Copper Company are preparing to put up a large refinery, and will be refining all their own copper in the near future. Machinery and buildings of this refinery will cost over \$200,000. The tunnel to drain the mines is now in between 1,500 and 1,600 ft.

##### Yuma County.

(From our Special Correspondent.)

The discovery of a deposit of auriferous iron ore in a spur of the Harcuvar Mountains, about 20 miles from Harrisburg, has attracted the attention of San Francisco capitalists who are about to examine the property. The croppings average about 100 ft. in width. The vein runs northeast and southwest, standing at an angle of 80°. The formation is slate and limestone.

#### CALIFORNIA.

##### Marin County.

(From our Special Correspondent.)

While an excavation was being made just outside the boundaries of Sansalito, oil was unexpectedly struck, and in the 12 hours following 70 gallons of excellent oil was obtained. A well is about to be sunk.

##### Mono County.

(From our Special Correspondent.)

Bodie Consolidated Mining Company, Bodie.—A seam of rich ore in upraise No. 4, above the 400 level, is being followed with encouraging results.

Bulwer Consolidated Mining Company, Bodie.—Last week there were crushed 121 tons of ore, the battery samples averaging \$24 and the tailings \$7.73. There were extracted 123¼ tons of ore.

Moro Mining Company, Bodie.—The ore seam in the south drift from 4 upraise, 700 level, averages from 4 to 6 in. wide. The annual meeting was held this week at which 44,813 out of 50,000 shares were represented. The following officers were elected for the ensuing year: G. J. Ives, president; L. Osborn, vice-president, and W. H. King, H. D. Walker and A. Herrman, directors. H. D. Walker was re-elected secretary and J. W. Kelly, superintendent. The financial statement showed a credit of \$2,046, but, nevertheless, an assessment of 25 cts. per share was levied on the company's stock. At a meeting of the new board of directors the New York transfer office was abolished for the purpose, as alleged, of effecting a saving of \$1,000 per annum.

##### San Bernardino County.

(From our Special Correspondent.)

Temescal Tin Mines.—On account of the political importance of the tin industry, it is with difficulty that any really authentic information can be obtained. The two experts sent from London have returned after making a thorough examination of the property. The report is abroad that they will report to the English stockholders unfavorably, the ore, despite the prospecting operations of the past year, not being sufficient in quantity to make the working anything like a paying proposition. Twenty-five men have been laid off, leaving a shift of only 12 men at work. At the meeting of the Academy of Science, this week, E. W. Jones, superintendent of the property, exhibited rich specimens of ore from

the mines, and samples of concentrations, refined tin and a curious specimen of crystallized tin. After examining the mode of crushing and smelting the ore and refining its product Mr. Jones, under the questioning of one of the audience, admitted that the specimens exhibited did not represent the average ore taken from the mine. He drew attention to the fact that the Cornwall mines contain but 2 to 4% of the metal and are worked at a profit, but as the deposit is enormous and labor cheap while at Temescal the ore exists only in pockets and labor is high, no comparison can be made between the two places.

**Temescal Tin Company.**—The mines of this company were closed on the 17th inst.

Shasta County.

(From our Special Correspondent.)

Considerable excitement has been caused by the lucky strike of an old prospector. He bought the Kempton mine for \$100 and at once began work in the old tunnel, 100 ft. in. Simultaneously he sank a shaft to connect with the tunnel about 150 ft. from the surface. At the depth of 7 ft. he struck gold quartz and during the last week has taken out ore valued at \$7,000. The pocket, while very rich, can hardly hold out.

**Queen of Diamonds Mine.**—This property has been bonded by San Francisco parties, who have put a shift of men to work and will erect a 10-stamp mill. The mine, in years gone by, yielded handsomely but was supposed to be exhausted. It will take some little time to open up the tunnels but the present owners are sanguine of obtaining a profitable return.

COLORADO.

Lake County.

(From our Special Correspondent.)

**Antoinette Mining Company.**—Everything is now working smoothly at the Antoinette, the water having been entirely drained out, not enough now remaining to supply the boilers. The ore body recently opened up in one of the lower drifts has proved up much better than at first expected, a large amount being now in sight and the shoot continuing to enlarge. This consists of a very fine grade of gold ore, neither silver nor lead being noticeable in any of the assays. The first shipments are to be made during the ensuing week.

Boulder County.

**Victoria Mining Company.**—A strike is reported at the Victoria mine near Ward. At the 185-ft. level in the workings, says the Denver "Times," a drift has been run 190 ft., the last 28 ft. of which has been along a 13-in. vein of ore that is said to average over \$400 per ton in gold and silver, estimating the value of the silver at 82 cents per ounce. A steam hoist has been sent up to the mine and will be put in operation shortly, when the company will at once begin shipping ore from this property. The Victoria was at one time owned by the Gold Run Consolidated Mining Company, which took over \$500,000 out of the mine. About 10 years ago the company shut down, having lost the pay streak, and for a number of years the property has remained idle. The directors of the old Gold Run Company, after quarreling among themselves, finally let a lease on the property to a company of Denver people, who last year shipped about \$40,000 worth of ore from it, but the company concluded that it would be good policy to sink a shaft to the present level and begin drifting toward the old and abandoned works, and this was done with the result of the present strike. The property is now owned by the Victoria Mining Company, which was incorporated last spring with H. C. Brooks, president; O. S. Avery, secretary, and E. W. Waybright, treasurer. The capital stock is \$500,000.

**Catalpa-Crescent Mining Company.**—A new lease on a portion of the south end of this property has just been granted to the Pocahontas company, and a drift is at once to be driven from the Pocahontas shaft to the Crescent ground for the purpose of opening up some of the large ore bodies known to exist at that point. Ore shipments from the Catalpa-Crescent properties are entirely up to the average, both of silver and iron ores.

**Crown Point.**—The Carson-Blow lease on the Crown Point has at last succeeded in opening up their ore body from the south side and are now almost ready to again begin shipping from that shoot. The iron ore opened up while performing this dead work has entirely disappeared, but will be investigated again in the near future.

**Forest Rose Mining Company.**—This old and valuable mine has just been leased to several well-known local parties and a new plant of machinery is to be put in place at once. It is expected that some difficulty will at first be encountered from the large influx of water, but adequate preparations will be made for this at the beginning.

**Little Joe Mining Company.**—A big strike has just been made at the Little Joe mine in the Twin Lakes district. In sinking the shaft to penetrate the wash and explore the contact a fine body of gold ore was opened up, which is now nearly 4 ft. across. Lumber is being packed to the spot and ore bins erected, in order to begin shipping at the earliest opportunity.

**Midnight Mining Company.**—The Midnight shaft has now been entirely drained of water and development work is to be resumed at once. What this work will consist of is not as yet known, but it is asserted that a new drift is to be run to the southwest in order to catch a continuation of the ore chute

formerly opened up in this property, on its dip. In order to do this, however, the shaft will first have to be sunk to a considerable depth below its present point, and thus allow the drift to strike the chute at a much greater depth than formerly.

**Silver Cord Combination.**—The mill at this property is treating an average of 80 to 100 tons daily of very good milling ore and this amount is to be increased in the near future, to 150 tons. This is mined chiefly from Ottawa and A. P. Willard's claims, none of this class of ore being produced at present from the Silver Cord ground. In addition to this some 100 tons per day of carbonate ore are being mined and shipped to home smelters, this being produced entirely from the Cord ground. The new concentrating mill is running in first-class order, all the product therefrom being shipped directly to Denver.

**Valley Mining Company.**—The new incline started from the bottom of the Valley shaft has just succeeded in opening up the famous Forest Rose ore shoot at its lowest point, thus obtaining a large area of stoping ground. Several thousands of feet of good ore are now blocked out and held in reserve, until the ore bins are closed in for the winter, which will be completed in a few days. Four large bodies of ore are now in sight in this property, one of very high grade, 5 ft. in thickness, consisting of sand carbonates, having at yet been left entirely undeveloped.

IDAHO.

Boise County.

**Boise Iron and Reduction Works.**—This company is erecting a stamp mill in connection with its reduction plant.

**Golden Chariot.**—A one-fourth interest in this mine has been sold, price not stated. The owners are now erecting a 5-stamp mill.

**Muddy Group.**—The tunnel is now in 882 ft. and progressing at the rate of 6 ft. per day.

Lemhi County.

**Dickens-Custer.**—This mill and the Fourth of July mill have commenced work, the former working on Rawhide ore.

**Italian Mining Company.**—The mine is now supplying ore to the Brigham and Haidee mills. The tunnel is in 200 ft. with a crosscut 120 ft. on the vein. Forty feet from the tunnel the vein is 5 ft. wide. At 50 ft. further a spur was cut which is now being stoped.

Owyhee County.

**De Lamar Mining Company, Limited.**—The following is the cabled return for the month of August: Crushed during the month, 2,300 tons; bullion, produced in the mill, \$61,300; estimated value of ore shipped to smelters, \$15,300; miscellaneous revenue, \$440; total produce, \$77,040; total expenses (including \$1,000 cost of boring for water), \$37,950; estimated profit, \$39,090.

**Garfield.**—The crosscut tunnel to cut the ledge is now in 1,300 ft. The mine is owned by J. M. Burke.

**Phillips & Sullivan Mining Company.**—In the Belfast tunnel the vein has been cut about 300 ft. south of the ore shoot on the upper level and at a much greater depth. The ore here is said to be showing up rich. Messrs. Phillips & Sullivan are now hauling ore from the upper working to the Silver City reduction works for treatment. The Ontario, in the neighborhood, is under development at two points. At the Discovery a cut has reached the depth of 30 ft., out of which considerable ore has been taken, some boulders of which show free gold. The vein is so badly broken up that its width cannot be ascertained, but the indications are that it is large.

**Sunlight.**—The tunnel is now in nearly 200 ft. It is expected to cut the vein shortly.

Shoshone County.

**Bunker Hill & Sullivan Mining Company.**—This company is rapidly increasing its force, from six to a dozen men have been daily engaged during the week, and large additions will be made to the number of employes as soon as the machinery of the new mill is in perfect running order. It is now working to one-half its capacity and it will take probably two weeks to complete the alterations, in which time it is expected the full capacity of the plant will be utilized. In the Clement tunnel work is being pushed as rapidly as possible by hand work. Two shifts are now employed, and as soon as the air compressor plant is in place the extension of the tunnel will be let by contract. There are at present 300 men on the pay roll.

**Nellie.**—This mine is now producing 17 tons, averaging 60 oz. of silver, per day. The Mineral Point adjoining it is being rapidly developed.

KANSAS.

Cherokee County.

During the week ending September 17th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,470,330; rough ore, pounds sold, 2,276,570; zinc ore, pounds sold, 857,010; lead ore, pounds sold, 208,880. Sales aggregated a total value of \$14,530.

MICHIGAN.

Copper.

The following rosy report is from the Boston News Bureau telegram dated 22d of September:

**Boston.**—Centennial shaft No. 3 was yesterday reported down 3,100 ft. on the Calumet vein and sink-

ing about 85 ft. per month. It may be well to state here that Calumet No. 5 shaft, the most northern shaft of the Calumet & Hecla mine, went down on the same incline 3,000 ft. before it found copper ground, and it is now down 4,200 ft. in very rich rock. The bottom of the Centennial shaft is now about due east from No. 2 Tamarack, Jr., shaft, and No. 4 Tamarack shaft. The latter is expected to strike the Calumet lode in 1894, 4,400 ft. below the surface, and on the dip of the vein, not far from where No. 5 shaft Calumet would reach if continued. Nos. 3 and 4 Tamarack shafts are in line due north from the Whiting shaft of Calumet & Hecla, No. 4 shaft of Tamarack being just one-half mile from it; and if No. 4 shaft finds the lode rich the northeasterly boundary of the richness of the Calumet vein may be located between it and the Centennial somewhere on the ground of Tamarack, Jr. Tamarack, Jr., owns three 40-acre sections lying just midway between Tamarack No. 4 shaft and the ground about the bottom of the Centennial shaft. No. 1 shaft of Tamarack, Jr., went down in the southern 40-acre tract 2,450 ft. and found the Calumet vein with paying ground, but not so wide as further south in the Calumet and Tamarack mines. It is, however, taking some very rich copper rock from this southern 40-acre section. At exactly the same depth in the corresponding 40-acre section a mile away, the Tamarack has stoped 25 acres of ground and paid therefrom \$3,000,000 in dividends. The edge of Calumet richness is probably in the second 40 acres of Tamarack, Jr., where its No. 2 shaft, at a vertical depth of 3,000 ft., finds copper ground from a few inches to 18 in. in width. If it is found 36 in. in width it will pay to stope. If the third 40-acre section of Tamarack, Jr., is worthless, so also are the three most westerly 40-acre sections of the Calumet & Hecla ground, which carry the same vein at greater depth, and worthless also is the Calumet & Hecla vein in the square mile of ground above, which constitutes the Centennial. Centennial's hopes, therefore, lay in the Osceola vein which is 700 ft. only under the Calumet vein, is opening very handsomely in the Osceola mine, 2½ miles away, and has been proved from the upright shafts of Tamarack to be even a little better under the rich Calumet shoots, but a little over a mile away from the Centennial. Present advices are that Centennial has opened up some good copper ground on this Osceola lode.

**Agate Harbor Mining Company.**—Operations will now be resumed at this property, says the Torch Lake "Times." This mine is now owned by capitalists in France, and during the past two and a half years considerable exploratory work has been carried on. Two conglomerate and two amygdaloid belts have been uncovered. From one of the amygdaloids, which was cut at a depth of about 73 ft., a drift has been run north 250 ft. to the ashbed, where there is a rich show of copper.

**Allenez Mining Company.**—The diamond drill hole is down 440 ft. from the surface, and about 410 ft. in the rock, and must be nearing the Calumet conglomerate. The pit on the Pewabic lode is being extended toward the foot wall. The lode shows a little copper.

**Atlantic Mining Company.**—The strike of the trammers is at an end. The miners were not in sympathy with them and refused to go out.

**Centennial Mining Company.**—The two shafts on the Osceola amygdaloid lode have been unwatered down to the 2d level, says the Portage Lake "Mining Gazette." No. 1 shaft on this lode is down about 200 ft. and No. 2 shaft is down about 500 ft. The 1st level drift north of No. 1 shaft is being opened out. The lode appears to be quite wide. Blasts at this point showed considerable barrel and stamp copper. The engine and drum for hoisting from this shaft are in place and the shaft house is well under way and regular hoisting will be carried on shortly. No. 3 shaft is still being sunk.

**Franklin Mining Company.**—This company has purchased the Ingersoll-Sergeant compressor of the Peninsula mine. This greatly increases the Franklin's facilities for breaking ground. Drifts in the north part of the mine are showing up well and they promise a longer lease of life to the mine than has been generally supposed that it had, says the Calumet "Conglomerate." Last month's product was 191 tons and 25 lbs.

**Tamarack, Jr., Mining Company.**—No. 1 shaft is opening up satisfactorily. No. 2 has developed an 8-ft. lode practically valueless. The openings in this latter are 200 ft. in.

**Wolverine Mining Company.**—The 6th level drift, going south of No. 2 shaft, which has been poor heretofore, is now in a good lode, showing strong copper and promises to furnish good stoping ground. No. 3 shaft in sinking for the last few cuts has shown up a good lode which promises a good stope at that point. A strike of moss copper is reported and good barrel ore is coming from the new openings.

Gold.

**Ropes Mining Company.**—This company reports good bodies of ore and that the plates are catching more than the usual quantity of gold.

Iron—Gogebie Range.

**North Pabst Iron Company.**—Operations will shortly commence at this mine, says the Norway "Current." Since the explosion that occurred at this mine last winter, nothing has been done.

Iron—Marquette Range.

**Champion Iron Company.**—About 50 miners are

now at work sinking shafts 5, 6 and 7. Shipping of ore continues.

#### Iron—Menominee Range.

**Mastodon Iron Company.**—About 7,000 tons have been shipped and there are 10,000 tons more in stock. The daily product, when there is no sand to contend with, is about 300 tons. The work of exploring from surface with a diamond drill has been suspended, and some work will now be done with the drill from points underground. The company also has some other mineral lands, adjoining, which will be systematically explored.

**Mastodon.**—No shipment is being made from this mine. The company sold and have shipped 7,000 tons and are negotiating for the disposal of another lot. At present operations are confined to mining and stocking the ore. A diamond drill is in operation at the east side of the mine. A hole is in 160 ft. east, at an angle of 65°. The present output is about 60 tons a day.

#### MINNESOTA.

##### Iron—Mesaba Range.

**Lone Jack Iron Company.**—This company has acquired control of some new property, it having been assigned by Alfred Merritt et. al. to N. D. Moore, of Virginia, and J. Foley, of Michigan, who immediately transferred the lease to the company. Fifty thousand tons must be mined annually and the royalty is 50 cts. per ton.

According to the Vermillion "Iron Journal" a rich find of ore has been made on this range near the Diamond property.

##### Iron—Vermillion Range.

**Washington Iron Company.**—Work is to be suspended on this company's lands in section 19. The company has 9 pits in excellent ore and there is no need at present of exploration work.

#### MISSOURI.

##### Jasper County.

(From our Special Correspondent.)

##### Joplin, Sept. 19.

The mines of the lead and zinc belt made their usual large output during the past week. The sales of ore were not up to the average owing to the dormant tendency of the market; large operators are holding their output for better prices. Zinc ore sold at an average of \$23 per ton and lead at \$23 per thousand. Following are the sales of ore from the different camps: Joplin mines, 1,805,430 lbs. zinc ore and 208,250 lbs. lead; value, \$25,102.20. Webb City mines, 384,920 lbs. zinc ore and 46,670 lbs. lead; value, \$8,966.75. Cartersville mines, 1,416,560 lbs. zinc ore and 125,800 lbs. lead; value, \$19,120.95. Zincite mines, 132,480 lbs. zinc ore and 3,860 lbs. lead; value, \$1,612.30. Oronogo mine, 69,970 lbs. lead; value, \$1,574.35. Abila mines, 85,430 lbs. zinc ore; value, \$982.45. Carthage mines, 103,100 lbs. zinc ore; value, \$1,288. Burch Center mines, 37,090 lbs. zinc ore; value, \$408. Wentworth mines, 40,000 lbs. zinc ore; value, \$440. Galena, Kan., mines, 857,010 lbs. zinc ore, and 208,880 lbs. lead; value, \$14,530. District's total value, \$73,718.95. The Bell Boy mine on the Rex. M. & S. Co. land is practically shut down but Colonel Mather, the general manager, is building a concentrating plant. The frame work is all up and the jigs are being placed in position. The contract calls for the mill to be completed and in running order in 30 days. W. B. Jaffrey, M. E., who recently purchased the Mahaska mines for an English syndicate, is making surface improvements and erecting new machinery. The old Ruby mills, south of the city, are now in full running order and under the personal management of Mr. Higham, one of the owners, the mines are producing at the rate of 50 tons of high grade zinc ore per week; in the meantime Mr. Higham is continuing his exploration work, which has opened some very rich ore bodies. The new Wentworth mining district is rapidly gaining ground from week to week as the development work is advanced; several new strikes are reported. The Pittsburg Land and Mining Company, are now well into their ore body with their new shaft, and are now cleaning ore.

#### MONTANA.

##### Deer Lodge County.

**Butte, Anaconda & Pacific Railway Company.**—According to the Anaconda "Standard" Mr. Marcus Daly is the authority for stating that this railway will be started within the month. Quoting Mr. Daly, it says: "The first business will be the construction of the road between Butte and Anaconda. The work will be pushed with all possible speed and the track extended westward from Anaconda as rapidly as it can be laid. The preliminary surveys were all made some time ago. The road will take in Phillipsburg and Granite, and go down through the Bitter Root Valley to Missoula. That much is assured, and possibly the road may be extended northward from Missoula to make connection with the Great Northern. The Butte, Anaconda & Pacific railroad is an Anaconda enterprise, and will be built by the Anaconda company."

**Salt Hill Tunnel.**—The machinery at the Gold Coin has been taken to this tunnel and a shaft will be sunk.

##### Jefferson County.

**Keating.**—The shaft is now down 350 ft., the ore body averaging 3 ft. in width and going \$20 to the ton. The owners are erecting a cyanide plant to test the ore, which is a sulphide.

**Jubilee Placer Mining Company.**—This company is now using 400 miners' inches of water. In Keating Gulch a bed rock flume is being run, to cross cut the gulch in order to find the main channel.

**Elkborn Mining Company, Limited.**—The following is the cabled return for the month of August: Mill worked 30 days and crushed 1,076 tons; bullion produced in the mill, \$34,950; 373 tons of smelting ore sold, \$21,846; total produce, \$56,796; total expenses, \$24,443; estimated profit for the month, \$32,353. The directors have declared an interim dividend of 2 shillings per share, for the three months ending August 31st, 1892, and a bonus of sixpence per share.

#### Silver Bow County.

**Butte & Boston Mining Company.**—This company now has six calciners in operation, says the Butte "Inter-Mountain." The new smelter building is almost completed, and by next week several of the Bruckner furnaces now idle, will be running. In the rear of the crusher room large blacksmith and machine shops are under construction. Several very important additions to the works are contemplated in the near future. All the mines of the company that were working before the fire are now running with a full force, and about 450 tons of ore are being taken out daily and treated at the mill and smelter.

**Butte & Boston Mining Company.**—The Boston "Herald" in answer to a correspondent who wrote asking where the company got the money it was spending in improvements, says: "It gets it in part from the insurance from the works which were burned—\$60,000 more or less, and \$180,000 from the proceeds of \$19,000 shares of stock held by the Clarke estate. When the new bond proposition was brought forward the executors of the estate concluded that they could not subscribe for the bonds, and agreed to sell the stock at \$10 per share and take bonds at 80 per cent. when issued. A syndicate of 19 gentlemen took the stock, and the money was turned over to the Butte & Boston company, which will deliver the bonds when they can be legally delivered. If for any reason the bonds cannot be issued the company will be held for the debt. Meanwhile, the company is provided with ample funds to prosecute development underground and reconstruction above ground."

**Gem Mining Company.**—The hoisting works have been burned to the ground, destroying the whole works with the exception of the gallows frame, and disabling the boiler. The mine is fast filling up with water, but when everything is arranged work will be continued.

**Modoc.**—A strike of some importance is reported to have been made on this property, a vein of high grade ore, 2 ft. wide, being cut at a point 60 ft. in on the new tunnel.

**Virginus, Butte City.**—A cave occurred in the west workings of the Virginus mine, about 200 ft. from the shaft, September 3d. The mine is a fraction lying just west of the Parrot and is being operated under lease by D. Bricker. It is a copper-silver producer, and at the point where the cave took place the vein is 18 ft. in width. A large area of ground has been stoped out above the 200 ft. level and has not been filled in, which is supposed to have been the direct cause of the mishap. In a few days more, however, a raise would have been completed to the surface under the dump, from which an ample supply of filling would have been obtained. The cave extended to the surface and left a hole about 75 x 50 ft. in dimensions and about 15 ft. in depth in the bed of the creek, passing through Dublin gulch. Twenty-five men were working in the ground at the time the cave occurred, but all escaped without injury. Two houses in the vicinity have since fallen in.

#### Beaver Head County.

**Golden Leaf Mining Company.**—The 20-stamp mill is run continuously at present on ore from the Golden Leaf. The company is also taking some ore from the Excelsior mine.

**Polaris.**—The tunnel is now in 400 ft. and good headway is being made daily. A considerable quantity of rich ore is being taken from the old workings.

**Hecla Consolidated Mining Company.**—It has been definitely decided to close down the mines on October 1st until silver increases in value.

#### NEBRASKA.

##### Otoe County.

At Douglas parties are boring for coal and have struck a 12-in. vein of good coal at a depth of 40 ft.

#### NEVADA.

##### Storey County—Comstock Lode.

(From our Special Correspondent.)

As the flow of water in the Carson River is steadily increasing the idle mill ought to be soon able to start up again. Ore extractions and regular shipments will then commence and the Gold Hill mines, from which little information is to be gained, however, will ship the ore that has accumulated in the bins. The following is the weekly tabulated statement of ore extracted from Comstock mines and

milled, with the car and battery assays, bullion product, etc.

Mine.	Tons ore.	Cars sample assay.	Tons milled.	Av. battery assay.	Bullion product, week.	Bullion shipped.
Con., Cal. & Va.....	992	25.57	980	22.52	\$.....	55,301.62
Gould & Curry.....	138	28.98	122	19.53	.....	.....
Con. New York.....	.....	35.00	.....	.....	.....	.....
Occidental.....	175	.....	175	19.10	.....	.....
Potosi.....	339	26.56	340	30.90	.....	2,923 lbs
Savage.....	643	26.51	515	23.30	8,888.95	.....
*Yellow Jacket.....	.....	.....	.....	.....	.....	.....

<sup>1</sup> Cars. <sup>2</sup> Crude Bullion. <sup>3</sup> Received in San Francisco bullion valued at \$11,000. \* No report.

**Hale & Norcross Silver Mining Company.**—The directors of the company have been invited to a conference with the directors of the Savage company for the purpose of trying to arrive at some conclusion relative to working both mines through the one shaft. The north drift, 1,800 level, has reached the Savage line, and everything is ready for cross-cutting which will be begun almost immediately.

**Kentuck Consolidated Mining Company.**—The top of the raise, 160 level, shows a streak of pay ore about 3 ft. wide, and assaying \$15 to \$30 per ton.

**Potosi Silver Mining Company.**—The official returns of the ore worked into the bullion produced during the month of August is of interest. The following statement shows the tonnage worked, and the reduction in expenses, etc.: Tons of ore, 1,444; gross proceeds in bullion, \$33,988.32; cost of reduction, \$8,664; net proceeds in bullion, \$25,324.32; assay value per ton, \$24.08; yield per ton, \$16.23.

**Savage Mining Company.**—The following statement of ore worked and the bullion product during the month of August has been placed on file in the local office: Tons of ore, 1,800; bullion product, \$32,062.74; discount on bullion, \$8,767.08; net cash received \$23,295.66; average car assay sample, \$25.33; average battery assay, \$22.18, per cent. battery assay saved \$80.25.

#### White Pine County.

(From our Special Correspondent.)

The gold placers at Osceola are yielding well at present. A nugget that was found this week weighed, with a small quantity of quartz attached, 35 oz., and is valued at \$550. On account of the lack of water, operations are being carried on under difficulties, and but for this drawback the placers, it is claimed, would make a rich return.

#### OHIO.

##### Muskingum Co.

The State geologists of Ohio have been busy this summer mapping the Upper Freeport (No. 7) coal field. The work has again commenced at Zanesville and is being carried to the northwest in Columbiana and Mahoning counties.

#### PENNSYLVANIA.

##### Anthracite Coal.

**Middle Creek Colliery.**—Extensive improvements are being made at this colliery, the least of which is not the new tunnel being driven in the slope, from the Primrose vein to the Orchard vein, and possibly to the Diamond vein. The work was begun on the 17th of August, and with two shifts of men the work is being rapidly pushed to completion.

#### SOUTH DAKOTA.

##### Lawrence County.

**Deadwood Terra Mining Company.**—The 600-ft level of the Caledonia mine is now being opened up on a large scale, says the Deadwood "Daily Pioneer." Many important improvements have recently been made in this mine, and its monthly output has lately been increased by several thousand dollars.

**Seabury-Calkins Mining Company.**—This company shipped 35 tons of ore to the Deadwood and Delaware Smelter, and after paying \$11 per ton smelter charges, had a balance of \$1,125. The company has been expending about \$800 a month for labor and transportation for the past four months.

**Hippopotamus Lode.**—A large body has been discovered, says the Black Hill "Times." It contains both gold and silver and 2% of lead.

**Gold Mountain.**—100 tons are now on the dumps awaiting shipment to the Deadwood and Delaware Smelter. The mine is owned by Russel & Higby.

**Swan.**—A large body of decomposed ore has been discovered in this mine.

**Tbos. H. White** has purchased for \$5,000 James Cox's one half interest in seven claims adjoining the Horseshoe group on Terry's Peak. These claims will be added to the Horseshoe group of twenty-nine claims. Mr. White informs us, says the Deadwood "Daily Pioneer," that a chlorination plant of 100 tons capacity will be erected in Deadwood, work to begin this year.

#### UTAH.

##### Juab County.

**Eagle.**—The body of ore recently discovered in this mine continues to show well, say the Salt Lake "Tribune." It was uncovered at a depth of 250 ft. A shipment will soon be made.



**Keystone Mining Company.**—The machinery for the new hoist is now being put up in place. A small force is employed in the mine, but no shipments are being made. The same is true of the Eureka Hill mine.

**Manhattan.**—At this mine three shifts are employed on the shaft, which is now down 150 ft. with iron and mineralized lime at the bottom.

**Retribution.**—This mine is on the Keystone lode. The tunnel is in 320 ft., and has cut several small stringers of ore, and one well defined ledge carrying low grade ore. As it dips to the east a shaft has been started near the mouth of the tunnel, which, it is claimed, will cut the vein at a depth of 200 ft.

**Piute County.**

**Deseret Mining Company.**—The tunnel has been advanced 15 ft. during the last week, and the face is now in ore. A shaft is being sunk from the lower tunnel. A contract has been let to sink a shaft on the Lucky Morrish, one of the group owned by this company.

**Mountain Queen.**—This mine is now bonded to Denver parties. Recently a 6 in. vein was cut, samples from which ran \$23 in silver and \$494 in gold.

**Salt Lake County.**

**Bi-metallic.**—The tunnel is in 40 ft. and it looks as though the ore body was near.

**Blair Mining Company.**—A late strike in the Blair mine discloses a 3 ft. vein. An average of the entire vein shows 352 oz. silver, 15% copper and \$16 gold. The shaft is now down 130 ft. The company has 12 men at work and are running three eight-hour shifts. The high grade ore is being sacked as it comes from the mine, preparatory to shipment. There are 500 tons of \$30 ore on the dump, it is claimed.

**Emma Company, Limited.**—The water has been considerably lowered and it is now being pumped out at the rate of 20 ft. per day.

**Peruvian Mining Company.**—It is reported that the lower workings are within 70 ft. of the vein. In the upper workings there is a large amount of low grade ore, none of which will pay to ship. The lower tunnel will tap the vein at a depth of 500 ft.

**Sampson.**—Over 300 tons of ore were shipped during August. The ore carries a high percentage of lead.

**Summit County.**

**Lucky Bill Mining Company.**—The reported strike of rich ore at this mine is denied by those in authority. Several bunches of good ore were encountered, but nothing like a chute of ore. The company is now contemplating putting in a steam hoisting plant, as the depth from which hoisting is being done, 335 ft., makes a whim almost as slow as a windlass.

**Morning Star.**—Sinking is again being done on this property and the shaft will be sunk 250 ft. before drifting.

The Deer Valley group of mining claims, eight in number, lying east of the Ontario mill, has been leased for a period of 18 months. A bond has been given on the same in the sum of \$50,000 to 10 men, all Ontario miners.

**Weber County.**

**La Plata.**—The water has been taken out of the La Plata shaft and the present force will be increased as soon as drifting is commenced. Ore will soon be shipped. Messrs. Thackwell and Fessenton, the lessees of the Red Jacket, are working two shifts and are taking out ore. They have several tons of ore on the dump and will be shipping soon.

**WASHINGTON.**

**Stevens County.**

**Al-Ki Mining Company.**—A contract has been let to run a 100-ft. tunnel on the Galena mine, belonging to this company.

**Young America.**—About 15 men are employed at the Bonanza and the ore is taken to the concentrator at the Young America mine. The shaft is down some 60 ft. A strike of gray carbonates and galena has just been made that is believed will assay high. It is the intention to continue sinking on the main shaft, also to drift on the ledge. The concentrates run 20 oz. in silver and 60% lead. Two shifts of men are working on the Young America, that is turning out from 50 to 60 tons daily. Five tons of concentrates are turned out every day, running 75 oz. in silver and 50% lead. A contract has been made with Fraser & Chalmers for the enlargement of the concentrator.

**WEST VIRGINIA.**

The Flat Top Coal and Coke Association held an important meeting September 14th, at Graham, Va. The business discussed was relative to the output of coal and coke for the ensuing year.

**WYOMING.**

**Fremont County.**

**Chicago.**—The Salt Lake "Tribune" is the authority for the statement that the Tabor Investment Company, of Denver, have offered John Herman, the discoverer of the new camp on the east fork of the Medicine Bow River \$80,000 for a controlling interest in the Chicago claim.

**FOREIGN MINING NEWS.**

**MEXICO,**

**Chihuahua.**

**Batopilas Mining Company.**—We are informed by a gentleman who has lately returned from Batopilas—town and mining district—situated in the Sierra Madre Range, Chihuahua, and who was largely interested in the old mines of "Todas Santos" and "Arbetrias," that they have been abandoned, and that the appurtenances thereof are now controlled by the American mining companies of which Alexander R. Shepard, ex-Governor of the District of Columbia, is the general manager.

**San Carlos and Sierra Rica Districts.**—The argentiniferous group of El Purissima, of San Carlos, near the Coahuila line, on the Rio Grande, and of the Sierra Rica and Aguilar silver mines, about 56 miles down that river, which has been variously and spasmodically worked for the past 70 years, with many vicissitudes from renegados, revolutionists and Apaches, have been abandoned.

**TASMANIA.**

**Mount Bishoff Tin Mining Company.**—The thirty-eighth annual meeting of the stockholders of this company was held July 29th. The directors' report showed a profit for the half year of £40,091 12s. 6d., which, added to the previous balance, makes a total of £75,982 18s. Of this sum £36,000 were paid in dividends, £1,350 in payment of royalty, and £32 2s. for interest, leaving a net balance of £38,600 17s. £4,035 9s. were spent in buying new material. According to the report of the superintendent of the mine there was mined during the six months ending July 1st, 1892, 1,100 tons 3 cwt. of ore, making, since the formation of the company, a total of 39,388 tons 13 cwt. of ore mined. There was treated at the smelter a total of 2,257 tons of ore, which yielded 1,421 tons 1 cwt. of tin. Of this quantity, 1,125 tons 16 cwt. of ore, producing 772 tons 17 cwt. of tin, were custom ores. The refined tin analyzed 99.88%.

**VENEZUELA.**

**El Callao.**—During August the mills only worked sixteen days. 1,851 ounces of gold were obtained.

**CHEMICALS AND MINERALS.**

**NEW YORK, Friday Evening, Sept. 23.**

**Heavy Chemicals.**—The market for bleaching powder has now settled down and there is no excitement; but the price which was raised so abnormally remains at a minimum of 4½ cents and probably will do so for many months. The trade in bleaching powder is altogether on contract and no buying from England is done on speculation. Consequently the stocks here are always small and were quite insufficient to meet the sudden demand that came from the druggists on the commencement of the cholera scare. All available supplies were snapped up at absurd prices by the druggists and now there is no more to be bought.

There has been such a great demand on the manufacturers in England that the price has gone up all round, and the rise in New York prices is not due so much to local demand as to English and especially Continental demand. Probably the price, which was 2½c. a month ago, will not be less than 4½c. for months to come.

Of carbonate soda ash there is practically no stock, and business consists of forward contracts over the remainder of the year at 1.57½@1.60c. for 48% best. Alkali is in the same position, and prices are 1.75c. for 48% and 1.85c. for 58%. The stocks of caustic soda are getting low.

Our quotations are this week as follows: Caustic soda, 60%, 3.17½@3.20c.; 70%, 2.95@3.12½c.; 74%, 2.97½@3.12½c.; 76%, 3.12½@3.25c.; 77%, 3.12½@3.25c. Carbonated soda ash, 48%, 1.57½@1.60c.; 58%, 1.47½@1.52½c. Alkali, 48%, 1.75@1.85c.; 58%, 1.65@1.75c. Sal soda, English, 1.07½@1.15c.; American, 1.05@1.10c. Bleaching powder, 4½c. minimum.

**Acids.**—There is nothing novel to be reported in the acid market. For many months the market has been a very even one and there is nothing to cause a fluctuation in prices. Our quotations are: 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 \$3.50@3.75; alum, lump or ground, \$1.70@2. Glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

**Brimstone.**—The market for brimstone is dull and quiet. As there is a fair supply in hand at present, the dealers do not anticipate any trouble on account of delayed shipments. Quotations this week are as follows: Best unmined seconds to arrive near due, \$24.50; future shipments, \$24 for best unmined seconds; thirds are held at 75c.@\$1 less.

**Fertilizing Chemicals.**—The state of the market for fertilizing chemicals is much the same as last week. There is some delay in deliveries owing to the detention of vessels at quarantine, but now that the state of things with respect to the cholera has so much improved there are no fears for the future. For some time the shipments will be all from a few days to a week or more delayed, and the stocks will be an absolute certainty as to future arrivals, so that no anxiety will be necessary. Prices will tend to firmness for some time. The demand for sulphate of ammonia is very good. Prices

for fertilizers are as follows: Sulphate of ammonia, \$2.87½@2.95 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$2@2.05 per unit for high grade and \$2 for low grade; acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$23@23.50. Azotine, \$2. Tankage, \$18@22, according to grade. Bone tankage, \$22.50 @ \$23.50; bone meal, \$23.50@25.50. The demand for double manure salts is good and the prices are stiff. The market for Kainit is fair and prices remain at \$8.75 for invoice weight and \$9 for actual weight. Muriate of potash is steady and there are plenty of forward sales; prices are: for 50 ton lots or over, New York or Boston \$1.81½; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86½. The high price of nitrate of soda is keeping buyers away and trade is not very brisk: the price is \$1.95 to \$2 on spot, and \$1.75 to \$1.97½ to arrive, according to quality.

**Liverpool.**

Sept. 14.

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

The excitement in Bleaching Powder has died away to a large extent and taking our market all round, trade is quiet this week. Soda Ash is scarce and nominal quotations are as follows: Caustic Ash, 48%, £5 6s. 3d. per ton and upward; 57@58%, £6 7s. 6d. per ton and upward; Carb. Ash, 48%, £5 9s. 9d. per ton and upward; 58%, £6 12s. 9d. per ton and upward; Ammonia Ash, 58%, £6 7s. 6d. per ton, all net cash. Soda Crystals are without special feature and quoted at £3 7s. 6d. to \$3 10s. per ton less 5%. Caustic Soda is receiving very little attention from buyers, but quotations remain unchanged as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s. to £12 10s. per ton, all net cash. For parcels under 10 tons 5% extra is charged. The "Union" will not set on this market for export to United States or Canada.

The rush into bleaching powder is over for the present, and prices have eased off from the top. The Union is fully sold for the month, and quotes £9 5s. for October. On the spot resale parcels are offered at £9 10s.@£9 15s., but buyers are pretty well filled up, and it is difficult to get orders. Nothing is available here at present for export to United States or Canada. Chlorate of potash is also less active, but there is not much offering by resellers, and 7½s. to 7¾s. are nearest values for September and October, and 7s. to 7¾s. for November and December. For all 1893 business is reported at 6½d. Bicarb. soda is firm at £3 15s. per ton, less 2% for one cwt. kegs, with usual allowance for larger packages. Sulphate of ammonia is rather steadier at £10 2s. 6d. per ton for good gray 24% and £10 5s. for 25%, both in double bags less 2½% f. o. b. here.

**MINING STOCKS.**

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 310 and 312.]

**NEW YORK, Friday Evening, Sept. 23, 1892.**

At last we are able to depart from our usual formula of words with which we have commenced this report for many months. We can no longer say that the market is flat and uninteresting, for the whole group of Comstocks are beginning to show a revival of life. There has been more activity and interest in the Comstock shares during the past week than there has been for six months past, and some stocks that are not heard much of have made their re-appearance in the list of sales. Phoenix of Arizona has been dealt in largely, this movement having been caused by the company setting up new and improved machinery.

In the Comstock group the greatest show has been made by the Comstock Tunnel, of whose shares 8,400 have been sold at 12c., 13c., 14c. and 15c., and finally closing at 15c. Sales have also been made of Comstock Tunnel bonds to the extent of 1,000 at 17c. and 1,000 at 18c. Of Consolidated California & Virginia 700 shares were sold at \$3.40, \$3.60, \$3.70, \$3.90 and \$4.00. Only 200 shares of Hale & Norcross were sold and those at \$2.20 and \$2.40. Of Sierra Nevada 100 shares at \$2.40 and of East Sierra Nevada, 300 at 40c. Of Bullion 100 have been sold at 65c. Of Mexican 100 at \$1.75, 100 at \$1.60, 100 at \$2.10 and 200 at \$1.90. Of Yellow Jacket, 100 were sold at 80c., 200 at 90c., 200 at \$1, 100 at \$1.10 and 100 at \$1.30. Of Ophir, 100 were sold at \$2.65 and 100 at \$3.25. Of Crown Point, 100 were sold at \$1.20 and 100 at \$1.30. Other stocks of the Comstock group figuring in the sales list this week are: Excbequer, 500 at 30c.; Utah, 100 at \$1.05, and Gould & Curry, 100 at \$1.65 and 100 at \$1.25.

A bullion shipment valued at \$11,000 has been received by the Potosi Mining Company. The August productions of the Savage mine was \$32,062 gross, of which \$8,592 was gold and \$23,295 was silver; 100 shares have been sold at \$1.30. Little has been done in the Tuscarora group and the only transaction recorded is a sale of 800 of Consolidated Imperial at 12c.

In California stocks Brunswick Consolidated comes well to the front with sales of 3,300 shares at 9c. Belmont comes next, with 800 at 37@38c. Of Bulwer Consolidated 500 were sold at 35c., and of Bodie Consolidated 200 were sold at 35c., 200 at 45c., and 200 at 50c. A single transaction in Hollywood of 100 shares at 1c. is recorded, and one of Standard Consolidated of 150 shares at \$1.50.

Black Hills' stocks do not figure very prominently this week. Besides a sale of 200 of Father de Smet at 30c. nothing is recorded except the so-called sales of 100 Sullivans at \$1 and \$1 05 alternately.

Colorado stocks have also been quiet, the only

transactions being 200 of Leadville Consolidated at 19c, 150 of Small Hopes at 95c.@\$1, and 600 of Little Chief at 26c and 27c.

Among the stocks outside the Comstock, Phoenix of Arizona has created the most attention this week. No less than 9,300 shares have been sold at prices varying from 50c. to 59c. and ending at 57c.

There were sales of 600 of Alice at 60c.; 500 shares of El Christo were sold at 36c., 50 at 25c. and 400 at 40c. No sales are reported in Horn Silver, as the transfer books have been closed during the preparation of the quarterly statement. A quarterly dividend of 12½ cents per share is announced, payable on Sept. 30. So far \$4,600,000 has been paid in dividends.

The Daly Mining Company, Utah, have declared the regular monthly dividend (No. 67) of 25 cents per share, making a total distribution of \$2,550,000 to date in dividends.

**Boston.** Sept. 22.

(From our Special Correspondent.)

There is no improvement to note in the condition of the market for copper stocks the past week—in fact prices continue steadily to decline owing to the weakness of ingot copper, which at its present price affords only a small margin of profit to even the largest producers, while the small companies are unable to pay more than their current expenses.

The Montana stocks are the only ones which show any degree of activity, and this is purely speculative, and prices are gradually seeking a lower level.

Boston & Montana was forced down to \$30 on persistent selling, rallying only a ¼ from that price. This is the lowest price for the year so far, and if memory serves, the lowest since April, 1889.

Butte & Boston also declined from \$8 to \$7½, but recovered and held quite firm at \$8.

Calumet & Hecla sold off \$3 to \$2.78, with a very limited demand.

Tamarack touched \$147 at one time this week, but rallied to \$150 later on. Both of these stocks are dealt in only in a small way, and mostly for investment.

Osceola declined to \$29½, with a rally to \$29½; the Opechee double skip shaft is now in operation, and will increase the amount of rock hoisted. Tamarack, Jr., continues to decline, and the reports from the mine are not of an encouraging nature. No. 2 shaft has been closed, as there was no copper in it. The stock sold at \$19½, and any pressure to sell it would cause a very material decline.

Centennial sold at \$5½, same as last week. Present advices from the mine indicate that some good ground has been opened on the Osceola lead.

Franklin is steady at \$12½, to ¼, and Kearsage at 10½.

Atlantic sold at \$9½, same as last week, but there is hardly any trading in either of these stocks.

Allouez declined to 90c. It is stated that no copper was found on the Calumet vein when the drill struck the vein at 458 ft.

Arnold is quite firm at \$1½. Sales at this figure and the same price bid for it. This mine is thought to have a future if copper should advance to a figure which would pay to work it.

Santa Fe sold at 10c., which seems to be the price at which speculators are willing to purchase it.

3 P. M.—Boston & Montana sold at \$30½ this afternoon, closing at 30½, with a small lot at \$30. Kearsage declined to \$10 and Tamarack to \$19, rallying to \$19½ on last sale.

Napa Quicksilver declined to \$5½.

**San Francisco.** Sept. 16.

(From our Special Correspondent.)

Considering the set back the stock market has suffered for some time, the past week has been unusually lively. All along the line of the Comstock prices have strengthened, while the sales have been much larger. The work being done in the Sierra Nevada, Savage and Belcher mines is the ostensible reason given for the present advances in values, but past experience does not lead one to suppose that any work being done in the mines has any effect on the market, unless the guiding hands of astute manipulators lead the gambling public the way it is desired they should go.

To-day sales were livelier than at any other time during the week. Consolidated California & Virginia, albeit the company was behind last month, has advanced from \$3.30, the highest bid reached a week ago, to \$3.55, the ruling rate to-day. Mexican sold for \$1.65; Ophir for \$2.60; Scorpion for 15 cents; Sierra Nevada for \$2.10; Union Consolidated for \$1.55 and Utah Consolidated for 35 cents.

In the middle group of Comstocks Best & Belcher opened this morning at \$1.50, a 20 cent advance on the week's trading, and advanced during the day 20 cents per share. Chollar sold for 75 cents; Gould & Curry for \$1.20; Hale & Nordcross for \$2; Potosi for 80 cents and Savage for \$1.20, the last named ranging 35 cents higher than a week ago.

Of the Gold Mill and South End Comstock Belcher has almost entirely monopolized attention. In both boards to-day, regular sessions, over 8,000 shares changed hands at advancing prices until \$21 was reached. The water has been sufficiently drained off in the ore body, 400 level, to permit work to be resumed and the ore shows improvement. The remainder of these stocks on the list sold fairly well at slight advances without any particular attention, however, being concentrated on any one stock. Aita sold for 35 cents; Alpha for 20 cents; Bullion for 65 cents; Caledonia for 75 cents; Challenge for 45 cents; Consolidated Imperial for 5 cents; Confidence for \$2.30; Crown Point for 85c.; Justice for 20c.;

Kentuck for 15c.; Lady Washington for 10c.; Overman for 55c., and Yellow Jacket for 80c. The outside stocks continue to be sadly neglected, but with cause. Bodie Consolidated sold to-day for 35c.; Bulwer Consolidated for 30c., and Mono for 15c.

In the Tuscarora group Belle Isle has sold during the week for 5c.; Del Monte for 10c.; Grand Prize for 5c.; North Belle Isle for 5c.; North Commonwealth for 10c., and Nevada Queen for 15c., with nominal sales.

**MEETINGS.**

Eureka Consolidated Mining Company at the office of the company in San Francisco, Cal., October 17th, 1892, at 11 a. m. Transfer books close in San Francisco October 14th, in New York, October 10th.

**DIVIDENDS.**

Champion Mining Company, paid dividends No. 24 of ten cents per share, \$3,400, September 19th, at the office of the company, No. 320 Sansome street, San Francisco, Cal.

Daly Mining Company, dividend No. 67, of twenty-five cents per share, \$37,500, payable September 30th, at the office of Messrs. Lounsbury & Co., 15 Broad street, New York. Transfer books close September 24th and reopen October 1st.

Elkhorn Mining Company, dividend No. 10, of two shilling six pence per share, \$100,000 payable September 23d, at the office of the company in London, Eng.

Great Western Quicksilver Mining Company, dividend No. 27, of twenty-five cents per share, \$12,500, payable at once at the office of the company in San Francisco, Cal.

Ontario Silver Mining Company, dividend No. 196, of fifty cents per share, \$75,000, payable September 30th at the office of the company in San Francisco, Cal., or at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York. Transfer books close September 24th and re-open October 1st.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	D't'nt' in office.	Day of sale.	Amt per share.
Alpha, Nev...	9	Sept. 2	Oct. 6	Oct. 27	.10
Belle Isle, Nev....	15	Aug. 22	Sept. 26	Oct. 20	.10
Best & Belcher, Nev.	62	Aug. 17	Sept. 22	Oct. 13	.25
Bullion, Nev.....	39	.....	Sept. 2	Oct. 4	.25
Challenge Con., Nev.	12	Aug. 24	Sept. 27	Oct. 18	.10
Com'n we'lt'h Con., Nev.....	9	Sept. 7	Oct. 13	Nov. 9	.10
Confidence, Nev....	12	Aug. 13	Sept. 15	Oct. 6	.50
Crocker, Nev.....	12	.....	Sept. 2	Oct. 18	.05
Evening Star, Cal..	7	Aug. 19	Sept. 21	Oct. 8	.01
Del Monte, Nev....	6	.....	Aug. 26	Oct. 5	.10
Florida Hill Gravel, Idaho.....	4	July 27	Sept. 2	Sept. 28	.30
Gold'n Fleece Gravel, Cal.....	17	July 16	Aug. 24	Sept. 30	8.00
Gover, Cal.....	3	July 28	Sept. 1	Sept. 28	.10
Guanacuaru & California, Hon. C. A.	7	Aug. 9	Sept. 15	Oct. 8	1.50
Hale & Nordcross, Nev	102	Aug. 11	Sept. 15	Oct. 7	.50
Independence, Nev.	17	Aug. 15	Sept. 29	Oct. 13	.05
Keystone, Cal.....	3	Aug. 22	Sept. 26	Oct. 18	1.00
Mountain Tunnel Gravel, Cal.....	5	July 28	Sept. 5	Sept. 26	.07
Navajo, Nev.....	22	Aug. 17	Sept. 21	Oct. 14	.10
North Belle Isle, Nev	2	Sept. 1	Oct. 6	Nov. 7	.10
Northwestern, B. C.	5	Aug. 17	Sept. 24	Oct. 15	.20
Silver Hill, Nev....	31	Aug. 29	Sept. 6	Sept. 27	.05
Silver King, Ariz...	8	Aug. 26	Oct. 7	Nov. 4	.25
Teresa, Mex.....	8	July 19	Sept. 22	Oct. 8	.10
Yellow Jacket, Nev.	52	Sept. 5	Oct. 7	Nov. 10	.25

The total sales of Pipe line certificates at the Consolidated Stock Exchange for the week ending Sept. 23d amounted to 52,000 barrels.

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, Sept. 23. PRODUCTION OF BITUMINOUS COAL for week ending September 17th, and year from January 1st.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	1,623	60,224	128,590
Cumberland, Md.....	87,390	2,664,007	2,957,320
Barclay, Pa.....	807	38,083	132,298
Broad Top, Pa.....	12,170	409,994	351,760
Clearfield, Pa.....	78,534	2,796,321	2,961,595
Allegheny, Pa.....	27,714	907,126	917,145
Beach Creek, Pa.....	34,372	1,718,943	1,706,419
Pocahontas Flat Top.....	56,678	1,722,724	1,643,191
Kanawha, W. Va.....	54,277	1,724,202	1,666,870
Total.....	353,365	12,040,724	12,405,188

\* Week ending September 10th.

**WESTERN SHIPMENTS.**

	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	23,045	905,037	885,394
Westmoreland, Pa.....	37,580	1,201,426	1,417,142
Monongahela, Pa.....	17,995	457,287	433,706
Total.....	78,620	2,563,750	2,736,242
Grand total.....	431,985	14,604,474	15,141,430

Statement of shipments of anthracite coal (approximated) for week ending September 17th, 1892, compared with the corresponding period last year.

Regions.	Sept. 17, 1892.	Sept. 19, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	501,617	429,888	Inc. 71,729
Lehigh Region.....	152,393	131,485	Inc. 20,908
Schuylkill Region....	282,238	265,305	Inc. 16,933
Total.....	936,248	826,678	Inc. 109,570
Total for year to date	28,624,054	27,061,025	Inc. 1,563,029

Statement of shipments of anthracite coal for month of August, 1892, compared with the corresponding period last year:

Compiled from the returns furnished by the mine operators.

Regions.	August, 1892.	August, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	2,019,518.03	1,689,625.04	I. 349,892.19
Lehigh Region.....	592,891.12	509,640.17	I. 83,250.15
Schuylkill Region....	1,081,515.03	967,169.11	I. 114,345.12
Total.....	3,693,924.18	3,146,435.12	I. 547,489.06

Regions.	Year to date, 1892.	Year to date, 1891.	Difference.
Wyoming Region....	14,735,299.18	13,278,819.13	I. 1,456,480.05
Lehigh Region.....	3,974,421.05	3,982,850.02	D. 8,428.17
Schuylkill Region....	8,041,867.04	7,641,198.18	I. 400,668.06
Total.....	26,751,587.07	24,902,868.12	I. 1,848,719.14

The stock of coal on hand at tide-water shipping points August 31st, 1892, was 691,399 tons; on July 31st, 1892, 701,475 tons; decrease, 10,076 tons.

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending September 17th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 100,307 tons; year 3,817,634 tons; to corresponding date in 1891, 2,889,664 tons.

**Anthracite.**

The anthracite coal trade is not brisk. The amount of coal going off is not so great, as is usual at this time of year, and stocks are large at every point. It is usual at this time of year for large consumers to put in their stocks for winter. This year we hear it said all round that consumers are not doing this so largely as usual as they are not inclined to stock at the present price. They hope that the price will not go up, and then they can buy for their wants later on, or they intend if the price does go up to try the use of some other fuel. However this may be, it is certain that the trade is dull instead of being brisk, as is usual in the fall. We have heard also of many consumers trying hituminous and coke for household purposes. In the retailers' yards there is a good deal of activity and their stocks are getting visibly reduced. When they are obliged to buy again they will have to pay the high prices now ruling and then they will be quite unable to retail coal at \$5.75 a ton as at present. The majority of retailers in this district do not deal with more than 15,000 tons per annum, and their expenses in transferring the coal from Jersey City to their yards and then to consumers cannot possibly be less than \$1.70, when everything is taken into account, such as cartage, freight across the river, office and yard expenses, screening and loss. Then the cost of a ton of stove (2,240 lbs.) to the retailer would be \$4.75 + \$1.70, that is, \$6.45, and of a ton of 2,000 lbs. \$5.75. It will be seen, therefore, that at \$4.75 wholesale the retailer must charge more than \$5.75 for his coal. A dealer handling 15,000 tons per annum would consider that he must make a profit for himself of at least \$5,000 per annum; this would add 33 cents to each ton and make the selling price \$6.09 per ton. It is probable that this is the lowest that any retailer could sell at, for the cost per ton must be very much greater for the small coal dealers who handle less than 10,000 tons yearly. They are bound to charge more, and as their business is among the poorer class of people the poor will have as usual to pay the highest price. Three-quarters of the families in New York City buy their coal in quantities not greater than 1 cwt. at a time, and they will soon have to pay 40 cents per cwt.

On making inquiries we learn that Mr. McLeod is intending to put up the price of anthracite another 25 cents on the 1st October, and that he will make an advance of 50 cents if he is able. Many of them interested in the question are very much against the advance at all, but Mr. McLeod will persevere, and in all probability carry the day. We believe Mr. McLeod lives a day at a time and does not have any definite idea of the consequences of any of his steps. His sole idea is that prices must be put up, and he is quite content to deal with the results when they come without troubling about anticipating them.

President Roberts, of the Pennsylvania Railroad, returned to this country on Wednesday last after a somewhat prolonged visit to Europe. People in this city and Philadelphia have an idea that something is going to happen with regard to the presidency and management of this railroad now that Mr. Roberts has returned, owing to a possible difference

of opinion between him and the rest of the officials with regard to the attitude of the Pennsylvania Railroad on the anthracite question. Why this idea should have gained ground we do not know, for there is no reason why there should be a clash of opinion. Mr. Roberts has not been so far away from this country as to be out of touch with current events, and he knows that men like Mr. Frank Thomson are perfectly aware of the right interests of the railroad and of the method of sustaining them in the absence of his chief.

As will be seen by referring to the table at the head of this column, the shipments of anthracite during August were 3,693,924 tons as compared with 3,146,435 tons during the same month of 1891. The increase amounted to 347,489 tons, and of this the Wyoming region contributed 349,892 tons. The output agreed on was 3,000,000 tons, so that it appears as if the restriction is being very laxly adhered to. The producers in the Wyoming region are the worst offenders against the edict of the "deal." It may be noted here also that the coal shipments for last week on the Reading system was less than in the corresponding week last year, but this may be accounted for by the delay of shipments owing to the meeting of the Grand Army of the Republic at Washington.

All sorts of rumors about the Reading and its leases have been circulated lately, chiefly for stock exchange purposes. The most notable one is that which declares that as the Reading lease of the Jersey Central has been set aside, it is the intention of that road to lease the Reading. This, of course, is a fable, but it is amusing. The Attorney-General of New Jersey is engaged in preparing a suit to annul the charter of the Port Reading. He holds that the action of the Port Reading in leasing the Jersey Central and in making an arrangement with the Reading was in violation of its charter rights. The exact details of the case have not yet been made public.

The taking of testimony in the Arnot suit to annul the lease of the Lehigh Valley Railroad to the Reading is finished, and the case is now ready for argument. The Master has not yet fixed any date, but it is understood that the argument will be commenced September 30th. Two days will probably be required for the lawyers to review the case before it is submitted to the Master for his decision. At the meeting of the Master to hear testimony documents were submitted by the defendant showing that the lease of the Jersey Central to the Reading had been discontinued in accordance with the recent decision of Chancellor McGill, and that therefore the Reading is not operating the Lehigh & Susquehanna's Railroad Company's tracks controlled by the Jersey Central, which run parallel to those of the Lehigh Valley for some distance.

**Bituminous.**

The cessation of freight transport over the Baltimore & Ohio and the Pennsylvania railroads, owing to the Grand Army of the Republic encampment at Washington, is working to the disadvantage of the bituminous coal trade. Coal is exceedingly scarce in the face of a great demand. As an instance of the scarcity of coal we may mention that great difficulty is being experienced in getting proper supplies of coal for the great Atlantic liners. Everyone agrees in saying that the demand for bituminous is greater than it has been during many recent falls. The stoppage of freight transport on the railroads has, of course, made vessels plentiful and sea rates low. From Philadelphia to Boston, Salem and Portland, they are 55c., and to Sound ports 60c. From Baltimore, Newport News and Norfolk to Boston, Salem and Portland 60c. and 65c., and to Sound ports 70c. Many of the coal producers are so thoroughly disgusted with their treatment at the hands of the railroads that they are seriously casting round for some other means of transport, and probably we shall hear of something being done in this direction shortly.

**NOTES OF THE WEEK.**

The Pennsylvania Railroad Company has begun the construction of an immense new breaker and washery at William Penn, and also started on the new branch railroad that is to connect Shenandoah with all mining towns westward to Girardville, including William Penn.

The Cherry Run extension of the Western Maryland Railroad has been opened. This road is strictly a main line extension of the Western Maryland Railroad, from Williamsport, Md., to Cherry Run, which latter point is upon the main stem of the Baltimore & Ohio Railroad, 13 miles west of Martinsburg, and 65 miles east of Cumberland. By its construction, the route for the interchange of freight traffic, consisting largely of anthracite and bituminous coal, between the Baltimore & Ohio and Philadelphia & Reading systems through the Cumberland Valley, is shortened 41 miles.

**Boston.**

(From our Special Correspondent.)

There is not much activity in the anthracite coal market. Retail dealers are as a rule pretty well supplied with stock and have not sufficient yard room to purchase more. When there is, however, they buy, as they believe prices will be advanced again by the combination next month. Prices are firm on about all kinds of hard coal.

We quote f. o. b. prices at New York: Stove, \$4.75; egg, \$4.50; free broken, \$4.10; chestnut, \$4.65. Lykens Valley (at Philadelphia), broken, \$4.85; egg, \$5.45; stove, \$5.90; chestnut, \$5.00.

At shipping ports it is said that there is very lit-

tle, if any, soft coal in stock. The grain shipping season is now drawing on us and the roads will neglect coal. This, together with the cessation of shipments for two weeks, will tend to keep soft coal firm through this and next month. Dealers in this city look for an improvement in prices of from 10 to 20 cents in the next 10 days. The retail dealers here, and about everywhere else for that matter, have turned their attention in the past few months more to hard than to soft coal, as the former has been steadily advanced and they were anxious to get as much stock of anthracite as possible. Soft coal has consequently been neglected. Retail dealers will find in the course of the next few weeks that they want soft coal badly. Clearfield coal on cars here is worth \$3.05@3.10 per ton and George's Creek from \$3.40@3.45.

Freight rates are still low as but little coal is being transported and tonnage is plentiful. From New York, 45@50c.; from Philadelphia, 60@65c.; to Portland 60@65c.; to Bath 75@80c.; to Providence 60@65c.; from Baltimore, 65c.; Newport News 60@70c.; to Sound Points 65@70c.

In a retail way there is a fair business doing, it having improved considerably during the week.

Quotations at retail are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25; Lehigh furnace, \$6.25. Wharf prices 50 cents less than the foregoing.

The receipts of coal at this port for the week ending September 17th were 34,968 tons of anthracite and 14,512 tons of bituminous, against 50,399 tons of anthracite and 25,525 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,491,268 tons of anthracite and 568,633 tons of bituminous, against 1,445,215 tons of anthracite and 768,118 tons of bituminous for the same time last year.

**Buffalo.**

Sept. 22.

(From our own Correspondent.)

There are no special features in the anthracite coal trade to comment on since our last report. Prices unchanged, buyers take only for home consumption, and out-of-town orders are anything but plentiful. Supply more adequate to requirements than for some time. Freight may be said to have resumed normal conditions.

Bituminous coal in fair demand for all the uses it is put to. A large fall trade is expected, as it will doubtless, in some degree, take the place of anthracite through the high price of that article. Supply good, and about equal to the wants of consumers. Prices firm, with quotations nominally unchanged.

Coke fairly active and steady.

The great influence of the canals of New York State have had and now have on the prosperity of the State and particularly on New York, Buffalo and other cities along the line of the great inland water-way will be demonstrated at a mass meeting to be held in Buffalo on October 19th next at 11 o'clock a. m. All persons interested in the improvement and enlargement of these canals are invited to form an organization in the locality and be represented. It has been demonstrated for years that but for the influence of the canals in keeping freight rates down to a reasonable limit, the cost of rail transportation would be burdensome and greatly enhance the cost of material, food, etc., to the consumer. To allow the canals to fall into decay would be disastrous to every interest in New York State, to say nothing of the Western producer.

During the year ending June 30th, 1892, the New York Central Railroad carried 5,258,401 tons of coal; in 1891, for corresponding period, 4,681,475 tons.

The Canadian Government will endeavor to have the work of its new Sault Ste. Marie Canal hurried to completion by July 1st, 1893; 18 months ahead of the time specified in the contract.

Lake freights on coal firm excepting drop of 10 cents Duluth and Superior for a few days, but the loss was recovered yesterday, with increased demand; supply better than for some weeks, but yet inadequate for vessel requirements. The movement of coal by lake to Western ports from September 14 to 20, both days inclusive, aggregated 97,180 net tons distributed about as follows: 46,430 to Chicago, 20,900 to Milwaukee, 15,940 to Duluth, 3,900 to Superior, 300 to Menominee, 600 to Mackinaw Island, 6,310 to Toledo, 1,575 to Bay City, 1 125 to Green Bay and 100 to Alpena. Rates of freight were 55c. to Chicago, Milwaukee and Green Bay; 70c. to Ignace and Mackinaw Island; 60c. to Kenosha and Racine; 35c. to Bay City; 35c. and 25c. to Duluth and Superior; 50c. to Portage and 25c. to Toledo and Detroit.

**Chicago.**

Sept. 23.

(From our Special Correspondent.)

The local "dailies" have for the past few days been full of the legal dispute between the Philadelphia & Reading Company and C. H. Vehmeyer, a coal dealer of this city, and have so far printed his side of the story only. Like all questions of a similar character there is another side which will probably be told in court. The amount being sued for by the Philadelphia & Reading's agent here is quite a large sum. It appears that Mr. Vehmeyer bought a round lot of anthracite previous to the consolidation. He received in the neighborhood of one-half. His terms of purchase, as we understand, were the usual terms of the company, payment by the 15th of the month following shipments. A portion of the coal received by Mr. Vehmeyer was claimed to be not up to the standard and he took the position that he would not pay for that which he had received until a satisfactory allowance had been made on the coal claimed to have been unmerchantable

and he had received the remainder of the coal he claimed to be due him on his original purchase. It appears to us that the question to be presented to the court will be whether a man can claim a forfeiture when he has himself evaded the terms of the contract? In a suit of a similar character last year, Judge Gresham decided in favor of a coal company against the dealer, entailing a loss to the latter of a large amount, though in this case the question of quality was not in dispute. The dealer in this case had the full sympathy of the majority of the shippers. The question, if raised, as to whether the "coal trust," so called, can collect bills in Illinois, will bring out many interesting legal points, which will be of peculiar interest and value to the entire coal trade.

The wholesale trade is fair, the slowness of shipments of all rail coal and the scarcity of cars on all railroads centering here, render it almost impossible for the shipper to move satisfactorily the limited amount of tonnage offering. Stove and range coal is in extraordinary good demand, while we learn that the stocks of this size are very limited at Duluth, Milwaukee, and at this point. Local rail trade on account of poor car service is taken only on ability to ship. Country orders for shipments from docks are fair only. As reported by some shippers business in Illinois is good, though at points where it is necessary to ship all-rail it is difficult to fill orders promptly. Trade in Iowa and west of the Mississippi River is rather light and will probably remain so until colder weather sets in. Retail coal is fairly active and a reasonable, though by no means seasonable, amount of orders being filled at the fair circular price of \$7.25. There is, however, an entire lack of snap which should characterize business during the latter part of September. The expected advance may and probably will bring consumers in with another big rush next week.

Bituminous coal is in good demand at full circular prices, and if there is any shading it is on big contracts. Business in a large measure is practically limited to car supply and many operators are refusing orders for early shipment. Quite a number of additional railroad contracts have been placed during the past week for the output of several of the new mines recently opened in Indiana. This coal appears to grow in favor with railroads and manufacturers for locomotive and stationary engine use. Illinois business is also briskly active, but the wretched car service is causing serious trouble in certain sections. Hocking and other Ohio grades are moving freely and prices on all descriptions show an upward tendency.

Coke is in better demand and receipts curtailed by the poor car supply. Foundries all over the country are more fully employed and consuming more fuel. Shipments are slow and there is no surplus at this point. Shipments over the B. & O. have been light during the week on account of the heavy passenger traffic to Washington. Prices are firmer.

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, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.40@2.50.

**Pittsburg.**

22.

(From our Special Correspondent.)

Coal.—Matters along the Monongahela Valley remain very quiet for the first time in two years. This is the first general strike, being brought about by the decision of the operators to reduce the price of mining to 3 cents. The last time such a movement was made by the operators was in December, 1890. At that time the mines were closed for three months, after which work was resumed at the old figures. The situation at present is different. The lower markets from Cincinnati to New Orleans are overstocked with coal and the boats and barges in the pools are principally loaded. The old question as to the comparative rates of mining on river and rail comes to the front. The river operations have been paying half a cent more per bushel than have the operators whose coal is shipped by rail. At several of the mines there are combination tipples where coal can be loaded either on barges in the river or on railroad cars. The river operators complain of the fact that the men in the mine get 3 1/2 cents when it is dumped in the river boats, but if through a hole in the tipple into the cars the price is 3 cents. They hold that it requires the same amount of labor whether the coal is mined for the railroad or the river trade.

Connellsville Coke.—Production is slowly increasing, being 115 cars ahead of the preceding week. Both the large and small operations made good running time at their works. Since the first of September many of the operators with idle ovens have made a start at firing up, others are preparing to do so. Orders are increasing slowly, but producers appear confident that they will be permanent and look for a weekly increase as occasion demands. The Frick Coke Company have fired 344 cold ovens since last report; this company made five and six days. The Southern Coal and Coke Company are still working six days. The McClure Company's plants in active operation are making six days. The independent operators, the majority of

them are making six days. Tonnages increased 2,070. Shipments: To Pittsburg, 1,600 cars; points east of Pittsburg, 1,385; points west of Pittsburg, 3,200 cars; total, 6,165.  
 Prices: Furnace coke, \$1.90; foundry, \$2.30; crushed, \$2.55 per ton and f. o. b. at works.

**METAL MARKET.**

NEW YORK, Friday Evening, Sept. 23, 1892.

**Prices of Silver Per Ounce Troy.**

Sept.	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.	Sept.	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.
17	4'87	38 1/4	83 3/4	'645	21	4'86 1/2	38 1/4	83	'642
19	4'86 1/2	38 1/4	83 3/4	'645	22	4'86 1/2	38 1/4	83	'642
20	4'86 1/2	38 1/4	83	'642	23	4'86 1/2	38 1/4	83 1/4	'644

As the Indian council declines to sell bills under the equivalent of 3 1/2 d., silver has remained comparatively steady. Shipments this week have been lighter than for a month past. No special features present themselves in the market.

Sight exchange on London: Sept. 17th, 4'86 1/2; 19th, 4'86 1/2; 20th, 4'86 1/2; 21st, 4'86 1/2; 22d, 4'86 1/2; 23d, 4'87.

The United States Assay office at New York reports the total receipts of silver for the week to be 161,000 oz.

There were sold during the week ending Friday, September 23d, 100,000 ounces in silver hullion certificates, at from 83 1/2 to 83 3/4 cents per ounce.

**Gold and Silver Exports and Imports at New York for Week Ending September 17th, 1892, and for Years from January 1st, 1892, 1891.**

Week.....	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892.....	\$740,210	\$43,297	\$460,905	\$238,648	\$918,970
1891.....	\$8,648,573	\$6,921,118	\$6,112,507	\$7,477,259	\$6,582,703
1891.....	75,218,910	4,598,173	12,382,344	1,488,316	81,514,765

During the week ending September 24th the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$800; silver, \$184,400. Imports, gold, \$22,733; silver, \$52,605.

The greater part of the silver exported went to England, the imports of both gold and silver came from the West Indies and South America.

**NOTES OF THE WEEK.**

It is claimed that the exportation of gold has come to an end. It looks like it at present; but as Austria has not yet completed the purchase of gold sufficient to carry out the proposed reform in the currency, it may be that some millions may yet be exported. In any case, the quantity cannot be very large.

In addition to its change in the large coins, Austro-Hungary is contemplating a change in the nature of its subsidiary coinage. The metal formerly used for small coins consisted of an alloy of 25% nickel and 75% copper; it is now proposed to replace this by pure nickel.

The *Bulletin de Statistique*, which is published by the French Ministry of Finance, contains some interesting tables of the gold and silver coinage of France since 1795, when the present monetary system was adopted. The gold coinage from 1795 to Dec 31, 1891, amounted to 8,826,948,250 francs, or \$1,680,371,096; deducting 104,081,280 francs for recoinage, the gold in circulation at the end of the year was 8,722,866,970 francs, or \$1,661,498,470.

The silver coinage, including the token money (2-franc pieces and under, of 0'855) was 5,334,675,124 francs, or \$1,054,223,829; deducting 222,165,304 francs for recoinage, there was in circulation at the end of the year \$5,312,508,820 francs, or \$1,011,906,438.

The bronze coinage represents a total of 65,339,027 francs, or \$12,442,529, of which the greater part was coined during the Empire. One curious statement appears in the last report. It says that no small silver pieces of 25 centimes or 5 cents have been coined since the reign of Louis Philippe, and as the amount of those called in and melted down is exactly equivalent to the amount coined, this coin can not be represented in any coin collection in the world.

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Mexican dollars.....	\$ .61	\$ .67
Peruvian soles and Chilean pesos.....	.61	.63
Victoria sovereigns.....	4.85	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.74	4.81

**Copper.**—In our issue of the 17th inst, it was erroneously printed that at the close there were free sellers of Lake Copper at 11c. This ought to have read 11'20c., which we herewith beg to rectify. The market has been very flat this week although we understand that the large companies have not met current prices, there was continually copper offering to satisfy the limited demand and several transactions took place for Lake Ingot copper at 11'5c. and even a trifle below, but for cakes and wire

bars mostly 11'20c. had to be paid. For Electrolytic copper the good demand continues and favorite brands remain very scarce. Casting copper is dull and offered at 10 1/4 to 10 1/2. Arizona pig copper is mostly held above the market, but we are informed some sales have been made below 9 1/2c.

In reply to a correspondent we would say that Arizona copper is always considered of better quality than casting copper. We always quote now, for Arizona pig copper, basis 96% fine copper, which has first of all to be refined into ingots. Formerly we used very often to quote Arizona refined ingot copper, but lately, it does not pay to smelt this product over here, and nearly all of it goes to Europe.

The usual classification of refined copper runs in the order as given herewith: Lake, electrolytic, Arizona and casting copper.

In Europe prices have also declined and Chili bars are quoted to-day at £43 10s. @ £43 12s. 6d. spot, and £44 @ £44 2s. 6. for three months. The tendency seems rather flat. For manufactured and refined we quote: Tough copper, £46 @ £46 10s; best selected, £47 @ £47 10s., strong sheets, £54 10 @ £55; India sheets, £51 @ £51 10s.; yellow metal sheets, 4 1/2 d. Some orders have been in the market for export to India, but not large enough to influence prices to any extent.

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

To	Copper.	Lbs.	Value.
To Cherbourg.....	3 casks	3,300	\$ 400
S. S. La Champagne.....	Copper.	Lbs.	
To Genoa.....	90 casks	112,500	12,600
S. S. Alsatia.....	Copper.	Lbs.	
To Leghorn.....	18 casks	22,500	2,600
S. S. Alsatia.....	Copper Matte.	Lbs.	
To Liverpool.....	2,274 bags	240,262	13,000
S. S. Bovic.....	2,916 bags	313,958	16,000
S. S. Saint Pancras.....	1,498 bags	160,414	12,000
S. S. Aurania.....	2,236 bags	240,214	12,000
S. S. Massachusetts.....	Copper.	Lbs.	
To Rotterdam.....	258 bars	44,957	
S. S. Obdam.....	41 bars	6,892	
" ".....	35 casks	6,480	\$14,125
" ".....	81 plates	9,081	
" ".....	253 bars	44,943	4,900

**Tin** continues to be rather dull and prices have turned slightly in favor of buyers. We quote Straits and Malacca at 20'20 @ 20'25, and November and December delivery at 20'35.

Reports from Europe are not very encouraging and consumption is said to be poor for this season of the year. Values in London have gone down to £91 15s @ £91 17s. 6d., with three months about £92.

**Lead**—There is little desire to operate and although offerings are not heavy, prices declined to 4'05 and an isolated sale at 4c. At the former figure Western smelters are sellers. The European market shows an improvement and prices in London have advanced to £10 5s. to £10 6s. 3d. for Spanish, and £10 10s. to £10 12s. 6d. for English.

**St. Louis Lead Market.**—The John Wahl Commission Co. telegraph us as follows: "Under rather liberal offerings, lead has declined here to 3'85c., and the market has more sellers than buyers at this price."

**Chicago Lead Market.**—The Post-Boynton Strong Company telegraphs us as follows: "The market has been very quiet at 3'90 @ 3'95c. asked. Consumers are looking on believing in lower values. Later sales of car lots have been made and foot up about 200 tons."

**Spelter** is very flat and irregular, and rather lower prices have been accepted by smelters who are anxious to hook further orders for spot as well as for delivery up to June. Production continues heavy, and there are some fears that, with the possibility of export being cut off, it is unlikely that the home market can use all of present production. We must lower quotations to \$4.50 delivered New York. After a heavy drop in prices in London a slight reaction has taken place and sales are reported at £18 @ £18 5s., but the market is reported as being very irregular and unsettled.

**Antimony** is continually pressed for sale, and at prices somewhat below parity of English market. We quote Hallett's at 10 1/2 c., L. X. at 11c., and Cookson's at 11 1/2 c.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Sept. 23, 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, September 19th, 1891, and for the corresponding week ending September 17th, 1892. Also the total estimated production from January 1st of last 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 each year. The figures are in gross tons.

Fuel used.	Week ending—				From Jan., '91.	From Jan., '92.
	Sept. 19, '91.	Sept. 17, '92.				
Anthracite.....	83	31,700	67	27,777	1,338,403	1,271,142
Coke.....	159	128,000	128	116,605	3,732,015	4,959,580
Charcoal.....	58	12,300	43	9,743	389,727	386,329
Total.....	300	172,000	238	154,130	5,460,145	6,617,051

The pig iron trade is in practically the same condition that it has been in for the last three weeks. In some quarters we are informed that there is a

greater firmness and more business; but the majority of producers do not express such a comparatively favorable opinion of the market. The increase in consumption this fall has not been anywhere near so great as is usual at this time of year. The production is still decreasing slightly, and the stocks are being drawn on a little to meet the increase in the demand, such as it is. The makers and dealers pretty much agree in saying that it is quite useless to try and frighten the consumer into a belief that there will be an increase of prices shortly; they do not believe it, and as a general rule refuse to buy more than a month's consumption at a time. Usually at this time of year the consumer desires to stock for winter in order to obviate the difficulty and expense of transport during the winter months; this year he considers that he would sooner keep his money out at interest instead of locking it up in the pig store, as there is no apparent possibility of the price of pig going up, and there is a possibility of it going down. The Thomas Iron Co. state that their trade is in very good shape and that their customers come up well with orders; as far as they are concerned things are firm, but they have no intention of raising their prices. Dealers in Southern irons state that there is a scarcity of No. 1 pig, and consequently they are holding out for a rise of 25-50c.

This action should have a beneficial effect on the market generally, for all the cutting of prices has come from the South; and perhaps with a little firmness now on the part of the Southern producers the Northern manufacturers might see a little strength come back to their prices. However, we are inclined to believe that this so-called advance of 25-50 cents is only nominal, and that it will not be sustained long when the dealers find that buyers hold off; if they want to effect sales they will have to go back to the old price and forego the hoped-for increase. We quote Northern brands: No. 1, \$15; No. 2, \$14 and gray forge \$13.

**Spiegeleisen and Ferromanganese.**—There is absolutely nothing to be reported in these markets. Importers state that they are troubled with a scarcity of ferromanganese and that the price they have to pay for it is so great that they cannot compete with domestic producers at the low prices lately ruling. They consequently quote \$61 and do not care to do business at less.

**Steel Rails.**—There are no new orders to report in steel rails. None of the makers see any prospect of anything except on the regular orders for necessary renewals. New railroad construction seems to be dead. Prices are still \$30 at mill and \$30.75 at tidewater. The New England Roadmakers' Association have decided that in New England a rail weighing 35 lbs. per yard is the best for heavy traffic, and that the base should be at least as broad as the height. They also recommend the use of tie plates.

**Rail Fastenings.**—No new transactions of any moment are reported in rail fastenings and all the work is on permanent orders. Prices rule as follows: Fish and angle plates, 1'55 @ 1'65c. at mill; spikes, 1'90 @ 2c.; bolts and square nuts, 2'50 @ 2'70c.; hexagonal nuts, 2'70 @ 2'80c., delivered.

**Merchant Iron and Steel.**—The sales for all kinds of merchant iron and steel continue to be slow and in small quantities at a time. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/2 @ 7 1/2 c.; special grades, 13 @ 18c.; crucible machinery steel, 4'75c; crucible spring, 3'75c.; open hearth machinery, 2'25c.; open hearth spring, 2'50c.; tire steel, 2'25c.; toe calks, 2'25 @ 2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

**Structural Iron and Steel.**—The mills still keep very busy, but the amount of new orders coming in just at present is comparatively small. The business that came in about a month ago was so very great, however, that the mills will be fully occupied on old orders for a month yet. The Carnegie structural material is again putting in appearance in Eastern markets in opposition to local productions. Prices are still retained at the high level which they reached a month ago, so that makers evidently do not anticipate any slackness due to lack of orders just yet. Prices are as follows: Beams, 2'3 @ 2'5c., except for 20-inch beams, which are 2'8c.; angles, 2'15c.; sheared plates, 2 @ 2'10c.; tees, 2'40 @ 2'60c.; channels, 2'35 @ 2'50c.; universal plates, 2 @ 2'10c.; bridge plates, 2 @ 2'10c., all on dock.

**Buffalo.** Sept. 21.  
 (Special Report by Rogers, Brown & Co.)

Although buying has been light during the week, the tone of the market is considerably firmer. Orders already taken by Southern furnaces are apparently more than they can handle. Inquiries are liberal and are for early delivery. We quote for cash f. o. h. cars Buffalo. No. 1 X Foundry Strong Coke Iron Lake Superior Ore, \$15.25; No. 2 X Foundry Strong Coke Iron Lake Superior Ore, \$14.25; Ohio Strong Softener No. 1, \$15.25; Ohio Strong Softener No. 2, \$14.25; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$16.25; Tennessee Charcoal, \$17.00; Southern Soft No. 1, \$13.90; Alabama Car Wheel, \$19.00; Hanging Rock Charcoal, \$20.50.

**Chicago.** Sept. 22.  
 (From our Special Correspondent.)

There is activity in nearly every department of the iron and steel trades, not only locally but in the vicinity usually termed the Chicago district. The demand from country foundries for crude iron in

carloads is a strong feature, evidencing the fact that business with them is more active. Carriage factories throughout the country are placing season's contracts for small steels and other material, and the smaller implement manufacturers are also in the market for their supplies. There seems to be a marked desire on the part of buyers to cover all possible requirements at present low prices, as many of the orders placed last week were given without previous solicitation. Local makers of crude iron state that the week under review was, on the whole, quieter than the one previous, but that inquiry was made for several round lots of coke and Lake Superior charcoal iron. Sales of the latter during the past few weeks have been very light. There is a weakening tendency in bar iron from mills in this district, and prices have been shaded fifty cents a ton on November and December deliveries.

**Pig Iron.**—The week has been uneventful, and the general volume of sales small. Demand may be called fair, and buyers, while indifferent, are making inquiries, which evidence a willingness to place additional contracts for both coke and charcoal iron if they can purchase at satisfactory prices, though from their offers they seem to think there is no bottom to the market. One agency flatly refused to meet the figures named on 1,000 tons by a competing furnace company. The carload trade continues active. With exception of several inquiries for round hocks of Lake Superior charcoal iron there is little or no demand, but prices remain steady as quoted. Offers of Southern coke iron for early shipment are liberal at material concessions in price. Some of the leading furnaces, however, are asking and getting 15 cents to 25 cents more on prices current ten days ago, and several furnaces which have been pressing for business are out of the market except at a distinct advance. Deliveries on contracts are large and consumption steadily increasing.

Quotations per gross ton f. o. h. Chicago are: Lake Superior charcoal, \$16.55@17.00; Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.50@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17.00; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.25; No. 3, \$12.50; Southern coke, soft, No. 1, \$13.25; No. 2, \$12.75; 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 Billets and Rods.**—Billets are in good demand in small lots, large orders only taken in accordance with mill capacity, and price steady at \$24.50. Rods are steady at \$34.50.

**Structural Iron and Steel.**—Demand for building shapes and architectural iron-work is fair. Bridge work is much more active than it has been, and inquiry in other directions is good. Prices, though not notably lower, are easier. Regular quotations, car lots f. o. b. Chicago are as follows: Angles, \$2@2.10; tees, \$2.30@2.40; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.25@2.50.

**Plates.**—Demand continues active from warehouse, and agents leave little chance to accumulate stock. Boiler shops are getting into better shape, and taking in more work. 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, 2¼ in. and smaller, 60%; 7 in. and upward, 70%.

**Merchant Steel.**—A number of large orders and contracts for coming season's supply of merchant steels were placed during the past week. Prices are a little firmer, and concessions are hard to get. The better grades of tool steel are in good demand. 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.**—Stocks in agents' warehouses are badly broken and mill shipments very slow; the scarcity is quite pronounced. Discounts are steady at 70 and 10% off on mill lots, and 70% on Juniata, and 70 and 5% off on charcoal from warehouses.

**Black Sheet Iron.**—Mills are much behind with deliveries and some complaint is made by dealers. Prices are steady at 2¢@2.95¢ for No. 27 common; f. o. b. Chicago Steel sheets are 10c. higher. Dealers quote 3-10@3-20c. from stock, same gauge.

**Bar Iron.**—Quotations from mills in this district are easier, as the starting up of the big mill at East Chicago, Ind., places a new competitor in the field. Demand is fair from miscellaneous consumers and mills here quote 1'60c. rates; Ohio mills are firm at 1'50c. mill, equal to 1'62½¢. Chicago. Orders for car iron are slow. Jobbers quote 1'50@1'90c. rates from stock.

**Nails.**—Steel cut nails are in good demand from mill at \$1.00@1.62, 30 cent average, and \$1.75 from store. Wire nails are also more active from factory at \$1.65@1.70 base and \$1.80@1.85 from jobbers in less than car lots.

**Steel Rails.**—The orders placed during the past week are still for small quantities and we hear of none over a 1,000 tons. The local mills are well supplied

with work for several months and are satisfied that business will become more active later. Prices steady at \$0.32. splice bars, etc., etc., are in light demand at \$1.70 for iron or steel splice bars; spikes, \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

**Scrap.**—There is no improvement, but as the mill at East Chicago will be a large consumer a betterment is looked for soon. Prices nominal. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$15.50; pipes and flues, \$7; cast borings, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

**Old Material.**—A sale of 500 tons of old iron rails to a local consumer at \$17.75 establishes the prices; \$18.25 has been paid for some in a speculative way. Old steel rails are unchanged in price and dull at \$12.50@14, according to condition, etc. Car wheels are stagnant at \$14.75@15.

#### Louisville. Sept. 19. (Special Report by Hall Brothers & Co.)

In some sections sales are reported to have increased during the past week, but locally the situation has remained practically unchanged. Buyers are indifferent, and have no apprehension about any increase in prices, and still pursue the hand-to-mouth policy. Stocks of iron ore reported to have been considerably reduced during August, which is an encouraging feature, but the reduction is only a drop in the bucket, and will have but little influence. If reports are true, prices during the last week have reached the lowest yet recorded.

**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. Sept. 22. (From our Special Correspondent.)

**Pig Iron.**—Sales of pig iron have been made to quite a satisfactory extent during the past week, and at firm prices. There is a great deal of new work looming up for the near future, for which large quantities will be wanted, and it is hinted by brokers that pig iron may suddenly take a turn and shoot up in prices, but these hints do not seem to affect buyers in the least at this time. Some large buyers of Forge have been in the market and stocked up to the end of the year in a few instances. Price paid was about \$13 delivered. No. 1 and 2 Foundry is selling in a moderate way at old figures. Bessemer is dull just now.

**Muck Bars.**—Stocks of muck bar are small. There are plenty of buyers in the market at \$25.25@25.75, but very little is selling at these prices. Small lots have been taken at \$26.25@26.50 delivered. Holders of muck bars are likely to be able to name their own prices for some time to come. Mill men think a good deal of business is near at hand.

**Steel Billets.**—There has been a fair amount of business during the past week; prices, \$26 for prompt deliveries.

**Merchant Iron.**—Merchant iron is selling at \$1.70 @ \$1.75, and quite a little business is reported.

**Nails.**—The nail makers look forward to a good winter both in cut and wire nails. Prices remain at old quotations.

**Wrought Iron Pipe.**—There is a better demand for pipe this week, although the volume is far from enough to keep mills going. Prices are as follows: Butt Black, 60 and 10%; galvanized, 52½ and 10%; boiler tubes, 67½¢.

**Merchant Steel.**—Merchant steel is moving along in a retail way; there is quite a little business in sight.

**Sheet Iron.**—The sheet mills are all crowded with work, and have had as much as they could do to meet prompt deliveries. Everything points to an active winter in this branch of the trade. Prices are steady. Best refined, 2'75@3'50; best soft steel, 3@4c.

**Plate Iron.**—Some of the mills are crowded with work, and managers think everything favorable for a good winter. There is plenty of work in sight, but it is not easily said when orders will be placed. Boiler plates 2'60, tank plates, steel 2c., shell 2'20.

**Structural Material.**—Mills are pretty generally busy on hack orders. All new business coming in so far seems to be in small lots, although prospects are very encouraging. Beams, tees and channels range from 2'25 to 2'40. Sheared plates, 2c.

**Steel Rails.**—There is a great deal being said as to large orders to be placed, but they do not appear. Quotations \$30.

**Old Material.**—Old iron rails are plenty at \$19. Steel, \$16. No. 1 Railroad scrap, \$17.

#### Pittsburg. Sept. 22. (From our Special Correspondent.)

**Raw Iron and Steel.**—There has been little change in the iron and steel market since our last report. Conclusive evidence is not wanting that

the consumption of pig iron has overtaken the production, and this condition has brought about a more hopeful feeling in the trade. In this vicinity prices are more firmly held than for many weeks, together with a much larger inquiry, and, while the quotations are on a very low level, there is not the cutting usually accompanying such a situation.

While manufacturers are generally holding firm as to prices, consumers are not disposed to buy largely, and the orders are therefore limited in quantity. Still the stocks at furnaces are not large, and are steadily decreasing, and the current output seems to be all taken, so that large orders could hardly be filled. One thing is self-evident, iron and steel men will do well to content themselves with moderate profits, for the day for large profits has been retired for an indefinite period. It will come again just as certain as time continues to work changes and then repeat them. But this is the era for the growth of great establishments that produce on a large scale and look for profit to quantity produced.

This policy restrains advances of prices and virtually places the control of business in the hands of large purchasers, and certainly it is better for consumers; but, like everything subject to man's direction, the scheme of engrossing all that is in the business by producing on a larger scale than any one else provides for its own defeat, and the exclusively large producers tumble after a while before the developments of progress, which wait not so much after all on the will of capitalists as on the necessities and sometimes the caprices of the people. The pace, as a rule, is too rapid in the one direction and not enough care is bestowed on side issues, which sometimes supplant original products as useful specialties.

A well informed Eastern dealer has this to say: "As a rule the market is more favorable to the sellers than the buyers. Those who are in the market with orders find that the leading producers are firm in their prices and less anxious to make concessions than they were some time ago. In the West a marked increase in production is noted. Notwithstanding that the tone of the market is better, that the consumption is now apparently larger and in excess of production, and that prices are favorable to the consumer, many buyers continue to confine their purchases to such material as they actually require; others, however, contract for the pig iron necessary to cover their orders for finished product." At a meeting, the manufacturers of steel rails decided to continue the present agreement in regard to output. Prices for standard sections remain at \$30 f. o. b. at works. Sales, 3,000 ton lot for a Southern road at the figures named. Bessemer, steady, unchanged; Grey Forges more inquired for; soft steel billets command fair attention; muck bar firmer; skelp iron advanced; scrap material steady.

**Coke Smelted Lake and Native Ore.**

2,000 Tons Bessemer, Oct., Nov.	\$13.80 cash
2,000 Tons Grey Forge, Oct., Nov.	12.50 cash
1,500 Tons Bessemer City Furnace, prompt.	14.00 cash
1,500 Tons Bessemer, Oct., City Furnace.	14.00 cash
1,200 Tons Grey Forge.	12.50 cash
1,000 Tons Grey Forge, Oct.	12.50 cash
1,000 Tons Bessemer Pumps.	13.90 cash
1,000 Tons Bessemer, Dec.	13.85 cash
1,000 Tons Grey Forge.	12.50 cash
500 Tons Bessemer, City Furnace.	14.00 cash
500 Tons Grey Forge.	12.55 cash
500 No. 2 Foundry, City Furnace.	15.75 cash
500 Tons Grey Forge.	12.50 cash
300 Tons White & Mottled.	12.00 cash
250 Tons Grey Forge.	12.50 cash
100 Tons No. 1 Foundry.	14.50 cash
100 Tons No. 2 Foundry.	13.50 cash

**Charcoal.**

150 Tons Cold Blast.	26.50 cash
100 Tons No. 2 Foundry.	19.00 cash
100 Tons No. 1 Foundry.	20.50 cash
75 Tons Hot Blast Southern.	17.50 cash
75 Tons Cold Blast.	24.00 cash

**Steel Blooms, Billets and Slabs.**

3,000 Tons Billets and Blooms, Sept., Oct.	24.00 cash
2,000 Tons Billets, Oct., Nov.	23.75 cash
2,000 Tons Billets, Oct., at mill.	23.50 cash
500 Tons Billets, prompt.	24.25 cash
330 Tons Billets, prompt.	24.50 cash
200 Tons Billets prompt.	24.00 cash

**Muck Bar.**

1,000 Tons Neutral, Oct., Nov.	24.90 cash
1,000 Tons Neutral, Oct., Nov.	25.00 cash
500 Tons Neutral, Sept., Oct.	25.90 cash

**Iron Skelp.**

1,000 Tons Wide Grooved.	1.65 4 m.
800 Tons Sheared Iron.	1.87½ 4 m.
750 Tons Narrow Grooved.	1.65 4 m.

**Steel Skelp.**

550 Tons Wide Grooved.	1.50 4 m.
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**Sheet Bars.**

250 Tons Sheet Bars, prompt.	30.00 cash
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**Steel Wire Rods, 5 Gauge American.**

750 Tons 5 Gauge American.	32.15
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**Ferro-Manganese.**

150 Tons 80 per cent. Domestic.	61.00 cash
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**Spelter.**

100 Tons Spelter.	4.60 cash
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**Blooms, Beams, Rail and C. Ends.**

2,500 Tons Bloom and Billet Ends.	17.00 cash
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**Old Iron and Steel Rails.**

1,000 Tons Old Iron Rail, Valley del.	19.80 cash
500 Tons Old Iron Rails.	20.00 cash
200 Tons Old Iron Rails.	19.75 cash
100 Tons Old Iron Rails.	20.00 cash

**Scrap Material.**

500 Tons Charcoal Scrap Iron, gross.	16.00 cash
200 Tons No. 1 R. R. W. Scrap, net.	16.00 cash
150 Tons No. 1 R. R. W. Scrap, net.	16.00 cash
150 Tons Railway Springs, gross.	18.00 cash
100 Tons Cast Scrip, gross.	12.25 cash

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from Sept. 17 to Sept. 23, and Sales. Dividend-paying mines are on the left, non-dividend-paying on the right.

\*Ex-dividend. †Dealt in New York Stock Ex. Unlisted securities. ‡Assessment paid. †Assessment unpaid. Dividend shares sold, 8,050. Non-dividend shares sold, 38,450. Total shares sold, 46,500.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, including columns for Name of Company, dates from Sept. 16 to Sept. 22, and Sales.

Dividend shares sold, 2,948. Non-dividend shares sold, 4,088. Total shares sold, 7,036.

COAL STOCKS.

Table of Coal Stocks, including columns for Name of Company, dates from Sept. 17 to Sept. 23, and Sales.

Total shares sold, 633,982.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, including columns for Name of Stocks and Closing Quotations from Sept. 16 to Sept. 22.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

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

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.

Table with columns: Aspen, Sept. 17. The closing quotations were as follows: Agnes C., Argentinum Junata, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallie, Bushwacker, Carbonate Chief, Empire Champion, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sheep Mountain S. & M. Co., St. Joe & Mineral Farm, Yellow Boy.

Table with columns: Baltimore, Md., Sept. 22. Bid, Asked. COMPANY, Atlantic Coal, Balt. & N. C., Big Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, North State, Silver Valley.

Pittsburg, Pa. Prices highest and lowest for the week ending September 22d:

Table with columns: COMPANY, Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazlewood Oil Co., Hidalgo Mining Co., La Noria Mining Co., Luster Mining Co., Mansfield C. & C. Co., Manufacturers Gas Co., Nat. Gas Co. of W. Va., N. Y. & Clev. Gas Coal Co., Ohio Valley Gas Co., Pennsylvania Gas Co., People's Natural Gas Co., People's N. G. & P. Co., Philadelphia Co., Pine Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silvertown Mining Co., South Side Gas Co., Sterling Silver Mining Co., Tuna Oil Co., Union Gas Co., Washington Oil Co., W'moreland & Camb., Wheeling Gas Co., W'house E. Light, W'house Air Brake Co., W'house Brake Co., Ltd.

Table with columns: Deadwood, Sept. 17. Bid, Asked. Bullion, Caledonia, Calumet, Cambrian, Carthage, Cora, Deadwood Terra, De Smet, Double Standard, Elk Mountain, Emmett, Equitable, Florence, Golden Reward, General Merritt, Harmony, Hester, Homestake, Hermit, Iron Hill, Isadorah, Maggie, Monitor, Rainbow, Retriever, Ross Hannibal, Ruby Bell, Ruby Wilkes, Seabury Calkins, Silver Queen, Spaulst R., Stewart, Tornado, Troy.

St. Louis. Sept. 21.

Table with columns: Bid, Asked. Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., Central Silver, Elizabeth, Mont., Granite Mountain, Mont., Hope, Leo, Little Albert, Montrose Placer, Colo., Mickey Breen, Pat Murphy, Colo., Silver Age, Silver Bell, Small Hopes, Colo., Yuma, Ariz.

Helena, Mont.

Table with columns: H, L. Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., California (Castle), Mont., Champion (Oro Fino), Mont., Combination (Phillips' pt.), Mont., Copper Bell (Cataract), Mont., Cornucopia, Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Selhart), Mont., Fourth of July, Wash., Glenary (Butte), Mont., Helena & Victor, Mont., Ingersoll, Mont., Iron Mountain (Missoula), Mont., Jersey Blue (Butte), Mont., Lone Pine Consolidated, Mont., Moulton, Mont., Polaris (Beaverhead Co.), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Nelhart), Mont., Southern Cross (Deer Lodge), Mont., Whitlatch Union & MacIntyre, S., Yellowstone (Castle), Mont.

Foreign Quotations.

Table with columns: London, Sept. 10. Highest, Lowest. Alaska Treadwell, Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., De Lamar, Idaho, Dickens Custer, Idaho, Eagle Hawk, Idaho, East Arevalo, Idaho, Eberhardt, Nev., Elkhorn, Mont., Elmore, Idaho, Emma, Utah, Esmeralda, Nev., Flagstaff, Utah, Garfield, Nev., Golden Feather, Cal., Golden Gate, Cal., Golden Leaf, Mont., Golden River, Cal., Idaho, Jay Hawk, Mont., Josephine, Cal., Kohinoor, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Maid of Erin, Colo., Mammoth Gold, Ariz., Mount McClellan, Mont., Montana, Mont., Mona Lake Gold, New California, Colo., New Eberhardt, Nev., New Gold Hill, N. C., New Guston, Colo., New Hoover Hill, N. C., New Russell, N. C., New Viola, Idaho, Old Lout, Colo., Parker Gold, N. C., Plumas Eureka, Cal., Richmond Con., Nev., Ruby, Nev., Sam Christian, N. C., Sierra Buttes, Cal., Plumas Eur., Cal., Silver King, United Mexican, Mex., West Argentine, Colo., Yankee Girl, Colo.

Paris. Sept. 8.

Table with columns: East Oregon, Ore., Forest Hill River, Cal., Golden Bell, Cal., Laurium, Greece, Lexington, Mont., Nickel, New Caledonia, Rio Tinto, Spain, Tharsis, Spain, Vieille-Montagne, Belgium.

CURRENT PRICES.

Table with columns: These quotations are for wholesale lots in New York unless otherwise specified. Acid—Acetic, No. 8, pure, 1,040, Alcohol—55%, Absolute, Ammonia—Sulph., in bbl. lots, Ammonium Chloride—Pure, Amalgamating solution, Asbesto—Canadian, Asbestos—Pot., 1st sort, Asphaltum—Prime Cuban, Barium—Carbonate, pure, Chloride, crystal, Chloride, commercial, Iodide, Nitrate, Sulph., Am. prime white, Sulph., foreign, floated, Sulph., off color, Carb., lump, f. o. b. L'pool, No. 1, Casks, Runcorn, No. 2, bags, Runcorn, Bauxite, Bichromate of Potash—Scotch, Bichromate of Soda, Borax—Refined, Borax—San Francisco, Concentrated, in car lots, Refined, Liverpool, Bromine, Cadmium Nitrate, Cadmium Iodide, Chalk, Precipitated, China Clay—English, Domestic, Chlorine Water, Chrome Yellow, Chrome Iron Ore—San Francisco, Chromalum—Pure, Commercial, Cobalt—Oxide, Cobalt—Sulph., English Wks., Vitriol (blue), ordinary, extra, Nitrate, Copperas—Common, Best, 100 lbs., Liverpool, Corundum—Powdered, Cryolite—Powdered, Eriolite—Powdered, Eriolite—Grain, Epsom salt, Feldspar—Ground, Fluorspar—Powdered, No. 1, French Chalk, Fuller's Earth—Lump, Glauber's Salt—in bbls., Glass—Ground, Gold—Chloride, pure, crystals, 15 gr., c. v., 15 gr., c. v., liquid, 15 gr., s. v., Chloride and sodium, Oxide, Gypsum—Calcined, Land Plaster, Iodine—Resublimed, Iron—Nitrate, Kaolin—See China Clay, Kieserite, Lead—Red, American, White, English, Acetate, or sugar of, white, Granulated, Nitrate, Lime Acetate—Am. Brown, Litharge—Powdered, English flake, Magnesite—Crude, Kilauea, Calcined, Brick, Manganese—Ore, per unit, Oxide, ground, Mercuric Chloride—Corrosive, Sublimed, Powdered.

Table with columns: Marble Dust—bbl., Metallic Paint—Brown, Red, Mineral Wool—Ordinary slag, Ordinary rock, Ground, Mica—in sheets according to size, 1st quality, Naphtha—Black, Nitre Cake, Ochre—Rochelle, Washed Nat Ox'rd. Lump, Washed Nat Ox'rd. Powder, Golden, Domestic, Oils—Mineral, Cylinder, light filtered, Dark filtered, Extra cold test, Dark steam refined, Phosphorus—white, Precip., red, white, Plumbago—Ceylon, American, Potassium—Cyanide, Bromide, domestic, Chlorate, English, Chlorate powdered, English, Carbonate, lb., by casks, 82%, Caustic, lb., pure slick, Iodide, Nitrate, refined, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone—Select lumps, Original cks., Powdered, pure, Pyrites—Non-cupreous, p. units, Quartz—Ground, Rotten Stone, Powdered, Lump, Original cks., Rubbing stone, Sal Ammoniac—lump, in bbls., Salt—Liverpool, ground, Domestic, fine, Common, fine, Turk's Island, Salt Cake, Saltpeter—Crude, Soapstone—Ground, Block and slab according to size, Sodium—Pruisiate, Phosphate, Stannate, Tungstate, Hyposulphite, in casks, Strontium—Nitrate, Sulphur—Roll, Flour, Sylvinit, 23@27%, S.O.P., per unit, Tale—Ground French, American No. 1, American No. 2, Tin—Crystals, in kegs or bbls., reathered or flossed, Muriate, single, Double or strong, 64° B., Oxy. or nitro., Vermilion—Imp. English, Am. quicksilver, bulk, Am. quicksilver, bags, Chinese, Trieste, American, Zinc White—Am. Dry, Antwerp, Red Seal, Paris, Red Seal, Muriate solution, Sulphate crystals, in bbls., Aluminum—lb., Arsenic—(Metallic), per lb., Barium—(Metallic), per gram, Bismuth—(Metallic), per lb., Cadmium—(Metallic), per lb., Calcium—(Metallic), per gram, Cerium—(Metallic), per gram, Chromium—(Metallic), per oz., Cobalt—(Metallic), per gram, Didymium—(Metallic), per gram, Erbium—(Metallic), per gram, Gallium—(Metallic), per gram, Germanium—(Metallic), per gram, Indium—(Metallic), per gram, Iridium—(Metallic), per oz., Lanthanum—(Metallic), per gr., Lithium—(Metallic), per gram, Magnesium—(Powdered), per lb., Manganese—(Metallic), per lb., Chem. pure, per oz., Molybdenum—(Metallic), per gm., Niobium—(Metallic), per gram, Osmium—(Metallic), per oz., Palladium—(Metallic), per oz., Platinum—(Metallic), per oz., Potassium—(Metallic), per lb., Rhodium—(Metallic), per gram, Ruthenium—(Metallic), per gm., Rutherfordium—(Metallic), per gram, Selenium—(Metallic), per oz., Sodium—(Metallic), per lb., Strontium—(Metallic), per gram, Tantalum—(Metallic), per gram, Tellurium—(Metallic), per lb., Thallium—(Metallic), per gram, Titanium—(Metallic), per gram, Thorium—(Metallic), per gram, Tungsten—(Metallic), per lb., Uranium—(Metallic), per gm., Vanadium—(Metallic), per gm., Yttrium—(Metallic), per gram, Zirconium—(Metallic), per oz.