

THE ENGINEERING AND MINING JOURNAL



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

VOL. XLVI. NOVEMBER 10. No. 19.

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REMITTANCES should always be made by Bank Drafts, Post-Office Orders, or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING COMPANY.

SUBSCRIPTION PRICE, including postage for the United States and Canada, \$4 per annum; \$2.25 for six months; all other countries, including postage, \$5. All payments must be made in advance.

FILE COVERS will be sent by mail for \$1.00, or delivered at office for 75 cents each.

Advertising Rates.—See page 386.

THE SCIENTIFIC PUBLISHING CO., Publishers, P.O. Box 1833, 27 Park Place, New York.

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to the Republican party was equally without danger, though "Wall street," the financial barometer, has interpreted the change unfavorably and stocks have declined. Natural causes have controlled the markets, except in cases where trade combinations or so-called trusts exist.

The majority of the manufacturers of this country are, very naturally, opposed to relinquishing any part of the benefits our high tariff brings them, and they are to be congratulated on the result of the election. At the same time, the question of tariff reduction is by no means settled, for a growing surplus in the national treasury confronts us, and no doubt this question will now come up under Republican instead of Democratic auspices.

Nothing has been changed in the industrial situation. Business is and has been very good, and will, no doubt, continue so, with the natural improvement due to the season and to the greater demand for various kinds of iron that has been growing for some months past. We also anticipate a very active and satisfactory business during the year of 1889, unless, indeed, some now-unlooked-for financial crisis should occur in Europe through war or the liquidation of the Panama Canal Company; but we anticipate nothing serious to this country in this.

Those who are wise will prepare in time for those inevitable periods of depression by adopting every means which mechanical skill and science have suggested to improve methods of manufacture and lessen its cost. It is always the "fittest who survive," and the time to make these improvements is when profits are large.

The excitement of the election is over, men will resume business with greater spirit, and the ENGINEERING AND MINING JOURNAL will contribute its share towards realizing the anticipations of the most sanguine.

THE DEBRIS QUESTION.

A short bill passed in the session of Congress recently adjourned is of interest and importance to what was at one time the most valuable mining industry in this country. It is known as the Biggs bill, and it provides for a thorough examination and investigation of the mining debris question in the State of California for the purpose of ascertaining whether some plan can be devised whereby the present conflict between the mining and farming sections may be adjusted and the mining industry rehabilitated, and for a complete examination of the injured navigable river channels and adjacent lands, with a view to the improvement and rectification of such rivers.

We have but two faults to find with the bill, first that the appropriation for carrying out this investigation thoroughly is quite inadequate, viz., \$2000, and, second, that the investigation is committed solely to the Secretary of War, who is instructed to detail three officers from the Engineer Corps of the United States Army for the purpose. It seems to us that this important branch of the mining industry in California, which was formerly so productive, and is now so oppressed by the existing laws, calls for a thorough and efficient examination, and this would require a more liberal appropriation and the services of experienced and otherwise qualified mining engineers, who are familiar with the debris question to make this important report; such an engineer, for example, as Mr. AUG. T. BOWIE on the committee would inspire confidence in the conclusions arrived at and recommendations made.

THE ENGLISH SALT TRUST.

This combination, the formation of which we recorded in our issue of October 27th, has lost no time in effecting its object. It has raised the price of common salt for domestic purposes from 2s. 6d. a ton to 9s., and the export article from 8s. to 15s. per ton. Moreover, in spite of this heavy advance, it has succeeded in stimulating the demand, we suppose in consequence of the consumers fearing a further rise in price, and it is stated that the whole of the large stocks on hand a month ago are now nearly cleared off. The principal works belonging to the trust are now working night and day for the first time in years, and there are rumors of the purchase by the Trust of other works not included in the original arrangement to further protect themselves. One such purchase has already taken place at the price of \$675,000, and as a large amount of this is payable in shares, it means a much larger figure, as the shares are worth much more than par. As we have already indicated, an advance in price, such as has taken place, is in our opinion full of danger for the combination and of oppression to the public, and the fact that it already considers it necessary to purchase less important concerns not contemplated at first (or, at all events, not referred to in the programme) is to us an evidence that it is aware of this. On the authority of the Times we learn that an organization of capitalists and landowners has already been formed in Cheshire, where there is ample territory

It is stated in our English exchanges that Messrs. BRIN BROTHERS, of Paris and London, are now alloying metals by their process, of which we gave a description in our issue of Oct. 27, with aluminum direct from clay, at a cost of 25 cents per pound for the aluminum in the alloy. Should this prove to be practicable on a large working scale, we may look for a large reduction, perhaps to 35 cents per pound, for the aluminum contained in the aluminum alloys now coming into extensive use, and so much appreciated, and this would be an immense progress, as the price hitherto in Europe and in this country, whether by the Cowles, Castner or Heroult process, has been about from \$2 to \$4 per pound for the contained aluminum.

ON Tuesday last the citizens of the United States selected their national officers to serve for the next four years, and the Republican party was successful in a large vote.

As the market reports in this journal have abundantly testified, the political question has exercised very little influence on the condition of trade during the canvass, the exceptional prosperity which this country has enjoyed during the past two years destroyed any apprehension as to the future under the same administration, and a change back

unoccupied, to sink brine wells and start salt-works on a large scale, with the avowed object of opposition to the Trust, and we see from our other English exchanges that the industry will be prosecuted in other parts of the country, under the altered conditions now existing. Nor is the danger confined to home competition. German merchants are already planning to undersell the English producers in foreign markets, including this, and should be able to do so. The ancient history of the Newcastle coal combination called the "Limitation of the Vend" may be studied with profit by some of these later financiers.

ANNUAL REPORTS OF THE GOVERNORS OF ARIZONA, MONTANA, UTAH AND WASHINGTON TERRITORIES.

The feature of the report recently made by Governor ZULICK on the growth of the territory of Arizona to the Secretary of the Interior, from an engineering and industrial point of view, is the important place that irrigation is beginning to assume in this formerly supposed to be arid and uncultivable region. Two hundred miles of canal are in operation, and one hundred additional miles will be completed during the present year, and the Governor dwells with great emphasis upon the importance of hydrographic surveys, and the location of storage reservoirs. In these views we heartily concur, as it is difficult to overestimate the value of irrigation, and a proper study of the question in such countries as Arizona. The yield of gold and silver in the year under review is stated to have been \$5,771,555.

Governor LESLIE, of Montana, in his report just issued, naturally devotes much attention to the mining industries and interests, and although the style of the report is somewhat florid, and at first sight the zealous Governor might almost be suspected of "booming" Montana, yet we do not think there is any exaggeration, and certainly Montana needs no "booming." After mentioning the prosperous condition of the mining industry, and referring to increased yield, owing in great measure to improved methods of working and greater knowledge and better machinery for ore treatment, together with greater facilities for transport, he states that the number of quartz mines of gold, silver, copper and lead now in operation is greater than ever before, and he predicts that the placer mines will yield large returns for many years. Notwithstanding a lack of water, and consequently a shorter mining season than usual, the yield of bullion is greater than ever before, and he places the value of Montana's product for this year in gold, silver, copper and lead at \$31,400,000. He draws attention to the importance of the coal-beds, and touching on the silver question he reiterates his request of last year, "that the silver produced shall share its full measure of just consideration in the legislation of the government." Summing up, he thus speaks of Butte:

"The city of Butte, in Silver Bow County, is already the largest and most populous city west of Denver, between the Mississippi River and the Pacific Coast, and is the largest mining camp in the world. In this city men of courage have quietly and steadily persevered in the use of skill and energy, and the ready help of honest laborers opened the mountains, measured their depths, and have in less than ten years given to the country's circulating wealth more than one hundred million dollars. The force of capital and labor concentrated there is increasing every year, and the rewards fully demonstrate the fact that this wonderful home of gold, silver, copper, and other minerals has been but partially disturbed. Butte City, in Montana, the richest mining camp in the world, is the pride and boast of this commonwealth, and no state or people in this nation of wealth can fail to appreciate the brightness of this silver star."

Again, in the case of the report of Governor WEST, of Utah Territory, do we find the importance of irrigation brought forward, the crops produced by dry farming being pronounced a failure, while irrigated land has produced abundantly. The value of the aggregate mineral products of the Territory for the year is given as \$7,637,729, of which \$5,976,884 was silver.

With regard to mining industries in Washington Territory we are informed by Governor SEMPLE'S report that the coal mining industry, which is the most important in his territory, is in a healthy and prosperous condition, the mines having produced 1,133,801 tons this fiscal year, against 525,705 in 1887. This is indeed a notable development, the product being more than doubled, and speaks well both for the energy of those engaged in it, and for the satisfactory condition of trade. Gold and silver mining is also said to be prosperous.

MINING INDUSTRY IN NEW ZEALAND.

We have before us the report of the Secretary of Mines to the Minister of Mines of New Zealand for the year ending 31st March, 1888. It is so complete, and the evidences of intelligent supervision and assistance in recording the development of the mining industries of the colony are so clear, that it almost makes us wish that we, too, had a Mines Department. The report deals with the subsidized roads, grants towards the construction of drainage, storm-water and sludge channels, and water supply, schools of mines, roads undertaken and constructed by the government for the opening up of mining lands, water races and mining generally, giving a full and detailed account of every district and the operations in each. Then, for the information of the government and the miners, there is a full description of Cassel's chlorination process—which was such a dismal failure here and subsequently in England—and

of the early forms of the Russell process for the lixiviation of silver ores, with excellent plates illustrating the plant required. There are also tables showing all the reduction works completed and in progress and their value, and, finally, a separate report on the coal mines.

The following table shows the results for the year 1887, contrasted with the preceding year :

NAME OF METAL OR MINERAL. (Tons of 2240 lbs.)	For year ending 31st December, 1886.		For year ending 31st December, 1887.	
	Quantity.	Value.	Quantity.	Value.
Gold.....	Troy oz. 227,079	£ 903,569	Troy oz. 203,869	£ 811,100
Silver.....	12,108	2,946	20,809	5,453
Total gold and silver.....	239,187	906,515	224,678	814,553
Mineral produce, including Kauri-gum-copper ore.....	Tons. 20	£ 390	Tons.	£
Chrome ore.....	.....	.....	.....	.....
Antimony ore.....	62	1,784	134	3,989
Manganese ore.....	328½	1,316	305	895
Hematite ore.....	.....	.....	.....	.....
Mixed minerals.....	445	1,846	444	4,142
Coal exported.....	46,136	52,133	43,719	44,143
Coke exported.....	497	715	183½	206
Coal consumed in colony.....	488,217	244,108	514,901	257,451
Kauri-gum.....	4,920¾	257,653	6,791	362,449
Total quantity and value of minerals. Value of gold and silver as above.....	540,626¼	559,945	566,177½	673,335
Total value of minerals produced including gold and silver.....	.....	906,515	.....	814,553
.....	.....	1,466,460	.....	1,487,888

The total amount of gold produced in the colony since returns were collected is 11,220,593 troy ounces, with a value of £44,042,576; silver, 497,465 ounces, value £124,721, and the total value of all minerals £50,981,028.

The value of the machinery, plant and other works in connection with gold mining amounts to £1,899,571, which is large, taking into consideration the poor return.

The revenue of the department from gold duty, mining leases, miners' rights, licenses, receipts from government water-races, etc., reached the substantial figure of £49,664, of which, however, the sum of £37,297 was paid over to the local governing bodies for police and other municipal expenses in the various districts.

Coal mining is evidently more profitable than gold mining, as the records show that during the year there was an average number of 11,751 persons engaged in gold mining, while the gold produced was £811,100 in value, which would be an earning of less than £70 per man, a sum insufficient to pay for the labor. In the case of coal, taking the labor of at 6s. per ton, the average wages of the 1552 men and boys employed would amount to about £108 per head, leaving £133,978 as profit and interest on plant, depreciation, etc.

It is curious to note that under the head of minerals, the greatest value next to gold is Kauri gum, a product which is confined exclusively to New Zealand, and which, strictly speaking, is not a mineral, but in common with minerals is dug out of the ground. This is the crystallized resinous exudation of the Kauri pine, and the deposits extend more or less over the Auckland Provincial district, in the open country, as well as in the still remaining forests, thus marking the sites of long extinct forests. The gum is extensively used in this country and Europe as a varnish, and realizes a high price. This industry on the crown lands is regulated by a 10s. per annum license, conferring the same right to dig as by the miner's license in the gold-fields.

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.

Rewards for Meritorious Discoveries and Inventions.

EDITOR ENGINEERING AND MINING JOURNAL :

SIR: The Committee on Science and the Arts of the Franklin Institute, of the State of Pennsylvania, respectfully requests that you will cause to be made known to the readers of your influential journal the fact that the committee is empowered to award, or to recommend the award of, certain medals for meritorious discoveries and inventions, which tend to the progress of the arts and manufactures.

These medals are:

1. THE ELLIOTT CRESSON MEDAL (gold).

This medal was founded by the legacy of Elliott Cresson, of Philadelphia, and conveyed to Trustees of the Franklin Institute. By the Act of the Institution, May 17, 1849, the Committee on Science and the Arts was designated and empowered to award this medal, and the committee decided to grant it, after proper investigation and report by sub-committee, either for some discovery in the arts and sciences, or for the invention or improvement of some useful machine, or for some new process, or combination of materials in manufactures, or for ingenuity, skill, or perfection in workmanship.

2. THE JOHN SCOTT LEGACY PREMIUM AND MEDAL. (Twenty Dollars and a Medal of Copper.)

The John Scott Legacy Premium and Medal was founded in 1816, by

John Scott, a merchant of Edinburgh, Scotland, who bequeathed to the city of Philadelphia a considerable sum of money, the interest of which should be devoted to rewarding ingenious men and women who make useful inventions. The premium is not to exceed \$20, and the medal is to be of copper, and inscribed "To the most deserving."

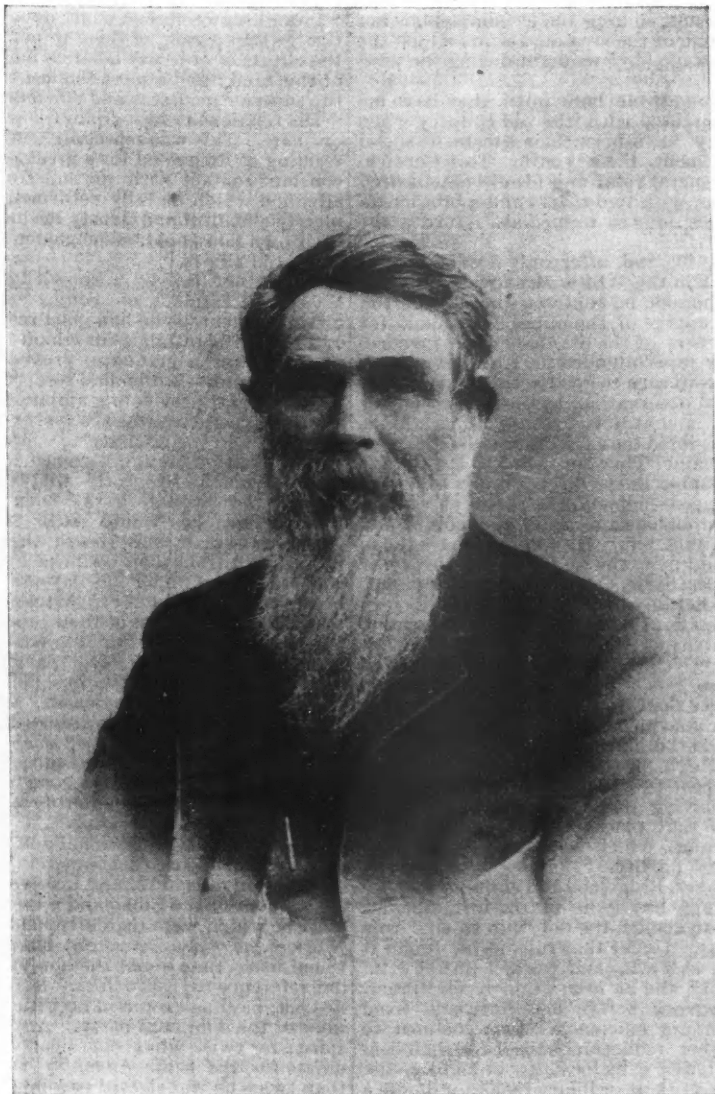
The control of the Scott Legacy Premium and Medal (by Act of 1869) was transferred to the Board of Directors of City Trusts, and referred by the Board to its Committee on Minor Trusts, and that committee resolved that it would receive favorably the name of any person whom the Franklin Institute may from time to time report to the Committee on Minor Trusts, as worthy to receive the Scott Legacy Premium and Medal.

The Franklin Institute, by resolution in 1882, accepted the above-named action of the Committee on Minor Trusts, and referred the duty of making such recommendations to the Committee on Science and the Arts. The committee determined that the recommendation for such re-

PHILIP R. GEORGE.

The death of Mr. Philip R. George, at Ringwood, N. J., on Sunday, October 21st, terminated a characteristic and creditable career, of which I offer the present sketch, not only as a tribute of personal esteem and friendship, but also as an appropriate recognition, in a journal identified with the mining industry, of one of the representative mining captains of the United States.

Mr. George—"Uncle Philip"—was a Cornish miner of the best type. Better than that, his long life in the American atmosphere had added to native industry, shrewdness, skill and good nature, the versatility and elastic energy, the inspiration of hopeful enterprise and the stimulus of success, which seem to be peculiarly the products of our national conditions. Due to blood these elements are not; for they affect men of all races, when they become Americans. Whether they result from liberty, or the tariff, or the climate, we will let the doctors of law and



PHILIP R. GEORGE.

ward shall be made on the favorable report of a sub-committee which shall be appointed to examine the invention or discovery.

The committee requests your co-operation in facilitating the making of the aforesaid awards for meritorious discoveries and inventions, by bringing the facts herein set forth to the knowledge of your readers.

Upon request therefor, from interested parties, made to the Secretary of the Franklin Institute, full information will be sent respecting the manner of making application for the investigation of inventions and discoveries; furthermore, the Committee on Science and the Arts will receive and give respectful considerations to reports upon discoveries and inventions, which may be sent to it with the view of receiving one or the other of the awards herein named, and full directions as to the manner and form in which such communications should properly be made will be sent on application.

By the Committee's order, **WM. H. WAHL**, Secretary.

The Franklin Institute of the State of Pennsylvania, for the Promotion of the Mechanic Arts. PHILADELPHIA, Oct. 1, 1888.

medicine decide. One thing is certain: a man of talent and virtue is not obliged to spend his life here in simply holding his own. He advances. The country is "growing up," and he enjoys the exhilarating sense of "growing up with the country." No better instance could be adduced of the fruitful development of inborn force of character by such influences than the life just ended at Ringwood.

Philip R. George came of an old family, the records of which run back to the middle of the fourteenth century. He was one of twelve children; yet, when he died, he left no immediate relatives living in Cornwall or in any part of England. All the members of his branch of the family either died before him, or immigrated to this country. The six elder children were girls; of the six boys, Philip, the second, was born in Parish Illogen, Cornwall, on the 22d of February, 1820. Four of the twelve survive him, John, William, and Richard George, well-known mining captains in New Jersey, and a sister, residing in the same State. The father, Richard George, was employed in mines from boyhood, and, for many years before his death in 1842, as captain at Carnbrey.

Philip attended school until he was twelve years old, when he began his career in the old-fashioned way—at the bottom—first as a runner of errands and doer of small jobs above ground, then as a "cleaner" of copper- and tin-ore, and finally underground, as "two thirds of a man," i. e., a youthful miner at two thirds the wages paid to men. He was noted for his venturesome spirit and also for his small stature; and on the latter account (at least, such is the report; but I think the former had something to do with it) it was for a long time customary, when the men went down the shaft to their work below, to fasten him, with a rope around his waist, to some stronger and older man, lest he should slip through the ladders, or otherwise come to harm. At the age of eighteen he had attained the dignity of full wages, and could afford to discard the rope.

Two years later, he came to this country, after the fashion of our most valuable immigrants, namely, not as a mere unit in a vast, wholesale importation, but as an enterprising and self-reliant seeker of fortune in the new world, and drawn hither by the personal reports of his own people. Years before he was born, an uncle of his had come to the United States, had served as a soldier in the war of 1812, and had not been heard of afterwards, until old Richard George, not willing to believe his brother dead, at last, in 1840, succeeded in obtaining news of him. In the very ship that brought the tidings came the wanderer himself, to revisit his native place after more than a quarter of a century of absence. That a severance from home and friends, so long and so complete, is not now as common as it used to be, is one of the striking results which the railroad, the telegraph and cheap postage have wrought during the present generation.

But men of foreign birth who have dwelt here until they have become Americanized, are seldom contented with the old country when they return to it, even though it may have been their dream to spend their declining years where they spent their youth. This Cornish-American was no exception to the general rule; and his discontent fired the ambition of young Philip, who, with two sisters and a brother-in-law, accompanied their uncle in his almost immediate return to the land of his adoption.

They landed in New York late in 1840; and, after only a week of rest and sight-seeing, Philip went to work in the White Meadow iron mines at Rockaway, N. J. The next year he took on contract the Brotherton mine; the year following, he took charge of the mines at Ironclaw for Messrs. Dickerson and Post, then owners of the Stanhope blast-furnace. For the same parties he subsequently superintended the Hurdtown mine. But during all this time he continued to turn to good account his knowledge of mining and his quick, shrewd observation by operations on his own account in leased properties or in contracts. These undertakings were usually of short duration, and covered the extraction and delivery of a few hundred tons of ore from each mine. They furnished to Mr. George a peculiarly varied and thorough training in the direction in which he was already both gifted and experienced—namely, the power of estimating upon inspection of a mine, its probable capacity of production and cost of operation. In this he had no superior. He was the best "judge of an iron mine" in New Jersey, and knew the nature and history of nearly every such deposit opened in the State. And he was a vigilant, just, sympathetic and efficient manager of workmen.

Mr. George came into business relations with the firm of Cooper & Hewitt through his engagement as manager of the once celebrated Andover mine. Peter Cooper took an active interest in the development of this mine, and on one occasion was so much pleased with the improvements introduced by the new manager that, as they shook hands in saying good-bye, he pressed a five-dollar gold piece into Mr. George's palm—to the great amusement of the latter, whose improvements had saved to his employers as many thousands. He kept the coin as a pocket-piece for years and was never weary of repeating the story.

In 1854, Messrs. Cooper & Hewitt having purchased the historic Ringwood tract, Mr. George removed to that place and assumed charge of the property (some 20,000 acres in extent), which he managed to the day of his death with conspicuous skill and fidelity.

The changes made by him at Andover, Ringwood and elsewhere, in the mining practice of the time, were simple but by no means insignificant. He is reported to have been the first to abolish the old "sun to sun" rule as to the working hours of the miners. Under that rule, as he found it in operation, the men began work at 5 A. M., and worked until 6 P. M., with a short interval at 7 for breakfast, and an hour at noon for dinner. Mr. George at once put an end to the work before breakfast, and fixed ten hours as the day's work of maximum efficiency. I am inclined to believe that he never favored further reduction, except for such continuous and exhausting labor as obviously calls for shifts of eight hours, or even less. A man who would not work at ordinary tasks ten hours a day was, in his judgment, simply lazy; and what he preached on this head he practiced.

Another improvement introduced by him was the use of large drills, deep holes and heavier charges of blasting-powder. Aided by skill and good judgment in the location of drill-holes, according to the nature, tension, cleavage and position of the working-face, this method secured the highest efficiency in extraction possible to the old drills and explosives. Such novelties as power-drills and dynamite he adopted later, after witnessing their effects in actual use.

No serious casualty ever occurred in a mine under his charge. During his forty years' career as a mine-manager, only five lives were lost in consequence of accidents in the mines, and in none of these cases could the cause be attributed to neglect, ignorance or mistake on his part. His temper was not easily ruffled; but nothing roused him to anger more quickly than omission or delay to put in the necessary timber to support a weak or threatening place in a hanging-wall. He would stop everything at the first suspicion of danger, until safety had been assured.

His long experience in the handling of men and his readiness at mechanical expedients led to his conducting many enterprises besides the management of the Ringwood mines and forests. Of the latter, let me remark, in passing, that a dozen years ago, in my capacity as the consulting engineer of the owners, I made an inspection of the woodlands of this tract, accompanied by a thoroughly educated professional expert, formerly an official of the Prussian forestry department. His verdict was, that Mr. George's treatment of the different parcels of forest-growth in all stages, was skilful and wise. The only criticism he

offered was, that, according to his old-world notions, it was not safe to have so many details of an extensive administration carried in one man's head—a comment which is now sadly confirmed. For Mr. George, like other born managers, educated in life rather than schools, could not analyze and record, for the instruction of others, the processes of his own mind, its memories or its purposes. Consequently, he leaves no successor who can cover the whole field of his administration.

Among the incidental labors in which he engaged was the construction of the Ringwood branch of the Greenwood Lake Railroad, the main line of the same road from Hewitt's Station to the State line, the railroad from Waterloo to Andover, and various branch roads on the Ringwood tract. One of the latter, a mine railroad three miles long, he built without any assistance, even from a surveyor, using his own judgment as to route and grade, and "making a good job of it." The improvements and constructions connected with the ice business at Greenwood Lake were also directed by him, as were the various building operations required on the Ringwood property, in connection with mines, trestles, dwellings, water-power, blast-furnaces, etc.

This multifarious activity reflected itself in his subordinates. A large proportion of them, having worked with and for him many years, were able, like him, to turn their hands to all sorts of trades or problems in rough engineering. It was almost a proverb in the region round about, that "those Ringwood men could do any thing;" and more than once Mr. George sent a gang of them to put through some undertaking in which the efforts of ordinary laborers had failed. I remember a recent occasion of this kind; and almost the last time I saw him, he spoke with pride of the superior readiness and efficiency of his "Ringwood boys."

His relations to his employers were those of a friend as well as a subordinate. This was especially true of Mr. Hewitt and his family, who, residing at Ringwood for a great part of each year, were brought into constant contact with its superintendent, and regarded him with an affection which he fully returned. In his death they have lost, not merely a skilful and trusty business agent, but a beloved member of their own household, associated in their memories with all its experiences and affairs.

I must not fail to acknowledge the courtesy and cordiality of Mr. George's treatment of young engineers. He was confident in his own judgment, as he had good reason to be; and he liked to remember and relate the instances in which he had proved right, while some other man, perhaps a graduate, proved wrong—in which particular we all resemble him. But he had respect for knowledge and education, and a hearty sympathy for young ambition and endeavor; and his own abundant store of experience was always at the service of those who had the wit to know, and the modesty to confess, its value. If he had enjoyed in youth that thorough scientific training, the lack of which he did so much by both study and practice in later years to supply, he would have been a great engineer, though it is likely that he would still have preferred to do things, and let others explain and record them. The wisdom of such men must be gathered from their own lips by respectful listeners, as they sit in the cool stopes and finger the clay-candlestick and talk while they rest—or before the fire of winter nights when work is over. Or, it must be gained by simple observation of their prompt, shrewd ways in action. At all events, it will not be found in books. Happy the young mining engineer (I speak with grateful personal remembrance of "Uncle Philip") who can reinforce his theories and formulas and analyses and drawings with the pithy maxims and wise judgments of such rugged, kindly old practitioners. They are, within their sphere, the true experts; for the term in its etymology signifies one who has gone through a thing and come out with practical success. They are the men who have "been there"; and, no matter how good a map the traveler may have, it is worth his while, before entering upon the actual journey, to hear what they have to say.

Apart from his professional and business ability, the force and uprightness of Mr. George's character commanded general confidence. He settled many disputes, and involved himself in few. He was an assiduous student of the Bible, and a member of the Episcopal church, the services of which were regularly held near his residence at Ringwood. In politics, he was a Democrat, but he concerned himself less about national issues than about the honest administration of local affairs, without reference to party lines. Residing in a Republican township and district, he thus exercised no little influence in determining the nominations of the dominant party. And his neighbors treated him in the same spirit; for twice when, out of party loyalty, he ran as the Democratic candidate for the State Assembly, they cordially defeated him, and more than twice he was elected to a much more important position, as a member of the Board of Freeholders of Passaic County.

A few weeks ago, a morning newspaper of this city published, as an attack upon Mayor Hewitt, a slanderous account of alleged wrongs and oppressions in the treatment of tenants and workmen at Ringwood. This falsehood really bore rather upon Mr. George than upon his employer. We are glad to note that, a day or two after his death, the newspaper in question made a complete retraction of the libel, confessing itself deceived as to the facts. Even had this act of tardy justice not been performed, the accusations which it cancelled would not have been credited by any man who knew the character of the men at whom they were aimed.

Mr. George was married in 1846, and his wife and four children survive him: three sons, Sampson W., mining superintendent at Chester, Edward C., in charge of the Charlotteburgh mine, and Samuel M., his father's assistant at Ringwood, and one daughter, the wife of Mr. J. L. Cunningham, also connected largely with mining operations. His three surviving brothers, Richard, John and William, and some of their sons, are also engaged in mining, the hereditary occupation of the family.

The funeral, which took place at Ringwood on Thursday, October 25th, and was attended by a large concourse, including many persons from New York and from Paterson and other points in New Jersey, was an impressive testimony of the truth of what I have written concerning his reputation and influence. The assemblage included a delegation from several lodges of Free Masons, and the funeral train was subsequently received by a similar delegation at Boonton, where the interment was performed with Masonic ceremonies.

Fortunately I am able to accompany this sketch with a portrait of "Uncle Philip" as I knew and shall always remember him. The quaint, rugged, humorous, strong face; the bushy brows, from under which glanced keen and kindly eyes; the patriarchal beard, that grandchildren were not afraid to pull; and the bowed but sturdy frame (which this portrait does not show)—these go to make up an outward personality which has often seemed to me, as it accompanied me through familiar subterranean ways, like the presence of a wise and friendly gnome. But I knew that there dwelt within it more than that; for it inclosed and expressed a loyal, honest, manly soul.

R. W. RAYMOND.

IRON IN MEXICO.

Written for the Engineering and Mining Journal by Richard E. Chism, M.E.

Iron is fairly well distributed all over Mexico, occurring in several districts in quantities large enough to make it of prominent importance in the future development of the country and perhaps to materially affect the markets of the world at some period in the not far distant future.

The most important deposit of all is the Iron Mountain, at the gates of the city of Durango. This is an immense hill, one mile long, one third of a mile wide and rising at its highest parts from 450 to 650 feet above the surrounding plain. The amount of ore "in sight" has been pronounced by well-known experts to be "practically inexhaustible," not improbably as much as 250,000,000 net tons. A portion of this mountain is now owned and being exploited by an American company. The mines are open cuttings.

The ores are all oxides and yield about 50 per cent of iron in the blast-furnace. They are reasonably free from phosphorus and sulphur.

The next most important deposit of iron is at present that found at Zimapan in the State of Hidalgo. These deposits are of "whole mountains" of oxide ores, principally magnetite. The iron in these ores is stated to vary between 30 and 80 per cent. They are likewise very low in sulphur and phosphorus. Some experiments on a sample of iron made at this locality were conducted by Sir William Fairbairn. The breaking weight for a section one inch square was 54,143 lbs. with an elongation of 0.233 per inch of length. The principal works in this locality are owned by a resident in the City of Mexico. They have six blast-furnaces, of which four are in operation, rolls, etc., for producing round rod iron up to 3½ inches of section, and also flat bar and square iron of the same dimensions. There are also a limited number of castings turned out in the shape of pillars, beams and smaller work like cartwheel bushings, gratings, etc. The supply is only limited by the demand, and the owner states that he can compete with foreign irons in price, even though they should be admitted free of duties. The difficulties with which he has to contend are dear fuel and difficult transportation. The cost of mining a ton of ore at this place is rather less than 50c., and the deposit is worked by an open cut.

The next most considerable production of iron is in the State of Jalisco. The ores found here are in great abundance, consisting of hematites principally, with an average of 95 per cent of iron. They produce an iron which is said to be better than that of Sweden. There are two blast-furnaces and a bar mill capable of making 2½-inch bars and all sizes of flats, 1½-inch squares and various sizes down to ½-inch round. Every description of castings can be made, from five pounds up to four tons, but the workmen are especially skillful in making ornamental railings and chairs, sugar boilers and small castings. The castings are made direct from the blast-furnaces, or from cupola furnaces of poor construction when the blast furnaces are not in operation. The fuel used is charcoal of medium quality, which costs about \$5 per ton. Mining costs from 50 to 75 cents a ton.

In the State of Guerrero there are also extensive deposits of hematite iron ores with about 60 per cent of iron. These are worked to some extent, but I have no particulars of the plant nor the quality and amount of the product.

In the State of Oaxaca there are extensive deposits of magnetite and hematite that are worked at several places. There are five plants whose united product is about 450 tons annually in the form of flat, round, and square iron and billets. No castings are made as far as I can learn.

There is a large deposit of magnetite near Salome Botello Station on the Mexican National Railroad, about 80 miles south of Laredo, Tex. This is about to be exploited by an American company, which will erect an extensive plant near Sabinas, on the Mexican International Railroad, about 40 miles from the mines, where they will have the advantage of cheap fuel from the coal mines at Sabinas and of railroad transportation for their fuel and materials. There is also a deposit of iron ore, said to be of considerable extent, near Monclova, a town on the Mexican International Railroad, about 50 miles to the west of the last mentioned deposit, and one in the Sierra of Santa Rosa, in the same state.

In Chihuahua iron is found in quantity in the cantons of Matamoros, Galeana and Jimenez; in the State of Guanajuato, in the district of Leon, and in the State of Sinaloa, near the city of Culiacan. I believe that none of the last-mentioned deposits are now being worked, at least I have not been able to obtain any information to that effect.

The total production of iron in Mexico may be estimated as follows:

Durango, said to be 20 tons per day, yearly, 365 days.....	7,200 tons.
State of Hidalgo.....	5,000 "
" Jalisco.....	900 "
" Oaxaca.....	450 "
" Guerrero.....	say, 200 "
All other places.....	100 "
Total.....	13,550 tons.

Of the above quantity, 13,550 tons, probably 4500 tons are marketed in the shape of castings of different kinds, the remainder being wrought-iron in the shape of rods and bars for blacksmith's use.

It must be confessed that the element of pure conjecture enters into the above estimates to a greater extent than is desirable, as the subject of the iron production in this country is enveloped in the darkest cloud of the very many that hang over the statistics of Mexico. However, my estimates have been obtained in part from the producers themselves, so that the larger items may be considered as fairly correct.

The cost of producing pig-iron in this country is variously estimated at amounts ranging from \$15 to \$22 per ton, including mining and smelting. The most satisfactory estimate that I have been able to obtain is one made by Mr. J. P. Carson, of New York City, and published in the Transactions of the American Institute of Mining Engineers, Vol. VI. p. 398. The estimate applies to the works at Tula in the State of Jalisco, and amounts to \$17.16 per ton. The cost of bloomery iron in billets is stated at \$52.03, the cost of puddled bar iron at \$34, and the cost of ordinary bar iron from puddled bars at \$49.71. It is not probable that iron is made for much less than the above at any works in Mexico, except that at Durango, perhaps, certainly not at any of the older establishments.

The wrought-iron, produced as above, sells at from 8 to 11 cents per pound in the city of Mexico, while the cast-iron sells for about from 6 to 9 cents.

In order to obtain any figures upon the importations of iron into Mexico we have to go a long way back. The only statistics that I have been able to get that have any useful bearing upon this subject are contained in a report issued by the Mexican Treasury Department, and relating to the last six months of the year 1884. In some later reports the weight of the importations are not given, and the values as recorded are so conjectural and variable that the statistics are practically useless. It is a work of labor to pick out the various forms of manufactured iron from the classification as made by the Mexican tariff law, where they are lumped with other manufactured metals, and it is necessary to resort to estimation to obtain the amounts of certain articles. There are also many forms of iron which it is absolutely impossible to obtain figures upon, as they have been so effectually "lumped," as above, that all identity is lost.

Such is the fate of iron in the form of hollow-ware, pipes and small castings of that description, and to a certain extent of that in the shape of nails, spikes, tools and wire. Having so far bespoken the indulgence of my statistical readers, I invite their attention to the following table, which is obtained as above, and based upon the best authority to be had:

IMPORTS OF IRON FOR THE LAST SIX MONTHS OF THE YEAR 1884.

Articles.	Met. tons.	Duties.	Values.	Estimated profits of trade.
Telegraph wire.....	506	Free.	\$6,188.00	50%
Card wire.....	285	"	2,207.55	25
Plows and fittings.....	121.1	"	21,131.89	25
Bar steel for mines.....	69.4	"	17,712.92	25
Fire engines.....	46.1	"	12,687.39	25
Hoes, cane-knives, shovels and picks.....	103.1	"	32,357.33	30
Pipes and tubes.....	372.4	"	33,096.82	25
Iron and steel rails.....	1,437.8	"	72,536.20	30
Machinery and accessories.....	3,245.7	"	702,049.20	50
Steam engines.....	1,210.0	"	73,911.31	40
Iron beams.....	243.0	"	10,100.00	28
Anvils.....	1.8	"	380.25	30
Tool steel.....	262.1	78%	23,387.22	100
Hollow ware, trinkets, enameled iron, etc.....	141.7	75	41,153.62	100
Corrugated iron.....	208.8	75	10,746.52	100
Other classes of iron.....	1,758.3	84	88,093.14	113
Tin plates.....	80.1	79	12,794.80	105
Totals.....	9,469.6	metric tons.	\$1,160,534.16	

Or, in one year, say 20,000 tons imported, valued at \$2,330,090.

The duties in the above table are calculated by a comparison between the invoice value given in the custom house reports and the gross amount of duties paid thereon. Most of the Mexican duties are collected by weight or number so that the above is only an approximation to the percentage paid. The profits of trade are estimated by a comparison between the invoice and market prices of the imports, which are also given in the custom house report just referred to.

At the present time I am informed that the imports have tripled in value and amount. Should this be the case the present importation would represent about 60,000 tons of iron, with a value of \$7,000,000. In my own opinion it would be safer to figure on an increase of about 75 per cent. on all the items except those of machinery and mining steel, which have probably increased threefold or more.

The population of this republic, according to the latest figures that I have seen, is, in round numbers, 10,500,000 persons, so that the consumption of iron per head at the figures given in the table, and including the domestic supply, would be only 7.4 pounds per annum. At the present time I believe, but without any exact statistics to support the assertion, that the consumption is about 13 pounds per head per annum, including, of course, both the foreign and domestic supply. It would be interesting to make the comparison between the consumption per head here and that in other countries; but I have not the data at hand for the purpose.

The great drawbacks to iron making in this republic are the fuel, the labor and the want of transportation. The fuel that would for the present have to be used in most localities is charcoal, which would cost from \$5 to \$10 per ton. The quality is likely to be good, but the great difficulty would be in obtaining a constant supply. The charcoal burners of this country are very unreliable and very independent, and are influenced a great deal in their work by the seasons and by the character of the country where the fuel is made.

Mexican labor is well known to be very unreliable. The men are by no means slow at learning anything that may be taught to them; but they are, as a rule, deficient in perseverance and in application. There are too many saints' days and too many libations for the prosperity of any enterprise in this country that must depend on getting its labor here, and besides face a sharp foreign competition. The importation of labor becomes difficult because of the many privations which must be faced and endured. Higher wages must be paid, and even then the men are not satisfied. The labor question is the great problem that must be solved in some way before the industrial future of Mexico can be assured.

Next comes the question of transportation. Most of the iron mines are situated far from the railroads, consequently the product must be made under the drawbacks already mentioned as to fuel, and pay heavy freight charges to get to a market. Nor is it always a question of money only. The roads are often in such a condition from the rains that traffic must be absolutely suspended. It is easy to imagine what an interruption of

transportation for days and weeks means to a producing plant on a large scale. It would probably be easy, however, to secure at the present time a location within a reasonable distance of one of the railroads, which might not be so abundant in ore as some others further off, but would, at least, be assured of cheap transportation.

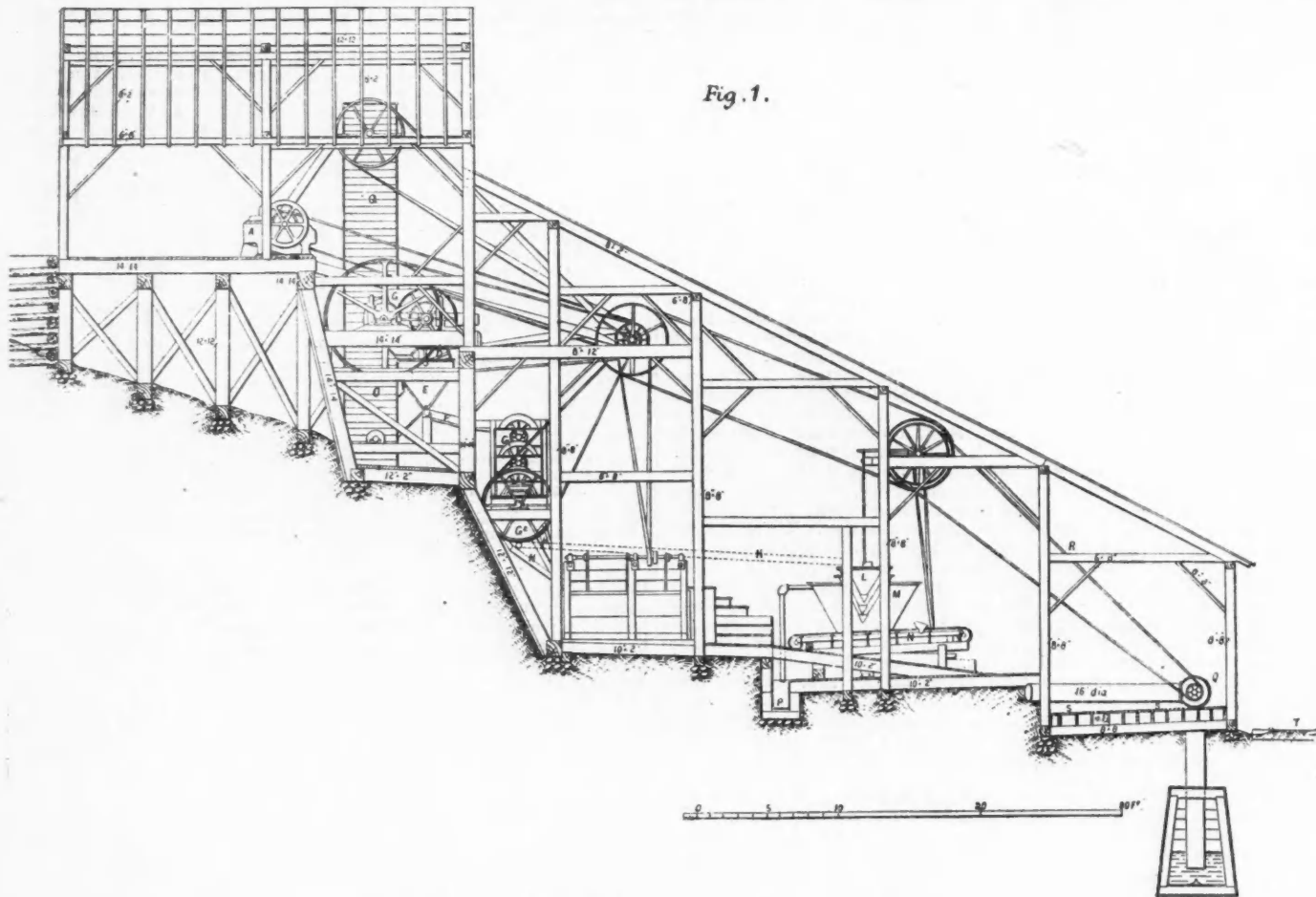
CONCENTRATING MILL FOR SILVER ORES.

We illustrate by the engravings here shown a mill for concentrating silver ores (argentiferous blende and pyrites), planned by Messrs. Taylor & Brunton of this city and Leadville, Colo., for the Dnoro Milling and Mining Company, and erected under their supervision. The difficulty presented in the treatment of the ore was its sticky nature, nearly one third by weight being of this character. In consequence of the certain loss if treated by ordinary methods, this special form of mill was devised, in which the feature is that the ore is followed in its passage through it by a strong current of water so as to break up and separate as much as possible the adhering particles.

The general arrangement is shown by Figs. 1 and 2, the power being supplied by a 15-inch double Leffel turbine on a horizontal shaft under 50-foot head of water. The turbine is run at 650 revolutions a minute, and the shafting at 140 revolutions. The crushing power consists of a 7-

type *N*. The mill is lit by thirty Swan incandescent lamps, and electricity is generated by a Brush dynamo fixed above the turbine on the crossbeams at *R*; the dynamo is run by a direct belt from the turbine wheel shaft.

The course of the ore through the mill is automatic, after it has been shoveled by hand into breaker *A*; from this it is carried by a current of water along the slightly inclined trough *B*, through the rolls *C*, into the return screen *D*; from this the over-discharge, the coarser ore, feeds with the surplus water into the water-tight elevator *O*, and is thereby returned to the stonebreaker and rolls for recrushing. From the return screen *D* the through discharge settles in water to the points of the hopper-shaped housing *E* in which the screen revolves; each point ends in a circular opening regulated as to size by a specially constructed gate valve, through which the ore particles are forced, by the head of water standing in the housing, into the trough *F*; along this the ore is conveyed by the water to the series of sizing trommels *G*. In these trommels the coarser portion of the ore passes over the wire screens and through the spouts *H* to the jigs *I*, wherein it is finally concentrated; the finer portion passes through the screen, collects in the hopper underneath, and feeds into the next trommel, and so on from the upper to the lower; the smaller sized screen used has 3600 holes to the square inch, and the ore that passes through it is conveyed by water into the pipe (*K*, shown in dotted line) to the hydraulic concentrator *L*. The



CONCENTRATING MILL FOR SILVER ORES.

inch by 10-inch Blake Crusher *A*, a pair of Cornish rolls each, 14 inches face and 36 inches in diameter *C*; a trommel 8 feet long and 3 feet in diameter *D*; from which the insufficiently crushed portions of the ore are carried back to the stonebreaker by a bucket elevator *O*. One roller is movable so as to give on a heavy strain.

The fixed roller is driven by a 14-inch belt received on an 8-foot band-wheel; it revolves slightly faster than the other roller, because, were they driven at the same speed, the same portions of the faces would be continually meeting, and wear into ruts would rapidly result. In order to thoroughly break up the cakes formed by the rolls, the return screen *D* revolves in an iron housing *E* kept full of water. The sizing apparatus consists of the return screen *D*, determining the maximum size of ore particles, three ordinary trommels, each 6 feet long by 30 inches in diameter *G*, and one pyramidal hexagonal screen *G*². A further division of the through discharge from the hexagonal screen is accomplished by Brunton's hydraulic classifier cones *L* acting on the "Spitzkasten" principle, but in which slowly revolving mullers regulate the size of the openings through which the water current ascends, and by their motion prevents the bridging over of the openings by any portions of ore. The concentrating apparatus comprises four three-compartment through-discharge jigs *I*, one of which, for the coarsest ore, is provided with "Herberle" gates; one Brunton hydraulic concentrator similar in construction to the classifiers, but giving a highly concentrated discharge, by reason of an up-water current acting on the ore particles coming direct from the dimension sizing—as distinguished from hydraulic sizing—and the final concentrating is done by three "Frue" vanning tables of the ordinary

overflow from this concentrator passes to the classifiers *M*, each of which furnishes a water-sized product to be treated on one of the vanning tables *N*. From the jigs *I* the waste tailings discharge by short spouts—nct shown, as they run under the floor—into the main tailings spout *P*; into this spout the tailings from the vanning tables fall, also the overflow from the last series of classifiers. The ore concentrates fall into boxes under each jig, vanning table and classifier, and from there are wheeled on to the draining floor *S*, a continuation of the water-wheel terrace; from this floor, when dried, they are loaded into railway wagons running alongside the mill on the road *T*. The capacity of the mill is 50 tons of ore in 24 hours, and the total cost, ready to run, \$22,500.

We are indebted to our contemporary, *Engineering*, for the illustrations and most of the foregoing description of the mill.

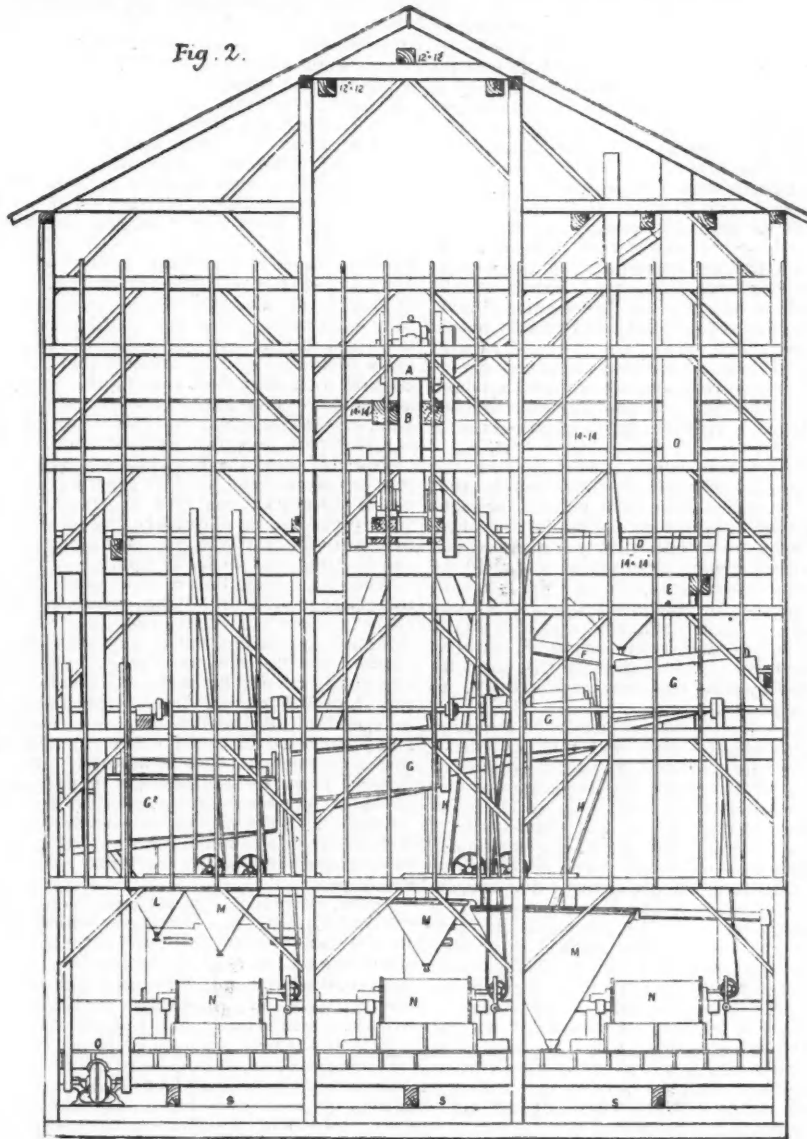
Vegetable Parchment for Shaft Bearings.—It is said that experiments have recently been made on Prussian railways with axle-boxes fitted with bearings of vegetable parchment in place of brass. The parchment is strongly compressed before being used, and it is thoroughly dried to prevent subsequent shrinkage. An emulsion of water and oil, any of the mineral oils, is used as lubricant. The parchment soon becomes impregnated with oil, and is able to go a long time without a renewal of lubrication. It is between the body of the journal and the thin edge of the parchment segments that friction takes place. The claim is made that the compressed paper bearings make a tough material that is superior to metal.

THE CENTRAL STATION OF THE LONDON ELECTRIC SUPPLY CORPORATION AT DEPTFORD, ENGLAND.

The general impression in this country is that we are far ahead of England in extent and magnitude of our electrical enterprises, but to give credit where credit is due, the works of the London Electric Supply Corporation, now under construction, far exceed anything in this country in boldness and importance, both from an engineering and scientific point of view. This corporation is the outcome or growth of a private concern established by Sir Coutts Lindsey, the Earl of Crawford and a few friends to light the Grosvenor Gallery and immediate neighborhood by electricity, and which is now operating 80 miles of mains and 33,000 lights. This was the limit of its capacity, and in a quiet and business-like manner, without any appeal to the public for capital, the corporation secured a suitable site on the Thames at Deptford and commenced work on an unprecedented scale in April last, from which may be inferred that the first venture proved profitable, and that by the aid of their intelligent engineer, Mr. S. Z. de Ferranti, they felt confident of overcoming all the difficulties involved in the problem

of fuel, which will be supplied to the furnaces by means of vertical shoots passing through the centers of the floors of the upper boilers to the lower ones. It may be interesting to note that appliances for producing forced draught will be used in connection with these boilers, and that each set of six boilers will be provided with a feed-heater or economizer, the products of combustion from the whole of the twenty-four boilers passing into one chimney, in the base of which two sets of the economizers are arranged, the other two sets being placed on a level corresponding with that of the upper boiler floor. Two chimneys are at present being erected, each measuring, internally, 24 feet by 18 feet, and the height of each when finished will be 135 feet. Each chimney is divided internally into four chambers. For the supply of fuel and the unloading from vessels in the river of the heavy masses of machinery a wharf has been erected, and on this has already been placed a steam derrick capable of dealing with a weight of fifty tons. From this riverside point a railway of ordinary gauge will convey materials right through the various buildings, down the center line of which, when completed, a broad permanent way runs, affording the means of unloading heavy weights at any point. Passing from the boiler-house, we

Fig. 2.



CONCENTRATING MILL FOR SILVER ORES.

of supplying the amount of electricity contemplated. We note that our English contemporaries apparently look upon this installation only as a source of light, but it seems to us that the very title of the corporation suggests that the supply of electrical power is also contemplated, and if this is the case the new venture should prove a formidable rival to the Hydraulic Power Company now in operation, of which we gave a description in our last issue.

We condense the following description of the works from our contemporary *Engineer*: "The site occupies about three acres of ground, and the buildings at present in course of erection comprise one boiler-house and two engine-houses, occupying a space of 210 by 195 feet, the height from the basement to the crown of the arched roof being close upon 100 feet, while the main walls reach 6 feet in thickness.

The boiler-house, when finished, will measure 195 feet long by 70 feet broad, with a height of nearly 100 feet. This building is designed to contain Babcock and Wilcox's boilers, aggregating 40,000 horse-power, and of these a number—twenty-four—are now being erected to give steam for engines of 13,000 horse-power. These boilers are being arranged on two floors, the upper floor being supported on iron pillars of immense strength, 30 feet high, while above this upper boiler floor will be another floor, similarly supported, and capable of carrying 4000 tons

found two engine-houses in course of construction, each 195 feet in length, 66 feet in breadth, and some 85 feet in height. These houses are separated from the boiler-house by a massive wall of masonry, and from each other by iron pillars of great strength, the arrangement being such that an uninterrupted view of the whole of the machinery may be obtained from an elevated gallery provided for the purpose. In the first engine-house a pair of "small"—comparatively speaking—engines will be erected. These engines have been built by Messrs. Hick, Hargreaves & Co.—as have also the larger ones hereafter mentioned—and are of the compound inverted marine type, with arrangements for condensing. They are fitted with Corliss valve gear, and are to work with steam at 200 lbs. pressure. The engines will run at 60 revolutions, and will drive, by means of 40 5-inch cotton ropes, working over a 24-foot drum, 2 Ferranti dynamos, each capable of supplying current for 25,000 lights, by far the largest electrical generators that have as yet been constructed. The exciting engines for these dynamos are being made by Messrs. Allan, and are of the Allan & Kapp type. Some 60 feet overhead will be placed a steam traveling crane capable of lifting 25 tons, and traversing the building from end to end.

Two questions which presented themselves for solution were, first, the

most economical method of getting the current into London; and, second, the most economical means of using the three acres of ground at disposal so as to get the maximum output of electricity.

With a view to solve the first question, Mr. Ferranti made a number of experiments with different electromotive forces of alternating currents, and finally settled upon 10,000 volts as being the most economical pressure at which to work, having regard not only to the small loss in the mains, but also to the design of the transformers and dynamos which have to resist such a severe tension. It is needless to say that very special and novel designs were necessary for the apparatus used.

Then, with regard to the second question, viz., the economical use of the land, Mr. Ferranti laid out a plan as follows: A central avenue was arranged from the river, running through the middle of the ground. A central line was then selected across the ground, and a massive partition wall built upon this line, the only opening in it being a lofty arch for the central avenue. On the river side of this the boiler houses are placed, consisting of a basement taking the flues for the smoke and compressed air, two railways for removing the ashes, and the necessary space for the forced draught apparatus. Next comes the ground floor, with the boilers and firing platform: above this is a concrete ceiling, which carries a repetition of the basement, viz., flues, &c.; above this another floor of boilers; again above this a sloping floor for storing some 4000 tons of coal, and over this the roof. The tramways for taking the coal from the ships will run at this elevation, and will discharge their coal directly into the store over several lines. The floor of these engine houses is formed of wrought-iron girders and concrete, the foundations for the machinery going through the basement, which is 12 feet deep, on to the gravel. This basement is, therefore, convenient for getting at the foundation bolts, and also for placing the steam and water pipes in.

The first engine-room on the left-hand side of the central avenue will contain two of the Corliss engines and two Ferranti high-tension dynamos of 1500 horse-power each. These machines will be the first to be started, but very shortly will only be used for the electric lighting in the day time. The first engine-house on the right-hand side of the central avenue will be entirely devoted to the condensing gear, which will be sufficient for the whole station when completed. The second engine-house is being arranged to take four direct driving Ferranti patent dynamos of 10,000 indicated horse-power each. To give some idea of the size of these machines, it may be here stated that the shafts are 36 inches diameter in the center, the armature about 45 feet over all, and the weight of the whole machine, exclusive of the engine, some 500 tons. They will run at 60 revolutions, with an electromotive force of 10,000 volts.

The electromotive force of 10,000 volts may cause some surprise to the electrical world, but a number of careful experiments have shown that 10,000 volts is no more difficult to deal with than 2400 volts if the right principles are employed in designing the machinery. The first two Ferranti patent dynamos of 1500 horse-power each are nearly completed and will shortly be erected. The first two Ferranti patent dynamos of 10,000 horse-power each will be completed in about five months. Mr. Ferranti, in designing the station and its details on the above principle, has a space at disposal now covered with buildings capable of accommodating 40,000 horse-power, and remaining space of ground easily available without crowding for another 80,000 horse-power. This brings up the capacity of the three acres of ground, after everything has been provided for, to the enormous figure of 120,000 horse-power.

In the larger plant the armatures of the dynamos are to be mounted direct on the shafts of their respective engines, the field magnets being built up on the bed plates. Each dynamo will have its pair of engines of 10,000 horse-power eventually, but at present only half the engine power will be applied, and the output of each dynamo will, with its 5000 electrical horse-power, suffice to maintain 100,000 lamps; but when the time arrives for the creation of more power by the addition of the second engine of each pair, these two large dynamos will each have their engines of 10,000 horse-power, and each will then supply current for 200,000 lamps, and all future extensions of the plant will be in machines of this type. These engines, like the smaller ones, are by Messrs. Hick, Hargreaves & Co., of the compound inverted marine type, with Corliss valve gear, and appliances for condensing, and are to work at 200 pounds; the exciter engines, as in the previous case, being also of the Allan & Kapp type. To facilitate the handling of the heavy weights in this engine-house an over-head steam traveling crane of fifty tons capacity will be provided. Before leaving the description of the buildings, we may state that they are being laid down on lines which will admit of an ultimate output of current for 2,000,000 lamps, and that the present preliminary arrangements will, as already shown, admit of 250,000 lamps being run.

Having now briefly described the means for supplying the current, we will consider how it is to be conveyed from Deptford to the metropolis. The alternating current, produced by the Ferranti generator, is to be conveyed, at a pressure of 10,000 volts, from its source to distributing stations situate in various parts of London, where it will be reduced to the required tension and distributed over the district of which the particular distributing station forms the center. The mains for conveying the current from Deptford to the various stations in London consist of two copper tubes placed one within the other, and thoroughly insulated from each other, the inner tube being $1\frac{1}{2}$ inch in diameter, and bare $\frac{3}{16}$ inch thick, and the outer one $2\frac{1}{8}$ inch in diameter, and bare $\frac{1}{8}$ inch thick, the area of each being nearly 5 inch. The outer tube makes earth throughout the whole of its length—some miles—and similarly one pole of the dynamo goes to earth. Although conveying currents of such high tension, the corporation have proved to demonstration that their mains do so with absolute safety, a long and exhaustive series of experiments having been undertaken with the express view of satisfying the several railway companies over whose systems the current will, by agreements already entered into, be conveyed.

Considering the length of outer tube exposed, we may take its large area of contact with earth to insure complete safety, or to use the words of the corporation's engineer, "it will be either a dead breakdown or absolute safety; it is the small leakages that kill."

It only remains to say that those concerned expect the resistance of the armatures will be less than one per cent of the total electrical resist-

ance to be overcome, and they believe that something under three per cent will cover all losses of current over mains, leads, etc."

We will add to the above description that the arrangement made with the Southern railway companies for entrance into London, and with the Metropolitan District Railway for distribution in that city, seem to us to afford the corporation exceptional facilities at a minimum of cost, and once in London the potential of 10,000 volts will be reduced at transforming stations to 2400 volts, which is the standard of the existing system, and for distribution to consumers this potential of 2400 volts will be further reduced to 100 or 50 as may be required. The precaution taken in dealing with the high voltage consists in the complete enclosure of the brushes in an iron box which is locked magnetically by the current of the circuit. The method of insulation between the two concentric copper tube conductors is the subject of an important patent of Mr. Ferranti. The insulation of the armature coils is effected by means of sulphur, which is said to yield excellent results.

COAL MINING IN CHINA.

The report of the Chinese Engineering and Mining Company, whose head office is at the Tong colliery, Kaiping, shows that the output and consumption of coal from this colliery in 1887 amounted to nearly 230,000 tons, and may be expected to reach 270,000 (or nearly 900 tons per day) in 1888. This and the following we learn from a correspondent of the London *Financial Times*: The "Tong" colliery, named after Tong-King-Sing, to whose indomitable perseverance and energy it owes its existence, is situated at Kaiping, in the province of Chi-li, about 90 miles from Tientsin, the riverine depot for Peking, the capital of China. Port Arthur (or, as it is locally named after the Viceroy Li Hung Chang, Port-li), which in the near future will be the great naval station of Northern China, is within easy distance by rail. The Tong colliery was opened about ten years since under the supervision of Burnett and Molesworth, but for some years past it has been under the sole management of Claude W. Kinder, C.E.—to whom our correspondent, Prof. I. A. Church, referred in complimentary terms in the *ENGINEERING AND MINING JOURNAL* of October 13th—son of the late Major Kinder, the first director of the Hong Kong Mint, and subsequently of the Imperial Japanese Mint at Osaka. The net profit upon last year's output was 200,000 taels (roughly £40,000), and with the improved means of transit the company should at least net 250,000 taels (£50,000) this year, or about 20 per cent on their capital—a result quite satisfactory enough to stimulate the astute native merchants to bolder efforts. Latest information from headquarters is to the effect that the railway connecting Kaiping with Tientsin is now a *fait accompli*, and before these lines appear in type "black diamonds" from the Tong colliery will be delivered by "coal train" at this important and rapidly growing depot, where they will soon drive out of the market coal from Japan, Australia and Formosa, and whence "Kaiping" coal will quickly find its way to Peking, and out from that field also the costly camel-borne fuel which now reaches the Chinese capital from regions far beyond the Great Wall.

Tong-King-Sing, one of the most prominent and enlightened of the merchant princes of China, when he first started work at the Kaiping Colliery, some ten years since, met (as was to be expected) with considerable opposition, but being well backed up by the Viceroy, Li Hung Chang, by the Marquis Tseng, and other partisans of progress, he eventually carried his point, the result being that at the present moment the Chinese Northern Fleet of iron-clads and gunboats is now practically independent of the coal supply hitherto drawn from Japan, Australia, and Formosa. Not only will an appreciable reduction in the naval estimates in time of peace be assured, but the important advantages to be derived from an independent supply of coal in the event of war with Japan or Western nations cannot be over-estimated. During the late struggle with France the Chinese fleet was practically blockaded at Port Arthur, unable to move for want of coal, supplies of which were suddenly stopped owing to the strict neutrality observed by Great Britain and Japan.

Apart, however, from the great political importance of an independent coal supply, the advantages which will accrue therefrom in a mercantile and domestic point of view cannot well be over-estimated. Without cheap coal it would be impossible to open up smelting works for the treatment of iron and other ores with which the northern provinces of China abound, or to establish a naval arsenal and dockyard at Port Arthur, a *desideratum* long and patiently looked forward to by the men who have the best interests of China at heart.

During the progress of the works at the "Tong" colliery, and the construction of the railway from Kaiping to Tientsin, Kinder did not let the grass grow under his feet. He has started brickmaking on a large scale, and it will be seen from the traffic returns that 85,543 bricks were sent from Kaiping to Lutin. This shows that Kinder manufactures more than he requires for "home consumption," and as colleges, factories, warehouses and mansions are rapidly being constructed at Tientsin and Taku, in European style, the supply of building materials to these ports bids fair to form an important item in the future receipts from goods traffic on the Kaiping-Tientsin line.

Each homeward mail from China brings fresh rumors of concessions granted to representatives of Western nations. So far these rumors have proved to be utterly without foundation, except in the busy brains of "our own correspondents."

Time will, we think, show that the progress made by China, though slow, has been sure, and that in the development of her immense resources, men like Li Hung Chang, Tseng, and Tong-King-Sing will not take rank as mere cyphers, but will insist on matters being managed on lines long ago marked out by them, nor will they submit to being dictated to by Western busybodies.

Burma Ruby Mines.—We understand on pretty good authority, says *Indian Engineering*, that the rumor regarding the lease of the Burma ruby mines is well founded. A concession has been granted, we believe, by the Government of India to Messrs. Streeter to work the mines, but for nine instead of five years, and at a rental of five instead of four lakhs (about \$175,000—Ed. E. and M. J.) It is understood that Messrs. Streeter in this case are acting also on behalf of Messrs. Rother-

child & Co., who are interested to the extent of one half of the mines. The concession, we are told, has already been sold for £200,000 or £300,000, to a syndicate who will, with the aid of Messrs. Rothschild, we assume, bring it out as a company on the Stock Exchange. These latter, however, are details which have not been as yet finally adjusted.

Success of the New Ore Carrying Vessel.—Concerning the performances of the cigar-shaped ore carrier described in *ENGINEERING AND MINING JOURNAL* of September 29th, the *Duluth Press* of October 24th says: The steel barge 101, owned by Capt. Alex. McDougall, made port here yesterday at 10 A.M. in tow of the Wallula. She accomplished the trip from Cleveland in just four and a half days, notwithstanding she passed through one of the severest storms ever experienced on the great lakes. She passed Sand Beach, while several boats which had started ahead of her for Duluth were seeking safety there, and arrived in Duluth ahead of them. The Wallula found no difficulty in towing her, and her own officers speak in terms of admiration concerning her behavior in the heaviest blow. She will discharge a cargo of coal here, and will return to Lake Erie with soft ore or stone. Captain McDougall is proud of her record.

Rogers' Synchronal System of Telegraphing.—Dr. J. Harris Rogers, of Washington, D. C., has lately invented a new system of synchronism, which, it is claimed, will make it cheaper to telegraph messages than to mail them. The new system reduces the English alphabet to ten elementary characters. The messages are prepared by means of a machine resembling a typewriter, and manipulated in the same manner with the use of ten keys—one for each character—any message desired can be written. Dr. Rogers for the past four years has been at work trying to perfect synchronism. Its application in telegraphy is to make two wheels—one at each end of the line—revolve simultaneously. According to Dr. Rogers, over 200 words can be transmitted in a minute by his new system. A test of the new apparatus was held on Tuesday afternoon, and a message of 76 words sent over in 25 seconds and printed on a tape in plain Roman characters. The inventor says that he can, by this system, make one wire do the work that ten do now by the system in vogue.

A Gas Hammer in England.—Instead of steam furnishing the motive power, a mildly explosive mixture of common coal gas and atmospheric air is employed. It is used to propel the hammer piston very much as in the cylinder of a gas engine. Softer blows are given by reducing the range of movement of the hand-lever, and the force of the blow can be regulated as easily and accurately as with the steam hammer. The hammer is three fourths hundredweight, but the ordinary blow struck by it is equal to a weight of three hundredweights, falling through a height of 1 foot; 3000 blows use only 33 cubic feet of Birmingham gas, which at 2s 6d. per 1000 cubic feet costs one penny, or 4500 light and heavy blows can be struck for the same sum.

The hammer is always ready for work at any moment, day or night, for short or long periods, and it works at the same economical rate for one blow as for 1000. It is only necessary to light the Bunsen flame, open the gas cock, and it is ready for action. The hammer is arranged to work with hand-gear, but if preferred it can be arranged to work with foot-gear also.

The Cost of Smoke in London.—Prof. Chandler Roberts estimates the weight of the smoke cloud which daily hangs over London at about fifty tons of solid carbon, and 250 tons of carbon in the form of hydrocarbon and carbonic-oxide gases. Calculated from the average result of tests made by the Smoke Abatement Committee, the value of coal wasted in smoke from domestic grates amounts, upon the annual consumption of five millions of people, to £2,257,500. The cost of cartage on this wasted coal is calculated to be £268,750, while the unnecessary passage of about 1,500,000 horses through the streets in drawing it adds seriously to the cost of street cleaning and repairing. Then there is the cost of taking away the extra ashes, £43,000 per year. Summing it all up, the direct and indirect cost of the wasted coal may be set down at £2,600,000, plus the additional loss from the damage done to property caused by the smoky atmosphere, estimated by Mr. Chadwick at £2,000,000, the whole aggregating £4,600,000, or \$23,000,000.

New Hydraulic Dredger—Important Suits for Infringement of Dredger Patents.—There is now being constructed at San Diego, California, by the Bowers Dredging Company, and under the patents of A. B. Bowers, a large hydraulic dredging machine, the hull of which is 120 feet long, 33 feet beam, 9 feet deep and drawing 3 feet of water. The excavator is 4 feet in diameter and 4 feet long, and its capacity is one cubic yard per revolution (maximum velocity 20 revolutions per minute) with full feed. In ordinary loose material, working with 85 pounds steam, and allowing for stoppages, etc., it is expected to average 10 cubic yards a minute. Owing to the high price of coal (\$18 a ton) the four cylindrical tubular boilers, each 20 feet long and 5 feet diameter, are provided with petroleum burners, which have proved themselves very economical. We hope soon to publish a full description of this interesting machine, with some data as to its work and a few suggestions as to its possible usefulness in some branches of hydraulic mining. The work to be done at San Diego will consist of cutting out a yacht harbor and using the material to fill out the flats for a park and race-track. We understand that the patentee has brought suit against all parties using the Hercules, Atlas, Chaquette, and Lynch dredgers for infringement.

Suez Canal as an Investment.—The receipts of the Suez Canal in the first nine months of this year were 48,829,000 francs, against 43,187,000 francs in the first three quarters of 1887, showing an increase of 5,642,000 francs. As there is practically no increase in expenditure in earning this additional sum, these figures may be taken as representing a gain in net revenue. The net profits of the canal are distributed thus: 71 per cent to the shareholders, 15 per cent to the Egyptian Government, 10 per cent to holders of founders' shares, 2 per cent to the directors, and the same to the employees. Thus, of every clear 100,000f. earned, the shareholders divide 71,000f., so that of the 5½ millions of francs by which the receipts have already increased this year there will be 4 millions for the shareholders. As there are, or rather were—for 4,500 of them have been redeemed by

drawing—400,000 shares, this means a dividend of 10 francs more than that of last year. In 1887, 78·25 francs were distributed on each share, so that by the end of this year they may count on at least 90 francs per share. At the present price of £88½ for the £20 (or 500 franc) share, this would be more than 4 per cent, so that Suez Canal shares are certainly not yet standing at their full value. A four per cent stock with the security of the Suez Canal is underrated at 88½.

Primitive Manganese Steel Manufacture in India.—Part 3 of Vol. XXI. of the Geological Survey Records of India contains an exhaustive and interesting paper by Baboo Pramatha Nath Bose, B.Sc., F.G.S., on the manganese iron and manganese ores of Jabalpur, in which we are reminded that the pyrolusite of Gosalpur was first brought to the notice of government by Mr. W. G. Olpherts in 1875. It has since been desultorily examined and experimented on by Mr. Medicott and Mr. Mallet, but seems only now beginning to be appreciated at its true worth; now when the uses of manganese as an alloy with iron in the manufacture of steel have been scientifically developed. In India it is employed in the manufacture of what Baboo Pramatha Nath Bose calls "a kind of steel iron, known as khert"—an industry affected by nearly every village of the Lora Hill Range. The furnace in vogue is of a most primitive type; 4 feet 6 inches in height, a foot and a half in breadth, built of mud mixed with straw. The bellows for it are about a foot and a half high when stretched. They are made of goat skins and cost Rs. 4 per pair; the making up costs a rupee. A pair will last one full season (November to May). The entire cost of furnace, bellows, and all requisites does not amount probably to more than Rs. 7. The Lora Hill artificers, in short, understand the uses of economy, as well as of manganese.

Proposed Dam Across the Rio Grande at El Paso.—It is reported that Major Anson Mills of the Tenth Cavalry, at present stationed at Fort Grant, Arizona, has prepared a project to construct a dam across the Rio Grande, four miles above the city, at a place where the bluffs come within 400 feet of each other and consist of solid rock, and where the bed of the river is also rocky. He proposes to build a dam 60 feet high of stone and Portland cement, and thus create a lake 14 miles long. This would hold water enough to permanently irrigate Rio Grande Valley on the Mexican as well as the American side of the river. An irrigating canal could thus be carried past the city of El Paso 70 feet above its level. The water could be utilized for hydrants and fire-plugs, as the pressure would be ample. The lake thus formed would be from 6 to 8 miles wide and cover 50,000 acres of land which is not settled and is mostly owned by private parties. This would have to be purchased or condemned by legal process. The plan is very favorably received by the citizens of El Paso, and will probably be acted upon. It would also supply water-power to run all the factories in El Paso. Major Powell, Director of the United States Geological Survey, is said to approve the plan as practicable, and he proposes to establish a station to measure the flow of the river and determine the amount of sediment. It is proposed to make the dam an international affair.

Rulings of the Interstate Commerce Commission.—The rulings are in reference to the special commodity tariffs which have occasioned difficulties at Chicago, St. Louis and other interior points. The rulings are as follows: (1) Rates that are just and reasonable from selected points through the entire territory east of the Missouri River and west of the Atlantic seaboard are prima facie just and reasonable from all other points in the same territory. (2) A tariff naming a rate from one locality lower than that enjoyed by a neighboring one where the circumstances are the same operates to give a preference, and any additional burden exacted of the shipper becomes undue and unreasonable unless it can be justified upon some substantial ground. (3) Common carriers are under obligations to take all descriptions of ordinary traffic from all points, and rates should be known and announced publicly in advance of the offering of traffic. (4) Shippers are not required to ask for rates, but are entitled to equal and open rates at all times. (5) Discriminations are made and undue advantages are given by special tariffs where they give different rates to places named and to those not named, to manufactured articles named and those not named, to jobbers at places named and those not named, or to manufacturers, jobbers and other dealers. The modifications suggested by the commission on the basis of these rulings have now gone into effect.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

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

- PATENTS GRANTED NOV. 6TH, 1888.
- 392,187. Furnace for Melting Metal. John M. Cooper and John W. Cooper, West Bellevue, Pa.
- 392,210. Rolling-Mill. William J. Lewis, Pittsburg, Pa.
- 392,213. Transformation and Distribution of Electric Energy. William J. McElroy, Pittsburg, Pa.
- 392,260. Reversing Attachment for Rotary Engines or Pumps. Charles H. Cary, Bristol, R. I.
- 392,285. Hydrocarbon Furnace. Jefferson Patten, Brooklyn, N. Y., Assignor of one hundred and thirty-four two-hundredths to Ivers A. Gard, Bergen Point, Charles Kennedy Hamilton, Jr., Summit, and Charles M. Mundy Metuchen, N. J.
- 392,286. Dehydrating Sodium Sulphate. Henry Pemberton, Jr., Philadelphia, Pa.
- 392,356. Rotary Steam Engine. Abram D. Minier, Milan, Pa.
- 392,428. Steam Boiler Setting. Martin E. Hershey, Harrisburg, Pa.
- 392,454. Apparatus for Treating Molten Slag or Material from Smelting Furnaces. Orrin B. Peck, Chicago, Ill., Assignor to the American Slag Furnace Company, same place.
- 392,455. Process of Separating Metals, Matte, or Metallic Compounds from Molten Slags. Orrin B. Peck, Chicago, Ill.
- 392,456. Process of Desulphurizing Ores and Decomposing Metallic Salts. Orrin B. Peck, Chicago, Ill.
- 392,468. Process of Reducing or Drawing out Steel Ingots. William A. Sparger, Bristol, Tenn.
- 392,484. Rolling-Mill. Anthony Zdziarski, Assignor to M. De Routkowsky, St. Petersburg, Russia.
- 392,448. Centrifugal Pulverizer. Joseph Behm, West Point, Cal.
- 392,532. Elevator Bucket. William G. Avery, Cleveland, O.
- 392,533. Rotary Engine. Charles H. Cary, Warren, R. I.
- 392,545. Rotary Steam Engine. Joseph H. Dow, Cleveland, O., Assignor of one half to William Chisholm, same place.
- 392,548. Device for Preventing the Incrustation of Boiler Tubes. Albert Fickett, Rochester, N. Y., Assignor of one half to Thaddeus W. Hulett, same place.
- 392,562. Ore-Feeder. Frank A. Huntington, San Francisco, Cal.
- 392,571. Hoisting Apparatus. Benjamin F. Shepherd, Pleasantville, Ind.
- 392,579. Steam-Generator. Lewis C. Thatcher, Chicago, Ill.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(Continued from page 375.)

The asymmetry of these columns may be referred to three facts.

1. The distance between the main axis of adjoining columns varies irregularly. 2. The directions of the lateral axis of neighboring crystals bear little relation to each other. For both these reasons the lateral growth of a given column is likely to be interrupted by that of its neighbors at different distances from its main axis on its different sides. 3. That the different lateral axes of a given column appear to grow at different rates.^a These

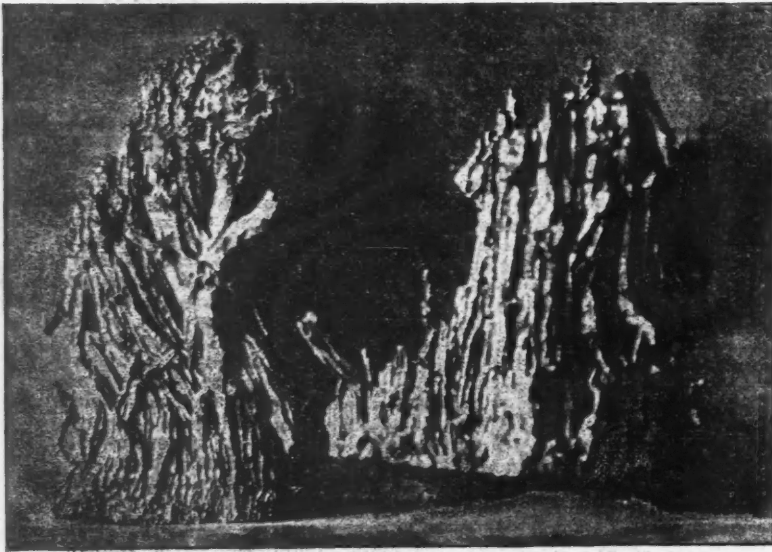
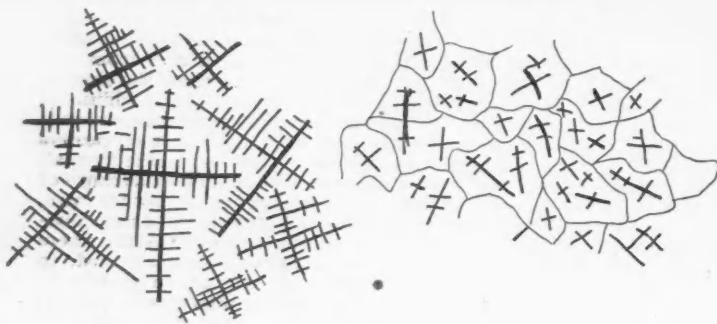


Fig. 64.

Fig. 65.



Longitudinal sections of steel ingots, transverse to main axes of the columnar crystals. (Chernoff.)

Fig. 66.

Fig. 67.

Supposed lateral axes of the columnar crystals.

Resulting irregular cross-section of the columnar crystals.

lateral axes are sketched in Figure 66, and the boundaries of the columns in Figure 67.

The exterior columnar structure is clearly due to the rapid escape of heat from the shell of the ingot into the mould. We may suppose that the metal naturally tends to crystallize in equiaxed grains: that there is a struggle between this tendency and the tendency to crystallize in indefinitely long prisms which the rapid outward cooling sets up. As the walls thicken and the flow of heat outwards slackens, the prismatic tendency weakens: the sudden transition from the prismatic to the equiaxed formation suggests that no resultant, no compromise is possible, so that from the moment when the equiaxed tendency outweighs the prismatic it reigns alone, as if its rival were not. Chernoff^b pointed out that, in large ingots, this granular

region is succeeded by an inner more compact one. He refers the granular region to the interstratal movements which must occur during even slow cooling, and which must be especially great in large ingots, and more marked near the outside than in the centre, because much of this motion must have ended before the centre has solidified. We may conceive that this motion, occurring while the region which we find granular is at a certain critical temperature of inter-crystalline weakness, breaks or weakens the mesh-work which surrounds the crystals, or at least weakens the inter-crystalline adhesion, so that when rupture subsequently occurs it passes between the crystals: while in the central portion, the inter-crystalline adhesion being unimpaired, rupture strikes more or less into the bodies of the crystals, the fracture is more compact.

Osmond and Werth^c explain the granular region by supposing that it begins at the moment when the interior as a whole has reached the freezing point: from this time on solidification occurs from internal centres of organization growing in all directions. But is there such a moment? Will not each successive layer reach this point after the one outside it?

§ 254. RECRYSTALLIZATION ON REHEATING SLOWLY

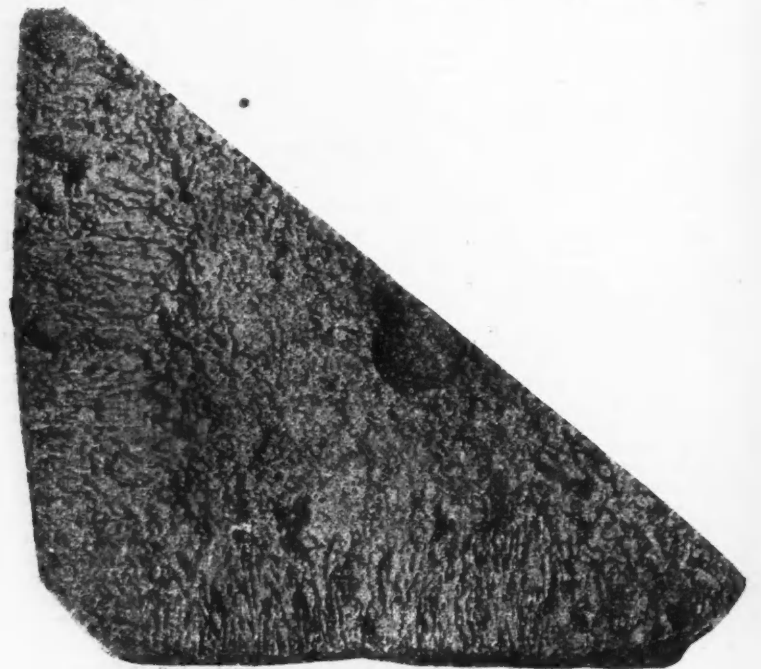


Fig. 68.

Cross-section of steel ingot, natural size, showing columnar and granular structures, and blowholes. (Martens.)

COOLED METAL.—A. On simple prolonged exposure to a high temperature, to judge from Sorby's microscopic studies, it seems that, even when no chemical change is apparent, each of the several minerals draws together and separates more distinctly from the others. Thus the pearlyte and free ferrite separate from each other as more distinct crystals when wrought-iron is annealed, and some of the combined cementite separates from the pearlyte: when steel of 0.49% of carbon is annealed, the free ferrite, originally distributed as mesh-work plates within and between the dominant crystals of pearlyte (Figure 56), draws together into grains.^d

^c Annales des Mines, 8th ser., VIII., p. 69, 1885. The resemblance which they note between the granular region and lead bullets powerfully pressed together in a mould does not imply that the former grows under pressure, for the granulation occurs in central regions which are not likely to be in compression during or after freezing. The hexagonal structure of the bee's honey-comb does not imply pressure, unless indeed of circumstances.

^d Jour. Iron and Steel Inst., 1887, I., pp. 269, 272.

* Copyright by the Scientific Publishing Company, 1887.

^a Idem, p. 141.

^b Idem, pp. 131, 143. I have carried these speculations a step beyond his.

B, at V.—During the gradual heating of iron several marked phenomena occur at or near V. The rise of temperature is retarded or perhaps even reversed^a: the expansion is checked and reversed, so that the metal contracts momentarily, and then re-expands^a: a dry crackling sound is heard^a: the thermo-electric department becomes anomalous^b: the coercive force^{cd} and the power of being rendered a *temporary* magnet^d (whether by electric current or by another magnet) and hence of being attracted by the magnet,^e almost disappear, the latter at least through a series of distinct and separate diminutions^d: and the specific heat (as inferred from the quantity of heat given out by the metal when immersed in a calorimeter) suddenly increases, remaining astonishingly high from 660° to 720° C., when it again descends somewhat, but remains about twice as great as at the ordinary temperature.^f The changes in attraction by the magnet and in specific heat have been directly proved to be simultaneous^g: the other changes, too, as far as we can tell without precise measurements, occur simultaneously with these.

Nickel and cobalt lose their power of being attracted by the magnet, and undergo like simultaneous changes in specific heat,^g nickel between 220° and 400° C., cobalt at about 900° C. The thermo-electric power of nickel, also, behaves anomalously at the critical point of this metal.^b Of these phenomena, the loss of magnetism, the thermo-electric change, the change of specific heat and the retardation of rise of temperature have been noted in almost and in some cases quite carbonless iron: the momentary contraction, however, readily detected in hard iron and especially in steel, could not be detected in very soft iron, at least in certain specimens.

If the quenching-temperature of steel be gradually raised, the coercive force of the quenched metal remains nearly constant till some temperature reported to be 875° C., or between V and W, is reached: with further rise of temperature, at least to above 1,075° C., the coercive force increases rapidly.

C, at W. To the sudden porcelainization of fracture which occurs when steel is heated to W, correspond not only the simultaneous sudden change from cement to hardening carbon and sudden increase of hardening power, but also the appearance of polished sections, and certain very marked thermal and other phenomena.

I. Polished Sections: By their study Sorby finds that when a steel ingot of 0.49% of carbon is quenched from redness, the composite structure with its marks of successive crystallizations is no more. Traces of the original net-work can be seen: "but on the whole the grain is so fine and uniform that even a power of 400 linear fails to

reveal the ultimate constitution, and shows little more than that the grains are somewhere about $\frac{1}{30000}$ inch in diameter."^h Just as our fracture studies show that the crystalline force exerted when cement changes to hardening carbon at W is so great as to completely eradicate all previous crystallization, so the microscope teaches that this force here reunites the comparatively widely scattered particles of the different minerals, forming a single new compound, hardenite, though to do this it probably has to move some of them considerable distances. Osmond and Werth too cannot find their composite cells in etched polished sections of hardened steel; and its structure as revealed by Weyl's method differs greatly from that of unhardened steel.ⁱ While the temperature at which these changes in the appearance of polished sections occurs has not been determined directly, we infer that it probably is W, from the fact that the fracture and the condition of carbon change at this point, and that the hardening power is acquired here.

2. *Coffin's Weld.*^j—If a bar of tool steel, say $\frac{3}{8}$ inch square, be broken, and the fresh fractures placed in apposition; or if two of its surfaces be accurately planed by grinding and put together: and if the pieces thus in close contact be inclosed in platinum foil to exclude the air, and heated to W in the flame of a Bunsen burner or otherwise, they will unite more or less completely. This does not seem to be like the cold welding of lead, for it does not appear to occur below W. It is here interesting to note Chernoff's remark that the intimate contact of two surfaces of iron of the same nature heated to a temperature above B (*i. e.* W?) suffices to unite them.^k

Mr. Coffin reasonably ascribes the union to the sudden and violent change of crystallization which occurs at W. The elements rearrange themselves, seeking new alliances with such energy that neighboring molecules, not only in different crystals but actually in different bars, unite.

3. *Coffin's Bend.*—A steel bar A was heated to above W and then, without removing it from the furnace, supports were placed beneath its ends, and the temperature held constant for thirty minutes, during which no perceptible deflection occurred. It was withdrawn, cooled, and replaced on supports in the hot furnace. When its temperature had again risen to about W the bar began to deflect.^l

In a similar experiment tried in my presence, two straight steel bars, 2 and 3, containing 0.67% of carbon, $\frac{3}{8}$ inch square and 4 feet long, were heated near each other in a reverberatory furnace. 3 was supported at its ends only, 2 lay on the level hearth. 150 seconds after entering the furnace and while at a low yellow 3 began to bend, and bent about one inch in the next 120 seconds. It then appeared to cease bending. Removed from the furnace 5.5 minutes later and slowly cooled, its total deflection was found to be 1.06 inches, showing that practically all the bending had occurred during two minutes while it was passing a certain critical range, above which it ceased to bend. 2, now apparently hotter than 3 had been when bending, was supported at its ends: no deflection could be detected. (TO BE CONTINUED.)

^a Pionchon obtained the following expressions for the specific heat of iron:

From 0° to 660° $q_0^t = 0.11012t + 0.000025,333,33t^2 + 0.000,000,054,86664t^3$.

From 660° to 720° $q_0^t = 0.57803t - 0.001,435,987t^2 + 0.000,001,195t^3$.

From 720° to 1,000°, $q_0^t = 0.218t - 39$.

From 1050° to 1200°, $q_0^t = 0.198,87t - 23.44$.

Comptes Rendus, CII., pp. 675, 1454; CIII., p. 1122.

From this it appears that during the cooling of iron two abnormal evolutions of heat occur; a lower one between 660° and 720° C., a c 1, absorbing 5.3 calories, and a higher one at about 1050°.

Barrett, Phil. Mag. XLVI., p. 473, 1873.

^e Osmond, Transformations du Fer et du Carbone, 1888.

^b Tait, Trans. Roy. Soc. Edinbgh., XXVII., p. 125, 1873; Proc. Roy. Soc. Edinbgh., VIII., p. 33, 1873.

^c Gilbert.

^d Gore, Phil. Mag., XL., p. 170, 1870.

^e Coercive force, or retentiveness, the power of becoming and of remaining a permanent magnet.

^f Pionchon, Comptes Rendus, CII., p. 1455, 1886.

^g Idem., CIII., p. 1124, 1886.

^h Jour. Iron and Steel Inst., 1887, I., p. 276.

ⁱ Annales des Mines, 8th Ser., VIII., pp. 14, 8.

^j Trans. Am. Soc. Mech. Eng., IX., to appear. Mr. Coffin performed this experiment successfully at the Philadelphia meeting of this society, using a Bunsen burner: and I have pieces which he has welded, which by their sharpness, color and freedom from scale show beyond question that they were united either at a temperature very far below the usual welding point of steel, or else with almost perfect exclusion of oxygen.

^k Revue Universelle, 1877, I.

^l Trans. Am. Soc. Civ. Eng., XV., p. 324, 1887.

PERSONAL.

Mr. A. W. Lange, a civil engineer, in the employ of the Norfolk & Western Railroad, died at Roanoke, Va., on the 1st inst.

Mr. O. H. Hahn, until recently connected with the Colorado Smelting Company of Pueblo, Colorado, has gone to San Francisco, Cal.

Mr. E. A. Macrum, Treasurer of Carnegie, Phipps & Co., Pittsburg, Pa., has resigned, and will be succeeded by Mr. Lawrence Phipps.

Prof. M. C. Vincent is now in Utah examining the Flagstaff mine previous to continuing further West, whither he is going to look after new mining properties.

Dr. David Hostetter, of Pittsburg, Pa., who has been prominently connected with railroad, natural gas companies and other industrial enterprises, died in New York on the sixth inst.

Mr. C. E. Palmer, mining engineer and metallurgist, until recently General Manager Grand View Mining and Smelting Company, at Rico, Colorado, has established an office at Aspen.

Mr. George S. Wilson, for many years the confidential bookkeeper of Messrs. A. J. Hoole & Co., of Buffalo, the coal merchants and miners, died in that city on the 31st ult., aged fifty-three years.

Mr. D. J. Mahoney, who has been employed in the Comstock mines for the past twenty-five years, and has held various positions, has been appointed Superintendent of the Consolidated New York Mining Company, of Nevada.

Mr. S. Raunheim has gone to New Mexico to act as financial agent in taking over the Santa Fe copper property recently purchased from W. A. Clark, of Butte, Montana, by a Boston syndicate. We refer to this company in our mining news.

Mr. James Douglass, the well-known mining engineer, had the misfortune recently to be thrown from a buggy while going from Prescott to Copper Basin, Arizona, breaking his right arm. Mr. Douglass has, in consequence, returned to New York.

Mr. Myron J. Carpenter, general agent of the Union Steel Company, of Chicago, for the past year, has been appointed general manager of the Duluth & Iron Range Railroad, over which the Vermillion Range iron ores are taken on their way to market.

Mr. Levi E. Riter, well known in Salt Lake, has assumed the position of manager of the Tintic Mining and Milling Company, Utah, made vacant by the retirement of Colonel Alex. Graham, who left to take charge of the old Manhattan property at Austin, Nevada.

Mr. Wm. J. Osborn, a well-known mining broker and one of the old members of the Consolidated Stock and Petroleum Exchange, fell dead in the ranks of the Republican parade in this city on the 3d inst. Mr. Osborn was fifty-five years old, and had been troubled with heart disease for some time previous to his death.

Mr. James G. Rule, late foreman of the Gould & Curry and Best & Belcher mining companies, at Virginia City, Nevada, has been appointed Superintendent of the Utah Consolidated, to fill a vacancy caused by the resignation of Mr. D. B. Lyman, who voluntarily relinquished the position on account of his many other duties.

Messrs. Edward P. Allis & Co., of Milwaukee, Wis., as usual, will this year issue a calendar for 1889. They write us that they will be ready to distribute them by the end of this month, and as the circulation will be limited, those desiring them are asked to send their names early. The calendar will be one of the handsomest ever issued by this well known firm.

INDUSTRIAL NOTES.

The laboring men employed at P. L. Kimberly's iron mill at Sharon, Pa., have been informed of an increase of 10 cents a day in wages.

The Union Malleable Iron Company, Moline, Ill., has started its shops again after a year's inactivity. The capacity of the works is 15,000 tons.

The United Gas Improvement Company has removed from 333 Walnut street to the Drexel Building, Chestnut and Fifth streets, Philadelphia, Pa.

The Montgomery Furnace and Chemical Company, of Montgomery, Ala., will shortly reorganize and complete its charcoal iron furnace and chemical plant.

The Lohr Iron and Steel Works, of Pittsburg, Pa., is enlarging its blast-furnace to a capacity of about 200 tons per day. It will go into blast about the middle of February.

It is stated that the Standard Charcoal Iron and Chemical Co., of Nashville, Tenn., will erect a charcoal iron furnace and chemical plant at Little Rock, Ark., and at Murphy, N. C.

The new iron furnace at Gadsden, Ala., has been making eighty tons of foundry iron every twenty-four hours since it started, and the output will soon be increased from 125 to 140 tons.

It is reported that the Pittsburg and Lake Erie Railroad Company is endeavoring to purchase the Clinton Rolling Mill, at Pittsburg, Pa., formerly operated by Graff, Bennett & Co.

It is announced that Mr. George Westinghouse, Jr., of Pittsburg, Pa., has purchased almost the entire capital stock of the Waterhouse Electric and Manufacturing Company, of Hartford, Conn.

The Light Rolling Mill Company, of Lebanon, Pa., has purchased the plant of the Port Carbon Iron Company, consisting of eight puddling furnaces and two sets of rolls. The machinery will be shipped at once from Port Carbon to Lebanon.

Northampton Furnace, near Freemansburg, Pa., operated by the Bethlehem Iron Company, of Bethlehem, Pa., has blown out, and will remain idle until spring. In the meantime the furnace will be thoroughly overhauled and improved.

It is stated that Moorehead Brothers & Co. have been experimenting for several weeks past on the manufacture and use of fuel gas at their iron works at Sharpsburg, Pa., and have reduced the cost of heating and puddling from \$3 per ton to 60 cents per ton.

The new works of the Henderson Steel and Manufacturing Company, at Birmingham, Ala., started up on the 5th inst., this time prepared to do business and make steel on an enlarged scale. The plant's capacity is enlarged from 4 to 16 tons, and calcine magnesias is used for lining.

The machinery and patterns of the Youngstown Stove Company, of Youngstown, Ohio, will shortly be removed to Burlington, Iowa, where the Hawkeye Stove Company has just been organized by Ralph E. Brown, formerly manager of the Youngstown works, and a number of Burlington citizens. The Youngstown Stove Company suspended business some months ago.

The Mitis Wrought Iron Casting Company, of Nefonset, Pa., the original establishment in this country doing that work, has been obliged to double the capacity of its works within the past six weeks, and now has six crucible furnaces. The fuel used is crude petroleum, which is led by pipes to the front of the furnaces and dropped on to the grate bars.

The Minerva Furnace, at Milwaukee, Wis., now operated by the Milwaukee Furnace Company, produced 2494 gross tons of Bessemer pig iron in October, on ores averaging a little under 60 per cent. During the summer, when out for repairs, this furnace was lined up to 14½ feet in diameter at the bosh, and it is only 55 feet high. It is, therefore, but a small furnace to average over 80 tons a day. The fuel consumption has been very greatly reduced this campaign as compared with the previous one.

The Sturtevant Mill Company, of Boston, Mass., is doing a large business with the Sturtevant Mill. Among recent sales is one to Messrs. W. M. Rces & Co., of Seaford, Del., which is now being erected, for the grinding of their phosphate rock, and to the Cata-sauqua Cement Company, successor to the United States Cement Company, which is erecting new works in place of those recently burned, for the manufacture of Portland cement. The company has purchased a 20-inch Sturtevant mill for grinding the cement clinker.

It is stated that a new industry in the manufacture of "The Universal Chain," made of wire, is about to be established at Spencer, Mass. One machine is said to turn out 500 feet a day in two sizes. The chain can be used in sash grooves instead of cord, and gains its name from the variety of uses to which it can be applied. The smallest size can sustain a weight of 400 pounds, and it can be sold cheaper than cord. Mr. Sugden has two or three machines almost ready for operation, and an order from one dealer for 10,000 watch chains.

Under the direction of William B. Cogswell, General Manager of the Solvay Process Works, wells have been sunk in five different localities with the expectation of reaching a bed of rock salt in the upper part of the Onondaga Valley, about seventeen miles southward from the city of Syracuse, and these efforts have been rewarded with complete success. The fourth test boring reached a bed of rock salt forty-five feet in thickness, and the fifth now being sunk is expected to reach the same bed at a less depth, which in the former case was at 1200 feet. It is intended to convert this rock salt into saturated brine and pipe it to Syracuse to the works.

A new process in the manufacture of crucible cast steel, known as the Kingsland-Sinclair process, has recently been invented by Le Roy Kingsland, of Pittsburg. An experimental lot of steel was recently made by this process at the steel plant of Howe, Brown & Co., Limited, in that city, which has been tested by the Motive Power Construction Department shops of the Pennsylvania Railroad Company at Altoona, Pa., and also by Miller, Metcalf & Parkin, at Pittsburg, giving satisfaction. The point claimed by the inventor for his process is that a crucible steel equal to the celebrated brands of Mushet steel can be produced for about one fifth the cost of the above-named brand.

About 700 men will be employed in the converting and blooming departments of the new Bessemer steel works now in course of erection by the Allegheny Bessemer Steel Company, at Duquesne, Pa. The employees in the last-named department will be very few, as the entire mill will be operated by machinery. There will be only one man at each train of rolls. He will control the "pieces" or bloom by means of hydraulic levers, thus dispensing with the service of a large number of employes who are required in other rail mills. The converting mill cost \$300,000, while the rail and blooming plants cost \$600,000, making the entire cost of the works \$900,000. The company

at the commencement will have to purchase all the pig metal used from outsiders, but it is the intention to erect two blast-furnaces close to the rail mill. It requires the product of two furnaces to keep the mills supplied. The work on this improvement will likely be commenced in the early spring.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xiv. Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open" on the same page. This week, proposals are invited for the following new contracts: No. 1159, Construction of Viaduct; No. 1160, Dredging; No. 1161, Furnishing Sewer Pipe; No. 1162, Dredging; No. 1163, Lighting Apparatus; No. 1164, Water-Works; No. 1165, Iron Viaduct; No. 1166, Construction of Iron Steam Propeller; No. 1167, Repairing Boiler, Engine, etc.; No. 1168, Construction of Brick or Stone Guard House; No. 1169, Building Superstructures and Dredging.

GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including October 31st, as reported by the *Marquette Mining Journal*, were as follows:

	Tons.	Tons.
	1888.	1887.
Marquette, Marquette District	760,709	757,016
St. Ignace, " "	103,677	88,116
Escanaba, " "	748,622	808,232
" Menominee District	1,005,290	1,042,438
" Gogebic District	179,735	.....
Ashland, " "	983,739	1,010,488
Two Harbors, Vermillion District	333,536	308,089
Total tons	4,143,358	4,074,439

Twelve of the larger Lake Superior mines had at this date last season shipped by lake 2,228,363 tons of ore, considerably more than one half the lake shipments of all the mines combined. The following comparative table shows their lake shipments to date, which amount to 2,214,072 tons:

Name of mine.	Range.	1887.	1888.
Lake Superior	Marquette	280,699	213,241
Republic	"	210,107	193,841
Cleveland	"	190,782	178,907
Pitts. & L. A.	"	176,725	191,708
Champion	"	129,389	144,376
Jackson	"	102,801	86,293
Chapin	Menominee	288,612	246,677
Vulcan	"	190,258	124,185
Colby	Gogebic	209,011	192,817
Norrie	"	187,809	348,069
Ashland	"	151,689	138,085
Aurora	"	110,470	155,873

The proposed railway from Salt Lake City to Sioux City, Iowa, is to be pushed with great energy to an early completion. The line is divided into three corporations, known as the Salt Lake Valley & Eastern, Wyoming & Eastern and Nebraska & Western Railway companies. To raise the required funds the road has been mortgaged to the Manhattan Trust Company of New York to the limit of twenty thousand dollars per mile, and these mortgages have just been filed for record in the various counties through which the line passes in Nebraska, Wyoming and Utah. This road gives a western outlet to the several roads having terminal lines at Sioux City, and will shorten the distance between Salt Lake City and Chicago. It is said fully 125 miles over any route now operated or proposed. That portion of Wyoming traversed by the road is a mineral country now lying dormant awaiting cheap transportation, and the oil-fields of Wyoming are directly on the line. These oil-fields have long been known, and to some extent have been developed, but could not be made profitable without a railway. Then there are the coal-fields along the Platte River and about Twin Creeks.

STANDARD OIL COMPANY.—The company has purchased the Crossman property of four acres above the Maine Central Station, at Lewiston, Maine. It is the intention to make this a distributing station, and it will be an extensive establishment.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—Official reports to us show that during October 16,571 tons of coal and 12,392 tons of coke were received directly from the mines of the Tracy City Division, making a total for the ten months of 1888 of 143,950 tons of coal and 124,852 tons of coke.

ALASKA.

ALASKA UNION MINING AND MILLING COMPANY.—This company, says the *Alaska Free Press* of October 6th, has closed down work on the mill and tramway in the basin this week, but operations will be continued on the mine for nearly a month yet. The company expects to start up again in the spring with increased forces.

ARIZONA.

PIMA COUNTY.

PEERLESS MINING COMPANY.—The low grade ore which filled the bins and chutes when the Peerless mill began crushing has all been worked off, and a better class of ore is now being milled. A shipment of bullion will shortly be made.

SILVER QUEEN MINING COMPANY.—The old Heintzleman mine, in the Ariavaca district, one of the first mines operated in Arizona, shortly after the United States acquired the Territory from Mexico, has been reclaimed, and is now owned by a strong San Francisco syndicate, known as the Silver Queen Mining Company. The old drifts, shafts and cuts have all been cleared out, and new timbering is being put in all through the old workings. The rich ore vein has been

found where the old company represented it was 30 years ago, and, although not large, is said to be rich.

CALIFORNIA.
AMADOR COUNTY.

PLYMOUTH CONSOLIDATED MINING COMPANY.—The work of opening the mine progresses steadily. The superintendent, E. L. Montgomery, writes to the New York office as follows: "We are gradually lowering the water, it is now a foot below No. 3 tunnel (which is 1237 feet down). So far every thing appears to be in good order and the work goes on without mishap. We hope in the near future to have the old mine open again. The circulation of air through the south shaft is not very strong yet, but as we get the water down it will increase. Weather still dry." The secretary, Mr. Lazelle, issued a brief circular to the stockholders on the 1st inst., the main points of which are contained in the above letter.

MONO COUNTY.

MONO MINING COMPANY.—The pump was started on the 24th ult., and the water is being lowered about 12 feet per day. There is 90 feet of water in the shaft.

SISKIYOU COUNTY.

HECKLA GOLD AND MINING COMPANY.—This company has been organized to work the Heckla gold mine, with a capital stock of \$500,000; shares, \$10 each. The Directors are J. M. Haskell, John Harrington, F. C. Bender, George W. Glover, Jr., and O. J. Johnson.

SHASTA COUNTY.

[From our Special Correspondent.]

A new interest is being taken in mining in this county. Several new mills are in process of erection. Walker Bros., of Utah, are putting in a new mill below the Butters Ore Milling Works, at Kennet. Two new mills are being put in Squaw Creek, five miles back from the railroad. The outlook is very promising.

The Butters Ore Milling Works is preparing to start up a part of the works. Mr. Charles Butters, the owner of the works, has been engaged all summer in the construction of a ditch from Big Backbone Creek to give power to the works. He is still engaged upon this work. The ditch will be five miles long, and will give a pressure of 150 feet at the works on the railroad. His water right is for 1000 inches, which is obtainable the year around. He is now bringing out only about 200 inches. The works have a three-hearth reverberatory, 43 feet long, 10 feet hearth, similar to the furnaces Mr. Butters built at San Sebastian, in San Salvador. The chlorination house contains two lixiviation tanks, 14 feet diameter, 5 feet high; two precipitation tanks, 10 feet diameter, 7 feet high; two copper precipitation tanks, 12 feet diameter, 4 feet high, and three solution tanks, 5 feet diameter and 5 feet high, besides a fine new style generator which was designed especially for this mill. The office, dwelling house, laboratory, shops and stables are very complete, and everything is built in first-class shape. The works will be started on pulverized material, concentrates and rich tailings, and will be run as chlorination works until a crushing house can be put up. Mr. S. R. Krom, of New York, will furnish the crushing plant.

The advantages of location are unequalled, being of the California & Oregon Railroad, with a side track in the yard of the works, free water power and almost free wood, as the works are just below the mouth of Pit River, down which the wood floats directly into the boom at the works. The Pit supplies the works with driftwood in abundance. The surrounding country is full of low grade sulphide deposits containing gold, silver and copper.

COLORADO.

COLORADO ASPHALTUM COAL AND TOLL ROAD COMPANY.—This company has been organized, with a capital of \$750,000, by W. S. Wood, Fred Cramer and C. W. Marker, of Denver; E. Marker, of Hot Sulphur Springs; and C. B. Hill, of Rangely. The object of the company is to mine albertite ore and construct a toll road from the mine to Caraca, a distance of forty miles. A refinery and warehouses will be built in Denver.

COLORADO GOLD AND SILVER EXTRACTION COMPANY.—This company filed its articles of incorporation with the Secretary of this State. The incorporators are William Peet, Charles J. Flint, Alfred Stansfeld, James M. Burridge, Arthur H. Lawford Vic Wallington and Herbert Guppy, all of London, England. The object of the company, in addition to all the privileges usually allowed to mining companies, is to have the exclusive use and sale of certain improvements in mining machinery. The capital stock is £100,000. The document is dated April 19th, 1888. William G. Birkin is the agent, with office in Denver.

CLEAR CREEK COUNTY.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.—At the annual meeting of the company held in this city on the 8th inst., the following trustees were elected: Paul Lichtenstein, H. R. Baltzer, G. W. Hall, W. E. Mantius, C. F. Tag, Chas. Dana, Jno. K. Creevey, T. H. A. Tromp, and Baron Ph. Van Zuylen. A dividend of five cents per share, or \$13,750 was declared.

CUSTER COUNTY.

MAVERICK MINING COMPANY.—The company has been organized by Ferd Barndollar, Z. V. Truie, and Hiram E. Alden, with a capital of \$2,500,000, stock non-assessable, to operate the Maverick lode. The company has a branch office at Kansas City.

EAGLE COUNTY.

[From our Special Correspondent at Gillam.] Considerable assessment work has been performed on Horn Silver, Girard and Battle Mountains within

the last month, and judging from the output of the various mines property will be more valuable here next year. The fissures of Eagle Cañon are rapidly coming into prominence as producers of fine ore. Some splendid bodies have been opened up in these veins during the last year as the result of development work and the permanency and worth of the fissures in this camp is an assured fact.

BLEAK HOUSE.—The different leases on this property are shipping regularly.

CHAMPION.—The ore here is of a very superior grade. Much open ground is shown up in the chutes and several car-loads are ready for shipment.

CHEESMAN & CLAYTON SHAFT.—This shaft, which I mentioned before as being sunk to intercept the chutes in the quartzite strata, is working three eight-hour shifts. They will put a plant of machinery in this week.

GARBUTT.—This property is looking very promising, the Haughey, Riley & Moore lease especially. They have a chute 7 feet in height by 5 feet wide, the ore averaging \$30 per ton, some of it very near a hard carbonate, which will assay high in silver.

GOLDEN COMET.—The Vaughn lease on this vein has a streak of fair talc and sulphide ore in the heading.

PRIMROSE.—The Lewis & Smitherum lease on the same vein in the Cañon has a fine streak of high-grade talc in sight. This will serve as an example of steady and energetic work.

SCORPION.—The long tunnel driven to cut the vein at the depth of 300 feet has nearly reached the point where the intersection will be accomplished. This will testify to the value of the veins in the cañon at this depth, and if favorable will probably cause more work upon the fissures.

SUCKER STATE.—Woods & McKay are opening up this vein below the Ground Hog property.

EAGLE RIVER VALLEY.

C. B. Patrick, Superintendent of the Eagle River division of the D. & R. G. R. R., and others have discovered a quarry of excellent redstone below Sherwood's, in the Eagle Valley. The texture is as smooth and fine as any found in the State. The stone has all the components of first-class building material. The force has been doubled from fifteen to thirty men; machinery and a 60-foot derrick have been put in place. The stone is to be quarried to the slide near Glenwood Springs. It is now being shipped to Leadville and other parts. The Denver & Rio Grande Railroad is constructing buildings of its own from the same.

HINSDALE COUNTY.

FRANK HOUGH.—All the buildings, including the hoisting works, of this mine at Lake City, one of the most extensive in that district, were destroyed by fire last week.

LAKE COUNTY.

We condense the following from the Leadville *Herald-Democrat*: A decline in the value of lead directly affects most of the mines of Leadville, and is rapidly followed by a reduction of several hundred tons in the amount of ore shipped. A few weeks ago, when lead was selling at from \$4.80 to \$5 per hundred, the mines of Leadville were producing fully 1500 tons per day, and more than one half of that amount was heavy lead ore, while considerably more carried a good percentage of lead. This output was larger than had been made from Leadville for several years. With the decline in the value of lead, however, the Henriett & Maid has reduced its shipments from 300 to 200 tons per day, and will make still further reduction as soon as possible. The Silver Cord, which was making an output of 130 tons per day, is now shipping less than 50. The Colonel Sellers, which was shipping 100 tons per day, fortunately had another class of ore which carried only a very small amount of lead, so that the character of its ore shipments were simply changed. The A. Y. & Minnie has made only a very small, if any, reduction, but both the Adams and Iron Silver made very large ones. The Lilian and the New Year are two other mines very heavily affected.

DENVER CITY MINING COMPANY.—This property is being worked entirely by lessees. About 300 tons per month is being shipped, all of it being argentiferous iron ore. This is of very fair grade, averaging about 35 per cent basic excess and 13 ounces silver, the silver contents of the ore running from 11 to 20 ounces. The company has about five acres of Virginia ground, adjoining the Result claim of the Small Hopes, in which the new McCormack shaft is now being sunk, and probably some prospecting work will be done in this ground. The company, it is said, has no debts, has about \$10,000 in its treasury, and has a small income from the royalties paid by lessees.

DUNKIN MINING COMPANY.—The following shows receipts and disbursements from October 16th, 1887, to October 16th, 1888: Received from operation, \$150,508; received from lessees, \$50,110; total, \$200,619; payments company account, \$73,560; payments lessees, \$35,068; total, \$109,528; profit, \$91,091. The above shows a profit of 51½ per cent from the direct operations of the company, and 28.22 per cent on the leases, or 45.4 per cent on both. The company had October 16th, 1888, 1,605,400 tons company iron, and 96,950 tons lessee iron not settled for. An accompanying letter of General Manager Schumacher describes the large body of silver bearing iron ore in sight, and says the outlook for Dunkin is not as bad as it might be. He says that there is also some first and second-class silver ore in sight.

LEADVILLE CONSOLIDATED MINING COMPANY.—A meeting of the board of trustees will be held in this city next week and a meeting of the stockholders will

probably be called after. Various propositions for the sale, lease or further working of the mine will be considered. A number of Leadville parties are anxious to lease the property, but we understand that the larger stockholders are in favor of contributing something for further work on the company's own account. The superintendent states that \$8000 or \$4000 will be required, he also says there is a body of ore that has heretofore been held in reserve which would pay for mining and timbering, and for running a new drift about 300 feet.

LEE BASIN MINING COMPANY.—About 90 tons of ore per month are being produced. This ore is a dry, silicious ore, which carries from 25 to 40 ounces of silver. The company has been doing some prospecting work in the Lee Basin from the Tiptop workings. These operations, however, are to be stopped, no ore of any consequence having been found in that ground and prospects poor.

In the Olive Branch mine, leased by the Lee Basin. The breast of the drifts in the new ore body shows considerable wire silver. This ore is being followed by the drift where possible, but is dipping so that it cannot well be opened until the second level is driven into it. The question of sinking a new vertical shaft further east than the present one is still under consideration by the company. This shaft is necessary for the economical working of the mine, the incline from the old shaft being an unhandy and expensive method of working, and would cost about \$20,000.

ST. KEVIN MINING COMPANY.—The property of this company was attached in Leadville last week by six different firms, whose claims, it is reported, aggregated \$18,882. As this property has been rather favorably regarded both in Leadville and in New York, the news of the attachment occasioned not a little surprise in mining circles. To a representative of the *ENGINEERING AND MINING JOURNAL*, Mr. G. L. Hassell, the President and Treasurer of the company, said: "I believe the amount, \$18,882, is greatly overestimated, but as I have not yet received the exact figures from Leadville, I cannot speak authoritatively on this point. Although the attachments, being entirely unnecessary, were a complete surprise to me, I have paid individually all the drafts that have come in, and our Leadville agent has been instructed to have the attachments removed at once."

LARIMER COUNTY.

Copper deposits have recently been discovered at Prairie Divide, near Fort Collins. Samples of the ore have been assayed and found to contain, it is said, from 65 to 83 per cent copper and from \$6 to \$12 silver. A capitalist from Omaha is looking over the Smith copper mine with a view to purchasing. The Copper Bug mine at Prairie Divide is down forty-five feet. Assays of the ore from this mine show 65 per cent copper.

PITKIN COUNTY.

Colonel W. R. Rust, of Aspen, owner of the Rust sampler, has been awarded a lease on the Hewitt sampler at Aspen by Hon. J. B. Wheeler, who recently became the sole owner, and to the capacity of his plant that of the Hewitt will be added. This will increase the capacity of the entire sampling outfit to 750 tons of mineral a day.

DURANT MINING COMPANY.—Since Mr. Hal Sayer has taken the management of this company's properties a new system has been inaugurated for the working of these mines. A new tunnel has been started to reach the stopes of the Durant through which will come the output of the mine. This will make a great change. The old Durant incline and Visino tunnel will soon be abandoned, and the mine will be worked from the other side of the mountain. The new tunnel starts in Vallejo gulch, on the Emma ground, a little to the east and above the old Emma shaft. This tunnel will run 300 feet through the blue lime, when it will connect with the court drift of the Durant. Work is being prosecuted at both ends of the tunnel with air drills, and it is estimated that in 30 days an opening will be made. The tunnel will be 8 feet wide and double tracked. Connected with the tunnel will be a bucket tram reaching to the railroad at the base of the mountain. This tram, on which work has now been begun, will have a capacity of 700 tons a day. Another work that is being pushed by this company is the Great Western tunnel. This tunnel is some 500 or 600 feet long, and is being run to work the Late Acquisition on West Aspen Mountain. This work will soon be finished. Ore-houses and other buildings are going up at the mouth of the tunnel, just above the Little Jessie, and this property will soon be shipping ore.

DAKOTA.

HAND COUNTY.

GLENDALE TIN MINING COMPANY.—It is the intention of this company, owning the tin mines at Glendale, to place reduction machinery upon the property so soon as developments may warrant. The *Rapid City Journal* says that a force of men is now at work on the property, which is located on Iron Creek. The property embraces seven claims. They were originally located for mica, and a large amount of work has been done upon them.

The property was recently visited by Mr. Geo. W. Cope, of Chicago, and by Mr. F. H. Long, who reported favorably on the property. The necessary money has been placed in the treasury of the company to continue the developments and to put up the reduction works. The machinery will be modeled after that in the metallurgical laboratory of the School of Mines, and Professor Carpenter's services have been retained by the company in the preparation of plans and specifications. Again, a reason for anticipation of good

results will be found in the fact that while the money is in the treasury of the company for the purpose of putting in the reduction works, there is no intention to put up such works until the mines shall have been so far developed as to be capable of supplying plenty of ore. The superintendent is Mr. Alex. Madill, who was originally interested in the property with Mr. Felix Pofnausky, who is still a member of the company. Chicago parties are interested in this enterprise.

MICHIGAN.

EUCLED GOLD MINING COMPANY.—At a meeting of this company recently held in Marquette, the following officers were elected: Smith Moore, President; Henry M. Brooks, Vice-President, and F. M. Moore, Secretary and Treasurer. The directors voted an assessment of five cents per share for the purpose of defraying the expenses of preliminary explorations, the assessment to be paid on or before the first day of December next.

COPPER MINES.

The following statement published by the Boston Transcript gives the product in "Mineral" carrying about 75 per cent copper of the mines mentioned for October and for nine months of 1888, and a comparison with the outputs of the same mines in the preceding year:

Mines.	October.		Jan. 1 to Oct. 31.	
	1888.	1887.	1888.	1887.
Calumet & Hecla.....	3,914	3,057	26,299	25,845
Tamarack.....	625	501	6,226	3,449
Quincy.....	341	519	3,327	2,540
Atlantic.....	214	226	2,265	2,077
Osceola.....	185	185	2,029	1,694
Franklin.....	181	188	1,824	1,982
Huron.....	125	103	1,194	715
Central.....	102	122	926	953
Kearsarge.....	100	.....	273	.....
Copper Falls.....	480	.....	642	360
Total 10 mines.....	5,867	4,901	45,018	39,615

*Mill not running last six months 1887.

†Approximate.

CALUMET & HECLA MINING COMPANY.—A warranty deed has been filed which conveys to the Calumet & Hecla Mining Company, from Evan Morris, Michael Hoffman and Charles J. Rainey, trustees of the Metalline Land Company, the southeast quarter of the southeast quarter of section 15, town 56, north of range 33 west, comprising forty acres, the consideration being \$500,000. The Calumet & Hecla Company will work it from one of the present shafts. The property belonging to Mr. T. F. Mason, upon which, it is rumored, work is to be commenced, lies just west of this Metalline forty, and consists of the west half of the southeast quarter and the southeast quarter of the southwest quarter of section 15. The remainder of section 15 belongs to the Tamarack Mining Company, with the exception of the southwest quarter of the southwest quarter, which belongs to the Hulbert Mining Company.

It is generally considered that the Tamarack Company made a great mistake in not purchasing this property.

TAMARACK-OSCEOLA COPPER MANUFACTURING COMPANY.—This company is collecting the second half of the \$5 assessment levied a year ago, and of which the first half was paid then. It is to pay for the new wire mill and other copper works.

MONTANA.

The amount of gold and silver deposited at the U. S. Assay office, Helena, during October, was \$82,235.62.

CASCADE COUNTY.

MONTANA SMELTING COMPANY.—The smelting works at Great Falls have started up. The company is now buying ores in any quantity. The office is in the Gold block, Helena.

DEER LODGE COUNTY.

COMBINATION MINING AND MILLING COMPANY.—The annual report of this company was filed last week with the county clerk and recorder at Butte. The capital stock is \$600,000. The amount actually paid in is cash is \$42,702, in personal and real property \$157,298. The assets consist of the following properties: The Oxide, Combination, Tempest, Silver Flake lodes, the Sultan, Silver Chief, Little Nell, Betsy Cook, Gen. Rosecrans, Combination No. 2, Buenaventura, Royal Bounty, Waldteufel, Gladstone, Wood Lawn, Ruby Hermanita, Sardonyx, Onyx, and Incas Own lodes and millsites, all situated on Willow Creek, Black Pine District; also 10-stamp quartz mill, hoisting works, buildings, etc., together with cash in bank and balance due from shipments of bullion and concentrates amounting to \$10,000, and 3865 shares of the capital stock remaining in the treasury and not offered for sale. The company has no liabilities other than actual running expenses, which at the present time amount to about \$7500. This company is a reorganization of the Black Pine Company.

SILVER REEF.—This mine, situated in the district west of Anaconda, has been sold, it is said, for \$50,000 to Mr. Gault of Washington. It is stated that the new owners intend to erect at once a steam stamp to mill the ores from this mine. The sale is important, as it is the first one that results in having a mill built in that district which will be able to handle ores peculiar to it.

LEWIS & CLARKE COUNTY.

HELENA & LIVINGSTON SMELTING AND REFINING COMPANY.—This company is pushing work on its plant in East Helena. Three stacks are completed, one being 140 feet in height and the others 100 feet each. The sampling works are about completed and will be started up by the middle of this month. The other buildings only await the placing of the machin-

ery, which is arriving daily, and by the middle of December the smelter will be completed and in running order. The company will shortly receive ores.

LEE MOUNTAIN.—Work has been resumed on this mine at Rimini and will probably be kept up all winter. The entire work in connection with this mine will be under the supervision of Mr. John R. Parks, of New York. It is also expected to start up the concentrator at Rimini within a short time. When in running order the concentrator will have a capacity of thirty tons per day.

SILVER BOW COUNTY.

AMERICAN GULCH MINING COMPANY.—This company has been incorporated in Butte, to acquire and operate mines in this county. Capital, \$200,000; shares, \$1 each, assessable. Term of existence, twenty years from October 8th, 1888. Trustees: Otto Stalman, A. L. Kempland, John J. Crocket, John R. Toole and S. J. Jennings. Operations to be carried on in American Gulch and vicinity, with an office in Anaconda.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The company has issued a circular dated Boston, Mass., November 1st, from which we extract the following (the subject was referred to in our last issue): It had been proposed to increase the capital stock of the company 50,000 shares, making the capitalization 150,000 shares or \$3,750,000, to enable the company to provide itself with an efficient smelting plant, and also to buy certain properties contiguous to its present land. It is now decided to give up the programme of providing the company with an efficient smelting plant, and at the present time to buy only certain properties contiguous to its present land, which in their new development show themselves to be of great promise and of vital importance to the future interests of the company. To provide for this modified plan will call for a total outlay of about \$625,000, and to provide means for this it is thought best that the capital stock of the company be increased 25,000 shares. The stockholders of the company have the right, until January 15th, 1889, to subscribe to said 25,000 shares pro rata, that is, one quarter of a share for every share held in this company January 2d, 1889, payment to be made to the treasurer company as follows: January 26th, 1889, \$10; March 26th, 1889, \$5; May 25th, 1889, \$5; July 26th, 1889, \$5, and that no stock shall be issued until after July 26th, 1889, the date of the last instalment. A special meeting of the stockholders of the company will be held on Thursday, December 27th, 1888, at 11 o'clock A. M., at the office of the company in Butte City, Montana Territory, to consider this plan and pass the necessary votes. The meeting called for November 1st, 1888, to consider the plan outlined in the circular of September 1st, has also been adjourned to Thursday, December 27th, 1888.

NEVADA.

ELKO COUNTY.

[From our Special Correspondent.]

TUSCARORA, Oct. 30.

The only drawback at Tuscarora is still the lack of reduction facilities. Within the next two months this will be overcome by the completion of the stamp mill now being built, and the writer believes that when all the new works are completed, the flow of bullion will be continuous from Tuscarora mines for many years to come.

NAVAJO MINING COMPANY.—Within a few days the company will commence milling the rich ore which it has been accumulating for the last four years, and it is expected and claimed that this will be the longest run and greatest output of bullion ever produced in Tuscarora. I understand that the company now holds nearly all the stock, and will no doubt make this the leading mine of Tuscarora for many months to come. It will commence paying dividends about January 1st, and will no doubt continue to do so for a long period.

NAVAJO QUEEN MINING COMPANY.—The company closed down pending the erection of steam hoisting works, their present machinery not being able to handle the water.

NEVADA QUEEN MINING COMPANY.—At present the Navajo mill is running on ore from the Nevada Queen, producing about \$20,000 a week. This mine could easily have been paying monthly dividends but for its having to bear its share of the heavy expense attending the erection of the new mill, water-works and concentrators.

LANDER COUNTY.

PITTSBURG CONSOLIDATED GOLD MINING COMPANY.—The mill has started up, an order having been made by the court refusing the injunction and dissolving the restraining order in the suit brought by Crum and Ferris against the owners of this property.

STOREY COUNTY—COMSTOCK LODGE.

We condense the following from the Virginia City Chronicle:

The plant for transmitting by electricity the power to operate the Nevada mill from the Pelton wheels in the Suro tunnel level of the Chollar incline is ready for a test run whenever the agent of the Brush Company arrives. The plant was put in at the expense of the Brush Company, and if it operates satisfactorily the Nevada Mill and Mining Company reimburses the Brush Company for the outlay. It is probable that the test run will not be made before there is an increase in the present water supply, that now coming in being little more than sufficient to operate the California battery and pan mills. We have several times called attention in the ENGINEERING AND MINING JOURNAL to these works, and given some details of the plant.

A drain is being cut in the floor of the drift connecting the Crown Point and Belcher 1400 level with the Suro tunnel, and as soon as drain boxes are in place to receive the water the work of draining the workings below the 1700 level will begin. These mines can be drained without difficulty to the 2700 level.

ALPHA CONSOLIDATED MINING COMPANY.—The annual meeting of this company was held in San Francisco last week. The following officers were elected: Charles Hirschfeld, President; M. Rehfsch, Vice-President. Charles E. Elliott was re-appointed secretary, and A. C. Hamilton, superintendent. The secretary's financial sheet shows a cash balance on hand of \$3684.89, which will be amply sufficient to meet this month's expenses, and although it was expected that an assessment would be levied, none will be put on for some time to come. Superintendent Hamilton's report of operations in the Alpha mine during the fiscal year, contains the following account of the situation on the 500 level, which is the present base of operations: On the 500 level we excavated a station, and ran a drift east from the shaft a distance of 100 feet. At a point about 90 feet east of the shaft we encountered some ore and penetrated it about 11 feet. The average assays from this ore exceeded \$30. About 25 feet west of this ore there was a north and south drift started, which is now in about 110 feet, the face of which is all quartz carrying some metal. About 25 feet further north will carry this drift to a point immediately under the incline winze that was sunk in the north drift on the 332 level. The south drift is now in a distance of 35 feet. The face is showing some good ore.

BENTON MINING COMPANY.—The assessment of \$1 per share levied by this company is for the purpose of raising a sum sufficient to pay the cost of erecting substantial hoisting works and placing a steam hoist plant over the mine shaft. Heretofore explorations in the Benton have been conducted through the Alta shaft, for which the Benton company paid a certain monthly percentage of the cost of operating the Alta hoist plant.

CROWN POINT MINING COMPANY.—On the 700 level, west crosscut No. 3 is showing great improvement over No. 2 and has cut ore, the extent of which is not yet determined, but the prospect for developing a valuable body further south is considered favorable.

NEW YORK MINING COMPANY.—Operations are to be resumed on this mine in Lower Gold Hill. The mine is controlled by Senator Jones. It is claimed that an ore development was made in sinking the shaft, extending downward from the 600 to the 900 level, which showed an average value above what is termed milling grade. If the company extracts ore it will probably follow the example of the Justice and build a stamp mill convenient to the mine.

WEST CHOLLAR MINING COMPANY.—Articles of incorporation have been filed in San Francisco. The ground is located west of the original Chollar line. The capital stock is \$10,000,000; shares, \$100 each. John Massie, George A. Davis, Phillip Scott, G. H. Turner, and J. S. Farrell are named as directors.

NEW JERSEY.

MORRIS COUNTY.

The New Jersey Zinc and Iron Company has been exploring with the diamond drill on Mine Hill a part of the Franklin and Sterling zinc, iron and manganese deposit with success. The company owns all the minerals in Mine Hill, with the exception of the Franklinite. They drilled on the Curtis property, going to a depth of 540, running into the Hill vein of iron. During the course of the drilling they struck the zinc vein in a thickness of 19 feet, samples being now in the hands of a chemist for analysis. This discovery insures them a fresh supply of zinc ore for many years to come.

NEW MEXICO.

GRANT COUNTY.

SANTA FE COPPER COMPANY.—This company, a re-organization of the San Pedro Company, to which we referred in our issue of October 27th, has elected the following officers: President, Hon. Jay A. Hubbell, of Houghton, Mich.; Secretary and Treasurer, John C. Watson, of Boston; directors, Messrs. Hubbell, Albert S. Bigelow and W. A. Haskell, of Boston; Leonard Lewisohn and Charles E. Coon, of New York; Samuel D. Stevens, of Concord, N. H., and Hon. S. W. Dorsey, S. C. White and R. W. Webb, of New Mexico. The head office will be in Boston.

NEW YORK.

ONONDAGA COUNTY.

The discovery of a large deposit of rock salt in this county is reported. Extensive explorations of a wide region in the upper part of Onondaga Valley, seven-tenths miles south of Syracuse, have been rewarded, it is said, with complete success. Wells have been sunk by the Solvay Process Company, who use large quantities of salt in the manufacture of soda ash, at Jamesville, on Onondaga Valley village, Lafayette and Cardiff. On the fourth trial full success was attained. The fifth trial is now in progress and promises a like result. Salt water was also found. A solid bed of rock salt 45 feet in depth was discovered. The boring was through 735 feet of shale, then 500 feet of limestone, when underneath, at a depth of 1,210 feet from the surface, the salt was found. It is proposed that the rock salt be converted into saturated brine and by a system of piping bring the brine to the city. Saturated brine can be converted into salt for market 83 per cent less than brine pumped from the State wells.

NORTH CAROLINA.

ORANGE COUNTY.

Prof. W. B. Phillips, of Chapel Hill, N. C., sends us

the following items of news from this part of the world.

1st.—Two students in the Mining Department of the University of North Carolina, E. A. Thies and J. R. Harris, found a peculiar looking mineral in quartz near Chapel Hill, Orange County, N. C., which proved before the blow-pipe to contain as follows: Zinc, lead, silver, and cadmium as sulphides, metallic copper, copper and iron as sulphides; besides bornite, malachite, mispickel. Several surface specimens of this ore have been picked up along the quartz lode. There are also on the same property two veins of hematite, which have been prospected and worked to some extent. I made the blow-pipe examination, and this is the first discovery of the variety of sphalerite known as prismatic, which has been made in this State. Whether the cadmium exists in workable quantities or whether the other constituents of the ore could be profitably extracted has not yet been determined. 2d. Some months ago Mr. R. D. Patterson found on his place on New Hope Creek, five miles east of Chapel Hill, Orange County, N. C., some indications of coal. A company is about to be organized to prospect at this place. Mr. W. A. Guthrie, of Durham, N. C., is interested in the matter. New Hope Creek, at this point, lies pretty well toward the western edge of the Triassic sandstone. On this same range of sandstone on Deep River, and at Egypt and the Gulf in Chatham County, Triassic coal was extensively worked many years ago. The Egypt shaft during the late war was sunk to a depth of 494 feet, and much coal of a fair quality mined. In that vicinity coal is now mined on a small scale. 3d. On the land of Irving Andrews, seven miles northeast of Chapel Hill, prospecting for gold is now going on. A free milling ore has been found there, but the true vein has not yet been found.

RANDOLPH COUNTY.

STAFFORD.—A 10-stamp mill is to be erected at this gold mine.

ROWAN COUNTY.

SOUTHERN BELL.—Boston parties, it is said, will fully develop this gold mine. They will overhaul the machinery.

OHIO.

HANCOCK COUNTY.

SYNDICATE OIL AND FUEL COMPANY.—This company has struck a large gas well on the Bigelow farm, just north of the city limits of Findlay.

OREGON.

EXCELSIOR-EUREKA.—According to reports the sale of this mine on Cracker Creek has been consummated and a lawsuit is likely to follow.

OREGON GOLD MINING COMPANY.—The attachment suit brought in St. Louis by the Knowles interest in this company against Jonathan Bourne, Jr., of Portland, for \$375,000, was dismissed on the 31st ult. at the cost of the plaintiffs. It was the result of a settlement of all the conflicting claims in reference to the property.

PENNSYLVANIA.

COAL.

The families of the twenty-six miners buried in No. 1 slope of the Pennsylvania Coal Company by the disaster at Nanticoke on December 14th, 1885, some time ago began suits to compel the company to proceed with the work of searching for the bodies. The cases were argued before Judge Rice, in Chambers, at Wilkes-Barre, Pa., on the 5th inst. The attorney for the company argued at length that all had been done that could be done, and that it was found by competent engineers and miners that it is a physical impossibility to have the bodies removed from the pit. The attorneys for the relatives claim that it could be done, and offered to have the work accomplished, relieving the company from any blame or responsibility in case of any accident. The Judge heard both sides and then took the papers. He announced that he would dispose of the same promptly.

The report of the Schuylkill Coal Exchange, dated Pottsville, November 2d, shows that the following collieries, drawn to return prices of coal sold in October, to determine the rate of wages, make the following returns: Elmwood Colliery, \$2.65; Ellangowan, \$2.58; North Mahanoy, \$2.65; Suffolk, \$2.53; Alaska, \$2.61, all collieries of the P. & R. C. & I. Co. The average of the prices is \$2.61, and the rate of wages to be paid is four (4) per cent above \$2.50 basis.

ELLANGOWAN.—Work has commenced on driving a 200-yard tunnel in this colliery at Shenandoah.

KETTLE CREEK COAL MINING COMPANY.—An explosion occurred on the 3d inst. at this company's mines, thirty miles west of Lock Haven, which were but recently opened. The explosion occurred in a new drift, in which twenty-one persons were at work. As soon as possible after the explosion the mine was entered, and fifteen dead bodies were carried out and four others badly injured were found, one of whom has since died, and the others are likely to die. The cause of the explosion is unknown, but it is supposed to have been the striking of a fissure or pocket of gas. It is generally conceded that there was good ventilation, and the mines were well supplied with air appliances.

SHENANDOAH CITY.—The work of sinking a shaft at this colliery has been commenced. The shaft will be 300 feet deep, and when completed will be used as a substitute for the slope.

NATURAL GAS.

It is said that one of the largest gas wells in Northwestern Pennsylvania was struck last week about three miles from Sheffield and fourteen from Warren. It is owned by Horton, Cary & Co., Sheffield.

PHILADELPHIA COMPANY.—In the Supreme Court

at Pittsburgh on the 5th inst., a decision was rendered in the case of the Philadelphia Company vs. city of Pittsburgh. An appeal was taken to the higher court by the city of Pittsburgh to dissolve the injunction granted to the Philadelphia Company restraining the city from collecting a ten-mills tax on all the sales and receipts of the company. Judge Stowe held that the city could only collect 1 mill tax. The Supreme Court affirmed this decision.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to November 4th:

	1888.	1887.
From Boston.....	Gallons, 3,995,202	Gallons, 3,624,727
Philadelphia.....	114,136,719	141,773,875
Baltimore.....	6,518,165	6,897,741
Perth Amboy.....	18,916,641	14,462,129
New York.....	307,774,451	319,520,550
Total exports.....	451,210,178	486,279,022

UTAH.

The bullion receipts at Salt Lake City, as published by the *Tribune*, for the ten months of 1889, excluding all ores, amounted to \$2,941,442.05.

HALE ASPHALTUM MINING COMPANY.—This company has been organized in Colorado for the purpose of working asphaltum beds in Emery and Uintah counties. The capital stock is placed at \$100,000; shares \$10 each. The incorporators are E. C. Hale, A. A. Miller, T. R. Thatcher, Joseph Crosby, G. M. Johnson, Dan. P. Stetzelburger, John O'Boyle, Edwin Shaw and William Foster, of Pueblo. The claims cover a thousand acres. Several kinds of material are found. The most abundant is a sand rock saturated with asphalt and petroleum, but the most valuable is the asphalt which bubbles out of the springs in the bed of sand rock.

JUAB COUNTY.

MAMMOTH MINING COMPANY.—The special meeting of stockholders will be held at Salt Lake City on the 30th inst. to consider a proposition for the purchase of the property. It is stated that the proposition is made by C. E. Mitchener, who has been very successful in mining enterprises at Stockton. It is also intimated that should the sale be made, the purchasers will erect works at Eureka instead of shipping the ore to Denver, as is done at present. The McIntyre Brothers and Mr. Cunningham, who hold a majority of the stock, are said to be in favor of this proposition.

SUMMIT COUNTY.

ANCHOR MINING COMPANY.—October 31st completed one full year since machinery and power drills were set at work on the tunnel which was commenced not only as an economic measure to relieve the Anchor mine from water by drainage, instead of by large pumping machinery, but with a view hereafter of utilizing it for the transportation of ore out and fuel and material to the mine by means of either an electric tramway or a cable road.

The surveyed length of the tunnel is 6600 feet, with an intermediate shaft of 300 feet depth (for air and convenience), at a point 2000 feet from the mouth or entrance of the tunnel. Size of tunnel 7 feet high, 5 feet sill, 4 feet cap in the clear when timbered, with flume or water ditch 3 feet wide, 2 feet deep; grade of tunnel $\frac{1}{2}$ inch to the rod. The contract was let by the Anchor Mining Company to John J. Daly, he agreeing to make an average progress of 10 feet per day, and to have it completed by June 1st, 1889.

Up to February 22d, 1888, three headings and four power drills were used—one heading and one drill from entrance toward shaft, one heading with one drill from shaft toward entrance, and one heading with two drills from the shaft westward toward the mine. After February 22d only one heading with two drills could be used.

During the year there have been in all 11 days stoppage work on account of snow slide, break in compressor and repairs of boiler, making the total of 354 days work. In this time there has been constructed 300 feet shaft, 5015 feet tunnel, an average of 15 feet per day. The machine plant consists of one double hoisting engine, 30 H. P.; one single engine for blowers, 10 H. P.; one compressor, four 3 $\frac{1}{2}$ -inch Ingersoll drills, two rotary blowers, numbers 4 and 5; plan of working, three shifts of eight hours each, daily; 125 pounds Hercules powder have been used per day. It is expected to complete the tunnel in March. The tunnel, when completed, will be the largest and longest up to date in Utah—being just $1\frac{1}{4}$ miles. It will not only drain the Anchor mine at a depth of 1200 feet, but furnish a route, free from stress of weather, for economical transportation to and from the mine by means of electric tramway or cable road.

CRESCENT MINING COMPANY.—At the annual meeting held at Salt Lake City on the 10th inst. the following directors were elected: R. N. Baskin, Salt Lake; L. H. Withey, Grand Rapids; J. R. Nichols, Salt Lake; W. R. Shelby, Grand Rapids; E. T. Sprague, Salt Lake; H. J. Hollister, Grand Rapids; C. E. Olney, Grand Rapids; C. H. Withey, Park City; J. M. Barnett, Grand Rapids. The President's report for the year ending October 1st, 1888, shows that the work of the concentration has been very satisfactory during the past year, having worked 20,000 tons of second-class ore at a fair profit to the company.

Since the last report, the directors purchased the interest of the contractor in the narrow gauge railroad between Park City and the mine, and have operated it during the past season successfully. Not as much progress has been made in sinking the new shaft as we had hoped, but it seemed wise to us to suspend work in that direction at such times as we have had to do much pumping. The affairs of the company are in a healthy condition. At a meeting of the directors held recently, it was decided to at once put on a sink-

ing force in order that work might be continued on the shaft.

The receipts for the year ending October 1st, 1888, were: from sales of first class ore—lots 277 to 599 inclusive—2269 tons, \$97,522.94; concentrates—lots 50 to 69 inclusive—3480.7 tons, \$90,466.50; received from boarding house, \$21,374.47; received from sampling and shipping, \$5010.93; received from transporting ore, \$3870.71; received from time checks, \$3; received from maps and surveying, \$208; total receipts, \$218,456.55.

The disbursements were: Overdraft, McCornick & Co., October 1st, 1887, \$5857.71; overdraft, Park City Bank, \$108.25; Utah & Montana Machinery Company, \$3191.33; mine labor, \$62,590.41; supplies, lumber, etc., \$14,950.99; keeping horses, \$883.81; hauling, sampling, commissions and assaying, \$22,969.45; concentrator, operating account, \$23,362.21; tramway operating account, \$7231.18; dump operating account, \$2171.25; total ore expenses, \$134,159.30; expense boarding-house, \$14,244.41; sampling mill expenses, \$1569.45.

General Expenses.—Salaries, \$9040.50; expense accounts, \$1405.33; maps and surveys, \$174; traveling expenses, \$610; interest and exchange, \$37.01; insurance, \$1050; legal expenses, \$945.50; office improvement, \$563.46; time checks outstanding, \$3; cash in Park City Bank, \$24.44; cash on hand, \$44,544.01; taxes, \$324.80; rents, \$600; total disbursements, \$218,456.55.

The Treasurer's report shows receipts, \$186,605.66, and disbursements, \$140,707.95; cash on hand, \$45,897.71.

The Manager's report shows assets: Mine building, \$11,116.35; tramway and equipment, \$45,129.93; sampling mill, \$4820.95; sampling mill, tools, etc., \$217.15; concentrator, \$48,764.01; concentrator, tools, etc., \$1353.75; office property, \$555; mine purchase, \$50,000; assay office supplies, \$527.85; supplies on hand at mine, \$12,843.23; horses, wagons and mules, \$350; 3500 tons second-class ore on hand at concentrator at \$3.50 net, \$12,250; new hoisting plant, \$42,155.86; tools and supplies, blacksmith shop, \$562; tools and supplies, blacksmith tramway (exclusive of locomotive), \$209.25; cash in hands of McCornick, \$44,544.01; cash in Park City Bank, \$23.44; total, \$272,437.68; mortgage payable, \$42,500; due on time checks, \$3; excess of assets over liabilities, \$229,934.68; total assets, \$272,437.68.

Supplies on hand are valued at \$15,813.23.

The statement of work for the year ending September 30th, 1888, shows that the main shaft was sunk 123 feet; inclines, raises, cross-cuts and drifts, 2514 feet; and there are 7550 cubic yards of stoping taken out, and for excavations for stations, 6735 cubic feet.

TOOELE COUNTY.

NAST MILLING AND MINING COMPANY.—This company has been organized at Salt Lake City, where the principal office will be, with a capital stock of \$200,000; shares \$2 each. The company owns the Nast lode mining claim and the Nast No. 2 lode mining claim, in West Jordan mining district. The officers of the company are: Charles W. Watson, President; Lewis Martin, Vice-President; George E. Chandler, Secretary.

VIRGINIA.

ROANOKE COUNTY.

WASHINGTON ZINC MINING COMPANY.—The company contemplates building large zinc works next Spring at Bonsack's.

WASHINGTON TERRITORY.

KITTITAS COUNTY.

An attempt to obtain natural gas at Cle Elum is being vigorously prosecuted. The boring has now reached a depth of a little over 600 feet. Even if gas is not obtained, the result of the boring will have proven that coal, which can be easily mined, lies beneath that town. When down a little over 400 feet a stratum of coal seven feet thick was struck. It is intended to keep on boring the gas well until a depth of 1000 feet is reached, if a good flow of gas is not had before that. The company engaged in this enterprise has spent upwards of \$10,000 already, including the work and cost of machinery.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF NOVA SCOTIA.

Representatives of the coal mine owners and the miners had a conference at Sydney on the 8th inst., but failed to come to an agreement, and the men have gone on strike.

PROVINCE OF ONTARIO.

[From our Special Correspondent.]

ALGOMA, Oct. 30.

BADGER.—This mine is preparing for another shipment of rich ore to the well-known New Jersey Smelting Works of Edward Balbach & Sons. Returns from last shipment are looked for here daily. Mr. Charles Brent, Mining Engineer, accompanied last shipment and will represent the Badger Company in Newark, N. J., during treatment of ores.

BEAVER MINING COMPANY.—The temporary suspension of sinking in No. 2 shaft, caused by the accidental burning of shaft-house, has been speedily ended by the energetic management, and work was again vigorously resumed there on 24th inst. with the most satisfactory results. The ore from this quarter of the Beaver is certainly of finest quality.

ELGIN.—This mine is near the Beaver, and operated by that company. No. 1 shaft has attained a depth of over 100 feet, showing a pay-streak of rich ore averaging 300 ounces—chiefly argentine—some of which yields 640 ounces per ton of 2000 pounds.

SILVER MOUNTAIN EAST.—Prospecting toward

east limits, where production of their, strong vein showed a small but rich streak of ore, has been discontinued pro tem, and work resumed in No. 3, or western shaft. This point is close upon the West End property, and it is significant that almost their first last displayed ore of very fine quality.

VICTORIA.—This mine, within three miles of the Beaver, and immediately on the high road to the Canadian Pacific Railway station of Murida, has been partially developed. It is in the same interesting geological formation as the surrounding silver mines. Two good houses are erected thereon, and development work on strong vein will be continued. The lode is an east and west one, carrying argentiferous blendes, black and leaf silver, with cube galena. It is owned by Mr. Coulter, of Toronto and London, Canada West, and will soon be placed in full blast.

WEST END.—The management here are busy bagging superior quality ore, and systematic mining is the order of the day.

WHITEFISH LAKE.—Captain Linde, operating on the Little Whitefish River, is erecting two substantial log houses on "R. 162," and so far as development goes (30 feet) has an average of about \$35 per ton.

WOLVERINE.—This mine consists of two strong lodes. No. 1 is a continuation of the Queen Lode, while No. 2 lode runs northeast at an angle of 80 degrees. A good house and stable has been erected between these two lodes that will accommodate a small force during winter months. Prospecting work on No. 2 lode has been encouraging so far.

MEXICO.

The following table, from the El Paso Bullion, gives the amount and value of the imports of ore, coin and bullion passing through the El Paso custom house for the week ending October 27th:

Table with columns for SILVER ORES, METALS, and Total. Includes entries for Con. Kansas City S & R. Co., Rio Grande S. & R. Co., Mexican silver coin, Wells, Fargo & Co., etc.

RUSSIA.

It is reported that a syndicate of American capitalists, including the leading members of the Standard Oil Company, are engaged in an attempt to introduce the pipe line system in the Russian oil district.

SOUTH AMERICA.

ARGENTINE REPUBLIC.

CATAMARCA IRON DEPOSITS.—The Romay iron mine, in the Argentine province of Catamarca, has recently been examined by Mr. Ag. Yehen Fayenbois, a mining engineer, who has issued a report on the subject. The deposit is situated about thirteen miles from the Frias station on the Central Northern Railway. He found "two excavations still in excellent condition, and showing layers of splendid soft iron, separated by strata of calcium, carbonates, quartz and granite, all excellent materials in smelting." This magnetic iron "is the same as the Norwegian metal, containing about 70 per cent of pure metal." He also noticed small quantities of pyrites. Good building stone and valuable slate were likewise seen. Mr. Fayenbois goes on to say: "An inspection of the third excavation convinced me that the entire hill has a uniform system of formation of magnetic iron, at an angle of 70 degrees to the top of the hill, where the extreme points of the layers meet. The hill is 150 feet high, with a circumference of 1500 feet at the base; calculating that the layers are not less than 6 to 7 meters, 4 to 5 meters wide at the base, dwindling to 1 meter at the top, an idea will be gathered of the immense quantity of iron present; years would elapse before this hill could be exhausted. The neighboring hills have exactly the same formation, but in some the layers of iron are 8 meters high. In some parts I saw the effects of previous explosions, the iron jutting out of the side of the hill. The principal wealth of the Romay mine is, beyond doubt, its magnetic iron, and the mineral can be worked with the greatest ease, as fuel and water are abundant. The wealth in these hills is incalculable, and I calculate that working at the rate of 500 to 600 tons of iron per diem, the mine would supply iron for a century to come."

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 9.

Statistics.

Production of Anthracite Coal for week ended November 3d and year from January 1st:

Table showing production of anthracite coal by company (P. & Read, Cent. R.R., L.V.R.R., etc.) for 1888 and 1887.

Increase..... 3,352,100 The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period: 1883..... 27,363,966 | 1885..... 26,101,408 | 1884..... 26,008,353 | 1886..... 26,781,426

Production of Bituminous Coal for week ended November 3d, and year from January 1st:

Table showing production of bituminous coal by company (Phila. & Erie R.R., Cumberland, Md., Barclay, Pa., etc.) for 1888 and 1887.

WESTERN SHIPMENTS. Pittsburg, Pa..... 15,696 | 612,323 | 467,656 | Westmoreland, Pa..... 35,814 | 1,298,287 | 1,187,274 | Monongahela, Pa..... 7,653 | 337,582 | 318,264

Total..... 59,163 | 2,248,192 | 1,973,194 Grand total..... 303,909 | 11,768,890 | 10,551,326

Production of Coke on line of Pennsylvania R.R. for week ending November 3d, and year from January 1st, in tons of 2600 lbs.: Week, 93,456 tons; year, 3,363,340 tons; to corresponding date in 1887, 3,042,176 tons.

Anthracite.

This market is much easier all around. It is easier to get coal, and it can be got at lower prices than we have been quoting for some time past. The companies, of course, maintain their nominal prices, and continue to deliver on old contracts made before the last advance. Stove coal still fetches \$4.50, but chestnut burning can be bought at \$4.35. Egg coal is weak. Good Lehigh can be purchased at \$4. Broken is somewhat demoralized, and good Lehigh can be bought at \$3.50@3.75. Pea coal is a little firmer, owing to the stoppage of shipments to tide water, which have been operating for some time to improve the market. It can still, however, be purchased at from \$2@2.25, and exceptionally at \$2.50.

From this on we must expect the market to become weaker unless the shipments are reduced. There is as yet no definite arrangement as to the reduction in output, and each one is waiting for the other to commence. This is the old plan, and if persevered in will bring about the old results.

We regret exceedingly to announce the very serious illness of Mr. Frederick Potts. It is to-day thought that he cannot long survive, and possibly even before our readers see this announcement his death will have occurred. The reports leave us little room to hope that the favorable change which every one so earnestly desires may occur.

We quote f.o.b. prices for free burning coal at New York shipping points nominally as follows, but there is some shading in most of the sizes:

Table with columns for Broken, Egg, Stove, Nut, Pea. Includes entries for Chestnut, Pea, etc.

Bituminous.

There is nothing new to report in this trade. Business is active and prices are firm. The holidays and the stoppage of business during this week have somewhat interfered with the business.

We continue our prices as heretofore: \$2.60 f.o.b. Baltimore and Georgetown, and \$3.25 for New York Harbor.

Boston.

Nov. 8.

[From our Special Correspondent.]

The dullness prevailing in the anthracite market here was to be expected. Election excitement held off unusually late here, but it was great for a few days before election, and nothing to speak of has been done in a business way since. Then the dullness of the weather has served as a check on trade. Take it all together coal dealers have had plenty of time to spare for election matters, and that is about all they have had to attend to.

The market seems to grow rather easier here. Stove coal is still scarce for prompt delivery. The delay in loading is still marked. However, the f.o.b. price of stove size even is not as firm as it was, although the weakness in this direction is hardly quotable. Broken coal is still dull and weak, but now there is a weaker feeling in egg coal than in any other size, owing chiefly to the fact that individual operators are beginning to have a surplus of egg, and are making concessions of 15 cents and thereabouts.

Pocket prices have been advanced as freights have gone up so materially of late. But little coal is held by the pocket dealers, and some of them are taking no new orders. The new prices are as follows:

Table with columns for Broken, Egg, Stove, Nut, Pea. Includes entries for Hard White Ash, Frey, Lykens Valley, etc.

The demand for bituminous coal is small but rather better than the usual movement at this period of the year. It is claimed that shippers are, generally speaking, well advanced in their deliveries, but a few shippers are notoriously struggling with all they can deliver. F.o.b. prices are steady at \$2.45@2.60.

Vessels continue in light supply, though more vessels are expected at shipping ports right away.

We quote vessel rates, exclusive of discharging: New York, \$1.10@1.25; Philadelphia, \$1.35@1.50; Baltimore, \$1.50@1.60; Newport News and Norfolk, \$1.35@1.55; Richmond, \$1.70; Provincial, \$1.90@2.

The movement at retail is small. Prices are unchanged. The retail movement is very good, and prices are firmly held.

Delivered prices are: Stove and Nut, \$6.50; Egg, \$6.25; Broken, \$6; Franklin, all sizes, \$7.75; Lehigh

Egg, \$6.50; Broken, \$6.25. Wharf prices 50 cents less than the above. Bituminous coal, \$4.25 on the wharf.

Buffalo.

Nov. 8

[From our Special Correspondent.]

Down freight to this port from the West will continue to be received until the 15th inst., but up freight package shipments are discontinued by the propeller lines running in connection with railroads west and east. This indicates the near close of navigation for 1888.

The trade, both of hard and soft coal, continues without exciting features. Business fairly good and prices firm. The scarcity of cars is still a subject of complaint. The stock of anthracite equal to requirements for rail but not for lake shipments. Bituminous is generally short, and of some kinds the market is bare.

The North Buffalo Gas Fuel Company is the name of a new company to supply a portion of our city with fuel. Application has been made to the Council for permission to lay pipes, etc.

The coal shipments for the past few days were principally to Chicago, Milwaukee and Toledo. In consequence of light offerings of down cargoes freight on coal to Duluth declined 10c., but rates to other points unchanged.

The shipments by lake westward from this port from November 1st to 7th, both days inclusive, were 74,510 net tons, namely: 37,400 to Chicago, 18,730 to Milwaukee, 3700 to Duluth, 1800 to Superior, 7550 to Toledo, 1750 to Fort William, 80 to Bay City, 1300 to Racine, 900 to Green Bay, 120 to Perry Sound, 530 to Port Huron and 650 to Detroit. The total shipments thus far this season 2,319,810 net tons, including cargoes on vessels from Tonawanda not reported at Buffalo Custom House.

The ruling freight rates on coal were 100c. to Chicago, 90c. to St. Ignace and Milwaukee, 60c. to Glad-tone, 75c. to Green Bay and Fort William, 50c. to Toledo, Detroit, Duluth, Port Huron, and Superior.

Pittsburg.

Nov. 8.

[From our Special Correspondent.]

Coal.—Prices have undergone no change worth noting. Mining is still going on in the pools and will continue until the empties are loaded. Coal men are not desirous of a rise in the Ohio. The lower markets are all overstocked. Prices have been further reduced, in some instances selling below first cost. Most of the empties have arrived and are being loaded for next rise, which, from present indications, will not be long. Prices in the pools are:

Table with columns for First pool, Second pool, Third pool, Railroad coal. Includes entries for Connellsville Coke.

Connellsville Coke.—Prices rule firm, the advance being maintained. Business active. The output last week amounted to 119,736 tons, against 118,040 tons for the previous week. Out of 13,060 ovens there are 11,558 in operation, and others making ready to commence operations. There is already talk of a further advance in coke. It may be premature just now. The movement will not be long deferred. The outlook for new business is good.

The new rates are: Blast-Furnace, \$1.25 per ton; to dealers, \$1.35; foundries, \$1.40; crushed, \$2.20.

Freight rates to Pittsburg, 70c. per ton; to the Mahanov and Shenago valleys, \$1.35; East St. Louis, \$3.20; to Cleveland, \$2.80; to Chicago, \$2.75; to all other points the same proportions.

FREIGHTS.

Southern Freight Rates.—The freight rates from Pittsburg to Galveston and Houston, Tex., were advanced as follows on the 2d inst.: Iron nuts, bolts, washers, rivets and staples were advanced from 54 to 56 cents per 100 pounds. The new class rates are: First-class, \$1.50; second, \$1.25; third, \$1.05; fourth, 86 cents; fifth, 78 cents; class A, 83 cents; B, 75 cents; C, 67 cents; D, 55 cents; E, 50 cents. The new figures are issued under a new classification, revised for Texas business.

The latest charters to November 9th per ton of 2240 lbs. From Baltimore to:—Bangor, Me., 1.60; Bath, 1.60; Boston, 1.55; Bridgeport, Conn., 1.35@1.40; Bristol, 1.25@1.30; Brooklyn, 1.15@1.20; Charleston, 1.15; Fall River, 1.40; Galveston, 2.90@3.00; Gardner, Me., 1.75; New Bedford, 1.35; Newburyport, 1.50; New Haven, 1.35; New London, 1.40; New York, 1.15@1.20; Portland, 1.50@1.55; Portsmouth, N. H., 1.60@1.65; Providence, 1.40; Quincy Point, 1.50; Richmond, Va., .70; Roxbury, 1.50, 3c.; Salem, Mass., 1.60; Savannah, 1.15; Somerset, 1.35; Williamsburgh, N. Y., 1.15@1.25; Wilmington, 1.00.

From Philadelphia to:—Bangor, 2.00; Boston, 1.50@1.60; Charleston, 90; Com. Point, Mass., 1.42 1/2; East Cambridge, 1.50; Fall River, 1.15@1.25; Galveston, 2.90; Gardner, Me., 1.60; Georgetown, D. C., .85; Lynn, 1.75@1.80; New Bedford, 1.15@1.25; Newburyport, 1.75; New York, .90; Norfolk, .70; Portland, 1.50@1.60; Portsmouth, N. H., 1.60; Portsmouth, Va., .65; Providence, 1.15@1.25; Richmond, Va., .75; Rockport, 1.22 1/2; Saco, Me., 1.75; Salem, Mass., .90; Savannah, 1.00; Washington, .85; Weymouth, 1.15; Wilmington, N. C., .60.

From New York to:—Bath, \$1.15; Beverly, \$1.15; Bridgeport, Conn., .70; Cambridge, Mass., \$1.10; 3c.; Cambridgeport, \$1.10; 3c.; Charlestown, \$1.10; Chelsea, \$1.10; Com. Pt., Mass., \$1.10; E. Cambridge, \$1.10; 3c.; E. Greenwich, R. I., .85@.90; Fall River, .75 @.90; New Bedford, .80@.90; Newburyport, \$1.25; New Haven, .70; Newport, .85@.90; New London, .80@.85; Norwalk, Conn., .70; Norwich, .90; Portland, \$1.10; Portsmouth, N. H., \$1.20; Providence, .80@.90; Salem, \$1.15.

* And discharging, 3c. per bridge extra, † Alongside, And to wharf.

METAL MARKETS.

NEW YORK, Friday Evening, Nov. 9.
Prices of silver per ounce troy.

Nov	Sterling Exch'ge.	London Pence.	N. Y. Cts.	Nov	Sterling Exch'ge.	London Pence.	N. Y. Cts.
3	4.87½	43	93¾	7	4.87½	43½	94½
5	4.87½	43	93¾	8	4.87½	43½	94½
6	4.87½	43	94	9	4.87	43½	94

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 5 per cent. During the week the bank gained £929,000 bullion, and the proportion of its reserves to its liabilities was reduced from 37.94 to 36.52 per cent against an advance from 45.56 to 47.11 per cent in the same week of last year, when its rate for discount was 4 per cent. The weekly statement of the Bank of France shows a gain of 5,000,000 francs gold and a gain of 1,700,000 francs silver.

Copper.—Very little can be said as to the copper market, as not a single transaction in lake copper was reported in the Metal Exchange during the whole week. At the same time it is understood that some parcels might be picked up for November or December delivery at 17½@17¾. Casting copper remains very firm at 16½@16¾. There cannot be the slightest question that as week by week passes over the whole copper business is being gradually but surely monopolized by the agents of the French syndicate.

Reports from Europe are to the effect that the tone of the copper market continues firm, and it is evident that the trade has become accustomed to the higher level of prices. Speculation in Chili Bars has, however, almost entirely died out, and the little business of a speculative character now taking place in these sorts is of a very retail character. The present quotations in London are as follows: Tough Cakes £80; Best Selected, £81; G. M. B., from £78 to £78½ spot, and £78 15s. to £79 three months; Chili bars £78 2s. 6d. to £78 5s spot, and £79 to £79 2s. 6d. three months. Some Anaconda matte is reported to have been sold at 15s. 6d. ex warehouse, Liverpool. Reports to hand from Chili are to the effect that there is no prospect that this year's production will exceed last year's, and the probabilities are that last year's figures will hardly be reached.

A cable from Paris, dated November 4th, says that the copper syndicate has been reorganized with a capital of £6,000,000, so as to be thoroughly within the French law, the former syndicate having been made precarious by the law against monopoly. The new company is now regularly organized, and has just concluded an agreement with the Rio Tinto Company to purchase all its product of copper for fifteen years to come, instead of three years, as now. Other companies will shortly make a similar contract.

The Excelsior Copper Company, Limited, is the name of a concern recently organized in London on a capital of £450,000, or \$2,250,000. The property, situated in Canada, has been worked and has absorbed more than one fortune. It is held in very light esteem in this country, where it is well known, and the London investors had better beware. We shall refer to the scheme editorially in an early issue of this journal.

Tin.—This market has been rather flat during the week and only small transactions have taken place, and these at lower quotations. Some bear sales for January delivery have been made at 22.60, at which price there remain buyers over. We quote Spot 22½@23½, and November and December are obtainable at about the same figure. The London market has been somewhat irregular, exhibiting considerable firmness at the beginning of the week, but reacting a little later on, and closing steady to-day at £101 12s. 6d. £101 15s. for spot and 5s. to 7s. 6d. higher for futures.

Lead.—A steady business for consumption can be reported at prices varying principally between 3.80 and 3.85, but it is understood that a few large lots have been sold at a shade under these figures. At present quotations there are very few sellers, and the greater part of the lead in New York is out of the market, and held for higher prices.

The tangle in which the Corwith failure has placed the lead market continues. The many banks and others who had made advances on the lead at high figures are helping the market, as do also the smelters who sold at high figures but now have the lead on their hands. There is no knowing what the market would be were it left to itself, but as this is not likely to be the case for some time it is not necessary to discuss it.

In Europe the market is very firm, Spanish lead being quoted at £13 10s. to £13 12s. 6d. in London and English lead at £13 15s. to £13 17s. 6d.

Chicago, Ill.—Messrs. Everett & Post telegraph us to-day: Market has ruled quiet at 3.60@3.65c. Quite large sales to consumers are reported.

St. Louis, Mo.—Messrs. John Wahl & Co., of St. Louis, telegraph us to-day: In sympathy with other markets, an increasing dullness has characterized the lead market. There has been a weak feeling all around, carrying prices down to 3.50c. for Common and 3.55c. for Refined. Sales for the week will probably amount to 1200 tons.

Spelter has been more inquired for at 5.15 to 5.25, and at these prices there are also buyers for future deliveries, but producers are holding back. Foreign

spelter is held for 6 to 6½, and the London quotations for good ordinary brands are £18 15s@£18 17s. 6d., and for special brands, £19@£19 2s. 6d. Antimony is steady, Cookson's being quoted 14c. to 14½c., and Hallett's, 10½@10¾c. Makers' quotations in England, £41 10s.@£43.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 9.

Heavy Chemicals.—This market has shown little animation. The political excitement of the week reduced the volume of business very materially, and in the absence of any urgent demand, and with no changes in the situation abroad, there is very little interest in the market. Now, that the election is over, a feeling of strength is apparent, and values are firmly sustained. Consumers have been buying very sparingly of late and dealers are therefore expecting a revival of activity in the near future, as the small hand to mouth supplies now held by consumers cannot last long. The following from S. W. Royce & Co., dated Manchester, October 26th, will be of interest:

"Chemicals.—With the exception of the alkali branch, the amount of business passing in chemicals, though very fair, is not so satisfactory as would appear from the general firmness of prices. The strong demand for bleaching powder that has existed for some time past is maintained, makers being well engaged for both early and forward delivery at full figures. A large business has been done in caustic soda, and though the demand has now somewhat slackened, prices continue very firm. Soda ash continues in strong demand, more especially for shipment, and soda crystals are steady. Acetates of lime are in rather better tone, though only a moderate amount of business is being done, the demand for acetic acid and liquors being only small, as is usual at this time of the year. Miscible naphtha has advanced, and may improve further, but solvent wood naphtha is slow of sale. All ammonia salts are steady, sulphate has secured a good advance, and as stocks are only light higher values seem probable. More is being done in carbonate of ammonia, and makers are quite disposed to book forward at current prices. Crude carbolic is dearer, and crystals are firmer though quiet. Foreign white sugar of lead has been advanced £1 per ton by makers, but plenty can still be obtained at old rates. Nitrate of lead is steady at the advance though demand is only moderate. A fair business is being done in sulphate of copper at steady prices."

In New York the market is practically unchanged. Liverpool brands of carbonated soda ash, 48 per cent, are in slightly better demand, but few transactions of importance can be recorded. Prices rule firm and unchanged. We quote 1.25@1.27½c. to arrive and 1.27½@1.32½c. for stock on the spot.

Newcastle soda ash, 48 per cent, although meeting with little attention, continues firm in price, as the spot stock is very light. There is no change in quotations, which are 1.22½@1.27½c. for lots to arrive, and nominally 1.25@1.30c. on the spot.

Caustic soda ash, 48 per cent, is quiet, sales being small, offerings both on the spot and to arrive light, and prices ruling generally firm. The usual quotations are: 1.27½@1.35c. on the spot, and 1.25@1.30c., according to brand, for arrivals.

Caustic Soda.—The market has been quiet, a natural reaction from the rapid advances and excitements caused by the combination of the English makers and the consequent decrease in production. Prices, however, continue firm, as dealers appear to be confident that the situation will warrant further advances in future, owing to the gradual decrease of the amount of stock coming on the market. Quotations remain at 2.55@2.60c. for 60 per cent and 2.35@2.40c. for the various higher tests, 70, 74 and 76 per cent.

Sal soda continues neglected. Although there is very little coming forward the market is so dull, it is stated, that sellers are willing to make concessions for large orders. The nominal quotations are 97½@1c. on the spot, and 95c. to arrive.

Hyposulphite of soda is quoted in casks at 1.90c. per pound, and in kegs at 2c. per pound.

Bleaching Powder.—There is very little doing, recent arrivals having completely satisfied any demand existing, and prices are consequently much easier. For supplies on the spot 2.20c. is asked, while arrivals may be had at 2.06½c.

Acids.—There is no change to report. The demand continues steady and fair. Toward the latter part of the week there seems to be an increase in the inquiry from consumers.

Acetic acid is dull at the nominal quotations of 2@2½c., according to quantity.

Nitric Acid.—Considerable business has been done. Prices remain as follows: 38°, 4@5c.; 38°, 5@5½c.; 40°, 6c.

Muriatic Acid.—There is a moderate demand and prices are quite firm; the trade is otherwise without interesting features. Ruling quotations are for 18°, 1.20c.; 20°, 1.30@1.50c.; 22°, 1.40@1.80c.

Oxalic Acid.—The market is quiet, with transactions of small proportions. Messrs. Roessler & Hasslacher report: "Prices are well maintained since the cheaper lots seem to be about closed out." Prices rule at 8½c. per lb. for large lots and 9c. per lb. for smaller quantities of prime English or German, ex store, at New York, Boston and Philadelphia.

Tartaric acid is wanted only to a limited extent. The quotations, which are unchanged, are as follows: 43c. for crystals, in quantities of 3000 lbs. or more; in bbls., less quantity, 44c.; in 50-lb. boxes, 45c. For powdered, advance these prices one cent.

Sulphuric acid continues very firm, owing to the very light stocks on hand. Manufacturers maintain prices very firmly, but as yet there has been actually no further advance from that noted in previous reports. We quote for 60 degrees, 90@95c. per lb., and for 66 degrees, 95@1.25c., according to quality.

Fertilizers, etc.—Considerable business is being done and prices are firm, owing to the scarcity of available stock. There has been, for several weeks past, a gradual stiffening in quotations. To-day the revised price list stands about as follows: Azotine, \$2.50@2.55 as to quality; dried blood (city), low grade, \$2.50@2.55 per unit; Western high grade, \$2.60@2.65 per unit for ground material; tannage, high grade, \$2.4@2.25 per ton; low grade, \$2.2@2.3 per ton as to quality. Fish scrap, \$2.4@2.5 per ton f.o.b. factory. Sulphate of ammonia, \$3.40@3.45 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, is quoted at \$19.00@19.50 per ton. Dissolved bone-black is 97½c.@\$1 per unit for available phosphoric acid, and acid phosphate 75@80c. per unit for available phosphoric acid.

Steamed bones, unground, \$19; ground, \$25@26. Charleston rock, undried, \$5@5.25 per ton; kiln dried, \$6 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at \$10@10.50 ex steamer at New York.

Muriate of potash is firm, there being a scarcity of supplies, which are nominally held at \$1.80@1.85 for both spot and arrivals.

Double Manure Salts.—Business is somewhat restricted, owing to the scarcity of available supplies, freights being high and scarce. Prices are nominal at 1.15@1.20c. on a basis of 48 per cent potash. High grade sulphate of potash is firm at \$2.30 per cwt., basis of 90 per cent.

Kainit.—No spot stock is offered, and there is very little afloat. Small resales are reported. The demand for shipment continues good, and prices are therefore very firm. We quote \$9.75@10 per ton for nearby cargoes, and \$9.50@9.60 for shipment, foreign invoice weight.

Brimstone is scarce and prices are very firm. We quote \$23@24 for best unmixed seconds on the spot or to arrive shortly, \$22 for later arrivals, and \$20.50@21.50 for shipment. A. S. Malcomson is quoted as being the authority for the following: "The production this year will be less than last, which was 300,757 tons. The exports are increased and amount from January to July (7 months) to total tons: 1888, 243,244; 1887, 237,023; 1886, 243,242. To American ports alone I note a large increase during the same period: 1888, 71,681; 1887, 36,674; 1886, 48,192. The shipment during remaining five months will also be heavy, and with curtailed production this year shippers are holding back for higher values."

Nitrate of soda is very firm, a strong demand being apparent. Spot supplies are now held at 2.22½@2.25c., while 2.20c. is asked to arrive.

Minerals.—The state of the foreign mineral trade is described by Messrs. S. W. Royce & Co., of Manchester, as follows: "There is considerable excitement in this branch, consequent upon the differences between the colliery proprietors and their men, and upon the general advance in freights. There has been a rush of orders for almost all classes of coal, both for home and shipping account, and prices are higher all round. Iron ore has been strongly inquired after, but only a moderate amount of business has been transacted, as buyers generally do not see their way to give the considerably increased prices now asked. Manganese also has much improved in value, and still higher prices are looked for. Brimstone continues to come forward in only moderate quantities, and prices are very firm. For China clay much higher figure are now being paid, the improved demand being well maintained. French chalk has advanced about 5s. to 7s. 6d. per ton on account of the higher freights now ruling. Sulphate of barytes is only in moderate request."

China Clay.—There is only a limited demand with a plentiful supply.

The ruling quotations are \$13.50@18.00, according to grade.

Sulphate of barytes is quiet and unchanged. Previous quotations rule.

See our "Current Prices" on another page.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Nov. 9.

The political excitement, with its demoralizing influence on business, did not prevent a pretty fair volume of business on the Building Material Exchange this week.

Bricks.—Supplies have come to hand pretty regularly, and for the most part have readily found an outlet.

The demand continues steady, and for the season is somewhat improved. A surplus variously estimated at from two to four million brick is admittedly on the market, but has had no material effect upon prices. The market is practically unchanged from the stereotyped conditions that have characterized it for some time past. Sales continue dull, and there is still considerable inquiry for the better qualities. Prices remain as quoted last week.

Lime.—Adverse weather has delayed shipments from the East. Several light cargoes have arrived during the week and have been readily taken up, leaving the market rather bare.

There are, however, a number of vessels afloat and due. Association rates are maintained with little or no variation.

Cement.—There has been a falling off in the offerings of Portland, owing to a slight decrease in the im-

portations and an improved demand for inland custom, in order to anticipate the closing of navigation. Otherwise the market is featureless.

For latest prices of building materials and wages paid to laborers in New York and vicinity see our register of current prices on another page.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 9, 1888.

The markets during the week have shown no new features worthy of note. The excitement of the last day before election, the election holiday, and the restlessness of the day after naturally lessened business, without, however, changing any of the general features of the markets. It is true that Wall street has interpreted the result of the election unfavorably, and there has been a slump in stocks in consequence; but this is of little consequence. Many persons, on the contrary, believe that a period of extravagant expenditures in every direction will be inaugurated in order to get rid of the surplus without reducing the tariff. We do not share these anticipations, but believe that things will go on pretty much as before. The responsibility which will attach to the Republican party, now that it will have complete control of both the Senate and Congress, will probably make it more careful in these matters than it was when it divided responsibility for jobs with the Democrats.

The prospects for the coming year continue very encouraging, as they have been reported in these pages for some months past, and our reports from the South and West continue to indicate a very prosperous condition in the ore and iron markets.

Iron Ore.—From Cleveland we learn that every ton of ore that can be brought down from the mines has

been sold, and instead of a large accumulation (some 700,000 tons of unsold ore), such as there was at the opening of this season, there will be such a demand for Lake ore before Spring opens that a large amount will probably have to come forward by rail. Prices for non-Bessemer ores at Cleveland are from \$4.25 to \$5 a ton.

There is an excellent outlook for the iron ore mines next year.

The ore shipments this year have now reached 4,200,000 tons.

American Pig.—The demand continues moderate and steady without interest or change, and with a continuance of bright expectations for the next year. We continue to quote \$18@19 for No. 1 and \$17@18 for No. 2, \$16@16.50 for Forge standard brands. The South and the West are steadily increasing their make of coke irons; the anthracite furnaces barely hold their own.

Scotch Pig.—We continue quotations in our table of current prices and have no material change in the general features of the market to report. The market is a little firmer.

Bessemer Pig.—There are no transactions of foreign, our prices here being far below the point of importation. We hear of some 10,000 to 12,000 tons of Cornwall pig having been sold at the Lebanon Valley, it is said, at about \$15 for the average of Nos. 1, 2 and 3. On the other hand, Western furnaces are talking of advancing the prices of Bessemer pig because the price of ore has advanced and the price of coke has also gone up, making an increased cost equivalent to nearly \$1.25 a ton of pig iron.

Spiegeleisen.—We continue to quote \$27 for 20%, and \$54 for ferromanganese 80%. There is nothing worthy of note in this article.

Steel Rails.—The contracts which we reported last

week are still discussed somewhat, owing to the low prices at which the New York Central orders were placed. It is now supposed that the price was very little, if at all, above \$27. Some other orders, mostly in the West, have also been placed at very low figures. We hear of nothing new in this market during the week, business having been quiet owing to the elections. There are large orders still in the market, and we expect to hear of several of them being closed within the next ten days.

The amount of railroad building this year has already exceeded 6000 miles, and it is supposed that it will go considerably beyond 7000 before the close of the season. Next year we look for quite an active railroad building business.

Structural Iron.—There is little new to report this week, though there are quite large orders in the market. The consumption for this article is increasing and the mills are confidently expecting large orders during the winter and early spring.

For further quotations see our table of prices current on another page.

Louisville, Nov. 6.

[Special report by Messrs. HALL BROTHERS & Co.]

The market has really been most satisfactory during this week than the previous one. The principal business, however, has been the consummation of deals that have been pending for some time past, most of them being the acceptance of offers made by the consumers. No business of importance is expected to transpire for some days, until the excitement of the election has fully subsided; some sales are reported at altered figures.

Quotations cash f.o.b. cars, Louisville, will be found in our weekly register of prices.

IMPORTS AND EXPORTS OF METALS AT NEW YORK OCTOBER 30 TO NOVEMBER 3, AND FROM JANUARY 1.

Table with multiple columns for metal types (Spelter, Zinc Sheets, Pig Lead, Antimony, Copper, Nickel, Tin, Tin Plates, Bar-Iron, Steel Sheets, Steel & Iron Rods, Scrap Iron, Charcoal Iron) and their respective import/export volumes in various units (Tons, Casks, Pounds, Boxes) for the specified period.

CURRENT PRICES.

Table of current prices for various commodities including acids, alkalis, and metals.

Table of current prices for building materials, iron, and steel.

Table of current prices for various types of pig iron and steel products.

Table of Philadelphia prices for various iron and steel products.

Table of stock market quotations for Baltimore, Md.

Table of stock market quotations for Birmingham, Ala.

Table of stock market quotations for Pittsburgh, Pa.

Table of foreign quotations for various metals and commodities.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. + This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. # Non-assessable for three years. T Deadwood previously paid \$275,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation in Aug., 1884, the California had paid \$31,330,000 in dividends, and the Con. ... 1,344,500,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1865, the Copper Queen had paid \$1,350,000 in dividends. † 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

Table with columns for 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each section lists company names and their stock prices for various dates from Nov. 3 to Nov. 9. Includes a 'SALES' column for each company.

*Ex. dividend. *Dealt in at the New York Stock Ex. Unlisted Securities †Assessment unpaid. ‡Dividend shares sold, 13,920. Non-dividend shares sold, 32,050. Total New York, 45,970. ‡Election Day.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for 'NAME OF COMPANY' and dates from Nov. 2 to Nov. 8. Lists mining stock prices in Boston with a 'SALES' column.

Boston: Dividend shares sold, 12,280. Non-dividend shares sold, 10,865. Total Boston, 23,145.

COAL STOCKS.

Table with columns for 'NAME OF COMPANY', 'Par val. of sh's', and dates from Nov. 3 to Nov. 9. Lists coal stock prices with a 'Sales' column.

San Francisco Mining Stock Quotations.

Table with columns for 'COMPANY' and dates from Nov. 2 to Nov. 8. Lists San Francisco mining stock prices under the heading 'CLOSING QUOTATIONS'.

*Bid. †Asked. **Of the sales of this stock, 44,510 were in Philadelphia, and 102,490 in New York. Total sales, 287,488. ‡Election Day. Exchange open in Philadelphia only.

Pittsburg.

Nov. 8.

[From our Special Correspondent.]
Raw Iron.—The past week was not a very active one in consequence of the election. Many were inclined to let business take care of itself, while they individually took an active part in looking after the interests of their favorite candidates. Under the circumstances, trade was neglected, with a material falling off in the transactions, but we think the result of the election will stimulate the iron and steel trade and cause a fresh revival of business, and new enterprises that have been waiting a decision will resume operations with a firm conviction that protection will be safe for the next four years. Well informed men predict that next year will show a general revival in the manufacturing trade of Pittsburg; that preparations to meet that end will soon be inaugurated. While the iron market was steady, prices are fully maintained; holders of favorite brands are inclined to advance prices in order to meet the advance in coke that will increase the cost of making pig iron 37 to 40 cents per ton. This advance must be met by the maker or the purchaser. Consumption continues large, and the output so far has been pretty much absorbed in filling contracts that were made some time since for later delivery. The general feeling in the iron trade is that the absolutely necessary requirements of the country will keep the mills pretty fully engaged all winter. Old iron rails are reported scarce, holders firm in their views and not very anxious to sell. Several lots in the East are held for higher prices.

Coal and Coke Smelted Lake Ore.

1200 Tons Gray Forge	16.50 cash.
1000 Tons Bessemer	17.50 cash.
1000 Tons Gray Mill Iron	16.50 cash.
500 Tons Gray Forge	16.25 cash.
500 Tons Class No. 3 Bessemer	17.50 4 mo.
500 Tons Bessemer	17.75 cash.
500 Tons Gray Forge	16.50 cash.
500 Tons Gray Forge	16.50 cash.
500 Tons Bessemer	17.75 cash.
100 Tons No. 1 Foundry	17.50 cash.
100 Tons Gray Forge, all ore	17.00 cash.

Coke, Native Ore.

200 Tons Gray Forge Storage	15.45 cash.
200 Tons Gray Forge Storage	15.50 cash.
50 Tons Silvery	17.00 cash.
100 Tons Mottled	15.50 cash.
50 Tons Gray Forge	16.50 cash.
50 Tons Silvery extra	19.00 cash.
30 Tons Silvery No. 2	16.00 cash.
30 Tons No. 2 Foundry	17.50 4 mo.

Steel Slabs and Billets.

1000 Tons Billets	29.00 cash.
500 Tons Slabs	28.65 cash.
500 Tons Slabs	28.50 cash.
500 Tons Billets	29.75 cash.

Muck Bar.

500 Tons Neutral, Spot	29.50 cash.
500 Tons Neutral, Spot	29.50 cash.

Old Iron Rails.

1000 Tons American T's	24.25 cash.
500 Tons American T's	25.00 cash.

Ferro-Manganese.

30 Tons 80 per cent.	56.00 cash.
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Steel Wire Rods.

1000 Tons American fine	42.75 cash.
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Skeip Iron.

1000 Tons Narrow Grooved per cwt.	182 1/4 cash.
750 Tons Wide Grooved per cwt.	195 cash.

Philadelphia.

Nov. 9.

[From our Special Correspondent.]
 It is impossible to verify or contradict some of the rumors that are afloat to-day concerning large transactions in steel rails. That there are inquiries on the market for large lots, and that there have been for several days, is admitted. That some Western concerns have taken orders below the prices heretofore named is also true, but what the prices are it is impossible to ascertain. There are inquiries on the market for considerably over 100,000 tons in all, most of them for Far Western buyers. Two or three New England railroad companies are about ready to place small orders, but are waiting farther developments. One or two Virginia roads and two or three Southern systems have about concluded to place orders, but for how much and where is a matter of rumor only. It is intimated to-day that steel rail contracts have been taken at \$27, but the matter is, of course, denied by parties who are interested in maintaining quotations at \$28@29. Quite a number of small orders have been booked this week at Pennsylvania mills. A large amount of business is threatening. The activity in Bessemer and pig indicates an upward movement in steel rails. The prices are low, and it is probable that some large transactions will be closed before the end of the week. Muck bar quotations have not weakened, and only a little business has been taken. Nail slabs are dull. Small lots of blooms are selling, and all the bloomaries are pretty well sold up. The irregular demand is reported at factories and stores for nails. Skeip iron is strong, but no important sales have been made as yet. Wrought iron pipe material is very active. Buyers are urgent for prompt deliveries. Merchant steel continues strong for all kinds. Every thing is encouraging from the standpoint of the sheet-iron manufacturers. Merchant bar has not changed in price and nothing has occurred since the writing of the last report on which to base any conclusions or comments. Manufacturers are all looking for a steady demand, and the latest prediction to day is that the results of the election will have a favorable effect upon a large body of buyers, not only of merchant bar but of all kinds of iron and steel, who will now come forward and place their orders lest an upward tendency might develop itself before thirty days. A month ago buyers intimated that they would pursue this course if they were not disappointed in the political anticipations. It now remains to be seen whether they meant any-

thing. The agents who have been canvassing the country very actively, say that there is a large amount of business that ought to be placed, and the representatives of some of our city mills state to-day that they have no doubt but that a good steady demand for material will now set in. The crude iron market is steady. It is too soon to predict any results from the strengthening of confidence. No. 1 iron is held by several parties who have good iron to sell at \$19. There are offers enough and iron enough at \$18.50. Some little No. 2 is to be had at a little less. It ranges from \$17 to \$17.50 per ton. There is a very good feeling all through the market. Old rails are unchanged. Nothing will be done yet for a few days in the way of closing negotiations for large lots which have been talked about for some weeks past. Quotations will be found in our weekly register of prices.

FINANCIAL.

NEW YORK, Friday Evening, Nov. 9.

The attention given to election, before and after the "great day," accounts for the unusually small business in the mining share market.

There was nothing doing in Castle Creek, and Holyoke shows only one sale at 6c.

Caledonia which paid its last dividend in February, 1886, has just declared a dividend of \$8,000. The stock in consequence advanced to \$3.15. Homestake was firm at \$11.50.

Ten cents continues to be the price for Rappahannock.

Considerable attention is still directed to Silver King, which was firm at from \$1.50 to \$1.75, some 1880 shares changing hands.

The first meeting of the new board of the directors of the Horn Silver Mining Company will be held in the city next week. We understand that nothing but routine business of little importance will be transacted. The stock is quiet at from 88@90c.

United Copper, which was placed on the list some time ago at about \$1.25, at which price it has ruled since then, began to show a declining tendency yesterday, and to-day went down to 50c.

Colchis was dealt in only to-day, when it sold at \$2.10. Silver Mining of Lake Valley showed no transactions until yesterday, when a few sales were made at 26c. To-day it sold at 25@23c.

El Cristo was neglected. Kingston & Pembroke, which last week showed a decline from \$2 to \$1, opened at \$1.38, and to-day sold at \$1.25.

North Star remains unchanged at \$6.50.

At present nothing is doing in Quicksilver Preferred, but Common shows a few sales at from \$9.63 to \$9.70. Only one sale of three hundred shares of Brunswick was made to-day at 9c.

Plymouth Consolidated was quiet and steady, selling at from \$9.50 to \$9.63.

No sales were made in the Bodie stocks.

There is little or no change to report in the prices of the Amador stocks as compared with previous weeks. Amador remains at \$2.25, Astoria at 24@25c., Middle Bar at from 41 to 43c., and Hollywood at 40c.

Sylvate appears to attract but little attention. Only one sale was made on Saturday at \$3.10. Chrysolite was quoted at 31c. Little Chief at 21@23c. Plutus at 95@97c. Robinson at 86@87c. Lee Basin at 70c. Adams at \$1.05.

Considerable activity was shown in Buffalo Iron Mining, which advanced from \$6 to \$7, some 2300 shares changing hands.

It is reported that the Tortilita Gold and Silver Mining Company has been re-organized.

The Comstocks show a small business, and considering that assessments are now pending on Crown Point, Chollar, Consolidated Imperial, Best & Belcher, Baltimore, Potosi, Utah Consolidated and Savage, it is but natural that little interest is being taken in the stocks.

Consolidated California & Virginia has declared its usual monthly dividend of \$108,000, but reports from San Francisco state it is doubtful if the dividends will be as regular in the future as they have been for two years past. There were but a few sales of the stock, the price of which advanced from \$10.50 to \$11.75. Yellow Jacket advanced from \$7.00 to \$7.38. Gould & Curry was firm at \$5.88, Union Consolidated at \$4.90, Belcher at \$8.50. Crown Point went from \$7 to \$9. Consolidated Imperial at \$1.20, Bullion at from \$2.25 to \$2.30.

Barcelona was quiet at from 75c. to 77c. Navajo sold at \$2.95 in the beginning of the week, but later declined to \$2.50, selling to-day at \$2.60. Belle Isle shows one sale at 45c.

Sutro Tunnel was neglected. The stock shows small transactions at from 10c. to 12c., and the Trust Certificates at 69c.

Meetings.

Boston & Montana Consolidated Copper and Silver Mining Company, Butte, Montana, December 27th, at eleven o'clock A.M. Special meeting to consider increase of capital stock.

Mammoth Mining Company, No. 163 South East Temple street, Salt Lake City, Utah, November 30th, special meeting to consider a proposition to purchase all the mining and milling property of the company, and to authorize the sale of the same.

Dividends.

The following dividends have been declared: Caledonia Gold Mining Company, of Dakota, dividend No. 5, eight cents per share, or \$8000, payable November 26th.

Calumet & Hecla Mining Company, of Michigan, \$5 per share, or \$500,000, payable December 3d, in Boston.

Colorado Central Consolidated Manufacturing Company, of Colorado, dividend No. 25, five cents per share, or \$13,750, payable December 10th, at Farmers' Loan and Trust Company, New York City.

Consolidated California & Virginia Manufacturing Company, of Nevada, dividend No. 23, fifty cents per share, or \$108,000, payable November 20th, in San Francisco, Cal.

Tuna Oil Company, extra dividend of \$2 per share, or \$4400, payable November 20th, at No. 67 Fourth avenue, Pittsburg, Pa.

Viola Mining Company, of Idaho, paid 37 1/2 cents per share, or \$56,250, in London for October.

Whitebreast Fuel Company, quarterly, one and three quarters per cent, payable November 12th, at No. 18 Broadway, New York City.

Assessments.

COMPANY.	No.	When levied.	D't'nt in office.	Day of Sale.	Am't per share.
Alta, Nev.	38	Sept. 28	Nov. 5	Nov. 26	.50
Amer. Eagle, Cal.	1	Sept. 20	Oct. 23	Nov. 15	.10
Anchor, Utah	8	Sept. 28	Nov. 3	Nov. 20	.25
Andes, Nev.	34	Oct. 5	Nov. 12	Dec. 3	.25
Baltimore, Nev.	3	Sept. 22	Oct. 25	Nov. 13	.25
Bear Butte, Dak.	3	Oct. 22	Nov. 30	Dec. 17	.002 1/2
Belcher, Nev.	36	Sept. 18	Oct. 23	Nov. 12	.50
Benton Cons., Nev.	18	Oct. 29	Dec. 3	Dec. 24	1.00
Best & Belcher, Nev.	41	Oct. 16	Nov. 21	Dec. 11	.25
Bodie, Cal.	9	Sept. 24	Oct. 29	Nov. 30	.50
Caledonia, Nev.	43	Oct. 19	Nov. 21	Dec. 12	.15
Chollar, Nev.	26	Oct. 8	Nov. 13	Dec. 5	.50
Crown Point, Nev.	50	Oct. 2	Nov. 5	Nov. 26	.50
Cons. Imperial, Nev.	25	Oct. 16	Nov. 21	Dec. 12	.05
Del. Monte, Nev.	1	Oct. 15	Nov. 20	Dec. 12	.25
Found. Treasure, Nev.	4	Oct. 25	Nov. 30	Dec. 21	.06
General Crook, Dak.	5	Oct. 12	Dec. 1	Dec. 20	.002
Gibraltar Cons., Cal.	23	Oct. 19	Nov. 19	Dec. 1	.30
Golden Reward, Dak.	3	Oct. 14	Nov. 21	Dec. 8	.02
Gould & Curry, Nev.	60	Oct. 4	Nov. 9	Nov. 30	.30
Grand Prize, Nev.	19	Oct. 12	Nov. 17	Dec. 5	.25
Horseshoe Bar Cons., Cal.	1	Oct. 9	Nov. 17	Dec. 10	.25
Justice, Nev.	47	Sept. 25	Oct. 31	Nov. 19	.25
Keyes, Nev.	3	Oct. 22	Nov. 24	Dec. 15	.25
Mikado, Dak.	1	Sept. 25	Oct. 27	Nov. 17	.002
Montrose, Colo.	1	Oct. 3	Nov. 12	Dec. 15	.01 1/2
Mono, Cal.	26	Sept. 20	Oct. 23	Nov. 28	.50
Mayflower, Nev.	43	Oct. 16	Nov. 16	Dec. 10	.50
North Belle Isle, Nv.	13	Oct. 23	Nov. 27	Dec. 19	.50
N. Commonw'th, Nv.	1	Oct. 15	Nov. 19	Dec. 11	.30
Potosi	31	Oct. 1	Nov. 6	Nov. 27	.50
Ross Hannibal, Dak.	3	Sept. 25	Oct. 27	Nov. 17	.002
Russell, Cal.	3	Oct. 18	Nov. 26	Dec. 17	.10
Ruby Hill, Nev.	16	Sept. 21	Oct. 29	Nov. 20	.01
San Luis, Cons., Cal.	20	Oct. 17	Nov. 17	Dec. 1	.00108
Savage, Nev.	71	Oct. 4	Nov. 7	Nov. 27	.50
Seabury Calkins, Dak.	10	Oct. 15	Nov. 20	Dec. 10	.06 1/2
Spruce Gulch, Dak.	3	Sept. 19	Oct. 25	Nov. 10	.001
Tuscarora, Nev.	1	Oct. 1	Nov. 4	Dec. 5	.05
Union, Utah	1	Sept. 12	Oct. 20	Nov. 10	.005
Utah, Nev.	5	Oct. 4	Nov. 8	Nov. 26	.25
Virginia Creek, Cal.	6	Aug. 29	Oct. 9	Oct. 29	.06
Wall St., Dak.	1	Sept. 20	Oct. 22	Nov. 15	.001 1/2

Pipe Line Certificates.

NEW YORK STOCK EXCHANGE.						
Nov.	3.	5.	6.	7.	8.	9.
Opening.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Highest.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Lowest.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Closing.	85	85	85	85	85	85
Sales.	510,000	463,000	547,000	802,000	647,000	2,959,000
CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.						
Nov.	3.	5.	6.	7.	8.	9.
Opening.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Highest.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Lowest.	84 1/4	85 1/4	85 1/4	85 1/4	85 1/4	85 1/4
Closing.	85	85	85	85	85	85
Sales.	1,006,000	916,000	1,002,000	1,612,000	1,584,000	6,120,000

*Election Day.

Boston Mining Stocks.

Nov. 8. [From our Special Correspondent.]

We have had rather a quiet week in the market for copper stocks, but prices have been fairly sustained and with no pressure to sell. Now that the election is over we look for more activity and better prices. The new accession to the market, the Butte & Boston alluded to in our last, made its appearance on the board with sales at par (\$25), and gradually advanced to \$29 1/2, with a slight reaction on the latest sales. Its friends predict much higher prices for it in the near future.

Calumet & Hecla declined to \$315 in the early dealings, but on the announcement of a \$5 dividend it advanced to \$320 and closed only \$1 below that figure. Boston & Montana gained a point from the opening, selling up to \$73, but subsequently lost it and closed at \$72 1/4 for a small lot.

Franklin continues to rule dull at \$18@19. The decline in its production affects the market, and while there is no manifest disposition to purchase there is on the other hand no pressure to sell.

Atlantic seems to be gradually gaining in favor as well as in price, and sold up to \$20 1/2. Osceola holds quite steady at \$22 1/2, with some sales at \$23.

Tamarack sold up to \$182, but subsequently declined to \$179, recovering in later sales to \$180. Kearsarge dull at \$13 1/2@13.

Allouez has been fairly active, with sales at \$5 1/2@5 3/4. There is no reason why this stock should not sell much higher. Its prospects are better now than for a long time in its history. With a good mill, and \$40,000 in its treasury, it is in good condition to pro-