

THE ENGINEERING AND MINING JOURNAL



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

VOL. XLVIII.

NOVEMBER 23.

No. 21.

RICHARD P. ROTHWELL, C.E., M.E. } Editors.
ROSSITER W. RAYMOND, Ph.D., M.E. }

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition Books for review and all communications for the JOURNAL should be addressed Managing Editor, P. O. Box 1833, New York. Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P. O. Box 1465, New York. Articles written by Mr. Raymond will be signed thus *; and only for articles so signed is he responsible.

London Office: Finsbury Chambers, 76 Finsbury Pavement, London, E. C. Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.

Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.

Peru, South America: Mr. John Newton, No. 2 Calle Constitucion, Calla.

Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:
Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$5.

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

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

THE SCIENTIFIC PUBLISHING CO., Publishers,
SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres & Gen'l Manager
P. O. Box 1833. 27 Park Place, New York.

The Table of Contents will be found at the end of the reading matter, page 465.

ON another page will be found a letter describing the measures which the Cambria Iron Company adopted for the betterment of its workmen. The testimony of the writer, who is in a position to speak with authority, is conclusive and highly gratifying as to the benefits that result to the employer as well as the employé from the adoption of such measures. The mud-stained pamphlets which accompanied the letter have been forwarded to "Manufacturer."

WITH the arrival of Mr. MENOCA at Greytown, renewed activity is evident in the Nicaraguan Canal work. The formal opening of the construction took place on October 22d, within one day of the Chief Engineer's arrival, and the presence of the Nicaraguan Government officials, and the part taken by them in the opening ceremonies, are the most satisfactory evidence that all friction between the canal company and the government on account of the Costa Rica concession, is at an end. The further details of the work in progress received by mail this week are satisfactory in every respect.

THE representatives of our great industries at the World's Fair of 1892 should be in the hands of men who not only are actually engaged in the industries, but of those who can and will give the work the attention it requires. The coal trade of this country should endeavor to secure as representative the Hon. ECKLY B. COXE, the wealthy anthracite mine owner of Pennsylvania, who is not only at the head of the largest private coal mining enterprise in this country, but is a skillful engineer, familiar with the details of coal mining as practiced in every part of the world, and with the marketing of coal. He speaks several languages, has visited and studied all the great exhibitions, is known in every civilized country as a representative American engineer, and is, withal, one of the most popular men in the United States. Fortunate, indeed, would be the coal trade if it should secure Mr. COXE as its representative, and we trust the whole trade will join in urging him to consent to act.

ON another page our readers will find a very interesting letter from one of our editors, correcting a statement of our Coeur d'Alene correspondent, concerning the railroad and smelting charges on lead ore. This correspondent, usually well informed, has clearly been led into making too sweeping assertions, and, owing to his absence at some of the mines, we have not yet learned the exact grounds on which he has based those statements. Possibly they were the well-known facts that the owner of the Bunker Hill & Sullivan mine closed them some time ago, when the Helena smelter was reported to have increased its smelting charges, and has since kept them closed in the expectation of lower railroad freights on the completion of the new road, now almost in running order.

We regret that the statement of our correspondent should have led us to charge the smelters of Montana generally, in combination with the railroads, with exorbitant charges, for we have many times shown

that the smelters pay more for the lead in the ore than it is worth. Dr. Raymond gives a full and satisfactory statement of the case. We still think, however, that when one railroad carries Coeur d'Alene ore 1,200 miles for \$4 a ton, it is an overcharge on the Idaho miners and Montana smelters when they are charged 1.18 cents per ton-mile on the same article. The fact that the Kansas City smelting works are able to buy large amounts (some 3,000 tons a month) of Idaho lead concentrates and ore is, no doubt, chiefly due to the fact that better freight rates are made to that distant point than to the nearby Montana smelters, but it may be also due, in part, to the fact that these works, having a supply of Mexican lead carbonate ores, are able to smelt a certain proportion of Idaho concentrates raw, thus saving the cost of roasting and being able to pay somewhat more for the lead ores than the less fortunate Montana smelters.

THE BEARS' NEST.

In reply to our editorial remarks on this subject in the ENGINEERING AND MINING JOURNAL, 2d November, we have received from Mr. R. M. BRERETON, the English expert, a communication requesting us to say he "had no interest whatever in Bears' Nest." We have never stated that Mr. BRERETON had any interest in the property, but simply that he had examined the property, made an exceedingly favorable report upon wholly insufficient evidence and, it is said, received \$10,000 for this report.

Mr. BRERETON does not deny these things. It is certain also that his favorable report was mainly the ground on which the property was purchased, and it must also be admitted that the exercise of ordinary precautions and care on his part would have prevented the success of this infamous plot. We do not, therefore, see how Mr. BRERETON can escape responsibility. It is no release from his responsibility to say that some one else, believing his report that there were "millions in it," neglected to take other more or less obvious precautions before paying over the money. Mr. BRERETON's duty is clear, and for the honor of the profession to which he belongs we trust we shall soon hear that he has refunded his fee and declined to be benefited while his clients have been so grossly swindled, chiefly through his neglect of his manifest duty to them. We also await response from the several gentlemen mentioned in our issue of November 2d, who profited largely by the perpetration of the Bears' Nest fraud.

GOLD MINING IN CHILI.

The predictions made in the ENGINEERING AND MINING JOURNAL May 18th and July 27th, when we pointed out that the probable result of the depression of the copper mining industry in Chili would be a revival of gold mining in that country, have been already fulfilled. We are advised that there is now a movement having in view the systematic working of the resources of the best known gold-producing district on a very important scale.

The first to enter the field is a French syndicate, headed by the cosmopolitan banker Baron ERLANGER; German by birth, Parisian by residence, married to an American, and as well known in England as in this country by his railroad, submarine cable and other enterprises. His representative, Señor ALFREDO QUETTFASLEM, has purchased for account of the French syndicate twenty mines in the Department of Taltal at prices aggregating \$7,000,000. This sum we presume is in Chilian currency, which would make the price paid in United States coin about \$4,900,000. It is also reported that in addition to taking options on other properties, the actual purchase of four other mines has been concluded by Baron ERLANGER and his friends for the sum of about \$900,000, American money. English capitalists were also negotiating for the same mining properties, and, being disappointed in securing them, have made considerable purchases in Guaniquito, a neighboring district.

In our former reference to the subject we drew attention to the exportations to Germany of extremely high grade gold ore that were going on without apparently attracting much notice. The official figures since the year of 1886 to 31st January this year gives a total of 2,046,388 grammes gold and 7,332 tons of ore, the total value being \$5,258,938. Of the ore exported the lower grades assayed 60 ounces of gold to the ton, while the higher grades ranged from 100 to 400 ounces to the ton, one exceptional shipment of 320 tons reaching 620 ounces to the ton, and another of 250 tons yielding 600 ounces to the ton.

One very important obstacle to the development of gold mining in Chili has hitherto existed, viz., the existence of an extremely complicated and unsatisfactory code of mining possession. Until last December the mining code contained 31 clauses affecting possession, the infringement of any one of which constituted a danger of loss of title to the parties working a mine.

This, however, has now been amended and the sole condition of ownership is the payment of an annual sum of about \$12.50 to the government. This no doubt has much facilitated this introduction of foreign capital, and if we are to judge from Baron ERLANGER's success in former enterprises, gold mining in Chili has a good future before it.

THE SILVER QUESTION.

The St. Louis Silver Convention, to which we have already alluded in these columns, meets on November 26th, and we hope will be largely attended and will suggest practical measures for the benefit of the silver market; though the outlook in this is now improved, as pointed out in the *ENGINEERING AND MINING JOURNAL*, November 2d, and the price of the metal seems to be on the upward road without any interference from any side.

Mr. WM. P. ST. JOHN has addressed a letter to the Chamber of Commerce, New York, repeating the suggestion he made some time ago before the Bankers' Convention, which is substantially that the government increase its purchases of silver to \$4,000,000 a month, and use half of this as the reserve for silver—legal-tender—certificates, to be used in withdrawing the present national bank notes.

This plan would make a market for all the silver produced in this country, and would undoubtedly increase the price of the metal, while at the same time it would release the United States bonds now held as security for the national bank notes.

The Secretary of the Treasury is credited with the intention of proposing in his forthcoming report to increase the purchases of silver bullion, and issue certificates for the bullion in bars instead of in coin as at present. This plan has certain manifest advantages, for it saves the expense of coining, would increase the market for the metal, and would afford a substantial security for the currency, which those who complain of government paper promises to pay" have urged against greenbacks.

The old assertion that the people wanted silver dollars in circulation was flatly contradicted by the facts, as we pointed out at the time the Bland act was passed would be the case. No one wanted or would take the silver dollars in any considerable quantities, as the overflowing Treasury vaults prove, but the silver certificates will of course circulate, and especially since the greenbacks of small denominations have been called in. We trust the cranks and wild inflationists who would have "free coinage and unlimited legal tender" will not be able to "run" the St. Louis Convention, for they will simply set back and injure the cause of silver. The metal is now in a fair way to regain, temporarily at least, some of its lost ground, and we hope reasonable counsels will prevail in the convention concerning it.

THE TREATMENT OF REFRACTORY GOLD ORES.

Although we believe that we have mastered the difficulties met with in various parts of this country in saving the gold from pyritous and other refractory gold ores, and have acquired the necessary knowledge and experience to enable us to do so with some certainty of success, yet we frequently hear of large losses in tailings which could be saved by proper concentration and chlorination of the concentrates.

If such be the case here, where experience is greatest and the most advanced practice prevails, we need not be astonished to learn that in countries where gold mining is comparatively young the percentage of gold saved is very far short of the assay value of the ore treated. The most recent accounts from South Africa estimate that not more than 60 per cent. of the value of the ore now being milled there is saved, and if proper appliances and methods were employed the production of that gold field would be largely increased. This estimate may be more or less correct. We have it on the authority of Mr. CHARLES KREISSMANN, an American engineer, in an interview with the *Johannesburg Standard*, in which his description of that district agrees substantially with that given in our issue of July 20th by Mr. E. BATES DORSEY.

In Australia, where the industry is nearly as old as in this country, a great deal of good work has been done and valuable experience gained in treating pyritous gold ores by the various chlorinating processes in use, but in the newer districts, especially in Queensland, there is still much room for improvement.

From many of these districts the government mining inspectors report to the Department of Mines that a large percentage of the gold is lost, owing to the want of concentrating and chlorinating appliances. In New Zealand, where the government makes great efforts to instruct the miners in more scientific treatment of the ore, the case is still very bad. In one district less than 50 per cent. of the value of the gold in the ore is saved and public testing works in connection with the Government School of Mines, one half the cost of which was paid by the government, the other half subscribed locally, have been established to enable the miners to ascertain the value that can be extracted from the ore, and the right method of treatment. Many of the mining companies have thrown away as a waste product their auriferous pyrites without attempting to treat them, and one government inspector reports the assay value of a large lot of tailings, looked upon as valueless, as being over two ounces of gold per ton.

In New Zealand the system of matting refractory gold ores, the matte being afterwards roasted and smelted with lead to combine the precious metal with the lead bullion, has been tried, but without success, the cost of the fuel and necessary fluxes for a very highly silicious ore having proved too expensive. Under certain conditions there is nothing impractic-

able in this system of collecting the precious metals in an iron matte, but, so far as tried in this country, it has not been a success on a working scale for the same reasons that made it a failure in New Zealand. Some years ago it was attempted at the Toston Smelting Works in Montana, near Helena, but, owing to the price of fuel, the cost of the ore and fluxes, it was not a success commercially. We learn that these works are to be again put in operation to make a second attempt. No doubt the conditions are now more favorable than in 1885, lower freight charges, better and cheaper fuel, and a better price obtainable from the lead smelters for the matte. Yet doubts are still expressed as to whether the necessary ores can even now be obtained in that district on sufficiently favorable terms to make a commercial success.

It is clear from the foregoing facts that there is a good field for intelligent mining engineers and metallurgists in South Africa and New Zealand, but we think that the direction in which their labors should be applied is in skillful concentration and chlorination.

NEW PUBLICATIONS.

A BIBLIOGRAPHY OF GEODESY. By J. HOWARD GORE, B. S., Ph. D. (Appendix No. 16, Report for 1887, United States Coast and Geodetic Survey, Washington: Government Printing Office, 1889. Paper, quarto, 197 pp.

Bibliography is deservedly gaining steadily in favor among professional men. By it the painstaking work of one or of a few persons simplifies and expedites the efforts of many students and of all subsequent writers. Even incomplete lists of authors and titles are of value, though the degree of merit is naturally in direct proportion to the thoroughness with which they are compiled. We do not know how nearly complete Professor Gore has succeeded in making this Bibliography of Geodesy; but as Mr. Thorn, the late Superintendent of the Coast Survey, states in his introduction that thirty-four of the principal libraries of the United States and Europe have been ransacked, and the compiler explains that a large correspondence has been carried on with all mathematicians whose addresses were obtainable, it is to be presumed that the compilation is quite full. The compiler draws the lines somewhat closely in limiting the scope of the work to publications treating directly of the figure of the earth, or describing operations which could be used in determining that figure. Latterly the significance of the word "geodesy" has been gradually extended to cover a good deal more than this, and to most minds it conveys the idea of the higher branches of surveying on the large scale, or, as it might be put, the mathematics and graphics of geography. In this wider sense the field is greatly enlarged, and its bibliography would be immensely longer. Evidently Professor Gore's conception of the term "geodesy" is considerably more stringent than that of the officers of the Coast Survey when they appended the title "Geodetic" to the name of that organization.

The arrangement is a simple one, making this bibliography convenient for reference. Only a single alphabet is used, giving authors, abbreviations and subjects, with cross references. The plan followed in quoting the titles, and the typographical details, differ somewhat from the methods and refinements of bibliographic science as now practiced; but no one consulting this list will be at a loss to find what he is looking for by reason of obscurity in entry of title—and the primary object of every bibliography, after all, is to facilitate the obtaining of books on a given subject, rather than to present a bibliography "for the sake of a bibliography."

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.

Definition of "Unit" of Metal.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Allow me a few words in relation to the matter discussed by Mr. W. E. C. Eustis and yourself in your issue of November 9th.

I think your statement "that a unit of copper is simply one per cent. of whatever ton may be meant" is misleading.

In my opinion the "unit" among copper men has a strict significance, utterly regardless of percentages or tons. It means 23.52 pounds of copper, and never means anything else among real copper men who trade abroad and are familiar with the English market. To be sure, it is 1 per cent. of the Swansea copper ore ton, or "Smelter's ton," i. e., 21 cwt. or 2,352 pounds; but that fact has long been ignored, and in my opinion a unit of copper is a fixed and stable weight, and only aids in demonstrating the utter preposterousness of the weights and measures we have inherited from the English. Very truly yours,

SUBURRY, Ont., Nov. 12.

EDW. D. PETERS, JR.

[Our several correspondents are, of course, quite correct as regards the practice in the English copper trade, but to make the definition general for any metal we should say that the unit of metal is one per cent. of whatever ton is used.—ED. E. AND M. J.]

The Cambria Iron Company's Measures for the Betterment of the Condition of Workmen. EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice in your journal the inquiry of "Manufacturer" in regard to what has been done in the way of a library for employes of manufacturing establishments. I inclose you a pamphlet, showing what the Cambria Iron Company has done in this respect. You will notice that this pamphlet has passed through the waters of our late flood and bears the evidence of its mud bath.

The design of this building was primarily to afford a library with reading matter specially suited to the wants of the Cambria Company's employes, but it was opened also to the citizens of Johnstown as well. The library room was a very beautiful large room, containing 5,000 volumes, open every day in the week (except Sabbath) until nine o'clock for the use of any persons who might desire to read.

Above this room was a lecture room capable of holding 300 persons, with benches and a speaker's stand, with maps of geology, mining, mechanical engineering, and various other apparatus connected with the sciences that bear upon the manufacture of steel. Classes were maintained in this room in geology, mining engineering, mechanical draughting, chemistry, algebra, mathematics and arithmetic. These classes were made up from the different departments of the Cambria Iron Works, and were taught by experts in the several departments.

A number of persons graduated from the mining course, and some of them are now mine inspectors and others superintendents of mines. A number distinguished themselves by progress in the sciences and in mechanical draughting.

In addition to these week-night classes, lectures were delivered every two weeks on different matters connected with the manufacture of steel and the materials entering into its manufacture.

As an independent course we had free-hand drawing, taught by a professor who came out from Pittsburg to give lessons once a week.

Alternating with these lectures we had meetings for the answering of general practical questions in harmony with the lectures. It is evident that an institution of this kind, when properly managed, can be made of great value to the employes of a manufacturing establishment. The practice in the day time at the works, with the night school attached, affords them the two elements in their education, the practical and theoretical. The president and directors of the Cambria Iron Company took deep interest in this matter, and other friends of the enterprise contributed very largely to its success.

The meetings were occasionally enlightened by a brief musical introduction. Mr. Cyrus Elder was Dean of the Faculty in May last and John Fulton Vice-Dean. Superintendents of the Cambria Iron Company's Works afforded excellent aid in educational lines and in the lectures.

The flood of May 31st carried the whole building away with all its valuable library, apparatus and maps.

It is believed that the Cambria Iron Company will rebuild this fine building at an early date. The value of such sources of education to the employes has been quite manifest, and I think has been fully appreciated by the management of the company as well as the men. F.

Prices of Cœur d'Alene Concentrates—Freight and Smelting Charges.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The letter of your special correspondent in Idaho, published October 19th, and quoted editorially by you October 26th, contains the following assertions:

1. That most of the Cœur d'Alene prospectors have stopped shipping ore and concentrates because the smelting and railway companies have raised the freight and smelting charges.
2. That the smelting companies of Montana have combined with the Northern Pacific Railroad Company to fleece the miners.
3. That the mining companies and miners do not know how much they are charged for treatment or freight.
4. That the charges are a lump sum—about \$38—for freight and treatment at Helena.
5. That the rate was raised about \$5 per ton without stating any cause, so that the ore shippers stopped shipping.

These statements are one and all erroneous. There has been no advance of \$5 or any other sum in the freight and smelting charges to the Cœur d'Alene miners. There is no combination between the railroads and the smelters for that or any other purpose. The mining companies know exactly how much they are charged for freight and treatment respectively. The rate deducted for these items has not been "about \$38"; it has always depended upon the percentage of lead in the material, and also upon the existing freight rate, which is frequently stated in the contract between the smelter and the shipper. And finally the smelters of Montana have been and are paying for the lead in the Cœur d'Alene concentrates more than it nets them after smelting and refining. In other words, they have been temporarily at the mercy of the miners of that district, have not been able to charge a fair price for smelting, and have submitted to loss in order to keep their furnaces in blast, until the rapid development of other lead-producing districts should break the partial monopoly enjoyed by that one. This result may be expected next year. When it arrives, the Montana smelters, able to get along, if necessary, without Cœur d'Alene ore, will probably decline to pay for it more than it is worth. The works at Denver, Omaha, and points even more distant, which have been desperately bidding for these ores, cannot keep up that enterprise indefinitely, even with the extraordinary freight rates granted by the Union Pacific Railroad. A railroad hauling at an actual loss, to supply smelters who smelt at a loss, does not present a stable basis for regular business. It may, therefore, be predicted that the Cœur d'Alene miners, who are holding off for the breaking of a supposed Montana combination, will wake up to find that they have allowed to slip by them a more favorable situation for their own interests than is likely to occur again.

The present freight rate on concentrates from any of the Cœur d'Alene mines to Helena (the principal lead ore market of Montana) is \$14 per ton. Of this, \$6 is the charge from the mines to Cœur d'Alene City, on the Northern Pacific, an average distance of about 85 miles, involving two transfers, from railroad to steamboat and back to railroad again. The remaining \$8 is the charge on the main line, 381 miles, to Helena. Allowing, say 50 cents per ton for the two transfers, it appears that the freight is, for the first part of the route, 64 cents, and for the second part, 21 cents per ton per mile; the average rate for the whole route being a little less than three cents. On crude ore, carrying not more than 30 per cent. lead, these rates have been respectively reduced to about three cents and 0.09 cents, or an average of 1.18 cents (\$6 per ton, including cost of transfers). I need not say that the railroad could not haul all its freight at such rates and pay its running expenses. The transportation to the main line is costly, and the winter business is reduced to very small proportions by the freezing of the lake. The latest order on the subject, however, far from being, as your informant pretends, an advance in rates, extended from and after October 3d, the percentage of lead in the crude ores to be accepted at the minimum rate, from 30 to 40 per cent.

The Montana smelters are certainly not satisfied with these rates, because they do not permit fair competition with the works on the Union Pacific system. Attempts are constantly made to persuade the railroad

authorities to protect by lower rates the establishments using their lines. But no such concessions have been obtained without the knowledge, or used against the interest, of the Cœur d'Alene miners. On the contrary, every reduction (and there have never been any advances) in freight is immediately credited to the miners. The ore contracts are made to suit the miner's option, f.o.b., either at the mine, the smelter paying the freight, or at Helena, the miner paying the freight.

The basis assumed is usually 50 per cent. of lead, and the terms offered by the different works are calculated somewhat differently as to allowances for silica, zinc, etc. But the net result to the miner in a given case is very nearly the same, for the simple reason that the rival smelters are at his mercy, and bid for his product as much more than its value as they dare go. For a 50 per cent. concentrate the price on large contracts has been \$35 off f. o. b. at the mines, and payment with this one gross deduction for 90 per cent. of the lead and 95 per cent. of the silver contained in the ore at New York prices on the day of settlement. Of this \$35, the smelter pays \$14 freight to Helena, leaving him \$21 per ton to cover all risks, costs of roasting, smelting, transportation, and refining of bullion, and transportation and sale of refined lead and silver, and profits. The bullion rate from Helena to St. Paul is \$9 per ton. The usual refiners' charge is \$12 per ton. You can decide for yourself how large a margin is left for roasting and smelting in Montana, and for transportation beyond St. Paul, brokers' commissions, interest, insurance, repairs and dividends. The allowance of 10 per cent. loss in lead and 5 per cent. in silver is not too much for ores which require roasting.

In short, while your special correspondent alleges that a deduction of about \$38 has been made for freight and smelting charges, and that this has been arbitrarily increased to \$43, the fact is that the miners in Cœur d'Alene have, in some recent instances (on their own showing at least), exacted a rate of less than \$35 off and refused to renew contracts at that rate, while the Montana smelters, to whom the \$35 rate represents the largest loss which they dare to incur, would not be inclined to buy another ton in Cœur d'Alene even at that price if they could supply themselves in any other quarter with the necessary lead for smelting dry ores; but meanwhile they stand ready to buy at \$35 or \$35.50 off, rather than close their works.

On the other hand, the miner may say that after deducting \$35 per ton freight and treatment from the New York value of 90 per cent. of the lead in his ore, he has little or nothing left (with lead at four cents he has only \$1 per ton). That is true enough, and amounts merely to saying that a 50 per cent. lead ore, containing neither gold nor silver, cannot be shipped at a profit. The lead will barely cover the cost of shipping, and the silver and gold must pay for mining and yield the miner's profit. There is nothing strange in that. The smelters give him the full value of the silver they get out of his ore, and charge him nothing for smelting or refining under that head. The deduction made on the lead covers it all. The risk of market fluctuations in lead and silver is taken by the smelter, and somewhat to his loss in the long run. The *ups* do not balance the *downs*, for when lead, for instance, is high the miners offer all that they can produce, and the smelter is obliged often to accept more than he likes, while a fall in lead invariably produces a diminution of shipments, so that the smelter can not accumulate a large stock at low rates to make good his loss by the decline.

I should add that there is usually a provision in the ore contracts by which the smelting charge is increased 30 cents for each unit above 50 per cent., and correspondingly reduced for each unit below. A concentrate carrying 60 per cent. of lead (as very few of them do) would thus be charged with \$38 instead of \$35, while a 45 per cent. concentrate (a frequent grade) would pay \$33.50. The reason for this ought to be easily understood. The New York price of a unit of lead is at this date (the price per pound being \$3.75) 75 cents. The smelter cannot realize on it more than 45; consequently he gives or takes 30 cents for each unit below or above the per centage on which the contract is based. These variations practically leave him no better off in either case.

MONTANA, NOV. 5, 1889.

R. W. RAYMOND.

MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

The American Society of Mechanical Engineers is closing the tenth year of its remarkably prosperous existence by holding in New York this week the most largely attended meeting in its career. The society now numbers over 1,000 members in the various grades of honorary, active, junior and associate members.

The meeting was opened on Monday evening, November 18th, by a "house warming" reception, held in its new headquarters, No. 64 Madison avenue. The rooms are handsomely furnished, and contain a valuable reference library, which is rapidly growing through contributions from members and by the accumulation of exchanges. The rooms were crowded, and the chief feature of the reception was the reunion of many of the members and their wives who had enjoyed each other's company during the European trip.

On Tuesday the sessions began in the New York Academy of Medicine, with the address of the retiring president, Mr. Henry R. Towne. It was devoted chiefly to a review of the European excursion, but was notable for its proposal to postpone the World's Fair to 1893 or 1894, on account of the impossibility of completing the exhibition as early as 1892 in a manner which would be creditable from an architectural and artistic point of view. It is desired to surpass the French exhibition, yet that required 4½ years from the beginning of the work to the opening, and that taxed to the utmost the best architectural, engineering and constructive skill of the French nation, assisted as it was by ample capital from the beginning. Mr. Towne strongly favored New York as by far the best location for the World's Fair, and said if it were held in any other city it would be national and not international. It would be possible to hold an exposition as early as 1892, but it would be huge, monstrous, inartistic and discredit-able. The financial and other official reports were presented, showing that the society is in an exceedingly flourishing condition. The tellers reported the election of new officers as follows: President, Oberlin Smith, of Bridgeton, N. J.; treasurer, William H. Wiley, of New York; vice-presidents (to serve for two years), Joel Sharp, of Salem, O.; George W. Weeks, of Clinton, Mass., and Prof. De Volson Wood, of Stevens Institute; board of managers (to serve three years), Prof. James E. Denton, of Stevens Insti-

tute; Carlton W. Nason, of New York, and H. H. Westinghouse, of Pittsburgh.

Papers were presented at the morning session as follows: By V. Dwelshauvers-Dery, of Liege, Belgium, honorary member of the Society: "Tables of the Properties of Steam, their Use in Study of Steam Engine Experiments." By Professor H. R. Thurstan: "Philosophy of the Multi-Cylinder Compound Engine, its Theory and its Limitations." By Horace B. Gale: "Theory and Design of Chimneys, with Criticisms on the Common Theory and Experimental Data."

Under the excellent rules of the Society all its papers are printed in advance of the meeting, and sent to those members who have signified their intention of being present, and only five minutes is allowed for the presentation of each paper by abstract. This allows time for the discussion of each paper, and none of the papers have to be passed over as "read by title." The discussion on each of these three papers was quite vigorous, and by no means complimentary. The mechanical engineers are not given to flattery of each other's papers, and if a paper has any weak points they are apt to be severely criticised.

The afternoon session was devoted to reading and discussion of papers, as follows:

By Prof. C. H. Peabody, two papers: "Flow of Steam through Orifices," and "Experimental Study of the Different Types of Calorimeters." By L. S. Randolph: "Cost of Lubricating Car Journals." By E. F. C. Davis: "Steam Pipes for Collieries." By D. K. Nicholson: "Rolling Steel Rails." By C. J. H. Woodbury: "Methods of Reducing the Fire Loss."

These papers proved more acceptable than those of the morning, as they contained new data and were less devoted to theorizing and speculation. The paper of Mr. Woodbury is especially valuable in giving quite a full description of the latest methods of protecting mill buildings against loss by fire, including the most approved methods of "slow burning construction," fire service, watchman's duties, and checks, electric alarms and automatic sprinklers. The paper should be carefully read by every mill owner.

In the evening a subscription dinner was held at Clarke's, in Twenty-third street, and it was voted a great success. The large attendance of ladies was especially noticeable, and the speeches were almost equal to the average of those at a mining engineers' dinner—a high standard of excellence.

Wednesday was devoted to a steamboat excursion to Willets Point, on Long Island Sound, where an inspection was made of the torpedo station and school of the United States army, under the direction of Lieut.-Col. N. L. King. Lunch was served on the boat, and on the return a visit was made to the Central Forging Works at Whitestone, Long Island. The forging of a heavy shaft under the ten-ton hammer was witnessed. Much interest was taken in a novel method of counterbalancing the weight of heavy compound engine shafts, while being turned in the lathe. The whole weight of the shaft is carried by a carriage with rollers, which is placed under its middle point and supported by a chain which passes overhead over two pulleys to a box outside the building, weighted so as to counterbalance the weight of the shaft and prevent its deflection while being turned.

In the evening a reception was given to the society by the Engineers' Club, at their house, No. 10 West Twenty-ninth street, a good evidence of the cordiality which prevails among the different classes of engineers who constitute the membership of the club. This was largely attended.

Thursday was devoted entirely to the reading and discussion of papers, as follows:

By Fred. W. Parsons. Indicator Rigging for Compound Engines.
By W. H. Bristol. A New Recording Pressure Gauge.
By D. S. Jacobus. General Solution of the Transmission of Force in a Steam Engine.
By S. J. MacFarren. Street Railway Car Gear for Modern Speeds.
Prof. J. Burkill Webb. Comparisons of Indicators.
By James E. Denton. The Cards from the Pawtucket Pumping Engine With and Without Jacket.
By J. F. Holloway. How to Use Steam Expansively in Direct Acting Pumps.
By C. F. Main. Cost of Steam and Water Power.
By Oberlin Smith. Graphical Analysis of Reciprocating Motions.

The following resolution was passed at Thursday morning's meeting:
WHEREAS, There are now in existence four associations of American engineers, each representing one branch of the profession, and each serving a useful purpose; and

WHEREAS, Many members of the existing societies are desirous that a new organization should be created, which, without superseding or disturbing those already in existence, will be broader and more comprehensive than any of them, and thus more representative and national; and

WHEREAS, It is believed that the result thus outlined may be accomplished without any encroachment on the autonomy of the existing organizations, and without any impairment of their distinctive character; and

WHEREAS, It is especially desirable, in view of the contemplated International Exhibition in 1892, that there should be some organization broadly representative of American engineers, and thus qualified in their behalf, to receive and entertain the foreign engineers who, it is hoped, will then visit the United States; and

WHEREAS, The desirability and feasibility of closer relations between the members of the existing organizations were demonstrated by the experience of those who took part in the joint excursion of American engineers to Europe in the summer of 1889.

Therefore, be it resolved:

1. That the American Society of Mechanical Engineers views with favor all efforts tending to establish more intimate relations between the existing engineering societies, and to develop a national organization of American engineers.

2. That to promote this object, the council be hereby requested to communicate the substance of these resolutions to the officers of the other engineering societies, and to invite them to unite in a discussion of the subject, and in an endeavor to reduce it to proper form for submission to the consideration of the membership of each society.

3. That to this end the council be further requested to appoint a committee of three members to represent this society in any such conferences.

to consider the whole subject herein referred to, and to report the result of their labors to the next meeting of the society.

On Thursday evening there was no regular session, but complimentary tickets for the American Institute Fair had been supplied to members, and many of them paid the fair a visit.

On Friday it had been intended to make a trip on the ferryboat "Bergen," but on account of a slight accident having happened to one of its boilers, this trip had to be given up. Instead of this the steamboat "Laura M. Starin," the same that was used on Wednesday's excursion, was secured, and a trip was made to the works of the Singer Manufacturing Company, at Elizabethport, N. J. Lunch was provided on the boat by the hospitality of President Henry Morton, of the Stevens Institute of Technology. The Singer Manufacturing Company's works are notable as being the largest sewing machine factory in the world, with the exception of the one owned by the same company in Glasgow, Scotland. The Singer Company, both in America and in Scotland, manufacture in addition to sewing machines, the well-known Babcock & Wilcox boiler.

The majority of the members left for their homes on Friday night, but some intended to remain over till Saturday, to visit the steamer "City of Paris," which had been thrown open to inspection.

OFFICIAL REPORTS.

THE GRANITE MOUNTAIN MINING COMPANY.

We accompany the following abstract of the official report of the Granite Mountain Mining Company with a map showing the workings and condition of the mine, which will be of especial interest to our readers, as in 1887 we illustrated it in the same manner.

Mr. L. M. Rumsey, the president, reports:

Since the date of our last annual report, the trustees were fortunate in securing the services of Mr. Thomas Weir to be superintendent of our affairs in Montana. Mr. Weir assumed the duties of his office December 20th, 1888.

His reports and statistical tables herewith attached will be read with great satisfaction, because of their clearness and promise of continued prosperity to our company.

Our fiscal year ends July 31, 1889, and all the maps and reports of the officers are up to that date. I shall consider it my duty to anticipate a portion of the next annual report by informing you of the existing state of affairs in our company to as near the present date as possible.

During the fiscal year ending July 31st, 1889, we have paid out in 12 dividends \$1,900,000. This makes an aggregate of \$6,700,000 paid out in 55 dividends.

To anticipate a part of the report of the next fiscal year, let me say that on November 9th we shall pay Dividend No. 59, which will make \$7,600,000 returned to stockholders since April 8th, 1885, or \$19 per share on our capital stock, consisting of 400,000 shares, of the par value of \$25.

From October 8th, 1880 (the date Mr. McLure first sent the tools to the mine), to July 31, 1889, the total gross sum of expenditures of every kind by our company has been \$4,092,512.29. This includes the purchase of property, erection of buildings and permanent improvements, the amount paid for supplies and labor, expended in litigation, and for express and refining charges on smelting ore and bullion, etc.—in short, as stated above, every expenditure of every nature and kind.

During the same period our mines have produced and sold 10,989,858.100 oz. of pure silver, and 6,521.10000 oz. of pure gold, realizing a gross sum of \$10,988,800.24.

The total product of our mines at government standard value (\$2.29 per fine ounce) has been \$14,335,135.38, while our total receipts were, as stated above, \$10,988,800.24, showing that the demonetization of silver by our government has cost our company to July 31, 1889, \$3,346,335.14, or over 30 per cent. of our gross income.

Since July 31, 1889, Mill B has been increased from 40 to 50 stamps. Mill C was completed in March, 1889, and is a large structure covering 506 x 260 feet. In the three mills we have 170 stamps and 7 roasters. Mill C, at Rumsey, is now connected with the mine at Granite by a wire tramway, 8,650 feet long, having a fall of 1,170 feet, 800 feet of which is almost a vertical drop from the brow of the Fred Burr Cañon. This tramway transports ore and supplies between Rumsey and Granite at a comparatively small cost.

An electric light plant is also in successful operation in the mines, mills and offices at Rumsey and Granite.

We have flumed, through our tailings reservoirs, the water which flows through the Fred Burr Cañon, and are thus able to deliver the water of the creek to the ranches below as pure and uncontaminated as when leaving Fred Burr lake.

We have established at Granite and at Rumsey reading rooms for the employés, in which are kept extensive files of newspapers, magazines and periodicals. These reading rooms are lighted by electricity.

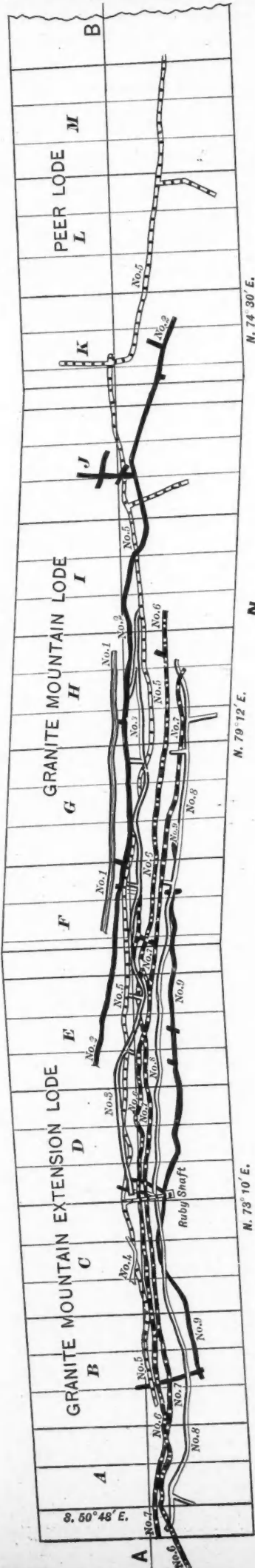
The completion of the Drummond & Philipsburg Railroad to Mill C, at Rumsey, has been of great benefit to our company in every way, and has well repaid the temporary investment of the \$100,000 which we advanced them to extend the road from Philipsburg to Rumsey. This "advance" has been returned to us as will be seen by our treasurer's report.

It will be noted that our expenses for the fiscal year ending July 31st, 1889, have largely exceeded those of the previous year. This is largely accounted for by the erection and completion of Mill C and the completion of the tramway. The accompanying inventory will give at a glance these and many other items of what might be termed, perhaps, *unusual* permanent improvements, but their cost, while all charged up to the year 1888-9, will result to the benefit of the stockholders in future years. In all parts of the mine there has been done an immense amount of timbering to secure safety.

Large amounts of "Representation" work, purchase and acquirement of necessary property, together with unusual and expensive litigation, have also greatly helped to cut down dividends. I believe the present year will find us freed from most of these burdens.

From No. 8 and below, the ground has been very much disordered for some distance east and west of the shaft, but the Bonanza ore chute, east of the shaft, continues unbroken through all the levels, No. 9 East having been in good ore for the last 400 feet. We have every reason to

UNDERGROUND WORKS

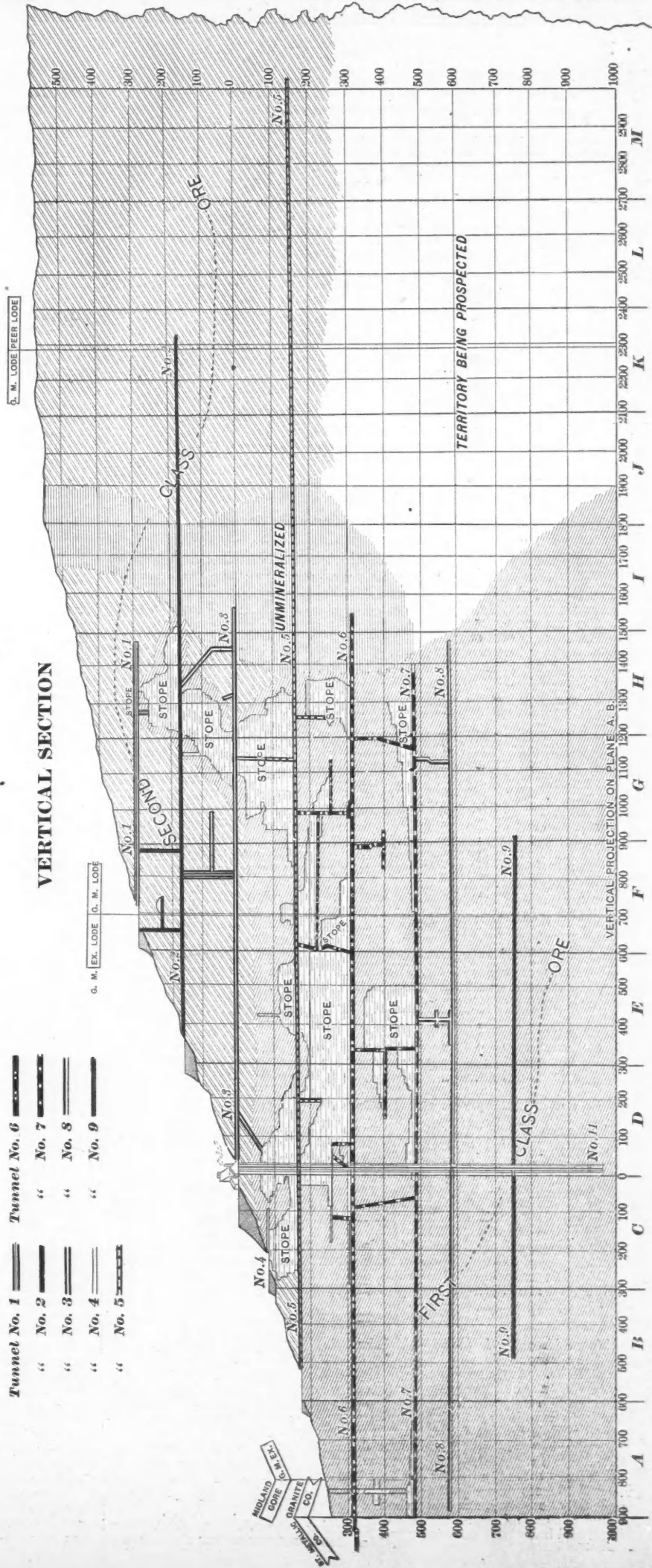


THE GRANITE MOUNTAIN MINE,

1889.

- Tunnel No. 1
- " No. 2
- " No. 3
- " No. 4
- " No. 5
- Tunnel No. 6
- " No. 7
- " No. 8
- " No. 9

VERTICAL SECTION



MIDLAND GORE CO. M. I. EX.
 GRANITE CO.
 M. I. EX.

believe that our explorations at depth will reward us as munificently as the developments eastwardly promise to do, and as those above have already done, and are yet doing.

REPORT OF TREASURER FOR THE FISCAL YEAR ENDING JULY 31, 1889.
Balance cash on hand, July 31st, 1888, at State Bank of St. Louis..... \$166,454.61

Receipts.	
Proceeds 2,954 bars bullion, containing 3,311,676.89 ounces pure silver, and 3,332,045 ounces pure gold, per New York assay returns, sold for.....	\$3,149,004.24
Less express charges.....	47,455.27
Less refining charges.....	36,041.96
Less commission.....	3,330.25
	86,827.48
	\$3,062,176.76
Net proceeds 67.695 tons of smelting ore containing 44,490.03 ounces silver and 46,184 ounces gold.....	38,356.29
Proceeds of sale of \$100,000 of Northern Pacific & Montana Railroad 6 per cent. bonds and interest.....	101,550.00
Received sundry rebates and discounts on mercantile bills.....	1,518.88
	3,203,601.93

Disbursements.	
Remitted to Montana Department for pay-rolls, supply bills, freights, etc.....	\$962,974.17
Supply bills, home department purchases.....	154,110.75
Insurance.....	10,524.10
Attorney's fees.....	15,268.40
Home department, salaries, rent and sundry expenses.....	17,634.50
Dividends Nos. 41 to 35, inclusive.....	1,900,000.00
Paid Northern Pacific Railroad on account Phillipsburg Branch Railroad.....	57,200.00
Paid on account of contract for machinery for mill C.....	108,000.00
Paid on account tramway construction contract.....	14,437.70
	\$3,240,149.62

Balance cash at State Bank of St. Louis, July 31, 1889..... \$129,906.92

THE SUPERINTENDENT'S REPORT MINING DEPARTMENT.

We have mined and hoisted to the surface as follows:

Ore delivered to mill A.....	9,465,818 tons
Ore delivered to mill B.....	16,402,009 "
Ore delivered to mill C ore bin.....	11,243,495 "
High grade ore shipped to smelter.....	83,104 "
Ore in loading terminal tramway.....	54,134 "
	37,248,566 "

The various stopes are in good condition, and are producing well. The average cost of mining operations has increased slightly, owing to increase in depth, amount of water and distance necessary to pump it, increased length of air lines and the fact that all ore and waste have now to be hoisted, while heretofore a good portion come from tunnels.

The following is the average cost for the year, including pro-rata of hoisting plant, blacksmithing, machine shop, superintendent's office, etc.:

Breaking ore, per ton.....	\$6.62 8
For levels, cross-cuts and drifts, per linear foot.....	11.04 8
For winzes and raises, per linear foot.....	18.78 9
For sinking Ruby shaft, per linear foot.....	77.06 4

MILLING DEPARTMENT.

Mills A and B have been kept running during the year. Mill C was completed and started up in March, 1889, and is doing nicely.

Mill A crushed in wet tons.....	9,465,818
Mill B crushed in wet tons.....	16,402,009
Mill C crushed in wet tons.....	9,843,495
Tons of salt used.....	5,122,910
Total tons ore and salt crushed.....	40,834,232
Assay of ore, mill A.....	162.40 ozs. per ton.
Assay of tailings, mill A.....	8.57 " "
Per cent. saved, mill A.....	94.80 " "
Assay of ore, mill B.....	105.084 ozs. per ton.
Assay of tailings, mill B.....	7.83 " "
Per cent. saved, mill B.....	92.85 " "
Assay of ore, mill C.....	54.05 ozs. per ton.
Assay of tailings, mill C.....	4.90 " "
Per cent. saved, mill C.....	90.76 " "
Number of Doré bars produced.....	2,115,000
Number of ounces pure silver produced.....	3,396,138,240
Number of ounces pure gold produced.....	3,607,975
Cost of milling per gross ton in mill A.....	\$11.29
" " " " " " " " B.....	10.82
" " " " " " " " C.....	9.61
Cost of milling per gross ton in mills A, B and C (average).....	\$10.61

The assay of ore was obtained from battery samples. The per cent. saved was obtained from assay of tailings. It is evident the "per cent. saved" (obtained as indicated) is lower than the actual savings.

Until December 15, 1888, salt rolls were used and the salt mixed after the ore had passed the battery. Since that time the ore and salt have been mixed before crushing in mills A and B. Ore to mill C is crushed at Granite, thence it goes over the tramway, and is mixed with salt as it is fed to the dryers at mill C.

The comparatively lower saving in mill C is explained by the fact that the ore was of so much lower grade than that treated in the other mills.

Of the average cost of treating one ton of ore, there is expended for salt \$2.73-6; fuel, \$1.90-6, and quicksilver, \$0.74-1.

Fossil Trees in Scotland.—An interesting discovery has just been made at the Tranent Colliery in the Lothians, Scotland, of a small forest of fossil trees. Single specimens of sigillaria in a fossil state, with all the marks upon them, have frequently been met with by miners, but certainly nothing like that which has been brought to light at Tranent. Several of the trees have been examined, and are found in some instances to be composed of light or dark freestone. In one instance the freestone is found in alternate layers about 15 inches in diameter, approaching to something like 2 feet in height, with strong wide-spreading roots at its base. In some cases there is a height of about 5 feet exposed. There are between 30 and 40 trees opened out at Tranent; and in appearance some of them, as locally described, are said to be not unlike the calamites that have been found in some mines, and which belong to the *Equistacea*, which bear a fruit, and have been well described by Carruthers and others.

IMPRESSIONS AND REMINISCENCES OF THE ENGINEERS' EUROPEAN TRIP.—VII.

By One of Them.

Sewage Disposal Works.—While in London we visited the sewage-disposal works at Wimbledon and at Kingston-on-Thames, and the Willans Engine Works at Thames-Ditton.

We had an excellent opportunity to inspect the working of two different systems of sewage disposal. Full accounts of these works have been published in *Engineering* and other English technical papers, but a brief note may here be made of them.

Wimbledon is a suburb of London, with about 25,000 inhabitants. Its area is 3,220 acres. The total length of sewers and drains exceeds 70 miles. The sewage disposal works comprise the necessary tanks for the chemical treatment of the sewage, and 73 acres of land, which are irrigated by the partially purified sewage, though which land it percolates and finally escapes into a branch of the Thames in a state of remarkable purity.

There are six settling tanks, each 50 by 49 feet, of a depth to contain 6 feet of sewage, or about 90,000 gallons. The chemicals used are lime and Spence's "alumino-ferric," or sulphate of alumina, in the proportion of 8 grains of the former to 6 grains of the latter per gallon of sewage. During hot weather 2 or 3 grains of permanganate of potash is added per gallon to the clarified sewage, which removes a slight odor which is otherwise perceptible.

The normal flow of sewage is 750,000 gallons per day. The lime used amounts to 7½ cwt. costing 7s. 6d., the sulphate of alumina to 5½ cwt. costing 16s.; wages of man 4s.

The sewage is lifted from the outfall into the tanks by a pair of pumping engines, the mean lift being 22 feet.

The sludge deposited in the settling tanks is swept from them into a reservoir, whence it is forced into filter presses, two of Johnson's and one of Manlove, Alliot & Fryer's make. One of these machines with 24 plates, 36 inches in diameter, suffices for pressing the sludge of sewage for 12,000 persons, if worked by day only. Fresh lime is mixed with the sludge before pressing. The resulting sludge cakes, two inches thick, containing about 54 per cent. of moisture, amount to about 2½ tons per week per 1,000 persons. Its value as manure is weight for weight slightly in excess of stable manure. The working expenses at Wimbledon now amount to 2s. 4d. per ton of cake.

The settled and clarified sewage is taken to the farm of 73 acres, and distributed by surface drains. The crops grown are Italian rye-grass, mangolds, osiers and vegetables, the areas devoted to each being 54, 10, 6, and 3 acres respectively. Five to six crops of rye-grass are produced yearly, and these are chiefly disposed of in the green state to cow keepers of the southwest of the metropolis. The average weight of the grass removed from each acre per annum is about 54 tons. The mangolds produced exceed 46 tons per acre.

The total receipts for produce for one year were £1,420, or nearly £20 per acre, and the working expenses were £910; leaving £510 to assist in repayment of interest on the money borrowed for the purchase of land, etc. The cost of the works and land was £53,439, on which the annual repayment is £2,867, pumping and maintenance costs £520 per annum, precipitation and sludge pressing, £811; making a grand total of £4,200, from which deduct the profit of the farm, £510; leaving the net annual cost £3,690.

This is equal to a tax rate of 6.15d. in the pound on the present rateable value, and to 2s. 11d. per head of the population.

The Sewage Works at Kingston-on-Thames.—After having given ample time for inspection of the Wimbledon sewage works, including the farm, we were taken by the train to Kingston-on-Thames, where we found another sewage disposal works of quite a different character. It is an entirely new works, built for treatment by precipitation of the sewage from the town of Kingston, containing 33,000 inhabitants, and the neighboring town of Surbiton, with 10,000. The chief point of contrast with the Wimbledon works is that the Kingston works dispense with the farm, the treatment being by precipitation with a liquid mixture of clay and charcoal and with a solution of alum, and precipitation in large tanks. The works were built by the corporation at a cost of £23,000, and they are operated under contract by the Native Guano, or A B C Company, the annual payment by the town being equivalent to a "three-penny rate."

The sewage flows from the main sewer of the town into a sump-well 25 feet deep by 14 feet diameter, from which it is pumped to a conduit leading to the tanks. At one point in this conduit the mixture of clay and charcoal is injected into it, which acts chemically on the organic matter in the sewage. Further on the alum solution enters the conduit from a saw tooth gutter crossing it at right angles. The sewage is then admitted into one or more of the settling tanks, of which there are eight, each being 85 feet long by 45 feet broad. The tanks are deeper at one end than the other, so that the sludge tends to gravitate toward the front wall. After thorough settling has taken place, the effluent is allowed to escape from the tank down nearly to the level of the sludge. The effluent is remarkably clear and free from odor and is said to contain less than 20 per cent. of the total oxidizable organic matter of the sewage. The sludge is then drawn off by pumps into a sludge well, from which it is lifted by compressed air to the filter presses, which express the fluid and mold the solid residue into cakes. The expressed water runs back into the sump-well, whence it is taken with the fresh sewage to the settling tanks again. The filter cakes are put into a revolving cylinder, in which they are thoroughly dried. The vapor or "reek" from this operation is forced by a fan into a closed chamber, where it is sprayed and cooled, and finally passes into the external atmosphere through a flue in the boiler stack. By this means foul emanations are prevented and the atmosphere in the vicinity of the works appears to be quite pure.

After the cakes are dried they are put into a disintegrator and broken down into a fine earth, which is sold at three pounds per ton to farmers and gardeners under the name of "native guano." This guano is said to contain 3.8 per cent. of ammonia and 5.0 per cent. of phosphoric acid, reckoned as tri-calcic phosphate. Numerous testimonials are shown from farmers and gardeners as to the value of this manure in actual use.

The Willans Engines at the Kingston Sewage Works.—One of the most novel sights at the sewage disposal works at Kingston-on-Thames is

the plant of Willans central valve engines. There are two of these engines, each of 40 horse-power, for driving the mixing mills, drying cylinders, air compressors and other machinery; three pumping engines, each of 100,000 gallons capacity per hour, and two of 45,000 gallons, eight engines in all.

The Willans engine of the latest type, which is at these works, is a three-cylinder vertical compound engine, the cylinders being arranged tandem, the high pressure at the top and the low pressure at the bottom. The engines are single acting, the steam acting on top of the pistons only, so that there is a constant thrust on all bearings. The most peculiar feature of the engine is its central valve, which works up and down inside of the hollow piston rod, holes in which form the steam and exhaust ports. The valve is driven in the usual way by an eccentric, but since the valve face (*i. e.*, the inner surface of the hollow rod) moves up and down with the pistons, the eccentric must move up and down with the pistons also. This is done by mounting the eccentric on the crank pin instead of on the shaft as usual. Steam enters at the top through a governor throttle valve into the steam chest, whence it is admitted into the hollow piston rod, thence into the high pressure steam cylinder. It is exhausted back into a lower portion of the rod, whence it passes into the intermediate cylinder, and so on. Although the engine is thus a throttling engine and is not provided with an automatic cut off to the valves, it shows a remarkable economy.

A trial of one of the engines by Professor Kennedy showed a water consumption per indicated horse power per hour, of only 19.11 pounds. The engine developed 36.44 indicated horse-power. The boiler pressure was 160 pounds, and the ratio of expansion 6.16. Another trial of the same engine, with steam at 172 pounds, gave 38.45 horse-power and a water consumption of only 18.45 pounds per indicated horse-power per hour. In both trials the speed was about 400 revolutions per minute.

The Willans engine is made in large as well as small sizes, many being from 170 to 200 horse power. The Willans engine is certainly remarkable in its simplicity and compactness, and has most of the features which are aimed at in the best engines, such as triple expansion, high speed, small clearance, automatic lubrication, etc., and it ought to show good economy when its size is correctly proportioned to the work to be done. We cannot see, however, how it can be an economical engine if the load is at all variable, having no automatic expansion gear.

The Willans Engine Works.—On leaving the Kingston Sewage Works we embarked on several small steamers on the Thames, and were given a trip of a few miles on the famous river, lunch being served on board each boat. We were then landed at the Willans Engine Works at Thames-Ditton. These are new works, not yet finished, the old works having burnt down in November, 1888. A number of new machine tools are already in place, and enough was seen to assure us that the works will be equipped with the very best appliances for handling and executing the work. The tools, lifting appliances, etc., are designed to allow of the manufacture of the central valve engines up to 1,000 horse power. The shops are large and well arranged and appear admirably adapted to the work to be done. We have no doubt that the Willans engine has "come

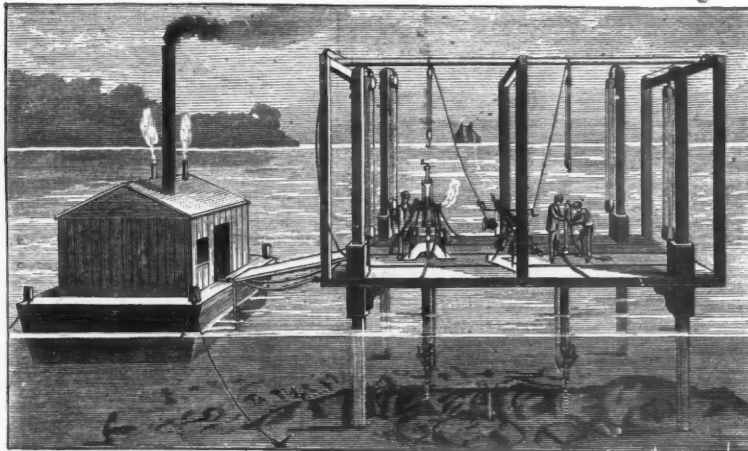


FIG. 1.

SUBMARINE MINING.

SUBMARINE MINING.

The removal of submerged rock may be classed as the most difficult kind of rock excavation. Before the introduction of the percussion rock drill, submarine rock work was carried on by chiseling, by surface blasting, as far as possible, and by the drop drill. The process of chiseling submarine rock has been entirely abandoned in America, because it is vastly more expensive to break away rock by chisels than to dislodge it by dynamite. Surface blasting is only practicable in the removal of boulders and jagged projections of rock. The surface blast has little or no effect upon a ledge.

Fig. 1 illustrates a modern plant for submarine drilling used by Mr. William L. Saunders, of the Ingersoll-Sergeant Rock Drill Company, in the removal of rock in New York Harbor. This plant is applicable to almost any kind of submarine rock work, and it has been approved by engineers as affording the best opportunities for economical removal of submarine rocks under the troublesome conditions of tide, storms, overlying material, danger from collision, etc. The independence of the drill stage is an important feature. Any old scow or hulk may be used for the boiler-room, engine-room and blacksmith shop. The drill stage itself is made of timbers rigidly trussed and made floatable, either by oil barrels or pontoons. Spuds are provided by means of which the stage is elevated

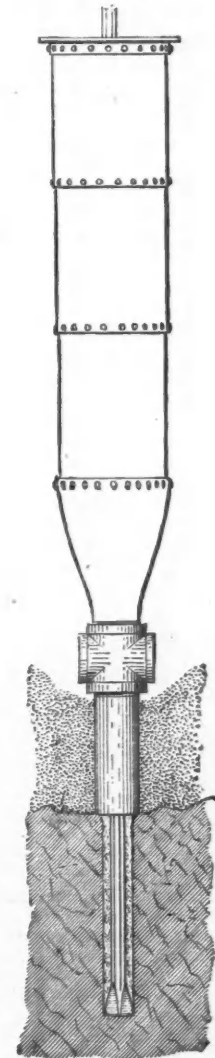


FIG. 2.

to stay," and that it will appear in America before long; but if a Yankee gets hold of it he will soon add to it a Corliss or other automatic gear.

Hampton Court.—The sewage works at Wimbledon and at Kingston, and the engine works at Thames-Ditton were enough of engineering matters for one day, so we finished with landscape gardening, architecture and painting at Hampton Court. Consult the guide books if you wish a description of Hampton Court, and go there if you wish to see the most wonderful grape vine in the world, and the strangest lot of paintings, good, indifferent and bad, especially the latter, that were ever brought together.

A Subterranean River in France.—Near Miers, in the Department of the Lot, between Auvergne and the Garonne, the course of a subterranean river has been traced in a boat for a distance of over two kilometers. Seven small lakes and thirty-two waterfalls were passed in the exploring voyage made in a small boat. It is estimated that the underground course is fully seven kilometers, the stream joining the Dordogne near St. Denis Martel. It is to be remembered that all that region is of limestone formation,

above the surface of the water. Slots are provided in the platform, through which the drilling and charging is carried on. Gallows frames, with overhead pipe provided with blocks and tackle, afford an accessible means of lifting heavy weights about the stage. A powerful hand winch is placed on the stage and is used for raising the stage or for lifting the spuds. The stage is connected with the boiler scow through hose which conveys the power to the drills, and by a gang-plank for conveying material. Little or no diving is necessary, owing to the fact that both the drilling and charging is done through submarine tubes. (See Fig. 2.) Two of these tubes are shown in the illustration; one of them being in use for drilling a hole, and the other being over a completed hole which the men are charging. This submarine tube has many advantages. It gives rigidity and steadiness to the bit when starting the hole. Formerly it was necessary to send a diver down to guide the bit until the hole was started. The tube also enables the drilling to be carried on successfully through mud, sand or gravel, or, in fact, any material which may cover the surface of the rock. Where there is material over the rock a water-jet is used in the tube for clearing away the debris, enabling the operator to press the tube down until it rests upon the rock. A water-jet is also used at times, while the drill is in operation. A small 1-inch or 1 1/2-inch pipe is provided. This pipe is lowered into the drill hole,

following the bit. Pumps are provided on the boiler scow for operating these water-jets.

The submarine plant shown in Fig. 1 admits of blasting without removing the drill stage. The worst that can happen is to break or damage one of the spuds. This is readily replaced. Those used in New York Harbor have at times been subjected to several hundred pounds of dynamite without damage beyond a spud breaking. Spud breaking is also the most serious result from collisions with passing vessels. The spuds act like the spring piles in a ferry slip, and if a collision is too severe one or more of them will break.

METALLURGICAL AND MINING CONGRESS AT PARIS.

Special Correspondence of the Engineering and Mining Journal.

The fifth session of the Congress was devoted to the questions of the ascent and descent of miners, of underground transportation, etc.

A valuable paper was read by M. Remaux, of the important Lens Colliery. He referred to the gradual abandonment of the man-engine, stating that there was not one in France, but six in Belgium, and that the Hartz and Cornwall almost alone continued their use. The last one built in Germany within his knowledge was that installed in 1875 at Clausthal, reaching to a depth of 628 meters, and costing about \$76,500. In the twenty years, 1868-1887, 42 men were killed per 1,000 carried per annum in the German mines, while less than half as many, to wit, 19, were killed per 1,000 carried by ropes.

M. Remaux next took up the question of parachutes, which, though very extensively used in France, Germany and Belgium, are rare in England. In nearly all the new installations steel rails of the common type and weighing from 40 to 60 pounds per yard are used for guides.

The requisites of a good guide he gives as

1. sufficient solidity to resist the tremendous shock which occurs when the parachute acts:

2. a regular section, designed to offer a gradual and brake-like resistance to the downward movement of the parachute:

3. great resistance to wear, so that the horizontal distance through which the jams, etc., of the parachute have to travel before grasping the guide may be and may remain small, and that the downward travel of the cage may be arrested before it has become rapid.

These requisites he thinks are fulfilled better by metal than by any other material.

Clear, brief descriptions and admirable cuts of some of the more important parachutes follow, and after these a brief discussion of the transportation of miners through levels, important statistical tables and diagrams concerning accidents in European mines, and the full text of the rules governing the transportation of miners underground adopted in several important mining districts.

At the sixth session the relative advantages of the hydraulic press and of the steam-hammer were first to be discussed, but no real discussion took place. The French, equipped as they are with an army of gigantic hammers, had nothing to say against the press, and nobody cared to say anything against the hammer. None cared to deny the old charge that the effect of the hammer cannot penetrate far beneath the surface, none offered, and probably none could offer, direct evidence for or against this proposition. So much, at least, as regards the effect of press and hammer on the quality of the product. It seems to be generally admitted, however, even in France, that the press works much faster than the hammer, and that it has a decided advantage in being able to treat either large or small pieces, while a large hammer cannot treat small pieces advantageously and *vice versa*. A detailed description of the work of casting the anvil of the great hammer at Terni was quite interesting, as was Coxe's statement that Fritz, after equipping Bethlehem with a gigantic press, was putting in a colossal hammer, apparently believing that each instrument has its legitimate field.

The ferro-metallic alloys were to be next considered, but a description of Darby's interesting process was dexterously introduced. Sharing the prevalent if ill-founded dread of manganese and silicon in steel, Darby recarburizes his decarburized open-hearth charge by pouring it, while on its way from the furnace to the casting-ladle, through a layer of gas-carbon (charcoal or any other carbonaceous fuel could doubtless be used) which dissolves in the molten metal as salt does in water. Steel thus made he terms "filtered steel." He informs me privately that the carbon varies only about 0.025 per cent. on either side of the point aimed at. It is said that at Brymbo in Wales, where this process is in use, about 1,000 tons of basic open-hearth steel are made by it weekly, the metal having about 0.1 per cent. of carbon when tapped into the filter. Filtered steel shown by Gilchrist at the exhibition had the following composition:

Composition of Brymbo "filtered steel," Darby's process.					
Carbon.....	.90	.81	.55	.43	.21
Silicon.....	0	0	0	0	0
Manganese.....	.27	.259	.252	.198	.....
Phosphorus.....	.067	.065	.061	.047	.06
Sulphur.....	.026	.031	.023	.02	.02
Tensile strength, tons.....	.....	.....	.....	.....	26.8
Elastic limit, tons.....	.....	.....	.....	.....	15.5
Elongation in 8 inches.....	.....	.....	.....	.....	28.12

The alloys of iron were next considered, and first those of iron with manganese. Of Hadfield's wonderful manganese steel nothing new was said; no means of machining it, and so overcoming the present obstacle to its use was proposed, nor was any new light thrown on the vexed question of the effects of manganese on the properties of steel.

The increasing use of ferro-silicon in the iron foundry for softening the iron and for enabling the founder to use a larger proportion of scrap, and the increasing use of silico-spiegel (or manganiferous ferro-silicon) for making solid steel castings were dwelt on, as were the difficulties of making these alloys in the blast furnace. In making ferro-silicon, an extremely acid slag, containing some 12 per cent. of alumina, is made; as much as 3.5 or even 4 tons of coke is used per ton of product; and only some 10 or 12 tons may be made per diem in a blast-furnace which produces 100 or 110 tons of mill-iron a day. Ferro-silicon with 17 per cent. of silicon was shown at the exhibition.

The feature of the session was Garnier's vivid account of his plucky struggle to overcome the difficulties in the way of making crude nickel in the blast furnace, and of refining it. He now proposes to make a highly

ferruginous crude nickel, which should be produced at much lower cost than the present comparatively ironless nickel of commerce, and which should be quite as good for making ferro-nickel or nickel-steel. His method is to smelt the ore in a common blast furnace, obtaining a highly sulphuretted nickel, which he would next desulphurize by melting, repeatedly if need be, in a cupola with a very basic slag (Rallet's process), finally melting the desulphurized production in the basic open-breath furnace.

At the seventh session the ferro-metallic alloys were again considered, Brustlein, the director of Holtzer's famous chrome-steel works, summing up his experience by saying that chromium increases the strength and the hardening power of steel without affecting its other properties correspondingly.

Coming next to the aluminum-iron alloys, it was pointed out that, as in the case of ferro-nickel, it should be possible to make ferro-aluminum at a much lower cost per unit of aluminum than the present relatively ironless aluminum of commerce. It seemed to be the sense of those who spoke that the action of aluminum in facilitating the production of sharp and sound castings was by no means explained by Ostberg's theory that aluminum lowers the melting-point of iron, for no aluminum can be found in the castings. This has been already pointed out, and Greiner added his testimony, insisting that his chemists had been unable to find aluminum in steel castings made with ferro-aluminum. Brin's aluminum process was referred to; but a protest was raised against considering it seriously since it bears all the marks of imposture.

Passing to the non-ferrous alloys, phosphor-bronze, Delta metal, and Roma metal were next considered. Delta metal is a brass with about 55 per cent. of copper, 41 per cent. of zinc, and from 1.5 to 4 per cent. of iron. Wherein it differs from stero-metal its advocates fail to show; they found an audience decidedly incredulous as to the strong claims made for their alloy.

Roma metal is a brass with a little cobalt, manganese and phosphorus.

Altogether the discussion of the non-ferrous alloys was decidedly the least creditable feature of the congress. Some of the papers seemed little better than unbridled puffing of patented alloys.

At the eighth session the application of electricity to mining was considered. It seemed the sense of the meeting that electric motors could not at present be safely used in fiery mines lest the sparks inflame the fire-damp. The advocates of electricity vainly protested, spoke of sparkless motors, of motors tightly enclosed in boxes from which a shaft alone projected, passing through a stuffing-box. Of course there were the familiar statements as to the greater efficiency of electric than of compressed-air systems, the oft-rehearsed list of uses to which electricity may be and even has been put, drills, pumps, cars, blasting, lamps, what-not! But the statement that 500 electric hand-lamps are in actual use at the Risca mine in Wales was naturally more effective than an hour of eloquence and argument.

At the final session the Congress met in two sections, one on mining, the other on metallurgy. The metallurgical section listened to a paper by Osmond on new methods of hardening steel, and much was said, but nothing told about Chatillon et Commeny's method of quenching in lead, which cools the steel faster than air, but slower than oil. Greiner properly questioned whether such a process was not rather an annealing than a hardening. Indeed it is rather misleading to call them either the one or the other. These are specific terms, which, as well as lead hardening and like operations, are comprised under the generic term "heat treatment."

The discussion closed, the final ceremonies were soon over, and the Congress was no more.

The metallurgical side of the Congress was disappointing. While there were many men of distinction present, and while it was clear why Ledebur, Müller and the other Germans were not, one wondered why Ackerman and Bell, Ehrenwerth and Kupelwieser, and many others of real eminence came not.

The mining side seemed much stronger, the papers better written, indeed some of them admirable digests of our present knowledge, the discussions showing a firmer grasp.

Altogether the Congress was a decided but far from a brilliant success. Its papers and discussions, which will be printed and distributed to its members in due time, will be of very considerable value. H. M. H.

Electric Capstans for Railroad Work.—In the year 1880 the Northern Railroad of France introduced in its yards a system of hydraulic capstans to transfer cars to and from turntables. The intermittent character of the work to be done, however, and the heavy first cost and operating expenses of this system has resulted recently in the substitution of an electric system worked by storage batteries. The innovation is due to W. A. Sartiaux, engineer-in-chief of the road. The plant was put down by the Société de Transmission de la Force par Electricité, and completely does away with the heavy, costly hydraulic machinery hitherto employed.

Coke Production in Europe.—The extraordinary prices now paid for coke on the Continent, says Mr. Geo. André in the *Colliery Guardian*, are leading to a great increase in the production. A moderate rise might have kept the industry in a state of prosperity for years to come. As it is, the reaction will be speedy and severe. In France many new ovens are being built, or are about to be commenced. In Belgium all that were put out of use by the low prices of a few years ago are being brought into operation again, while in some instances fresh ovens of the most approved design are being built. The same augmentation of the means of production is taking place in Germany. This week I am informed that in Upper Silesia, at Zaborze, the Königin Luise Colliery Company are about to build 160 new coke ovens, all of which are to be constructed to recover the by-products, tar and ammonia.

Most of the new coke ovens now being built are thus constructed—that is, to recover the ammonia by-products. This is a circumstance of the times worthy of attention, because it has a double significance; it implies a smaller difference between the prices of coal and coke on account of the reduced cost of manufacture, the by-product ammonia sulphate being salable at a profit, and it points to a great and rapid development of the ammonia sulphate industry. The quantity of sulphate produced in the United Kingdom last year amounted to 123,785 tons, of which quantity only about 3,500 tons were recovered from coke ovens.

EUREKA COAL DOCK, JERSEY CITY, N. J.

The Eureka coal dock, sometimes locally called the Harsimus pier is at the foot of Fifth street, Jersey City, N. J. It was built by the Pennsylvania Railroad Company for the Berwind-White Coal Mining Company. Construction began in October, 1888, and the dock was completed and in working order March 14th, 1889, the entire structure, including piling, being new.

The dock is approached from the land side by an inclined trestle having a 2 per cent grade. The length of the dock proper (that is, the level portion) is 1067 feet, and the water front is about 100 feet longer. The minimum low water depth along the front is 16 feet. Discharging is done on one side only. The height of the dock from low water to upper floor is 40 feet. This is rather higher than is customary, and was decided upon in order to conveniently supply such steamers as receive coal over the upper deck instead of taking it in through side-bunker ports. The slightly increased percentage of fine coal made, when loading from the high chutes into low barges, is unimportant for the purposes to which the Eureka coal is applied, and the dock is enabled by its commanding height to supply vessels of all kinds at all stages of tide.

A single track leads to near the foot of the incline, where there is a Y switch, thence there are double tracks to the end. There are three switches on the level portion; none on the incline. There is room for 32 large cars (of from 20 to 22 long tons, net coal weight), or for 35 or 36 smaller cars (of from 17 to 20 tons capacity), on the dock simultaneously; while the number of switches admits of rapid handling.

There are nine swinging chutes of the usual type, arranged as follows: One triple set on the outer end of pier, 44 and 33 feet apart; then, 259 feet shoreward, begins a series of four pairs of chutes, each couple being 33 feet apart, with wider intervals between the couples. The Berwind-White Company has 30 barges, of from 300 to 600 tons coal capacity each.

The dock can discharge 4000 long tons of coal in ten hours, working full capacity. During the winter season it will work two shifts. A full gang has 63 coal handlers. There are 4 in the office force and watch.

The coal exclusively handled is Eureka bituminous, mined by the Berwind-White Company in the Clearfield district of Pennsylvania. It is largely used as steamship fuel and is taken by the principal trans Atlantic lines, among them the Inman, North German Lloyds, Hamburg-American, Compagnie Transatlantique, Red Star and others. It is also shipped as a steam coal to points north and east and is taken by various railroads.

The Eureka dock is not extraordinary as to size or novelty, but it is a fine example of solid workmanship and convenient design. It is in charge of Superintendent Theo. L. Roese.

The Electric Shot-Hoist.—The electrical ammunition hoist of Lieut. Bradley A. Fiske, now in operation on board the "Atlanta," is reported to be giving satisfaction. The apparatus is called into play on all general quarters' calls, and hoists projectiles weighing 250 pounds from the bottom of the hatch to the gun deck in ten seconds. In no instance has the hoist been taken down or given the slightest trouble. A great many naval officers were opposed to the apparatus on its introduction, but now one hears nothing but praise for it. The hoist has been put aboard the flagship "Chicago," and will, undoubtedly, be put aboard all the new ships.

How the Burmese Work their Oil Wells.—Dr. Noetling, of the Indian Geological Survey, to whose report on the petroleum deposits of Burmah reference has already been made, gives an interesting description of the native method of digging the wells. As soon as a native has made up his mind where he is going to have a new well, the workmen, usually four in number, begin to dig a square shaft, the sides of which measure between 4 feet and 4 feet 6 inches. Over this pit a cross beam, supported on stanchions at either side, is placed, in the center of which is a small wooden drum or cylinder, which, with its axis, is made of a single piece of wood, the latter running on coarse fork-shaped supports. The leather rope used in hauling up the oil passes over the drum, and on it is fastened the workman who is going to be lowered down, as well as the common earthenware pot in which the oil is drawn up. If possible the well is so placed that the men or women drawing the rope walk down an inclined plane along the slope of a hill. The tools employed in digging are quite primitive, and can only be used in soft strata. Timber is used to support the walls of the shaft, and the latter is lined with wood. This wooden wall has considerable strength, but it has to be carefully watched lest it should give way.

The workmen are lowered in an ingenious way. The man sits on two slings formed of strong rope running between his legs and knotted over his left shoulder. To prevent sliding a thin rope runs down from the knot, across the breast, underneath the right shoulder to the back, where it is fastened to the rope forming the slings. A second rope for the same purpose is fastened round the hips. On account of the explosive gas filling the shaft no light can be taken down; the workman, therefore, ties up his eyes previously to descending, so as to enable him to see during the short time he is in the well, otherwise it would take him longer to accustom his eyes to the darkness than he is able to stay down on account of the gas, which renders breathing difficult. The data obtained by Dr. Noetling as to the time occupied in the ascent and descent, and the period during which the laborer can remain below, show that not 25 per cent. of the total working time is really spent in extracting the oil. Two hundred and ninety seconds is the longest time any man, however strong, can remain below without becoming unconscious, while in some he can only remain 60 seconds. With increasing depths the difficulties in obtaining the oil after the Burmese methods become insuperable. Hence the limit is 310 feet, and the workers object to more than 250 feet.

The drawing up of the oil is as primitive as everything else. The rope is fastened round the neck of the ball-shaped pot, and, being lowered, is allowed to fill by sinking in the oil below. The oil thus raised is poured into another pot of the same shape, but much larger, and twelve of these are packed on each country cart.—*London Times.*

BOOKS RECEIVED.

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

A Bibliography of Geodesy. By J. Howard Gore, Ph. D. Appendix No. 16, Report for 1887, United States Coast and Geodetic Survey. F. M. Thorn, Superintendent. Pages 512. Published by the government, 1889.

Chemical Technology or Chemistry in its Applications to Arts and Manufactures. Edited by Charles Edward Groves and William Thorp, with which is incorporated Richardson and Watt's Chemical Technology. Vol. I. Fuel and its Application. By E. J. Mills and F. J. Rowan. Pages 802 and index. Illustrated. Published by P. Blakiston, Son & Co., Philadelphia, Pa., 1889. Price, \$7.50.

Catalogue No. 8, Ingersoll-Sergeant Rock Drill Co.: Mining, Tunneling and Quarrying Machinery. Published by the company, 10 Park Place, New York, 1889. This, while professedly a regular business catalogue, is a well-prepared and profusely illustrated pamphlet of 184 pages, which gives much useful information as to mining appliances in general. The numerous tables of dimensions and efficiency are especially valuable, and altogether it is a book of reference which every engineer, mining or otherwise, should have.

Experimental Science, Elementary, Practical and Experimental Physics. By George M. Hopkins. Published by Munn & Co., New York, 1890. Pages 719 and index. Illustrated. Price, \$4.

Egyptian Irrigation. By W. Willecks, Indian Public Works Department; Inspector of Irrigation, Egypt. With introduction by Lt. Col. J. C. Ross, Inspector-General of Irrigation. Published by E. & F. N. Spon, New York and London, 1889. Pages 367. Illustrated. Price, \$15.

Our Silver Coinage and its relation to debts and the world-wide depression in prices; with an appendix noting events to August, 1889. By John A. Grier. Published by John W. Lovell Company, New York, 1889. Price, 25 cents.

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.

ISSUED NOVEMBER 19TH, 1889.

- 415,185. Apparatus for Manufacturing Pigments. Frank L. Bartlett, Portland, Me.
- 415,186. Apparatus for Refining Fume. Frank L. Bartlett, Portland, Me.
- 415,190. Dynamo-Electric Machine. Thomas E. Daniels, Jr., Provo City, Utah.
- 415,194. Car Coupling. Benjamin G. Follansbee, Allegheny, Pa.
- 415,206. Cupola and Blast Furnace. George Enssen, Hanover, Germany.
- 415,209. Elevated Suspension Railway. Lysander Johnston, Waco, Tex.
- 415,214. Fluid-Pressure Car Brake. Albert P. Massey, Watertown, N. Y.
- 415,215. Horse Power. William M. Milroy, Baltimore, Md.
- 415,226. Hot-Blast Stove. Victor O. Strobel, Philadelphia, Pa.
- 415,236. Elevator Bucket. Henry W. Avery, Cleveland, O.
- 415,239. Car Coupling. Perry Brown, Louisville, Ky., Assignor to Daniel E. Doherty and Mark Munday, same place.
- 415,261. Ore Pulverizer. James E. Westlake, Albuquerque, N. Mex.
- 415,269. Device for Ventilating Mines, Cellars, etc. William H. Hoadley, Chenango Forks, N. Y.
- 415,290. Railway Rail or other Joint. Andrew J. Curry and George W. Curry, St. Louis, Mo.
- 415,302. Steam Boiler. John P. Simmons, Los Angeles, Cal.
- 415,305. Electric Welding Clamp. Elihu Thompson and John Tregoning, Lynn, Mass.
- 415,328. Mold for Casting Metals. Clement Payen, Philadelphia, Pa., Assignor to the Electric Storage Battery Company, Gloucester City, N. J.
- 416,330. Process of Manufacturing Porous Metal Plates. Clement Payen, Philadelphia, Pa., Assignor to the Electric Storage Battery Company, Gloucester City, N. J.
- 415,332. Mold for Casting Plate for Use as Electrodes of Storage Batteries. Clement Payen, Philadelphia, Pa., Assignor to the Electric Storage Battery Company, Gloucester City, N. J.
- 415,347. Process of Producing Crystallized Metal Plates. Clement Payen, Philadelphia, Pa.
- 415,370. Regulator for Compressors. Henry C. Sergeant, New York, N. Y. Assignor to the Ingersoll Rock Drill Company, same place.
- 415,391. Device for Supporting Wire during the Process of Annealing. Charles E. Matterson, Allentown, Pa.
- 415,397. Steam Generator. Edward E. Roberts, Red Bank, N. J.
- 415,401. Mill Appliance. Henry Aiken, Homestead, Assignor of one-half to David E. Oliver, Philadelphia, Pa.
- 415,403. Process of Manufacturing Axles. Henry Aiken, Homestead, Assignor to Carnegie, Phipps & Co., Ltd., Allegheny County, Pa.
- 415,411. Concrete Mixing and Delivering Wagon. George F. Gray, San Francisco, Cal.
- 415,421. Pulverizer. George Raymond and Albert Raymond, Chicago, Ill., Assignors to the Raymond Brothers Impact Pulverizer Company, same place.
- 415,422. Railway Rail Joint. Diedrich Rohlfing, Omaha, Neb.
- 415,439. Traction Engine. Edgar M. Birdsall, Buffalo, N. Y., Assignor to Mary Birdsall, same place.
- 415,445. Ore Separator. Alonzo C. Campbell, Nashville, Tenn.
- 415,452. Mechanism for Feeding Sand and Water to Stone-sawing Machines. John H. Fremier and Leon Leblanc, Rutland, Vt.
- 415,454. Ore Concentrator. James Gray, Camptonville, Cal.
- 415,484. Dumping Car. John Voegtline and Gustaf Bergstrom, Republic, Mich., Assignor of one-third to Isaac M. Engberg, Minneapolis, Minn.
- 415,488. Device for Dumping Cars. Charles F. Wilson, Breckenridge, Colo., Assignor to himself and Russell C. Macy, same place.
- 415,493. Device for Conveying Coal. Leander Boudreau, Manchester, N. H.
- 415,501. Dredging Machine. Thomas Z. Cole, New Orleans, La., Assignor by mesne assignments to James E. Campbell and Daniel McConville.
- 415,512. Furnace Door. Edwin A. Kern, Warren, O.
- 415,513. Air-Brake. Frank Lansberg, St. Louis, Mo., Assignor by direct and mesne assignments, to the Lansberg Brake Company, East St. Louis, Ill.
- 415,519. Governor for Fluid Compressors or Pumps. Frank Lansberg, St. Louis, Mo., Assignor to the Lansberg Brake Company, East St. Louis, Ill.
- 415,547. Journal-Box and Bearing. James F. Morell, Camden, N. J.
- 415,574. Electric Police Signal System. Charles E. Scribner, Chicago, Ill., Assignor to the Western Electric Company, same place.
- 415,576. Process of Electro-Deposition of Metals. Werner Siemens, Berlin, Germany, Assignor to Siemens & Halske, same place.
- 415,604. Spiral Conveyer. Hans Birkholz, Milwaukee, Wis., Assignor to Edward P. Allis, same place.
- 415,610. Dr. Il. Edward M. Brown, Nashua, Assignor of one-half to Morgan Kelly & Co., Osage, Ia.
- 415,619. Dredging Machine. Thomas Z. Cole, New Orleans, La., Assignor by mesne assignments to James E. Campbell and Daniel McConville.
- 415,620. Dredging Machine. Thomas Z. Cole, New Orleans, La., Assignor by mesne assignments to James E. Campbell and Daniel McConville.
- 415,621. Method of Burning Coal in Furnaces. Edward Fales, Philadelphia, Pa.
- 415,622. Furnace for Steam Boiler. Edward Fales, Philadelphia, Pa.
- 415,644. Process of Electrolyzing Salts of the Alkalies. George Kerner, Frankfurt-on-the-Main, Prussia, and Julius Marx, Ulm-on-the-Danube, Wurtemberg, Germany.
- 415,654. Process of Manufacturing the Alloys of Steel and Copper. Henri Schneider, Le Creuzot, France.
- 415,655. Process of Manufacturing the Alloys of Steel and Nickel. Henri Schneider, Le Creuzot, France.
- 415,656. Process of Manufacturing the Alloys of Cast Iron and Copper. Henri Schneider, Le Creuzot, France.

PERSONALS.

Mr. G. W. Hall, for ten years past superintendent of the Colorado Central Consolidated Mining Company of Colorado, has resigned.

Mr. J. B. Wheeler, President of the Aspen Mining and Smelting Company, has returned to New York after a four months' sojourn in Colorado.

Mr. Frank F. Amsden, metallurgist, of Scranton, Pa., is examining the Tilly Foster iron mine in New York, in the interests of the Lackawanna Coal and Iron Company.

Prof. George T. Duck of the Lehigh University, Bethlehem, has accepted the position of Dean of the School of Mines at Rapid City, South Dakota, succeeding Prof. Franklin R. Carpenter, who lately resigned to engage in private mining and smelting enterprises.

Mr. J. H. Flagler has resigned the presidency of the National Tube Works Company, of McKeesport, Pa. Mr. E. C. Converse has been elected to succeed him. The New York offices of the company have been removed from John street to the Guernsey building, 160-164 Broadway.

Mr. E. C. Brown, of the *Progressive Age*, is the member of the committee of the World's Fair for 1892, as representative of the gas industry, and any information that may be desired by the gas fraternity will be gladly furnished by him. He will also be glad to receive subscriptions.

Mr. S. W. Blakely, the general superintendent of the El Cristo, Bocanema, La Casas, El Colon and La Charga mines, in the Republic of Colombia, left for that country on the Pacific Mail steamer "Colon" on Wednesday. Mr. Blakely has been here for about two months on a vacation.

Mr. James K. Harvey, an English mining expert representing a London syndicate of which Mr. Thomas Philpotts is the chairman, left on the White Star steamer "Germanic" on the 20th inst. Mr. Harvey has been in the United States for seven months looking at mining properties for his people. He spent some time in the San Juan district in Colorado, and also examined the tin mines in Dakota.

The Grand Jury, London, England, has returned a true bill against Claude Marks and Sidney Woolfe, joint proprietors of the *Mining Record*, and Mr. Marx, of the *Financial Times*, for blackmail. The indictment grew out of an alleged attempt, as already mentioned in our issue of Oct. 19th, by the accused to obtain large sums of money for suppression of articles affecting a gold mining company.

Señor Don Mirtillano Sicard, of the Republic of Colombia, has been in New York for some two months, arranging for a small reduction works plant for the general and departmental governments of his country. Señor Sicard is also studying assaying with Mr. Riote, of the New York Metallurgical Works, with a view to taking charge of the reduction works when finished. It is to be a small affair and is only intended as a testing works, to further the mining industry in Colombia.

The chief management of the Krupp works, at Essen, which was constituted on April 13th and July 23d, 1888, consisting of Messrs. Alfred Longsdon, Richard Cohnheim, *Finanzrath* Ludw. Klüpfel, Fritz Asthöwer and Wilhelm Gross, will be in so far changed as the procurement of Mr. Cohnheim has expired in consequence of his retirement on the 31st ult. from the service of Mr. Krupp, with whom he had been engaged for twelve years. According to a circular issued by Mr. Krupp, he has appointed Dr. Adolf Schmidt and Mr. Theodor Fitting, mining engineer, as members of the board of management.

Mr. Arthur Winslow, who was recently appointed geologist of Missouri, has appointed his corps of assistants, among whom are Professors Walter P. Jenny, James D. Robertson and Dr. Hambach, of Washington University, St. Louis, Mo.; Elston Lonsdale, of Columbia, Mo., and Leo Gluck, of Lamonte, Mo. The State has appropriated \$20,000 for the maintenance of a geological bureau during the year 1889-90. After a brief investigation Prof. Winslow has discovered that he will be forced to start almost without any information. In 1873-74 Prof. Broadhead made a partial survey of some portions of the State, but for lack of funds was unable to continue. The Director of the United States Geological Survey has notified Prof. Winslow that the government will co-operate with the State, and will put a full corps of surveyors in the field next spring, who will work in such localities as the State Geologist may direct.

OBITUARY.

T. C. Leake, Jr., prominent in various mining and land companies in the South, and President of the Alabama Land and Improvement Company, died at Richmond, Va., on the 15th inst.

John S. Gilman, aged 60, Vice-President of the Abbott Iron Company and director in the West

Virginia Central Railroad, died on the 16th inst. at his home in Baltimore County, Md. He had been ill for some time.

Charles H. Wells, editor and proprietor of the *Dixie*, the trade journal of Atlanta, Ga., died at Saranac Lake, N. Y., this week. He was twenty-nine years old and was well known in railroad circles through the North and East.

Richard A. Bostley, of the firm of R. A. Bostley & Co., nail manufacturers, died on November 16th, at South Towanda, Pa., aged about 50 years. Mr. Bostley had been in ill health for a year past, but it is believed that the disastrous results attending the explosion at this nail works last summer, by which several lives were lost, hastened his death.

The death is announced of the eminent geologist, Mr. Thomas Hawkins, which took place at Ventnor, Isle of Wight, England, a few days ago. The deceased was born at Glastenbury on July 25th, 1810. Mr. Hawkins was the founder of the two great national collections of fossil Saurian remains procured by the government for the British Museum, and now at South Kensington. To illustrate and explain these extinct monsters, Mr. Hawkins published "The Memoirs of the Ichthyosauri and Plesiosaurs," and the "Book of the Great Sea Dragons." The deceased also presented two other collections to the Universities of Oxford and Cambridge, respectively, for which he received a special grace of thanks. In 1831 he was elected a Fellow of the Geological Society, and he was a member of other learned societies.

INDUSTRIAL NOTES.

It is reported that fire has destroyed the Tonawanda Iron and Steel Works at Tonawanda, N. Y. This is the concern that started up a few weeks ago after being idle for a long period.

The Standard Oil Fuel Burner Company informs us that the main office has been removed from 137 Broadway, N. Y., to Fort Plain, N. Y. All correspondence is to be directed there in the future.

The Cowles' Electric Smelting and Aluminum Company made a very modest exhibit at the Paris Exposition, yet, notwithstanding, the novelty and importance of their process has given to the Cowles' Brothers a gold medal.

The 100-ton furnace of the Centre Iron Company at Bellefonte, Pa., has been put into blast again, after an idleness of six months. It has changed hands, Colonel James B. Coryell, of Williamsport, being president of the new company.

Mr. Robert Coleman, of Lebanon, Pa., will make extensive improvements at his North Cornwall anthracite furnaces, and has just contracted with Messrs. Gordon, Ströbel & Laurean, Limited, of Philadelphia, Pa., for this work, which includes two plants of Gordon fire-brick stoves.

Notices have been posted in all the mills of the Glasgow Iron Company, near Pottstown, Pa., announcing an increase in the wages of puddlers of 25 cents a ton. The men have been getting \$3.50, and will hereafter receive \$3.75. Wages of all other employes will be correspondingly increased.

The large government contract with the Eddy Valve Company, of Waterford, N. Y., for 48 valves has been increased, and with orders from other parties for this and other sizes of valves, together with fire hydrants, their works are kept very busy and in some departments their men are working overtime.

The Colorado Coal and Iron Company, of Colorado, is reported to be putting its steel plant at Pueblo in shape to begin rolling steel rails again. The cost will be about \$200,000, and it is said the directors have not yet decided whether to negotiate a loan for the purpose or to use the proceeds of real estate sales which have realized within a short time over half a million.

The Abendroth & Root Manufacturing Company has issued a handsomely finished catalogue relating to the well-known water-tube boilers of that company. The illustrations afford all the information requisite; but, in addition to these, there is ample letter-press and three tables of great value to all engineers and boiler-users, viz.: of chimney proportions, horse power conversions and relative factors of evaporation.

The glass blowers of Poughkeepsie, N. Y., are holding out against a reduction in the price for work and against an increase in the number of apprentices. It is stated that the reduction is 25 per cent., which will make the blowers earn less than \$6 a day when previously they earned \$7 and \$8. The company says it has enough stock on hand for the season and there is no need of any hurry. On November 21st, 18 glass blowers arrived from New Jersey.

Several months ago a Taylor producer was erected at the International Pottery in Trenton, N. J., for firing their decoration kilns with gas from anthracite coal. It proved to be a great success, bringing out the colors much better, and giving a finer gloss than had ever been obtained before in any direct firing. Mr. Taylor advises us that the success of this was so satisfactory that

two more Taylor producers were erected at the same pottery by the Taylor Gas Producer Company, of Philadelphia, to fire a biscuit kiln, which was altered for gas firing and regenerators added for reheating the air by Frank C. Roberts, C. E., of Philadelphia, and Mr. Burgess, president of the pottery company. This kiln has made two successful burns, the latter one being especially so. The regenerators are small, yet the economy in fuel was very marked notwithstanding that all appliances for utilizing the heat were in an experimental state.

In the last burn 13 tons of anthracite buckwheat were used in the producers against 16 tons egg required in direct firing. The latter costs almost double per ton. The successful development of the Taylor producer will undoubtedly lead to much pottery kiln firing with producer gas, now that Mr. Burgess and Mr. Roberts have been so successful with their first experiments.

A press dispatch from Cleveland, O., on the 21st inst. says: The Federal Steel Company, the gigantic corporation formed for the purpose of combining all the wire, wire nail and barbed wire manufacturing plants of the country, has been formally organized. Among the gentlemen present at the meeting at which this was accomplished were John W. Gates, of the St. Louis Wire Company, St. Louis; T. McCosh, of the McCosh Iron and Steel Company, Burlington, Ia.; Joel Sharpe, of the Salem Wire Nail Company, Salem, O.; James Larmon, of the Cincinnati Barb Wire Fence Company, Cincinnati; James F. Hazen, of the Cincinnati Wire Nail Company, Cincinnati; E. Buffington, of the American Wire Nail Company, Covington, Ky., and Anderson, Ind.; A. R. Whitney, of the Brooklyn Wire Nail Company, Brooklyn, N. Y.; George T. Oliver, of the Oliver & Roberts Wire Company, Pittsburg; W. Douglass, of the Iowa Barb Wire Company, Altoona, Penn., and New York; C. B. Beach and S. H. Chisholm, of the H. P. Nail Company, Cleveland; E. S. Page, of the Cleveland Rolling Mill Company, Cleveland, and Thomas Jopling and William Arkless of the American Wire Company, Cleveland.

It is understood that a five-year contract has been made with the Cleveland Rolling Mill Company to furnish the Federal Steel Company with steel billets and wire rods. The barbed fence business of the Cleveland Rolling Mill Company, under the contract, will be suspended, and that department of the company's large plant closed. It is also said that the absorption of the American Wire Company has been practically completed. The American Wire Company is a close corporation, the stock being held, as far as known, by C. A. Otis, Thomas Jopling, E. B. Thomas, W. E. Wellman, Samuel Andrews, William Arkless, and J. K. Bole, of this city. All of the shareholders, it is said, favor the consolidation project and have exchanged their holdings for stock in the Federal Steel Company through the trustees appointed for that purpose. The plant of the wire works, it is said, was valued at \$600,000 and the good will at \$200,000, so that the Wire company will be represented by \$800,000 worth of stock in the consolidated corporation. The owners of the H. P. Nail Works were not so unanimous in regard to entering the new company, but later on agreed to do so.

CONTRACTING NOTES.

Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open" on page xx. This week proposals are invited for the following work: Material and Labor; Tunnel Construction; Bridge Construction; Grading and Masonry; Iron Bridge; Iron Work and Building Material; Street Work.

Secretary Tracy has issued an advertisement for proposals for building the proposed new steel gunboats Nos. 5 and 6, of about 1,000 tons each; and for a steel practice vessel of about 800 tons, for the Annapolis Naval Academy, the proposals to be opened Jan. 22, 1890. The cost of the gunboats (exclusive of speed premium) is limited to \$350,000 each, and that of the practice ship to \$260,000.

Advertisements have been issued from the Navy Department for proposals for furnishing steel plates for use in the construction of the United States armored battle ship Texas, building at the Norfolk Navy Yard, to be opened at the Department, December 16, at noon. There are required about six hundred and sixty-one tons of plates, of which 246 tons are for the lower layer of protective deck plating and 415 tons for the upper and middle layers, the upper and lower layers of top of redoubt and the protective side plating. Deliveries are to be made at the Norfolk yard, and are to commence thirty days and end sixty days from the date of the contract. Bids for these same plates were opened on the 6th of last August, but it was found that the prices were too high and the proposals were all rejected. The cause of the excessive prices was that among the plates required were 115 inches wide. As the largest steel rolls in the country are stated to be only 119 inches wide, the manufacture of plates of that width would be extremely difficult, and there would be danger that much of the material submitted would be rejected for irregularity at the edges. The schedule has been revised and a new plan of plating arranged to overcome the difficulty.

ing from the north drift of a fair grade, and the developments to the west, it is said, have opened up a large body of low-grade ore.

SMALL HOPES CONSOLIDATED MINING COMPANY.—The receipts of this company for October were \$3,375.68, and the expenses, \$10,270.52, the latter account being augmented by a good deal of development work, including the sinking of the McCormick shaft. The ore also fell off in grade, averaging per ton 26.7 ounces silver in October against 34.6 ounces in September.

OURAY COUNTY.

NEW GUSTON COMPANY, LIMITED.—"The estimated net proceeds of the ore shipped during October is \$50,000 from 34 cars. The superintendent states that, judging from appearances, he has nearly reached the ore body in the sixth level."

PITKIN COUNTY.

DURANT VS. BONNYBEL.—This famous suit came up for a second trial before Judge Hallett in the United States Circuit Court on the 12th inst. at Denver. When the case was first tried, commencing January 23th, 1889, as noted in the *ENGINEERING AND MINING JOURNAL* of February, 2d, the trial continued eighteen days, and the Bonnybel people were victorious. The case is distinguished generally as the Durant-Bonnybel suit, but the proper title is D. M. Hyman against John C. Eames, D. R. C. Brown and others. Since the 12th inst. the trial has continued steadily, and many witnesses have been examined.

MORNING AND EVENING STAR.—On these claims in Ophir Gulch, fourteen men are at work in development. These claims were Mr. J. B. Wheeler's first purchase in Pitkin County. There is said to be a large body of low-grade quartz carrying brittle silver cropping on the claims, that runs from 15 to 25 ounces of silver to the ton. It is a dry ore.

RAYMOND MINING COMPANY.—This company, in which St. Louis capitalists are largely interested, as noted in the *ENGINEERING AND MINING JOURNAL* of October 26th, is working the Raymond group at the head of Queen's Gulch, under the management of J. B. Warner. This tunnel has a northeast course, and has been run about forty feet.

GEORGIA.

LUMPKIN COUNTY.

DAHLONEGA COMPANY, LIMITED.—This company has been formed to work three freehold properties named the Ivey, Lockhart and Fish Trap Gold Mines, comprising an area of about 600 acres, near the centre of the Dahlonega Goldfields, in this county. The capital is \$125,000, shares \$1 each, of which 41,500 are retained by the owner of the properties, Mr. Marshall A. Phillips, of Philadelphia, Pa., and 83,500 shares are offered for subscription. The vendor guarantees for five years the payment of minimum dividends of 10 per cent. per annum upon the shares which may be allotted to the public, such dividends to be paid quarterly, the first to become payable three months after allotment. From the company's prospectus we have taken the following: The Ivey mine has been examined and reported upon by Mr. A. C. Johnson, mining and civil engineer, who states that it consists of about 180 acres, with a water-way or canal about 15 miles in length, and dams, trestles, flumes, etc., constructed, in 1883 for a capacity of 300 miner's inches of water, which can be materially increased. The plant comprises a first-class 60-stamp mill of the latest improved design, and best adapted to the ores of the district, supplied with all necessary appliances. The water motor is a Leffel's high-pressure water-wheel of sufficient capacity to drive the entire mill and machinery. There is, in addition, a 40 horse power engine and boiler as supplemental motive power if needed. The development consists of open cuts, one about 1,100 feet long and 200 feet wide, with an average depth of 40 feet, containing three large veins, and another from 300 feet to 400 feet in length on another parallel vein. A shaft has also been sunk to the depth of about 45 feet. The amount of ore immediately available in the Ivey Mine alone, on four veins, for a distance of 3,000 linear feet by about 70 feet deep, is estimated by Mr. Johnson to be at least 200,000 tons, which would be doubled by working to the depth of an additional 30 feet. The above estimate does not take into account the ores below 100 feet in depth. Excavating by hydraulic power, the profit is from \$3 to \$5 per ton. Mr. Johnson's report upon the Ivey Mine is confirmed by A. B. Linderman, mining and civil engineer, who also reports that the mine has yielded gold to the value of over \$110,000 in three years' working, and that the cost of working by hydraulic power may be put at 13 cents per ton. Mr. Linderman has also examined and reported upon the other two properties, the Lockhart and Fish Trap, and with regard to them he states as follows: The Lockhart comprises 180 acres, all gold-bearing, and surrounded with rich mines, which have made their owners millionaires. It is opened out by a level driven into the side of the hill to the extent of about 150 feet, working a lode of auriferous drift, 8 feet wide, of a net value of \$3 per ton. With this property is a 20-stamp mill, with all appliances required for the mine as a going concern, worked by a Leffel water-wheel in first-rate order. The Fish Trap is 240 acres in extent, all gold-bearing, opened out by a cut about 400 feet long by about 100 feet wide, containing several rich veins, from

which large amounts of gold have been taken. The cost of working by hydraulic is put as low as 13 cents per ton. With this property also is a 20-stamp mill and all necessary appliances, and a 40 H. P. engine and boiler.

It occurs to us that this company may be a re-organization of the Dahlonega Gold Mining Company, which flourished in New York for a time in 1879-1880.

IDAHO.

CUSTER COUNTY.

DICKENS CUSTER MINES, LIMITED.—It is reported that the first shipment of bullion of four bars has been sold in London for £2,889 9s. 6d.

MICHIGAN.

The brownstone quarries at Marquette and Portage Lake and the slate quarries near L'Anse, in Baraga County, produce stone that materially increases the mineral wealth of this State. It is now said that the quarrying of marble, deposits of which have recently been uncovered north of Ishpeming, near the Ishpeming gold belt, is to be taken in hand by Eastern men.

GOLD AND SILVER MINES.

ROPES GOLD AND SILVER MINING COMPANY.—During October, it is stated, there were produced \$7,500 in bullion and \$2,500 in concentrates, making a total yield of \$10,000. The mine is looking well in every drift, according to Mr. Weatherston, the superintendent. It is quite likely, says the *Ishpeming Iron Ore*, that 10 new heads will soon be added to the mill to fill the available space in the new mill building, which will give the mine a total of 75 heads.

IRON MINES.

It is reported that the mines composing what is known as the Barnum group in the Marquette district, being the Cambria, Lucy and Lillie, have been sold to C. E. Stewart, G. R. Denny, and others of New York, for \$600,000. The mines were owned by the estate of Senator W. H. Barnum, of Connecticut, and the sale, it is stated, was negotiated by John Quincy Adams, of Neogaunee, and C. A. Avery, formerly of Milwaukee and now of New York.

A press dispatch from Negaunee, Mich., says: "Dispatches from Milwaukee giving particulars of the alleged sale of the Queen, Buffalo, South Buffalo and Prince of Wales iron mines of Negaunee to Ferdinand Schlessinger for \$800,000 are incorrect. The Prince of Wales mine has been sold for \$125,000, but the others have not been sold. General Alger has given a \$2,000,000 option on the Volunteeer mine near here."

MICHIGAMME MINING COMPANY.—According to published reports, a controlling interest in this company has been secured by Messrs. Pickands, Mather, Chamberlain and other Cleveland capitalists and iron-men who are prominently identified with the Cleveland Iron Mining Company. The books will be balanced this month, and a complete reorganization will take place on December 1st. The controlling interest was secured at the rate of \$400,000 for the entire property.

MONTANA.

BEAVERHEAD COUNTY.

CARLISLE GOLD MINING COMPANY.—The Secretary's report shows that during October the mill worked 23 days, and the yield was as follows: Bullion, \$6,500; concentrates realized during the month, etc., \$3,800; total, \$10,300. The working expenses for the month were \$10,000. There has also been expended on development work \$2,000.

DEER LODGE COUNTY.

BI-METALLIC MINING COMPANY.—At the annual election of officers of this company, held recently in St. Louis, Paul A. Fusz was elected president, to succeed Charles Clark and Alph M. White, secretary, to succeed Mr. Smith.

CHAMPION CONSOLIDATED MINING COMPANY.—The mill which this company is building is but one mile east of Deer Lodge, will consist of 20 stamps, dryer, roaster and everything necessary for the reduction of ores. The contract has been let to James Brown, of South Butte, to furnish 30 tons of ore per day. It is stated that the entire plant will be in running order by the end of December.

ELIZABETH MINING COMPANY.—A deed has been filed for record in Deer Lodge, transferring the Rattlesnake, Butte, Clear Grit, Fraction, Alameda, Little Daisy and Elizabeth lodes from the West Granite Mountain Mining Company to Charles S. Taussig, for the Elizabeth Mining Company. This virtually disposes of the West Granite Mining Company, and if nothing further comes up to delay proceedings the former company will soon commence operations on the property that has long laid idle owing to litigation.

HELENA.

There is some talk of establishing a mining exchange in this city. This was tried some years ago, but was a failure. Since then, however, the mining industry in this State has made great progress, and it is possible that the movement to establish an exchange will meet with favor. No doubt the "reported success" of the exchange at Denver has stimulated this action.

JEFFERSON COUNTY.

The Keene mine, in this county, it is reported, has been bonded by Eastern parties for \$100,000. The same parties are also said to have a bond on the Sophia, in the same district, for a like amount. The Cliff mine, in the immediate vicinity of their

properties, has been bonded by Word & Smith, of Helena, for \$35,000. The activity in this section of Montana is caused by the belief in the early completion of the Elkhorn branch of the Northern Pacific, which will give excellent facilities for bringing ore to the smelters.

SILVER BOW COUNTY.

ALICE MINING COMPANY.—According to the daily reports of the mill operations received in New York City, sixty stamps, in crushing about 83 tons, yielded \$2,893.75 one day recently. The average daily product is about \$2,400.

MAJOR BUDD GOLD AND SILVER MINING COMPANY.—The following is condensed from the *Butte Inter-Mountain*: Ten men are now at work on the Major Budd mine, about four miles east of Butte. The original development on the property consisted of a tunnel 1,100 feet in length. At the distance of 450 feet from the mouth of this tunnel a shaft was sunk 85 feet, which gave a total depth of 285 feet below the surface. From the bottom of this winze a second tunnel has been started, and in this the force is employed at present. The level has been carried 40 feet, and the owners expect shortly to encounter the pay chutes crossed in the upper tunnel. For the first time in its career the mine is in a position to be developed and judged on its merits. In our issue of October 12th we published the company's annual statement.

NEVADA.

ELKO COUNTY.

It is reported that the contract entered into some six months ago between the Grand Prize and Commonwealth mining companies of Tuscarora has been remodified, after an experimental working test, to the extent of providing compensation for labor and fair profit. The Grand Prize Company will receive \$3.25 per ton of ore worked, provided it performs the work, or \$1 per ton if the Commonwealth does the work and assumes the responsibility.

ESMERALDA COUNTY.

AURORA HILL MINING COMPANY.—The suit of Henry Tangerman *et al.*, to have revoked a mineral patent granted this company, of which ex-Governor Blaisdel is the president and principal owner of the property in litigation, decided adversely to Tangerman by Judge Sabin in the U. S. Circuit Court at Carson, has been appealed to the Secretary of the Interior, who has sustained the decision of Judge Sabin. Tangerman and his co-plaintiffs in the suit are miners who claim to have developed an ore body in the Aurora Hill mine.

EUREKA COUNTY.

The timber suits brought by the government against the mines of Eureka district were to be tried at Carson City on the 20th inst. No news concerning them has yet been received.

EUREKA CONSOLIDATED MINING COMPANY.—This company has received a shipment of lead valued at about \$6,000.

RICHMOND CONSOLIDATED MINING COMPANY.—It is reported that the furnace, which had been running on iron from Dunderberg slag dump, has been closed down.

LINCOLN COUNTY.

PIOCHE CONSOLIDATED MINING COMPANY.—The new reduction works of this company at Pioche have started, and are reported to be working satisfactorily.

STOREY COUNTY—COMSTOCK LODGE.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—We condense the following from the *San Francisco Report*: "Expenses of the mine for the month of October, as shown by the superintendent's drafts, amounted to \$152,153.30. They were smaller than usual, because the company, for the first time since its agreement with the old Suto Tunnel Company, refused to pay the monthly royalties on the ore extracted. The amount of these royalties is \$11,726. It is still an obligation which the company will eventually have to settle when the courts decide as to the proper persons to pay the money to. The chief items of expense in October were as follows: Salaries and wages, \$43,588.50; mine supplies, \$23,431.91; transportation and hauling, \$24,211; assaying, \$1,834.38; reduction of ores, \$82,082. An esteemed subscriber is mistaken in supposing that the company had a surplus of \$120,000 on hand after settling up for September. The surplus was about \$72,000. The present surplus is about \$156,000, showing that the company had profits of about \$84,000 in October. The mine expenses for October are given above. The yield of \$282,000 for the month represented the gross value of the bullion, from which the discount of silver and the expenses must be taken. Our subscriber can rest assured that this company is honestly managed. Where the trouble now lies is in the steadily weakening condition of the mine."

The official returns from the mine for the month of October show that there was worked at both mills a total of 11,727 tons of ore, yielding bullion of the gross value of \$282,680.61, of which \$123,494 was gold, and \$159,186 was silver. The average yield in bullion per ton was \$24.10, and the average assay value of the battery samples was \$27.99 per ton. The large increase of the bullion produced at the California mill over that of preceding months was due to the closing down of that mill, which enabled a thorough clean-up to be made.

COMSTOCK TUNNEL COMPANY.—The *Virginia City Enterprise* publishes the following: The mines

controlled by the Sharon estate paid their royalty without reserve. The Bonanza firm mines have not paid their royalty for October, doubtless holding back until further advice with regard to the rights of the Sutro Tunnel Company and the Comstock Tunnel Company in the premises, or until ordered to pay by the courts. Superintendent Thomas says the work of the Tunnel Company will go on just the same as though there were no legal hindrances. Deeds are on file in the Recorder's office at Virginia City from the Union Trust Company, of New York, and the Sutro Tunnel Company conveying to the Comstock Tunnel Company all the property of the Sutro Tunnel Company, including all the privileges and franchises granted by Congress. An agreement in the nature of a mortgage is also filed between the Union Trust Company, of New York, and the Comstock Tunnel Company, providing for the liquidation of \$3,000,000 in bonds held by the former. The clause in the agreement in relation thereto reads in substance as follows: On November 1st of each year intervening between September 1st, 1889, and September 1st, 1919, the Comstock Tunnel Company agrees to set aside one-half of its surplus net income for the year ended September 1st preceding, for the redemption by purchase of its bonds, the lowest bid to be accepted. If bonds are not offered to cover the full amount of the surplus set aside for that purpose, the Comstock Tunnel Company may apply the whole balance of said surplus for the improvement or extension of the tunnel, or for paying additional dividends to those which may be declared out of the other half of the surplus net income of the property. Following is the official list of trustees and officers elected at the last annual meeting of shareholders, also filed at the Recorder's office. Trustees—Eugene Seligman, Theodore Sutro, Herman R. Baltzer, Peter C. A. M. Van Weel, Gordon McDonald, Otto Lowengard and Henry E. Kavanagh. President, Theodore Sutro; Vice-President, Eugene Seligman; Secretary and Treasurer, H. H. Thayer; General Superintendent and Agent, C. C. Thomas.

HALE & NORCROSS MINING COMPANY.—From November 1st to 12th, inclusive, this mine hoisted 1,392 tons of ore and had 1,192 tons worked at the Nevada mill, the average battery assay of which was \$31.10 per ton. The ore comes from the 400 to the 1,200 levels and the several stopes are said to be looking well.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—The following is the bullion statement of this company for the months of September and October: The company milled 2,747 tons of ore, producing \$50,846 in bullion, the average assay value being \$18.51, of which \$4.90 was gold, and \$13.71 silver. Concentrators produced 45,260 pounds, the assay value per ton being: gold, \$369.06, and silver, \$525.20; total, \$894.26. The gold worked up to 89½ per cent. of the assay value of the ore, and the silver to 79 per cent. of the assay value of the ore. The yield in gold was 28.4 per cent. of the actual value, and the silver 71.6 per cent.

QUARTERLY YIELD OF THE COMSTOCK.—According to the sworn statement of superintendents filed with the Assessor of Storey County, Nev., the yield of the Comstock mines for the quarter ending September 30th, 1889, was as follows:

	Tons of ore.	Bullion produced.	Average per ton.	Cost of production.	Net yield.
Alta.....	2,161	\$63,943.34	29.30	\$36,502.68	\$27,440.66
Challenge.....	751	11,337.45	15.10	15,878.68	*4,541.28
Confidence.....	789	11,822.49	14.95	18,536.46	*6,713.97
C. Cal. & Va.....	84,621	620,731.48	18.10	456,570.50	164,160.50
Justice.....	2,740	56,112.62	20.50	51,688.13	4,424.48
Y. Jacket.....	6,321	71,471.94	11.50	77,905.72	8,433.78

*Cost of production above yield.
Bullion tax on production: Alta, \$1,372.03; Challenge, no tax; Con. Cal. & Va., \$4 925; Confidence, no tax; Yellow Jacket, no tax.

A recapitulation of the above shows that the total number of tons of ore extracted during the quarter was 47,423, producing bullion valued at \$835,419.32. The bullion product of the lode during the quarter ended June 30, 1889, was \$1,350,000, as given in the ENGINEERING AND MINING JOURNAL of August 17th, 24th and 31st.

SAVAGE MINING COMPANY.—Since the Savage mine resumed ore shipments up to the 12th inst. a total of 289 tons of ore had been hoisted and 734 tons shipped to the Rock Point mill, where the average battery assay was \$25.36 per ton. Ore is being extracted from the 300 and 500 feet levels.

NEW MEXICO.

SANTA FE COUNTY.

SANTA FE COPPER COMPANY.—Concerning the change in the presidency of the company as noted in the ENGINEERING AND MINING JOURNAL last week, Mr. Jay A. Hubbell, the late president, is reported to have made a statement to the Boston Transcript, from which we condense the following: "The company got into a position where it needed more funds to carry out its work of putting the mine into the best possible condition to produce

copper at a profit. Stronger backing, also, was needed. It was suggested by the friends of the company that some effort be made toward economy at the Boston office, as well as elsewhere. Mr. Leonhard Lewisohn expressed his willingness to make advances to the company, and suggested that, if it were agreeable to all parties, he would be president without a salary, and he also would furnish office rooms in New York free of rent. This proposition was accepted, and I therefore willingly resigned the presidency. Mr. Lewisohn and his friends, under the arrangement, will put money enough into the enterprise to make it a success. They are closely identified with the company by having a large interest in it. The equipment will all be in place by the first of December, and will enable the company to reduce the cost of production, so as to make a profit with copper at ten cents. The mine has never looked so well as it does now, and when work is begun again, about December 1st, there will be from three to four months' oversupply on hand ready for treatment, which has been developed by the opening work which has been going on. By the 1st of February, connections will be completed at the new developments at the Apex mine, where a large deposit of decomposed iron ore has been opened, averaging about \$8 per ton gold and three per cent. copper. This deposit is very thick, and a cross-cut has been made for a distance of about 230 feet, which will give a breast for stoping or taking out ore in sufficiently large quantities to warrant any reasonable estimates for ore supply in the future. On the hanging wall of this deposit there are large seams of rich copper ore. Ground is opening by shafts and tunnels by which the company can draw ore from four mines, all of which, I think, are as valuable as the White mine from which we have been producing copper. With a little more money now and careful management the Santa Fe will become a very large producer of copper matte averaging 40 per cent. fine copper, and gold matte, averaging \$200 per ton. The gold ore is mostly iron, and furnishes just the flux needed in smelting the copper. Formerly it has cost the company \$4 per ton for iron fluxing, but now the Santa Fe can furnish its own iron and deliver it at the smelter for \$1.50 per ton, besides the iron containing gold at the rate of \$8 per ton." Mr. Hubbell will continue to be a director of the company, and he emphatically says that there has been no disagreement or misunderstanding which has led to this change and that no ill feeling prevails. Mr. Lewisohn and two other gentlemen practically take charge of the company, and the Transcript says that they may take the stock off the market eventually. Mr. John Stanton, of the Atlantic and Central Milling Company, of Michigan, is further stated, may become prominently interested.

PENNSYLVANIA.

COAL.

A noteworthy accidental discovery in the colliery of Lawrence & Brown at Mahanoy Plane, near Pottsville, is reported. The men were running a drift about 440 yards down when, it is said, they suddenly struck a large vein of pure coal. The discovery was made at the bottom of an old colliery not worked. The men were simply making a drift through to another colliery when the vein was struck.

LEHIGH AND WILKESBARRE COAL COMPANY.—A fire in the west side of No. 9 mine broke out on the 19th inst., at Sugar Notch, near Wilkesbarre, operated by this company. The cause is not known. The fire has been extinguished. Superintendent Scott says that the loss is not serious.

UTAH.

BEAVER COUNTY.

HORN-SILVER MINING COMPANY.—The stockholders are watching with more than usual interest the work being done from shaft No. 5, which was sunk in new ground about 1,000 feet from the old workings. At a depth of 200 feet a station was made, and drifting to the older portion of the mine was commenced about October 1st. Secretary Morrison says that if ore is not struck on this level, Shaft No. 5 will be sunk deeper, and a drift will be run at 400 feet. The average yield of the ore is reported to be \$22 per ton, and the total cost of production \$9.

FOREIGN MINING NEWS.

CANADA.

ONTARIO.

(From our Special Correspondent.)

The diamond drill at the Beaver mine is now at a depth of 850 feet, and is in a mixture of quartz and black slates. The drill went down on the vein for a distance of about 100 feet from the bottom of the shaft. Argentite was encountered at many points, some of which were very rich. The management propose to thoroughly test the underlying rock to a depth of 1,700 or 1,800 feet. They shipped a carload of ore on the 2d inst. to Newark, N. J., valued at \$20,000. They shipped to Wells, Fargo & Co., New York, on the 8th inst., 122 pounds of silver bullion. A steady output may be looked for henceforward from this mine.

The Badger mine is 2½ miles from Port Arthur, and about two miles off the line of the Port Arthur,

Duluth & Western Railway. It is owned principally by Milwaukee capitalists, and is under the superintendence of Capt. Herbert Shear. The Badger has been actively mined since May, 1888. They made their first shipment of ore September 17th, 1888, being one carload valued at \$75,000, to Newark, N. J. This was followed on December 14th, 1888, by another carload to the same place, valued at \$40,000. Since the first of January of this year they made the following shipments:

January 31, 1889, silver bullion.....	\$3,900
February 21, 1889, silver ore.....	24,000
April 27, 1889, silver bullion.....	1,233
June 23, 1889, silver ore.....	15,000
September 17, 1889, silver ore.....	40,531
October 29, 1889, silver ore.....	40,000

They erected a Krouse atmospheric single-head stamp, with a capacity equal to about five Cornish stamps, and also five stamps, the combined capacity being 25 tons daily. The mill began operating on the 15th of June last. At that time the management estimated they had 1,000 tons of mill rock on the dump, which they have been constantly adding to since. The rock treated in the mill averaged \$55 per ton during June and July; August, \$42, and September, \$50 per ton. The greatest depth is 300 feet. They have 5,000 feet of levels and 350 feet of winzes. They are at present employing 140 men in and about the mines.

On the 2d inst. deeds were recorded by which Thomas Marks, of Port Arthur, conveyed to Dr. A. M. Eastman, of St. Paul, Minn., and R. J. Anderson, of Minneapolis, representatives of a wealthy St. Paul, Minneapolis and Philadelphia syndicate, the property known as the Kakabeka Falls, containing 430 acres and the water rights to the Kaminstiqua River at that point. The river is there 350 feet wide, with a perpendicular fall of 110 feet, and can be developed to furnish 200,000 horse power. The purchasers have since that date secured a large tract of adjoining land capable of accommodating a busy city. The new proprietors propose to build up at that point a manufacturing city. A large amount of capital is behind the promoters, and it is proposed to build there flouring mills equal to those of Minneapolis, for grinding Manitoba wheat; pulp and paper mills for utilizing the vast tracts of white poplar in the immediate neighborhood; silver reduction works, blast-furnaces, sawmills and factories of all descriptions. Eventually it is proposed to utilize a portion of the water-power for generating electricity for use, not only locally but at the neighboring mines. The Port Arthur, Duluth & Western is to extend its line, two miles, up to the falls, and a branch of three miles will connect the Canadian Pacific Railway with the new center. A hotel of 100 rooms is to be built, and ready for next season's business. Engineers are now on the ground making a complete topographical survey, in order that plans may be made as complete as possible for the town and water power. The people connected with it know what power has done for Minneapolis, and they are satisfied the Canadian northwest furnishes even a greater field for development than did Minnesota and Dakota, and there is no reason why a Canadian Minneapolis should not be built up at the new city of Kakabeka. The utilization of this power will materially affect the production of minerals in this district, as iron smelting, silver and lead reduction works can be operated much cheaper by it than in the ordinary way.

PROVINCE OF QUEBEC.

Considerable excitement is reported from Gaspé, on the south shore of the Gulf of St. Lawrence, in consequence of the extensive preparations now going on for the development of the oil deposits there. Indications of petroleum were found there eighteen years ago, it is stated, and a company was in process of formation for the purpose of boring, when the men interested in the scheme were attracted to Pennsylvania by the immense yield of oil there reported. Col. James Foley, of Boston, representing a company of American capitalists, has now arrived at Gaspé with extensive machinery and a strong force of engineers, derrick builders, etc., and is hurrying forward preparations for sinking a couple of wells to a depth of 2,500 feet each. The company represented by the Colonel, it is reported, has acquired a large area of the land covering the Gaspé deposits.

COLUMBIA.

TOLIMA.—A telegram from the superintendent, dated Frias, 2d inst., gives the estimated returns for October at \$3,000, the machinery during that month having only worked half time owing to the erection of the new pumping wheel, which is reported as having been completed at date.

MEXICO.

CHIHUAHUA.

SANTA JULIANA MINING COMPANY.—Since our last reference to the work of this company (ENGINEERING AND MINING JOURNAL, July 6th, 1889), work has been going on steadily. Mr. Lindley Vinton, the Secretary of the company, informs us that the shaft on the Ronquilo vein has now reached a depth of 375 feet. The point of intersection of the Santa Juliana and Ronquilo veins was found at 350 feet. It is intended to sink the Ronquilo vein down to 500 feet, and then by drifting a short distance to the bottom of the San Juan winze, to go down that to the bottom of the Santa Juliana. Mr. Vinton states that in sinking this shaft enough ore has been taken out to probably pay the expense of the work. "The top of the San Juan shaft, 500

feet from the surface," said Mr. Vinton, "will be reached 125 feet below the present workings. The cost of sinking the shaft to this point and drifting to the San Juan should not exceed \$20,000. This point M. Sexton expects to reach in four months. If the San Juan shaft is open the water can be pumped out in three to four weeks, and we shall then be at the bottom of the old mine, a depth of 800 feet." The mine has recently been visited by Mr. Vinton and by Mr. Louis Ross, upon whose reports Mr. Vinton states that treasury stock to the amount of \$15,000 has been sold.

MEETINGS.

Hudson Tunnel Railway Company, No. 2 Nassau street, New York City, December 17th, at 12 o'clock, noon.
New York Keely Motor Company, No. 10 Wall street, New York City, December 2d, at 12 o'clock, noon.

DIVIDENDS.

American-Nettie Mining Company of Colorado, dividend No. 5, of 10 cents per share, aggregating \$30,000.
Chicago Gas Trust Company, quarterly dividend of 1 per cent., payable December 20, at No. 48 Exchange Place, New York City, N. Y. Transfer books close December 7th and re-open December 21st.
Daly Mining Company, dividend No. 33, of 25 cents per share, aggregating \$37,500, payable November 30th, at the office of Lounsbury & Co., Mills Building, New York City. Transfer books close November 25th.
Homestake Mining Company, dividend No. 136, of 10 cents per share, aggregating \$12,500, payable November 25th, at the office of Lounsbury & Co., Mills Building, New York City.
Ontario Mining Company, dividend No. 162, of 50 cents per share, aggregating \$75,000, payable November 30th, at the office of Lounsbury & Co., Mills Building, New York City. Transfer books close November 25th.
Plumas Eureka Mining Company, of California, paid in London, October 17th, a dividend of 37½ cents per share, aggregating \$52,734.
Standard Gas Light Company, dividend of 1¼ per cent. on the preferred stock, payable November 30th, at No. 2 Cortlandt Street, New York City. Transfer books close November 23d and re-open December 2d.
Westinghouse Electric Company, quarterly dividend of 1½ per cent., payable November 25th. Transfer books close November 18th and re-open November 25th.
Westinghouse Electric and Manufacturing Company, quarterly dividend of 1½ per cent., payable November 25th. Transfer books close November 18th and re-open November 25th.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'ng't in office.	Day of Sale.	Amn't per share.
Anna, Dak.	4	Oct. 10	Nov. 15	Dec. 5	.002½
Atlas, Dak.		Oct. 3	Nov. 11	Dec. 15	.000½
Belcher		33 Oct. 17	Nov. 20	Dec. 11	.50
Centennial, Nev.		33 Sept. 27	Oct. 28	Nov. 28	.03
Chollar, Nev.		28 Nov. 1	Dec. 4	Dec. 24	.50
Comstock & Belfast, Dak.	5	Oct. 7	Nov. 8	Nov. 25	.001
Con. Pacific, Cal.	11	Nov. 1	Dec. 5	Dec. 28	.10
Del Monte, Nev.	2	Oct. 28	Dec. 3	Dec. 26	.20
Grey Eagle, Dak.	2	Sept. 10	Nov. 9	Nov. 30	.00½
Goodenough, S. Dak.	4	Oct. 25	Nov. 25	Dec. 11	.002
Gould & Curry, Nev.	63	Oct. 15	Nov. 18	Dec. 11	.30
Hallstorm, Dak.	2	Oct. 22	Nov. 22	Dec. 12	.001½
Locomotive	5	Oct. 17	Nov. 25	Dec. 17	.05
McDonnell, Dak.	3	Oct. 15	Nov. 20	Dec. 10	.001
Monitor, Dak.	3	Oct. 19	Nov. 26	Dec. 14	.001½
Navajo Queen	2	Oct. 25	Nov. 26	Dec. 11	.10
Nevada Queen Nev.	6	Oct. 31	Dec. 4	Dec. 30	.20
N. Gould & Curry, Nev.	11	Nov. 6	Dec. 7	Dec. 27	.20
North Gover, Cal.	1	Oct. 21	Nov. 19	Dec. 16	.00½
Phil Sheridan	1	Oct. 23	Nov. 26	Dec. 11	.10
Rialto, S. Dak.	2	Oct. 21	Nov. 8	Nov. 23	.001½
Russell, Cal.	5	Nov. 11	Dec. 16	Jan. 8	.45
Savage, Nev.	74	Nov. 5	Dec. 10	Dec. 30	.50
S. e. g. Belcher & Mides, Nev.	4	Oct. 7	Nov. 8	Nov. 29	.25
Sierra Nevada, Nev.	96	Oct. 5	Nov. 7	Nov. 27	.50
Trojan	18	Oct. 23	Nov. 26	Dec. 11	.10
Tuscarora	2	Oct. 12	Nov. 15	Dec. 5	.10
Union Con., Nev.	29	Oct. 8	Nov. 13	Dec. 4	.25
Utah	8	Oct. 22	Nov. 26	Dec. 16	.25
Victor, Utah	1	Oct. 14	Nov. 14	Nov. 30	.10
Vine Spring, Cal.	1	Oct. 10	Nov. 18	Dec. 9	.15
Young America, Dak.	1	Oct. 5	Oct. 29	Nov. 30	.001

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 467 and 468.]

New York.

FRIDAY EVENING, NOV. 22.

While fluctuations in values have been narrower, the increased activity in the mining share market noted last week has been well sustained during the last seven days. There has undoubtedly been a gain in speculative interest, as is evinced in the number of inquiries that brokers are receiving for various shares, and with more desirable invest-

ments afforded on the local exchange, there is no doubt that considerable business would ensue.

The firmness of the silver market continues to sustain a great deal of interest in the situation, and to place a number of mines on a more profitable basis.

Speculation in pig iron warrants thus far has not amounted to much. Satisfactory progress has been made with several of the schemes for the re-suscitation of a number of mining enterprises that have heretofore been more or less moribund on account of the prevalent dullness. It is also expected that several new stocks will be listed, among which are some of those now prominently figuring on the Denver Exchange.

The Amador County properties have been about the liveliest on the list this week. Astoria, which sold at 15@17c. last Saturday, has been so manipulated that a quotation of 55c. was recorded on Thursday, but latterly those underneath the movement received the sound advice that they were making their quotations altogether too high for a "prospect," and that they had better ease them a little, which has been promptly done, the latest quotation being 40c. Another Amador County enterprise that has been revived this week is Sutter Creek, which, however, is apparently on a sounder basis than Astoria. The promoters of the company, which it will be remembered, was listed on the Exchange over a year ago, are endeavoring to sell some 30,000 shares of the stock for the purpose of developing the property and increasing its stamp power, and consequently have not hesitated to relate to us something of the history of the enterprise, which will be found in detail in our Mining News columns. The stock opened Tuesday at 50@52c., since when quotations have been steady, with moderate transactions. No sales of Plymouth are recorded.

Among the Bodies we note sales of Bodie Consolidated at 60@75c.; Standard at 60c.

The statement of the bullion production of the Comstock lode for the third quarter of the year, which will be found in our Mining News column, is not encouraging. The aggregate yield shows a falling off of about \$500,000 as compared with that of the preceding quarter. The impression prevails in this city that, with ore of the average grade of that now produced in a number of Comstock mines, stockholders would receive dividends where they now get assessments, if the milling charges were at all reasonable. With the exception of Consolidated California & Virginia, the best showing is made by Alta, and much is hoped for this mine on the Pacific coast. In this market, sales during the week have included Consolidated California & Virginia at \$6.50@6.75; Gould & Curry at \$2.10@2.17; Hale & Norcross at \$3.05; Ophir, \$4.70@4.30; Savage, \$1.70@1.40; Yellow Jacket, \$3.05; Alta, \$2.15@2.20; Andes, \$1; Bullion, 80@90c.; Chollar, \$1.80; Exchequer, 85@75c.; Julia, 44@40c.; Kossuth, 11c.; Mexican, \$3.85; Occidental, \$1.25@1.20; Oriental & Miller, 7@6c.; Overman, \$1.20@1.25; Potosi, \$1.85@2.05; Utah, 85@80c.

Sutro Tunnel old stock is still changing hands; sales have been made at 7c. The trust certificates which, of course, are exchangeable for the new Comstock Tunnel securities, and which will probably soon retire from the list, has been sold at 50@55c. Comstock Tunnel, common stock, has risen from 18 to 22c.; the 4 per cent. bonds sold at 38@40c.

The Tuscaroras have been dull. Navajo sold at 40c.

Barcelona has not been so active this week as last. Toward the close prices have been slightly weaker. On Wednesday sales were recorded as high as 43c., but latterly a decline to 35c. has occurred.

Eureka Consolidated is steady and firm at \$4 bid.

There is nothing particularly noteworthy to be said about the fluctuations in Colorado shares. The October statement of the Leadville Consolidated shows a net profit to the company of about \$400, but additional expense in New York for stock registration, etc., had decreased the net surplus of the company on the 1st inst. to about \$6,200. Stockholders are encouraged, however, by the fact that the mine is still yielding a profit above working expenses. The only sale recorded during the week was on Tuesday at 11c. The statement of Small Hopes is not so encouraging as was expected. As will be seen by reference to our mining news column the ore has fallen off in grade, and the dividend has been decreased about \$2,000. The company, therefore, had on the 1st inst. a dividend fund of \$9,000 in addition to the reserved fund of \$55,000. No sales of the stock were made during the week. The best bid, 95c., is about 15c. below the figure at which the last sale was made. New York representatives of the Iron Silver Company inform us that the company has been doing rather better of late. Further information is given in our news columns.

Other sales of Colorado shares included Lacrosse at 7c.@6c.; Little Chief, 34c.@35c.; Breece, 30c.; Chrysolite, 27c.@31c.

On the whole Dakota stocks have been quiet. The excitement in Caledonia has subsided. This stock has shown an advancing tendency, sales being made at \$1.60 yesterday against \$1.40 last Saturday. Father De Smet has also scored a notable advance, rising from 25c. to 50c. There has been a good deal of quiet buying presumably on the rumors that are current that the Deadwood-Terra Company will shortly make a settlement for the Father De Smet mill which it has been using for

several years without compensation to the De Smet Company. Homestake has declared a dividend, No. 136, of 10c. per share, payable next month at Messrs. Lounsbury & Co.'s transfer agency. Total dividends paid to date aggregate \$4,468,750.

Horn Silver has been fairly active from \$2.25@ \$2.50. It is generally believed that at the monthly meeting of the Board of Directors on Tuesday afternoon a dividend of 12½c. per share will be declared payable on the first of the year. The officers of the company also state that they hope to pay dividends of this amount quarterly, or \$200,000 per annum. To do this they will have to earn over \$16,000 per month, and the stock would pay about 20 per cent. on its present price. Ontario sold at \$34.50@36. The company has just declared its 162d dividend for October amounting to \$75,000 payable on the 30th inst. Transfer books close on the 25th. Total dividends paid to date amount to \$10,550,000. Daly has also declared its usual dividend of \$37,500 making a total of \$1,275,000 up to date.

Calumet & Hecla sold at \$236.75; Tamarack, \$138.50; Franklin, \$15.13; Atlantic, \$12.13.

Alice has continued firm with an advancing tendency, sales being made during the week as high as \$1.20. News from the mine continues of a very favorable character, and it is rumored that a dividend of \$25,000 or 6½c. per share will be paid December. This is the first dividend since last December. The holders of the stock are very enthusiastic in their claims for it. They point to the advance in the price of silver and also to the fact that when the last dividend was paid, President Walker said he would never pay another until the company had sufficient in the treasury to pay them successively. Now that another dividend is talked of they are hoping he has persisted in this determination. El Cristo has been moderately active at \$1.10 to \$1.25, closing firm.

Phoenix of Arizona has been traded in to the usual extent at from 49c. to 54c. The first regular weekly report of the superintendent will be found in our mining news columns.

Among the miscellaneous dealings are United Copper at \$1.15@1.25; San Sebastian, 32c.; Rappahannock, 5@6c.; Mutual Mining and Smelting, \$1.66@1.65; Kingston Pembroke, 75c.; Shoshone, 2c.; Freeland, 30c.; Holyoke, 5c.; Silver King, 25@40c., closing weak. St. Joseph lead is quoted at \$16½.

Boston. Nov. 21.

[From our Special Correspondent.]

The market the past week has reflected the decline in ingot copper in London, and buyers have been a little cautious in loading up to any extent. At the same time good buying orders are in the market at any concessions sellers are disposed to make, and prices are not much lower, although below the highest prices of last week. The tone of the market is conservative, but any advance in copper from present rates will result in a good demand for stocks which will send the market booming again.

Calumet and Hecla declined to \$235, advanced to \$238 and reacted to \$235½. There has been no pressure to sell stock, and the market is quite firm.

Boston and Montana touched \$43½, but rallied to \$45 and closed only one-half below that price.

Tamarack declined to \$137 but is wanted at \$138. Very little stock came out on the decline.

Quincy advanced to \$67, but lost the advance and closed at \$65.

Franklin came out quite freely at \$15@15½ early in the week, declined to \$14½, with sales to-day at \$15.

Atlantic declined to \$11½, but recovered and sold at \$12½ to-day.

Osceola declined to \$15½, but was in demand to-day on some good reports from the mine, and advanced to \$15@15½ on sales of over 600 shares.

Kearsarge very steady at \$3.

Butte & Boston sold up to \$25, but declined on very small lots to \$23.

Allouez sold at 85c. early in the week and declined to 60c.

Pewabic steady at \$5½.

National firm at \$2½.

Huron at \$2¼ @ \$2½.

Bonanza declined to 60c. and rallied to 70c.

Dunkin Silver sold at 75c.@80c., but there is very little doing in it.

3 P. M. The market closed quite firm with very little if any change from the morning quotations,

Denver.

The Smiling Friend and Aspen United Mining and Milling Company have been accepted by the Colorado Mining Stock Exchange. The former will be listed as a mine and the latter as a prospect.

Lake Superior Gold and Iron Stocks.

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

The long pending claims were disposed of in the Superior Court last Friday by the decision in favor of the Michigan Gold Company. This gives them a clear title, and the company has commenced active mining operations, putting in steam hoisting and pumping machinery, and propose to erect a stamp mill. This decision has giving an increased value to the stock, which is in demand with few sellers, many holding their stock at \$5@10 per share. The control of this mine is

held in Cleveland and by some of the heaviest iron capitalists, such as Pickarrrds, Mather & Co., Garretson, Brown and other leading iron men of Cleveland and the iron country. Jas. Pickarrrds, president; Wm. G. Mather, vice-president Cleveland Iron Company, secretary and treasurer.

The price of the gold stocks has fluctuated some, as it always will when some of the stock is in the hands of small holders, who are forced to sell sometimes way below regular going rates. Grayling held stiff, no sales. The following actual sales were made on the 15th and 16th inst.: Michigan Gold Company, 250 shares, \$2.50; Michigan Gold Company, 50 shares, \$3; Peninsula Gold and Silver Company, 400 shares 75c.; Roper Gold and Silver Mining Company, 100 shares, \$2.25.

Name of Company	Par value.	Lowest.	High.
Grayling Gold & Silver Co.	\$25.00	\$0.85	\$0.90
Michigan Gold Co.	25.00	2.00	3.00
Peninsula Gold & Silver Co.	25.00	2.00	.90
Ropes Gold & Silver Co.	25.00	.75	2.50

Name of company.	Par value.	Bid.	Asked.
Champion Iron Co.	\$25.00	\$100.00	\$110.00
Chandler Iron Co.	25.00		40.00
Chicago & Minn. Ore Co.	100.00		110.00
Cleveland Iron Co.	25.00	19.00	20.00
Jackson Iron Co.	25.00	110.00	115.00
Lake Superior Iron Co.	25.00	60.00	65.00
Milwaukee Iron Co.	25.00	4.00	6.00
Minnesota Iron Co.	100.00	80.00	85.00
Pittsburg Lake Angeline Co.	25.00	131.00	135.00
Republic Iron Co.	25.00	48.00	49.00

PIPE LINE CERTIFICATES.

(Special Reported by Messrs. WATSON & GIBSON.)

The oil market during the past week has been gravitating downward slowly, and business been almost at a complete standstill. Everything connected with the statistics of the trade would indicate higher prices and the only thing lacking is a speculative disposition. Upon any further reaction we should advocate purchases.

Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 16....	110	110 1/2	110	47,000
18....	110 1/2	110 3/4	109 3/4	173,000
19....	109 3/4	110	108 3/4	211,000
20....	109 3/4	110 1/4	109 3/4	67,000
21....	109 3/4	109 3/4	109	171,000
22....	109 3/4	109 3/4	109 3/4	223,000

Total sales in barrels..... 892,000

Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 16....	110 1/2	110 3/4	110	108,000
18....	110 1/2	111 1/2	109 3/4	305,000
19....	109 3/4	110 1/4	109	331,000
20....	110	110 1/2	109 3/4	311,000
21....	110	110 1/2	109 3/4	275,000
22....	108 3/4	109 3/4	108 3/4	385,000

Total sales in barrels..... 1,715,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 22.

Statistics.

PRODUCTION OF ANTHRACITE COAL for week ended November 16th and year from January 1st.

Tons of 2,240 lbs.	Week.	Year.	1888.	Ye. r.
P. & Read. R.R. Co.	169,102	6,349,674	6,359,561	
Cent. R.R. of N. J.	142,209	5,320,576	5,115,947	
L. V. R.R. Co.	215,939	6,456,845	5,931,087	
D. L. & W. R.R. Co.	117,250	4,585,240	6,192,614	
D. & H. Canal Co.	83,385	3,355,523	3,980,317	
Penna. R.R.	83,804	2,836,163	4,090,640	
Penna. Coal Co.	40,410	1,203,565	1,513,202	
N. Y., L. E. & W.	17,250	862,824	838,210	
Total.....	869,349	30,969,810	34,021,578	
Decrease.....		3,051,768		

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.

These figures are subject to corrections for duplications.

Production for corresponding period:

1884.....	27,815,367	1886.....	28,708,716
1885.....	27,650,187	1887.....	30,308,787

PRODUCTION OF BITUMINOUS COAL for week ended November 16th, and year from January 1st:

Tons of 2,240 lbs.	Week.	Year.	1888.
Phila. & Erie R.R.	2,526	74,836	53,383
Cumberland, Md.	62,083	2,680,478	3,186,719
Barclay, Pa.	3,188	105,903	140,559
Broad Top, Pa.	11,007	306,278	521,955
Clearfield, Pa.	60,735	475,358	2,950,872
Allegheny, Pa.	18,793	716,805	599,529
Beach Creek, Pa.	31,935	1,377,463	1,295,296
Pocahontas Flat Top.	37,714	1,506,453	1,215,513
Kanawha, W. Va.	38,289	1,611,511	1,421,687
Total.....	272,313	8,856,143	12,231,397

* Week ending November 14.

	Week.	Year.	1888.
Pittsburg, Pa.	16,355	584,540	644,495
Westmoreland, Pa.	38,890	1,340,792	1,366,177
Monongahela, Pa.	4,259	338,715	354,247
Total.....	59,414	2,464,047	2,364,919

Grand total..... 331,727 11,320,190 14,596,316
 PRODUCTION OF COKE on line of Pennsylvania R. I. for week ending November 16th, and year from January 1st, in tons of 2,000 lbs.: Week, 101,592 tons; year, 3,880,161 tons; to corresponding date in 1883, 3,555,585.

Anthracite.

The fact that the coal trade does not possess this year the usual seasonal briskness should not be allowed to create an exaggerated impression that consumption is light. Compared with 1888, a year of unexampled large production, 1889 suffers by the comparison, but the fact remains that consumption has been large, as it always will be, even although the weather is very much against it as it has been so far this fall.

A striking proof that the dullness has been in no wise so black as it is painted, is afforded by the official statistics of Mr. Jones, which we publish herewith. It will be noted that although the production of October exceeded by 700,000 tons the allotment, stocks at tide-water decreased about 200,000 tons, making a total stock at tide on the 1st inst. 700,000 tons. It is therefore apparent that had all the coal at tide-water been moved, and had the actual output been restricted to the amount previously agreed upon, all the surplus would have been wiped out, but of course, this was not possible, much of the consumption being by trade along the lines of the various roads. However, the fact remains that consumption notably increased, and that the month has started with a lighter stock at tide-water than was the case on Oct. 1.

Locally, trade continues to present the same features that we have previously noted, the briskness of the demand being regulated by the condition of the weather. Prices are not materially changed. Individual operators are selling coal at \$4.30 alongside or equivalent to \$4.15 f.o.b. at shipping port. General sales agents are adhering nominally to the schedule quotations.

It is again reported that the Reading is kicking over the traces, and that Mr. Corbin declares that the proper policy of that great coal company is "unrestricted production." Mr. Gowen long ago demonstrated this in one of his annual reports, and showed that the Reading always lost by going in a combination—but he then joined the next combination proposed. Perhaps Mr. Corbin may "go and do likewise."

New York Retail Trade.—The Retail Coal Exchange is sadly in need of a Moses to deliver it from a wilderness of perplexity. It has committed itself to the task of solving two weighty problems, and with each succeeding meeting and discussion their solution seems further away.

The first of these problems is: the detection of short weight coal sellers, to which we referred at length in this column two weeks ago. At last Friday night's meeting of the Exchange the contest was renewed over a motion introduced by the secretary, Mr. Pangburn, which provided that the Exchange should appoint a committee to put into operation a plan which included the employment of an official weigher and weighing wagon to travel around the city and to weigh all coal that he could get to weigh for consumers at the rate of five cents per ton. After a number of amendments this motion was finally put to a vote. The result of the ballot showed 19 nays, 11 yeas, and one blank. This showing, temporarily at least, seems to have discouraged those who have been earnestly advocating a number of short weight plans. The whole trouble seems to be, that although the Exchange has placed itself upon record as desiring to adopt some plan, its entire membership is not unanimous in this desire, and in fact there is apparently a certain clique which is very determined that no plan be adopted. Inasmuch as whenever the matter comes to a vote these members appear to be in the majority, there seems to be little hope of anything being accomplished unless the advocates of some plan recruit their forces sufficiently to secure a working majority. Some of the large dealers are known to be willing to personally advance the money necessary to put a plan in operation.

If we may suggest a remedy for the short-weight swindle, it would be for the honest dealers to employ a detective to get evidence sufficient to convict the short-weight dealers and then prosecute these and have them heavily fined. A few examples would have the same effect in the coal trade as in the milk trade.

The second problem, the solution of which was attempted last Friday night, was the matter of prices. Committees are finally appointed by the chair to confer with the up-town members of the trade on both the east and west side of the city to endeavor to seek a uniform adherence to the schedule that has been adopted by the Exchange. Among the routine business that received attention was the election of first vice-president to fill the vacancy created by the resignation of Mr. Bishop. Mr. Edward Elliott, the second vice-president, was promoted to this position, and Mr. Cornelius McManagle was selected for the second vice-president.

The secretary of the board of trustees, Mr. C. F. Davies, was then instructed to begin the preparation of the annual revised list of "bad pays," and dealers are requested to send the names of all such delinquents to this gentleman.

The thoughts of some of the more active members are beginning to turn to the annual election of trustees and officers, to take place at the last meeting in December. It seems to be the unanimous opinion that the present incumbent of the chair can secure re-election if he so desires; but, judging from information in our possession, Mr. Theford would be very reluctant to accept it for another term. In this event, the first vice-presi-

dent, Mr. Elliot, seems to be a man well thought of for the position. Among other candidates whose names have been mentioned are Messrs. Smith, Dewitt and Ehrenicht.

It is greatly to be regretted that a larger attendance of the membership of the Exchange than is usually present, cannot be obtained. Out of about 150 members on the roll, usually not more than 30 attend except at the annual election, or at the meetings for the adoption of price schedules. Judging from the experience of similar organizations in other trades, a well managed exchange of this sort, can bring about many reforms and work much benefit, and there seems to be no reason why the Retail Coal Exchange should prove an exception to this rule.

Mr. John H. Jones, Chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of anthracite coal production for month of October, 1889, compared with same period last year, compiled from returns furnished by the mine operators:

	October, 1889.	October, 1888.	Difference.
From Wyoming Region	1,718,370	2,234,306	Dec. 485,935
From Lehigh Region	663,725	673,390	Dec. 9,865
From Schuylkill Region	1,299,774	1,279,629	Inc. 20,144
Total.....	3,711,870	4,187,626	Dec. 475,656

	For year, 1889.	For year, 1888.	Difference.
From Wyoming Region	15,452,245	18,375,757	Dec. 2,923,511
From Lehigh Region	5,233,268	4,518,168	Inc. 715,099
From Schuylkill Region	8,613,647	8,829,217	Dec. 215,569
Total.....	29,299,161	31,723,143	Dec. 2,423,981

The stock of coal on hand at tide-water shipping points, October 31st, 1889, was 704,909 tons; on September 30th, 1889, 877,237 tons; decrease 172,328 tons.

Bituminous.

The scarcity of coal due to want of transportation facilities, which we have had to record for some time past, still continues. The several companies are pressed to obtain coal for prompt delivery and there is no immediate prospect of a full supply of cars, for the railroads are all full of more profitable freights and are short of both motive power and cars. We continue our old quotations of \$3 to \$3.50 alongside, but spot coal commands fancy prices.

A Pittsburg dispatch to the *Evening Post* says: "It is announced to-day that a syndicate headed by Col. W. H. Simms, of New York City, has been organized for the control of the Monongahela Valley coal region, which supplies Cincinnati, Louisville and the river trade. The mines and vessels are to be turned over to the syndicate in return for stock. Options expire on December 15th, and before that time details will be arranged."

Boston. Nov. 21.

(From our Special Correspondent.)

The anthracite coal market is very quiet. It is of no use to try to force trade, and this course is not being tried. F.o.b. prices are reasonably steady, but enough good coal can be had at 15 to 25 cents off circular. Consumption is exceptionally light. We have not had more than one cold day for a month.

The soft coal market is active, owing to the trouble in meeting contracts. The Pennsylvania and Baltimore and Chicago railroads are giving the coal trade the poorest service they have had for a long time. It was bad enough last fall, but much worse now. Owing to the high water freights there would be more all-rail shipments than usual, both of anthracite and bituminous if cars could be had, but they cannot, and the only excuse is that the roads are rushed with more profitable freight business than coal carrying. Clearfield coal is in big demand, and many are using it who have never done so before because they simply can not get Cumberland coal. As I stated last week, this is likely to hurt the Cumberland region in more than a transient fashion. Last year the Pocahontas people oversold, and had to buy from the New River folks; this year the situation is reversed. Both companies are troubled for vessels. F.o.b. prices on bituminous remain high. Cumberland coal is nominally \$2.60, but cannot be sold for immediate shipment. Clearfield coal is also selling fully up to \$2.60.

The freight situation is unchanged, except as to New York, where somewhat lower figures are quoted, making it \$1.10 from Hoboken. At Philadelphia \$1.45 is paid, and \$1.60 from Baltimore.

The receipts for the week were 19,584 tons anthracite and 11,339 tons bituminous, as compared with 11,098 tons anthracite and 9,332 tons bituminous for the same week of 1888. Since January 1st receipts have been 1,459,155 tons anthracite and 798,862 tons bituminous.

Buffalo. Nov. 21.

(From our Special Correspondent.)

The season of navigation is drawing to a close, and but few cargoes are expected to leave this port or Western points from this time out. The last

shipments were made at advanced quotations. The loss of coal by lake disasters this season is light.

The stocks of hard coal here are fully adequate for the wants of consumers, but bituminous continues in very light supply, and the heavy rains of the past few days have been destructive to railroad bridges, etc., preventing many trains of coal from arriving.

Prices of both hard and soft coal are firm. The demand is moderate for the former and good for the latter. Manufacturers are doing a fine business and all establishments are running full time. New ventures are being started every day and the hopes of the projectors are of a buoyant character.

Detectives have been working up cases against the thieves of coal from Lehigh Valley cars, and several of the gang have been arrested. The plan was to fill bags with the coal, drop them alongside and then the confederates would carry them away. Many cars were from one to three tons short.

It is said that Mr. Chauncey N. Shipman, of Elmira, N. Y., for many years connected with the firm of Messrs. J. Langdon & Co., will soon come to Buffalo and start in business for himself. He will handle hard and soft coal of all kinds, backed with a capital of \$300,000.

Mr. H. A. Bischoff, editor of the *Black Diamond*, of Chicago, has been appointed on the World's Fair Committee of that city. His idea is to "construct a large palace, the material to be of the various kinds of coal mined in this country, and big enough to contain the entire exhibit. Also to arrange to have miners engaged in the actual work of mining, thereby showing the various methods in vogue, the modes of handling, and the appliances used."

The season of navigation is drawing to a close. Freights all higher; fair demand for Chicago and Milwaukee, but to-day Superior ports are not talked of at all. Cold weather at the end of last week, but since it has moderated with heavy rainfall. The coal shipments by lake from this port from November 14th to 20th, both days inclusive, 69,139 net tons, namely, 35,100 tons to Chicago, 9,750 to Milwaukee, 9,200 to Duluth, 700 to Escanaba, 1,000 to Marquette, 3,500 to Gladstone, 5,700 to Superior, 1,250 to Toledo, 600 to Windsor, 800 to Bay City, and 1,500 to Ashland; total for season to date, 2,007,725 net tons.

The rates of freight were as follows: 60c. @ 70c. @ 75c. to Chicago; 60c. @ 75c. to Milwaukee; 75c. to Duluth, Superior, Ashland and Sheboygan; 50c. to Toledo and Escanaba; 40c. to Windsor, and on owners account or contract to Bay City, Marquette and Gladstone.

Canals of the State will close November 30th, unless navigation is previously stopped by ice.

Canal freights on coal reported as follows: One load to Lockport, at 35c. net ton, free off, and one load to Palmyra, 65c. net ton, free off; last shipments for season.

Pittsburg. Nov. 21.

(From our Special Correspondent.)

Coal.—The market has undergone no change since our last. The lower markets are well stocked; prices are weak. The mining situation is unchanged; the large dealers decline to pay three cents for mining, preferring to keep their works closed. The miners are to hold another meeting this week, and the opinion prevails that the strike will continue. We have a good stage of water, but no coal to go forward.

The nominal rates are:

PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.

First pool.....	\$4.75	Fourth pool.....	\$3.25
Second pool.....	4.50	Railroad coal.....	5.90 @ 5.50
Third pool.....	3.90		

Connellsville Coke.—The situation shows little change. Coke is plentiful, prices liberal, cars scarce; production for the past week, 124,150 tons, the second largest production ever made. Active ovens, 13,642; idle, 324. A large number of new ovens are being constructed. Week's shipments: 7,250 cars to Pittsburg, and river points, 1,650 cars; west of Pittsburg, 4,100; east of Connellsville, 1,500 cars.

November prices: Furnace, f.o.b., \$1.75; foundry, \$2.05; crushed, \$2.55. Report says 100 cars were sold at \$2.85 per ton. We give the rumor for what it is worth.

Freights.—Pittsburg, 70c.; Mahoning and Shesango valleys, \$1.35; St. Louis, \$3.65; Chicago \$2.75; Cleveland, \$1.70.

FREIGHTS.

From Baltimore to: Boston, Mass., 1.60; Bridgeport, Conn., 1.40; Brooklyn, 1.15 @ 1.20; Charleston, .75 @ .80; Fall River, 1.45; Galveston, 3.00 @ 3.20; New Bedford, 1.40; New Haven, 1.40; New London, 1.40; New York, N. Y., 1.15; Portland, 1.40; Portsmouth, N. H., 1.70; Quincy Point, 1.80; Richmond, Va., .70; Salem, Mass., 1.60; Savannah, 1.00; Williamsburgh, N. Y., 1.15 @ 1.20; Wilmington, N. C., .85.

From Philadelphia to: Alexandria, 85¢; Annapolis, .80; Baltimore, .60¢; Boston, Mass., 1.45 @ 1.55; Charleston, .75; Fall River, 1.05 @ 1.15; Galveston, 3.25; Georgetown, D. C., .85; Milton, 1.80; New Bedford, 1.05 @ 1.15; New York, .90; Norfolk, Va., .80; Portsmouth, N. H., 1.45 @ 1.55; Portsmouth, Va., .90; Providence, 1.05 @ 1.15; Richmond, 1.00; Salem, 1.50; Savannah, 1.00.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, Nov. 22.

Prices of silver per ounce troy.

Nov	Sterling Exch'ge	London Pence.	N. Y. Cts.	Nov	Sterling Exch'ge	London Pence.	N. Y. Cts.
16	4.84½	43 11-16	94¾	20	4.84½	44	95½
18	4.84½	43 11-16	*	21	4.84½	44½	95¾
19	4.84½	43 13-16	95¾	22	4.84½	44½	†

* 94¾ to 95. † 96 to 96½.

Silver market has been characterized by steadily advancing prices, due to London demand with scarcity of supply. Rumors of possible legislation on the silver question in the next Congress have aided to give a speculative tendency to our market here.

United States Assay Office at New York reports total receipts of silver for the week 140,000 ounces.

Foreign Bank Statements.

The governors of the Bank of England, at their weekly meeting, made no change in its minimum rate for discount, and it remains at 5 per cent. During the week the bank lost £210,000 sterling in bullion, and the proportion of its reserve to its liabilities was reduced from 41-41 to 40-94 per cent., against an advance from 38-40 to 39-93 per cent. in the same week of last year, when its rate for discount was 5 per cent. The weekly statement of the Bank of France shows a loss of 2,150,000 francs gold and a loss of 3,475,000 francs silver.

Domestic and Foreign Coin.

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

	Bid.	Asked
Trade dollars.....	75	75
Mexican dollars.....	70½	71½
Peruvian notes and Chilean pesos.....	73	74½
English silver.....	4.83	4.88
Five francs.....	.94	.95
Victoria sovereigns.....	4.84	4.88
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish doubloons.....	15.55	15.75
Spanish 25 pesetas.....	4.80	4.85
Mexican doubloons.....	15.55	15.70
Mexican 20 pesos.....	19.50	19.65
Ten guilders.....	3.96	4.00

Copper.—The market has been exceedingly strong in tone during the whole of the past week, and copper of all kinds has marked an important improvement in values. It is understood that sales of lake copper have been effected as high as 13½c. per pound, but whether or not that figure has yet been paid for any considerable quantities we are unable to say. The producing companies are very reluctant to quote, and are no doubt in a thoroughly satisfactory condition in regard to the orders on their books. Glad as we are to be able to report this continued buoyancy, and to note the many encouraging signs of expanding consumption, and the hopeful prospects of trade in general, it may still be wise to adopt a little caution in regard to the recent rapid rise in prices, for we cannot but fear that values have advanced rather too quickly in view of all the contingencies that may have an important influence on them for some time to come, and it must not be forgotten that the stocks of copper in warehouse belonging to foreign bankers are still in existence, and may be placed on the market at any moment.

We quote to-day lake copper at 13½c.; casting copper, 11½c. @ 12c.

In Europe the tendency continues highly satisfactory, and sales of Anaconda matte have taken place recently at 9s. 3d. in Liverpool.

In London the market for Chili bars and G.M.B.s has advanced during the week from the closing quotations of last week, which were £45 12s. 6d. @ £45 15s. spot, and £45 15s. @ £45 17s. 6d. three months, to the latest cable prices received to-day, viz., £47 15s. @ £48 spot, and £48 @ £48 5s. three months, but the movements in this market are always more or less speculative in character.

Manufactured kinds are also quoted higher at \$51 @ \$52 for English tough; \$52 @ \$53 for best selected; \$58 @ \$59 for strong sheets, and \$54 @ \$55 for Indian sheets.

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

To Liverpool—	Copper Matte.	Lbs.	
By S. S. Wyoming.....	3,140 sacks	365,527	\$16,300
" " Spain.....	4,938	550,588	24,500
To Liverpool—	Copper.		
By S. S. Wyoming.....	75 casks	56,587	5,700
" " Spain.....	283 bars	121,168	11,000
" " ".....	2,233 pigs	692,080	55,000
To Amsterdam—			
By S. S. Amsterdam.....	79 casks		11,199
To Rotterdam—			
By S. S. Amsterdam.....	343 pigs		10,400
" " ".....	90 bbis		13,000
To Bordeaux—			
By S. S. Panama.....	90 casks	112,500	13,500
To Hamburg—			
By S. S. Wieland.....	32 lbs	32,000	3,500

Tin.—The tin market has been rather irregular all the week and the fluctuations have been of some importance. Last Friday the closing quotations were: Spot, 22c.; November,

21½c.; December, 21½c.; January, 21½c., and February, 21½c.; but since then, in sympathy with lower values in London, prices here gradually gave way until Thursday, when the lowest prices of the week were touched, showing a decline of about 75 points for spot and all the futures. To-day (Friday), however, the market is stronger again, and the closing quotations are: Spot, 21½c.; November, 21½c.; December, 21½c.; January, 21½c.; February, 21½c.

There has evidently been a good deal of selling lately for shipment from the straits, and had it not been for the very satisfactory consumptive demand a decline in prices seemed probable. However, the offerings have all been promptly taken up at a moderate concession in prices, and this would tend to strengthen the belief in the soundness of the market generally. The fluctuations in London during the week have ranged between £96 5s. @ £96 10s. and £95 2s. 6d. @ £95 5s. for spot and £95 15s. @ 95 17s. 6d. and £94 12s. 6s. @ £94 17s. 6d. for three months, the closing quotations to-day being, spot, £96 @ £96 5s.; futures, £95 15s. @ £96.

Lead continues rather dull, and consumers are still holding off from purchasing. Some metal having thus accumulated, the market went down to 3'80, with one transaction reported as low as 3'75, but at the last-named price nothing more can now be bought. The London market is strong on very good buying, and according to latest cables the quotations in London are now, for Spanish lead, £13 15s., and for English, £14.

The Chicago Market.—Messrs. Everett & Post telegraphs us as follows to-day: Our market shows little change in values since last week, but the general tone seems better. Since the opening lead has been freely offered at 3'65c. Some holders are asking 3'70c. Sales during the week have been large, amounting to over 700 tons, mostly for December delivery. At and around 3'65c. at the close market is firm, 3'65c. asked.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows: Market is quiet. Values may be quoted at nominally 3'60 @ 3'62½c. for common, and chemical desilverized is held at 3'65c. Sales are light.

Spelter.—This metal has at last become very active and values in the East have advanced in keeping with those ruling out West. In St. Louis prices are quoted 4'95 @ 5c. and in New York 5'25 @ 5'30 for early delivery. For next year's delivery very high prices are asked but no business is reported.

The foreign markets are strong, and the quantity of metal offering is very small. The last quotations are: Ordinaries, £23 @ £23 2s. 6d.; specials, £23 5s. @ £23 7s. 6d.

Antimony.—Prices have again advanced considerably; for Cookson's 30c. has been paid, and Hallett's is now quoted 20¼ @ 20½c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, November 22.

American Pig Iron.—No notable changes have occurred in the situation of the market for American foundry irons. The railroads and steamship companies are affording better facilities for shipments, and deliveries on contracts are being made more freely than heretofore, but new business as yet does not amount to much. Belated consumers have been obliged to pay "fancy" prices for iron on the spot, but, as a rule, there are no urgent inquiries for large amounts until after the opening of the year. There are many inquiries for forward delivery, however, and were furnaces willing to book orders for a period of, say six months ahead at \$18 or \$19 for No. 1 foundry, and proportionately less for other grades, it is probable that they could fill their books for some time to come, but as it is, neither furnaces nor consumers are displaying much anxiety to close business, a feeling of uncertainty being still apparent.

New York is not an important market for forge irons, but it is reported that recently a contract has been placed here for 4,000 tons of gray forge at \$14 at a Birmingham furnace, which is equivalent with freight added to \$18.11 delivered here.

Nominally we quote as follows: No. 1 foundry, \$18.50 @ \$19.50; No. 2, \$17.50 @ \$18.50, and gray forge, \$17 @ \$17.50.

Bessemer Pig.—The advance in the price of Bessemer pig has been much more rapid and pronounced than has been the case with foundry irons, and, moreover, the demand for it appears to be more urgent and of larger volume than is the demand for ordinary anthracite or coke irons. The firmness of the Bessemer ore market, together with the good demand for and recent advance in steel rails, afford a very substantial foundation for an upward movement. We learn that the Crane Iron Company has recently closed a contract for 10,000 tons for delivery, running well into 1890, at \$23.50. Bessemer pig cannot be imported at less than \$26 per ton.

Scotch Pig.—The Glasgow market continues very firm. Some surprise was occasioned on Saturday last by the publication of a press dispatch announcing a collapse in the foreign market and a consequent drop of 13s. per ton, but later it was found that the dispatch was entirely erroneous, a mistake having occurred in substituting

shillings for pence. The American demand for Scotch iron at these figures is almost nil. We quote nominally for the leading brands as follows: Coltness, \$26.50@27; Shot, \$26.50; Summerlee, \$26.50@27; Dalmellington, \$24@24.50. Glasgow freights to this port remain at 1s. @2s. per ton.

Spiegeleisen and Ferro-Manganese.—A sale of a 1,000-ton lot of spiegeleisen at \$34 is reported, but is unconfirmed so far as we can learn. Nominally, sellers are asking \$35 for 20 per cent. Ferro-manganese for future delivery is quoted at \$92@92.50. On the spot the supply is very light, and is held nominally at \$95@100.

Billets, Slabs and Rods.—Quotations for nail slabs and billets remain at \$35, but no recent sales are recorded, and in the absence of late business prices are purely nominal. Mills continue crowded with work, and deliveries are much delayed. For foreign wire rods \$53@54 for No. 5 is quoted. Quotations on rods at American mills are unchanged at \$50.

Steel Rails.—A number of mill representatives held a conference this week, as a result of which the announcement has been spread abroad that the minimum price at mill hereafter will be \$35 per ton, an advance of about \$2.50 per ton over the sales reported 10 days or a week ago. The uncertainty as to the prices of Lake Superior ores next year, together with their scarcity and the increased cost of spiegel and bessemer pig, and the amount of orders for rails that have already been booked for 1890 delivery (said to be about 600,000 tons), are all presented to constitute an ample justification of such an advance in the selling prices of rails. These considerations are certainly plausible, and are being used in some quarters to promote something like a "boom," but there is a less sanguine minority in the trade whose views are entitled to much weight. They point out that the orders already entered for next year are mainly renewals, that at present there is a dearth of important railroad enterprises, save a few big reorganization schemes, and that the outlook for an increased consumption of rails for extensions and replacements is not unusually promising.

It seems probable, therefore, that while certain substantial conditions favor an advance, \$35 is as yet rather above the actual market, and in fact with the exception of one rumored sale at this figure, no important transactions at over \$33@34 are discoverable. A firm offer of \$34 to \$34.50, all other things being satisfactory, would probably command a very liberal quantity of rails.

Structural Iron and Steel.—The latest quotations are as follows: On wharf, bridge plate, 2'30c.; iron angles, 2'25@2'35c.; iron tees, 2'80@2'35c.; steel angles, 2'35c.; beams and channels on wharf, 3'1c.

Steel plates on wharf: Tank and ship, 2'6c.; shell, 2'8c.; flange, 3@3'1c.; fire-box, 4@4'1c. Iron plates on wharf: Common tank, 2'25c.; refined, 2'35@2'45c.; shell, 2'5@2'6c.; flange, 3'5@3'7c.; extra flange, 3'7@4c.

Bar iron at mill is quoted at 1'8c. for common and 1'8@1'90c. for refined. Deliveries from store are quoted as follows: Common, 2'1c. base; refined, 2'2c. base; "Ulster," 3@5'5c.; Norway bars, 4c.; shapes, 5c., and Norway nail rods, 5'5c.

Merchant Steel.—We quote as follows: Best English tool steel, 15c. net; American tool steel, 7'5@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3'5c.; open-hearth machinery, 2'5c.; open-hearth spring, 2'5c.; tire steel, 2'5c.

Pipe and Tubes.—Rates of discount on wrought-iron pipe remain as follows: Butt welded, plain and tarred, 50 per cent. discount; galvanized, 12'5 per cent. discount; lap-welded, plain and tarred, 62'5 per cent. discount; galvanized, 50 per cent. discount. A discount of 57'5 per cent. is allowed on boiler tubes of 2 inches and larger, and 52'5 per cent. on 1'5 inches and smaller. Cast-iron pipes remain at \$25@28, according to size.

Rail Fastenings.—A meeting of manufacturers was held this week and the subject of an advance in prices was discussed. It was at length decided that any official price at present would not be prudent, but it was tacitly understood that all those present would advance their prices individually as far as consumers would permit. That this decision was very well understood is verified by subsequent prices. An inquiry for a large lot of fish plates brought quotations of 2'15 and 2'25c. per pound for steel plates, and 1'85c. for iron plates. Asking prices are as follows: Spikes, 2'25c.; angle fish plates, 2'15@2'25c.; bolts and square nuts, 3c.; hex. nuts, 3'25c.

Old Material.—While the demand for old iron rails is as yet rather light, consumers are carrying limited stocks, and, it is believed, before long will be obliged to replenish their supply. In the meantime owners of rails are withholding quotations until higher prices can be secured; nominally about \$26 is asked. No. 1 wrought scrap iron is quoted at \$24 to \$24.50.

A press dispatch from Birmingham, Ala., has the following: Thomas Seddon, president of the Sloss Steel and Iron Company; H. G. Bond, manager of the Tennessee Coal and Iron Company, and a number of local capitalists have partially affected the organization of a new railroad and steamship

line. The plan is to build an air line railroad to a convenient Gulf port, probably Pensacola, Fla., and operate a line of freight steamers in connection with it to New York and other Eastern ports. The object of the inaugurators is to provide a new and better outlet for Birmingham iron. All of the vessels owned by the Ocean Steamship Company cannot transport the output of the Tennessee Coal, Iron and Railroad Company's furnaces alone, nor can the Old Dominion Company handle the Eastern shipments of the Sloss Company.

Louisville. Nov. 18. (Special Market Report by Messrs. HALL BROS. & CO.)

The week under review has been one of marked activity, there having been in the neighborhood of 20,000 tons of iron sold in this vicinity, mostly for prompt or nearby deliveries, while one or two furnaces sold round lots through the entire year of 1890 at about \$1 above early delivery iron. Gray forge sold in lots ranging from 500 to 5,000 tons, equal to \$17.50 for future and \$16.50@17 for early delivery, showing the confidence of almost all in the market and the belief that the future will bring higher prices still. English iron cannot enter this market for less than \$28@30; besides, iron in this country has not advanced in proportion to the English. The supply in both countries seems inadequate for the demand.

We learn that there have been recent contracts let for nearly 100,000 cars to be built. This will require say 500,000 tons of pig iron. Offers and reports from almost every direction show strong, active, advancing markets. One furnace refused an offer for 3,500 tons, one-third each gray forge, mottled and white, at \$17.50 cash, Louisville as basis for delivery, during the whole of next year. On the whole the market is strong, advancing, and excited.

We quote as follows:

Hot Blast Foundry Irons.	
Southern Coke No. 1	\$30.00@18.50.
" " No. 2	00.00@ 18.00.
" " No. 3	00.00@ 17.50.
Mahoning Valley, Lake ore mixture	00.00@ 20.00.
Southern Charcoal No. 1	18.50@ 19.00.
" " No. 2	18.00@ 18.50.
Missouri " No. 1	18.50@ 20.00.
" " No. 2	19.00@ 19.50.

Forge Irons.	
Neutral Coke	17.00@ 17.50.
Cold Short	16.00@ 16.50.
Mottled	15.50@ 16.00.

Car Wheel and Malleable Irons.	
Southern (standard brands)	23.50@ 24.25.
" (other brands)	19.50@ 20.00.
Lake Superior	22.50@ 23.00.

Hall Brothers & Co., of Louisville, Ky., have been appointed sole agents in all markets for the Cherokee iron of Cedartown, Ga.

Philadelphia. Nov. 22.

[From our Special Correspondent.]

Pig Iron.—The high range of prices for Northern forge and foundry iron has started a good deal of inquiry for Southern irons, but up to this writing without result. It transpires that Southern iron makers and brokers are just as anxious for outside prices as are Northern makers, and the higher freight rates from the South leave them very little margin. Quotations to-day are: For No. 1, \$18.50@19; No. 2, \$17@18, and gray forge, \$17@17.50. Extreme prices are asked to-day for a few favorite brands; but as they are not to be had for an indefinite time, it is hardly the correct thing to recite these prices as market prices.

Inquiries have been received by some furnace managers for contracts which would not expire until next June; but it is safe to assert that no business of this kind has been accepted. The general impression is that iron will go a little higher, and the time when will be determined by the action of buyers in anticipating next year's wants. The hope is occasionally expressed in a quiet way that the increasing weekly production will come to the rescue of buyers; but there is not much prospect of this.

Foreign Iron.—Spiegel is quoted at \$34@35 and ferro-manganese at \$85@90, according to per cent.

Blooms.—Very little new business in steel blooms or slabs has been closed. The makers are so far oversold that they are hardly in position to enter into large contracts. Quotations are given to-day at \$35@36 for nail slabs, \$37 for sheet and tank slabs, \$39.50 for shell, \$43@44 for flange, and about the same for fire box. Charcoal and anthracite blooms remain where they have been for months past.

Muck Bars.—The high prices of steel and the difficulty of obtaining supplies is driving a good many buyers to make inquiries concerning supplies of muck bars for next month, and for later delivery. Good bars are selling at \$30, and makers who are now executing large contracts are declining to accept new business at present, in the belief that when they are ready for new work the \$30 limit will be inside price.

Merchant Iron.—A well attended meeting was held here this week, but the question of advancing prices was considered only as a side issue; and it was recognized on all sides that the recent hardening tendency in values has put merchant iron about as high as it is safe to let it go at present. Our local Iron Association has not been of much account, and a proposition is under consideration to consolidate all Eastern bar iron makers into one

association. Good iron is selling at 2 cents, and common and medium iron are very strong, owing to the rushing demand for deliveries during the next sixty days for car purposes.

Skelp Iron.—Several thousand tons of iron have been inquired for, and makers are asking for grooved, 1'90c.

Wrought Iron Pipe.—There is not the slightest departure from existing discounts, and an advance in prices is probable.

Nails.—Nails are steady at \$2.10 for car-load lots, iron, and \$2.20 at store. The higher prices for steel nails, amounting to 20 to 25 cents more, have been hurting their sale of late.

Plate and Tank Iron.—The steady demand for plate and tank for weeks past has crowded quotations up to 2'40 for ordinary plate, and 2'40@2'50c. for universal plates. Shell iron is strong at 2'70, and flange is quoted to-day at 3'30. All steel plates for ship purposes are very strong at 2'60c.; shell, 2'80c.; flange, 3'10c. Only where large orders are to be placed is there any concession from these figures.

Sheet Iron.—Nearly all the sheet iron that has been sold this week has commanded a little advance over previous quotations, particularly for the retail trade. Nothing but car-load orders can induce manufacturers to make a shading. Buyers are anxious and urgent, and mills are all crowded.

Structural Iron.—The prices for structural shapes are advancing. A good deal of business is awaiting its turn. Quotations were given to-day on bridge plate at 2'40c.; angles, 2'35@2'40c.; tees are strong at 2'7@2'80c. There is a good deal of inquiry for steel plates and angles. Manufacturers are unable to satisfy inquiries from buyers in regard to when their business can be taken care of, because old customers who have the preference are hurrying in orders for new work.

Steel Rails.—Steel rails are quoted strong at \$34@35. There is a great deal of uncertainty in regard to business for the coming year, one trouble being the difficulty of settling on prices for raw material. A great deal of business is said to be under cover, and a good authority states that nearly all the trunk lines throughout the country will be heavy buyers during January and February.

Old Rails.—Old rails are extremely scarce, and quoted nominally at \$26.50@27.

Scrap Iron.—Scrap is very scarce, and in demand for prompt delivery at \$24 for No. 1 in car-load lots. When there is any choice to be had, it brings \$24.50@25, and dealers have orders in hand for all they can deliver.

Pittsburg. Nov. 21.

[From our Special Correspondent.]

Raw Iron.—Notwithstanding the unprecedented sales in raw iron for the past three months, which are largely in excess of anything that has ever been reported, by several hundred thousand tons, there is no falling off in the demand. Parties who have bought largely for future delivery, extending over the first quarter of 1890, are still in the market for large blocks, particularly steel and Bessemer. Those who predicted a falling off in the demand have made the discovery that their views have not yet materialized, and from present indications will not for some time to come. City furnaces are well sold up. The stimulus which has been imparted to production will probably continue all winter. A multitude of new schemes and enterprises are coming along from boat building, railroad building, house building and various other projects, all of which will require liberal amounts of iron and steel. In fact, business has been all that could be desired. For most descriptions there has been a general hardening of prices all along the line, yet nothing speculative or illegitimate. The surroundings are such as to confirm the opinion that these conditions are not likely to be disturbed for some time to come, so that the entire trade regards the outlook with the most absolute confidence. Washed metal, made by the Youngstown Steel Company, is being used very largely now for open-hearth steel of high grades, sales aggregating 8,000 tons having been made in the last month by one of our leading brokers. The big reported decline in the English iron market had no foundation—in fact, prices ruled higher than at any time during the past 20 years. On the Clyde alone ship yards extend 27 miles, all crowded with work, with orders booked sufficient to last for years. In the face of these facts the prospect of any material decline is a long way off. The Shenango and Mahoning Valley furnaces are well sold up; some of them have orders extending four to five months.

Bessemer is firm and a shade higher.

Grey Forge held firmly at quotations.

Ferro-manganese declined; Spiegel holds its own; steel slabs and billets without change. Muck bar steady; old material unchanged; old rails less fancied.

The following sales describe the situation:

Coal and Coke Smelted Lake Ore.	
6,000 Tons Bessemer, January, February and March	\$21.50 cash.
5,000 Tons Bessemer, January, February and March	21.50 cash.
5,000 Tons Bessemer, January and February	21.50 cash.
3,000 Tons Bessemer, January, February and March	21.75 cash.

1,000 Tons Bessemer.....	21.25 cash.
1,000 Tons Mill Iron.....	17.00 cash.
1,000 Tons Mill Iron.....	17.05 cash.
1,000 Tons Mill Iron.....	17.20 cash.
1,000 Tons Gray Forge, December and January.....	17.00 cash.
750 Tons off Bessemer.....	18.50 cash.
500 Tons Gray Forge.....	17.05 cash.
500 Tons Extra White.....	16.75 cash.
500 Tons Off Bessemer.....	18.65 cash.
500 Tons Gray Forge, Wheeling delivery.....	17.25 cash.
500 Tons Bessemer Spot.....	16.75 cash.
500 Tons Gray Forge.....	17.25 cash.
500 Tons Standard Bessemer.....	21.75 cash.
<i>Coke, Native Ore.</i>	
1,000 Tons Gray Forge.....	17.00 cash.
200 Tons Gray Forge.....	16.90 cash.
100 Tons No. 2 Foundry, all ore.....	18.00 cash.
100 Tons Silvery.....	17.00 cash.
50 Tons White Iron.....	16.50 cash.
50 Tons No. 2 Foundry.....	17.50 cash.
50 Tons No. 1 Foundry.....	18.50 cash.
<i>Charcoal.</i>	
125 Tons No. 2 Foundry.....	22.00 cash.
100 Tons Cold Blast.....	27.75 cash.
<i>Muck Bar.</i>	
1,000 Tons Neutral, January.....	30.25 cash.
500 Tons Special Spot.....	31.25 cash.
500 Tons Neutral.....	30.50 cash.
<i>Steel Wire Rods.</i>	
500 Tons American Fives, Cleveland.....	50.00 cash.
500 Tons American Fives.....	50.00 cash.
<i>New Steel Rails.</i>	
3,500 Tons December.....	34.00 cash.
<i>Steel Bloom Ends.</i>	
1,200 Tons Bloom Ends.....	23.25 cash.
<i>Spiegel.</i>	
300 Tons 20 per cent., Seaboard.....	34.00 cash.
200 Tons 10 and 12 per cent.....	29.50 cash.
<i>Ferro-Manganese.</i>	
50 Tons 80 per cent.....	90.00 cash.
<i>Steel Slabs and Billets.</i>	
3,500 Tons Nail Slabs, Jan., Feb., March.....	34.00 cash.
2,000 Tons Nail Slabs, delivered.....	35.00 cash.
1,000 Tons Billets.....	34.00 cash.
200 Tons Billets.....	34.50 cash.
<i>Skip Iron.</i>	
300 Tons Sheared Iron.....	2.15 4 mo.
200 Tons Wide Grooved.....	1.82½ 4 mo.
200 Tons Narrow Grooved.....	1.77½ 4 mo.

Prices.

Coke or Bituminous Pig—	
Foundry No. 1.....	\$18.25@18.50
Foundry No. 2.....	17.25@17.50
Gray F. No. 3.....	16.75@17.25
" No. 4.....	16.25@16.50
White.....	16.25@16.50
Mottled.....	16.25@16.50
Silvery.....	17.00@20.00
Bessemer.....	21.50@21.80
Low Phos.....	25.00@25.50
Charcoal Pig—	
Foundry No. 1.....	23.50@24.50
Foundry No. 2.....	22.00@22.25
Cold-Blast.....	25.00@28.00
Warm Blast.....	24.00@25.00
10 + 12 Spiegel at seaboard.....	29.50
20% Spiegel at seaboard.....	34.00@34.75
Muck-Bar.....	30.00@31.50
Steel Blooms.....	34.25@35.00
Steel Slabs.....	34.10@34.50
Steel Cr'p Ends.....	22.75@23.25
Steel Bl. Ends.....	23.00@23.25
Ferro-Man., 80%.....	90.00
Steel Billets.....	34.00@35.00
Old Iron Rails.....	27.00@27.50
Old Steel Rails.....	21.00@22.00
No. 1 W. Scrap.....	20.50@21.50
No. 2 W. Scrap.....	18.00@19.00
Steel Rails.....	34.00
" light sec.....	34.00@37.00
Bar Iron, nom.....	1.80@ 1.90
Iron Nails.....	2.25@ 2.31
Steel Nails.....	2.25@ 2.31
Wire Nails.....	2.60@ 2.65

BY TELEGRAPH, Nov 22.—The large iron firm of Long & Co., whose works are located at Char-tiers, confessed judgment yesterday for \$300,000 in favor of the Lawrence bank, and the latter institution closed its doors. The first intimation which the business people received of the bank's inability to meet its obligations was a notice to the Union bank, through which it clears, to return checks to the amount of only \$11,000.

President Young states that he did not know when the bank would be opened. The failure of the iron firm, he said, had something to do with the failure of the bank, but not everything. Some bad investments had been made. None of the officers, he says, has defaulted.

The bank's liabilities are given at \$700,000. The assets are not known. It is, perhaps, questionable whether or not the amount of the judgments confessed by Long & Co., can be realized from the property. There are said to be other and prior liens. The bank is located in the Lawrenceville district of the city, where mechanics and ironworkers pre-dominate, and, in consequence of rumors, a run was at once made upon it. About \$250,000 was withdrawn. Hundreds of workmen, however, have still their all in the bank, and there is great excitement in that portion of the city.

The bank was organized in 1866. The capital stock of company is \$80,000; surplus \$45,000; un-divided profits, \$10,234.33. The officers are: Presi-dent, W. W. Young; Vice-President, Samuel Mc-Mahon; Cashier, John Hoerr.

Long & Co.'s iron plant is in the hands of the sheriff. The judgment confessed in favor of the defunct bank was \$300,000, but it is claimed by the firm that the actual amount is not over \$150,000.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 22.

Heavy Chemicals.—The most interesting feature of the market continues to be the very urgent and large demand for soda ash and refined alkali. Other than the firmness of prices occasioned by this demand, there have been no new develop-ments during the week.

The demand for carbonated soda ash and B. M. and Solvay alkali seems to be increasing rather than diminishing in volume. Reports from dealers all over the country are to the effect that stocks are very nearly depleted, and will have to be re-

plenished by the end of the year. Nearly all the window glass manufacturers are now at work, and it also seems probable that the bottle manufac-turers will soon have to resume operations. The demand for bottles on account of the suspension of production is now large. When the demand for alkali from the bottle makers or other quarters begins to be felt, if additional supplies are not re-ceived, a very lively market in this line is promised. According to our special correspondence from the other side there is very little offering there for prompt shipment, and it is, therefore, apparent that the market is a firm one.

During the week carbonated soda ash, 48 per cent., has been sold for prompt shipment at \$1.45 for small lots on the spot for early delivery. Quo-tations range from \$1.45@1.55. So far as can be learned the only supply obtainable on the spot is in small odd lots. For refined alkali, 58 per cent., \$1.40@1.45, and for 48 per cent., \$1.50@1.55 are the latest quotations. For contracts \$1.25@1.30 is quoted for 58 per cent., and for 48 per cent. \$1.35. Sellers state that these figures apply only to large contracts for delivery through the year 1890. A number have been placed.

Caustic soda ash is nominally firmer, in keeping with the advance in carbonated ash, but we learn of no business of importance at the figures named. We quote nominally \$1.25@1.37½, depending upon brand, quantity, buyer, seller, etc.

Caustic soda on the spot is rather scarce, but for forward shipment the market continues easy and prices low. We may quote \$2.32½@2.37½ for 70, 74 and 76 per cent.

It has now come to be generally accepted that the caustic soda association as well as the bleach-ing powder syndicate will not be revived.

Bleaching powder on the spot is not in large supply but on the other hand, the demand is neither urgent nor important. We quote nominally for lots in this position \$1.70, and for shipment \$1.67½. There are unconfirmed rumors of contracts for delivery over next year being offered at \$1.50.

Sal soda continues very firm, the latest English asking price being equivalent to 1c. to 1.05 here. American makers have not materially advanced their quotations.

Acids.—The situation in this market has been in no wise changed since our last report. Trade is, as a rule, good, although in some quarters busi-ness is reported as slightly quieter than it has been. The usual meeting of the "combination" will be held on Wednesday next.

The fact that at least one large manufacturer will be in no way included in the combination, and will be bound by none of its regulations, does not seem to deter the others from completing their organization.

The fact remains, based on the experience of all previous combinations, that unless every loophole for outside competition is closed, at one time or another the combination will be obliged to fight for existence.

The most important development of the week, and one which New York manufacturers will do well to observe, has been the announcement that the combination of oxalic acid makers on the other side will terminate December 31st, all efforts to prolong its life having failed. It has had an ap-parently successful career of two years, previous to which the most excessive competition prevailed. The causes to which the collapse is attributed are general dissatisfaction with the restrictions of the combination.

Now that the European makers have agreed to disagree, the market will be an open one on and after Jan. 1. The present combination prices are 9½@10½c. per lb. ex-store or dock, according to quantity.

Fertilizing Chemicals.—Everyone knows that the ENGINEERING AND MINING JOURNAL takes unusual pains to be well informed, and that it scrupulously avoids making statements which have only a personal, and not a public, bearing, or which may injuriously affect private interests. It is therefore all the more annoying when, through the inexperience of a reporter, though without any culpable intention, very improper and unjust statements were made in our reports of this market, October 26th, and November 2d and 9th, concerning a prominent, and we believe an alto-gether honorable, Baltimore firm of fertilizer deal-ers. These assertions were to the effect that this firm was "bearing" the ammoniacal market, and that a sudden improvement in this might be em-barassing to them.

We regret exceedingly that our columns should have been made the medium for statements which might have proved injurious to a private business. Fortunately the high standing of the firm referred to is so well known that the injury accomplished by the careless and unwarrantable statements has fallen, as it properly should, upon the reporter and responsible editor in this office.

The week has developed no new features of in-terest in this line. Trade is rather quiet, as is usual at this time, although last year the usual dullness was not so apparent. Before long the demand for the Spring trade should be felt. Prices remain about as follows:

Azotine, \$2.05@2.12½; dried blood, city, low grade, \$2@2.05; high grade, \$2.05@2.10. Tank-age, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, \$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per

cent. phosphate, \$18@20. Fish scrap, \$21@21.50 per ton, f. o. b. factory. Sulphate of ammonia at \$3.15 per cwt. Concentrated tankage, \$2.07½. Refuse bone-black, guaranteed 70 per cent. phos-phate, \$20 per ton. Dissolved bone-black is 87½@90c. per unit for available phosphoric acid, and acid phosphate 70@80c. per unit for available phosphoric acid. Steamed bones, unground, \$20@21; ground, \$25@26.

Charleston rock, undried, \$5.75 per ton; kiln dried, \$6.75@7 per ton, both f.o.b. vessels at the mines. Freights by sail from Charleston to New York, \$3@3.25 per ton. Charleston rock, ground, \$11.50@12, ex-vessel at New York.

Double manure salts continue in good demand at the schedule prices.

Muriate of Potash.—Arrivals of 250 tons are re-ported. The demand is light. Prices are un-changed.

Kainit is steady with no advance in prices. Brimstone is rather weak. It is stated that sec-onds on the spot can be had at \$19.25 and thirds at \$18.75. Nitrate of soda is also quiet. Prices are unchanged at \$1.90@1.92½.

NOTES OF THE WEEK.

President Mapes says that a meeting of the Fertilizer Exchange will be called shortly for the purpose of securing some uniform action on a number of subjects of great importance to the trade, the most burning question perhaps that requires attention being that of credits.

According to the nitrate of soda statistics issued by Mr. F. B. Nichols on the 15th inst., arrivals during the fortnight to that date aggregated 22,050 bags, of which 10,120 were received at New York, and 11,930 at Charleston. Total deliveries during the same period aggregated 34,452 bags. Stock on the spot on the 15th inst. is therefore diminished to 43,603 bags, which is less than the stock on hand on the same date at any time dur-ing the last four years. Total deliveries for the year to date amount to 511,139 bags, as compared with 406,249 in 1888, 435,712 in 1887, and 392,004 in 1886.

In speaking of the condition of the trade, Mr. Nichols says: "The market continued steady with a fair business both in spot and futures. There were several large transactions for forward deliv-ery, including March shipment. The arrivals were "Routenback," at this port, and "E. L. Shaw" and "Aconagua," at Charleston. The shipments to all points up to November 1st were 695,000 tons, against 508,000 same time last year."

Liverpool.

Nov. 13.

(Special report by Messrs. J. P. Brunner & Co.)

Chemicals.—With the exception of soda ash our market for chemicals has gone very slow, and in most cases prices show a slightly easier tendency. The meeting of the alkali makers on the 8th inst. was adjourned till the 14th, and the position being somewhat unsatisfactory, has probably had some-thing to do with the easier tendency.

Carbonated is still wanted, but nothing obtain-able for this or next month. Caustic ash scarce, at 1½@1¼d., according to brand. For next year, 1½d. for carbonated, and 1¼d. for caustic ash, are about nearest quotations, and makers very firm. Soda crystals are in small compass at £2 15s. near-est value, while perhaps 2s. 6d. less would be taken for late November delivery.

Caustic Soda—The improvement noticed last week has all disappeared, the demand having fallen off again, and for prompt delivery nearest values are: 60 per cent., £6 7s. 6d to £6 10s.; 70 per cent., £7 5s. to £7 7s. 6d.; 74 per cent., £8 to £8 2s. 6d.; 76 per cent., £9. For contracts over next year the tone is also easier, and \$7 6s. 3d. has been accepted by one maker for 70 per cent.

Bleaching powder dull, but there is little offer-ing, and £6 17s. 6d. to £7 represent nearest values. For all 1890 a sale of hardwood is reported at £6, and softwood on rails is also weaker for forward delivery.

Chlorate of potash dull at 5d. to 5½d., the lower figure having been accepted by resellers. Bicarb soda cleared for this month, and £5 per ton and upward quoted for one hundredweight kegs, De-cember delivery, according to brand and quantity, with usual allowances for larger packages. Sul-phate ammonia better at £11 18s. 9d. to £12 per ton, for good gray, 24 per cent. f. o. b. Liverpool.

The meeting of the alkali makers, adjourned from the 8th inst., is to be held to-morrow, but the prospects are very doubtful of any arrangement being made as regards the bleach combination for next year.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Nov. 22.

The committee appointed some ago to revise the by-laws and to take other action to revive the as-sociation of building material dealers will meet shortly. This committee consists of President Rogers, R. C. Martin, of Peck, Martin & Co., and Colonel Smith, of Candee & Smith. It is hoped that this association will do much to correct some of the evils which at present exist in the trade, and it will also tend to create a more cordial spirit among its members.

Brick.—The week has been a quiet one in the brick market. The weather continues to put a

dampener on the hopes of sellers, an advance in prices being altogether out of the question under the present circumstances. Arrivals continue steadily, but the demand is irregular on account of the weather. A notable exception to the rule is that sellers of South Rivers have been able to advance their prices. It is stated that some well selected brick has been sold during the week as high as \$7 per M. In quality South Rivers will compare very favorably with ordinary grades of Haverstraws, but their color is not so desirable, being dark and liable to be tinged with iron stains. For best qualities of Haverstraws \$7.25 remains the top quotation. Ordinary grades have been sold as low as \$6.75. For Up Rivers \$6.25 to \$6.75 is asked. The prices of Jerseys vary widely, depending upon brand. Quotations range from \$6 for poor qualities to \$7 at which price South Rivers may be quoted. The demand for pale brick continues strong at \$3.50 to \$4.

Roofing Slate.—Some weeks ago we called attention to the fact that Northern dealers in stone eventually will have to widen the local market for their product to compensate for the falling off of the Southern demand, in consequence of the stone of that section of the country coming into use. The same may now be said of roofing slate, as may be seen by the following description condensed from the Chattanooga Tradesman:

At the intersection of the East Tennessee, Virginia & Georgia, and the East & West Alabama railroads is located the town of Rockmart, Ga., and at this point, and almost within a stone's of two depots, the slate crops out in low hills in beds of great thickness, and have been quarried here in a small way for thirty years. Previous, however, to 1883-5, when the East Tennessee, Virginia & Georgia Railroad and the East & West Alabama Railroad were completed, the slates were all hauled 23 miles, to Cartersville, Ga., to be shipped, which was done at a good profit. Owing to lack of capital the quarries are worked in the most primitive style, without any of the improved methods now in use, and only roofing slates are made, all the other product of the quarry being

wasted, which in reality, with proper machinery, could be made the most profitable. There are now made here annually over 5,000 or 6,000 squares, which is sold f.o.b. cars at \$5 per square, yielding a net profit, after paying 50 cents royalty, of \$1.75 or \$2 per square. The slates are dark blue and unfinishing, and are at present quarried entirely above water line.

Among those who have reported favorably on the Georgia deposits are Mr. George W. Hughes, of Granville, N. Y., Prof. N. A. Pratt, of the Georgia Geological and Mining Bureau, and Messrs. W. H. Williams and G. W. Jones, two experienced Welsh quarrymen.

A large sale and transfer of slate property has just taken place at Bangor, Pa. The Fidelity Slate property has been sold for \$67,500 to the Lehigh Coal and Navigation Company. The same company, it is reported, has also purchased the West Bangor slate quarry for \$62,500. The entire purchase is thirty-five acres in extent. The new owners, it is stated, will spend \$25,000 in improvements, and will be able to produce 5,000 squares of slate a month.

CONTENTS.

Table listing various articles and their page numbers, including 'Cambria Iron Company's Library for Workmen', 'The Nicaragua Canal', 'The Representation of the Coal Trade in the World's Fair', etc.

Table listing 'Impressions and Reminiscences of the Engineers' with sub-sections like 'European Trip', 'A Subterranean River in France', 'Submarine Mining', etc.

Table listing 'MINING NEWS' by state (Arizona, California, Colorado, etc.) and 'MARKETS' for various commodities like Coal, Iron, and Metals.

IMPORTS AND EXPORTS OF METALS AT NEW YORK NOVEMBER 9 TO NOVEMBER 16, 1889, AND FROM JANUARY 1.

Large table with multiple columns detailing imports and exports of various metals (Iron, Steel, Copper, etc.) and other materials, including company names, quantities, and values.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

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

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Dead wood previously paid \$275,000 in level dividends, and the Terra \$275,000. ¶ Previous to the consolidation in Aug., 1884, the California had paid \$31,300 in dividends, and the Con. Virginia, \$240,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid \$1,320,000 in dividends. †† 1,591,500

STOCK MARKET QUOTATIONS.

Table with columns: COMPANY, Bid, Asked. Includes Baltimore, Md. stocks like Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Table with columns: COMPANY, Bid, Asked. Includes Birmingham, Ala. stocks like Ala. Con. C. & C. Co., Ala. R. Mill Co., Alice Furnace, etc.

Table with columns: COMPANY, H, L, Sales. Includes Denver, Colo. stocks like Allegheny, Amity, Big Indian, Brownlow, Calliope, etc.

Table with columns: COMPANY, Par value, Bid, Asked. Includes Kansas City, Mo. stocks like Ben Harrison, Burch, L. & Z. Mo., Hillsboro Gold, etc.

Table with columns: COMPANY, H, L, Closing. Includes Pittsburgh, Pa. stocks like Bridgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., etc.

Table with columns: COMPANY, Bid, Asked. Includes St. Louis, Nov. 20. Closing Prices. Adams, American & Nettie, Aztec, N. Mex.

Table with columns: Bid, Asked. Includes Black Oak, Cal., Black Spar, Bremen, Buckskin, Carriboo, Idaho, Central Silver, etc.

Table with columns: Bid, Asked. Includes Auction Sales of Stocks, Nov. 20. The following shares were sold at auction this week: 5,000 shares American Copper Mining Co., etc.

Table with columns: Bid, Asked. Includes Electric Stocks, Nov. 22. The following closing quotations are reported to-day by Tobey & Kirk, New York City: Brush, Illuminating, etc.

Table with columns: Bid, Asked. Includes Trust Stocks, Nov. 22. The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange: American Cotton Oil, Cattle Trust, etc.

Table with columns: Bid, Asked. Includes Foreign Quotations, London, Nov. 9. Almada, Mex., Atusara Gold, Idano, Amador, Calif., etc.

Table with columns: Bid, Asked. Includes Josephine, Cal., Kohinoor, Colo., La Luz, Mex., La Trinidad, Mex., Mason & Barry, Port., etc.

Table with columns: Bid, Asked. Includes Paris, Nov. 7. Belmez, Spain, Boleo, Mex., Caliao, Venez., Caliao Bis, Venez., etc.

Table with columns: Bid, Asked. Includes CURRENT PRICES. These quotations are for wholesale lots in New York. CHEMICALS AND MINERALS. Acid-acetic, 100 lbs., \$2.00, etc.

Table with columns: Bid, Asked. Includes Ammonia-Sulph., 100 lbs., \$3.05, etc. Asbestos-Amer., p. ton, \$50.00, etc. Asphaltum-P, ton, \$13.00, etc.

Table with columns: Bid, Asked. Includes Barytes-Sulph., Am. prime white, 17@20, etc. Bauxite-White, powdered, 100 lbs., \$3.34, etc. Brimstone-See Sulphur, etc.

Table with columns: Bid, Asked. Includes American, 100 lbs., 5@7, Potassium-Cyanide, 100 lbs., 30@40, Bromide, 100 lbs., 33, Chlorate, 100 lbs., 13@14, etc.

Table with columns: Bid, Asked. Includes THE RARER METALS. Aluminum-(Metallic), 100 lbs., \$2.00, etc. Arsenic-(Metallic), per lb., 40, Barium-(Metallic), per gram, \$4.00, etc.

Table with columns: Bid, Asked. Includes BUILDING MATERIAL. Bricks-Pale, 1,000, 3.25@4.00, Jerseys, 1,000, 5.50@6.50, etc.