

THE ENGINEERING AND MINING JOURNAL



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

Vol. LV. APRIL 1. No. 13.

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SUBSCRIPTION PRICE: For the United States, Mexico and Canada, \$5 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7. 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. NOTICE OF DISCONTINUANCE - The ENGINEERING AND MINING JOURNAL is sent to subscribers until an explicit order for its discontinuance is received by us, and all payment of arrears is made, as required by law. Papers returned are not notices of discontinuance.

THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS: R. P. ROTHWELL Pres. & Gen'l. Mang. SOPHIA BRAEUNLICH, Sec'y & Treas. P. O. BOX 1833. 27 Park Place, New York. Cable Address: "Rothwell, New York." U-e A B C Code, Fourth Edition.

LONDON OFFICE: 20 Bucklersbury (Room 366), London, E. C., England. Edward Walker, Manager.

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THE LONDON OFFICE OF THE ENGINEERING AND MINING JOURNAL.

The great increase in circulation and influence of the ENGINEERING AND MINING JOURNAL in foreign countries and the need of keeping in closer touch with the mineral industry in Europe has for some years made it desirable to have an office in London, a headquarters for gathering and distributing information and to handle the many technical books which the Scientific Publishing Company is now publishing.

It is with especial pleasure, therefore, that we are now able to announce that we have taken offices at

20 Bucklersbury (Room 366), London, E. C.,

which is in the most desirable location in the city, within a few steps of the square on which are the Bank of England, the Mansion House, Exchange and Stock Exchange, and to which converge Lombard street, Cornhill, King William street, Threadneedle street, Queen Victoria street and Cheapside, a point which everyone seeking business or pleasure in London must visit and of easy access by every means of conveyance.

We have been fortunate in securing for our London representative Mr. EDWARD WALKER, an engineer and journalist of experience on both sides of the Atlantic, who has been connected with high London technical papers and English engineering industries, and has also acquired a familiarity with our American conditions, ways and needs by his experience during the past year in New York on the staff of the ENGINEERING AND MINING JOURNAL. He is therefore exceptionally well qualified to represent a cosmopolitan journal at the financial centre of the world, and to get and to give authoritative information on all matters of interest to our readers.

The facilities which our London office, with its files of the ENGINEERING AND MINING JOURNAL, and stock of the publications of the Scientific Publishing Company, will afford to American as well as English subscribers in London in getting information promptly concerning American mining or engineering interests, and in affording our readers everywhere early and reliable news concerning financial conditions in the great world centre, and concerning the American mines or enterprises seeking capital in London, will be of the greatest value and, we doubt not, will be fully appreciated. Worthy enterprises will be benefited and unworthy schemes be more effectively exposed through the increased influence which this office in London will bring.

We bespeak for our representative, Mr. WALKER, the confidence and courtesy so long and so fully extended to the JOURNAL by our British constituency.

THE eleven talc mills of St. Lawrence County, New York, have been purchased by a company, with CHAUNCEY M. DEPEW and H. WALTER WEBB at its head. This organization is practically a talc trust so far as the production of this State is concerned, but the output of the mines of North and South Carolina and those of Virginia will hardly allow this combination to force prices to excessive figures.

FORGED steel projectiles have heretofore been thought to be necessary for use in piercing armor of the latest types, but some recent trials seem to prove that shells of steel cast by the Hadfield process are almost as efficient as the Holtzer or Carpenter forged shot, while they can be produced at a much lower cost. The cast-steel shells tried were fired from a 10-in. gun against a steel plate, and the results showed equal penetration with the forged shells, with no more injury to the projectile itself. The trials are to be continued further.

MINES on the Gympie Gold Field in Queensland have suffered during recent severe floods; some 26 of the principal ones were flooded, and it will be some time before work can be fully resumed or the damage repaired. Owing to this stocks of these companies fell 20 per cent. on an average. It is difficult to understand how flood could cause such damage to lode mines unless they had been stoped to the surface; otherwise it must have been due to lack of proper precautions or possibly to an extremely pervious country rock.

THE new armored cruiser "New York" on her preliminary trial trip reached a speed of 19.5 knots an hour in Delaware Bay, and increased it to 20.5 knots on reaching deeper water. This is a remarkable speed for a new ship, whose engines have not been running long enough to reach their best condition. It has been exceeded by the Spanish "Reina Regente" and the Argentine "25 de Maio," both light cruisers, but has never been equaled by an armored or partially armored ship, or by one of so great a weight and displacement as the "New York."

THE Japanese Government is engaged in prospecting the oil deposits on the coast near Idzuosaki, where small quantities of petroleum have for many years been obtained by wells sunk to the depths of 100 to 250 ft. by very simple methods. The oil obtained is of a better quality than the Baku petroleum, but does not yield as high a percentage of refined oil as the Pennsylvania product. What can be obtained by sinking deeper wells and by improved methods is still uncertain, as the explorations have but recently been begun. The Russian petroleum has already made

some inroads into American oil trade in the far East, and it is further threatened by possible developments in Sumatra, in Burmah, and now in Japan.

A REPORT on the phosphate industry has been forwarded to the Senate by Commissioner of Labor CARROL D. WRIGHT. From this report it appears that \$4,705,582 has been expended on plants, and \$14,366,067 in land, while some 9,165 hands are employed, of whom 5,240 are in South Carolina mines. The total expenditure for labor in 1892 amounted to \$2,473,265. The average annual earnings for each man employed were \$211 in the Florida land mines and \$355 in the river mines. When compared with the exciting boom times the industry appears quiet, and the low price of the fertilizer tends to depression, but, all things considered, it is in the healthy condition of legitimate mining, much preferable to the abnormal inflation of the speculative era.

THE British & Foreign Mines Development Company of London which has been brought prominently before our readers, we have to announce, has gone out of existence and has disappeared, no one knows where, leaving debts behind. We have made inquiries on the spot into the personnel of this company, but have not been able to ascertain further than that the leading spirit was a Mr. J. Hopwood Wilson. The company commenced operations with excellent prospects, as the officers were in touch with willing capitalists and with sufficiently capable experts. It appears, however, that they soon commenced promoting disreputable concerns and lost the confidence of all with whom they came in contact—we consequently issue this warning.

It appears that this campaign for better roads is not to be allowed to lag, and some of the enthusiastic leaders who have already given it much time and work are arranging to press upon the attention of Congress the plan for the establishment of a road bureau in the Agricultural Department at Washington. Arguments for better highways are not hard to find at this season of the year, and a reference to our market and news columns each week will serve to show the bad condition of the roads assigned as a cause for depression of trade, delay in prosecuting work, and for other results equally undesirable. While opinions may differ as to details, there can be no doubt that good work might be done by the Department of Agriculture in spreading information as to the best methods of building and maintaining roads, and its assistance would be valuable if the proposed bureau of roads was carried on with the same energy and intelligence as the Forestry division, for example. Few classes suffer more, on the whole, from bad roads than those engaged in mining, and they certainly ought to be interested in any improvement of the present general condition of affairs in this respect. But the making of new government bureaus is not a good way to improve roads. We have far too many "bureaus" now. They simply absorb money and make politics.

LABOR AND COMPETITION.

In my article on "Labor and Strikes," published in the JOURNAL of March 24th, I treated the action of the United States court in the Ann Arbor railway case as if it had been already consummated, whereas, at the time of the present writing, the final decisions in both branches of that case have not been announced. The injunction granted was temporary, and whether it will be confirmed after the full hearing of both sides remains to be seen. On the other hand, the question whether certain employes of the Lake Shore railroad shall be punished for contempt of court in disobeying the preliminary injunction also remains to be decided, but this has no special interest outside of the immediate case. For it will be settled as a question of fact upon the evidence in this particular case, the principle that disobedience to an order of court is punishable not being at all in controversy. The accused persons had tried to prove that they acted without knowledge of the order, or that their acts did not disobey it. Their testimony, including that of Mr. ARTHUR, the head of the great Brotherhood of Locomotive Engineers, presents an unfortunate appearance of evasion and subterfuge, and, even if it should effect a technical escape from punishment in this particular instance, will scarcely dispose either the courts or the public in favor of the ingenious violators of law.

Again, my last article may be open to criticism as implying that the preliminary injunction granted by the United States Court in the Ann Arbor case was based on the existence of an implied contract, the violation of which it forbade. The telegraphic summaries of the arguments at the subsequent hearing indicate that this may, perhaps, turn out not to be the real ground. At least, it seems to have been argued that the United States Court as such could not interfere in a case of simple violation of contract (except under certain well known conditions, giving it unquestioned jurisdiction); that a State court would be primarily the proper tribunal for such a question; and that the action of the United States Court in this case was really based on an alleged infraction of the Interstate Commerce law. The point may prove important as a part of the tactic of this special contest, but it does not affect the general principle that the contract between employer and employe implies obedience to the laws

and public policy, and that a violation of this implication may be summarily forbidden, when the legal remedy of damages is inadequate or inapplicable. The question, Which court has jurisdiction? is wholly subordinate.

I understand that in the more recent case of the strike of the New York garment makers (which certainly does not involve the Interstate Commerce law) the remedy of an injunction has been besought by the employers. The result will be interesting, as tending to settle the legal relations of the boycott.

But this latter case presents some other aspects, perhaps still more significant, to which I wish to call attention, confining myself, as heretofore, to those features which have a wider application.

It appears that in this instance two great "labor organizations" are in conflict. Mr. GOMPERS, the head of the "Federation," and Mr. POWDERLY, the head of the "Knights," are on the ground to direct the campaign; and the latter society, in order to "get even" with the former for a previous injury, propose to support the employers in this instance. The situation suggests three principal comments, which I shall briefly state.

1. The wordy war between the two "labor organizations" furnishes additional proof of the formal and conventional character of much of the alleged bitterness of feeling between "labor" and "capital." No doubt the reckless expression of such feeling produces a permanent effect among ignorant individuals, but the leaders of "labor" do not share it. Their vocabulary of wrath and scorn is kept for use against anybody who stands in the way of their plans: and as soon as a given war is over, they "shake hands across the bloody chasm" as readily as other politicians. The rage, like the "wrongs," is part of the ammunition for the immediate conflict; and if the enemy happens to be, not "capital," but the representative of some other group of labor, this ammunition is just as freely used—and leaves as little sulphur in the air.

2. We have here a case of competition between two organizations engaged in the business of furnishing workmen to employers. The notion that the failure of these two concerns to "combine" so as to make the strike and the boycott irresistible is a misfortune, and seems to me highly amusing. Why should monopolies everywhere else be considered evils, and a monopoly of labor in a given trade be a good thing? It is a pity only that there are not half a dozen instead of only two strong organizations competing for the business of furnishing "cutters" to tailors. Such a rivalry is the most trustworthy test of the merits of a contest between employers and employed. And if the two rivals proceed to boycott one another they will make the boycott ridiculous, which is almost as good as making it illegal.

3. But I have not yet observed that either party in this latest fight has fixed upon the other the odious name of "scab." It may come to that, but thus far it has not. But why not? If the Knights may accept work on terms which the Federation refuses, why may not individuals outside of both organizations do the same?

As I write, the latest news is that Commander GOMPERS and Commander POWDERLY are going to have a conference, and perhaps arrange matters so that "labor" will present a united front to "capital." I have heard somewhere that it is positively wicked for rivals to hold conferences and make agreements calculated to remove competition. But perhaps it is all right if "labor" does it. Only, if anybody should be left after the GOMPERS-POWDERLY reconciliation who is not in either of the two organizations, and yet is a cutter and would like to cut, why may he not cut? He will be no greater sinner day after to-morrow than the POWDERLY people were day before yesterday.

Those of us who believe in competition for the gander as well as the goose are not anxious to have it destroyed by a bargain, and so long as any competition is left we want to see it have fair play.

R. W. R.

NEW PUBLICATIONS.

JOHNSTON'S ELECTRICAL AND STREET RAILWAY DIRECTORY. New York; The W. J. Johnston Company, Limited.

In our notice of this convenient directory in last week's issue an error of the types made the price \$4, when it should have been given as \$5, which is the correct statement.

LOGARITHMIC TABLES. By Prof. George W. Jones, of Cornell University, Ithaca, N. Y. George W. Jones. 160 pages. Price \$1.

This work has been so highly appreciated by instructors and students that a fourth edition has been prepared by the author to meet the demand. The author, in enlarging it and widening its scope, has sought to avoid errors by repeated comparisons with the tables of Vega, Hutton, Bremiker, and other computators; and where any doubt arose, the figures were recalculated. It is stated that the possible error of any logarithm, as printed in the tables, is half a millionth, and the possible error of any tabular difference one-millionth; but the probable error is much less. To promote the detection of errors in the tables, Professor Jones offers \$1 for the first notice of every such error.

To facilitate the work of reference, and to avoid straining the eyes, the logarithms are arranged in blocks of five, so that instead of tracing the line across the page and down the columns, the computer can guide himself by correspondences of position in the blocks. The

book contains besides the regular logarithms, trigonometric functions, squares, cubes, etc., several tables of constants of chemistry, engineering and physics, weights and measures, etc., which greatly add to its value. The pages are large and open, the type clear and in such variety, large and small, that every figure stands out by itself; the paper is of the best quality and the typography and press-work are excellent.

MANUAL OF IRRIGATION ENGINEERING. By Herbert M. Wilson, C. E. New York: John Wiley & Sons. 1893. 8vo, 351 pages, illustrated. Price \$4.

The great and growing importance of the subject of irrigation in the arid region of the United States is evinced in the attention given to it by the State and Federal governments, and by the appearance of popular treatises and handbooks, of which this one is a specimen of more than average value. Irrigation has but just reached among us the stage at which it must invoke the aid of engineering science on the one side, and jurisprudence on the other. The former is needed to effect the economic use (that is, the maximum result at minimum proportional cost and waste) of the available water supply; the latter, to regulate equitably the distribution of that result. On the subject of "water rights," I shall only say, at this time, that it is full of difficulty, both in theory and in practice, and that, with the settlement of the country, it becomes more and more a problem of public character. In cases like that of the Rio Grande, where the citizens of another nation, along the lower course of the river, are affected by the diversion and consumption of its waters above, the difficulty assumes international importance. So long as settlers are few, and there is water in overwhelming abundance for all, no serious trouble is encountered. But when somebody must suffer for lack of water, it is not easy to determine who it shall be, and to what extent the suffering shall go. Nor is it clear that the nation should be the victim, when individuals do not suffer. For instance, if the settlers on a certain stream have "appropriated" the water they desire, and left none for public lands which are thereby made valueless, is there no remedy?

Engineering science touches such problems in a peculiar way, not recognized by social students as pertinent, and still less appreciated in its full importance. The part which science plays in all departments of the modern State is, indeed, strangely overlooked or underrated. It has, in fact, both created and solved more problems of sociology than all other agencies put together. There would be, in the case before us, no motive for disputes over water rights, if science had not made it possible to send the products of agriculture to distant markets. There would always be water enough to support the population which could afford to live in a region without railroads. But having supplied the conditions of competition, science deals with the results by saying, "Before we fall to fighting about the distribution of water, let us ascertain the amount of available supply, and stop unnecessary waste." This may sound to the doctrinaire like a feeble evasion or alleviation of the difficulty. But history tells a different story, emphasizing in this, as in so many other cases, the wisdom of reducing an alleged evil to a minimum before applying "radical" remedies.

No stronger illustration of this principle could be given than is afforded by the operations of English engineers in Egypt during the last ten years. I have already told the story in these columns; and I need only sum it up, at this time, by saying that when the English took hold of Egyptian irrigation, there was a reign of oppression and corruption in the distribution of the Nile water, which was fast reducing the native population to slavery by "freezing out," or rather drying out, the small proprietors, and was, at the same time, reducing the arable land itself, little by little, to barren desert. The magnificently fair and firm administration of just laws has remedied one-half the evil; but this would have been impracticable, I think, had not engineering science abolished the other half, or rather, demonstrated the practicability of abolishing it, and made great advances toward that end. For the opposition of Turks, Levantines, speculators and favorites of all classes to an equitable system of water distribution might have proved victorious but for the proof, speedily afforded, that everybody (the rascals included) was better off under such a system, reinforced by skillful engineering, than under the old regime of cheating and grabbing; while the rehabilitation of the bankrupt finances of Egypt has satisfied the bondholders who quietly pull the strings of diplomacy that the new order of things is blessing humanity in the form of interest and dividends. In other words, the English engineers have proved that there is water enough in the dry season to furnish the necessary irrigation for all the land in Egypt that needs it, and that the mere prevention of useless waste solves the problem of national prosperity. That the triumph of scientific methods would be equally complete in every arid region, we may not venture to presume; but certain it is, that there would be in all cases, after such a treatment, much less of the original difficulty to be dealt with than is usually imagined.

Mr. Wilson, the author and compiler of the book before me, has furnished to the publications of the United States Geological Survey two valuable treatises, one on "Irrigation in India," constituting Part II. of the twelfth annual report (1891), and one on "American Irrigation Engineering," constituting Part II. of the thirteenth annual report. These, together with other publications of the survey (such as the reports of Thompson and Dalton in the tenth annual report, Part II., and of Newell in several successive annual reports) have furnished much of the material for the present more popular treatise, which is specially adapted to the conditions of our Western practice.

The book is divided into three parts, treating respectively of hydrography, canals and storage reservoirs. Under hydrography, there are chapters on precipitation, evaporation and absorption, run-off and flow of streams, sub-surface water sources, alkali, drainage and sedimentation, quantity of water required, pressure and motion of water, and flow and measurement of water in open channels. Under canals and canal works, there are chapters on classes of irrigation, alignment, slope and cross-section, head works and diversion weirs, scouring sluices, regulators and escapes, falls and drainage works, distributaries, and application of water and pipe irrigation. Under storage reservoirs,

there are chapters on location and capacity of reservoirs, earth and loose rock dams, masonry dams, waste ways and outlet sluices, and pumping, tools and maintenance. And there is a good index.

It will be seen that the scheme is sufficiently comprehensive. Indeed, it is evident at once that for a volume of only 351 pages, index included, the book is too comprehensive to be thorough. An examination of its pages confirms this prima facie conclusion. Mr. Wilson has not attempted to exhaust any part of his subject; nor has he, in general, treated any part with the elaborate detail appropriate to a discussion before an audience of specialists. He takes pains to say in his preface that "great care has been taken throughout the volume to avoid the use of mathematics;" and the reason he states is, that "many of the formulas given on the flow of water in open or closed channels, on the discharge from catchment basins, and on strains in masonry dams are exceedingly faulty and misleading." His work would have had more value for educated engineers if he had pointed out and discussed these misleading formulas, or even included in his reference lists some titles which I do not find there, and which would guide the theoretical student to sources of information. But we can have no fault to find with an author for not doing what he disclaims the intention of doing. Mr. Wilson has not produced an original discussion of his theme, enriching technical literature with a new authority of the first rank; but he has furnished a popular review of it, calculated to be widely useful to beginners in study or practice, and by no means without convenience and value for expert engineers. The books he cites are not numerous; but they are good, and they are for the most part easily accessible. His descriptions of different irrigation works, etc., are clear and interesting, though usually very brief, and sometimes unnecessarily meager. He might have spared space enough, for instance, in describing the Walnut Grove dam, to say that it was situated in Yavapai County, Arizona; and a similar criticism is applicable to a good many other works, descriptions and pictures of which are given without naming their special localities.

Mr. Wilson's account of existing practice in the West is highly interesting, and goes to show that our irrigation engineers are already gaining a firm grasp upon the elements of the problem with which they have to deal. In some respects, however, they have got beyond the position in which he has, as it were, "kodaked" them. For instance, on the immensely important question of the prevention of leakage from reservoirs and canals, I do not find allusion to any other remedy than that of natural or artificial puddling with clay, though I have looked with sincere desire and much care for some reference to the practice of lining reservoirs with two layers of hot-rolled asphalt, each $\frac{1}{2}$ -in. in thickness, the lower one being held in the place by steel pins, the heads of which are covered by the second layer. This is highly spoken of by engineers of experience; but I have never seen it described in print. It would be interesting to know more about its details and the record it has made.

After making all deductions, critical or hypercritical, the fact remains that Mr. Wilson's book is one of those convenient and useful summaries that everybody concerned in irrigation will need and use and value. It is handsome and handy; it brings together much information not to be got otherwise without laborious gleaning; it points the way to much more; it exhibits common sense and is not unscientific, though mainly empirical. And I think it will do much good in a field which needs it. Both the engineering and the legislation of the future in this country must be backed by a popular intelligence sufficiently educated to comprehend the general nature of the questions involved and their bearing upon the national welfare; and nothing can more powerfully operate toward that result than the diffusion through books, not too technical for general readers, of the knowledge already possessed by experts at home and abroad.

R. W. R.

BOOKS RECEIVED.

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

The Journal of the Iron and Steel Institute, Volume II., 1892. London, England: E. & F. N. Spon. Pages 664.

Foreign Office Reports on Trade and Finance. Annual Series, 1893. Nos. 1153-1158. London, England: H. M. Stationery Office.

Transactions of the American Institute of Electrical Engineers, Volume IX. New York: Published by the Institute. Pages 860.

Columbian Exposition: New Bird's-eye View of the Grounds and Buildings. Chicago and New York: Rand, McNally & Co. Colored plate 39 x 27 in.

Foreign Office Reports on Subjects of General and Commercial Interest. Miscellaneous Series, 1893. Nos. 276-280. London, England: H. M. Stationery Office.

Mines and Mineral Statistics of the State of Michigan. By James P. Edwards, C. E., Commissioner of Mineral Statistics. Lansing, Mich.: State Printers. Pages 138.

Bulletin of the United States Fish Commission, Volume X., for 1890. Marshall McDonald, Commissioner. Washington: Government Printing Office. Pages 450; illustrated.

Telephone Lines and Their Properties. By Wm. J. Hopkins, Professor of Physics in the Drexel Institute. New York: Longmans, Green & Co. Pages 258, illustrated; price \$1.50.

Annual Report of the Minister of Mines of the Province of British Columbia for the Year Ending December 31st, 1892. Hon. James Baker, Minister of Mines. Victoria, B. C.: Issued by the Province.

United States Geological Survey, Monograph XX. Geology of the Eureka District, Nevada. By Arnold Hague. Washington: Government Printing Office. Pages 400; illustrated and accompanied by atlas.

The Measurement of Electrical Currents, and Other Advanced Primers of Electricity. By Edwin J. Houston, A. M. New York: The W. J. Johnston Company, Limited. Pages 429, with 169 illustrations. Price, \$1.

Geological and Natural History Survey of Minnesota. First Report of the State Zoologist, with Notes on the Birds of Minnesota. Henry F. Nachtrieb, State Zoologist. Minneapolis, Minn.: State Printers. Pages 488.

Pumping Machinery: A Hand-Book of the Construction and Management of Steam and Power Pumping Machines. By William M. Barr. Philadelphia: The J. B. Lippincott Company. Pages 448; 260 illustrations; price, \$5.

Annual Report and Statement of the Chief of the Bureau of Statistics, Treasury Department, on the Foreign Commerce and Navigation, Immigration and Tonnage of the United States for the Year Ending June 30th, 1892. Washington: Government Printing Office. Pages 1248.

CORRESPONDENCE

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Russell Process and Pyritic Smelting.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Referring to the letter of Mr. Herbert Lang in your issue of March 18th, I would like to have the gentleman's opinion of the adaptability of an ore of the following composition for pyritic smelting: Pb, 2.27%; S₂O₃, 21.66%; BaSO₄, 20.9%; C.O., 10.9%; MgO, 4.24%; Fe, 10.02%; Zn, 2.85%; Cu, .16%; S, 8.10%; As, trace.

The above is the average analysis of 30,000 tons of ore treated at the works, which he designates as the "Aspen Works" in his letter, last year by the Russell process.

My knowledge of pyritic smelting is as limited as his seems to be about the Russell process, and, as he has expressed an opinion as to the methods used at these works, and judging from his letter, he is an expert on pyritic smelting, I would like very much to have his opinion on the above subject.

* ASPEN, Colo., March 23d.

WILLARD S. MORSE.

The Marsac Refinery.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Your editorial of February 25th on "The Hyposulphite Lixiviation Process" contains some statements that may convey a false impression. The new process for refining sulphides, in operation at the Marsac mill since February 16th, consists in dissolving the dry sulphides in concentrated, boiling sulphuric acid, the apparatus and modus operandi being essentially the same as that used in parting Dore bars. It had been generally assumed that sulphides could not be treated by sulphuric acid. The principal advantage of the new method, as compared with the process introduced by the writer, consists in the parting of gold and silver, both metals being obtained as fine bars. You state correctly that the old process introduced by the writer was a technical success, but condemn it from a commercial standpoint. The latter opinion is not shared by Mr. W. G. Lamb, who was in charge of the refinery. Mr. Lamb has promised to give me a full set of statistics, and it is my purpose to publish these as an appendix to my Institute paper, "The Marsac Refinery," read at the Plattsburgh meeting, June, 1892.

Mr. Dewey has reconstructed the Marsac refinery at his own expense, and has taken the contract to refine the sulphides at a stated figure per ounce of silver, guaranteeing to return the full assay value of the sulphides in gold and silver in fine bars.

OAKLAND, Cal., March 7, 1893.

C. A. STETEFELD.

Keck's "Review of Ore Deposits in Various Countries."

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your issue of March 18th Doctor Raymond was kind enough to criticise my little pamphlet. As he always hits the nail on the head, I am sorry to state that in one point he was somewhat missing, as he accuses me of the wholesale adoption of Sandberger's theory. It is easily explained why he did so. I often observe in American literature, and in conversation with mining experts, that they talk about Sandberger whenever they mean to talk about leaching. But, Professor Sandberger entirely denies the ascension theory, as he could never demonstrate it on regular, well defined fissure veins; although he does not deny the formation of ascension veins going on before our eyes in California. For a small part of the veins he gives credit to the descension, but for the majority of veins to the lateral secretion theory; by which he means that the materials which had filled the fissures had been leached out of the wall rocks, until the solutions arrived at the fissure, where that process of which he speaks went on. But in my pamphlet I give just credit to the ascension theory, which, especially in various mines in the Rocky Mountains, allows a satisfactory explanation.

On page 14, where I say of the primitive part of the Leadville deposits, "there were no waters percolating yet through these horizontal plastic sediments 10,000 ft. below the bottom of the former ocean," etc., and further on the same page it will be found that I cannot agree with Sandberger in regard to the primitive parts of the Leadville ore deposits at all; and the same in other cases, as on page 22. But as we miners are scratching around only in very small depths, and as Sandberger's theory often has good chances in the upper parts of the lodes, I had to mention him so often; and thus Doctor Raymond came to that wholesale idea.

Two well known scientists in Germany and Austria wrote me letters praising my pamphlet, for the very reason that I did not accept Sandberger's theory throughout, and also for its brevity, "as it wants to give an historical picture of the various stages of development or decomposition visible in the deposits," which will induce our prospectors to do some logical thinking, and observation by analogy. Whenever the time may come, that men can explain the genesis of the primitive parts of ore deposits, the explanation will be found not by a professor of geology, but by a professor of physics.

COLORADO SPRINGS, C. lo., March 23, 1893.

RUDOLPH KECK.

The Persistence of Ores in Lodes in Depth.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your issue of March 4th, Mr. George E. Collins takes exception to my statement that the deep mines of the Caribrea district of Cornwall are becoming poorer than they were before they reached their present depths. He then quotes the yield of tin per ton of ore broken in three mines, Caribrea, Cook's Kitchen, and Tineroft.

I would point out that he only gives the quality of the ore produced but not the quantity. A mine may become poor in two ways, by a diminution in the tenor of the ore or by a decrease in the size of the lode. Let me also draw attention to the fact that the three mines above mentioned are all, as allowed by your correspondent, on the Dolcoath or Highbarnow lode. It will be remembered that I instanced Dolcoath as a notable exception to the general non-persistence of ores in lodes in depth.

On turning to the dividend list of the Cornish tin mines for the year 1892 (as given in the "Cornwall Gazette"), I find that the total decreased from £91,724 in 1891 to £77,162 in 1892, this, notwithstanding, Dolcoath increased its dividends from £19,975 in 1891 to £32,900 in 1892. Cook's Kitchen does not appear on the list. This mine has been a steady drain on its shareholders for many years. Tineroft and Caribrea both show diminutions in the amount of dividends paid, the former decreasing from £9,750 in 1891 to £3,000 in 1892, while the latter paid only £17,250 in 1892, as against £27,000 in the previous year. During the past year mining operations ceased in several mines, of which the most noteworthy are Wheal Eliza, South Phoenix, Callington, United, and Violet Seaton. Operations were resumed at one idle property previously.

The classic mining regions of Great Britain are no marked exception in the matter of the ordinary non-persistence of ore in depth. The hills of the "old county" are dotted over with engine houses that are silent and pumps that are idle; of the many lured mines that have been worked in that region during the past centuries only a small proportion are now actively at work. It is not pleasant to dwell upon the fact that mines, as a rule, do not become more productive with increasing depth; rather let us think that nature in her beneficence has placed the most valuable portions of the lodes where man can more easily exploit them. The fact, however, remains and the statement founded upon it is, I submit, though unpleasant, yet true, and its proper recognition can in no way be hurtful to the best interests of the mining industry.

DENVER, March 22, 1893.

T. A. RICKARD.

Some Misconceptions Concerning Asbestos.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your issue of March 25th Mr. Albert H. Chester protests against my suggestion that the name asbestos be restricted to fibrous serpentine. In support of his protest he appeals in the first place to language, saying: "We have in our language several adjectives made from it (the word asbestos) such as asbestic, asbestiform, etc. Its meaning is thus fixed by long usage." To my view of the matter this stand does not appear to be well taken. As I have already pointed out, the widely extended use of fibrous serpentine under the name asbestos has made the great majority of the inhabitants of our land familiar with the mineral and with its name asbestos. As a consequence the adjectives above mentioned at once carry the thoughts to the asbestos of commerce, the hydrated magnesian silicate, the fibrous form of serpentine.

When Mr. Chester states that "all lists of chemical supplies include asbestos of various grades" I quite agree with him, but it must be remembered that these different grades are not different mineral species. They are different qualities or grades of one and the same mineral species, fibrous serpentine; and it may be added these various grades are usually the product of my own Canadian province of Quebec.

On the other hand when Mr. Chester states that "a chemist ordering it (asbestos) would expect to receive good old-fashioned asbestos" (by which I presume he means fibrous hornblende) "and would be justified in expecting it," I cannot agree with him.

I happen to be a chemist in active practice, and may be permitted to speak on this point. I am confident, too, that American chemists generally will agree with me when I say that a chemist who orders asbestos from a dealer in chemical supplies generally expects to receive, and does receive, Canadian asbestos, the hydrated magnesian silicate or fibrous serpentine. For some special purposes Italian fiber of similar composition may be specified.

If Mr. Chester will order asbestos from a dealer in chemical supplies, and will send to some chemist (for analysis) the material he receives, I think he will, on receipt of the certificate of analysis, wish to correct his statement about "good old-fashioned asbestos."

But again Mr. Chester appears to infer that I am inclined to discredit the statement that a napkin made of fibrous hornblende "may be thrown into a hot fire and remain there without injury."

I am quite willing to admit that a napkin, if made of fibrous hornblende, is practically uninjured by fire; my skepticism is as to these ancient napkins being made of fibrous hornblende. I wish to know where hornblende having fibers so fine and flexible that they may be spun and woven is to be found.

MONTREAL, March 28, 1893.

J. T. DONALD.

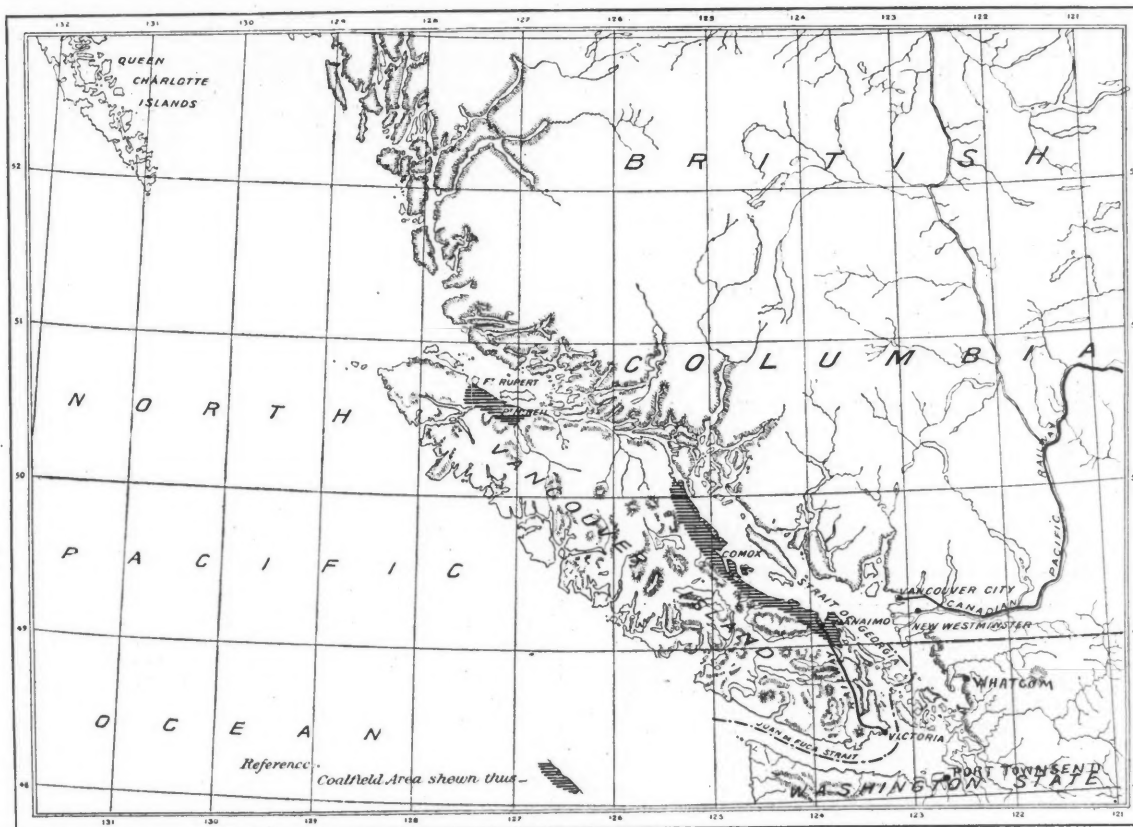
Ship Building in Great Britain.—The total tonnage launched in Great Britain in 1892 was 1,300,142 tons; about the same as in 1891 and 1890, but 46,000 tons below 1889. Excluding war ships, the merchant tonnage floated was 1,131,816 tons, considerably less than in 1891. A larger proportion of the total is sailing tonnage—22%, as against 18½% in 1891. As to material 98% of the shipping built was of steel. There was a decrease in the proportion of tonnage built for foreign orders, which has been falling off for several years.

THE COAL FIELDS OF VANCOUVER ISLAND.*

The island of Vancouver, in the colony of British Columbia, has about 14,000 square miles, the chief town being Victoria, situate at the southern end, and having a population of about 25,000. It is reached by steamer from Vancouver and New Westminster in British Columbia, and from Port Townsend and Seattle in the State of Washington. Nanaimo, the chief town in the coalfields, is about 70 miles, by rail, north of Victoria, is directly opposite Vancouver across the Straits of Georgia, and has a population of some 6,000 or 8,000. It is beautifully situated on a sunny slope on the east shore of the island. It is within a few miles of the southern or southeastern extremity of the coalfields, which extend to the northward about 100 miles. The average width of the field is about 5 miles. It is worked in two districts, Nanaimo, and Comox, 50 to 60 miles north of Nanaimo, but of the 1,000,000 tons raised in 1891 the Nanaimo district contributed over 80%. Two seams are worked, with an average of 5 ft. each of clean coal. The base of the measures is a hard igneous rock resembling trap, and it is said that the coal occasionally lies immediately upon the trap. The overlying strata of sandstones and shales are barren, and between these and the coal is a well marked conglomerate. The deepest shaft is one put down on a small island in the harbor of Nanaimo, and it tapped the lowest workable seam at a depth of 720 ft. This seam is not troubled with water or firedamp to any considerable extent; two explosions that have occurred in it were due princ-

THE GEOLOGICAL SURVEY OF NORTH CAROLINA.

The appropriation of \$10,000 per annum made by North Carolina, for the purpose of making a geological survey of the State, has been renewed by the legislature, and Prof. Joseph A. Holmes continued in charge. The North Carolina survey was among the first, if not the very first, to be established, its existence dating back to 1819. Since that time Olmstead, Mitchell, Emmons, Kerr, and Holmes have carried the work along under varying circumstances. There have been wide gaps in the records, and a sad lack of systematic work, due chiefly to the uncertain favor of the legislature and the diversity of the interests to be conciliated. The Kerr survey, extending practically from 1866 to 1883, enjoyed the longest lease of life and did a great deal to bring the ores, timbers, minerals, climate, and water powers of the State into notice. Prof. Kerr was an indefatigable worker, and a man of high scientific attainments, but he lacked system, and that pertinacity of purpose that finishes one thing before going to the next. This is one reason why the North Carolina survey presents something of a "scrappy" appearance. It is a dictionary of geological surveys and changes the subject much too often for consecutive reading. From 1883 to 1890 there was no survey in existence, but Professor Holmes was successful in re-establishing it in the latter year. He retired from the Professorship of Geology in the University of North Carolina, which he had held for several years, to take charge of the survey, and has been actively engaged in field work ever since. No publications have



MAP OF VANCOUVER ISLAND SHOWING THE COAL FIELDS.

pally to dust. A very elaborate system of water pipes is in use at one colliery to lay the dust and lessen the risk of danger from this source. At one of the mines electrical coal cutters are in use, and at another an electrical haulage plant.

Mr. Ormiston does not think that the quality of the coal is equal to that of the Scottish, as the ash is about twice as high and the fixed carbon below the standard for good steam coal. At the Union mines, in the Comox District, the coal is in some respects better than at Nanaimo, the ash is perhaps no lower, but the fixed carbon is higher and the coking property is much better developed.

Good firm coke has been made of washed Comox slack, but the ash runs to 18%. At no place on the island has anthracite been found, not even where the coal lies immediately upon the trap, which leads to the conclusion that the trap had cooled before the coal was laid down. The age of the coal deposits seems to be Cretaceous, variations in physical structure and in fixed carbon having arisen from local conditions of pressure, etc.

The coal deposits of the Queen Charlotte group of islands, 150 miles northwest of Vancouver Island, are thought to be of similar age. Some thin seams have also been found on the north end of the island, and prospecting for workable seams is now in progress.

Large numbers of Chinese and Japanese are employed at the mines, and they soon become expert miners.

The future of coal mining on the island of Vancouver and along the northwest coast generally seems bright. Mining in the State of Washington shows a remarkable activity, although the coal seems to be of a more ligitic character than that further north.

* Abstract from article by Mr. James Ormiston in the "Transactions" of the Mining Institute of Scotland, Volume XIV., Part 8.

been issued under his directorship, although several reports are now in press, as:

Biennial Report of the State Geologist for 1891-1892, to include a historical account of the former geological surveys and a statement of the methods, results and expenditures of the present survey.

Bulletin No. 1. Iron Ores in North Carolina, by H. B. C. Nitze, E. M. Jos. A. Holmes.

Bulletin No. 2. Building Stones in North Carolina, by J. V. Lewis and Jos. A. Holmes.

Bulletin No. 3. Minerals and Mineral Localities of North Carolina, by W. C. Kerr, F. A. Genth, and others (a republication of one of Kerr's reports, with additions.)

Bulletin No. 4. The Timber Trees of North Carolina, their distribution and uses, by Gifford Pinchot and W. W. Ashe.

During the year 1892 the iron ore deposits of the State have been in charge of Mr. H. B. C. Nitze. He visited nearly every known deposit of any importance, particularly in the counties west of the Blue Ridge. The Dan River coal field and the Turkey Cove marble deposits were prospected with a diamond drill under supervision of W. L. Spoon. The minerals of the mica and corundum regions have been investigated by Prof. S. L. Penfield, of Yale, who visited the localities in person. The geologic structure of the Cherokee limestone belt was examined during the latter part of the year by Arthur Keith. Professor Holmes and J. V. Lewis have examined the building stones, especially the granites and sandstones, and Professor Holmes and H. L. Harris have worked on the coastal plane and along the Roanoke and Tar rivers. Mr. W. W. Ashe has had charge of the work in forestry, especially in the Western part of the State. Dr. Frank P. Venable, and Chas. Baskerville, of the university, have done the chemical work of the survey, analyzing iron ores, nickel ores, limestones, pyrite, etc. They

analyzed during the year about 150 samples, which under the difficulties besetting outside work at any Southern college, is certainly a good record.

We await the issue of the reports with interest, especially that of Mr. Nitze on the iron ores. His paper of a year ago on the titaniferous ores of the Northwest portion of the State was widely discussed, and taken in connection with the recent investigations of A. J. Rossi on the use of such ores in the blast furnace may lead to their utilization.

THE CAMPBELL WASHING MACHINE AS USED ON COPPER ORES.

The Campbell coal washer, described in the Engineering and Mining Journal, February 11th, 1893, has been applied to concentrating Michigan copper ores, and in reply to an inquiry, Professor Campbell gives the following account of the results obtained:

The unavoidable losses in concentrating the Michigan native copper ores are so heavy that better methods are always being sought for. The machine used had a working area of 8 ft. in length by 20 in. in width, and the method was as follows:

1. The concentrates treated were from the last, or third, series of finishing jigs. All of the heavy or most available copper had been removed before reaching these jigs, and it is with the greatest difficulty that they perform their work in separating the more massive grains of iron sand from the fine, flaky copper, sensitive to every impulse. The concentrate, or hutchwork, which has from 20 to 40% copper, was fed into the Campbell machine at the rate of about 10 tons per day. The headings contained about 70% of copper and the tailings showed only a trace of a variable copper by vanning.

2. The tailings from the first run were again passed over the machine at the same rate, the adjustments as to inclination and force and quantity of water having been suitably arranged. Headings containing about 40% copper, nearly all of the "shell" character, were obtained. It is the practice in all of the mills only partially to enrich the sands of the finishing jigs to insure against too heavy loss. The poor concentrate is either sent to the smelter, or is further enriched in the keeve, which gives three skimmings. The top skimming is passed over the slime tables, the middle skimming is treated over in the keeve and the bottom skimming is rich enough to barrel and includes nearly all of the heavy and available copper.

3. The middlings from the keeve were fed to the machine at the usual rate, and gave about equal volumes of headings and tailings, the former being about 60% copper.

4. These tailings were again passed over the machine, and so far enriched as to give good concentrates, suitable for barreling, and the tailings thoroughly impoverished.

5. The top skimming of the keeve, which is generally considered as worthless, since the copper is so fine and otherwise treacherous that practically none of it can be caught and enriched upon the jig, can be caught upon the slime table only in very small quantity, to be again returned to the top skimming of the keeve, and thus, it will be seen, that eventually the copper is almost entirely washed in the great mass of barren sands and carried away by the enormous floods of water. About 400 lbs. of this top skimming of the keeve was treated on the Campbell machine, which gave headings of about 50 lbs. of 60% copper.

6. Concentrates from the slime tables were treated. The machine was adjusted in inclination, and the quantity and position of the top water so regulated as to give the best results for the particular material. The concentrates from the slime tables are caught and classified into headings, middlings and tailings. The heavy copper, and, in fact, the largest proportion of the copper, lodges in the first third of the buddle. The middle section carries the light, flaky copper that is prone to mix with the black sand. The third section, or tailings, is said to be almost entirely barren of available copper. About 500 lbs. of the middlings were selected and subjected to treatment, to test the machine fairly as a slime washer. The very fine slime copper came promptly to the head, accumulated in a massive sheet on the steep incline and escaped as rich headings of about 60% copper and poor tailings. There was also a proportion of very fine hutchwork of headings and tailings.

7. The tailings from this operation were also treated, and gave headings of very fine, shelly and mixed copper, which probably had never before been brought to light in the mill, except by hand manipulation. The motion of the pan was too violent to give the best results, and it was found best to use adjustable cone pulleys to arrive at the best results by gradual approaches. The speed, the force of impact or percussion, the length of stroke, inclination of pan and quantity and force of water are all adjustable with such precision that the finest slimes may be treated advantageously. The pulp must not be allowed to pack or even thicken so much as to prevent the separation of the copper from the gangue. Again, too violent action would so unseat the fine concentrate that the machine would be powerless to carry it to and over the head. This excessive sensitiveness to treatment of slimes has always been a source of great annoyance, not only from the careful, skillful watching that is necessary, but from the diminished output, the returns being out of proportion to the trouble. Bearing these facts in mind, a passing reference may be made to the hand manipulation of vanning, as practiced upon a sample of mixed sands from the stamps. When agitated upon the shovel with water in the usual way, the fine stuff, whether copper or sand, settles to the bottom, filling the interstices of the coarser grains. The coarse barren sand is crowded to the surface, because of its larger size and lesser density. The finer grades are left to arrange themselves in the interstitial spaces, according to the size of the grains and the density of the matter. The very finest, or slime, settles to the bottom like a viscous fluid, and remains there, except in the event of more violent agitation, when the slime is further intermixed with water and thus made less viscous. This slime plays the important part of so enlivening the entire mass that gravity may assert itself in the arrangement of all the particles according to size and density. The copper,

coarse and fine, should rest on a stratum, and as a unit of mass upon the shovel. The fine copper should fill the interstitial spaces, and, in general, the finest should be found at the bottom and most protected from the surface swash of water. The manipulation has served to classify the assay, so as to place the barren gangue where it will be floated from the surface by the water, and the concentrate at the bottom in a compactly knit mass, clinging to the shovel with such tenacity that it is directed by its motions to the head. The finest slime copper protects the coarse copper by expelling the barren slime from the interstitial spaces, and knitting the mass compactly together. The slime copper is in turn protected by the coarse copper, which acts as a stable support and gives some coherence to the mass. The behavior of the shell, or flake copper, in the process of vanning is still to be observed, but it is necessary to refer only to that class of shelly stuff that is common to the mill—an intermixture of thin shells or flakes with grains of heavy black sand. It is impossible to change the homogeneity of this assay by any amount of skillful agitation of the shovel. Only partial separation can be attained by vanning a small quantity at a time. The shelly copper cannot penetrate through the closely knit mass of black sand, because there is not the space for it to pass through. The only means of providing a passage is by more violent agitation, which stirs up the mass from the top by more thorough intermixture of water. But the weights of the individual flakes of copper are not sufficient to enable them to gravitate through the interstitial water spaces. Increased depth of the assay makes it more difficult for the shelly copper to penetrate the more compact mass of the lower depths. Agitation stirs up the topmost portion where the water is in excess and most active, while that portion of the assay nearest the shovel or bottom is compacted by the weight of the overlying mass and by its deficit of water. Thus, it will be understood that practically and theoretically shelly copper cannot be vanned successfully. It is a well known fact among the mill men of Lake Superior that all the vanning and panning machines that have won a creditable reputation through years of successful service have failed most completely in the treatment of shelly copper. I am told that the coarser grades of shelly copper may be caught and enriched by treatment upon the jig, but that the capacity is reduced to one ton or even half a ton per 24 hours, and that the slime or shelly copper can never be saved. The jig in its action differs from that of the vanner, in that it keeps the stuff more thoroughly stirred up throughout, thus giving the length and breadth of space for the passage of the shelly copper. There is greater diffusiveness at the bottom, while the tip sands are finer, lighter and closely matted, thus forming, to a great extent, a barrier to the shelly copper. In other words, the lighter copper is driven back from the bottom, and it is pinched out from the top; hence the reduced capacity and inefficiency of the jig. Exactly the reverse takes place in the vanner, both in action and in order of arrangement of the sizes of sand, as heretofore explained.

In this machine effort has been made to combine the principles of the jig with those of the vanner, and with such modifications as to secure the best results. As in the jig, water penetrates the mass from the bottom, but it is not so violently sent, or in such larger quantities as to drive back the lighter copper. Like the jig, it gathers hutchwork, and it performs the further service of classifying the hutch into headings and tailings. Like the jig, it maintains its bed which may be of greater or less thickness as the case may demand. Unlike the jig, the concentrate is from 6 to 8 ft. from the tailings, while in the jig, the poor and the rich are separated by only a few inches, or sometimes only a fraction of an inch. Like the jig, it has great capacity, and it treats all grades of sizes from the finest slime to the coarsest stuff that can be treated on the jig. Unlike the jig, it treats mixed grades best. Unlike the jig, the coarse grades rest on top, while the finer penetrate to the bottom; in this particular, it is like the vanner. In general, it is like the vanner, except so far as it is imbued with the principles of the jig.

Time and conditions were unfavorable to a run on unclassified tailings on a commercial scale, but an experimental run on a few hundred pounds of unsized stuff, gave very promising results. As in washing coal, so in the concentration of ores, the machine seems best adapted to the treatment of unsized materials. The capacity is thus greatly increased, the headings thoroughly enriched and the tailings impoverished. The hutchwork may be classified into two or more grades, but generally it has been found sufficient to have only one discharge, since it may be made as rich as desired.

Consumption and Production of Metals in France.—The "Journal des Mines" gives the following estimate of the consumption and production of metals in France in 1891: Lead consumption, 60,500 tons; production, 6,655 tons. Zinc consumption, 47,000 tons; production, 20,680 tons. Copper consumption, 28,000 tons; production, 840 tons. Nickel consumption, 921 tons; production, 332 tons.

Coal Production of the Breslau District, Germany.—The total output in 1892 was 20,334,664 metric tons (2,204.6 lbs.), a decrease of 1,223,224 tons from the output of 1891, and of 189,445 tons from that of 1890. The decrease in the output of stone coal (hard bituminous) since 1891 was 1,262,300 tons, and since 1890, 225,378 tons. The output of brown coal does not show much variation, as it was 448,489 tons in 1890, 446,346 in 1891, and 485,422 in 1892.

The increase in the total number of workmen since 1891 is 1,098, and since 1890, 7,392; the number in 1892 being 74,495. Since 1890 there has been a rise in the average spot value of the stone coal from \$1.36 to \$1.51 in 1891, and \$1.49 in 1892, while the average value of the brown coal has remained stationary, being \$0.87 in 1890, \$0.89 in 1891, and \$0.88 in 1892. From tables giving the production, workmen and average f. o. b. mine price of the stone and brown coal since 1890, it appears that in 1890 the average output was 306 tons per man employed; in 1891 it was 294 tons, and in 1892 it had decreased to 273 tons. The total receipts from coal sales averaged \$412.69 per man employed in 1890; \$439.74 in 1891, and \$402.75 in 1892. The number of days' work is not given.

THE LOSSES IN DRESSING CORNISH TIN ORES.

In no part of the world, it is safe to say, where mining is a leading industry has so little improvement been made in methods, particularly in concentration, as in Cornwall. Large losses have always occurred in the dressing of tin ores, and every year a considerable part of the output comes from the tin concentrates produced by workers in the rivers below the mines and dressing works. At the present time, however, the Cornish men, are opening their eyes to their losses and are erecting at many of the mines improved dressing works. The effect of this is shown in increased output from the works and a reduction in the amount obtained by the stream workers. Attention to these losses and the possibilities of reducing them still further was called by Mr. James Hicks in a paper read before the Mining Association and Institute of Cornwall. In this and the discussion that followed a number of interesting points were brought forward.

In early days, when mining was confined to the upper horizons, the black tin occurred in comparatively coarse crystals, and it was thought proper to crush the ore coarsely, but in the lower levels now being worked the finely disseminated mineral requires a finer crushing to liberate it from the gangue. As a consequence the screens employed have become finer and finer, until now they are No. 35 or 36 B. W. G. This finer crushing has increased the production of slimes, as have the pulverizers employed. The old methods of jigging and buddling were unable to save a high proportion of this, and as a consequence other appliances were employed, but the works are far from perfect, as may be imagined from the statement that nearly 50% of the slime tin is lost in dressing.

The mines on the Carn Brea Hill, which include Dolcoath, Cook's Kitchen, Carn Brea, East Pool and other famous mines, whose tailings flow into the Red River, produced in the aggregate 7,558 tons of black tin in 1890, and 8,234 tons in 1891. The stream workers on the tailings of these properties sold in 1890, 1,302 tons, valued at £52,080; but in 1891 their output fell off to 879 tons 16 cwt., owing to the improvements made in dressing works, notably at the Tineroft, Carn Brea, Greenville and East Pool mines. In 1890 the tin caught by the stream workers was 17% in weight, and nearly 13% in value of that produced at the works, and when it is considered that the methods employed in working the tailings are extremely simple, it is safe to say that the 405,000 tons of

MEETING OF THE LAKE SUPERIOR MINING INSTITUTE.

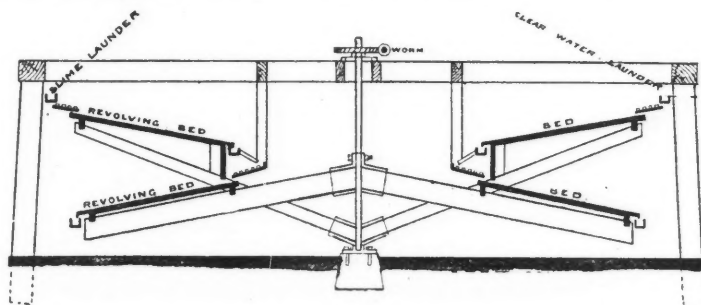
The meeting of Lake Superior mining men, to which some previous references have been made, began at Iron Mountain, Mich., March 22d. A large number were present, and 135 names were entered on the roll of the new association. At the opening meeting Maj. W. W. Bent, of Ironwood, was chosen chairman, and Mr. William Kelly, of Vulcan, secretary. A committee was appointed on organization; a paper was read by Mr. Per Larsson, on "Methods of Mining Soft Ores," which will appear in full in the next issue of the Engineering and Mining Journal.

The morning of March 23d was occupied by visits to the Chapin, Hamilton, Aragon and Vulcan mines.

A large number of members were interested in examining the mammoth pumping engine of D shaft of the Chapin mine. It is a vertical compound engine, with 50 and 100-in. high and low-pressure cylinders, respectively, with 10-ft. stroke, and intended to operate a Cornish lift pump, which is expected to lift 3,000 gals. of water per minute from a depth of 1,500 ft., and will develop 1,500 indicated H. P. It is capable of running up to 10 strokes per minute, and can be run by steam or compressed-air.

After inspecting this pump the members walked to the Hamilton property to witness an exhibition of bailing from a depth of 1,400 ft. The bailers were wrought iron tanks, 43 ft. in length and about 42 in. in diameter, with a valve in the side near the bottom. A round trip was made in about 70 seconds, and at each trip about 2,800 gals. of water was raised and discharged, the power consisting of a pair of Webster, Camp & Lane direct-acting Corliss engines, with hand friction wheels for flat rope. The cylinders were 20 in. by 48 in. stroke.

There is little difference between the actual performance of this pair of engines and the huge pump of the Chapin company; the latter is guaranteed to deliver 3,000 gals. from a depth of 1,500 ft. per minute, while the other delivers 2,800 gals. from 1,400 ft.; a difference of 200 gals. and 100 ft. The following points are in favor of bailing as against pumping: The difference in the initial cost both of plant and installation—the latter item being probably 50% of the former; second, chances of disposal of the plant in case of removal or closing down; if the water should fall far below the normal flow, the hoisting engines could be used for raising ore; and, finally, if the larger pump were to fail through any small (or large) breakage, the entire plant is stopped,



HICK'S TWO DECKER REVOLVING FRAME FOR DRESSING SLIMES.

tailings which flow annually into the Red River carry 20% of their original contents, or about 8 lbs. to the ton of black tin are lost to the mines. In the aggregate, this is a large amount—over 1,000 tons of black tin annually—valued at about £100,000. But if these results are to be considered poor, those at the mines whose tailings flow into Portreath River are still worse. These mines, which include Wheat, Basset and West Basset, produced 1,247 tons 13 cwt. of black tin in 1890, and in 1891, 1,279 tons. The river workers did nearly as well as the miners apparently, as mining and crushing had been done in advance, and produced in 1890 428 tons of black tin, and in 1891, 330 tons, an average of 33% in quality of that produced at the mines, and 25% in value. (The slime tin recovered from the rivers is always less valuable than the black tin from the mine.)

The two-decker revolving buddle designed by Mr. James Hicks, which we illustrate herewith, is automatic, and designed with the object of twice dressing the slime in one operation. The lower table receives the tailings from the first, the concentrates being washed off into a receiving pit. In its management the chief point required is the regulation of the distribution of proper proportion of slimes and clear water. In operation it is similar to an Evans or a Linkenbach table.

The Electrical Volatility of the Metals.—Some hopes were entertained a short time ago of the ultimate evolution of a commercial method by means of which articles might be coated with thin films produced by the volatilization of metals in the electric arc, says the London "Electrical Review." It must be reluctantly admitted now that further experimental evidence has recently been adduced by Mr. W. L. Dudley that the application of the electro-disposition of metallic films in this way is very limited. Gold films, it appears, may be readily procured, and the difficulties may be largely obviated by following the method of Kundt. When the metals themselves were used as terminals for the electric arc, the film deposited was usually granular in nature, and altogether unsatisfactory. The condensed spark between the two points of metal inclosed in an exhaustive glass tube serves well in some cases. No relationship has yet been discovered between the degree of electrical volatility and any known constant, but a relationship might be found if the volatilization were carried on under such conditions of temperature as would insure molecular conditions. The metals given in the order of their electrical volatility are as follows: Palladium, gold, silver, lead, tin, platinum, copper, cadmium, nickel, iridium, iron. In this list the electrical volatility is placed at 103, that of the last at 5.5.

and unless the mine is equipped with a full line of steam pumps there is danger of the mine becoming flooded—while in the case of the double engine one bailer might be kept at work while the other engine was being repaired.

After inspecting the plants of the East and West Vulcan mines Dr. N. P. Hulst read his paper upon the geology of that portion of the Menominee Range east of the Menominee River. He described, in a clear and concise manner, the laying down, formation and characteristics of the Huronian and Silurian series of rocks. He traced upon a large map, prepared to accompany his paper, the line of the outcrop of the dolomite, starting at Waucedah (Breen mine), and working in a course north of west, as far as the Menominee River.

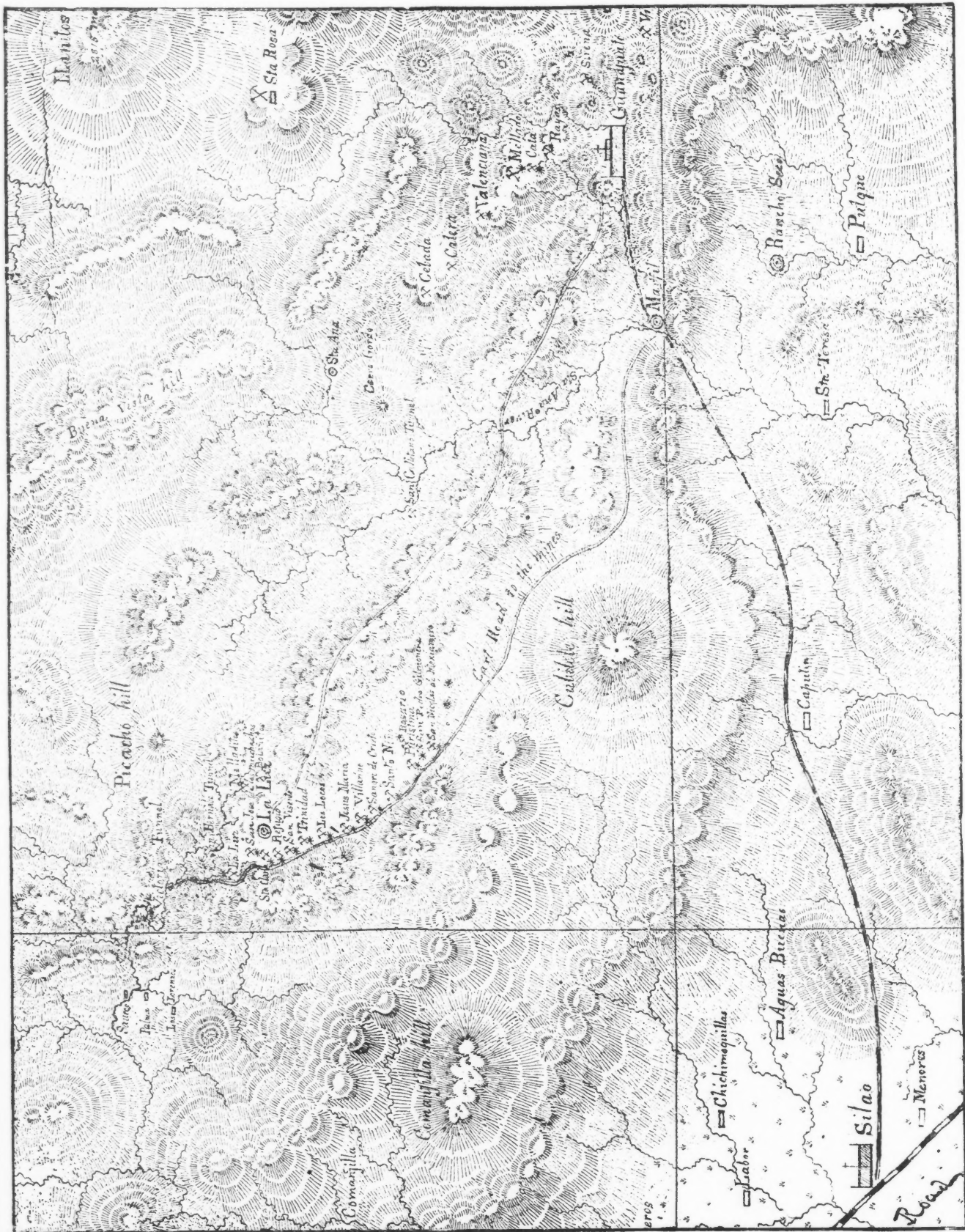
The limestone has a dip to the south, from Waucedah westward for a distance of eight miles; there is then a break in the formation, owing to its being covered by more recent rocks; when the strata again appear upon their westward trend it is found that the dip has reversed, and forms what is known as an overturn. The dip of the mines at Breen, Vulcan, Curry, Murray and Cyclops is to the south, while it is to the north at the Quinnesec, Keel Ridge, Pewabic, Millie, Chapin, Hamilton and Ludington mines.

The topographical feature noted in connection with the occurrence of ore bodies on this part of the range is, that wherever there is a marked break in the range of hills the chances of finding lenses of ore are found to be greater there than where the hills are continuous.

This condition, it may be noted, is exactly opposite to that found to exist upon the Gogebic range—there, when there is a break in the continuity of the hills, there is very apt to be an absence of ore-lenses in the valley locations; the ore usually being found in the hills up to the break.

The next forenoon was spent at the Pewabic mine and the Quinnesec Falls power house for generating compressed-air—which was greatly enjoyed by all. At noon the meeting ended, and it is safe to say that in spite of fog and disagreeable weather the members heartily and thoroughly enjoyed the meeting, which was pervaded by a feeling of goodfellowship and a desire on the part of those present to learn something new; the Lake Superior Mining Institute has been successfully launched, and her guidance placed in the hands of competent officers—may she ever avoid the reefs of petty jealousies, and sail for years to come in the open sea of knowledge.

The committee on permanent organization and officers reported; the report was adopted, and the name given above accepted as the title of the association. The following officers were elected: President, Nel-



MAP OF THE MINING DISTRICT OF GUANAJUATO, MEXICO.

son P. Hulst, of Milwaukee; vice-presidents, for two years, J. T. Jones, F. P. Mills, and Graham Pope; for one year, M. W. Burt, J. Parke Channing; board of managers, for two years, Walter Fitch, John Duncan; for one year, J. N. McNaughton, Chas. McGregor, and Wm. Kelly; secretary, Professor Denton, of Houghton; treasurer, C. M. Boss.

It was decided to hold two meetings yearly, to begin on the first Wednesday in March and the first Wednesday in September. Ishpeming was selected as the place for the fall meeting. The usual resolutions of thanks were passed. Much interest was expressed in the new society, and it is expected that a number of papers will be presented at the September meeting.

PYRITES VERSUS BRIMSTONE.

By Phillip C. Hoffman.

The advantage pyrites possess from a financial standpoint over brimstone is self-evident, and it is, therefore, not astonishing that the former has at last come into more general use in this country. But in the many articles that have appeared on this subject within the past few years it seems to me that brimstone, on the other hand, has not always been fairly treated. While it is undoubtedly advisable to construct, as a rule, all new works for pyrites, there are some facts which ought to be brought into more prominence, when it comes to the question of changing a brimstone plant. The most important thereof is the reduction of the yearly output by at least one-fourth. I will endeavor to illustrate this more clearly in the following calculations:

To produce 8,000 tons 50 Bé sulphuric acid per annum from brimstone requires in this latitude (Baltimore) a chamber space of 150,000 cu. ft., counting on a yield of 4.80 lbs., 50 Bé sulphuric acid to the pound of sulphur burnt. The erection of a modern plant of that size would cost, say \$35,000. A pyrites plant would require a capacity of 200,000 cu. ft. under the same conditions, and would cost \$50,000. The consumption of nitrate of soda is taken at 3 and 3 1/4%, respectively. The amortization of plant is calculated at 8% per annum of original cost price with brimstone and 10% with pyrites.

I.—BRIMSTONE.

1,534 tons (2,210 lbs.) " thirds " brimstone (97% S.), at \$29.....	\$30,680
100,000 lbs. nitrate of soda, at 2 1/4c.....	2,250
600 tons coal, at \$3.....	1,800
Labor.....	1,500
Jobbing repairs.....	700
General expenses (management, insurance, taxes, etc.).....	2,500
Amortization of plant, \$35,000, at 8%.....	2,800
8,000 tons 50 Bé sulphuric acid, cost.....	\$42,230
Making the cost per ton, \$5.28.	

II.—PYRITES.

3,472 tons (2,090 lbs.) 48% pyrites (97% avails), at \$7.56.....	\$24,394
116,000 lbs. nitrate of soda, at 2 1/4c.....	2,610
600 tons coal, at \$3.....	1,800
Breaking pyrites, at 15c per ton.....	521
Labor.....	3,000
Jobbing repairs.....	1,000
General expenses (management, insurance, taxes, etc.).....	3,000
Amortization of plant, \$50,000, at 10%.....	5,000
8,000 tons 50 Bé sulphuric acid, cost.....	\$41,235
Making the cost per ton, \$5.16.	

Based on these calculations I maintain that as long as sulphur can be contracted for at reasonable figures, it is in a good many cases a better policy to continue with the brimstone in preference to changing to pyrites, with the consequent necessity of either reducing the annual output or making up the deficiency by purchasing acid. This latter method would require, for example, the purchase of about 2,000 tons 50 Bé acid in case of making the change with chambers of 150,000 cu. ft. capacity.

German Pig Iron Production.—The production of pig iron in Germany for the years 1891 and 1892 is reported as follows, in metric tons:

	1891.	1892.
Forge pig and spiegel.....	1,747,731	1,822,167
Bessemer iron.....	384,196	313,819
Basic iron.....	1,704,279	2,066,400
Foundry iron.....	616,411	630,670
Totals.....	4,452,617	4,793,056

The total increase was 7.7%. The notable points in the statement are the increase of 17.7% in production of basic iron, and the decrease of 18.3% in Bessemer pig.

Mexican Smelting Works.—A paper recently read before the Institution of Civil Engineers, in London, by Mr. J. W. Malcomson, described the erection of a plant treating 100 tons of ore a day, at Los Trojes, Michoacan, for the Michoacan Railway & Mining Company, of London. A slag dump from the existing works was utilized as a charging floor, and the furnaces were erected at a lower level, upon which were also placed the machinery, engines, etc. The furnaces, which were water-jacketed, were 36 in. by 84 in. at the tuyeres, and 12 ft. 6 in. from the tuyeres to the charging floor. They had each ten 3-in. tuyeres, five each side, facing each other; the water-jackets were of wrought iron, with a 6-in. water space between the fore and back plates. Air was supplied to the furnaces at a pressure of 10 oz. per square inch from the blowers in the machinery building. The furnace was built of firebrick to the charging floor, and above that level of common red brick. A 3-ft. wrought iron downtake, leading to a main flue, was provided to carry off the dust and fume. In the machine shed, a 6-ft. Pelton wheel was attached directly to the center of the 4-in. main shaft, and supplied with water from a tank, situated 487 ft. above the works, through a 12-in. wrought iron pipe. The wheel made 270 revolutions per minute. The blowers were of the Baker type, discharging 30 cu. ft. of air per revolution. All air mains were above ground. Ventilation of smelting works, the author stated, seldom received much attention in Mexico, but if proper regard were paid to it much sickness and discomfort might be prevented.

THE MINING DISTRICT OF GUANAJUATO, MEXICO.

To many people a Mexican silver mine is close kin to a Spanish castle, but the fact remains that the most productive silver mines of the world are in Mexico; not the most productive at present, but in the gross amount of the metal won in the past.

The mining district of Guanajuato, of which we publish herewith a map, has been an active producer of silver since 1548, and the known amount of metal obtained with the crude and wasteful methods in use approximates \$650,000,000. Some of the greatest shafts ever put down are in the vicinity of the city of Guanajuato, one of them being 40 ft. in diameter and over 1,400 ft. deep. The new shaft of the Bolanitos mine is 20 ft. in diameter and 600 ft. deep. This mine is said to have produced over \$3,000,000 in the six years preceding 1890.

The entire district is permeated with veins of quartz in metamorphic clay slate, nearly all the chief silver bearing minerals being present. Only the first class ores are worked commercially, those whose assay value falls below \$30 per ton not being available for the Washoe or the patio process. The excessive cost of transportation and of fuel militates against the working of any ores of this grade. Packing on mules to the Haciendas costs \$3.50 per ton, and treatment of the ores \$11.50; these two items added to the \$12 for mining, hoisting, pumping, sorting, etc., leave but a small margin on a \$30 ore.

The unwatering of the lower levels of the mines has attracted considerable attention of recent years, and two companies are now engaged in an undertaking of this kind. The first of these on the ground was an English company, and work has been prosecuted on the San Calletano tunnel for several years. The second is the Victoria Tunnel Company, an American concern, which proposes to drain the La Luz group of mines by a tunnel 7,000 ft. in length. This group lies about 12 miles west of north of Guanajuato, and comprises 14 mines, viz., San Bernabe, La Luz, San Jose, Santa Clara, Refugio, San Vicente, La Trinidad, Los Locos, Jesus Maria, Villarino, El Santo Nino, La Purisima, San Pedro, and San Nicholas. Up to the end of 1889 the group had been credited with a production of \$312,860,000, since 1548.

The main difficulty in the way of the successful treatment of the ores seems to be the excessive cost of fuel. Wood costs \$10 and coal \$22 per ton, so that the operations, even if the mines can be made dry enough for working, would be restricted to the better class of ores. It is in respect of such undertakings that the importation of Southern coal and coke into Mexico deserves to be carefully investigated. Coal for domestic consumption will cut but a small figure in Mexico for many years to come, and it is to metallurgical and often industrial enterprises that one must look for a market.

Coal and Iron in Belgium.—The coal production of Belgium in 1892 was 19,591,908 metric tons, a decrease of 0.4% from 1891. The output of pig iron was: Foundry, 74,500; forge, 458,002; Bessemer, 235,819; total, 768,321 tons; showing an increase of 84,195 tons, or 12.3%, over 1891. The production of finished iron in 1892 was 554,679 tons, an increase of 10.3% over the previous year. The steel product for 1892 was 467,729 tons, showing an increase of 17,211 tons, or 3.7%. Of the steel produced 208,301 tons were made into rails, plates and shapes, and 259,428 tons are reported as ingots and castings.

The Latest Marine Engines.—An interesting comparison might be made between the engines which the Fairfield company is building for the new Cunard steamers and those which the Cramp company, in Philadelphia, will put in the two large ships just begun for the Inman line. The English and American steamers are about the same size, and will undoubtedly be rivals in speed; they are expected to make at least 23 knots an hour. The Cunard steamers have triple-expansion engines with five cylinders; two high-pressure, 38 in. in diameter; one intermediate, 75 in.; and two low-pressure, each 100 in.; all are 66-in. stroke. The high-pressure cylinders are placed above the low-pressure, working on the same piston rod, so that there are three cranks. The working boiler pressure will be 160 lbs. The American steamers will have quadruple-expansion engines, intended to work with a boiler pressure of 210 lbs. The cylinders are 36 in., 50 in., 71 in. and 100 in. in diameter and 60-in. stroke. These great ships will require about 30,000 H. P. to drive them at full speed.

The Iowa Geological Survey.—At the last meeting of the legislature a bill was passed providing for a geological survey of Iowa. The Geological Board, which, by the bill, was made to consist of governor, state auditor, president of the Agricultural College, president of the State University, and president of the Iowa Academy of Science, has appointed Prof. S. Calvin state geologist; Dr. Charles R. Keyes was made assistant geologist; Prof. G. E. Patrick, chemist. The "Transit," published at the State University, says that it is the purpose of the survey to make a thorough examination of the geological structure of the State, and to represent accurately on maps the distribution of its various formations. The extent and value of the coals, clays, cement rocks and building stones of Iowa, as well as the ores of lead, zinc, iron and other metals, will be among the special and prominent subjects of inquiry. The matter of artesian and mineral waters will be reported on by a competent expert. The soils of the State, which will always remain the chief source of its prosperity, will receive full attention. In a word, so far as it can be accomplished by the means at the disposal of the survey, all facts that can throw any light on the geological resources of Iowa will be ascertained and the information placed within reach of the people. Notwithstanding the lateness of the season at which it was possible to begin work, a great deal has been already accomplished. Work on regional geology has been begun in quite a number of counties, and important investigations have already been made on paving brick clays and cements. One noteworthy feature of the present survey is the number of competent investigators who are giving their services without pay. It is expected that there will be at least one such local assistant in each county, so that no geologic facts of scientific or economic interest will fail to be recorded.

VOLUMETRIC DETERMINATION OF LEAD.

Written for the Engineering and Mining Journal by H. H. Alexander.

The following is a volumetric determination of lead, which I have used for some time at the works of the Globe Smelting and Refining Company, at Denver, Colo., and up to the time of writing, I have obtained very satisfactory results. This method is based upon the fact that ammonium molybdate when added to a hot solution of lead acetate will give a precipitate of molybdate of lead ($PbMoO_4$), which is insoluble in acetic acid. Any excess of ammonium molybdate will give a yellow color with a freshly prepared solution of tannin. In practice I make the tannin solution by taking one part of tannin and dissolving it in three hundred parts of water, which I use as the indicator. The standard solution of ammonium molybdate is prepared by taking nine grams and dissolving it in one liter of water. This will give about 1% solution. If the solution is not clear, it can be made so by adding a few drops of ammonium hydrate. This solution is then to be accurately standardized with pure sulphate of lead.

I prefer to weigh out 300 milligrams of sulphate of lead and dissolve it in hot ammonium acetate; then acidify with acetic acid, and dilute with water up to 250 cc. This is then to be heated to boiling; next add from a burette the molybdate solution, prepared as above mentioned, until all the lead is precipitated as a white precipitate. This is ascertained by placing the drops of tannin solution upon a porcelain plate, and then to these drops are added other drops from the beaker from time to time. As long as the lead is in excess no coloration is produced, but as soon as the molybdate is in excess a yellow color is produced (300 mgs. $PbSO_4 \times .6817 = 204.95$ mgs. Pb). Dissolve from $\frac{1}{2}$ to 1 gram of substance, according to the percentage of lead. Whenever the substance contains over 30% lead, $\frac{1}{2}$ gram will be found to be adequate. The substance so weighed out is then treated in a porcelain casserole with 15 cc. strong nitric acid and 10 cc. strong sulphuric acid. Heat is then applied until all of the nitric acid is completely expelled, which is done by evaporating until fumes of sulphuric anhydride appear; then allow it to cool and dilute with cold water; stir, then boil until all soluble sulphates are brought into solution. Next filter, leaving as much of the precipitate in the casserole as possible. Now wash twice with hot diluted sulphuric acid and once with cold water. The sulphate of lead remaining in the casserole is next dissolved with hot ammonium acetate; pour the hot solution on the filter and allow to run into a clean beaker. This operation is repeated until all of the sulphate of lead is dissolved. Wash out the casserole thoroughly with hot water into the filter. Acidify the solution with acetic acid, dilute up to 250 cc. with hot water. Next heat to boiling and run in from a graduated burette the standardized solution of ammonium molybdate until all lead is precipitated, stirring the solution.

I have ascertained that the method may be somewhat simplified and also shortened by throwing the filter paper through which the soluble sulphates have passed, directly into the casserole containing the sulphate of lead precipitate. Then add the hot ammonium acetate, and digest for a few minutes to insure complete solution of the sulphate of lead; acidify this solution with acetic acid, and dilute up to 250 cc. as before, with hot water; next heat to boiling and titrate as above. I find no material difference in the results, but prefer filtering, as it is much neater.

The lead determination can easily be made in 30 minutes, and we have made as high as four determinations in one hour.

Below are given a few results showing the comparison of determinations made by the gravimetric method and by the volumetric method; a few fire assays are given, to be compared with the new volumetric method.

Nos. 1 and 2 were made with the volumetric method, and checked the same with the gravimetric method. Nos. 3, 4, 5 and 6 were made by Mr. Henry Zisch, head assayer for Mr. E. E. Burlingame, of Denver, who made the volumetric determinations, while I made the gravimetric determinations. Mr. Zisch also checked the method against the fire assays. Nos. 1, 2, 3, 4 and 5 are cupiferous mattes, made by argentiferous lead smelting; No. 6 is the so-called antimony slag, produced from the refinery at these works, which contains, of course, antimony and some arsenic. No. 7 is a silicious ore, produced by the Amethyst mine at Creede. No. 8 is an arsenical iron pyrites. No. 9 is a sulphide ore, the Lamartine, at Idaho Springs, Colo. Nos. 10 and 11 are Aspen ores both containing calcium carbonate and barium sulphate:

No.	Gravimetric.	Volumetric.	Fire assay; gravimetric.	Volumetric.
1.....	18'30	18'35	7.....	4'40
2.....	16'58	16'50	8.....	9'90
3.....	17'20	17'22	9.....	12'60
4.....	22'70	22'25	10.....	25'40
5.....	22'10	22'47	11.....	22'90
6.....	59'00	58'60		

I find that arsenic, antimony and phosphorus do not interfere with this method, as they readily pass through the filter in solution. I am still interested and engaged on this subject, but will be pleased to learn the results and experience of others.

A Glass Metal Solder.—According to the "Journal des Inventeurs" an alloy composed of 95 parts tin and 5 parts copper can be used for soldering glass to metal. It is prepared by adding the copper to the melted tin, stirring with a stick of wood and pouring. The alloy can be made hard or soft or more or less fusible by the addition of $\frac{1}{2}$ % to 1% of lead or zinc.

Lead and Silver Mines of Kara-Tchai, Russia.—According to the "Revue Universelle des Mines," Mr. Vladimir Tomaszewsky has discovered in the basin of the Kouban, in the northern part of the Caucasus, a number of argentiferous lead veins. The mineralized section has an area of 5,685 square kilometers. These properties have been leased for the term of 30 years. Mr. A. D. Kondratieff has made a study of the section.

DIGEST OF RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Department of the Interior.

Railroad Grant—Adjustment—Mineral Land.

In the adjustment of the grant made by act of July 25, 1866, to aid in the construction of the California & Oregon Railroad, the non-mineral character of lands cannot be considered as established by the fact, alone, that the returns of the Surveyor-General do not show said lands to be mineral.—In re California & Oregon Railroad Co.—(Sec'y Noble, decision, March 3, 1893.)

School Land—Mineral Land—Building Stone.

Lands that are declared valuable for ordinary building stone are not excepted as "mineral lands" from a grant to a State from the United States for school purposes.—State of South Dakota v. The Vermont Stone Company, on application of the latter for patent under the mining laws as a placer mine. Mitchell Land District, South Dakota.—(Sec'y's decision, March 3, 1893.)

Coal-Land Railroad—Railroad Grant—Settlement Right.

1. A temporary settlement on known coal land, abandoned shortly thereafter without any substantial improvements, and under which no right, or color of right is acquired under the settlement laws, does not operate to exclude the land from the grant to this company.—Brownfield v. Northern Pacific R. R. Co., involving properties in E. Olympia (Wash.) land district.—(Dec., Sec'y Noble, Feb. 15, 1893.)

Mining Claim—Land Excluded from Application.

Land embraced within a mineral application and subject to appropriation thereunder, but excluded therefrom when entry is made, is thereafter vacant public land and may properly be included within the subsequent application of another, and a discovery on such tract is sufficient to support the later claim.—In re Adams Lode, Glenwood Springs, Colo., Land District.—(Sec'y Noble, decision, February 21, 1893.)

Mining Claim—Protest—Hearing.

On a sufficient showing made by protest, the Interior Department has authority to investigate a mineral entry, and to order a hearing to determine whether there has been due compliance with the mining laws, although it may appear that the adverse location, set up by the protestant, was not made until after the entry in question had been allowed.—Tam et al vs. Stovey, involving "Single Tax" lode-claim, Helena, District, Montana.—Sec'y's decision, March 13th, 1893.)

United States Supreme Court.

Diligence in Prosecuting Claim Necessary.

The Supreme Court of the United States on March 27th promulgated a very important decision in the case of John C. Johnston vs. The Standard Mining Company, wherein it appears that because the plaintiff did not fully appreciate the possibilities of a mining claim located by himself and others in the Roaring Fork Mining District, Colo., and diligently prosecute proceedings to determine his right of title thereto, it was decided that he could not establish his claim to a one-fourth of the undivided whole in trust in the claim for laches.

The case came up to the Supreme Court on appeal from the Circuit Court of the United States for the district of Colorado. Johnston's contention was that in the year 1880 he conveyed a quarter interest in the claim to certain parties, in trust, the conditions being that they should defend his title as against all adverse claimants. He paid no further attention to the matter, neglecting it entirely, until 1885, when he incidentally learned that a patent of the United States Land Office had been issued for the claim, and that his grant had been conveyed to the Standard Mining Company. In 1888 he brought suit to recover his one-quarter interest, but the court below dismissed his bill for laches, which judgment the Supreme Court has just affirmed.

In delivering the opinion of the court Mr. Justice Brown said: "Where the question of laches is in issue the plaintiff is chargeable with such knowledge as he might have obtained upon inquiry, provided the facts already known by him were such as to put a man of ordinary intelligence upon the duty of inquiry. The duty of inquiry was all the more pre-emptory in this case from the fact that the property itself was of uncertain character, and was liable, as is most mining property, to suddenly develop an enormous increase in value. This is actually what took place in this case. A property, which, in October, 1880, the plaintiff sold upon a basis of \$4,800 for the whole mine, is charged on a bill filed October 1st, 1887, to be worth \$1,000,000, exclusive of its accumulated profits. Under such circumstances, where property has been developed by the courage and energy, and at the expense of the defendants, courts will look with disfavor upon the claims of those who have lain idle while awaiting the results of such development, and will require not only clear proof of fraud, but prompt (timely) assertion of the plaintiff's rights."

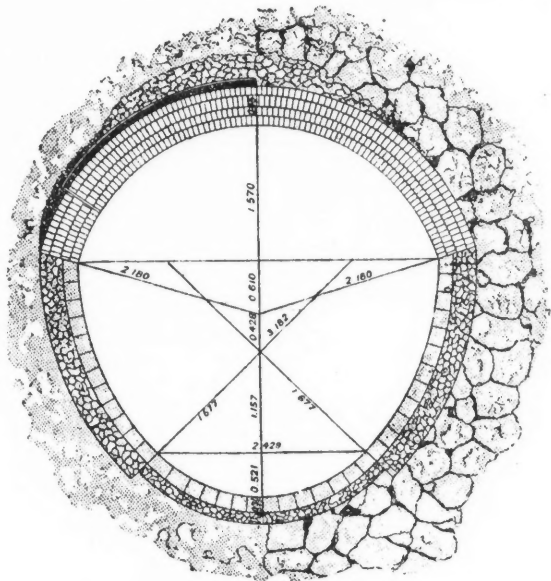
Burmese Amber.—Dr. Noetling, of the Geological Survey of India, has lately written an interesting report on Burmese amber, which he propose to call burmite, because chemical examination has shown it to be totally different from all other fossil resins, and especially from that commonly known as amber, says the London "Mining Journal." The amber is found in the Hukong Valley, access to which is difficult on account of impassable mountain ranges and on account of the jealousy of the natives. It is obtained in a very primitive way. After the harvest the diggers go to the hills, and, selecting a place where there are no pits dug by previous prospectors, shape with their swords a small pointed hoe, a wooden shovel, and a basket of split bamboo. With these they make a hole in the blue clay, removing the refuse by means of the basket, and gradually deepening the shaft. Three men work in company, one below (the shaft not being large enough for more than one at a time), while the others hand up the basket. The amber is found in "pockets," which are generally indicated by strings of coaly matter appearing in the clay.

THE MEXICAN VALLEY DRAINAGE TUNNEL.

The work which is now in progress for the completion of the drainage plan for the valley of Mexico consists chiefly in the construction of the tunnel, a contract for which was let in 1888 to Messrs. Read & Campbell, an English firm. The valley, in which the city of Mexico is situated, has no natural outlet, and the waters of the numerous lakes which it contains rise during the rainy season to a height above the level of the city. The plan of making an outlet for the surplus waters was formed many years ago, when the country was still a colony of Spain, but for many years no work was done upon it. About 1870 it was taken up again and it was decided to utilize the great cutting at Tezquixquia, which was begun by the Spaniards, a tunnel being carried through the intervening hills. The old cut has been cleared out and deepened, and has been lined with stone where necessary, and will be ready before the tunnel. The canal from Lake Tezcooco to the tunnel, a distance of about 30 miles, is under contract, and the work is well advanced, according to the correspondence of the London "Engineer."

The tunnel itself is to be 10,020 meters, or 6.23 miles long, and of oval section, as shown in the accompanying sketch, the extreme height being 4.28 meters and the extreme width 4.18 meters. The method of lining and protecting the work is also shown in the cut. Each lineal meter of tunnel requires 20 cub. m. of excavation, 3.125 cub. m. brickwork; 1.70 cub. m. concrete and 2.10 cub. m. backing. The first work of the present contractors was to sink 25 shafts to the grade level; the depth of these shafts varies from 28 to 93 meters. From each shaft two headings are being run. Up to January 31st last about 7,000 meters of heading had been driven and about 6,000 meters of the tunnel completed. All the shafts are down to grade. It is believed that the tunnel will be finished before the end of 1894.

The ground through which it is being driven is, as a rule, soft, and can be worked almost entirely with picks. In some parts it is of a hard



SECTION OF DRAINAGE TUNNEL, VALLEY OF MEXICO.

compressed clayey sand, almost sandstone, known in Mexico as "teptate," but this disintegrates on exposure, and requires timbering as carefully as the softer materials. In some places running sand has been met, and large quantities of water are found in almost every shaft. The arch is of four rings of brickwork, as shown, and the invert of concrete blocks, both being made on the ground. Large Hoffmann kilns have been erected, capable of turning out 30,000 bricks per day. The size is $9\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{3}{4}$ in., and they are of a better quality than can usually be obtained in Mexico. The majority of the concrete blocks measure $15\frac{3}{4} \times 8 \times 6$ in. The molds for these are made to the proper curves and lined with sheet iron, the concrete being rammed down as soon as they are filled. There is a backing of volcanic stone behind the blocks; and the same stone, a sort of red lava, is pulverized and used in the mortar with which both bricks and concrete blocks are set, the proportions being one part each of ground lava, lime, and sand. The different shafts are connected by a narrow-gauge track, which ends at Zumpango, the terminus of the Hidalgo Railroad, and the contractors have a machine shop and other necessary plant.

Opal Mining in New South Wales.—The White Cliffs opal field is situated in the Yungnulgra country, about 65 miles from Wilcannea. Mr. Jaquet, geologist and surveyor to the Mines Department, has made a report upon the field, in which he says every description of opal can be obtained at White Cliffs. The field at present supports a population of about 20 miners, who own and work the various claims. There is probably an almost unlimited supply of opal in the kaolin beds, and the output could be largely increased if a good market were obtained for the gems. At present only small quantities are exported by the dealers to Europe. According to a note appended to the report by Mr. Pittman, Government Geological Surveyor, the rocks in which the opal occurs appear to be of the upper Cretaceous age, and to correspond to the well known desert sandstone series of Queensland.

Electric Locomotives in France.—For a year past much has been said in France about the use of electricity for long distances on railroads. At the present moment there are three electric locomotives about to be tried upon the principal lines, and they are being constructed upon entirely different systems. For the State railways a locomotive has been designed by M. Heilmann, who has produced an entirely new form of engine, which carries a steam motor operating a dynamo and supplying accumulators. The engine is mounted upon two trucks, and carries an armature on two axles and a boiler in the rear. In working order the engine is said to weigh 90 tons, including six tons of coal and 12 tons of water. Upon the Chemin de Fer du Nord, the chief engineer, M. Sartiaux, has for some time past been engaged upon a locomotive for which the electricity will be stored in accumulators. This engine is now complete and is being experimented on. Another scheme is that proposed by Messrs. Bonneau and Desroziere, engineers on the Paris-Lyons-Mediterranean line, who have taken a very prominent part in adapting electricity to locomotives. They are working out a plan for establishing a number of generating stations, whence the electricity is carried along the lines by aerial wires, and utilized by contact with a metallic brush on the locomotive.

Relief Map of Pennsylvania.—For several months past Mr. Edward B. Harden has been at work in Phoenixville, constructing relief maps of the State for the World's Fair Commission, to a scale of 10,560 ft. to an inch horizontal, 2,000 ft. to an inch vertical (1: 126,720 and 1: 24,000 of nature), in size 13 ft. by 7 ft. 6 in.

On one map, which will probably go into the State building, is shown the county boundaries, principal towns, railroads and streams, with appropriate lettering by which a person can identify every part of the State. Another map, duplicate of the above, which will probably form part of Pennsylvania's exhibit in the Department of Mines, illustrates, in addition to what has been mentioned, the coal, oil and gas fields, pipe lines, iron ore mines and blast furnace locations.

Mr. Harden has also made a relief map of the H. C. Frick Coke Company's lands; scale 12,000 ft. to an inch. On this map is shown the property lines, coal outcrops and areas of coking coal, coke ovens, streams, railroads, common roads and towns, size of the map 16 ft. by 2 ft. 6 in., including over 17,000 ovens; more than 10,000 being the property of the H. C. Frick Coke Company.

Besides these principal works, Mr. Harden has made in addition for the World's Fair Commission a relief map of the floor of the Mammoth coal bed in the Panther Creek Basin, also the same in the Shenandoah and Mahanoy basin of the Southern anthracite coal field, showing the coal areas mined out and yet to be mined from that bed.

Another relief map is of the Cornwall iron ore mine, Lebanon County, and several other relief maps in geological color, of other parts of the State. Many of our readers will remember having seen the relief map of the Cumberland Valley, constructed by John H. and Edward B. Harden for the Cumberland Valley Railroad Company, and a photo-type of the same made for business purposes. We refer those interested in learning more about relief maps, their method of construction and varied uses to a paper on "The Construction of Relief Maps; by John H. Harden and Edward H. Harden," in the transactions of the A. I. M. E., Vol. XVI., page 279.

DIVIDENDS PAID BY MINING COMPANIES DURING MARCH, 1893.

NAME OF COMPANY.	Paid in Mar.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in Mar.	Paid since Jan. 1st.
Alaska, Tr'd w'll, Alaska	.....	\$75,000	Idaho, Cal.	\$7,750	\$23,250
American Turquoise....	.....	60,000	Kennedy, Cal. ....	.....	50,000
Belden Mica, N. H.	\$5,000	15,000	Lexington, Colo.	3,000	9,000
Bi-metallic, Mont.	40,000	120,000	Mayflower Gravel, Cal.	10,000	30,000
Centennial - Eureka, Utah.	15,000	45,000	Minnesota Iron, Minn.	.....	210,000
Champion, Cal.	3,400	10,200	Mollie Gibson, Colo.	150,000	450,000
Colorado Central, Colo. ....	.....	13,750	Morning Star D., Cal.	7,200	21,600
Colorado Fuel Co., Colo. ....	.....	67,120	Napa Cons., Cal. ....	.....	20,000
Cons. New York, Nev. ....	.....	10,000	North Star, Cal.	50,000	50,000
Copper Queen, Ariz. ....	.....	100,000	Pacific Coast Borax....	.....	15,000
Daly Utah.	37,500	112,500	Parrott, Mont.	18,000	54,000
De Lamar, Idaho. ....	.....	100,000	Quincy, Mich. ....	.....	150,000
Elkhorn, Mont.	87,500	87,500	Red Cloud, Idaho. ....	.....	10,000
Enterprise, Colo.	25,000	75,000	Seven Stars, Ariz. ....	.....	37,500
Golden Reward, S. Dak.	5,000	15,000	Standard, Cal.	10,000	10,000
Great Western Quick-silver, Cal.	12,500	37,500	Trinity River Hydraulic, Colo.	2,500	5,000
Hecla Con., Mont.	15,000	45,000	Utah, Utah. ....	.....	5,000
Homestake, S. Dak.	12,500	37,500	W. Y. O. D., Cal.	3,000	9,000
Hope, Mont. ....	.....	75,000	Total.	\$560,250	\$2,370,420
Horn Silver, Utah.	50,000	50,000			

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, MARCH 28TH, 1893.

- 394,121, 394,122. Coal Barge. Jonathan Chase, Boston, Mass., Assignor to Henry Kellogg, Jr., same place.
- 394,134. Gas Engine. John Foss and Charles F. Endter, Springfield, O.; said Endter Assignor to said Foss.
- 394,147. Joint for Gas or Water Pipes. Gordon W. Lloyd, Detroit, Mich.
- 394,173. Self-Adjusting Friction Clutch. Frank M. Shaw, James R. Methven and George M. Sharp, Minneapolis, Minn.
- 394,201. Smoke Consumer. Thurston G. Hall, Chicago, Ill., Assignor to the Hall Chemical and Gas Company, same place.
- 394,207. Steam Pump. George R. Kendrick, Portland, Ind.
- 394,226. Die for Pointing Metal Drills. Francis H. Richards, Hartford, Conn.
- 394,231. Treatment of Metal Plates Prior to Electrolysis.
- 394,232. Apparatus for Electrolyzing Copper. Chas. B. Schoenmehl, Waterbury, Conn., Assignor of one-half to Alden M. Young, same place.
- 394,244, 394,245. Pyrometer. Edward Brown, Philadelphia, Pa.
- 394,302. Feed-Water Heater and Purifier. Ruther McDougal, Chicago, Ill.
- 394,310. Combined Pipe Wrench, Monkey Wrench and Flange Holder. John Winsing, Milwaukee, Wis., Assignor of one-third to Anthony V. Kleflich, same place.
- 394,335. Foot Power Hammer. George Humphrey, Belvidere, Ill.
- 394,412. Steam Engine. Alfred Collins, Vienna, Austria-Hungary.
- 394,471. Grinding or Polishing Wheel and the Art of Manufacturing same. Frederick N. Gardner, Beloit, Wis., Assignor to Chas. H. Besly, Chicago, Ill.

PERSONALS.

Mr. A. W. Pratt, late of the Pratt Laboratory, at Jacksonville, Fla., is now associated with Mr. N. P. Pratt in his laboratory at Atlanta, Ga.

Capt. Henry Truscott, late of the Waverley, has succeeded Capt. James Bryant as superintendent of the Appleton and Loretta mines, Norway, Mich.

Mr. V. M. Brachi, the Mexican representative of the Rand Drill Company, of this city, was in New York recently, but has now returned to the city of Mexico.

Mr. Charles G. Yale, editor of the "Mining and Scientific Press," of San Francisco, has been selected by the State Board of Examiners to edit the State Mineralogical Report.

Mr. George A. Sonnemann, mining engineer, of Boston, Mass., has started on a short professional trip to North Carolina for the purpose of examining a number of gold properties in different parts of the State.

Mr. W. F. Haskins, of Wallace, has been appointed State mining inspector of Idaho. He received his early mining education on the Comstock, and is said to be well qualified for the position.

Mr. W. F. Durfee, for some time past connected with the C. W. Hunt company, has left that company and established an office as consulting engineer and expert in patent cases. His address is at 77 Jewett avenue, West New Brighton, N. Y.

Dr. F. P. Vandenberg, of the Vandenberg Laboratory of Chemical Industry, at Buffalo, N. Y., has just returned from a trip to Venezuela and the island of Trinidad, where he was engaged in examining the asphalt deposits for New York parties.

Capt. W. J. Gilbert, who formerly mined in Lake Superior, Colorado and California, has returned to his native land, Cornwall, where he has introduced a self-feeding device, of his own design, for stamp bottoms at his own Overcoat mine. This is said to be the first introduction of the machine in Cornwall, while its use is universal in this country.

Mr. A. A. Robinson has resigned his position as second vice-president, and general manager of the Atchison, Topeka and Santa Fe Railroad. He has been connected with the road 22 years, beginning as division engineer, and nearly all the company's lines have been built under his supervision. His successor as general manager is Mr. J. J. Frey, recently on the Missouri, Kansas & Texas.

Mr. J. H. Collins, F. G. S., the well known mining engineer and metallurgist, and vice-president of the Institution of Mining and Metallurgy, of London, England, is now on a professional tour in the United States and Mexico. Before returning to England he will make a study of the Chicago Exposition. His address for the months of April and May will be found in the "Professional Directory" in the advertising pages.

The firm of Dickman & Mackenzie has been organized at Chicago to carry on mining expert work and metallurgical chemistry. Mr. Dickman was for several years manager of the Bessemer Department of the Otis Steel Company, at Cleveland, O., and has recently had an office in that city. Mr. J. Kenneth Mackenzie has been with the Illinois Steel Company for four years as head chemist of the Union Works. The office will be in the Rookery Building, Chicago.

Dr. Theodore B. Comstock, the well known mining engineer and metallurgist, director of the Arizona School of Mines at Tucson, is at present engaged in making an extended examination of some mining properties in the State of Chihuahua, Mexico, for some London capitalists. He has made a number of reports on Arizona mines within the past year, and has devised processes for working some of the more refractory ores. As reported in Bulletin No. 3, recently issued by the School of Mines, many of the sulphide ores of Arizona can be profitably worked, and the investigations made in the laboratory under Dr. Comstock's direction have been of great service to the mining industry. At his suggestion several mines have resumed work, with profitable results.

OBITUARY.

Francis Wedge, president of the Griffith & Wedge Company, manufacturers of mining machinery, of Zanesville, O., died in that city March 14th, aged 68. He was born in Staffordshire, England, and emigrated to this country in early life. He had succeeded in building up a most successful business for his firm.

Henry De Groot, well known all over the Pacific coast, was killed in Alameda, Cal., on March 28th, by a railroad train. He was 73 years old. Dr. De Groot did more than any other man to spread the news of Marshall's gold discovery in California. He was born in Schenectady, N. Y.; graduated from Union College and studied law and medicine, but finally joined the New York "Tribune." When the news came of the gold discovery at Coloma, Horace Greeley decided to send a representative to

California, and De Groot was chosen for the mission. He went thither in 1848, verified the news of the discovery and returned to New York. In 1849 he went back to California, where he has since resided.

John Taylor Johnston, who died in New York, March 24th, aged 74 years, was for many years president of the Central Railroad of New Jersey. He took the position when the Central was a struggling company, with only 30 miles of track, and under his administration the road was completed to Easton and later acquired the Lehigh & Susquehanna and the other properties which made it a great coal road. Its success was largely due to Mr. Johnston's energy, business ability and indefatigable purpose; but the latter quality did not serve the road so well in later years, when the Central lost the business of the Delaware, Lackawanna & Western and afterwards of the Lehigh Valley through its president's unwillingness to yield the smallest point. Mr. Johnston retired from business some years ago with a considerable fortune. For the rest he was known as a public spirited citizen and an art collector of much taste and liberality.

SOCIETIES.

California Miners' Association.—At a meeting of the executive committee in San Francisco, March 23d, two delegates were appointed to attend the trans-Mississippi congress at Ogden, Utah, April 24th. The delegates were S. K. Thornton, with Charles G. Yale as alternate, and J. Sonntag, with R. J. Thomas, of Nevada, as alternate. Testimonials were presented to Senator T. H. Ford and Assemblyman R. T. Thomas.

Engineers' Club of Philadelphia.—At the regular meeting on March 18th the secretary announced the death of Mr. W. W. Thayer, and a committee was appointed to prepare a memorial. Mr. George S. Webster exhibited, by means of the projecting lantern, a series of photographs of all the important bridges in Philadelphia that had been built by the City Survey Department, and described their principal dimensions and interesting engineering features. In many cases the bridges were represented by two or more photographs from different points of view, and reproductions of the working drawings.

Western Society of Engineers.—At the regular meeting in Chicago, March 1st, Chas. B. Stowell, George D. Stonestreet and Melville S. Hawkins were elected members. Papers were read on "A Reduction Formula for Stadia Leveling," by J. L. Van Ornum, and on "Relation of Railroad Signaling to Train Accidents," by W. W. Salmon. A plan for doing away with railroad grade crossings in Chicago was presented by Mr. Faust.

A special meeting was held March 16th to consider the plan presented by the finance committee for improving the financial condition of the society. After full discussion, it was resolved that the plan be adopted; that efforts be made to increase the membership and to reduce expenses to the lowest possible point.

Montana Society of Civil Engineers.—The regular monthly meeting was held in Helena, March 11th. Mr. Keerl read a circular from the Department of Agriculture on the effect of tapping for turpentine on long leaf pine. The committee appointed at the annual meeting to prepare and submit to the legislature a bill regulating the compensation of county surveyors stated that the bill was prepared, but never presented to the legislature. The committee was requested to report the bill prepared to the society at its next meeting. The president appointed Messrs. Keerl, Herron and Foss as the committee on library, and Mr. Ryan as committee on membership. Mr. E. H. Beckler's paper on the "Reconnaissance and Location of the Pacific Extension of the Great Northern Railway Line from the East Borders of Washington to Puget Sound" was read by the secretary, Mr. Foss.

INDUSTRIAL NOTES

Topton Furnace, in Berks County, Pa., has gone into blast, having been rebuilt.

The Sheridan Steel and Wheel Company has been organized at Wheeling, W. Va., with \$500,000 capital.

The Valentine Iron Company, Bellefonte, Pa., has started up its works after closing five weeks for repairs.

The Keystone Steel Company, at Norristown, Pa., has been placed in the hands of N. H. Larzere and H. H. Haines as receivers, on application of the creditors. The company has a plant which cost over \$200,000.

The Bethlehem Iron Company, Bethlehem, Pa., recently shipped to Chicago a shaft for the Ferris wheel at the Exposition grounds, which is said to be the largest steel forging of the kind ever made. It is 33 in. in diameter, 45 ft. long, and weighs 89,320 lbs.

The Link Belt Machinery Company, Chicago, Ill., have just sold a complete set of coal and ash handling machinery for the Milwaukee Street Railway Co.'s new power house in Milwaukee, which has 18

boilers; a set of the same class of machinery has also been put in the Auditorium Hotel, Chicago.

The Clayton Air Compressor Works, Brooklyn, N. Y., has issued Catalogue No. 7 in a very handsome form. This catalogue describes and illustrates the latest improvements in and patterns of the company's duplex and single air compressors, pressure governors and other appliances. It is well illustrated.

A press dispatch from Cincinnati says that there is a probability that the iron and steel pipe combine will not be formed; the report is that differences between the parties have arisen. Another report is that it had not fallen through, but is in statu quo; there is some delay; in fact, no progress has been made lately.

The Berlin Iron Bridge Company, of East Berlin, Conn., has received the contract for a new bridge at Norwich, Conn., to cross the tracks of the Norwich & Worcester and the Shetucket River. The bridge will consist of one span of 145 ft., with a roadway 24 ft. wide in the clear, and two sidewalks each 5 ft. wide in the clear. The roadway and sidewalks will both be covered with steel buckle plates and concrete.

The Edgar Thomson Steel Works, Braddock, Pa., owned by the Carnegie company, are to be enlarged. The capacity of the blooming department will be increased to about double what it is now by the addition of two heating furnaces, each having a capacity of 50 ingots. They will be heated by gas. The foundation has been laid for the new foundry and machine shops which are to be built east of the works. It is the intention to build a foundry in which will be made all the castings used in the various Carnegie mills, including rough rolls.

The Aetna Standard Steel Company has been formed at Wheeling, W. Va., by the consolidation of the Aetna Iron and Steel Company and the Standard Iron Company, at Bridgport, O. The new company's capital is \$2,300,000, divided into 1,500,000 shares 8% preferred stock guaranteed and \$800,000 common stock. The two mills have a capacity for turning out nearly 40,000 tons of finished sheet, galvanized, bar, rod and rails a year. A new Bessemer steel plant to supply the two finishing mills will be erected.

The Jeffrey Manufacturing Company, Columbus, O., has recently made several large sales of coal mining machines to mines in Pennsylvania, Ohio and Colorado. The sales were of both compressed air and electrical machines, several of the latter, including complete electrical plants, with engine, dynamo and fixtures. These machines, with the power coal drills, are meeting with much favor. The Jeffrey company announces that its headquarters at the Columbian Exposition will be in Machinery Hall, Section 26, and in the Mines and Mining Building, northeast section on the ground floor.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column and his address will be furnished to any one desiring to supply him.

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

No charge will be made for these services.

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

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

Goods Wanted at Home.

3,007. A double-cylinder hoisting engine outfit (without boiler); size of cylinders 6x8, drum 30 in. diam., 36 in. long, smooth face to suit a wind of 5/8 wire rope 1,000 ft. long, at a speed of 600 ft. per minute, up an incline of 60 ft. to the 900 ft. distance of mine from the washer. Florida.

3,008. Saw mill outfit and planer. Georgia.

3,009. A second-hand, 25 H. P. hoisting engine to raise 15 tons with two or three ropes. North Carolina.

3,010. Machinery for a planing mill, including an 8-in., three-sided molder, an 8 or 12-in. jointer, and a single head shaper. Virginia.

3,011. Shingle mill outfit. Georgia.

3,012. A good, second-hand heading machine. Tennessee.

3,013. A grist mill. Georgia.

3,015. Cotton gins. Georgia.

3,016. 90 to 100 tons second-hand 20-lb. steel rails. Virginia.

3,017. Stave machinery. Georgia.

3,018. Prices of incubators. Virginia.

3,019. Belting. Georgia.

3,021. A second-hand gas machine of 30 or 40 burners' capacity. North Carolina.

3,022. Latest approved gold mining, placer and crushing machinery. Alabama.

3,023. A small metal turning foot-power lathe or lathe head, suitable for gunsmith's purposes. Texas.

- 3,024. A 40 H. P. engine and a 50 H. P. boiler. Texas.
 3,025. A small portable forge. Texas.
 3,026. A 48 to 50 in. turning and boring mill. Pennsylvania.
 3,027. A 60 saw gin. Texas.
 3,028. A hand or foot-power drilling machine, self-feed, available for gunsmith's purposes. Texas.
 3,029. An 18 to 24 in. shaper and keyseater. Pennsylvania.
 3,030. A corn mill. Texas.
 3,031. A small anvil. Texas.
 Goods Wanted Abroad.
 2,998. A separator for freeing steam or hot water from oil. Mexico.
 3,014. A second-hand laboratory crusher (steam or hand); also a small amalgamator and parts and necessary appliances and plant for treating small parcels of ore to determine best working method. British Columbia.
 3,020. Aluminum canoes. Canada.

GENERAL MINING NEWS.

ALABAMA.

Cleburne County.

Arbacoochee.—This gold mine is now turning out some good ore, according to the Cleburne "New Era." A 10-stamp mill has been ordered of Isbell & Co., of St. Louis.

Crown Point Gold Mining Company.—The Cleburne "New Era" reports the discovery of a new vein in this company's mine, at Micaville. The ore taken out so far looks and works well.

ARIZONA.

Maricopa County.

Commercial Mining Company.—While drifting on the ledge of the Senator mine from the 1,600 ft. tunnel, about 60 ft., 5 ft. of sulphuret ore was struck, which, it is said, will mill \$20 per ton in free gold on the plates besides the value of the concentrates.

(From our Special Correspondent.)

The recent gold strikes in the Plamsa Mountains are attracting attention. The ore is rich, but it is all float, as no well defined ledge has yet been struck. The formation is slate, carrying narrow seams of quartz. Inasmuch as the ore is so rich, prospecting in the district is being carried on actively, but as water is scarce prospectors are having a hard time.

Phoenix Mining Company, Phoenix.—Preparations are being made for the erection of an enormous dam, four miles above the property of the company, on Cave Creek, by means of which power will be obtained to hydraulick the gravel banks.

Mono County.

Bulwer Consolidated Mining Company.—The latest official weekly letter says: We are stopping out ore from the various stopes on the 200-ft. level. The stope above the south drift from the intermediate cross-cut is looking well and yielding a fine quality of ore. Stope south of No. 5 upraise is turning out fair-grade ore. Stope north of No. 5 upraise is in good ore; also stopping from top of No. 6 upraise. We hauled to the mill since we started up 242 tons of ore. We are crushing about 19 tons daily. Average battery assay, \$31.10 per ton; tailings, \$8.26 per ton.

Pima County.

Santa Rita.—In the case of Astiazaran, De Oequeria and others against the Santa Rita Land and Mining Company and the New Mexico & Arizona Railroad Company, the United States Supreme Court has confirmed the decision of the Arizona Supreme Court in favor of defendants. The plaintiffs brought suit to establish title to the land under a Mexican grant of 1844; defendants hold under a conveyance claimed to be from the original grantee. A report in favor of the defendants has been filed by the Surveyor-General, but never been acted on by Congress. The court holds in substance that in cases affected by Mexican grants Congress has made itself the final authority, and has laid down methods of procedure; these rules have been complied with in this case, and until Congress has acted the courts cannot intervene, by any ordinary procedure.

Yavapai County.

Big Bug.—It is reported that the Big Bug onyx quarries have been sold for \$220,000. The owners were W. O. O'Neill, J. W. Dougherty and George and Al. McCann.

Yuma County.

(From our Special Correspondent.)

The Bonanza mines in Harquahala district have made a clean-up of \$150,000, as the result of the last month's run.

CALIFORNIA.

Amador County.

Albany Gold Mining Company.—The Albany, the Littlefield and the Astoria tunnels are being extended as rapidly as possible, with one shift of miners at each place. At the Littlefield the superintendent says that he expects to cut the vein at a

very early date, tapping it about 100 ft. from the surface. This vein is very prominently exposed on the surface and shows good milling prospects, says the Amador "Ledger."

Blazing Star.—This mine, located a mile from West Point, is about to resume operations, says the Amador "Ledger." The owners are putting in an electric plant for the purpose of reducing their ores.

Amador County.

Ivanhoe.—At this mine, in Plymouth district, the Messrs. Wheeler are running a five-stamp mill and crushing about 12 tons of ore in 24 hours, which yields from \$3 to \$5 a ton. They are hoisting about 70 ft. with a whim, and are running levels now at that depth. This property had a mill upon it in 1871, but the main ledge seems never to have been opened up at that time.

Nevada County.

(From our Special Correspondent.)

Mayflower.—This property, situated in the Canada Hill district, is yielding rock just now exceeding anything found in this section for some time. The ledge is about 1 ft. wide, the ore running several hundred dollars per ton. The shoot which was struck was making an upraise, and it is at present pitching toward the surface. How extensive it is has not been developed. It may not last long, or it is possible that the ledge breaks before reaching the surface and takes a downward course, in which case the find probably will be of great importance. On an average the ore being taken from the mine averages \$60 per ton.

Placer County.

(From our Special Correspondent.)

The Mayflower Gravel Mining Company, Forrest Hill.—A bullion shipment, valued at \$5,600, has been received at San Francisco.

San Bernardino County.

(From our Special Correspondent.)

Borax.—The development of the borax industry during the year 1892 proved to be greater, proportionally, than during any previous year in the history of the State. Owing to cheap freights the shipments by sea increased, while the rail shipments showed a striking falling off. The total, however, equalled about 14,000,000 lbs., as compared with 12,000,000 lbs. in 1891 and 10,000,000 in 1890. The business has been concentrated, the Pacific Coast Borax Company controlling the trade. This corporation throughout the year paid a regular dividend of \$1 per share each month. The works erected at Columbus Marsh, having a capacity of 50 tons per month, were shut down in January of the present year; also the works at Teels Marsh, having a capacity of 35 tons, and the Rhodes Marsh Works have reduced production, and will probably close down. These several deposits are said to be exhausted. The experimental works erected on Saline Marsh, Inyo County, have not proved successful, owing to the machinery not being adapted to the requirements. The works of Coure & Tredo, at Saline Marsh, are producing 25 tons per month; while the Smalls Bros.' works, at Daggett, are working on Colemanite.

Shasta County.

(From our Special Correspondent.)

The placer diggings, on Olney Creek, six miles from Redding, are yielding nicely. This week the two brothers Jones, while making a clean-up, found two lumps of gold, worth \$500 and \$200, respectively, besides getting about \$300 in smaller pieces and dust. Others of the miners are also obtaining profitable yields.

COLORADO.

Lawrence Mining and Milling Company.—This company has started its new mill. It has 20 stamps, and is a modification of the Gilpin County mill, having 50 drops to the minute. The company has ore of its own to work on from the start.

El Paso County.

Emma.—A year ago Count Pourtales and T. C. Parrish leased the Emma mines, Nos. 1 and 2, at Cripple Creek, of Messrs. Morse Brothers for 3,000 shares in the Bull Mountain Mining Company's stock and \$25,000, to be paid at the expiration of the lease, April 1, 1893. Messrs. Pourtales and Parrish have secured for \$8,000 cash an extension of the lease to October 25th, 1893, when \$17,000 additional is to be paid.

Pharmacist Mining Company.—Recent developments in the Pharmacist mine indicate that the chute from which so much ore has been extracted is dipping diagonally into the Burns lode, and will be encountered at a depth of about 100 ft. in that mine. A level from the Burns working shaft is being driven to intercept this channel of ore at a depth of about 135 ft., and within a few days it will be reached. After April 1st the lease and bond now held by W. B. Brooks, A. D. Jones and others will be surrendered to the Calumet Mining Company in exchange for 600,000 shares of stock, and the mine will therefore be operated by that company, its sole owner.

Lake County.

In the District Court at Leadville on March 21st Judge Dickson rendered a decision in the cross-

injunction suit between the Bimetallic and the Holden smelter. The decision was in favor of the Holden company to the extent of not allowing the motion of the Bimetallic to dissolve the Holden injunction to prevail. Costs were assessed on the Bimetallic. The court ordered that "the injunction be and is hereby continued until the said slag dump described in the complaint herein is removed in accordance with the terms of the lease from the La Plata company to plaintiffs, providing the same is removed on or before the 9th day of November, 1893." The defendants, through counsel, excepted to the finding of the court, and gave notice of appeal to the Court of Appeals. The Holden company secured a temporary injunction against the Bimetallic to restrain the latter company from interfering with their removing slag from the La Plata dump under the terms of a lease which they enjoyed. The Bimetallic cross-joined, claiming the slag as their property; hence the action.

The following items of Leadville are taken from our exchanges: The morning and Evening Star, on Carbonate Hill, are being actively operated by numerous leasers, the production for last month being up in the thousands, including 300 tons of lead ore. The Fanny Rawlins has developed an extensive body of fine grade carbonates, and shipments are large and steady. The Mike and Starr is shipping daily about 30 tons of argentiferous sulphide ore, which nets a fair return. It is assumed that this property has one of the largest bodies of iron sulphides in the State. The A. Y. & Minnie continues a regular shipper, the amount sent to the Valley smelter approximating close to regular monthly tonnage. Among the smelters the Holden and the Bimetallic are both very active, each within the last few months having completed arrangements and facilities which have enabled them to largely increase their output.

Huckleberry.—A good strike was made recently in this property. The vein is still strong, and it is now being cross-cut in order that the hanging, or western wall, may be reached. The owners have decided to build a mill in order that the product may be handled to better advantage. Machinery for this purpose is now being constructed in Denver, and after its arrival building operations will at once commence.

Humboldt Mining and Smelting Company.—At a recent meeting of this company's stockholders in Leadville the following officers were elected for the ensuing year: President, John McGee, of Boston, Mass.; treasurer, J. Harris; secretary, Walter Whittlesey; general manager, C. G. Arnold. The company controls a large group of well known properties, among them the Quartzite, Modest Girl, Gold Leaf, Thistle and Iron Rock.

Maid of Erin.—Considerable attention is at present being directed to this mine on account of the developments that are taking place there. In the lower workings at the bottom of the shaft as depth is gained in the quartz, copper ore is being uncovered which is very rich.

Marian.—This mine, in the California mining district, has been abandoned until the snow melts. Ore has recently been uncovered in this property of a high grade.

Minnie.—This placer in the California mining district has passed into the hands of John Harvey and others, who propose to develop it fully.

Valley.—This mine, on Little Ellen hill, is keeping up regular shipments. Increased shipments are contemplated, which will necessitate an increased force. A new body of fine mineral was recently opened up in this property. The new body is lead carbonate, running 35 oz. in silver and 60% lead. The property is at present entirely free from water. The first drift was started in the old shaft at the 450 level, and the present indications are that the stubborn fight with the water in this property will result in returns that will compensate the promoters of this enterprise. Operations are just now being carried on in the iron. Taking the explorations in the Bohn shaft and the Penrose as a guide, there seems to be a probability that a carbonate body will be encountered underneath the iron. This was the case in the Bohn and other properties within the city limits, and the same conditions, it is expected, will prevail in the Sixth street. One unpleasant fact in connection with the more recent development work in the property is that the flow of water, instead of decreasing, seems to increase. The pumping facilities are good, and no difficulty, it is anticipated, will be experienced in handling it.

(From our Special Correspondent.)

A new electric light company, with large capital, is endeavoring to obtain a franchise from the city council, binding itself to furnish with their initial plant 500 E. H. P. to be used for mining and milling purposes here at 40% less than the present cost of steam power. This company also claims that it will double its capacity if necessary. The plans have been submitted to a committee.

The attention of mining men is being attracted more and more to the satisfactory work in the several properties located in the heart of the city. In the Sixth Street the water flow is 1,300 gallons per minute, but it is being handled without difficulty, while the first real development work is being carried on in drifting from the lower, or 490-ft. level of the old shaft. In the Bohn stations are

being cut, and as soon as completed the ore bodies already disclosed will be thoroughly developed.

In the Grey Eagle the bodies of ore opened up show undiminished strength, and shipments are continuous. The work for this month will run over 1,500 tons iron and some good shipments of carbonates.

At the El Paso property an entire new plant is being erected, as it is this shaft that is to act as a drainage for the big combination recently formed to work a number of properties on East Fryer Hill. The group is to be worked by the Union Mining and Leasing Company, a corporation capitalized at \$500,000, and with such men as C. A. Otis, D. P. Geels, Mr. Osgood, J. J. Hagerman and others at its head. The properties in the combination are the El Paso, Tip Top, Forepaugh, Jeanie Lee, Olive Branch, Clyde, Cullen, Silver King, Licks-cumdedricks, Quadrilateral, Alpha, Fitzhugh and the Kennebec. Some of these claims were once worked by the Ward Mining Company, but of late years have been worked spasmodically by lessees.

Ourray County.

We extract the following items of Ourray mining news from our local exchanges: The Cora Belle mine, at Guston, is in good ore again, which is being hoisted and prepared for shipment. The Sweepstakes has just encountered a fine body of 149-oz. silver ore, which also carries from \$8 to \$10 gold per ton. Besides this there is a 5-in. vein of good shipping ore in the north drift, and 25 men are at work stripping it. This is the highest mine in this section, and owing to deep snow cannot ship before June 1. On and after that date, however, it will rush out an enormous amount of very fair mineral. At the Humboldt shipments continue regularly, and 157 men are employed. Superintendent Sherman has put a force of men at work on the old Sky Rocket mine. A strike of promise was made in the Vanderbilt, at Red Mountain, last week, but as ore is piled up in every available place, and it has thus far been impossible to get cars for shipment, but little work is being done for the present. The National Belle has on a force of 65 men, and is making regular shipments of its copper ore to Durango. This property will send out 20 cars of ore per day during the coming spring and summer. The grade of the mineral is about medium. It is expected that a sale of the Gray Eagle will be consummated soon. The Guston shipped 359 tons of gold ore two weeks ago, but on March 20th the Silverton railroad was blocked by snow again, and shipments were delayed for a few days.

Pitkin County.

Percy Consolidated Mining Company.—The suit of Charles A. Hallam against this company, W. J. H. Miller, Nora Miller and Clinton Markell, involving title to a one-thirty-second interest in the La Salle, Denver and Harrisburg mining claims was decided at Denver, March 25th, by Judge Allen in favor of the plaintiff. The court ordered a decree setting aside the conveyance of the interest in question by W. J. H. Miller to Nora Miller and by her to Markell, and perpetually enjoining them from disposing of it.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending March 24th were as follows: Smuggler-Union, 180 tons; Sheridan Consolidated, 44 tons; Hector Mining Company, 11; G. L. Fisher, 11. Shipments since January 1st aggregate 4,703 tons.

The following mines are now, and have been, steadily worked during the winter: Smuggler Union, Montana, Columbia, Flora, Cimmarron, Hamburg, Champion, Montezuma, Carribeau, Capitan, Silver Belle, San Bernardo, Silver Pick and What Cheer, besides a number of small properties. In addition to these, the Gold King, Turkey Creek and Suffolk gold mines and mills will start in operation in a short time.

Black Bear Mining Company.—According to the Telluride "Republican," a good strike was made recently in the White Bear lode, situated at the head of Ingram Basin, above timber line. The present owners have spent nearly three years of time and a large amount of money in development work. The strike was made in the vein where tapped by a crosscut and was in the shape of a body of ruby and brittle silver 40 in. wide. An assay gave a return of 9.95 oz. in gold and 1,565.65 oz. in silver. Drifting will be at once begun on the vein, and shipments will be made as soon as the trail to the mine is safe for pack animals.

Silver Pick.—This mine is working 35 men and sending out from 3 to 8 carloads of high-grade first-class ore per month. A large amount of second-class ore is being piled up at the mill for concentration.

Telluride.—A press dispatch says: The closing down of the Sheridan-Mendota mines two weeks ago, throwing out of employment 500 men, was followed up by the Humboldt and Way Up mines, which closed down on March 21st, the men refusing to work with a reduction in wages. The last-named mines, however, resumed work on the following day with a new force of men at \$3 per day. Under the present state of affairs, it looks as though the reduction of wages would be inaugurated by all San Miguel County silver mines.

FLORIDA.

Phosphates.

Dunellon Phosphate Company.—This company has completed an overhead tramway to carry rock to the washers. Two large steel-log washers have been ordered of McLanahan & Stone, of Hollidaysburg, Pa.

Foote Commercial Phosphate Company.—The buildings of this company, near Boston, are complete; the pumps and other machinery are being put up.

Stone Wall Phosphate Company.—The new Cummery dryer is now ready for work at the Blue Springs mines.

IDAHO.

The Idaho office of the United States Geological Survey is now established in the United States Capitol. E. T. Perkins, Jr., is in charge. The engineers will take the field about April 15th. They will commence work in the Weiser Valley, will go next to the Wood River country, and thence proceed to the Salmon River region. They are now working upon a contour map of the Snake River plain, which will, when completed, show every town, hamlet, railroad, wagon road, trail, stream and mining camp.

Alturas County.

Red Cloud Mine.—The men have quit work on account of great danger from snow slides.

Boise County.

Hardscrabble.—A raise has been made 75 ft. from the tunnel to the surface for air connection. Drifting on the ledge struck in the tunnel at 600 ft. has commenced.

Muddy.—The tunnel is in 1,800 ft., but the ledge which it was thought would be cut at 1,500 ft. has not yet been encountered. A vein 3 ft. wide, carrying gold, was met with, however, some three weeks ago.

Lemhi County.

Lemhi Placer Mining Company.—The preliminary work preparatory to washing during the flow of early spring water is nearing completion.

Owyhee County.

Ralph Pool.—Lack of mining timbers is keeping work back on the Ralph Pool, and little stopping can be done until they can be procured. The Blaine tunnel is nearing completion and a large force of miners will undoubtedly be employed on this property the coming summer, says the Idaho "Avalanche." Development work is being pushed on the Phillips & Sullivan mine this winter, and an increased product of bullion may be expected from this property. At De Lamar there are indications of unusual activity. The De Lamar Mining Company is enlarging its mill.

Shoshone County.

The Portland Smelter has had an agent in Wardner, Idaho, making arrangements with the owners of small properties for their product.

Argentine Mining Company.—Only 17 men are now employed. These are sinking the shaft, which is now below the river level, and they are also doing some necessary development work. The mill is not in operation at present.

Black Bear.—The lower tunnel is now in 225 ft. The general operations of the mine continue about the same, a force of sixty men being employed. They are troubled somewhat by an insufficiency of water.

Bunker Hill & Sullivan Mining Company.—This company is employing about fifty men, the majority of whom are working under contract. They are doing some necessary work in the mine, such as filling in with waste where necessary, retimbering in certain places, etc.

Gem Mining Company.—The Gem is still producing about twenty tons of concentrates daily. The amount shipped last month was 600 tons. Two new jigs are being added to the mill. These will increase the concentrating capacity from two to four tons of concentrates daily. The total capacity when these improvements are completed will reach from twenty-three to twenty-five tons of concentrates daily.

(From our Special Correspondent.)

The Morning Mine, Mullan.—This week this mine closed down, and with the Bunker Hill and Sullivan mines, in the Coeur d'Alene district, will remain shut down for an indefinite time.

IOWA.

Tests of Clays.—The Engineering Department of the State University at Iowa City has established a laboratory for testing clays and chalks as to their value in the manufacture of paving brick and cement. The University "Transit" says: "There is no State in the Union that has more generally distributed deposits of valuable clay than Iowa, and the making of paving brick is destined to become one of the leading industries of the State. The equipment consists of a stone crusher and grinding machinery, steel assay furnace, a model down-draft kiln and a laboratory brick-making machine. The

laboratory is now complete, and a series of tests are being made upon samples of material from different parts of the State. An examination and test will be made of any clay or chalk found within the State of Iowa, without any charge being made above the actual expense of doing the work, which will amount to \$5 or \$10, depending upon the hardness of the material and the actual amount of manual labor required. For testing material that comes from other States the regular laboratory rates will be charged. The amount of material forwarded for examination and report should not be less than one-half bushel."

MICHIGAN.

Copper.

Adventure Mining Company.—At the annual meeting of this company, held in New York recently, the directors were instructed to take steps to renew the charter of the company, which will expire in February, 1894. The directors elected were: Thos. F. Mason, Wm. Todd, J. Henry Mason, W. Hart Smith, of New York, and S. B. Harris, Michigan. The financial statement showed that the work being carried on was on borrowed capital, and the indebtedness, January 1st, 1893, was \$2,000. To meet this indebtedness and provide means for continuing the work, an assessment will have to be levied. The work being done is proving up the Knowlton vein, and as far as has been opened and examined, the agent, Captain Harris, believes it would pay to work, with modern appliances and proper stamping facilities, says the "Ontonagon Miner."

Carp Lake Mine.—This mine has lately been examined by Professor Fairchild, of Oberlin, and by Mr. B. F. Chynoweth, who, it is said, advise the cleaning out of the old adit level.

Centennial Mining Company.—The improvement in No. 1 shaft still continues, says the "Norway Current," and the showing is decidedly encouraging. Preparations are being made to sink the shaft another lift. In the cross-cut from No. 3 to the Osceola lode 103 ft. were driven during February.

Hilton Mining Company.—At a meeting held March 14th it was voted unanimously to dissolve the company, which is the oldest in the copper country, being formerly known as the Ohio. It was controlled by the same interests as the Adventure mine, and it will now be consolidated with it.

Osceola Mining Company.—The 19th level south in No. 5 shaft is running in good ground, and it is said that No. 6 shaft will now be sunk.

St. Louis Copper Company.—The annual meeting of this company was held recently, and the old board of directors was re-elected. As the corporate existence of the company expires in about a year, action was taken to renew the charter for 30 years.

Tamarack, Jr., Mining Company.—In a recent letter Captain Daniel states that in drifting the 6th level south the lode has improved, and at this time we are opening as good ground at this point as anywhere in the mine. The same level north shows shows good stopping ground. The 4th level south keeps good, and the 3d level south is opening satisfactorily. The drift at No. 2 is improving in character.

Iron—Gogebic Range.

Ashland Iron Company.—The mine is now being unloaded of water, and the work of mining will shortly recommence.

Iron—Marquette Range.

Bessie Iron Company.—At a meeting held March 20th the following directors were elected: Chas. McGregor, Wm. Pelmeur, Jos. Cornish, Mrs. Edw. Lobb, Geo. Voelker. The directors elected Mrs. Edw. Lobb, president; Chas. McGregor, vice-president; J. C. Dougherty, secretary; Geo. Voelker, treasurer. The mine is a producer of limonite ore, but has been idle for some time. A shaft down 60 ft. has developed a considerable body of ore and the mine will now be worked.

Cleveland Cliffs Iron Company.—This company has followed the example set by the Minnesota company, and will crush its ores to 2½ in.

Cleveland Iron Company.—This company started on March 25th the pumping the water that remained in Lake Angeline last fall after the contractors left work.

Iron—Menominee Range.

Commonwealth Iron Company.—During this year all of the shafts at the Badger mine have been sunk to the 270-ft. level, making an additional depth in the ore of 90 ft. This will not be all mined out from the present level, but will be cut in two at a depth of 230 ft. and worked, except at two or three points, as two levels or stopes, one of 50 ft. and one of 40 ft. The cross-cuts to the north through the ore have also been driven, and connecting drifts are well under way. The ore in the several cross-cuts at both the 230 and 270-ft. levels shows a width of from 180 to 275 ft., and at various places the breasts are still in ore.

Sheridan Iron Company.—The stock pile contains about 20,000 tons; 50 men are employed.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, March 20.

The mines of the lead and zinc belt closed a prosperous week Saturday evening, but had to contend with some bad weather. The price of zinc remained firm at \$23 per ton for best grades and an average of \$22.50 per ton. The price of lead ore advanced from \$21.50 to \$22 per thousand, and the sales were heavy from Cartersville, Mo., and Galena, Kan. Following are the sales from the different camps: Joplin mines, 1,874,520 lbs. zinc ore and 177,670 lbs. lead, value \$24,059; Webb City mines, 878,570 lbs. zinc ore and 49,630 lbs. lead, value \$10,496; Cartersville mines, 2,834,000 lbs. zinc ore and 115,990 lbs. lead, value \$33,500; Zincite mines, 144,670 lbs. zinc ore and 2,850 lbs. lead, value \$1,617; Oronogo mines, 13,530 lbs. of lead, value \$284; Carthage mines, 100,700 lbs. zinc ore and 40,000 lbs. lead, value \$1,947; Granby mines, 133,190 lbs. zinc ore and 83,630 lbs. lead, value \$3,525; Wentworth mines, 29,070 lbs. zinc ore, value \$309; Galena, Kan., mines, 1,710,690 lbs. zinc ore and 286,990 lbs. lead, value \$23,863; district's total value, \$99,600. Aurora, Lawrence County, mines, 1,449,410 lbs. zinc ore and 200,440 lbs. lead, value \$13,919; lead and zinc belts' total value, \$113,519. Prof. W. P. Blake, of Wisconsin, has been making a geological examination of the Oswego Mining Company's land, which comprises a tract of 700 acres of land lying within the city limits of Joplin, on the southeast side. This tract of land has been one of the noted producers of the Joplin district for the past 15 years, and has recently passed into the hands of Eastern parties, who are having a thorough examination made in reference to the present condition of the development, and will there draw plans for future systematic plan of operations. The Rex Mining and Smelting Company's 1,000-acre tract east of the Oswego is still making extensive development and opening up new ore lodes. The company's operations on this land made a total production of 661,770 lbs. zinc ore and 32,670 lbs. lead. New developments in the Spring City district south of Shoal Creek, in Newton County, still continue to attract attention; miners and prospectors are rapidly going into the new camp.

Joplin, March 27.

The mines of the lead and zinc belt had a steady and successful week. The output of ore was very large, but could not all be shipped on account of a scarcity of cars. Zinc ore remained firm at an average price of \$22 per ton. Lead ore was in good demand at \$22 per thousand. Following are the sales from the different camps: Joplin mines, 2,049,290 lbs. of zinc ore and 259,510 lbs. lead, value \$27,748; Webb City mines, 582,490 lbs. zinc ore and 34,500 lbs. lead, value \$7,031; Cartersville mines, 2,264,530 lbs. zinc ore and 55,840 lbs. lead, value \$25,593; Zincite mines, 255,100 lbs. zinc ore and 22,740 lbs. lead, value \$3,230; Oronogo mines, 78,260 lbs. zinc ore and 19,310 lbs. lead, value \$958; Carthage mines, 100,550 lbs. zinc ore and 42,000 lbs. lead, value \$2,030; Sherwood mines, 80,740 lbs. zinc ore, value \$848; Wentworth mines, 137,525 lbs. zinc ore, value \$1,375; Galena, Kan., mines, 1,575,250 lbs. zinc ore and 145,170 lbs. lead, value \$18,844; district's total value, \$87,657. The past week has been marked with great activity, and one mine at Cartersville was sold to Eastern parties for \$30,000. Another large sale is pending to Chicago parties of a 40-acre lease on the Rex Mining and Smelting Company's land. New strikes of ore in Newton County are being reported.

MONTANA.

Fergus County.

Maginnis Mine.—A special to the Helena "Independent" says that a strike of good free milling ore has been made in this mine. This is one of the old mines of Montana, but has been idle for ten years. It belongs to Messrs. Hauser, Holter and others, of Helena.

Jefferson County.

Keating Mine.—The shaft is now 450 ft. deep, and the ore body is 3 ft. wide, with an average value of \$22 per ton. The cyanide process has been put in at this property, and has so far given very satisfactory results.

Lewis & Clarke County.

Blue Cloud.—Thirteen men are now employed. The shaft is 350 ft. deep and hoisting works have lately been built.

Golden Crown.—This group, which belongs to a Maine syndicate, is said to show considerable promise. The shaft is down 150 ft. and the vein has steadily improved. The syndicate will build a mill on the Prickly Pear.

Whitlatch-Union-McIntyre Mining Company.—A new ore body has recently been discovered, and development work has proved it to be of some size. The mill erected last fall will be put in operation as soon as the weather will permit.

Missoula County.

Keystone and King Mining Company.—This company, operating in Spring Gulch, is shipping consid-

erable ore from the Keystone mine. The president stated that the erection of a 50-ton concentrator would be commenced as soon as the snow was off the ground. A body of ore was discovered near the surface, and worked for some time, over a year since, producing something over \$50,000. The ledge at this point was much broken and laid nearly flat. Last summer but little ore was shipped. This winter a body of fine carbonate was uncovered on the west end of the claim, some seven or eight hundred feet from the one previously worked. This is much less broken than the ore previously worked, and gives every indication of being in place. The walls of the vein at this point are nearly vertical, and the ledge gives every indication of permanency. A large body of concentrating ore was cut on the 150-ft. level and again on the 300. The concentrates run well in both copper and lead. The development on the mine has been quite extensive, and erection of a milling plant has been delayed only from want of funds, which, it is understood, have been secured.

Nine Mile.—The mill has been running continuously with satisfactory results to the company. During the past month 10 additional stamps have been added, and it is quite probable that a 40-stamp mill will be added this summer.

Silver Bow County.

Blue Bird Mining Company, Limited.—The stockholders of this company are now engaged in New York in reorganizing the new company with the intention of resuming operations at the mine and mill at an early date. It is learned from a reliable source that one of the first acts of the new company will be the development of another shaft on the Blue Bird property, says the Butte "Inter-Mountain." The old shaft will, when drained of water, need repairing from top to bottom. This old shaft is a long distance from the ore bodies, and as depth is attained would be still further away.

Gambetta.—The lessees of this mine have had much good fortune. At present they are engaged in sinking the shaft from the 500 to the 600-ft. level. They are down only 10 ft. at present, having just commenced to sink a few days ago. They have encountered a good body of ore at bottom of the shaft which they have penetrated for 10 ft., and have not yet cut through it. It carries about 30% copper.

Montana Ore Producing Company.—The new smelter, of which F. A. Heinze is the general manager, is working about 200 tons of crude ore per day. Recently the new water jacket blast furnace was started up, and it is understood gives good satisfaction. Most of the matte obtained from the furnaces will average 75% copper. The matte is crushed and sacked at the smelter and shipped to New York. The ore for the smelter is obtained from the Gleggarry or Cambers, the Gambetta, Speculator and Pacific, each of which carries a high percentage of copper and silver.

New Silver Crown Mining Company.—A circular recently issued by Wm. Wilson, of Butte, Mont., warns the stockholders in this company against T. Galitzki and Edward Sampson, the promoters, and counsels them against paying the last assessment. Mr. Wilson says the property is worthless, and the ore represented to have been taken out came from other mines. The stock of this company, we are informed, was floated in Chicago, where the company has an office at 806 Tacoma building.

Yellowstone County.

Fine & Pankey Mill.—This mill was started up March 19th. There is a large amount of Easton ore at the mill and at the mine.

NEVADA.

Storey County—Comstock Lode.

W. R. Eckart, the engineer employed by the mining companies interested in the resumption of deep mining on the Comstock, has arrived in Virginia from San Francisco. Mr. Eckart will be employed for some time in gathering data from the various mining companies engaged in pumping operations prior to suspension of work several years ago of the amount of water handled at that time, and make a report. Mr. Eckart has already gained much information from the "log" of the mining companies in regard to the matter. Before making his report he will visit the shafts where pumping operations were formerly carried on and the machinery there. Since deep pumping operations were in progress on the Comstock it is claimed that more powerful machinery has been invented for such work. Mr. Eckart will investigate everything thoroughly relating to the matter before submitting a report as to the feasibility of a resumption of pumping operations. The work will occupy some months.

Belcher Mining Company.—The latest official weekly letter says: On the 350 level the south drift from the west cross-cut is out 80 ft.; the face is in porphyry, clay and small seams of quartz having no value. The face of west cross-cut No. 2, 100 ft. north of the north winze on same level, is in porphyry and a streak of fair ore about 8 in. wide. There is on hand at the mine about 150 tons of fair-grade ore, and are daily hoisting about 20 tons of ore from the stopes immediately above and below the 300-ft. level.

Justice Mining Company.—In the Justice mine the south drift from the north stope on the 822

level is in 132 ft. The face is in a mixture of quartz and porphyry. About 7 tons of ore per day are being extracted, the average car sample assay of which is \$20 per ton.

Savage Mining Company.—The latest official weekly letter says: We have hoisted 133 cars of ore from the 1,400 level. This, with ore remaining on the ore chutes, made 159½ tons, all of which has been shipped and milled at the Nevada mill. This closes the ore shipments for the present. Average car sample assay, \$17.64; average battery assay, \$16.43; bullion yield for the week, \$1,834.25. On the 1,300 level the upraise on the ledge is advanced 35 ft.; top is in quartz, giving fair assays.

(From our Special Correspondent.)

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

Mines.	H'st'd Tons.	Car assay.	Mil'd. Tons.	Bat'ry assay.	Bullion for week.	Bullion Shipped.
Belcher....	140	.....	.....	.....	.....	.....
C. C. & Va.	560	30.78	545	27.68	.....	.....
Kentuck..	21	30.	.....	.....	.....	.....
Potosi....	448	25.04	500	21.60	.....	.....
Savage....	133	17.64	160	16.42	1834.25	.....

¹ Cars.

Savage Mining Company.—This week shipments of ore to the Nevada mill ceased. Although it is given as an excuse for stopping the ore shipments to the mill that stockholders will not pay assessments, and the expense of working the ore is carried on at a loss, no effort is being made to curtail expenses or inspire stockholders with confidence. What about the report made by Mr. Miles, appointed with Mr. Woods as a committee by the board of directors, to investigate and report upon the entire matter of crushing the ore? Some time ago Mr. Miles submitted his report, wherein he showed that the reduction of Savage ore was carried on on a scale of such exaggerated expense as to be, practically, fraudulent. He obtained from M. W. Fox a bid to reduce all ore at a uniform scale of \$3.50 per ton, he guaranteeing to return not less than 65% of the car sample assay, which is equivalent to 75 to 80% of the battery assay value of the ore. The acceptance of such a contract would have meant dividends to the stockholders, and was, of course, not accepted. Mr. Woods has not yet submitted his report.

West Consolidated Virginia Mining Company.—The ledge which has been struck in the Aspen mine, on Mt. Davidson, in the Gold Hill mining district, and west of the Belcher mine, is of interest apart from any intrinsic value it may have, inasmuch as its discovery and pitch indicate the continuation of the Red, or West, ledge, of which so much has been heard lately in connection with the West Consolidated Virginia Company. The Apex mine is owned by a New York syndicate, and there is no doubt that the company has something in sight warranting the expenditure of money in development. The ledge pitches at an angle of 45° and strikes northwest. There is no hanging wall, and the width is not known. The vein has been traced three miles from the Apex and in the extreme northwest of the Consolidated California and Virginia ground. This vein has been prospected to some extent by the West Consolidated Virginia company. The shaft sunk was started east of the vein, and passed through it at 90 ft., it then being 65 ft. wide with a 20-ft. clay hanging wall. When cut on the 250-ft. level it showed a 62-ft. vein carrying a fair percentage of mineral. On the 350-ft. level it was again cut with the same result, the vein, however, being more largely mineralized. On the 450-ft. level, the ledge maintains its general character, dipping 60° to the east. It will be remembered that it was from this ledge that the Bonanza people took out considerable ore, or so it was alleged, and was brought to task by the West Consolidated Virginia company. That matter is still pending, and as the application for a survey, by which the allegation might have been rebutted, was refused at Virginia City by the judge, who is on the pay roll of the Comstock clique, the charge preferred remains in abeyance.

Washoe County.

It is expected that the Reno Reduction Works will resume operations on or about April 1st.

NEW MEXICO.

Grant County.

Mineral Point Zinc Company.—This company shipped a carload of zinc ore from Hanover to Mineral Point, Wis., last week. The ore was taken out while the assessment work was being done on the company's mines at Hanover this year. It is not expected that any further shipments will be made this year.

PENNSYLVANIA.

Anthracite Coal.

Coxe Bros. & Company's iron breaker was damaged by fire on March 29th to the extent of nearly \$200,000. The structure was supposed to be entirely fireproof.

Following is the report for the Seventh Mining District for 1892 by Inspector Edward Brennan, of Shamokin: Philadelphia & Reading Coal and

Iron Company, 2,167,658 tons of coal mined; fatal accidents, 18. Mineral Railroad and Mining Company, 583,544 tons; fatal accidents, 5. Summit Branch, 347,864 tons; fatal accidents, 5. Lykens Valley, 292,014 tons; fatal accidents, 4. Union Coal Company, 539,971 tons; fatal accidents, 4. L. A. Reilly & Co., 379,829 tons; fatal accidents, 2. Individual collieries, 1,133,795 tons; fatal accidents, 7. Total tons of coal mined, 5,464,675; total fatal accidents, 45. There were 101 non-fatal accidents in the district.

Kingston Coal Company.—Suit has been brought in the Luzerne courts by Robert W. and Clarence J. Rice for \$50,000 damages against this company, the allegation being that the defendants have mined 25,000 tons of coal from the anthracite vein in Edwardsville, having entered upon the lands unlawfully and without consent of the plaintiffs, knowing that they belonged to the plaintiffs. The coal is valued at \$12,500 and the defendants are held to be liable in four times that amount.

Locust Mountain Coal Company.—A dispatch from Ashland states that what threatens to become a very serious mine fire is now raging on the lands of this company, on the hillside west of the old pumping station at Little Mine Run. The outcrop of the mammoth vein overlying the workings of the abandoned Big Mine Run Colliery is in a fierce flame, and fully 80 ft. is burning rapidly. It is believed that the fire has been burning for several months. A big force of men under the direction of Samuel M. Riley, engineer for the Locust Mountain Coal Company, are at work, endeavoring to run a stream of water on the burning vein.

Coke.

Hardin.—Isaac Taylor, superintendent of the Cambria Iron Company's coke works, has purchased for the company a tract in Nicholson, Pa., which is underlaid with good coking coal, and will be developed when the Baltimore & Ohio road is pushed south to Morgantown. The company pays \$140 an acre for the tract.

Oil.

In the McDonald district, in Washington County, Pa., quite a large number of new wells have been struck, but, as for some weeks previously, the production has not varied much from 16,000 barrels daily. In the new districts along the Ohio, south of Wheeling, the developments have been of an ordinary character. The average run from the wells has been 64,000 barrels daily, and compared with the runs during March last year show a decrease of 14,000 barrels. The shipments have averaged 76,400 barrels. The exports from Atlantic ports from January 1st to latest dates were 143,000,000 gallons; increase over the same period last year, 21,000,000 gallons.

SOUTH DAKOTA.

Lawrence County.

Bullion Mining Company.—The annual meeting of the stockholders of this company was held recently. An assessment of four cents per share was levied on the capital stock. The following officers were elected: S. A. Flower, president; G. S. Clevenger, vice-president; S. A. Flower, treasurer; John Bagdaley, secretary. Board of directors: G. S. Clevenger, George P. Bennett, George C. Hunt, S. A. Flower.

Esmeralda.—This mine, with others adjacent, has been sold by W. E. Jones to Ed. Shannon and others for \$2,500. During the past year Mr. Shannon, who was working the claims on lease, took from them about \$20,000 in bullion.

Golden Reward Mining Company.—This company has struck a shoot of high grade ore in its Blacktail property. The body was crosscut about 175 ft. from the side lines on the American Express lode side.

Golden Rod Mining Company.—The last monthly clean-up amounted to \$13,000. The company is employing about 250 men, and shipping to its mill about 100 tons of ore daily, some of their best product coming from the Wells Fargo group, in Blacktail, where, it is reported, a rich vein was recently struck.

Hattie.—The tunnel is being driven 100 ft. further in. It will cut the vein at a depth of 200 ft.

Mikado.—It is said that a body of high-grade ore was recently struck in the south drift of this mine.

Pennington County.

Welcome Chlorination Company.—On March 24th 35 tons of ore were received from the Welcome mine, the first since litigation began.

TENNESSEE.

Coal.

Indian Mountain Coal Company.—This company has been organized to work the coal fields at Indian Mountain, near Jellico. A. W. Schenck, R. J. Rankin, C. C. Sullins are the incorporators.

Tennessee Coal, Iron & Railroad Company.—It is announced that Mr. John H. Inman has bought 25,000 shares of the stock of this company from the De Bardeleben party at a price not made public, but believed to be about 25. Mr. De Bardeleben still retains control of the company, and it is said that he and Mr. Inman will work together, at least for the present. Another report is that Mr.

Inman and his associates want a controlling interest.

TEXAS.

Coal.

Sierra Blanca.—Lands have been purchased by some Pittsburg capitalists, who are making arrangements to develop the coal veins recently discovered and to build a railroad to Chispa, the nearest station on the Southern Pacific. The distance by the survey is 26 miles.

UTAH.

Salt Lake City.—Mr. Green has signed the smelter plant contracts and filed his bond. By the terms of the contract the smelter plant and refinery shall cost, exclusive of the ground, \$500,000; the work of construction is to begin within 30 days, and the works are to be completed and put in operation on or before the first day of January, 1894. The plant is to have a capacity sufficient to employ 300 men, and it is agreed that the works are to be operated for a term of five years during at least nine months of the year, unless prevented by strikes and unavoidable accidents; and at least 250 men are to be employed during the time the plant is so operated. The plant to be erected under the agreement is described as follows: An electrolytic copper refining plant of capacity sufficient to refine and turn out 25 tons of pure copper product daily; a gold and silver plant, to be of sufficient capacity to handle and separate all the gold and silver product from said electrolytic plant; a roasting furnace; a copper smelting plant; a copper casting furnace plant; a converter plant; a copper rolling mill for manufacturing sheet copper, etc., of suitable dimensions and capacity for the practical operation of the same; a copper wire mill of suitable dimensions and capacity for the practical and successful operations of same.

Cache County.

Mahogany.—This and two other claims at the head of Logan Canyon have been bouded to Salt Lake parties for \$60,000.

Juab County.

Bullion-Beck Mining Company.—The Salt Lake "Herald" states that the company is gradually gaining ground in its contest with the miners. Many of the old hands are at work, and there is no disturbance.

Nephi County.

Mount Nebo.—A. Hague is pushing ahead his development on Mount Nebo. Last year he shipped five carloads of selected ore, running 58% lead and 17 oz. silver, and he has now three carloads more ready to ship when the roads are good. He has considerable ore on the dump that runs from 25% to 30% lead and 8 to 10 oz. silver, while there is more in sight in his mines. One shaft is down 75 ft., from the bottom of which drifts have been run 50 and 75 ft., making 120 ft. on the vein and in ore. A tunnel to cross-cut the vein at a depth of 375 ft. is in 450 ft., the last 100 ft. encountering some ore, but they look to tap the vein some 50 to 75 ft. farther ahead.

Nephi Plaster and Manufacturing Company.—This company shipped in 1892 about 2,000 tons of plaster of paris. It fully supplied Utah with plaster and sent much to points in the northwest and to California. It has a mill with a capacity of 100 tons per day, and run by water. Only a few rods from the mill there is a deposit of gypsum, some two or three hundred feet wide, extending up the side of the mountain. It is easily blasted, and loaded onto cars and run into the mill. Once in the mill it is crushed in rock breakers, then by rollers, and on being run through a burr mill is ready for calcining. After calcining it is run into bins, elevated, bolted and then sacked. Besides making plaster of paris, the company is beginning to make land plaster or fertilizer, which goes through the same process, except that it is not calcined.

Salt Lake County.

Butterfield Tunnel.—This tunnel is now in 3,500 ft., and is being driven at the rate of 14 ft. per day. Lately water has interfered with the work. The tunnel has cut several barren ledges, but no pay ore. When completed (8,766 ft.) it will drain over 30 claims, the chief of which is the Northern Chief mine, which it will cut at a depth of 1,800 ft. below its present workings.

Monte Cristo.—Work will be resumed as soon as weather permits. There is a considerable quantity of first class ore sacked for shipment at the mine.

North Last Chance.—This property, which formerly belonged to an English incorporation, with the title of the New Last Chance Mining Company, Limited, is now in the hands of T. W. Buzzo and Mr. Hodge, of Houghton, Mich. The English company was slow to develop, but the new owners have expended considerable money and have a paying property.

Sampson Mine.—North from the 600 level a breast of ore, 2½ ft. thick and said to run 200 oz. in silver, has been opened.

Willow Creek.—The tunnel which has been driven from both sides now has a length of 800 ft.

(From an Occasional Correspondent.)

Stewart No. 1 and No. 2.—These mines are large veins of oxidized quartz in Bingham Canyon. The ore, which occurs in immense bodies, carries from \$8 to \$20 per ton. A great deal of money in the past has been spent in trying to make these mines pay. By free amalgamation from 25% to 40% could be obtained, but beyond that nothing. At the Stewart operations were resumed last fall, and the cyanide process introduced. It was found that the cyanide alone was not entirely successful, as coarse gold escaped that the cyanide did not succeed in dissolving. But by experimenting, using amalgamation with quicksilver and cyanide. I understand they have arrived at a very satisfactory result. The mills used are Huntington's and Crawford's. Cyanide solution is fed into the mills with the ore; the ore is reduced to a pulp, which, coming in contact with the quicksilver in the chamber, gives up the free gold. In the scouring process the cyanide is thought to very materially assist. The pulp passing from the mills, thoroughly charged with the cyanide solution, is deposited in tanks. The solution is drawn off through troughs in which are deposited zinc shavings, upon which the gold in solution is precipitated. The liquid is pumped back into the mill. On the Stewart ore this combination process is said to save 90% of the gold. They are putting through 50 tons per day, and preparing to increase the capacity of the plant to 200 tons per day.

The Stewart and Stewart No. 2 are on the same great vein. The ore bodies are very large and cheaply mined. The Stewart No. 2 has a mill, but is not working at present, the property being under bond. The cyanide process has not yet been used on a working scale.

Coal.

In 1892 Utah produced 360,508 tons of coal. According to the report of Coal Inspector Robert Forrester, which has just been handed to the governor, the largest producing mine was the Castle Gate mine, belonging to the Pleasant Valley Coal Company. Its output was \$149,918 tons; next to it came the Winter Quarters mine, 98,550 tons; the Pleasant Valley No. 1, 61,256 tons, and the Wasatch mine, 39,278 tons. The coal filings at the Salt Lake Land Office during the fiscal year 1892 were 39 in number, covering 5,480 acres, against 45 in 1891, covering 6,560 acres.

Summit County.

Crescent Mining Company.—For some time a long drainage tunnel has been under consideration. It is reported that a deal is being made whereby the company will get the privilege of extending the Alliance tunnel into Crescent ground. If this arrangement falls through, it is quite probable that assessments will be levied.

Glencoe Mining Company.—This mine was sold at marshal's sale on March 24th to satisfy the judgment secured against it by the Utah & Montana Machinery Company. The property was bid in by C. P. Mason for an amount equal to the judgment and costs of sale. This places the property in a peculiar position, and is quite liable to involve it in serious litigation, as Superintendent Curtis has also secured a judgment against the same property for wages due himself and the men employed, says the Park City "Record."

Mackintosh Sampler.—Arrangements have been made to use the Crescent concentrator for sampling Anchor and other ores until the new mill is completed, plans for which are now being prepared.

WEST VIRGINIA.

Atheus County.

Phoenix.—This coal mine, at Jacksonville, was found on fire on March 29th. Some men are in the mine, and great anxiety is felt for their safety.

Kanawha County.

Falling Rock Cannel Coal Company.—This company has recently purchased some coal land on Falling Rock Creek, about 18 miles up Elk River from its mouth. This company was incorporated a short time ago with a capital stock of \$500,000, and is composed largely of New York capitalists, says the "Manufacturers' Record." The land which the company has bought includes 3,087½ acres of cannel coal land, which was purchased from James B. Wier, of New York City, who disposed of 87½% for \$349,500. Robert Haydock sold a 2¼% interest in the same property for \$10,000. Both Messrs. Wier and Haydock retained an interest in the company. The property is underlaid with cannel coal. The new owners will develop it as soon as possible.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

Kootenai.

Comstock No. 2. This mine has been sold to Spokane parties, purchase price not given. It is a free milling ore.

Pilot Bay Smelter.—The building is completed. The boiler house and machine shop have been in use for some time. The assar office is ready for work and the concentrator building is also well

under way. The company has also constructed an 800-ft. wharf on the north side of the bay. The machinery for the plant is all on hand and it is expected that the smelter will be completed July 1st.

CANADA.

Province of Nova Scotia.

Dominion Coal Company.—A telegram from Halifax says that "a big fire is raging at Bridgeport in the Cape Breton coal mines. All the surface plant has been destroyed."

ENGLAND.

In the House of Commons Mr. Asquith recently stated that the number of deaths caused by defective pit-ropes and chains during the past ten years was reported to be 29, or an average of two per annum, in metalliferous mines, and 46, or an average of 4½ per annum, in coal mines. There was at present no official test applied to ropes or chains. By the Coal Mines Act, 1887, it was the duty of the mine owners to have the ropes and chains examined once in every 24 hours by a competent person. Mr. Asquith said he had consulted the mines inspectors and had come to the conclusion that it was undesirable to relieve the mine owner of his proper responsibility in this respect, and, as at present advised, he does not propose to institute any official test for these ropes.

Fire Clay in Cumberland.—During the sinking of a shaft for the winning of iron ore by the Whigham Mining Company, of South Cumberland, a band of fire clay, 5 ft. thick, was struck. It is believed that coal exists in the neighborhood, and steps will at once be taken to test the matter.

GERMANY.

A cable dispatch from Berlin, March 29th, states that the mining town of Kaernton, near Bleiberg, is burning. Two churches and 65 houses have already been destroyed. Fifteen persons have lost their lives.

Coal.

Westphalian Coal Syndicate.—The articles of agreement of this syndicate have been signed by all the contracting parties. The syndicate embraces 170 collieries, producing together 27,000,000 tons of coal per annum, or 50% of the total output of the country. The owners have bound themselves for a term of five years from March 1st, 1893, to resign their freedom of competition to the syndicate, which is armed with full powers to regulate the amount of output and the terms and rates of sale. Although the syndicate professes to have in view the interests of consumers no less than those of producers, its first object is avowedly "an upward regulation of prices." There is already a rise of 8 or 9% in the contract price of coals for future delivery.

MEXICO.

Hidalgo.

San José Maravillas Mining Company.—A drift has been run from this mine to the Los Ompaquez mine. It gives good ventilation to the Maravillas mine, and will enable the company to undertake the exploration of the Cabrera vein. At the Ompaquez mine the vein is 1½ metres wide, at a depth of 85 metres, and carries rich ore.

Monterey.

Messrs. Townsend & Harrison have obtained a State concession for the erection of a smelter at Monterey. Its cost must not be less than \$30,000, and it must be completed in eight months. Exemption from State and municipal taxation is guaranteed for eight years.

NEWFOUNDLAND.

Coal of excellent quality has been found near Grand Lake. Several seams have been traced for 15 miles along the south shore.

NOVA SCOTIA.

The Mines Department reports sales of coal during 1892 at 1,752,934 tons against 1,849,945 tons in 1891.

Boston Gold Mining Company.—This property at Malaga was advertised to be sold by the sheriff on March 18th, but the sale was restrained by an order of the court.

Memarock Gold Mining Company.—This company has bought the 50-stamp mill at Coldstream, and will move it to its own mine.

Montagu.—The work on the Simon-Kaye mine is progressing, and the stamp mill will be ready for its trial run about April 15th.

PUERTO RICO.

During 1892 Puerto Rico produced 8,120 tons of phosphates against 8,278 in 1891 and 7,374 tons of salt against 9,351 in 1891. The phosphate was mined by Messrs. Porrata, Doria & Contreras. In the Rosita mine owned by the former a vein of galena has been discovered and traced for 60 metres.

SCOTLAND.

At the 18th annual dinner of the Glasgow colliery representatives Mr. A. B. McCosh, who presided, said that one feature of the Scotch coal trade of the

past few years was the great development of the export trade. In the years 1890, 1891 and 1892 more coal was exported than in 1889 by 10.8%, 14.9% and 24.3%, whereas the increase in the exports from England and Wales in these years over their exports in 1889 were 1.5%, 5.5% and 2.8% respectively.

SUMATRA.

Oil.

Mr. Jacques Deen, who holds a concession for sinking oil wells on a tract of 170 square miles near Langkat, has had an examination made and analyses of the oil obtained from the first well. The report is that the product is of better quality than Baku petroleum, and will yield a higher percentage of merchantable burning oil.

TURKEY.

Coal Mines.—A limited company for working the Turkish coal mines is in course of formation at Constantinople. It will be composed of native capitalists, and will seek to acquire the concession to work several coal mines in proximity to railroads now built or about to be laid down.

COLORADO ORE MARKET.

Denver.

March 27.

(From our Special Correspondent.)

For the past two weeks ending March 25th the receipts of ore in this market offered for public or competitive bid at the public ore sampling works amounted to only 445 tons. This falling off in tonnage and the future decline in shipments, which is bound to occur, are due to one cause, the low price of silver, forcing the numerous small shippers to discontinue work and shipments. Of course the large shippers are not exempt from the same discouraging factor, as was proved by the Sheridan mine, a producer of 100 tons per day, shutting down about the same time last week that the Humboldt did, a producer of 300 tons per month, both located in the Telluride mining district. At this writing it looks like an absolutely sure thing that many other ore producers are bound to follow suit, and although it is yet early in the year to forecast the result it appears to us as certain that the silver production for this year is bound to fall off many millions, unless we have an improvement in the price of silver.

Of straight siliceous ores there was offered 175 tons, which sold at 95% of the silver, \$19 to \$20 per ounce for gold, and stood treatment charges of from \$10 to \$14 per ton, resulting in an average treatment for 50% x. s. silica of about \$11.50 per ton.

Of siliceous lead ores (sulphide) carrying from 5% to 12% there was offered 154 tons, which did not bring as good figures as usual for the miner, due to liberal offerings of low grade lead sulphides under contract. This 154 tons sold at 95% of the silver, \$19 to \$20 for gold, 20c. to 35c. per unit for lead, and stood treatment charges of from \$7 to \$14 off; an average ore, carrying 10% lead, brought about 30c. per unit for lead and \$10 off for smelting.

Of heavy lead ores (sulphide), carrying from 20% to 45% lead, there was only offered 62 tons, which brought good prices; for example, one lot of 44½ lead sold at 54c. per unit, with nothing off for smelting.

Of copper ores and concentrates there were offered 40 tons, running from 4% to 11% copper, which brought 95% of the gold and silver, 80c. per unit for the copper, and stood a treatment charge of from \$9 to \$14 off per ton.

Of heavy iron sulphide ore and concentrates there was only offered 14 tons, which stood a treatment charge of from \$8 to \$10 per ton, the iron being low in x. s.

MINING STOCKS.

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

NEW YORK, Friday Evening, March 31.

To-day being Good Friday, the various exchanges were closed. This naturally has made the volume of business in mining stocks for the week smaller than usual. The total number of shares sold during the week (including last Saturday) amounted to but 16,190 shares, of which 4,580 were dividend shares and 11,610 non-dividend. Many of the so-called "dividend-paying shares" are stocks of mining companies which declared dividends once upon a time, and have ceased to do so for several years. Of the "non-dividend shares," none has ever paid a cent to the stockholders, but hope to do so in the future. Justice compels us to declare that many of these mining companies have lost this hope—if ever they entertained it. It should be the business of the Committee on Mining Securities at the Consolidated Stock & Petroleum Exchange to strike off the list all such stocks and to replace them with good properties. Only by this means might public interest be attracted to the Exchange and the present dullness be replaced by a fair, bona-fide trading in mining securities.

What little business was done during the past week, generally speaking, was devoid of features of interest. The Comstock stocks were quiet with the

exception of Comstock Tunnel, of which 1,200 shares were sold at 10c. Other sales were as follows: 100 shares of Gould & Curry at 75c., 100 shares of Hale & Norcross at \$1, 150 shares of Ophir at \$1.75, 200 shares of Savage at 60¢@75c., 400 shares of Yellow Jacket at 35c., 300 shares of Best & Belcher at \$1.45@1.50 and 400 shares of Union Consolidated at 80¢@90c.

Of the California stocks Bodie Consolidated shows a sale of 100 shares at 30c. Of Belmont 300 shares were sold at 21¢@22c.

The Colorado shares were quiet. Of Leadville Consolidated 500 shares were sold at 18c. Other transactions were as follows: 300 shares of Chrysolite at 21c., 200 shares of Little Chief at 21c., 100 shares of Robinson Consolidated at 35c., and 100 shares of Small Hopes at 85c.

Phoenix of Arizona was rather heavily traded in during the week, 6,950 shares being sold at 29¢@32c. It is probable that the Committee on Reorganization will be ready to submit their report next week. The committee and their attorneys have been hard at work on it for some time, as the plan of reorganization will show.

The only Black Hills stock traded in during the week was Father de Smet, of which 300 shares were sold at 20c.

Ontario was in very fair demand; total sales aggregate 430 shares at \$15.50@16.

Sales of El Cristo this week amounted to 1,400 shares at 45 to 48c., and of Monte Cristo to 500 shares at \$3.10@3.15.

Minnesota Iron Company was traded in to the extent of 560 shares at \$63.50@66.25.

BOSTON.

March 30.

(From our Special Correspondent.)

The market for copper mining shares is almost at a standstill, with very few transactions recorded in the whole list. An unusually large order in Calumet & Hecla was executed early in the week at \$315, after which the price receded to \$312. A few shares of Tamarack were sold at \$161, with later sales at \$164@163. Quincy was heavy and declined to \$130. Osceola was only lightly dealt in, but the price was firm at about \$35@35½. The Montana stocks are almost neglected, less than 1,200 shares having changed hands for the week. Boston & Montana holds steady at \$31½, with a few sales at \$32. Butte & Boston declined ¼ to \$10¼. Centennial improved slightly with sales at \$8¼@8½. Franklin held quite firm at \$12¼@12½, with a small lot selling at \$13. There was quite a lot of Kearsarge thrown upon the market, which caused a decline to \$9.

Atlantic declined to 9¼, with an advance to 9½ for a 100-share lot. Tamarack, Jr., sold at 22¼, a gain of ¼ over last week's closing. Wolverine seems to have support at \$2¼@2½. It is reported that the mill will start up again soon, and that some very good ground has been opened recently. Alouez sold at 70c. and Arnold at 50c.

The long predicted boom in copper stocks seems to be as far off as ever. There is no speculative feeling manifested and no rise in prices probable under existing circumstances.

3 P. M.—There was no change after the noon hour except in Tamarack, which dropped \$2 to \$1.61 on sale of 10 shares. Centennial was 8½ and Kearsarge \$9, being the lowest prices of the week.

SAN FRANCISCO.

March 24.

(From our Special Correspondent.)

During the earlier days of the week prices ruled a shade higher than during the week previous, but yesterday and to-day there was a falling off in prices and also in the volume of trade. Trading has been confined almost entirely to the middle group of Comstocks, but each call to-day showed a shading off in prices. Work in several of the mines on the Comstock is being delayed pending the arrival of J. W. Mackay and J. Flood, but as the former is still confined to the sick-room it is very doubtful how soon he will be able to visit Virginia. Meantime interest is centered on the middle mines, where work of a promising nature is going on. With the suspension of ore shipments from the Savage mine the stock fell flat, and manipulators will have all their time taken up in advancing prices in the face of the present outlook.

Of the North End Comstocks Consolidated California & Virginia has shown to-day a decline of 25c. on the week's trading, selling in both sessions steady at \$2.15. Ophir has declined to the same extent, having ruled at \$1.60 this afternoon; Mexican at \$1.40; Sierra Nevada at 85 and Union Consolidated at 75 showed a proportionate decline value from the rulings of a week ago.

In the middle group prices have not shown such a decline on the week's trading as the North Enders in consequence of their having advanced early in the week. The declines of yesterday and to-day brought prices to much the same figures as the ruling rates of last week. Chollar sold this morning at 65c.; Gould & Curry at the same price; Hale & Norcross at \$1.00; Potosi at \$1.55; and Savage at 65c.

The dealings in Gold Hill and South End Comstocks have been very light, and in every case at lower prices. Belcher sold on afternoon call for 85c.; Bullion for 45c.; Challenge Consolidated for 35c.; Confidence for 95c.; Consolidated New York for 15c.; Crown Point for 30c.; Justice for 10c.; Overman, 20c.; Occidental for 5c., and Yellow Jacket for 35c.

The trading in outside stocks has continued to be merely nominal. Bodie Consolidated and Bulwer have ruled at 25c. bid, and a small lot of Mono sold for 30c. Belle Isle, Navajo, North Belle

Isle and North Commonwealth were held for 16c.; 5c were bid for Grand Prize, and Nevada Queen was held for 15c. In the Quijotoa stocks Crocker was held for 5c.; Peerless and Weldon for 10 cents; Peer for 20c. and Silver King for 25c. At the above prices the market closed steady.

MEETINGS.

Bulwer Consolidated Mining Company, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, Cal., April 12th at 1 p. m.

Champion Mining Company, at the office of the company, No. 320 Sansome street, San Francisco, Cal., April 11th, at 3 p. m.

DIVIDENDS.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 33 of fifteen cents per share, \$150,000, payable April 15th at the office of the company in Colorado Springs, Colo. Transfer books close April 8th and reopen April 17th.

Sloss Iron and Steel Company.—Coupons due April 1st, 1893, on the general mortgage 4 1/2% gold bonds of this company will be paid on and after that date by the Central Trust Company, No. 54 Wall street, New York City.

Victor Gold Mining Company, dividend No. 1 of five cents per share, \$10,000, payable April 10th, 1893, at the office of the company in Cripple Creek, Colo.

METAL MARKET.

New York, Friday Evening, March 31, 1893.

Prices of Silver per Ounce Troy.

March.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	March.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
25	4 87 1/4	37 1/2	82 1/2	628	29	4 87 1/4	38 1/4	83 1/4	632 1/2
27	4 87 1/4	37 1/2	82 1/2	629	30	4 87 1/4	38 1/2	83 1/2	632 1/2
28	4 87 1/4	38	82 1/2	630	31	4 87 1/4	38 1/2	83	631

Under the influence of rising exchanges in the East the London price of silver reacted sharply and the India Council were able to sell their full quota of bills on Wednesday. Demand for silver has continued good, but on Thursday buyers being supplied the condition was quoted dull. To-day being a close holiday in London there are no quotations.

The United States Assay Office at New York reports the total receipts of silver for the week to be 183,000 ounces.

Gold and Silver Exports and Imports at New York for Week Ending March 25th, 1893, and for Years from January 1st, 1893, 1892.

Week.	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1893.....	\$1,475,659	\$1,105,916	\$416,775	\$14,904	\$771,008
1892.....	\$3,700,178	\$5,045,656	\$6,947,015	\$18,812	\$4,750,725
1892.....	12,043,255	5,359,59	5,755,808	339,523	12,100,351

During the five days ending March 31st the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$129,965; silver, \$403,180; imports, gold, \$107,977; silver, \$1,425. The exports included \$97,000 in Spanish alfon-os to Havana and \$341,680 in American silver bullion for London.

NOTES OF THE WEEK.

In the early part of the week call money ruled at 2% to 4%, with time money at 5% to 6% on mixed collateral, but owing to the demands made by various companies for disbursements on April 1st, rates have made a considerable advance, which caused a shifting of loans. This, however, has had little or no effect on securities, which have remained strong throughout. No notable amount of gold has been exported during the week, and the probabilities are that none will be exported so long as money continues high.

Will money become easier after the regular April disbursements take place? No definite answer can be given to this question. It is the general opinion that the West is not yet supplied with a sufficient quantity of notes, and that a westward movement will take place during April. Color is lent to this opinion by the fact that neither in volume nor in duration did the movement which began in February compare with previous years.

A partial explanation of the outward movement of gold when exchange did not warrant it is found in some recent figures ament the Rothschilds and the Austro-Hungarian government. On January 5th the Hungarian government agreed with the Rothschild syndicate to change its debt of \$200,000,000 payable in paper to a 4% perpetual non-taxable gold debt. The old debt was to be turned in at par and the new gold debt was given the Rothschilds guaranteed the outstanding notes of the Austro-Hungarian bank and various State note issues to the amount of \$328,000,000. On January 11th the

Rothschilds further agreed to furnish Austria's 70% liability of the above notes and take in payment \$24,000,000 in gold four per cents, at 92.

It can be easily seen that the 8 and 9% allowed the syndicate permitted them to pay a liberal premium to get the gold necessary to comply with their contract. Although this monetary change has made money easy in Austria, it should not be forgotten that her obligations have been increased \$100,000,000.

From the City of Mexico comes the intelligence that it also is worrying about the continued export of its gold. It is now recommended that the government place a small export duty on gold and that in the future silver and gold shall be coined at the ratio of 20 to 1. The proposer evidently believe that this recognition of the changed values of the two metals would prevent the export of gold. This may or may not be so, but the proposed export duty would be useless. Mexico, like any other country, must pay her foreign debt in gold or in its equivalent, and it is potent that the only effect of such a duty would be to make it harder for Mexican merchants to pay for their goods.

The movement of precious metals at the Peruvian Mint during 1892 was as follows: Silver, bars received for coinage, 1,196, containing 59,256'86 kilos of fine silver, valued at 2,633,656'4 soles. Bars received for export, 87, containing 5,238'85 kilos of fine silver, valued at 232,838'2 soles. This gives 64,495'72 kilos as the total production. Gold, for export, 101 bars, 128'42 kilos of fine gold, valued at 87,089 soles. The sole weighs 25 grains and is 900 fine, consequently contains 22.5 grains of pure silver.

The government collected 9,663 soles on the silver and gold exported.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars	\$65 1/4	\$66
Peruvian soles and Chilean pesos	59 1/4	60
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.89
Twenty marks	4.74	4.78
Spanish 25 pesetas	4.80	4.85

Copper.—Business has been very dull and unsatisfactory, and prices have eased off slightly. In spite of this, no increase in demand is perceptible and buyers are all waiting for lower values. Lake copper is freely offered at 11'75, and the actual business done has been somewhat below this figure. Casting copper is obtainable at 10 1/4@10 1/2 and Arizona pig copper (96% at 9 1/4@9 1/2, according to brand). Exports of furnace material have been heavier lately than was anticipated, considering that the Anaconda has not shipped anything for several months past, but it is reported that they are now producing rather heavily. We hear on good authority that the renewal regarding the limitation of production has been signed and will become operative.

The London market has hardly shown any fluctuations, and price for G. M. B.'s are steady at £45 for spot, and £45 15s. for three months prompt. For refined and manufac ured we quote: English Tough, £48@£48 5s.; Best Selected, £49@£49 5s.; Strong Sheets, £56 10s.@£57; India Sheets, £52 10s.@£53; Yellow Metal, 4 1/4@d.@5d.

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

To	Copper Matte.	Lbs.	Value
To Liverpool—			
S. S. Majestic	1,040 bags	119,940	\$5,000
" Tauric	4,193 bags	480,960	21,000
" Aurania	5,710 bags	626,513	29,000
To Liverpool—			
S. S. Majestic	4 casks	4,480	
" "	33 bars	4,566	\$1,306
" "	14 casks	2,370	
" Tauric	113 pigs	37,008	11,000
To Havre—			
S. S. Gardenia	102 casks	91,840	\$10,100
To Naples—			
S. S. Al'esia	2 bbls.	2,500	\$300
To Bordeaux—			
S. S. Chateaux Yquem	45 casks	56,250	\$6,000
To Hamburg—			
S. S. Amalfi	90 bbls.	112,500	\$14,500
To Rotterdam—			
S. S. Spandam	205 pigs	59,598	\$6,000

Tin is depressed and has been selling rather cheaply. We have to quote 20 1/2@21c. for spot and April, 21@21 1/2c. for May and 21 1/4c. for June. Offers from London are rather above the parity of prices here. The market in London has been steady and values have been maintained. Spot is quoted at £94 17s. 6d., but three months prompt is nominal at about £91@£92, with hardly any business doing.

Lead.—The market continues very strong, but sellers' prices being rather high very little business has been done. Under the circumstances, only a few transactions took place at 4'02 1/2@4'05. The London market remains strong, with Spanish lead at £9 17s. 6d. and English lead at £10.

Chicago Lead Market.—The Post, Boynton, Strong Company telegraph us as follows: "The market has been much firmer with 3'80c. bid and 3'85c. asked, with few transactions."

Spelter.—There is a better demand, and producers, who have been selling all along at a loss, are somewhat firmer. In consequence we have to raise the quotation to 4'30, delivered New York. The London market remains unaltered, good ordinaries being quoted at £17 5s. and special at £17 17s. 6d.

Antimony is dull. Cookson's is quoted at 10 1/4@10 1/2c., L. X. at 10 1/4@10 1/2c., and Hallett's at 10@10 1/2c.

Nickel is again somewhat easier and must be quoted at from 46c. to 52c., according to brands and quality.

Quicksilver.—This market continues without change. Quotations are: New York, \$38@38.50; London, £6 10s.

IRON MARKET REVIEW.

New York, Friday Evening, March 31, 1893.

Pig Iron Production During Weeks Ending March 25th, 1892, and March 25th, 1893, and During Both Years to These Dates.

Fuel used.	Week ending		From Jan., '92	From Jan., '93
	Mar. 25, 1892	Mar. 25, 1893		
Anthracite	94 38 970	73 34,310	467,640	398,440
Coke	164 138,990	146 134,595	1,667,880	1,591,180
Charcoal	55 11,820	36 8,623	108,889	105,692
Totals	313 189,780	255 177,528	2,244,409	2,095,312

Northern brands: No. 1, \$14.50@15.25; No. 2, \$13.75@14.50; Gray Forge, \$12.75@13.50. Southern: No. 1, \$14.25@14.75; No. 2 F. and No. 1 soft, \$13.25@13.75; Gray Forge, \$12.25@12.50, tide-water. Scotch irons: Coltness, \$21.50@22; Eglington, \$19.50@20.

Billets and Rods.—Steel billets, tidewater, \$25 @ \$25 25; foreign, \$29@29.50; wire rods, \$32.50@32.75; foreign, \$40@40.50; Swedish, \$32.50@53.

Manufactured Iron and Steel.—Angles, 1'8@2c.; axles, scrap, 1'90@2'10. delivered; steel, 1'85@2c.; bars, common, 1'55@1'60c.; refined, 1'65@1'9c. on dock; beams, up to 15 in., 2@2'15c.; 20 in., 2'35@2'4c.; car truck channels, 2@2'10c.; channels, 2'10@2'20c., on dock; hoops, steel, 1'8@1'9c., delivered; links and pins, 1'85@2'10c.; plates, bridge, 2@2'10c.; fire-box, 2'5@2'8c.; flange, 2'25@2'50c.; marine, 2'50@2'75c.; sheared, 1'85@2'10c.; shell, 2'10@2'25c.; tank, 1'8@2c.; universal mill, 1'85@1'90c.; tees, 2'30@2'60c., all on dock.

Merchant Steel.—The advancing tendency of steel billets at Pittsburg will, if it continues, stiffen price on merchant steels and further stimulate the implement trade to place their orders early, inquiry for which is already fair. Tool steel is becoming more active. Quotations are: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe calk, \$2.30@2.40. Bessemer machinery, \$2.10@2.20. Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

Old Material.—Rails, iron, \$6.50@17; steel, \$13@13.50; No. 1 scrap, \$15.75@16; car wheels \$12.50@13, f. o. b. Jersey City.

Rail Fastenings.—Fish and angle plates, 1'55@1'60c. at mill; spikes, 1'9@1'95c.; bolts and square nuts, 2'45@2'50c.; hexagonal nuts, 2'55@2'60c. delivered.

Spiegeleisen and Ferromanganese.—Spiegel, \$25.25@25.50; Ferro, \$56.50@57.

Steel Rails.—\$29 mill or tidewater. Girder rails, \$32.50@33.

Buffalo. March 30.

(Special Report by Rogers, Brown & Co.)

More activity has developed during the week than has been seen for several months. Prices continue low, but consumption is very heavy, and both inquiry and purchase are on the increase. As contracts mounting to several thousand tons are to be placed in the immediate future it would not be surprising to see a stiffening in values very soon. We quote for cash f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$14.50; No. 2 X foundry strong coke iron, Lake Superior ore, \$13.75; Ohio strong softener, No. 1, \$14.50; No. 2, \$14; Jackson County silvery, No. 1, \$17@17.30; No. 2, \$16.30@16.80; Lake Superior charcoal, \$17.25; Tennessee charcoal, \$18; Southern soft, No. 1, \$14; Alabama car wheel, \$19; Hanging Rock charcoal, \$20.50.

Chicago. March 30.

(From our Special Correspondent.)

The main feature of the week in local pig iron circles seems to be increasing confidence on the part of buyers. This is more particularly evinced by the fact that they are placing contracts for good sized amounts, running through the year, at current figures. Additional territory has been opened to blast furnaces in this vicinity by the reduction in railroad rates on pig iron to the Mississippi River, and some inquiry is already noticed. Most of the foundries in this neighborhood are running full, and only in exceptional cases is there any slackening up. One of the local furnace companies notes an improved inquiry for Bessemer iron. Southern coke iron orders are small and mainly for quick shipment. Finished iron is in better request, orders larger and consuming manufacturers are more anxious than they were to cover requirements during April, May and June. Light sheets continue active, structural in fair inquiry, but plates in mill lots are quiet. Scrap and old material of all kinds are very quiet and entirely in buyer's favor.

Pig Iron.—Northern coke iron is in fair demand and prices are well maintained. With the week large smelters have brought in lots from 500 to 1,000 tons and others have increased their orders by several hundred tons, which denotes increasing con-

fluence in the market. Local Scotch irons are in better demand and prices have been slightly advanced. The actual amount of business transactions show a larger tonnage than the week before. Demand for Southern coke iron is light and inquiry at a low ebb. Orders are small for quick delivery and taken at shaded prices. Lake Superior charcoal iron, though quiet, holds its own as regards price. A sale of 1,000 tons Saug, an inferior grade of charcoal, is noted at a low price.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17.25; Lake Superior coke, No. 1, \$13.75@14.00; No. 2, \$13.25@13.50; No. 3, \$12.75@13; Lake Superior Bessemer, \$14.75; Lake Superior Scotch, \$14.50@15; American Scotch, \$16.00@16.50; Southern coke, foundry, No. 1, \$14.25; No. 2, \$13.10; No. 3, \$12.50; Southern coke soft, No. 1, \$13.10; No. 2, \$12.75; Ohio silveries, No. 1, \$16.50; No. 2, \$16.00; Ohio strong softeners, No. 1, \$16.75; No. 2, \$16.25; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$19.50@20.

Steel Billets and Rods.—Small lots of billets from stock are held at \$25. Rods are nominal at \$32.50.

Structural Iron and Steel.—Light bridge material is more active and there is a fair demand for small lots of beams, angles and columns. Further large contracts are expected shortly for eliminated railways. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$1.85@1.90; tees, \$2.15@2.25; universal plates, \$1.90@1.95; sheared plates, \$1.90@1.95; beams and channels, \$1.95@2.25.

Plates.—The tonnage moving from warehouse is large, but with no improvement in price. Mill business is flat. Steel sheets, 19 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank steel, \$1.90@2; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.25; flange steel, \$2.75@3; boiler rivets, \$4@4.15; boiler tubes, all sizes, 60%.

Merchant Steel.—Soft steel of all kinds and shapes continue in very fair demand, and prompt or early shipment orders are referred to mill before being closed. Increasing activity is noted in tool steel. Quotations are: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20. Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—The volume of business is very satisfactory to mill agents. Jobbing and consumptive demand is quite good. Discounts are steady at 70 and 10% off on Juniata and 70 and 15% off on charcoal, and jobbing quantities at 70 and 5% off on the former and 70 and 10% off on the latter.

Black Sheet Iron.—Roofers and jobbers are placing large contracts for the lighter weights and prices are firm at 285c. for No. 27, common; some mills ask a dollar a ton more. Jobbers quote 3@3.10c. for iron and 3.10@3.15c. for steel, same gauge.

Bar Iron.—An order of 600 tons from a wagon-maker was placed at 155c. base with half extra. Several other large specifications are in the market, inquiry increasing and prices firmer. Most of the business is for delivery during the next three months. Regular mill quotations are 157½@160c., and any concession would be for an extra good specification carrying large extras. Jobbers report a fair volume of business at 170@150c. on iron or steel in less than car loads.

Steel Rails.—Railroads continue to order lightly. Prices are steady at \$30@31.50. The lighter weight rails are quite active at \$32 and upward, according to weight and section. Mill orders are quiet for splice bars and fastenings generally. Quotations on iron and steel splice bars are 160@165c.; track bolts, square nuts, 255c.; hexagon, 265c.; spikes, 205@210c. according to style.

Nails.—Wire nails are more active from mill at \$1.65 base Chicago and \$1.70 from stock. Steel cut nails are also in better demand than they have been at \$1.40 base here, and \$1.50 from store in less than carloads.

Scrap.—There is very little doing in any grade; even business in the cheaper kinds has materially decreased. Dealers, as well as consumers, are buying very lightly. Quotations are nominal: Railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$15.50; axles, \$18.50; horseshoes, \$15; pipes and flues, \$7; cast borings, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10; coil steel, \$15; leaf steel, \$15.50; tires, \$14.50.

Old Material.—Moulders of iron rails ask \$18@18.25 and consumers want them for less, as offerings inside of 30 days by railroads are expected to be large. Old steel rails are quiet at \$11@14, according to length and condition. Car wheels are in better demand and prices steadier at \$14.50@14.75.

Louisville, March 25. (Special Report by Hall, Bros. & Co.)

The general features of the market remain unchanged. Buying keeps up fairly well; in fact, better than some anticipated. Prices remain without quotable change, Grey Forge ranging from \$3 to \$8.25, Birmingham basis, and other grades proportionately. Charcoal irons, which have remained rather quiet for some time, are a little more active now.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13@13.25; Southern coke No. 2, \$12@12.25; Southern coke No. 3, \$11.25@11.50; Southern char-

coal No. 1, \$15.50@16; Southern charcoal No. 2, \$15@15.50.

Forge Irons.—Neutral coke, \$10.75@11; mottled, \$10.50@10.75.

Car Wheel and Malleable Irons.—Southern (standard brands) \$17.50@18.50; Southern (other brands), \$16.50@17; Lake Superior, \$18@18.50.

Philadelphia, March 31. (From our Special Correspondent)

Pig Iron.—A good week's business has been done at low prices. The best posted brokers say there has been no change. No. 1 commands \$15 for standard. No. 2, \$14.25. Forge, \$13.25, with 25 to 75c. less according to quality. The low prices have lessened production. Foundry irons of good brand are not crowded on the market. Less Southern iron is heard of. Forge is moving steadily but only for immediate use. Bessemer is firmer.

Muck Bars.—A few orders were placed this week for bars at \$22.75.

Steel Billets.—The attempt to get orders at higher prices has not been a success, buyers say. There is no reason for an advance, and as a good many have blooms enough to last them awhile manufacturers will not meet with much inquiry. Prices, \$25.

Merchant Iron.—An improvement has come and orders for assorted lots are keeping shippers busy—especially storekeepers. The mill people say there is an increase of mill orders, but the anxiety to do business keeps prices where they have been for months.

Skelp.—A good week's business at 155c. for grooved.

Wrought Iron Pipe.—A steady demand on small lots in this week's report. The competition is of such intensity as to make profits impossible.

Sheet Iron.—Steel sheets are going as fast as they can be turned out. In fact there is a good demand for all sheet mill products. Orders for summer delivery are placed without hesitancy. It is not correct that prices are higher, though small lots of galvanized have been taken at slight advances over quotations of a month ago.

Plate and Tank.—Certain brokers representing large purchasers have advised the placing of large orders at an early date for the double purpose of being secure in deliveries, and, second, to be secure against the possibility of an advance. A great deal of work is in sight. Mills are well supplied; iron tank steel and, 180.

Structural Material.—The anxiety for business keeps prices very low. The general run of orders is for 50 to 100-ton lots.

Steel Rails.—An improving inquiry is reported for light sections, but the orders have been few as yet. Standard sections, \$29.

Old Rails.—Lots are offered at \$18; small sales. Scrap No. 1 is active at \$15; machinery, \$11.50; old car wheels, \$13.50.

Pittsburg, March 31.

Raw Iron and Steel.—The situation of the iron and steel market presents nothing of special importance as compared with our last report; firmness of leading descriptions was the rule, not the exception. The volume of business for the past few weeks has been large, still there has been no accumulation of stocks in the hands of consumers; in fact, there is no accumulation at any point; all seems to be worked up so rapidly that even purchasers of good-sized blocks are kept well employed in purchasing stocks to keep their works running and filling orders that have accumulated on their order books. The furnace men in this vicinity are well satisfied with the situation and the outlook; most of them are well sold up and manifest no anxiety for new business unless for late deliveries. The sales of Bessemer pig continue liberal, the advance being fully maintained. Reports from the Shenango and Mahoning valleys represent liberal sales of Bessemer pig at the furnace \$13.50, freights to Pittsburg 60c. per ton, making the cost here \$13.10 per ton. As usual, dealers are somewhat apart in their views in regard to the market; while some contend that top prices have been reached, there are others who are firm in their belief that higher prices are not far off you can take your choice as regards the different views. Steel billets and slabs continue firm; spot or early deliveries find ready purchasers at outside prices. If it were possible to foresee what the outcome in regard to ores will be the remainder of the problem would not be hard to solve.

Non-Bessemer is comparatively dull, and as a matter of fact the interest is centered entirely in steel. As already intimated, the position seems to be impregnable, and, for a time at all events, it looks like higher prices. But consumers are skeptical, they have heard all that kind of talk before. A leading Eastern dealer on the situation: "Indications are not wanting of a better feeling among producers and prospects of a heavier and more remunerative business as the season advances. Bessemer pig iron and crude steel has shown considerable strength in all the leading markets of the country, and prices are not only firmer but higher. Reports from Eastern furnaces show a fairly satisfactory condition of things, although prices of foundry and mill grades of iron continue weak where the grade of material is not standard quality. The leading producers have their trade well in hand, and their order books in condition to carry them forward for some weeks, so that no occasion exists for them to meet the

quotations made by many of the other Northern and Southern producers." Coke Smelted Lake and Native Ore.

Table with columns: Tons, Cash, Charcoal, Muck Bar, Skelp Iron, Steel Skelp, Ferro-Manganese, Blooms, Billets and Bar Ends, Spelter, Old Iron and Steel Rails, Scrap Material.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 31. PRODUCTION OF BITUMINOUS COAL for week ending March 25th and year from January 1st: EASTERN AND NORTHERN SHIPMENTS.

Table showing coal production and shipments for Eastern and Northern regions, including Philadelphia, Erie, Cumberland, Barclay, Broad Top, Clearfield, Allegheny, Beach Creek, Pocahontas Flat Top, Kanawha, W. Va.

Table showing Western Shipments for Pittsburg, Westmoreland, and Monongahela, Pa.

Totals for Eastern and Western shipments.

Grand totals for production of coke on line of Pennsylvania R. R. for the week ending March 25th, 1893, and year from January 1st.

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending March 25th, 1893, and year from January 1st.

At the meeting of the sales agents March 30th, no change was made in prices, but it is said that the April output will be restricted to 3,000,000 tons.

On April 25th a meeting of the Western agents will be held. On April 1st freight rates from the Schuylkill region will be restored to \$1.70. Prior to last September the rate quoted was \$1.70, and the Reading endeavored to raise it to \$1.80. The Pennsylvania would not agree, and the rate was fixed at \$1.75. The rate from the Lehigh region remains at \$1.75, and from the Wyoming it will probably be \$1.80.

For the week ending March 25th, the estimated shipments of the Reading were 495,000 tons, 15,000 of which were for Port Richmond and 70,000 for New York waters.

For the week ending March 11th, the shipments were 410,500 tons, and since the first of the year 6,823,348 tons.

A number of interested parties were represented at a meeting in Philadelphia, March 29th, in regard to the receiver's certificates. The meeting was held in the office of George L. Crawford, master, but there were no practical results from it. Mr. Thomas Hart, Jr., of counsel for the receivers, stated that they were not ready to proceed, as they had in mind certain amendments to the petition. Just what these were was not stated; for, as Receiver Paxson remarked, they did not propose to give out the company's business in advance. Whether the amendments were of such a nature as to provide for all outstanding obligations, in which case the certificates would cover \$7,000,000, or whether they deal with matters of another sort, is unknown.

In this connection it may be noted that the receivers have refused to allow an expert accountant to examine the books in the interest of the New York committees of the general mortgage and income bondholders. The trustee under the general mortgage, the Pennsylvania Company for the Insurance on Lives and Granting Annuities, is at work on the books.

Ex-Governor Ludlow, who was appointed by Chancellor McGill some time ago to take testimony to ascertain whether the Central Railroad Company

was violating the Chancellor's injunction restraining that road from continuing its connection with the Reading coal combine, made his report March 29th. He states that he finds that the injunction is being obeyed, both in letter and in spirit, by the Central Railroad. He also finds that the lease of the Central to the Port Reading Railroad and the tripartite agreement entered into by the Central and with the Philadelphia & Reading Coal and Iron Company and the Lehigh & Wilkes-Barre Coal Company have been terminated. He concludes with a full exoneration of the Central road from the charge of having continued in the combine after the order of the Chancellor had been issued restraining it therefrom.

The interminable Coxe Bros. & Co.'s matter is again up. It will be remembered that the finding of the Interstate Commerce Commission in the case of Coxe Bros. against the Lehigh Valley road was to the effect that the freight rates from the mines to tide-water were excessive. But the Commission cannot enforce its verdicts, which are merely prima facie evidence in a civil suit, and just so long as this is the status will there be trouble and endless worry.

Coxe Bros. may have lost all concern in the case, but the other independent operators should not allow the principles involved in the decision to lapse from lack of agitation.

Prices are as follows:

PHILADELPHIA.				
	Broken.	Egg.	Stove.	Chestnut.
Hard White Ash.....	\$3.75	\$3.75	\$3.90	\$3.90
Free White Ash.....	3.65	3.65	3.90	3.90
Shamokin.....		3.90	4.10	3.90
Schuylkill R. A.....		4.00	4.25	4.00
Lykens Valley.....	4.50	5.25	5.50	4.75

NEW YORK.				
	Broken.	Egg.	Stove.	Chestnut.
Hard White Ash.....	\$4.00	\$4.00	\$4.15	\$4.15
Free White Ash.....	3.90	3.90	4.15	4.15
Shamokin.....		4.15	4.35	4.15
Schuylkill.....		4.25	4.50	4.30
Lykens Valley.....	4.75	5.50	5.75	5.00

Bituminous.

The condition of the market is that of a man who could sell more than he has and is afraid to bind himself to dispose even of what he has. Complaints as to the wretched condition of the transportation facilities continue to be recorded. Cars that should not require longer than a week for the round trip are not seen again on the yards for two, three and even four weeks. One large company has ordered 500 cars for its own use, and has 1,000 now. But it is in the same plight as its neighbors, and the addition of 50 per cent. to its cars will not relieve it of embarrassment.

Inquiry in the trade has shown that the principal companies are chary of making contracts, except at big figures, for the dislocation of railway service sure to follow close upon the World's Fair will react on the coal business, and the result of shortage in cars will be felt throughout the entire year. We hear of some contracts made for Pocahontas coal on board at Norfolk for \$2.30, but unless it be some favorite of the powers we are disposed to regard the report as premature. On board contracts at Norfolk have certainly been made at \$2.50 and \$2.40, but a contract in Philadelphia that finally went at \$2.55 was not secured by the Pocahontas people. It is understood that Pocahontas coal sells f. o. b. mines at 75c., the haul to Norfolk is 383 miles at 4 mills per ton mile, or, according to one statement, 33 mills, which brings the freight to \$1.55 or \$1.28. The latter figure is the more probable rate. The coal at Norfolk, therefore, will cost \$2.03. The difference between this and the \$2.30 contract is the only chance for profit. It may be true that the contract was secured for \$2.30, but as a rule \$2.40@ \$2.50 is the rate.

Coal for domestic consumption is sold in Norfolk for \$3.10.

The export of soft coal from Philadelphia has grown to goodly proportions of late years, while anthracite barely holds its own. For the last three years the exports have been as follows:

	Anthracite.	Bituminous.	Total.
1890.....	20,489	251,653	272,142
1891.....	23,153	297,596	320,749
1892.....	16,236	402,477	418,713

It goes chiefly to South America and the West Indies.

In Minnesota the great Donnelly is still rampant, but no bituminous coal operator has taken advantage of the situation, so far as we are informed. General Manager Rhodes, of the Minnesota Bureau of Coal Statistics, has been arrested on charge of perjury in swearing that he knew nothing of any combination and had nothing in his office that related to any such enterprise.

He was admitted to bail in the sum of \$5,000, pending the action of the Grand Jury, which meets in May. In the meantime Ignatius Donnelly has presented a joint resolution calling upon the governors of all the States wherein coal is produced to appoint delegates to a convention which shall take hold of the coal barons of "Pennsylvania and other States" and make them bitterly rue the day when they stirred the wrath of Ignatius Donnelly. We hope the convention will assemble without delay, for coal markets are a bit dull and we need "copy."

Prices in New York harbor are from \$3.10@ \$3.15, and at lower tide-water ports \$2.50@ \$2.60.

Charter rates are: New York to Rhode Island, 65 @ 75c.; to Boston, 75@90c. Philadelphia to Sound ports, \$1.10@ \$1.15; to Boston, \$1.15; to Portsmouth, \$1.25. Baltimore to Sound ports, \$1.10@ \$1.15; to Boston, \$1.20@ \$1.25.

Boston.

March 30

(From our Special Correspondent.)

The anthracite coal market is still very quiet. Dealers' stocks are light all over New England, yet they will buy, as they expect that seagoing freights will be lower in the course of two weeks. The fact that the agents did not change prices any at their meeting Wednesday was a surprise to some of the trade here, who have been hopefully anticipating a further decline in prices.

We quote f. o. b. prices at New York on free burning coal: Stove, \$4.15; egg, \$3.90; free broken, \$3.90; chestnut, \$4.15; Lykens Valley (at Philadelphia) broken, \$4.85; egg, \$5.45; stove, \$6; chestnut, \$5.

The entire soft coal trade is on the alert to close contracts with corporations and to see who closes them. It is probable that prices are kept up to \$2.70 f. o. b. Baltimore to consumers, and \$2.40 to dealers. The railroads have not contracted for coal as yet. They take a rather low grade of coal, paying in the vicinity of \$2 per ton for it. The same parties who sold for that price last year are asking about 25c. per ton more for it this year, the result being the roads are not disposed to close, hoping by holding to obtain coal at last year's prices.

Spot soft coal is very scarce and firm. Manufacturers and dealers alike are clamoring for coal, but are unable to get their supplies. This stringency is due principally to the fact that the vessels that should be here are at Southern ports. They are loading quickly, however, and will soon be on the way for this port. Spot coal is very firm here. George's Creek coal is worth fully \$4@ \$4.05 per ton, and Clearfield \$3.75@ \$3.85 per ton.

Freight rates continue very firm, though in some few instances they are a little lower. They are: From New York, 75@80c.; from Philadelphia, \$1@ \$1.10; from Baltimore, \$1.25; from Newport News and Norfolk, \$1.

The retail trade is good. The volume of business is not as great as it was, yet it averages big for this time of the year. Prices on stocks are well maintained. The retail dealers of this city have a banquet to-night, after which coal matters will probably be discussed.

We quote: Stove, \$6.50; nut, \$6.50; egg, \$6.25; furnace, \$6; Franklin, \$7.75; Lehigh egg, \$6.50; Lehigh furnace, \$6.25; soft coal, \$4.25@ \$5.

The receipts of coal at the port of Boston for the week ending March 25th were 18,614 tons of anthracite and 11,275 tons of bituminous, against 42,305 tons of anthracite and 12,180 tons of bituminous for the corresponding week last year. Since January 1st the receipts have been 265,027 tons of anthracite and 213,864 tons of bituminous, against 344,900 tons of anthracite and 125,070 tons bituminous for the corresponding time last year.

Buffalo.

March 30.

(From our Special Correspondent.)

The conditions of the anthracite coal trade are unchanged. Demand fair as weather continues cold, but not stormy. Bituminous coal in good request, and as a rule all sizes may be quoted as firm.

Messrs. Scott & Co., of Erie, have secured 25,000 tons of the soft coal contract for the use of the Canadian Pacific Railroad; Messrs. Ellsworth & Co., of Cleveland, 78,000 tons, and the Cuddy-Mullen Company, of Cleveland, 30,000 tons. Deliveries are to be made at Owen Sound, Algoma Mills, Fort William, Rosport and Heron Bay, respectively.

Advices from Ottawa say that the Dominion Parliament on Monday last passed a bill to incorporate the North American Canal Company. The promoters are to construct a canal from Lake Erie to Lake Ontario, deepen the St. Lawrence canals and cut a canal from Lake St. Francis to Lake Champlain, and thence to the Hudson River, in order to give a new waterway to New York City.

There is but little doing but talk relative to the opening rate on coal hence by lake to Chicago and Lake Superior ports. Shippers offer 60c. per net ton to the former place, but no engagements made. Vessel men complain of the 55c. Cleveland rate to Lake Michigan ports. The railroads have commenced stocking up their dock trestles for the season's commencement. A well-posted man says: "That the Eastern coal-carrying railroads have not yet recovered from the unusual demand for fuel made necessary by the severe winter. The rail shipments from Buffalo westward have taken a large quantity of the stocks which have accumulated here, and the companies are weeks behind in filling their stocking trestles. All the coal-carrying railroads are busy making up the deficiency."

Indications still point to a late opening of navigation. The ice in the Straits of Mackinaw, the Sault Ste. Marie River and at Duluth is very solid and thick. Other lake ports report plenty of ice of unusual thickness.

Chicago.

March 30.

(From our Special Correspondent.)

Nearly all the resident sales agents and representatives of the anthracite coal producing companies are in New York attending the meeting of the general Eastern and Western sales agents to fix the prices for April and for an exchange of opinions as to the policy to be pursued for the ensuing season. Country orders are few and far between, being now entirely for actual requirements, and dealers are waiting to see what the operators propose to do before ordering a ton over and above absolute necessities. Hence wholesale trade from the outside is exceedingly dull just now. City trade is also of very moderate proportions, the weather now being much milder.

Should April prove a cold, wet month, preceded by such a severe winter, there may still be a fair movement of hard coal, but at the best sales will be governed by the weather conditions. All rail coal is coming forward quite actively and is going into stock. There is, of course, some little shading of prices, but it is for the most part confined to certain of the trade who have a surplus of sizes they wish to clean up before the opening of navigation, and does not in the least affect or reflect on the general situation.

Bituminous coal is in overwhelming supply. Over all coal-carrying roads from surrounding states—West Virginia, Ohio and Indiana, as well as from Illinois—coal is being shipped in such quantities that the railroads cannot take care of it and shippers cannot dispose of it. Sellers are more plentiful than buyers, and coal in round lots often to twenty cars can be picked up at very low figures. On a very conservative estimate there is enough coal in and around Chicago to supply her requirements for several weeks. What adds to this congested condition is the fact that only two weeks ago the probability of a switchmen's strike caused large and small consumers of steam coal to put in extra quantities to tide them over any possible trouble in procuring supplies; hence demand from them is proportionably lighter than ordinary. Most of the Indiana mines are running only a quarter to half time, and some of the Illinois companies are working under similar conditions. This state of things will, however, soon right itself by judicious restriction until the opening of navigation, when large quantities will be required for lake use. Some railroads have already commenced to feel the market in regard to contracts for the ensuing year. It is believed that bituminous coal of the better class for steam purposes will command a better price, the past winter having been a revelation and a warning to shippers and operators not to contract their product at figures which too closely represent the cost mark.

Connellsville coke in fair demand, but not as active as shippers had expected it to be with the opening of spring. Other grades are in moderate request only.

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

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

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.35; Hocking Valley, \$3.00; Youghiogheny, \$3.25; Illinois block, \$2.65; Brazil block, \$2.50@ \$2.60.

Pittsburg.

March 30.

(From our Special Correspondent.)

Coal.—The great coal strike that was inaugurated along the Monongahela Valley last September came to an untimely end last Saturday. The loss in wages alone amounts to \$1,500,000. The coal men's loss was also very large. The miners held a meeting and declared they would starve before they would accept three cents for mining; inside of two days they asked to go to work on the terms they have refused. All except the mischief makers will be taken back.

The coal shipments by the Ohio River for January, February and March, 1892, reached 26,458,000 bushels; shipments the same time this year were 5,381,000 bushels, showing a deficiency of 21,077,000 bushels. The season for lake shipments has not opened too favorably to sellers, for sales are reported at \$1 at the mine. The lake shippers are trying to make the miner pay the increase of five cents a ton, put on this year by the railroads, so that they shall not have to make their customers pay it.

They hope to do this by contracting at five cents a ton less than last year. Prices show no change.

Connellsville Coke.—The coke trade don't seem to be picking up much with the coming of spring; last week, though, the production spurted more than it has for some months. It increased more than 3,000 tons over the previous week's production, but the shipments were over 300 cars short last week of what they were on the previous week.

Some of the operators evidently anticipated a much better demand than they actually had; they gave orders for their ovens to run six days. Some of the smaller operators, however, were short of cars and were compelled to lay off one day. The consequence of the good time made last week is that the yards are again accumulating stock coke. The outlook for transportation showed little change. A piece of coal 10 ft. 10 in. high by a foot square has been taken out of the Trotter mine for shipment to the World's Fair. The coal is entirely free from the slate binders found in the Pittsburg seam and the greatest height of any piece of coal yet mined for the World's Fair exhibit. A sample block of coal is also being mined at the Adelaide mine, to be placed in the Frick exhibit at Chicago. Shipments for the week aggregated 132,336 tons, distributed as follows: To Pittsburg, 1,820 cars; points east of Pittsburg, 1,800 cars; to points west of Pittsburg, 3,314 cars; total, 6,964 cars. Western shipments decreased 303 cars; Eastern shipments decreased 27 cars and Pittsburg shipments increased 27 cars, leaving the net decrease in shipments 303 cars. Prices are: Furnace coke, \$1.90; foundry coke, \$2.30; crushed coke, \$2.65 per ton of 2,000 pounds f. o. b. cars at ovens.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 31.

Heavy Chemicals.—The heavy chemical market during the past week has developed nothing of importance. The main features continue practically as last reported. There has been a fair inquiry for future shipments of caustic soda and carbonated soda ash. Bleaching powder has been quiet, with no change in prices. Alkali has been in good demand, and there are no surplus stocks on hand, although arrivals have been fairly heavy. The shipments of heavy chemicals from Liverpool to the United States for the first two months of 1893 show an increase over the shipments during the same period of 1892. They were as follows: Caustic soda, 4,093 tons in 1893 against 3,581 tons in 1892. Carbonated soda ash, 13,568 tons in 1893 against 8,908 tons in 1892. Sal soda, 511 tons in 1893 against 1,311 tons in 1892. Crystal carbonate, 502 tons in 1893 against 203 tons in 1892. Salt cake, 3,586 tons in 1893 against 2,826 tons in 1892. Bleaching powder, 8,174 tons in 1893 against 7,201 tons in 1892. We quote this week: Caustic soda, 60%, 2.95¢@3.10¢; 70%, 2.70¢@2.80¢; 74%, 2.72¢@2.82¢; 76%, 2.80¢@2.90¢. Carbonated soda ash, 48%, 1.40¢@1.45¢; 5%, 1.35¢@1.40¢. Alkali, 48%, 1.35¢@1.40¢; 58%, 1.30¢@1.40¢, according to package. Sal soda, English, on the spot, 1c; American, 90¢@95¢; bleaching powder, 2.25¢@2.50¢.

Acids.—The good demand for acid which has been felt for some time continues. Reports of sharp competition and low prices come from Connecticut, but in this market everything is as it has been for the past year. Our quotations this week are as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.75¢@2.25¢, according to quality; muriatic, 18", 90¢@1.10¢; 20", \$1.15¢@1.25¢; 22", \$1.25¢@1.50¢; nitric, 40", \$1.42¢; 42", \$1.50¢@1.75¢; sulphuric, 90¢@1.10¢; mixed acids, according to mixture. Oxalic, \$6.30¢@6.50¢. Blue vitriol is quoted all the way from \$3.37¢ to \$3.75¢; glycerine for nitroglycerine, 11¢@12¢, according to quality and quantity.

The many friends of Mr. Franklin H. Kalbfleisch will be pleased to learn that the Franklin H. Kalbfleisch Company, of New York City, has been incorporated to manufacture, buy and sell chemicals. Capital, \$100,000. The directors are E. B. Walden, of Brooklyn, and M. Kalbfleisch and F. H. Kalbfleisch, of Babylon, L. I.

Brimstone.—This market continues very quiet. Prices show but little change from last week, as follows: Best unmixed seconds, on the spot or near by, \$20.50; to arrive, April-May, or May-June, or June-July shipments, \$20; best unmixed thirds, 5¢@

75¢. lower. Some sales are reported at these prices.

Fertilizing Chemicals.—There is not much change in the main features of the fertilizer market. If anything, an easier feeling is observed and the ammoniates are slightly lower in price. This has been caused by the arrivals of foreign material, but inasmuch as the European market is short of supplies and the Western dealers are inclined to "hold on" to their stocks, it is not likely that ammoniates will rule very much lower than at present. Quotations are as follows: Dried blood, \$3.15¢@3.20¢ per unit; azotine, nominally, \$3.20¢@3.25¢; sulphate of ammonia, on the spot, \$3.25¢@3.30¢ for bone goods and \$3.30¢@3.35¢ for gas liquor. Acidulated fish scrap, no stocks on hand; dried scrap is scarce and is quoted at \$31 f. o. b. fish factory. Tankage, high grade, \$28¢@31¢; low grade, \$28¢@29¢. Bone tankage, \$24¢@25¢; bone meal, \$24¢@25.50¢.

Messrs. Couper, Millar & Co., of London, send us, under date of March 17th, the following interesting report on the fertilizer market of the United Kingdom: "The main feature of the past four weeks has been the continuous rise in nitrogenous materials, which are now at a higher level than has been touched for several years. The demand from the United States still continues, and the shipments from Europe have cleared the markets of all available stocks. The fine weather at home has also helped the upward movement by making the demand for fertilizers more active. Phosphates are slightly firmer, and it is reported from Florida that several companies have sold larger quantities of hard rock than they can deliver. Canadian Phosphates.—There are a few hundred tons of first quality available for the opening of navigation, but sellers are holding for higher prices than are obtainable at present. South Carolina offering at 6¼¢d. per unit. Florida hard rock 75¢ has been sold at 8¼¢d. per unit for prompt shipment; river pebble 60¢@65¢ steady at 7d. Land pebble 70¢, none offering for Europe, but some important sales reported for the United States. Ground Somme 10d, for 70% and 11d. for 75% basis c. i. f. London, but no business is reported for United Kingdom. Ground Belgian remains at about 5d. per unit, f. o. b. Osso—we hear of nothing doing. Cambridge and Bedford Coprolites—there is a slight demand for them." The potash salts generally have been in fair demand. The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12¢ Philadelphia, \$1.14¢; Charleston and Savannah, \$1.17¢ cwt. basis, 48¢@50¢ in 50 ton lots on foreign weights and analyses. Sulphate of potash, 90%—96%, basis, 90¢; New York and Boston, \$2.07¢ Philadelphia, \$2.09¢; Charleston and Savannah, \$2.12¢; sulphate of potash, 90-99%, basis 90%, is 4¢ higher.

Muriate of Potash.—The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.7¢; Philadelphia, \$1.80¢; southern ports, \$1.83¢.

Kainit.—Quotations for shipments previous to September are as follows: New York, Philadelphia and Boston, \$8.75¢ for foreign invoice weight and test, and \$9 for actual weight; Charleston, Savannah and Wilmington, \$9.50 for invoice weight and test, and \$9.75 for actual weight. Shipments after September 1st, 25¢ higher.

Nitrate of Soda.—This market is stronger under cable advices from Europe, which report a stronger feeling there. Quotations are: On the spot, \$2.30¢; shipments, \$1.80¢.

Liverpool. March 22.

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

Our market is in rather a stagnant state at the moment, business generally being very slack.

Soda ash is dull, but prices are nominally unchanged, being about as follows: Caustic ash, 48%, £4 17s. 6d. @ £5 5s. per ton; 57@58%, £5 15s. per ton.

Carb. ash, 48%, £5 @ £5 5s.; 54%, £5 7s. 6d. @ £5 15s. per ton. Ammonia ash, 58%, £5 7s. 6d. @ £5 15s. All net cash. For contracts over 1893 concessions would probably be made. Soda crystals are dull at £3 @ £3 2s. 6d. per ton, less 5%.

Caustic soda receives very little attention and orders are scarce. Quotations vary considerably according to quantity and export market, the nominal spot values being about as follows, viz.: 60%, £8 5s. @ £9 per ton; 70%, £9 5s. @ £10 per ton; 74%, £10 5s. @ £11 per ton; 76%, £11 15s. @ £12 5s. per ton, all net cash. For parcels under 10 tons 5s. per ton extra is charged.

Bleaching powder is firm at £8 10s. @ £3 15s. per ton net cash for hard wood packages.

Chlorate of potash is very dull, so far as prompt business is concerned, and with resellers showing more anxiety to clear their holdings. Values are easier. For prompt delivery there are sellers at 9d. per lb., but no buyers at the moment. We quote April, 9d. May, 8¼¢@9d., June, 8¼¢d., July to December, 7¼¢@8d.

Bicarb. Soda is moving at £3 15s. per ton, less 2½%, for one cwt. kegs, with usual allowance for large packages.

Sulphate of Ammonia is in rather a peculiar position, being almost unobtainable at present, and on this account some fancy prices are talked of. Today £13 @ £13 5s. per ton is talked of for good gray, 24%, in double bags, less 2½% f. o. b. here.

Nitrate of Soda is firmer and \$10 7s. 6d. @ £10 10s. per ton for double bags, less 2½% f. o. b. here.

Carb. Ammonia.—Lump, 3d. per lb.; powdered, 3¼d. per lb., net cash.

CURRENT PRICES.

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

Table listing various chemicals and their prices, including Acetic, Commercial, Carbonic, Chromic, Hydrobromic, Hydrocyanic, Hydrofluoric, Alcohol, Absolute, Ammoniated, Alum, Alumina Chloride, Amalgamating solution, Ammonia, Muriate, Aqua Ammonia, Antimony, Argois, Arsenic, Asbestos, Ashes, Asphaltum, Barium, Chlorate, Chloride, Iodide, Nitrate, Sulph., Carb., Bauxite, Dichromate of Potash, Bichromate of Soda, Borax, Mercuric Chloride.

Table listing various minerals and their prices, including Bromine, Cadmium, China Clay, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Chromalum, Cobalt, Copper, Vitriol, Nitrate, Copperas, Corundum, Cryolite, Emery, Epsom salt, Feldspar, Fluorspar, French Chalk, Fuller's Earth, Glauber's Salt, Glass, Gold, Kaolin, Lead, Litharge, Magnesite, Manganese, Mercuric Chloride.

Table listing various pigments and dyes, including Marble Dust, Metallic Paint, Mineral Wool, Nitre, Ochre, Washed Nat Ox'rd, Golden, Oils, Phosphorus, Platonic Chloride, Pimento, Potassium, Bromide, Chlorate, Chloride, Carbonate, Caustic, Iodide, Nitrate, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone, Pyrites, Quartz, Rotten Stone, Salt, Soapstone, Sodum, Stannate, Tungstate, Hypsulphite, Strontium, Sulphur, Syvinia.

Table listing various salts and other minerals, including Tale, Terra Alba, American, English, American, Tin, Muriate, Oxymur, Vermilion, Am. quicksilver, Chinese, Zinc White, Antwerp, Paris, Muriate solution, Sulphate crystals.

THE RARER METALS.

Table listing various rare metals and their prices, including Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Platinum, Potassium, Rhodium, Ruthenium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Titanium, Thorium, Tungsten, Uranium, Vanadium, Yttrium, Zirconium.

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

Main table of New York Mining Stock Quotations, listing various mining companies and their stock prices across multiple dates from March 23 to March 31, 1893.

*Ex-dividend. †Dealt in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares so o, 4,580 non-dividend shares sold, 11,610 Total shares sold, 16,190.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing various mining companies and their stock prices across multiple dates from March 24 to March 30, 1893.

Dividend shares sold, 2,341. Non-dividend shares sold, 1,560. Total shares sold, 4,201.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Large table detailing mining companies, their capital stock, shares, assessments, and dividends, organized into two columns: Dividend-paying mines and Non-dividend-paying mines.

DIVIDEND-PAYING MINES.

NON DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total Levied, Date and amount of last), Dividends (Total paid, Date and amount of last), Name and Location of Company, Capital Stock, Shares (No., Par), Assessments (Total levied, Date and amount of last).

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

COAL AND COAL RAILROAD STOCKS.

Table with columns for Stock Name, Date (March 25-31), and Sales. Lists various coal and railroad stocks like Am. Coal, Balt. & Ohio, etc.

*Good Friday. Total shares sold, 266,141.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Name, Date (March 25-31), and Sales. Lists industrial and trust stocks like Adams Express, Am. Cotton Oil, etc.

* Good Friday. Total sales, 254,482.

CALIFORNIA.

Table with columns for Stock Name, Date (Mar 21-28), and Closing Quotations. Lists California stocks like Alpha, Alta, Belcher, etc.

Colorado Springs. March 27.

Table with columns for Stock Name, Bid, and Asked. Lists Colorado Springs stocks like Anaconda Gold, Calumet, etc.

Denver.

Table with columns for Stock Name, High, Low, and Sales. Lists Denver stocks like Anaconda, Amity, Bangkok-Cora Belle, etc.

Rico. March 27.

Table with columns for Stock Name, Bid, and Asked. Lists Rico stocks like Atlantic Cable Cons. M. Co., etc.

MARYLAND.

Table with columns for Company, Bid, and Asked. Lists Maryland stocks like Baltimore, COMP. Y., etc.

MINNESOTA.

Table with columns for Stock Name, Date (March 17), and Bid/Asked. Lists Minnesota stocks like Duluth, LISTED STOCK, etc.

UNLISTED STOCKS.

Table with columns for Stock Name, Bid, and Asked. Lists unlisted stocks like Allegheny Iron Co., Aurora Iron Co., etc.

MISSOURI.

Table with columns for Stock Name, Bid, and Asked. Lists Missouri stocks like St. Louis, Closing quotations, etc.

MONTANA.

Table with columns for Stock Name, Bid, and Asked. Lists Montana stocks like Helena, Prices for the week ending March 25th, etc.

PENNSYLVANIA.

Table with columns for Stock Name, Bid, and Asked. Lists Pennsylvania stocks like Pittsburgh, B Idgewater Gas Co., etc.

Table with columns for Stock Name, Bid, and Asked. Lists stocks like Excelsior B. & S., Locust Mt. C. & I., etc.

SOUTH DAKOTA.

Table with columns for Stock Name, Bid, and Asked. Lists South Dakota stocks like Deadwood, Deadwood Terra, etc.

Pipe Line Certificates.

Table with columns for Week Ending, High, Low, and Sales. Lists pipe line certificates for March 31.

FOREIGN QUOTATIONS.

Table with columns for Location, Highest, and Lowest. Lists foreign quotations like London, Alaska Treadwell, etc.

Paris. March 16.

Table with columns for Stock Name, Bid, and Asked. Lists Paris stocks like Belmez, Spain, Golden River, etc.

ASSESSMENTS.

Table with columns for Company, No., D't'nt in office, Day of sale, and Amt. per sh're. Lists assessment details for various companies.