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THE discovery is announced in South Africa of diamonds in auriferous conglomerate at Klerksdorp. The stones, which were of good shape, but green, were discovered in cleaning up the batteries of the Gold Estate Company. Some 15 stones were taken out, but, owing to the difficulty in recovering the diamonds from the conglomerate without injury to them, it is not believed that this will prove a field for profitable operations.

THERE is no doubt that South Africa is regarded at present as the most promising field for development in the production of the precious metals. The continued extension of mining operations in the Transvaal, and the more recent rediscovery of the ancient gold-fields of Mashonaland and the Matabele country, seem to be drawing miners and mining engineers from other countries in considerable numbers, and the movement is likely to continue for some time to come.

AN important step has been taken toward the repeal of the silver legislation enacted by Congress in 1890, President CLEVELAND having formally announced that he intends to call an extra session of Congress early in September for the express purpose of dealing "with a financial condition which is the only menace to the country's welfare and prosperity." This is strong language, but it is fully warranted by the facts of the case. We have frequently called attention to the inevitable result of the workings of the Sherman Act, and the present condition of business fully justifies the anticipations we have expressed and the language of the President in his announcement. It is to be hoped that the object lesson before the people will have fully impressed the members of Congress with the necessity of prompt action as soon as the extra session shall begin.

THE report of the Anthracite Coal Waste Commission is a carefully considered and valuable document, prepared by men who are thoroughly familiar with the subject, and most of its conclusions will be received with but little demur. The estimate which they give, however, of the total amount of coal in the anthracite region, and of the amount which is still available for public use, must be accepted with some caution. Although based upon all the facts available, any such estimate must be largely a matter of opinion, as, indeed, the members of the Commission themselves will be the first to admit, and it seems possible that the available coal remaining is somewhat less than the amount given in the report. This is a side issue, however, and does not lessen the value of the suggestions made or of the information given.

IN an article on the Elmore copper depositing process, and on the conduct and condition of the companies formed in England to develop that process, which was published in the ENGINEERING AND MINING JOURNAL of May 13th, we stated on what seemed good authority that the ELMORES themselves received only a few hundred pounds for their discovery and the use of their patents. A correspondent, who claims to be well informed, now writes us that the ELMORES received in all £60,000 for the patent; a large part of this was in stock of the Elmore companies, but as these were issued at £3 per share and were worked up shortly afterwards to £8 per share, the disposal of the stock, if sold at that time, would have returned considerably more than the equivalent amount in cash. If this is the fact, however, it does not alter in any way the opinions expressed in that and previous articles on the general management of the company and the methods by which the stock was placed and investors misled.

THE elimination of sulphur from pig iron is the most important subject which occupies the attention of iron and steel men at the present time, and the paper of Mr. SANITER, read at the recent meeting of the Iron and Steel Institute, and published in another column of our present issue, should be read with attention. The first paper on the same subject, which was published last fall, indicated that in this process was to be found one of the most promising solutions of the sulphur problem, and the present paper seems to show that the success of the method has been quite as great as could be expected. The report of Mr. SNEBUS upon the process confirms the statements of its discoverer, and the results which have been obtained with it in actual working are evidently encouraging. The further development of the process on an extensive scale may be expected to follow, and it seems to be well worth the careful attention of our iron producers, especially of those to the profitable marketing of whose output the high percentage of sulphur has been the chief drawback.

At the same meeting Mr. STEAD read a continuation of his elaborate paper on the same subject, which we hope shortly to present to our readers, and which still further develops the facts and theories which were brought forward in his first paper.

THE Russian Ministry of Roads and Communications has reached the conclusion that the Trans-Caspian railroad—which was built originally without any expectation of commercial traffic at all—is insufficient to meet the requirements of Russian Turkestan and its growing commerce. The railroad has not only served to develop the country itself agriculturally

ally, but it has made accessible some valuable mineral deposits, the working of which adds considerably to the business of the road. The extension to Tashkend, which is now under construction, will still further increase this traffic by bringing to the road much of the freight still carried by caravan from China and Thibet. A commission appointed by the ministry has suggested two plans, one for a railroad from Orenberg to Tashkend, north of the Trans-Caspian road, which will provide a new line for through traffic and will also open up the best mineral region in Central Asia; the second for a canal to unite the Amu Daria with the Caspian Sea, which will be chiefly valuable to the agricultural interests of the region. It is said that both plans will be adopted. The minerals of the Trans-Caspian include gold, silver, copper, lead, manganese, iron ore and coal; the latter is said to be abundant, though there is some doubt as to its quality.

THE following table shows the money held in the treasury and in circulation at the beginning of each month of the present year. The amounts are given in millions of dollars, the six ciphers being omitted:

	Jan.		Feb.		March.		April.		May.		June.	
	Treas.	Cir.	Treas.	Cir.	Treas.	Cir.	Treas.	Cir.	Treas.	Cir.	Treas.	Cir.
Gold coin.....	156	412	147	411	137	409	138	407	121	410	115	407
Standard silver dollars.....	355	62	357	61	358	60	359	59	360	58	361	58
Subsidized silver.....	10	67	11	66	11	65	11	66	11	66	11	66
Gold certificates.....	24	117	15	120	7	114	5	111	8	105	3	101
Silver certificates.....	3	322	5	323	6	321	5	322	5	321	6	322
Treasury notes.....	2	123	4	123	5	126	6	128	10	128	10	132
United States notes.....	15	330	26	319	32	314	29	316	26	319	27	19
Currency certificates.....	1/2	7	1/2	14	1/2	19	1/2	16	1/2	15	3/4	17
National bank notes.....	6	168	7	166	5	169	3	172	5	171	5	171

The Silver Purchase Act was advocated by two classes of persons—those favoring the free coinage of silver and its use at any cost, and those who wanted cheap money. The chief argument of the latter class was that the country needed a larger volume of money, a greater per capita circulation.

At the time far sighted financiers demonstrated that this argument was fallacious and that any ill-considered augmentation in the volume of the currency would naturally create the very conditions that would make money scarce. On January 1st, 1890, the per capita circulation was \$23.76; January 1st, 1891, \$24.50; January 1st, 1892, \$24.52; June 1st, 1892, \$24.77; January 1st, 1893, \$24.32, and on June 1st, 1893, \$23.88. In other words the per capita circulation is about the same as three and a half years ago, and this notwithstanding an increase of \$142,000,000 in treasury notes, \$7,000,000 in currency certificates and \$3,000,000 in standard silver dollars.

But this is not all. During the last six months the Treasury stock of gold coin has dropped from \$156,000,000 to \$115,000,000; and while the amount in circulation remains nominally the same and even greater than on January 1st, 1890, it must be remembered that at present there is practically no gold in circulation.

Again, the total amount of gold certificates has dropped from \$141,000,000 to \$104,000,000, a loss of \$37,000,000 within six months. In other words the country has lost \$78,000,000 in its effective gold supply since January 1st, while the demand liabilities against gold have steadily increased.

#### MINING REPORTS.

In a former issue we called attention to the fact that the periodical reports of mining companies are too often provoking documents, not only on account of sins of omission, but of commission as well. In this connection it is a pleasure to mention the report of the Hecla Consolidated Mining Company, which is a model of its kind. Not only does it give the most detailed account of operations during the previous year, showing cost of mining, concentrating, smelting, transportation supplies and general expenses per ton of ore mined and per ton smelted, but it also gives a series of tables showing the same for the last twelve years. For example, Table 5 shows operations of concentrator during 1892, followed by a statement giving the work of the concentrator for each year since 1883, under the following heads: Tons of crude ore treated; tons concentrates produced; average assay of concentrates; tons of lead in concentrates; ounces of silver in concentrates; expenses; cost per ton of crude ore, ore, and cost per ton of concentrates.

This table shows, as nothing else could, the rapid improvement and consequent cheapening of the work. There are tables of equal fullness for smelter consumption, production of bullion, output of ore, disbursements and returns. Under the head Disbursements there are given for 12 years past: Labor at mines; at concentrator; at reduction works; at iron mines; at charcoal camp; transportation of silver ores and of iron ores; charcoal; coke; mining timbers; supplies; ores purchased; limestone; freight on bullion; taxes; general and office expenses.

But the report is worthy of attention for still another reason. Many, if not most, mining companies charge improvements and machinery to

capital or an improvement account. After a time the mine is worked out, and mine and machinery are worth nothing, yet they stand as an enormous asset. Upon this practice Mr. KNIPPENBERG, general manager of this company, says:

"For 12 years I have insisted that the cost of all permanent improvements, buildings, tramways, machinery supplies, etc., should at once be charged to expense, and that the stockholders should be shown as profits each year only the cash remaining after all expenses had been paid. You may call this a cold-blooded proposition; but it is a safe one, and never deceives. Suppose that to-day I should show you a surplus of \$500,000, consisting of smelter, concentrator, machinery, tramways and all other tools and machinery, but should show your mines entirely exhausted, how would you divide these assets? Sell them you could not. Cash is all you can divide between the stockholders. The curse of the mining industry is the fictitious value placed upon unknown quantities of ore of uncertain quality and finely engraved stock certificates, entrapping the unwary and innocent, only to let them find out how quickly the supposed millions can vanish. Such schemes are based upon wind, and are conceived in diseased or dishonest minds. Every dollar invested in a mine must come back, if at all, in the shape of dividends. Stop paying dividends, honestly and forever, and your capital stock is worthless; an empty hole in the ground being your entire assets."

In this there is food for much serious reflection and we commend it to mining stockholders.

#### THE TREATMENT OF ORES CARRYING FINE GOLD.

The treatment of ores containing gold in a state of fine division is a question that has attracted the attention of millmen here, but in a less degree than the subject warrants. In Australia and New Zealand this is a question constantly present, and one which has not yet been solved, although metallurgists and millmen both have worked at it.

It may be said here that millmen differ from metallurgists in their treatment of a knotty metallurgical problem. The millman attempts to solve the difficulty usually by a mechanical modification of an existing process, and how fruitful he has been in these changes can be appreciated by anyone who has read T. A. RICKARD'S series of interesting and valuable articles on the "Variations in the Milling of Gold Ores," which have appeared from time to time in the columns of the ENGINEERING AND MINING JOURNAL. The metallurgist, on the contrary, is prone to drop the process he is unsuccessfully using and to seek another. Up to the present time the advantage lies with neither; the millman has advocated hundreds of mechanical devices, which have almost invariably proved failures, and the metallurgist has discovered or resurrected countless processes, the great majority of which have been abandoned after a trial.

Generally speaking, the process adopted in this country to treat this class of ore has been the Gilpin County gold-milling practice—a high drop, high discharge, and low speed, the object being fine comminution of the pulp and its retention in the battery for a long period. As compared with the California practice of quick-running stamps, with a drop as low as four inches and a discharge of the same height, this offers considerable advantages, but these, however, are only comparative. Many ores are known to exist that, while they give fair assays, show but little gold on panning; almost invariably these ores are difficult to treat by free amalgamation. The gold in this case is generally assumed to be coated with a film of oxide of iron, and to this compound is attributed the rebelliousness of the ore.

The millman has attempted to remove this film by attrition in a grinding apparatus or by bringing it into frequent and intimate contact with mercury or mercurialized copper plates. The methods by which he has attempted this have differed, but the results have been uniformly failures; so have been all attempts to concentrate the gold by vanners or otherwise, while blankets and strikes have been very modified successes indeed.

The metallurgist in the treatment of this class of ore has been hampered by the low value of the ore; otherwise various processes he has devised, such as the chlorination process, would have proved successful in many instances.

It would seem, however, that more attention has been paid to the character of the gold than to the nature of the gangue. The influence of the various gangue constituents on amalgamation is a subject which has not been thoroughly studied. It is true that MM. MALAGATI and DUROCHER made a number of experiments, but these succeeded in proving little beyond the fact known to every amalgamator, that argillaceous material interferes greatly with the amalgamation of the precious metals.

In this country we have metallurgists in Nevada and Arizona who claim that the presence of oxide of manganese causes much difficulty in amalgamating silver ores, while others in Montana, equally competent men protest that they do not fear manganese, but rather like it. So also with carbonate of lime and other minerals. The opinion of metallurgists seems to be unsettled upon these points.

As for successful methods of treating these ores we have much faith in the barrel chlorination process as applied to raw non-sulphide ores. Whether or not the process would be a financial success would depend on the grade of the ore, but the improvements and reduction in cost of working constantly made with this process will soon bring many low-grade ores within its scope. The cyanide process may, as it is now doing

in certain cases, prove successful on ores whose composition does not interfere with the treatment in this way.

This subject is an important one, and judging from the interest expressed in the Antipodes the discoverer of a successful process for treating ores carrying fine gold will have little difficulty in reaping an adequate reward.

#### NEW PUBLICATIONS.

THE ASHLAND DAILY PRESS ANNUAL NUMBER. Ashland, Wis.: Published by the "Daily Press." Pages, 184; illustrated.

Our contemporary shows commendable enterprise in publishing this handsome annual number illustrating the growth of the city of Ashland during the past year. The prosperity of the city seems to rest on solid foundations, and its varied industries are well represented in the text and engravings here given.

FIFTY YEARS HENCE: WHAT MAY BE IN 1943. By Robert Grimshaw. New York: The Practical Publishing Co. Pages, 90. Price, \$1.

We have had rather a surplus of this kind of writing ever since Edward Bellamy published "Looking Backward." It is an easy matter to write a description of what may be, provided one is not called on to show how the ideal state is to be brought about. In this case the author tries to show what may be expected from the development of physical science during the next half century; but he has not succeeded in presenting us with anything especially novel or interesting, or in making any suggestions of particular value for future improvements.

ELECTRIC LIGHTING SPECIFICATIONS. By E. A. Merrill. New York: The W. J. Johnston Co., Limited. Pages 176 Price \$1.50.

In this book Mr. Merrill has given outline specifications for electric lighting work of various classes, and has added the rules adopted by the insurance companies to guard against danger by fire. It is a very convenient work for the engineer and architect who have to plan and supervise the construction of buildings, and who want to have some check on their electrician or on the parties furnishing the electrical plant. The specifications appear to be carefully drawn up, and are adapted to different kinds of buildings.

THE MINING MANUAL for 1893. By Walter R. Skinner. London: 1893. Pages, 700. Price, \$1.40 (delivered in New York).

The present volume is the fifth issue of the "Mining Manual," and in it the particulars of English mining companies, lists of dividends and directors, in fact all the varied information so valuable in previous editions, have been enlarged, revised and brought up to date. From it we gather that with each succeeding year less English capital is being embarked in mining enterprises. For example, since 1890 the annual investment has been as follows: 1890, £28,289,925; 1891, £15,009,240; 1892, £13,173,200. In regard to investments in the United States it would seem that "although there have been several disappointments among American mines, some new ventures have been subscribed for." The "Manual" has secured a high position as a book of reference in relation to British mining companies or those in which British capital is invested, and this position seems warranted by the care taken in securing its facts and by the convenience of its general arrangement and make-up.

THE WEALTH AND PROGRESS OF NEW SOUTH WALES, 1892. By T. H. Coghlan, Government Statistician, Sydney, N. S. W. Charles Potter, Government Printer, 1893. Pages 970. Illustrated with colored diagrams.

Mr. Coghlan's work as government statistician has long been well and favorably known for its thoroughness and accuracy, and the volume before us, the sixth annual issue of its kind, surpasses even the high standard of previous years. The work is comparable only to a statistical abstract of a census in its broadest sense, for the book treats of every subject of general interest in regard to which statistics are obtained. Thus we not only have an account of the mines and mineral production of the country, but also of its agricultural production, population, etc. Necessarily the amount of space devoted to each is restricted, but the book contains nearly a thousand pages, and pages of statistics and colored diagrams tell much in small space. The principal subjects treated are: Physics and geography, mercury, flora, fauna, shipping and commerce, imports and exports, crime, law and government and financial and vital statistics of all kinds.

In preparing a work of this kind a difficulty must always be experienced in making the information it contains interesting to those outside the colony, but Mr. Coghlan has succeeded in overcoming this difficulty to a very creditable degree. A well arranged index completes the volume.

ELEMENTS OF GRAPHIC STATICS. A Textbook for Students of Engineering. By L. W. Hoskins, Professor of Pure and Applied Mathematics in the Leland Stanford, Jr., University. New York and London: Macmillan & Co. Pages, 192. Illustrated. Price, \$2.25.

The author states very clearly in the preface the object which he had in view when writing the book, and as the book seems to carry out very nearly this purpose we cannot do better, in reviewing it, than to quote parts of this preface. "The present work is designed as an elementary textbook for the use of students of engineering. In preparing it, a chief aim has been simplicity of presentation. The matter treated has been limited to the development of fundamental principles and their application to the solution of typical problems. The method of the force and funicular polygons is deduced purely from statical principles, with very little consideration of the geometrical theory of reciprocal figures. Since the book is designed to embrace only what can profitably be taken in an elementary course by the student of engineering, it has not been thought best to include a discussion of problems involving the theory of elasticity. For similar reasons the discussion of curves of inertia has been limited to simple cases; a more general treatment being of interest to few besides the student of pure mathematics. No effort has been made to secure novelty in the matter

treated, but it is believed that in a few cases it has been found possible to simplify, and perhaps thereby improve, the methods usually adopted. Attention is invited to the method adopted for lettering corresponding lines in force and space diagrams. It will be seen that this is merely an extension of Bow's well known notation. This notation is, however, capable of a much wider use than has usually been given it. It is believed that its use, wherever applicable, will be found of great value, both in facilitating the work of the student and in guarding the draughtsman against mistakes. There is an unfortunate diversity of usage among writers in regard to the technical terms of mechanics—a diversity especially noticeable in engineering literature. In this book the endeavor has been made in all cases to comply with the usage to which the highest authorities are tending."

The book is exactly what it purports to be—the elements of graphic statics. It is a well written book for engineering students, the study of which will well repay them. It is to a certain extent incomplete and lacks many things in the line of graphic statics that an engineer needs; but this may be said of all the many recent textbooks upon this subject. We fail to see any particular advantage in Professor Hoskins' method of lettering his diagrams; to us it seems unnecessarily cumbersome, but this lack of appreciation may be due simply to our familiarity with Burr's notation and a certain amount of conservatism on our part.

#### 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.

Ninth Annual Catalogue of the College of Montana, Deer Lodge, Mont. Published for the College. Pamphlet, 60 pages.

Annual Report of the Secretary of War for 1892. Volume II.: in four parts and an Atlas. Washington: Government Printing Office.

I. The Slide Rule: Third edition. II. The Duplex Slide Rule. By William Cox. New York: The Keuffel & Esser Co. Pages, 44; illustrated. Price, 75 cents.

Seventh Annual Report of the Commissioner of Labor, 1891. Cost of Production: Textiles and Glass. Hon. Carroll D. Wright, Commissioner. Washington: Government Printing Office. Pages, 840.

Tabeller Vedkommende Norges Bergverksdrift: 1889 und 1890. (Mineral and Metallurgical Statistics of Norway.) Christiania, Norway: The Central Bureau of Statistics. Pages, 80; with tables and diagrams.

#### 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 Broken Hill and Mt. Morgan Mines, Australia.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: At a time when a succession of financial disasters has overtaken the Australian banks it may be interesting to point out that among the causes which have brought this state of things to pass there must be mentioned the great depreciation in the value of the shares of the celebrated Broken Hill Proprietary mine. Not much over two years ago the shares, of which there are 960,000, were selling for over £15, or \$75. Now they are quoted at a trifle over £3, or \$15. This represents a depreciation of about \$60,000,000. The mine had been considered so safe an investment that large blocks of shares were placed with the banks as security for moneys advanced and their great falling off in value became a minor factor, of which the major factor was the reaction following a wild real estate boom, in causing financial collapse.

Australia has a population of about 4,000,000; the two chief colonies, Victoria and New South Wales, have a combined population of about 2,500,000, so that it can be understood that reckless gambling in the high-priced shares of such a mine as the Broken Hill Proprietary can have far reaching results. So it was with the Mt. Morgan mine. The shares, 1,000,000 in number, were sold in 1888 at £17¼, or \$86.25 each. A little more than a year later they fell to £8, or \$40, representing a depreciation of over \$46,000,000. To-day they are quoted at \$10. At Mt. Morgan the inflation of the share value of the parent mine led to the silly squandering of money upon adjacent claims which were quite worthless. I pointed this out more than two years ago, in a paper upon Mt. Morgan contributed to the Transactions of the American Institute of Mining Engineers, which the Journal reprinted in 1891; yet upon glancing at a recent copy of the London "Mining World" I find that the directors of the Mt. Morgan Extended, a "pup" of the big mine, have only now begun to realize that assays will not pay dividends.

In both cases, Mt. Morgan and Broken Hill, the examination of the mine indicated to the experienced miner that the ore bodies were decreasing in value and size as depth was gained. In both cases the public preferred the stock jobber's opinion to that of the mining engineer, and in both cases the public has been badly bitten. The disregard of the ordinary rules of common sense has the same results in mining as in any other industry which is conducted on business principles.

T. A. RICHARD.

BERKELEY, CAL., MAY 12, 1893.

Some Misconceptions Concerning Asbestos.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Since Mr. Donald's second article on asbestos appeared, I have made the tests to which he challenges me, and wish now to report results. We have sometimes had difficulty in this laboratory in getting suitable asbestos for our filters, and I therefore had the two samples which were in stock subjected to analysis. One of them had previously been rejected because it would not stand heat and acids, and it turned out to be fibrous serpentine, hydrous silicate of magnesium, containing a little iron and aluminum. The other, which had been found suitable

for our work, and from which filters are made that are not altered when treated as above, turned out to be fibrous hornblende, anhydrous silicate of calcium and magnesium, with also a little iron and aluminum. The latter sample came from a lot recently purchased in New York, from a dealer in chemical supplies, under the name "asbestos." To test the matter still further, I procured from another New York dealer in chemical supplies a sample of each of the grades of asbestos that he carries in stock. Two of these were recognized at sight as hornblende asbestos, and on analysis proved to be so. A third sample was as readily recognized as serpentine, and analysis again corroborated the eye. The fourth sample, in very short fibres, was not recognized, and analysis showed it to be a mixture of about half and half of each. It will be seen from these tests that of six samples, three at least were not serpentine, and that the prediction that I would receive only fibrous serpentine when ordering asbestos from a dealer in chemical supplies has not been fulfilled.

The word asbestos was at first applied to "the unquenchable stone," a fabulous stone which, when once set on fire, could not be quenched. This was probably a distorted reference to the phenomena observed when water was put on quicklime. Pliny changed the meaning, and applied it to what he believed to be incombustible vegetable fiber, but which really was the mineral known as amianthus. From this use of the word, which has become general, the meaning "incombustible" or "unaltered by fire" has become the popular and accepted one for asbestos, and it, and the adjective derived from it, can be found scattered through the literatures of all nations. No wonder there are misconceptions concerning it, when a mineral so different in character is allowed to go under its name. This recent use of the name asbestos is a commercial one, and I hope and believe it will never be adopted by mineralogists or scientific men generally. I have never seen it so used in any scientific work. Mr. Donald quotes Prof. Dana correctly when he says "that asbestos is a finely fibrous form of hornblende, but much that is so called is fibrous serpentine." That is, it is not asbestos, though called so. To propose to adopt this name for chrysolite, and to use some other name for the fibrous hornblende that has so long been called asbestos, would be exactly paralleled if those interested in Mexican onyx should propose to have the name onyx confined to that variety of calcite or aragonite, and to use some other name for the semi-gem to which it has been so long applied.

In conclusion, let me state that I have lately received from Alabama a sample of asbestos (not chrysolite) in fine, soft, flexible fibres more than 10 ins. in length, and from which I am sure an incombustible napkin could be made. I am assured there is a large deposit of it, but have no personal knowledge, except of the sample.

ALBERT H. CHESTER,

Prof. of Chemistry and Mineralogy, Rutgers College,  
NEW BRUNSWICK, N. J., May 10, 1893.

"The Mineral Industr." for 1892.]

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The directorate has much pleasure in thanking you for the copy of the very valuable and interesting work, "The Mineral Industry," and begs to inform you that he shall be only too pleased to give any information whatever in his power to assist in the continuation of such a valuable, and, for the mining industry of the whole world, most interesting work.

G. STARKE,

Director of the Imperial and Royal Geological Institute,

VIENNA, Austria, May 24, 1892.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Your splendid volume on the statistics, technology and trade, of the mining industry in the world is not only a very accurate statistic and a very useful collection of information, but a true and instructive work, as a compendium of the most advanced processes in the mining and metallurgical industries. I congratulate you very much on the accuracy of the compilation. For producers of metals and minerals this volume is the most important issued in the world, to this present. It is perfect already, and will be, no doubt, even more perfect in the future. The "Engineering and Mining Journal" is one of the most important for our industry; it becomes really the best of all when completed with an annual volume like that you have issued.

E. CORTESE,

CESENA, Italy, May 29, 1893.

Ingeniere Miniere Solfure Trezza.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In looking through the pages of your volume of "The Mineral Industry," for the year 1892, I am greatly struck with the immense amount of information you have accumulated. It must, I am sure, have involved an enormous amount of labor and expense. The table showing the annual mineral produce of the United States from 1880 to 1892, inclusive, is very interesting and instructive; likewise, the comparative statement on page 84, showing the coal production of the various countries for the past 30 years; in fact, from beginning to end the volume is a mine of valuable information on all matters connected with the mineral industry of the world. As a book of reference it will be a useful addition to the library of the mineral statistics branch of this department, as also are the weekly numbers of the "Engineering and Mining Journal."

JAMES B. JORDAN,

WHITEHALL, May 31, 1893. Mineral Statistics Department, Home Office.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have gone over your "Mineral Statistics" with very great interest and consider it a very useful and valuable book. As I collected the Canadian figures for a number of years for the reports of the English Inspectors of mines, and have furnished the Nova Scotia figures for the annual summaries of the Geological Survey, as well as my own department, I may claim to know something of the labor and trouble involved in the preparation of your book. The completeness with

which the ground has been covered, and the rapidity of the verification and condensation of the returns surpass anything yet accomplished. As it is said that a laudatory critic is of no value unless he shows that he knows something by criticising, I venture to remark from my own experience that the miner of any given material is desirous of learning something about the appearance, value, etc., of minerals, he is not familiar with; and that the addition of a certain amount of general mineralogical information in your next issue would recommend it to a still wider circle. To the general business man and the manufacturer of metal, your book is invaluable.

E. GILPIN, Jr.,  
Inspector H. M. Mines.

HALIFAX, N. S., May 18, 1893.

The Dewey Refining Process for Sulphide Precipitates.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Inclosed I send you a circular received from the "Dewey-Walter Refining Company." Is it possible that such a process can be patented? The chemical reaction taken advantage of is a hundred years old. How can a simply "chemical reaction" be patented? Is the Patent Office of the United States so arranged that all "chemical reactions" can be patented? This strikes me as going even one better than the Cyanide process.

MOREY, Nev., April 30th, 1893.

H. A. COHEN.

EDITOR ENGINEERING AND MINING JOURNAL:

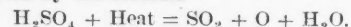
Sir: In your issue of April 15th, 1893, under the above heading, appears an account of a process for refining sulphides produced in the lixiviation of silver and gold ores, and the statement that the process was invented by Mr. Frederick P. Dewey.

The facts are that the process described was invented by Mr. L. D. Godshall, while in the employ of this company, and the process in actual use by this company before Mr. Dewey even applied for a patent, as the following dates will show: June 25th, 1892, Mr. Godshall applied for a patent on the process, which was filed in the Patent Office July 25th, 1892; June, 1892, a plant was erected for the treatment of sulphides produced at the works of this company in Aspen; August 20th, 1892, Mr. Dewey visited Aspen, and at that time evidently "invented" the process, although the process was in actual operation at the time of his visit in Aspen; September 8th, 1892, Mr. Dewey filed an application for patent, and in January, 1893, a patent was issued to him without even an interference being declared with the Godshall application filed in July, 1892. This speaks volumes for Mr. Dewey's ability as a patent attorney, but does not establish his claim as an inventor of the process. I give you the facts in the case in justice to Mr. Godshall, who is not now in our employ, but who is entitled to any credit due as the inventor of the process. So far as the company is concerned, it is a matter of indifference, since the process was abandoned, as, on account of the amount of sulphuric acid required, it was a failure commercially, and, we understand from Mr. E. H. Russell, the same is the case at Park City, Utah, where Mr. Dewey has introduced it for the treatment of sulphides produced at the Marsac Mill.

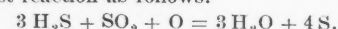
Mr. Godshall claims that the reactions quoted in the article in question are not correct, and writes me as follows: "Mr. Dewey claims that the following reactions take place:



"The statement is then made that as the heat is continued, water is driven off and the acid becomes stronger, so that there is the decomposition represented by the formula



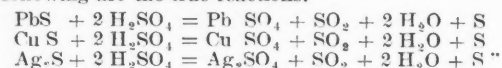
"The  $SO_2 + O$  produced by this decomposition reacts upon the  $H_2S$  evolved by the first reaction as follows:



"In practice the first, second and third reactions are practically simultaneous, so that they may be expressed as follows:



"That some  $H_2S$  may be given off may be quite as possible, but it must be remembered that sulphides produced from lixiviation generally contain more or less iron and zinc in the form of sulphides, and which dissolve in sulphuric acid with the evolution of  $H_2S$ , and the formation of sulphates, but in the case of the sulphides of silver, copper and lead the following are the true reactions:



It matters little, however, as to the correctness of the formula; the fact remains that the process was in actual use here before Mr. Dewey filed his application for patent, and abandoned on account of its being a failure from a commercial standpoint, before Mr. Dewey began operations at Park City.

W. S. MORSE, General Manager Holden Smelting and Milling Co.  
ASPEN, Colo., April 29th, 1893.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Referring to Mr. Cohen's letter, it is quite evident that he is far more familiar with ancient chemical reactions than with what constitutes patentability. A reaction may be a thousand years old and yet a new and useful application of it will be validly patentable, and this is still more so when several reactions are combined to form a completed practical process.

The statement of facts by Mr. Morse shows absolutely nothing as to who invented the sulphuric acid process for treating sulphide precipitates. At best it shows simply the respective dates of applications for patent. Dates of applications do not establish dates of invention, otherwise there would be no call for interference proceedings, and questions of priority would be decided in the United States Patent Office, as they are in England, upon the record. In this case the Patent Office decided that Mr. Dewey was entitled to a patent notwithstanding the application of Mr. Godshall pending at the same time.

Now, the following are two facts which really bear upon the question of who invented this process: 1st. Previous to going to Aspen—that is, previous to August 20th, 1892, our Mr. Walter told Mr. E. H. Russell and Mr. Frank Johnson, at Park City, that the process the Aspen people were using belonged to us, and they were infringing our rights. 2d. When in Aspen, Mr. Godshall told our Mr. Walter that he was led up to and guided in devising the process then in use in Aspen by information given him by our Mr. Dewey.

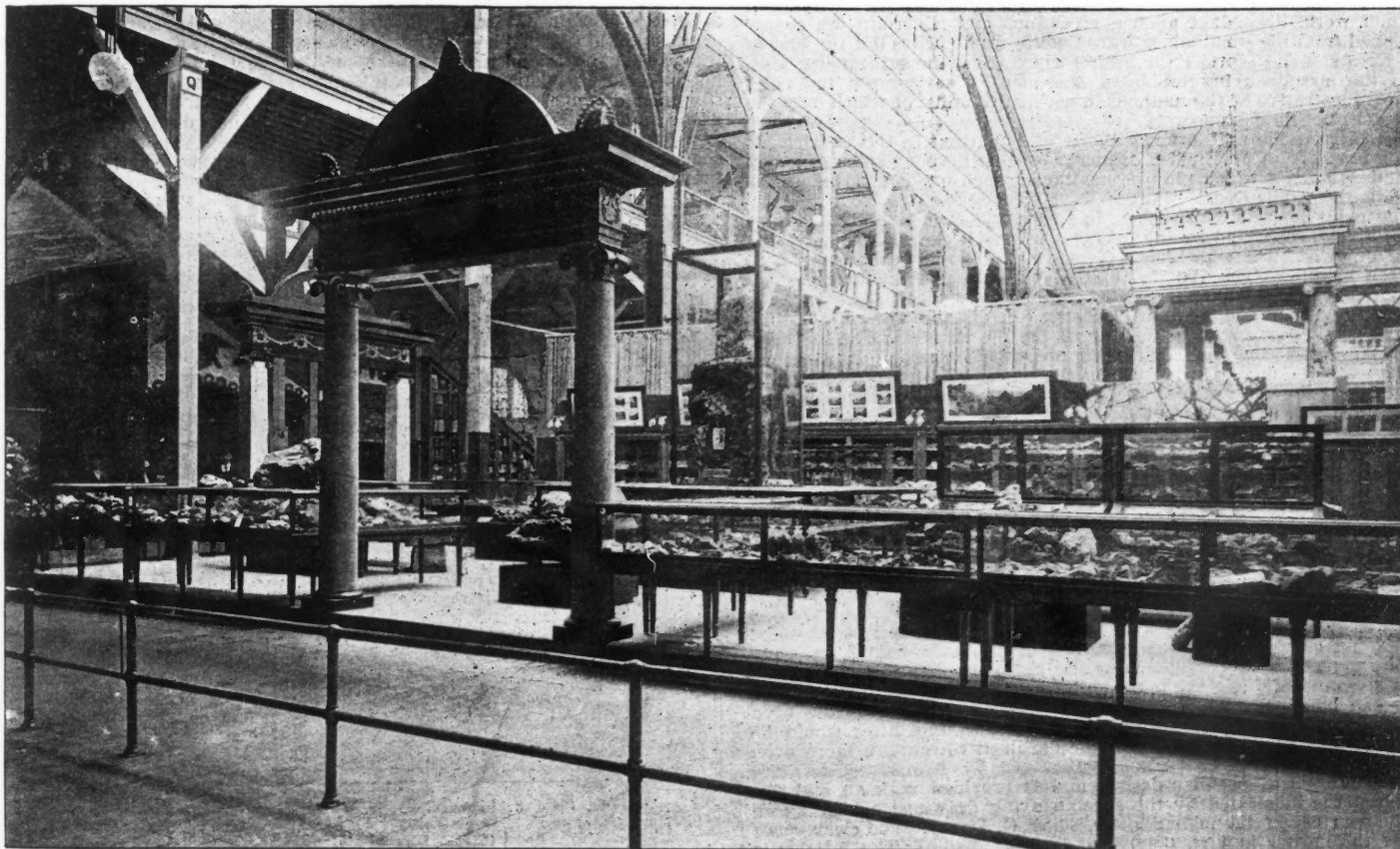
At the proper time and place we are fully prepared to show that Mr. Dewey is the real inventor of this process, and that the Holden Smelting and Milling Company is endeavoring to rob him, not only of the credit of devising this great improvement in refining sulphides, but also of the substantial fruits as well. It is not worth while to waste time and space in discussing possible formulae, but the evolution of  $H_2S$  was established when operating upon sulphides prepared in the laboratory and free from IV. group metals, and the enormous development of sulphur during the boiling certainly supports the reaction between  $H_2S$  gas and  $SO_2$  gas with separation of sulphur, since the temperature of boiling  $66^\circ$  acid is much below the boiling point of sulphur.

Since Mr. E. H. Russell has never had the figures of the cost of operating the process at Park City placed before him, it is manifestly

MINING AT THE COLUMBIAN EXPOSITION.

Specially Reported for the Engineering and "Mining Journal."

The accompanying illustration is from a photograph showing the very handsome exhibit made in the Main Hall of the Mining Building by the Territory of Arizona, which in its general appearance is one of the most attractive of the State exhibits. It was collected and arranged under charge of Mr. T. R. Sorin, the representative in Chicago of the territorial board, of which Mr. S. Price Behan is vice-president. The large trophy in the center is a square block of azurite from one of the Arizona mines, which is supported by a base of malachite, making a beautiful contrast of color. The series of cabinets shown in the engraving contain collections of specimens, largely from the copper mines, which are so important a part of the mining industry of the Territory. They include a great variety of copper ores, carbonates, oxides and native copper, with some fine specimens of silver incrustations. In other cabinets are a variety of specimens of petrified wood, some of them exceedingly fine. Another part of the exhibit includes a number of relics of mining instruments used in operating Arizona mines in pre-historic times, such as stone axes, gads and hammer-heads. The



THE ARIZONA EXHIBIT IN THE MINES AND MINING BUILDING AT CHICAGO.

impossible for him to have said that the process is a commercial failure there. On the contrary all the figures show the process will be a commercial success at Park City, and, with proper technical and business management, it would also succeed commercially at Aspen. We have positive information that the process was not abandoned at Aspen before we began operations at Park City. If the Holden company has since ceased using this process it is undoubtedly due to the fact that our attorneys have notified them to stop infringing our patents and render an accounting.

THE DEWEY-WALTER REFINING CO.

WASHINGTON, D. C., May 18, 1893.

By FREDERIC P. DEWEY.

French Iron Trade.—The exports from and imports into France of iron and steel during the first three months of the current year, as compared with the corresponding three months of 1892, were as follows: Imports: Pig iron, 32,141 tons in 1893, against 36,441 tons in 1892; manufactured iron, 6,617 tons in 1893, against 7,867 tons in 1892; steel, 1,892 tons in 1893, as against 1,697 tons in 1892; scrap iron, 10,938 tons in 1893, against 7,114 tons in 1892; total imports, 52,286 in 1893, against 53,119 tons in 1892. Exports: Pig iron, 24,387 tons in 1893, against 29,816 tons in 1892; finished iron, 4,433 tons in 1893, against 4,152 tons in 1892; steel, 852 tons in 1893, against 1,797 tons in 1892; scrap iron and steel, 38,418 tons in 1893, against 39,777 tons in 1892; total exports, 68,090 tons in 1893, against 75,542 tons in 1892. The iron exported from France during this period was 47,029 tons in 1893, against 55,284 tons in 1892. The imports for the same period were 328,852 tons in 1893, against 316,381 tons in 1892.

arrangement has been made with great taste and skill, so as to show the specimens to the best advantage.

SOME SPECIAL EXHIBITS.

The Chrome Steel Works, of Brooklyn, N. Y., have an exhibit of chrome steel castings, which is somewhat out of the usual run of manufactures. Instead of showing new castings, the greater part of the exhibit consists of worn-out castings, such as shoes and dies, cams, tappets, etc., for stamp mills, gear wheels, hammer-heads and dies for steam hammers and similar work, the idea being to illustrate in this way the combination of durability of strength and toughness claimed for this steel. These castings have been contributed by mills from almost every mining district in the United States and Mexico, and each one is accompanied by a report from the superintendent of the mine where it was used, stating the length of service, the quality and quantity of ore crushed, with other information. In addition to these worn-out castings the Chrome Steel Works display samples of their combination welded steel and iron plates as used in building safes and vaults. Mr. John S. Power is in charge of the exhibit.

The New Cascade Tunnel.—Work will soon be begun on the new tunnel of the Great Northern Railroad at Stevens Pass, Wash., where the line is now carried over the Cascade mountains by a switchback. The tunnel will be 13,178 ft. long, being one of the longest in the United States. The east portal is 3,380 ft. above sea level and the west portal 3,150 ft.; the highest elevation of the pass is nearly 2,000 ft. above the level of the tunnel. The tunnel will be 16 ft. wide, 23 ft. high, and will have to be lined with brick through its entire length, it is expected. The estimated cost is \$2,000,000.

VARIATIONS IN THE MILLING OF GOLD ORE.—NO. VI. THE OVENS, VICTORIA.

Written for the Engineering and Mining Journal by T. A. Rickard.

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The Ovens is one of the main tributaries of the Murray, the only great Australian river. Its source is in the Australian Alps and its headwaters flow through the most rugged and picturesque portion of the colony of Victoria. This district is northeast from Melbourne, and near the border dividing Victoria from its neighbor New South Wales. In the early fifties the mining camps of Bendigo and Ballarat sent forth bands of pioneers who penetrated the hearts of the snowcapped ranges and found placers of extraordinary richness which made the Woolshed, the Buckland and other localities in the Ovens district rank among the very best discoveries of that golden age. Now, however, the former glory has departed, the Mongolian has come to pick up the crumbs which have fallen from the table of the Caucasian, and the more steady routine of quartz mining communities has replaced the feverish excitement of alluvial diggings. The mines are scattered over a country the most mountainous in Australia, and the mills stand beside streams whose perennial flow is in pleasing contrast to the dusty dryness which is characteristic of most of the mining centers of Queensland, New South Wales and Victoria.

The methods of milling have been derived for the most part from Clunes. The mills themselves are usually small, and do an irregular custom work, dependent upon a precarious and uncertain ore supply obtained from the small mines whose white waste heaps dot the blue of the forests of eucalyptus ("the bush") which cover the surrounding hills. In the accompanying tabulated statement I have given the chief figures illustrative of the methods in use at five mills, of which only the first does not do custom work.

The Harriettville mill is much the most important in the district. It is the property of an English company owning a very extensive group of mines, among which may be mentioned such euphonious names as "Tiddle-Dee-Addle-Dee," "Jackass," "Monsneg," etc.

The plant consists of 25 heads, in two sections of 10 and 15 stamps respectively, separated by the overshot waterwheel which supplies the motive power. The wheel has a diameter of 40 ft. and a breast of 5 ft.

Each stamp weighs 700 lbs. and drops 70 times per minute. The height of the drop averages 8 in. When new dies have just been placed in position, the depth of discharge (the distance from the bottom of the grating or screen to the top of the die or false bottom) varies from one-half to one inch, depending upon the amount of sand packed underneath the dies. On measuring the depth of discharge in several batteries at the close of a month's working, I found it to be 2¼, 3, 1, 1¼, 1, 2¼, 1¾, or an average of 1¾ in.

The entire mill treats 1,100 tons per month. Each stamp crushes 1½ tons per 24 hours.

The coffer or mortar box is 5 in. deep, while the dies, which are octagonal, are 4 in. thick. The shoes have round tongues, and are 9½ in. in diameter by 9 in. high. A shoe weighs 172 lbs., and a die 84 lbs. Both are made of best quality white iron, forged, not cast. This costs 16 shillings per cwt. (112 lbs.). The shoes wear evenly, but the dies soon develop an irregular surface ("cupping") and exhibit much variation in their time of service. The average wear of iron per ton of ore crushed is at the rate of 9.8 oz. of the shoe and 3.4 oz. of the die. The ore being of comparative softness, the wear of the shoe must be considered as excessive. This result is due to two causes, the non-employment of a rock breaker and the use of an identical material in both shoe and die. By the more uniform breaking of the millstuff the shoe can be saved much violent work, and by making the die of a metal less hard and more tough than the shoe, the latter would be found to last longer and to cause the die itself to retain a more even wearing surface.

The coffer is of peculiar design, and is provided with an end discharge, as is illustrated by the accompanying drawings, which I owe to the courtesy of the manager, Mr. Thos. G. Davey. The clear space inside the mortar is 4 ft. 6 in. long by 1 ft. wide. The interior is protected by a cast iron lining, one inch thick and divided into four parts. These are shown in position in the section elevation. (See illustration.) The bottom of the mortar is flush with the amalgamating table outside. A part of the front edge or lip of the mortar box is removable, and allows of the easy introduction or removal of the dies.

The grating frame is in three sections, of which the two frames at the ends are curved, but afford a discharge surface similar in extent to that of the front, which is straight and has a length of 2 ft. The screen itself is of round punched Russia iron. That at the ends has 175 holes per square inch, while that in front has 240. The time of service is slightly in favor of the front grating. A set lasts from under three weeks to nearly a month; that is, during the crushing of from 125 to 200 tons of ore. In this mill, as in many others which came under my notice, complaint is made of the weakening of the gratings by the perpendicular lines formed by the action of the press used at the time of their manufacture. The gratings are not fixed to a frame, but are kept in place by an iron clamp.

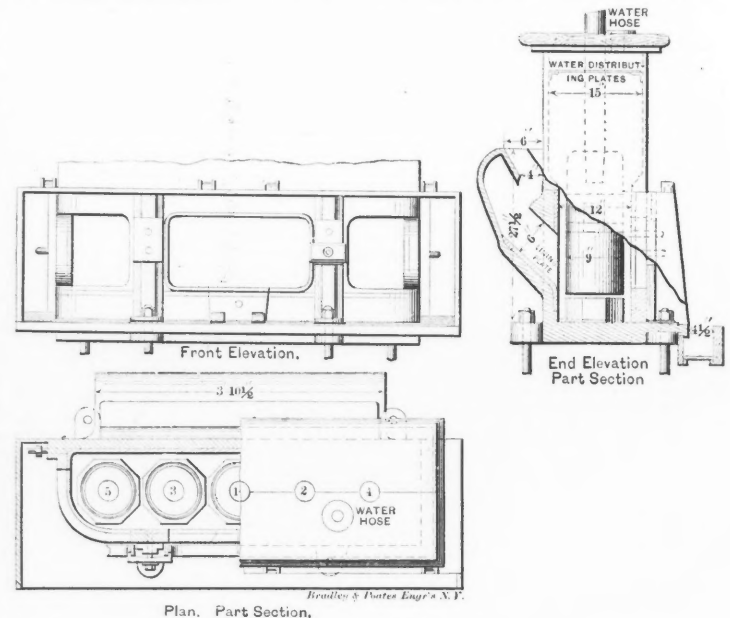
The gold saving is done in the mortar box itself, by outside amalgamating tables, by wells and indirectly by shaking tables, the concentrates from which are first roasted and then treated by amalgamation in pans.

There are no amalgamating plates inside the mortar. Mercury is added to the ore fed into the battery, in quantities varying with the richness of the millstuff. The average amount is about 1 oz. of mercury per battery (of five heads) every half hour. The regulating of this addition is determined by the examination of the plate which forms the head of the amalgamating table. Every four hours this is inspected. If it be "moist," less mercury is added to the ore in the battery; if it be "dry," more is introduced.

The amalgamating tables are 12 ft. long and 6 ft. wide. They have a slope of ¼-in. per foot. The total length is distributed over four subdivisions, of which the two uppermost are lined with silver plated copper and the two latter with plain copper. The first or apron plate is 22 in. long, and the second, 3 ft.

A variation in the arrangement of the plates of the tables of two adjoining batteries enabled an interesting comparison to be made. At No. 5 battery the succession of plates is silver plated copper, plain copper, plain copper. The middle one of these came from the old Monsneg mill, was thoroughly amalgamated and in first-class condition. At No. 4 battery the order was silverplated copper, silverplated copper, plain copper. After a year's working with one of identical character it is found that the plain copper forming the third plate of No. 5 battery is well amalgamated, while the corresponding plate of the same material at No. 4 has not yet become whitened by amalgam. This proves that the second plate at No. 5—viz., plain copper—is not arresting gold and amalgam so successfully as the corresponding plate—viz., silverplated copper—at No. 4 battery.

The amalgam is cleaned up every three days. Immediately after the first length of plate there is a drop well 3½ in. deep. There is also a shallow well or ripple following this drop well and succeeding each of the other subdivisions of the tables. All are charged with mercury



COFFER FOR STAMP MILL.

and cleaned up once a week. Three bottles are in use for each set of tables. Thus 15 bottles are in use for the entire mill. The loss of mercury amounts to about 75 lbs. avoirdupois per 1,100 tons of ore crushed, being at the rate of 19 dwts., Troy, per ton. This includes that consumed in the pan amalgamation of the concentrates. In the mill proper the consumption would be about 8 dwts.

There are no blankets below the tables, the pulp passing on at once to the shaking tables. There are five of these. They are the usual colonial variety of the Rittinger procussion table, and are not nearly so effective as some others designed on the same principle, as, for instance, the "bumper" of Gilpin County, Colo. The speed is regulated at 135 strokes per minute. The distributor of each concentrating machine is lined with old copper plates which are intended to arrest floured quicksilver and escaping amalgam. The ore yields about 1% of concentrates, consisting mainly of iron pyrite. The concentrates contain 5 oz. of gold per ton or at the rate of 1 dwt. per ton of ore crushed by the mill.

COMPARATIVE TABLE.

Name of Mill.	No. of stamps.	Weight of each.	No. of drops per minute.	Height of drop.	Depth of discharge.	Capacity per head.	Capacity of mill.	Description of grating.	Fineness of grating, in holes per sq. in.	Percentage of con- centrates, gold con- tents of same.		Fineness of bullion.	Retort per- centage.	Wear of grat- ings.	Loss of mercury per ton of ore.	Con- sumpt'n of water.
		Lbs.								Inches.	Tons.					
Harriettville.....	25	700	70	8	2	1½	37†	Round punched Russia iron.	240	1	5	965	33	18	19‡	5
* Oriental.....	16	784	55	9	3	1½	20		220	Not saved.	540	52	17	8	4	
* Hillsborough.....	8	784	60	9½	3	1½	14		200	2	1½	940	50	18	4	3½
* Railway.....	20	720	60	9	4	1½	32		200	Not saved.	950	45	20	8	4	
* Stephens.....	6	840	50	9½	4½	1½	9		250	Not saved.	945	48	18	8	4½	

\* Custom mill. † Long tons, 2,240 lbs. ‡ Including pans. § Per stamp per minute.

The general clean-up takes place on the last day of each month, and requires six hours for its completion. The dies are taken out and any adhering amalgam is scraped off. The sand inside the mortar is collected and washed over the amalgamating tables. This serves to catch most of the amalgam. The sand passes on to the shaking tables, whence the heaviest portion is returned to the battery when the mill is re-started. Of the amalgam obtained, 33% is collected inside the mortar boxes; of the remaining two-thirds 8% comes from the wells and 58% from the amalgamating tables. Of what is saved on the plates fully 90% is yielded by the first length of the plate. Of the total yield of gold 86% is extracted by amalgamation and from 7 to 12% is saved in the concentrates. The retort yield of the amalgam varies from 25 to 52%, averaging 36%. The bullion is of high caratage, equivalent to 965 fine. Upon measurement it is found that the consumption of water is at the rate of 5 galls. per stamp per minute. This comparatively large amount is necessitated by the clayey character of the ore and is also in part owing to the use of the end discharge.

The framework of the mill consists of iron standards of a comparatively light pattern. Owing to the care taken in the building of the foundations there is, however, no excessive vibration. The tappets or discs are kept in place by a key and not by the old discarded, but more common, colonial device of a screw. It was found here as elsewhere that while screw tappets are very excellent in theory, and while they may answer admirably when first put in position, as soon as they become the slightest bit loose, which cannot be prevented eventually, the screw gets instantly worn and is soon ruined. This necessitates too frequent stoppage for the cutting of a fresh thread.

The order of the drop of the stamps varies in the two sections. Fifteen heads drop in the order of 5, 3, 4, 2, 1, while ten fall in pairs, 5 and 1, 4 and 2, 3. The latter style is unfortunately too common in

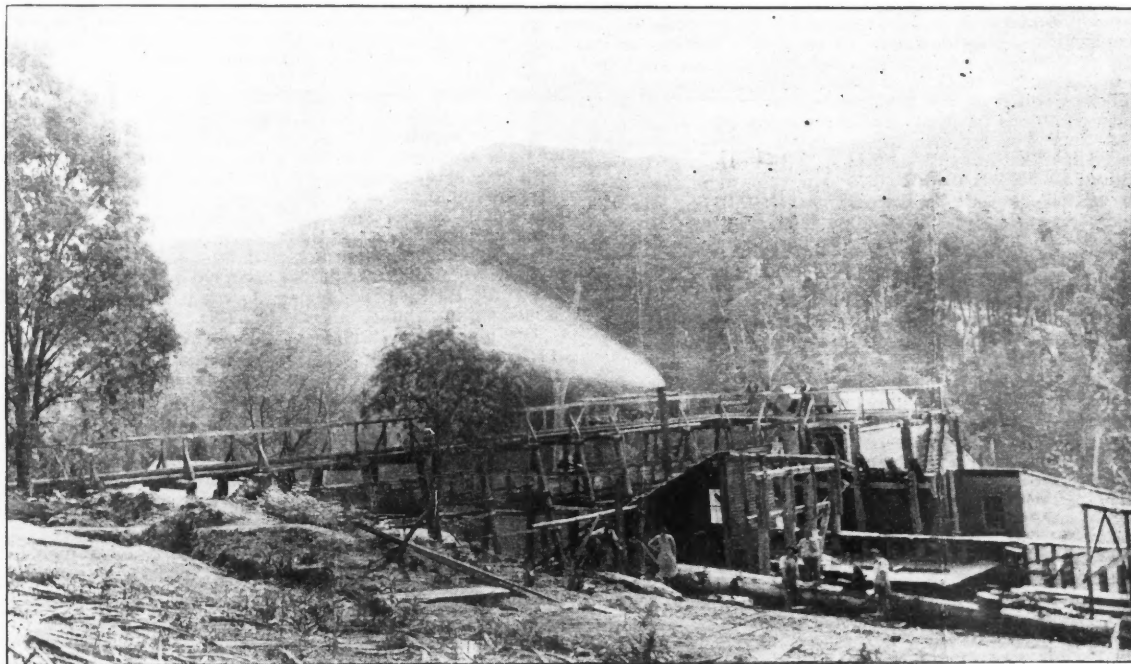
the use of an end discharge. The reason is not far to seek. It is ordinarily attempted under the very unfavorable conditions afforded by a mortar box of rectangular shape. The result is that the issue through the end gratings is both weak and irregular, while at the same time the discharge from the front is injuriously affected.

At Harrietteville these difficulties are overcome by a variation in the design of the mortar box itself, and by using screens of different mesh. The two ends and the front of the mortar make a curve which is an arc of which the straight line of the back of the mortar is the chord. The discharge surface is sub-divided into three equal portions, each 2 ft. long. The splash at the ends being weaker than in front the former have gratings pierced with 175 holes per square inch, while the latter is provided with a grating carrying 240 holes.

The concentrates from the percussion tables are roasted and amalgamated. The roaster is a simple reverberatory furnace. The hearth is 27 ft. long and 9 ft. wide. Its length is sub-divided into three equal portions, each separated by a drop of 2 in. The charge is 12 cwt. The time taken is eight hours. The daily capacity of the furnace is four tons. Immediately below the roaster is the amalgamation plant, consisting of two Wheeler pans and one settler. The extraction of the gold is exceedingly good, ranging from 90 to 97% of the assay value of the concentrates.

(To be Continued.)

Coal Mining in Queensland.—At a recent meeting of the North of England Institute of Mining and Mechanical Engineers, Mr. E. S. Wright read a paper on "Coal Mining in Queensland," which was principally a description of the Ipswich coalfield. The seam worked



HARRIETTEVILLE MILL, THE OVENS DISTRICT, VICTORIA, AUSTRALIA.

the colonies. I noted that the stamp made a complete turn in from four to seven drops.

This is an excellent mill excellently managed, but it has one serious defect, a defect only too common in Australian mills. I refer to the absence of a rockbreaker. The Harrietteville plant is in advance of many of the colonial mills in being equipped with self-feeders, which, while simple, perhaps crude, in design, are yet effective in practice. For the absence of a rockbreaker there can be no excuse. The ore, it is true, is of less than ordinary hardness, most of it is small when broken in the stopes of the mines, but there is a proportion of larger stones sufficient to prevent anything like uniformity of size and to cause an excessive wear of the iron of the stamp shoes. For breaking ore a machine constructed upon the principle of a multiplied lever must necessarily be better adapted than one designed on the idea of a falling weight, hence the rockbreaker is better qualified to break ore than is the stamp. (Pulverization is another question.) By compelling the latter to do work which should be previously done by the former you produce unnecessary waste of the material of the shoes, dies, screens and other wearing parts; you seriously diminish the crushing capacity of the mill and also interfere with the regular operation of the amalgamation which saves the gold.

We have seen that the mortars in use at this mill are designed so as to have a discharge at the two ends, as well as in front. It will be remembered that at Clunes the batteries have both a back and front issue. These variations from a dull uniformity are interesting. At the Harrietteville mill the end discharge is certainly successful. If it does nothing more it enables the use of copper tables of an unusual width, and by so doing it increases the area of amalgamating surface, and the thin distribution of the pulp. An amalgamating table 6 ft. wide and 12 ft. long is a sight to gladden a millman's heart. As observed by me the wash of the pulp over the tables was very regular in speed and even in distribution. The colonial millman will generally condemn

at the West Moreton colliery is 19 ft. in thickness, and is worked at a depth of 640 ft. There is only 7 ft. of this seam worked at present, and this contains a stone band 8 in. thick. Five inches below this there is a layer of workable coal. The coal contains about 7% ash, and the miner receives 3s. 4d. per ton, for which he cuts and riddles the coal, does his own timbering, lays his own track and trams the coal sometimes a distance of 300 yards. At this price, the miners earn from 9 shillings to 11 shillings per day of nine hours. The prevailing method of working is the board and pillar system.

Belgian Iron and Coal Trade.—The Belgian exports and imports of iron and steel during the first three months of the current year, compared with those of the corresponding three months of 1892, were as follows: Exports: Steel, including cast, rails, bars and manufactured, 12,351 in 1893, against 18,431 tons in 1892, the decrease being over 9,000 tons in rails; pig iron, 5,111 tons in 1893, against 3,197 tons in 1892; scrap iron, 2,565 tons in 1892, against 2,240 tons in 1892; hammered, drawn and rolled iron, 56,554 tons in 1893, against 56,225 in 1892; forgings, 6,558 tons in 1893, against 7,091 tons in 1892; testings, 2,701 tons in 1893, against 4,409 tons in 1892; rolling stock, 7,636 tons in 1893, against 11,364 tons in 1892; machinery, 5,367 tons in 1893, against 6,713 tons in 1892. The total exports were 98,843 tons in 1893, against 109,670 tons in 1892. The imports of these various articles showed but little change, having been 55,532 tons in 1893, against 56,378 tons in 1892. The imports of iron ore during the first three months of the current year amounted to 427,119 tons, as compared with 417,255 tons for the corresponding period of 1892. The exports were 36,471 tons in 1893, against 53,316 tons in 1892. The exports of coal for the same three months were 1,086,698 tons in 1893, against 966,712 tons in 1892; of coke, 260,346 tons in 1893, and 251,881 tons in 1892. The imports of coal were 345,277 tons in 1893, as against 386,969 tons in 1892; of coke, 62,531 tons in 1893 and 49,620 tons in 1892.

## THE SANITER PROCESS FOR THE ELIMINATION OF SULPHUR FROM IRON.\*

The first paper on this subject, which attracted much attention, and which was published in the "Engineering and Mining Journal" for December 10th, 1892, page 556, is here supplemented by Mr. Saniter with an account of the work done lately in continuation of his former experiments. At the works of the Wigan Coal and Iron Company, a plant has been laid down for dealing with the whole make of a blast-furnace. The plant and general arrangements are as follows: The sand-bed has been lowered to the ground level; on this level, and in front of the blast-furnace, is a ladle on a carriage, which is provided with tipping gear. This plant cost considerably under \$1,250 per furnace. The ladle is heated before the first operation, the mixture put on the bottom, a small cast iron plate being used to prevent the molten metal cutting under the mixture. The metal is then run in, and as soon as the reaction ceases, is tipped into the lowered sandbed, and the slag raked out of the ladle, which is then ready for the next operation. This ladle treats from 9 to 12 tons at a cast.

Twenty consecutive results show a range before treatment of 0.072% up to 0.258% sulphur; the amount of sulphur after treatment ranging from 0.025% to 0.074%, the latter being much above the average. The greatest reduction was from 0.258% to 0.047% sulphur.

The cost of materials is fourpence per ton on these charges, and the other costs, including labor and grinding, have been found to be under twopence per ton.

Among many other results obtained in this way, one may be mentioned which was worked at Dowlais, in which the metal contained only 0.64% manganese, the sulphur being reduced from 0.40 to 0.134%, which indicates pretty clearly what may be expected from the ladle treatment under ordinary conditions.

In dealing with larger quantities of metal, where it has been impossible to get the metal quickly enough from the furnace to the ladle, it has been found necessary to make the mixture more infusible. In order to accomplish this, it is desirable to replace a portion of the calcium chloride by the more infusible fluor spar; in this way the time taken for the fusing of the mixture is considerably lengthened, thus obtaining the desired action on the iron.

Good work also continues to be done at the steel works where large quantities of sulphury iron are also treated in the basic open-hearth, and indeed the record has lately been broken with an iron of the following composition: Si, 0.28; S, 0.96; P, 0.75; Mn, 0.30. The analysis of the bath when melted showed: Si, trace; S, 0.953; P, 0.55; Mn, 0.22. The steel made showed: C, 0.12; Si, trace; S, 0.07; P, 0.026; Mn, 0.47. The elimination of sulphur here shown from pig to steel is 92%, the steel being of first-rate quality.

The Wigan Coal and Iron Company at the end of last month had made over 16,000 tons of basic steel from sulphury iron, and had treated over 5,000 tons of iron in the ladle at the blast-furnace. Besides this, considerable weights have been treated at other works in the country with successful results.

This steel has been tested in Sheffield for various purposes for which Swedish bar is used, in making the highest class cutlery and tool steels, with marked success. It has also been found nearly equal to the best charcoal iron for conductivity purposes. It welds splendidly. A piece which had been welded was turned and pulled in the testing machine; it broke clear of the weld, the line of which it was impossible to detect. The mechanical tests show with 0.10% carbon a breaking strain of 23.4 tons per square inch, with 27.8% elongation and 60.4% reduction of area; the results on a number of tests varied from this up to a sample with 0.62 carbon, which gave a breaking strain of 48.8 tons, with 14% elongation and 22.8 reduction of area.

It is generally conceded by most authorities that about 45% of sulphur is on an average eliminated in the basic Bessemer blow; this, unfortunately, is insufficient to allow a high sulphury iron to be used with advantage in this process. When, however, this process is applied, the conditions aimed at being similar to those required in the basic open-hearth, a very satisfactory elimination takes place; so much so, in fact, that iron containing nearly 0.5% of sulphur has been made into steel.

In carrying out the process in the basic converter a somewhat larger quantity of lime than usual is put in, together with about 40 lbs. of calcium chloride to the ton of metal. The blowing proceeds in the usual way, no difficulty whatever being experienced.

A number of tests made by the Lilleshall company showed an elimination of sulphur of 78%, as compared with 45% by the ordinary process.

An appendix gives a report on the process made by Mr. G. J. Snelus, vice-president of the Iron and Steel Institute, who says that the steel made by this process was of fine quality, rolling clearly and showing all the characteristics of a high-class steel. The process is adapted either for purifying fluid pig iron direct from the blast-furnace, by running the fluid metal into a ladle having a layer of the purifying materials on the bottom, and afterward running the metal into pigs or plate metal for subsequent use in the puddling furnace, etc.; or the crude sulphury pig is treated in the basic Siemens furnace or Bessemer converter with the patented mixture. Calcium chloride is the purifying material in admixture with lime. This at present costs 35s. per ton at the works where it is made by the United Alkali Company from residues of the Weldon process, and containing 70% absolute calcium chloride, 1 to 2% impurities, and balance water. It is dried in rough iron dishes in a reverberatory furnace before use. In purifying the metal in the ladle, fluor spar is sometimes mixed with the calcium chloride to retard the process, and some limestone is used to save lime and produce a boil in the ladle. Fluor spar can also be used with the other ingredients, lime, limestone, and purple ore in the ladle, but the mixture is not quite so efficient as when calcium chloride is used.

The pig iron used in these experiments was made from 94.68% tap cinder; 4.21% Irish ore and 1.11% purple ore. The analysis of the tap

cinder showed: Iron, 53.8%; manganese, 3%; silica, 16.1%; phosphoric acid, 5.5%; sulphur, 0.25%. The Irish ore showed: Iron, 21.5%; silica, 6.3%; alumina, 30.7%; titanic acid, 2.6%; moisture, 14.7%. The analysis of the limestone gave: Carbonate of lime, 94%; magnesia, 0.6%; alumina, 0.7%; iron oxide, 0.5%; silica, 3.2%; water, 1%. The blast-furnace was running very freely on this mixture; the slag was fluid and evidently carried off the bulk of the manganese from the tap cinder.

Three experiments were tried on this. In the first a mixture of 90 lbs. dry calcium chloride, 90 lbs. fluor spar, 225 lbs. limestone, and 110 lbs. lime, finely ground and dried, was placed at the bottom of a 10-ton ladle lined in the ordinary way. A piece of cast iron plate was placed on the mixture where the iron struck. The iron was run from the furnace very quickly, the whole 9 tons 1 cwt. being run in three to four minutes; very considerable boiling took place in the ladle, and dense white fumes escaped from the mixture, but there was no ejection of metal and no trouble. In a few minutes the boil subsided, and the metal was tapped and run into iron plate molds. It appeared as though considerable heat was developed by the process, for the iron remained perfectly fluid, and there was not the least skull in the ladle. The metal contained before treatment 0.23% sulphur and 0.932% silicon; after treatment, 0.025% sulphur and 0.768% silicon. The slag contained 21.6% silica, 59.13% lime and 2.74% sulphur. Thus, there is considerable diminution of silicon and a very remarkable elimination of sulphur, part of which, at least, is found in the slag.

In the second experiment the mixture employed was calcium chloride, 180 lbs.; lime, 200 lbs. This was rammed into the bottom of the ladle as before, and the metal run on to it rapidly from the furnace. The boiling was not so violent as in the previous case. The metal contained before treatment 0.26% sulphur and 0.512% silicon; after treatment 0.091% sulphur and 0.442% silicon. The slag contained: Silica, 23.4%; lime, 53.0%; sulphur, 2.93%. The pig iron contained rather more sulphur in this case, and the elimination, though not so complete, is very remarkable. The weight of metal treated was 9 tons 12 cwt.

In the third experiment the mixture consisted of 120 lbs. purple ore, 180 lbs. fluor spar, 225 lbs. limestone and 110 lbs. lime. The metal before treatment showed 0.302% sulphur and 0.745% silicon; after treatment, 0.096% sulphur and 0.495% silicon. The slag showed 20.6% silica, 53% lime and 3.91% sulphur.

A final experiment was made in the basic Siemens furnace; in this the pig employed was the same as in the previous experiments, run into pigs in the ordinary way. The scrap was a mixture of all kinds. Calcium chloride was the purifying reagent. The following are particulars of this charge: 12 tons white cinder pig; 3 tons steel scrap; 1 ton 10 cwt. limestone and 15 cwt. purple ore charged with the metal; 1 ton 7 cwt. 2 qrs. lime, 1 ton limestone, 16 cwt. 1 qr. pottery mine and 7 cwt. 70% calcium chloride used for feeding; 15 cwt. No. 3 common pig (1.5% P), used for pigging; 1 cwt. 1 qr. 20 lbs. 80% ferro-manganese added in steel ladle.

The ingot made weighed 14 tons 15 cwt. The furnace was full at 11:25 a. m.; it was tapped 10:35 p. m. Analyses made of samples drawn from the furnace at intervals showed a gradual reduction in sulphur. The analysis of the final steel showed: Combined carbon, 0.100%; sulphur, 0.040%; phosphorus, 0.030%; manganese, 0.504%.

Mr. Snelus' conclusion is that this is a thoroughly practical, reliable and inexpensive process for desulphurization, and that by it, using the basic process, white iron made entirely from cinder can be converted into excellent steel without undue waste or loss of time.

The Colbert Shoals Canal.—Bids were recently received for the construction of the great lock on the Tennessee River improvement at Colbert Shoals, near Florence, Ala. The lock will be one of the largest in the country, being 575 ft. long and 80 ft. wide, with a 25 ft. lift. The bids ranged in amount from \$305,767 to \$624,034. The contract has not yet been awarded. The Colbert Shoals Canal is second only in importance to the Mussel Shoals Canal, on the Tennessee River, which was completed two years ago, and will open up and complete the connection between steamboat navigation on the lower and the upper Tennessee. The canal is eight miles in length; it is to be 150 ft. wide and will have a depth of 7 ft. at extreme low water. It is 29 miles farther down the river than the Mussel Shoals Canal. The improvements will be of considerable importance to the coal and iron interests of East Tennessee and North Alabama, as it will enable them to ship a considerable part of their output by water to Middle Tennessee, Kentucky and Mississippi River points.

Prices of Iron and Steel in Germany.—The German Iron and Steel Association has issued a report on the prices of iron and steel for the last ten years, the price at the beginning of each year serving as the standard. The price given is the price at the works to home consumers, the export price, of rails, for instance, being in some cases \$7.50 lower than the home price. The quotations for 1893 are for pig iron: Forge, \$9.25 to \$11.25; foundry, \$13.75 to \$16.50; Bessemer pig, \$14.50; basic iron, \$9.25; charcoal pig, \$11.25; spiegeleisen, \$18.25. For No. 1 foundry iron the highest price recorded in 10 years was \$23.50 in 1890. In that year the highest prices ruled for all grades. For finished iron the quotations this year are: Bar, \$27.25 to \$30.50 per ton; boiler plate, \$31.25; wire rods, \$25. For steel rails this year's quotations are \$27.75 to \$28.75, a considerable fall from 1890, when prices were \$40 to \$41.25. Steel castings are this year \$38.75 to \$42.50. Steel ties are quoted at \$26.75; Bessemer tires and axles, \$47.50 per ton. The metric ton of 2,204.6 lbs. is so near the gross ton of 2,240 lbs. that they have been taken as practically the same. The value of the mark has been taken at 25 cents. Charcoal iron in Nassau is still produced at the rate of 25,000 tons per annum, and the forge iron of that district is of excellent quality. Forge iron is made also in the Rhine provinces, Westphalia, Silesia, Luxembourg, and Lorraine. Foundry iron is made in Westphalia and Silesia, and Bessemer pig in Westphalia from Spanish ores. Basic (Thomas) iron is made in Luxembourg, Lorraine, and Rhineland, the production last year being 2,006,000 tons out of a total of 4,793,000 tons of all kinds of iron in Germany.

\*Abstract of paper read before the British Iron and Steel Institute, at the May meeting, by E. H. Saniter.



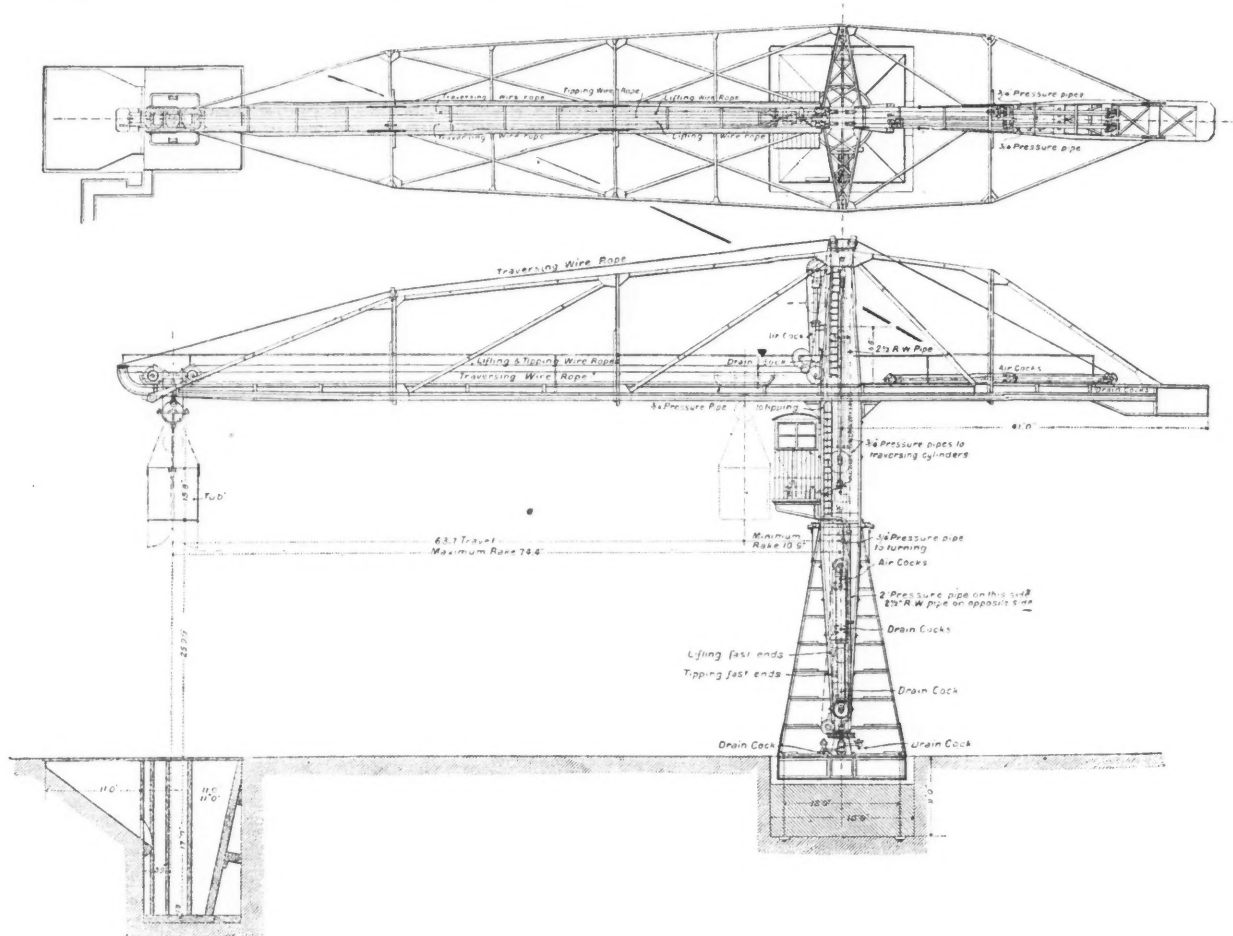
A HYDRAULIC COKE STACKING CRANE.\*

A hydraulic crane of unusual proportions has recently been erected at the Saltley Gas Works of the Birmingham corporation, in accordance with the proposals of Mr. Henry Hack, the engineer. The crane is used for stacking the coke as it comes from the retort house. Formerly the work was done by men with wheelbarrows, taking it up plank roads laid at considerable inclination, but this was found to be very laborious and expensive, besides causing much waste. The crane, as will be seen from the engraving, has a vertical pillar and long horizontal jib. The foot of the pillar is carried on a wrought iron girder, which transmits the weight to a wrought iron pedestal, the upper part of which takes the horizontal strain of the upper bearing on the pillar. The pedestal is fixed on a block of concrete 16 ft. square and 9 ft. deep. On the jib a bogie carriage travels, from which is suspended a rectangular box for holding the coke. At the back of the pillar is a counterweight jib, at the outer end of which is stowed a counterweight partly balancing the structure. Both jibs are stayed vertically and horizontally from the pillar. The coke box, which holds two tons of coke, is lowered into a pit and there receives its load of coke from an adjoining hopper, as shown, the passage between the hopper and the box being controlled by a hydraulic slide. The coke as it is wheeled from the retorts is constantly being tipped into the hopper. The box can be lifted through a height of 43 ft. 6 in. The maximum radius of the crane is 74 ft. 4 in., and the horizontal travel of the box is 63 ft. 7 in. This enables coke

difficulties and delay arose which ultimately led to considerable departure from the original drawings. For the bottom half of the pit, in lieu of Portland cement concrete walls, a cast iron caisson had to be resorted to. This was made in sections, the plates being bolted together with flanges, and the whole forced through the sand by excavating inside, and weighing the caisson in the usual way. The crane itself was constructed by Sir W. G. Armstrong, Mitchell & Co., and has been at work about three months with great success. It is capable of raising and tipping 25 tons of coke per hour, and when fully employed stacking coke at the maximum height saves 28 men per 24 hours. The working hydraulic pressure is 700 lbs. per square inch, and the crane may equally well be used for stacking coal.

WASTE IN ANTHRACITE COAL MINING\*

The commission to investigate the waste of coal mining was appointed in February, 1890, and was composed originally of Messrs. J. A. Price, of Scranton; Peter W. Sheaffer, of Pottsville, and Eckley B. Cox, of Drifton. Mr. Sheaffer died in March, 1891, and Col. Price in August, 1892; both had done much work toward the preparation of the report. Their places were taken respectively by Mr. Heber S. Thompson, of Pottsville, and Mr. William Griffith, of Scranton. Their report is a carefully prepared and practical document, containing much information of value.



HYDRAULIC CRANE FOR STACKING COKE, SALTLEY, ENGLAND.

to be stacked to a height of about 24 ft. 6 in., in a circle of 150 ft. diameter, giving with the slopes a storage of about 7,000 tons. The lifting cylinder is placed within the pillar. The box is lifted by means of two wire ropes, which, after passing around sheaves on the lifting cylinder and ram, go over the bogie carriage and running blocks above the box, and are made fast at the end of the jib. A third wire rope passes around the lifting cylinder and ram, and thence over the ram head of a small hydraulic cylinder, and on to the box, where it is attached to the bottom doors. By means of this rope the doors are kept closed when the small ram is at its outstroke, and the doors are allowed to open when the cylinder is exhausted. The traveling of the bogie along the jib is effected by a pair of horizontal cylinders placed on the counterweight jib, and connected to the bogie by wire ropes. The crane is turned by two hydraulic cylinders, fixed one on each side of the pillar. The chain from these cylinders passes around the turning drum, which is fixed to the bottom socket of the crane. All the motions are controlled by one man in a valve house on the front of the pillar, just below the jib, only one other attendant being required to work the hydraulic slide between the pit and coke hopper.

The work in connection with the coke pit and hopper, also the foundations for the crane, was carried out by the employees of the gas department under the direction of the engineer, and owing to the large amount of water to be dealt with and the treacherous nature of the ground, running sand being met with within a few feet of the surface,

After the commission had organized and carefully examined the question submitted to it, the following conclusions were arrived at:

1. That the most important work to be done was to determine the causes of waste in its broadest sense, and, after stating them, to give briefly such suggestions as it could as to the lines in which effort should be made to diminish or avoid it.
2. That while it is important that attention should as far as possible be called to all the methods, apparatuses, furnaces, etc. (patent or otherwise), by which the smaller, and until recently valueless, sizes of anthracite can be and are gradually being utilized; yet a minute description of any apparatus, or a comparison of rival systems, would be out of place and beyond the powers of the commission with the limited time and money at its disposal.
3. That while the body of the report should be as untechnical as possible, it should give the general results briefly but comprehensively.
4. That a series of appendixes should be prepared in which information of a more or less technical character, but of value to those wishing to make a closer and more detailed study of any part of the subject, would be given.

These appendixes contain estimates of the original and present extent of the anthracite field; the amount of coal taken from it and the approximate probable future production; experience in the use of the

\* From the London "Engineer."

\* Abstract from Report of Commission appointed by the State of Pennsylvania to investigate the Waste of Coal Mining.

smaller sizes of anthracite which were originally wasted; patents and devices bearing on the subject, and the literature of the subject.

In considering the question "What is coal waste?" the commission has taken these words in their most comprehensive sense and has discussed the subject with the view of determining, as nearly as possible, what portion of the coal originally deposited has been, or will be, lost to the community, and the causes to which this loss is due, with such suggestions as they were able to make with the view of diminishing the waste in the future.

A very small percentage of the coal originally deposited now remains in the coal fields, by far the larger portion having been carried away by the erosion following the uplifting of the strata by which the present anthracite coal basins were formed. Of the coal that remains, quite an appreciable percentage is rendered practically useless by the distortion to which it has been subjected when upturned; for where the dips are steep or overturned a large amount of coal has been twisted, crushed, and sometimes intimately mixed with the slates that occur either above, below or in the vein, thus destroying or diminishing its value. The coal in those portions of the veins (or beds) which lie close to the surface is often more or less depreciated in quality by the action of the air; and the proximity of rivers, creeks and buried valleys may practically destroy the value of much coal of good quality.

Waste by mining may be considered under two heads: That which is absolutely necessary and cannot be avoided; and that which may be diminished or done away with by better methods of mining.

It is evident that, except in very special cases, it is not possible to remove all the coal. A certain amount must be left in order to maintain the slopes, shafts, gangways, air-ways, etc., and in some cases to support the surface, as, for instance, under railroads, streets, houses, streams of water, etc. A thorough study of each area to be worked will enable the mining engineer to reduce this, but it will never be possible to take out all the coal, except by stripping. In thin veins, where the longwall system of working is used, a very large percentage of the coal can be taken out; and where the method of gobbing up is used, as is very commonly the case in France, a very large percentage of the coal can be obtained. The possibility of adopting the latter method, however, depends very largely on the rate of wages paid in the district and the price of coal. The nature of the roof or of the floor of the vein may often be an insuperable obstacle to getting out all the coal. The proximity of the veins to each other is also a difficulty. In strata where there is a good deal of water it may be necessary to sacrifice coal in order to prevent the water from reaching the lower levels, and thereby causing too great an expense for pumping, including, as it may do, a great consumption of coal, so that it may be better mining to leave larger pillars. Where the pitch of the veins is great, it is often necessary near the bottom of the basins to leave considerable coal to prevent the whole superincumbent strata from crushing in the mine. In other words, to keep the mine safe and in such condition that the maximum quantity of coal can be worked economically out of the openings, a certain part of the coal must always be sacrificed. Where the mine generates large quantities of firedamp, it may be necessary for safety to leave large pillars between the air courses, and it may not be possible to rob as closely as it would be were the mines free from gas. It is one of the best evidences of engineering skill when the coal that must be sacrificed is determined and deliberately set apart for that purpose at the time the colliery is opened out, or very soon thereafter.

When any given territory is to be worked a much larger percentage of coal can be gotten out if the conditions in which the coal occurs are carefully studied, and a general system of working decided upon and thoroughly carried out from the beginning. One of the most important points is to leave large pillars more than sufficient to sustain the workings and to take no more coal than is commercially necessary until the boundary of the colliery is reached, and then to rob back carefully in sections, so that whatever caving-in occurs is back of the main body of the coal still to be worked. The gangways and other openings should be driven through the faults wherever it is necessary to properly open up the workings, and the coal should be mined regularly instead of taking only the better coal first, and leaving the inferior for future operations. One of the great causes of loss of coal is the tendency to leave too small pillars which are not sufficient to sustain the pressure or crushing, thus closing off much coal that could otherwise be gotten out. In order to avoid leaving in the ground much coal that is fit for market, the breakers should be prepared to take anything the mine may send to them, and the miners should not be required to leave coal inside because it contains more slate than the breaker is able to handle without cutting down its capacity. In many cases where veins contain bands of slate they are either not worked or only those portions of the veins which are pure are taken out; that is to say, in many cases a vein containing 10 ft. of coal, interstratified with slate, will not yield more than a vein of clean coal 4 or 5 ft. thick.

A large amount of waste is due to the preparation for market. With anthracite, in order to have a good economical combustion, the pieces used in a fire should be as far as possible of about the same size. The sizes are known in the market, beginning with largest, as lump, steamboat, broken, egg, stove, chestnut, pea, buckwheat, No. 2 buckwheat or rice, and No. 3 buckwheat. Screenings made at shipping points are sold as "pea and dust," and there has already developed a large trade in what is known as culm, which is made at the mines, and includes some of the finer coals mixed with the dust.

As a general thing, much more lump, steamboat, broken, and egg are produced naturally than can be sold, and less stove and chestnut. This involves the breaking up by mechanical means of the surplus of the larger sizes. Pea, buckwheat, and the finer sizes must be sold as they are made, and it is impossible to diminish the quantity below a certain amount, dependent upon the quantity of coal broken and the method used for breaking it. These smaller sizes must therefore be sold at what they will bring, stocked, or thrown upon the dirt banks. The breaking down of the coal is one of the great causes of waste. When pieces of coal coming from the mine are of such peculiar shapes that they cannot be burned with economy or convenience they must be

broken into smaller sizes. In many mines large quantities of flat or abnormally long pieces occur which consumers will not take. A still larger portion of the coal must be broken, because it has attached to it pieces of slate or bone which renders it unfit for market. By breaking it down the objectionable parts can be removed in the preparation and a large amount of good marketable coal obtained.

Breaking up, of course, causes much loss, as the percentage of the smaller sizes, which are of much less value, and the percentage of dust, which is of no value at present, are greatly increased. Great attention should be given to the breaking of the coal. It seems to be pretty well demonstrated that less waste is caused when the coal is broken down by degrees, that is, when lump is broken to steamboat, steamboat to broken, broken to egg, etc., than when an effort is made to break down lump or steamboat directly into stove and chestnut. Careful study should in all cases be made of the way in which the particular coal breaks, and we should try to adapt the machinery to the nature of the coal. The ordinary method of breaking is by what is known as rolls. Great improvements have of late years been made in their construction. They were formerly merely cast iron cylinders, with more or less rude cast iron teeth upon them, but now they are constructed with much greater care. They are made of cast iron cylinders carefully turned, with cast steel teeth inserted in them very accurately, and great attention is paid to the form, construction, tempering, sharpening and insertion of the teeth. They are so arranged that whenever a tooth becomes dull or breaks it can be taken out. Some use fluted cast iron cylinders; that is to say, cylinders in which the teeth are continuous from one end to the other, the coal being broken very much as a man breaks a piece of chalk or a slate pencil with his two hands.

At Bernice, where the coal is very brittle, it is broken by means of chisels inserted in a head, which has an up-and-down motion very much like the hammer part of the steam-hammer, the coal passing under it. A modification of the Blake rock breaker has been used, and also a breaker constructed very much like a coffee-mill; that is, there is a funnel-shaped cavity with teeth on it in which a cone covered with teeth moves. The shaft of this cone at the lower end is in a step, or ball and socket joint, while the upper end describes a circle, so that the axis of the shaft of the cone describes a conical surface. At every colliery careful experiments should be made to determine whether the coal breaks with little or much waste.

Another great cause of waste is the screening. If the screens are overcrowded the pieces of coal abrade each other in passing through the screen. This may be diminished by making the screens shorter, taking the larger sizes out at the end, and dropping the smaller soon after the coal enters the screen. By putting two sizes of jackets upon the screen so as to make two sizes in each screen, and placing several screens under one another, each taking coal from the preceding one, waste of this kind may be diminished. In a number of collieries gyrating screens are used, in which the coal does not remain for any length of time upon the screen, and it is almost impossible for one lump to ride upon another. In the construction of breakers the waste can be very appreciably diminished by arranging the chutes in such a way that the coal does not rush down them, and that there are no drops in the chutes or into the pockets. This also applies to the running of the coal into the screens. The coal should be allowed to enter the screens as gently as possible.

A certain amount of waste is made in loading cars, and in unloading coal at the shipping points and loading it into vessels there. Especially in the West, large amounts of coal must be stocked in the dull season and picked up afterward. Enormous storage plants have been erected all over the country, and much waste is occasioned by the handling of the coal in them, particularly with the older and more primitive plants. The loss on large sizes shipped by the lakes and reshipped in cars at lake ports, amounts to from 5 to 11%; that is, there is that much pea, buckwheat, and dust made in handling the coal after it leaves the mines.

A large portion of the coal coming from the mine is either slate coal or bony coal. By slate coal is meant coal which has pieces of slate of greater or less size attached to it, which can be separated by breaking the coal into smaller pieces and subjecting it to preparation. Bony coal is coal in which the impurities are so intermingled with the coal that it is impossible to break the coal in such small pieces as to separate the impurities. Sometimes bony coal is merely coal with such a high percentage of ash as to interfere seriously with its burning. Until a comparatively recent date slate coal and bony coal were either left in the mines by not working the veins containing any large quantity of them, or by not loading anything that was of this character. Of course this involved leaving behind much good coal, or if brought out they were generally thrown on the dirt bank, except such portions as were sent to the consumer against his will. To such a great extent was this carried on that many of the old coal banks are being worked with profit yielding as high as 75% of good coal. Already some of the collieries are putting a portion of their old dirt banks through the breakers with the fresh mined coal, where they have better facilities for cleaning it. The above remarks apply, but with not so great force, to what is known as slippy (or crushed) coal.

Having thus treated the causes of waste, the report proceeds to consider how the waste can be reduced.

(To be continued.)

A Polyglot Factory.—The Committee on Information and Courtesy of the American Society of Civil Engineers are receiving kind offers of co-operation from nearly all members of the Society. One answers the query as to foreign languages at command as follows: "As for language we can welcome the representatives of Russia, Denmark, France, Sweden, Norway, Germany, Spain and Portugal in pretty stereotype speeches, and give them all information in their mother tongue besides. We also have engineers whose musical Gaelic will entertain the John Thomsons as completely as it could be done on the old sod. We also number United States in our linguistic capacity and some English."

THE STOREY "SOLENOID" ELECTRIC MOTOR.

The accompanying illustrations show an electric motor intended especially for the direct driving of machines, without the use of a countershaft. The first effort made by I. E. Storey, the inventor of this motor, was in the production of a motor for the direct driving of a mining drill in which all the ordinary disadvantages of electrical application of power were met under exceptionally difficult conditions, with the added trouble due to the extreme moisture and dirt of all kinds common to mining work. This was a success, and led to the adaptation of the principle to other lines.

The motor is a plain cylindrical machine having end projections for the boxes and commutator. The accompanying engraving, Fig. 1, shows a longitudinal section through the T-shaped pole pieces which project internally from the cylindrical portion of the machine. Fig. 2 shows a longitudinal section through the poles projecting from the end portions, Fig. 3 a cross section through the poles, and Fig. 4 a cross section through the brush holder and commutator. A in Fig. 1 represents the cross section of the cylindrical portion, as noted above, showing the two T-shaped fields. B in Fig. 2 shows the opposite field pieces carried by the cap ends. C in both drawings represents the cross section and location of the field windings. D are the bolts which are used in assembling the main portion of the magnetic fields. One of the unique features of this machine consists in the construction of the field magnets, which, as shown, present four poles so arranged that while the

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, JUNE 6TH, 1893.

- 498,755. Apparatus for Charging Gas Retorts. William Arrol and William Foulis, Glasgow, Scotland.
- 498,768. Electrolytic Apparatus. Thomas Craney, Bay City, Mich.
- 498,769. Method of Electrolyzing Salts. Thomas Craney, Bay City, Mich.
- 498,771. Electrolytic Cell. Thomas Craney, Bay City, Mich.
- 498,779. Apparatus for Stirring and Drawing Gas Retorts. William Foulis, Glasgow, Scotland.
- 498,805. Machinery for Breaking Pig Iron and Loading Same Into Wagons. Edward P. Martin, Dowlais, and Enoch James, Cardiff, England.
- 498,815. Derrick. William A. Ross, Maryville, Mo.
- 498,823. Ore Concentrator. Charles E. Seymour, Lake Geneva, Wis. Assignor to the Seymour Concentrator Company, of Illinois.
- 498,824. Brace for Dredges. Frederick J. Smith, Sheldon, Ill.
- 498,855. Apparatus for Building Tunnels. Simeon L. Morris, St. Paul, Minn., Assignor of one-half to Jason W. Wait, same place.
- 498,859. Wrought Iron or Steel Column. Niels Poulsen, Fort Hamilton, and Bette E. J. Eils, New York, N. Y.
- 498,860. Column. Niels Poulsen, Fort Hamilton, N. Y.
- 498,876. Pine Joint. Robert T. Balls, Birkenhead, Assignor to Edward William Quirk and James Sharp, Liverpool, England.
- 498,882. Naphthylene Diamine Disulpho Acid. Meinhard Hoffmann, Mainkur, near Frankfurt-on-the-Main. Assignor to Leopold Cassella & Co., Frankfurt-on-the-Main, Germany.
- 498,886. Steam Hammer. Charles Deyherle, Iron Mountain, Mo.

FIG. 1.

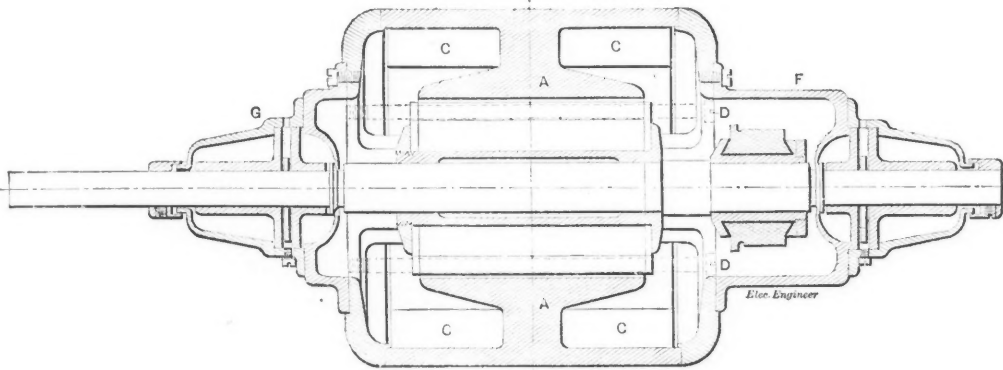


FIG. 2.

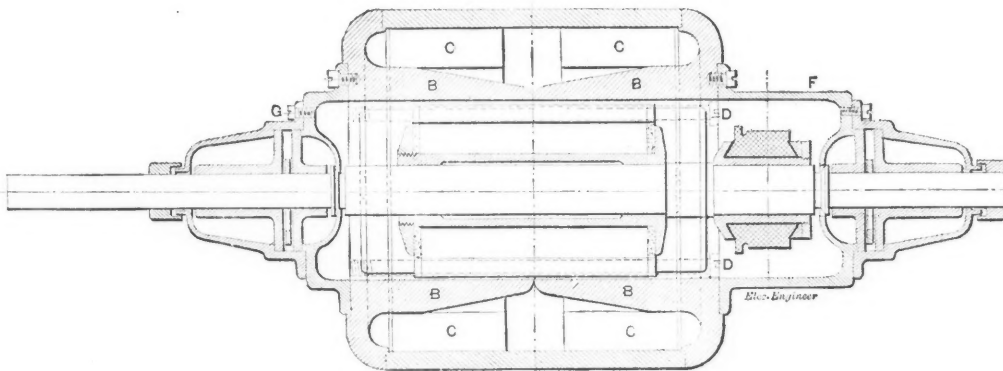


FIG. 3.

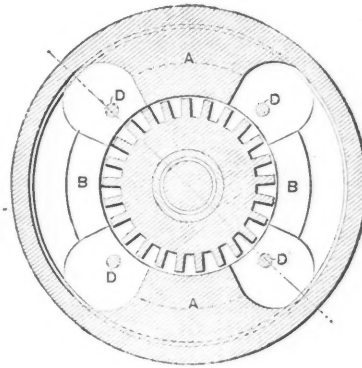
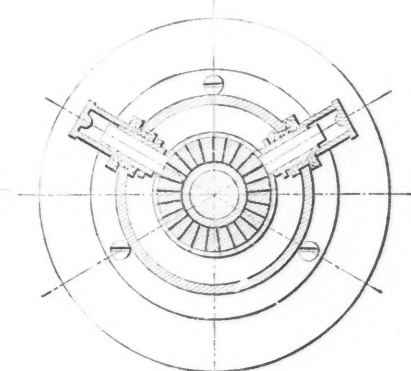


FIG. 4.



THE STOREY "SOLENOID" ELECTRIC MOTOR FOR DIRECT MACHINE DRIVING.

center of the machine is of one polarity the ends are of opposite polarity, both ends being of the same polarity. From this it will be readily seen that while this is a four-pole machine it has eight distinct magnetic circuits, making the path of the magnetic lines uncommonly short and of very low resistance, giving maximum efficiency for minimum quantity of wire. The coils C are wound on spools of size, are removed from the spools, thoroughly insulated, slipped loosely in the cylindrical chamber and occupy a position in a plane perpendicular to the center line of the shaft, being held in position by the pole pieces A and B. The armature is of the drum type, toothed. The end caps F G serve for supports, and form the outside chambers for the self-oiling bearings. The end cap F carries the brushes which are shown in Fig. 4. The bearings are of peculiar construction and are of such a design that the motor can be placed in any position as long as the center line of the shaft is horizontal, the end of caps F being protected by a cap projecting over the opening of the box, thereby rendering the boxes impervious to dust and moisture. In cases where there is much moisture these caps are replaced by stuffing boxes. From the description it will be evident that the motor is practically a hermetically-sealed machine. Thus it is protected on the outside against moisture, dust or any possible external injury, and being entirely inclosed no outside injury can possibly arise from any internal condition incident to the operation of the motor, such as burning out of armature or fields, or sparking at the brushes. The form is such that it can be easily attached to a machine without injuring its appearance.

These motors are made by the Hornell Iron Works, Hornellsville, N. Y., and the Dahl Electric Company, of New York, is agent for their sale and introduction.

- 498,918. Road Engine. William C. Oastler, New York, N. Y.
- 498,930. Metal Bending Machine. Christopher Cunningham, Brooklyn, N. Y.
- 498,938. Evaporating Apparatus. Samuel M. Lillie, Philadelphia, Pa.
- 498,957. Apparatus for Treating or Reducing Bituminous Substances. Joseph B. Jardine, San Francisco, Cal.
- 498,959. Smoke Consuming Furnace. Henry C. Metz, Cleveland, O.
- 498,978. Single Cylinder Double Acting Force Pump. William L. Hippert, Galesburg, Ill.
- 498,979. Hydraulic Amalgamator. Robert J. Kennedy, Redlands, Cal., Assignor of two-thirds to Geo. H. Crafts, same place, and George Boalich, Colton, Cal.
- 498,989. Device for Compressing Air. Thomas O. Perry, Chicago, Ill.
- 498,995. Stone-Cutter. Lamartine C. Trent, Salt Lake City, Utah, Assignor of two-thirds to William J. Chalmers and Charles S. Leeds, Chicago, Ill.
- 499,013. Pumping Engine. Harmer Denney, Brooklyn, N. Y.
- 499,018. Composition for the Purification and Separation of Metals and Alloys. John A. Frey, Milwaukee, Wis., Assignor of one-half to William J. Krause, same place.
- 499,022. Process of Forming True Sharp Corners on Metal Shapes. Frank P. Howe, Danville, Pa., Assignor to the North Branch Steel Company, same place.
- 499,040. Metal Working. Elias E. Ries, Baltimore, Md., Assignor to Ries & Henderson, same place.
- 499,042. Hydraulic Dredging Machine. John M. Robins, Fort Worth, Tex.
- 499,045. Oil Well Rig. Solomon R. Sheakley, Bradford, Pa.
- 499,056. Jacket for Retorts. William L. Teter, Philadelphia, Pa.
- 499,114. Traction Engine. Benjamin Holt, Stockton, Cal.
- 499,117. Miners' Safety Lamp. Heinrich Hübner, Hermsdorf, Germany.
- 499,120. Coal Weighing Basket. Simon Jones and Samuel B. Bishop, Hamilton, and Thomas C. du Pont, Central City, Ky.
- 499,127. Water Wheel Bucket. Ferdinand Von Leicht, Mirabel, Cal.
- 499,130. Guide for Stamp Mills. Edmund Major, Terraville, S. Dak.
- 499,131. Fuel Gas Mixer. William G. Taylor, Hullon, Assignor to the Taylor Burner Company, Limited, Pittsburg, Pa.
- 499,151. Gas Generating Apparatus. William T. Bate, Conshohocken, Pa.
- 499,157. Gas Furnace. William T. Bate, Conshohocken, Pa.
- 499,175. Spiral Conveyor. Benjamin F. Radford, Hyde Park, Mass.
- 499,178. Grading and Ditching Machine. Christopher B. Taylor, Idaho Falls, Idaho.
- 499,188. Furnace. Joseph H. Giroux, Jerome, Ariz.

## PERSONALS.

Mr. J. W. Chandler, of Boston, has been elected president of the Boston & Nova Scotia Coal Company.

Mr. Wm. Knox has severed his connection with the Broken Hill Proprietary Company New South Wales, to become managing director of the Mt. Lyell Mining Company, Tasmania.

Mr. John M. Benson, who for a number of years past has been connected with the Burden Coal mine, in the Cumberland region, has been appointed postmaster at Frostburg, Md.

Mr. Koushin, of the Russian Imperial Mining Department, has been ordered by his government to proceed to the United States to study machinery and appliances for deep boring of oil wells.

Mr. F. K. Cazin, who for the last two years has been connected with the Compania Metallurgica Mexicana, of San Luis Potosi, Mex., has resigned his position and returned to Denver, Colo.

Mr. John B. Hastings, mining engineer, of Boise City, Idaho, returned from England, June 7th, after an absence of a number of months. For the next few days Mr. Hastings will be at the Murray Hill Hotel.

Prof. A. M. Ryon has been appointed president of the Montana College of Agriculture and the Mechanic Arts, at Deer Lodge. He has been professor of engineering and mining at the college for some time past.

Col. D. H. Jackson, formerly superintendent of the Holmes Mining Company, at Candelaria, Nev., has entered into partnership, it is said, with Geo. D. Roberts and is now inspecting mines in the neighborhood of White Pine, Nev.

Mr. Trojan, engineer of the Imperial Smelting Works, at Zlatoust, has been ordered by the Minister in charge of the Russian Mining Department to proceed to Chicago, to observe and report on the progress made in metallurgy.

Messrs. Eckley B. Cox, Jr., and E. B. Ely have been admitted as members of the well known firm of Cox Brothers & Co., coal operators. Eckley B. Cox, Jr., takes the place of Alexander B. Cox and Eckley B. Cox, executors of his father, Charles B. Cox, deceased.

The re-organized staff of the Philadelphia & Reading Railroad, as lately announced, is as follows: Theodore Voorhees, first vice-president; Henry C. Drinker, assistant to the president; John Taylor, general traffic manager; H. R. Nichols, chief engineer. Mr. J. H. Jones is continued as general coal agent of the company.

James N. Stover has been appointed general manager of the Chateaugay Ore and Iron Company, of Plattsburg, N. Y., in place of A. L. Inman, resigned. Mr. Stover will also have charge of the mine and furnace of the Crown Point Iron Company, at Fort Henry. He was recently manager of the Hudson River Iron and Ore Company, at Poughkeepsie.

Mr. Adolphus Bonzano, vice-president and chief engineer of the Phoenix Bridge Company, severed his connection with the company June 1st, after having been its virtual head for more than 25 years. We understand that he expects in a short time to resume active business with other parties. Mr. John Sterling Deans, heretofore principal assistant engineer, has been appointed chief engineer of the Phoenix Bridge Company.

Mr. George Cawley, who has been chief editor and manager of London "Industries," from its first foundation, some seven years ago, has retired from that position in consequence of a change in the ownership of the paper, and has opened an office as consulting engineer in London. Mr. Cawley has made "Industries" a most excellent paper, and has established for it a place in a field which many thought was already pretty fully occupied.

The trustees who are to vote the Reading stock for seven years under the re-organization plan have been announced as follows: Joseph S. Harris, president of the company; E. P. Wilbur, president of the Lehigh Valley Company; Thomas McKean, for a number of years past a member of the board and a large holder of securities of the company; Richard C. McMurtrie, a well known corporation lawyer, of Philadelphia, and Joseph F. Sinnott, who is said to be the largest individual holder of the company's stock.

## OBITUARY.

Josiah Robbins died at Sharpsville, Pa., on June 5th, aged 65 years. He was superintendent of the Claire Furnace Company, Limited.

William S. Jacques, a well known coal dealer, of this city, formerly president of the New Central Coal Company, of Maryland, died in Brooklyn, June 2d.

Joshua Hendricks, who died suddenly at his residence, in New York, June 3d, aged 61 years, was born in the city and had lived there all his life. He was a member of the firm of Hendricks Brothers, metal merchants, which is the oldest firm in the

trade in New York, having been founded by the grandfather of the present members of the firm, in 1764. In addition to their business in New York they own a copper rolling mill, near Belleville, N. J. Mr. Hendricks left a wife and several children, and a moderate fortune.

Bard Wells, who died at Pottsville, Pa., May 29th, was still comparatively a young man. He graduated from Lafayette College, at Easton, in 1877, and after serving for a time in the Reading Coal and Iron Company, he was appointed assistant to Mr. A. W. Sheaffer, on the State Geological Survey. When Mr. Sheaffer resigned Mr. Wells succeeded him and completed the survey of the Western Middle coalfield. He resigned some years ago and opened an office in Pottsville as a mining engineer. He was for a time manager of the Bird Coal and Iron Company. He was a member of the American Institute of Mining Engineers.

## SOCIETIES AND TECHNICAL SCHOOLS.

General Mining Association of Quebec.—The quarterly meeting is to be held at Sherbrooke, July 5th; a large attendance is requested as some business of interest is to be brought up.

Mining Society of Nova Scotia.—The quarterly general meeting will be held at New Glasgow, beginning June 27th. An inspection of the coal mines and steel works in the vicinity will be a feature of the meeting.

American Society of Civil Engineers.—At the regular meeting in New York, June 7th, Mr. W. H. Jaques read a paper on the manufacture of high-power guns, with special reference to the wire-wound gun. A number of foreign engineers were present.

Engineers' Club of St. Louis.—This club has issued, in the form of a small pamphlet convenient for the pocket, a list of the engineering work in St. Louis and vicinity, which is likely to be of interest to foreign visitors. It forms a very convenient guide and handbook to the visiting engineers and will doubtless be appreciated by those who are guests of the club.

New York Railroad Club.—At the regular meeting, May 18th, the first subject for discussion was the iron-work of car trucks intended to carry heavy loads. This was followed by a discussion on steel plates, and the degree to which their strength is affected by drilling or punching. Mr. Sampson Fox, of Leeds, England, made an interesting address on the manipulation of steel.

Alabama Industrial and Scientific Society.—A regular meeting was held in Birmingham, May 30th, at which several papers were read on the manufacture of coke and the advantage secured by washing the coal. Col. T. H. Aldrich made some statements with regard to the experiments now being made by the Tennessee Coal, Iron and Railroad Company, at Bessemer, in the manufacture of steel. He said that the company, it is believed, has now succeeded in securing a pig iron sufficiently low in sulphur for the profitable manufacture of steel by the basic process. An ore concentrating plant with a capacity of 100 tons daily is being put in.

Montana School of Mines.—This institution, which is less than six years old, ranks ninth in point of attendance among the 17 mining schools in the United States, according to Prof. A. M. Ryon, in a paper read before the Montana Society of Civil Engineers. The course of instruction requires 160 weeks' work during the four years; the work being so divided that the mornings are given to recitations and the afternoons to chemical analysis, mineralogy, blow-piping and assaying, in the laboratory and to drafting and surveying in the engineering department. The institution is well supplied with laboratory and field apparatus, although space for the former is rather cramped. Mr. W. A. Clark, of Butte, recently gave \$2,000 toward a laboratory building, and this will soon be erected. Professor Ryon, who has had chief charge of the mining department for some time past, has lately been elected president.

British Iron and Steel Institute.—The spring meeting was held in London, on May 24th and 25th. Owing to the fact that the date of the meeting fell in the midst of a holiday week, the attendance was not so great as usual, and the discussions on the papers read were not particularly lively. The depressed state of the British iron and steel industries is well reflected in the facts that many members of the Institute have allowed their names to be removed from the roll and fewer new members have joined during the year. Mr. J. S. Jeans, who has held the office of secretary, resigned this position at the meeting, after a service of 16 years. After a visit to the Chicago Exhibition, he will assume the editorship of the "Engineering Review," while Mr. Bennett H. Brough, A. R. S. M., succeeds him in the secretaryship to the Institute. The proceedings on Wednesday, May 24th, commenced by the retiring president, Sir Frederiek Abel, introducing the president elect, Mr. E. Windsor Richards, of the Low Moor Iron Works, Yorkshire. At the conclusion of Mr. Richard's inaugural address, the Bessemer gold medal was presented to Mr. John Fritz, of Bethlehem, Pa. Owing to Mr. Fritz's engagements in the United States, he found it impossible to travel to London

to receive the medal in person. The ceremony was thus shorn of its interest, and the reading of papers was proceeded with almost immediately. The papers that attracted the most attention were: "The Elimination of Sulphur from Iron.—Part II," by Mr. J. E. Stead, and "The Desulphurization of Iron and Steel by the Saniter Process," by Mr. E. H. Saniter. These papers, especially the later, caused considerable discussion. Prof. Roberts Austen afterward read a communication on the "Recording Pyrometer," and Mr. John Head one entitled "Notes on Puddling Iron." Three other papers presented to the meeting were taken as read: "Methods of Determining Chromium," by Mr. J. E. Stead; "Determination of Chromium in Ferrochrome," by Mr. Wm. Galbraith; and "Basic Steel at Witkowitz," by Mr. P. Kupelwieser.

## INDUSTRIAL NOTES.

The Hubbard Iron Company, Hubbard, O., has started up its bar mill, which has been idle since November last.

The strike at Rock Hill furnace, near Huntingdon, Pa., ended June 5th, when 100 of the former employees returned to work.

The Mahoning Valley Iron Company has completed the plans for a large rolling mill in Youngstown, O., and work will soon be begun.

William Tod & Co., Youngstown, O., have a number of orders on hand for pumping machinery, blowing engines and rolling mill machinery.

The blast furnace of the Appalachian company, at Big Stone Gap, Va., has been in blast for about a year and is making 80 tons of pig iron a day.

The machinery is now being put in the South Baltimore Rolling Mill, at Curtis' Bay, Baltimore, and the mill will be ready to start up early in August.

The finishing mill of the Lookout Iron Company, at Harriman, Tenn., has been started up by the receiver, and the rest of the plant will soon be put in operation.

The Chaplin-Fulton Manufacturing Company has completed two of the largest gas regulators ever made for the Duquesne Steel Works, of the Carnegie company.

The Radford Pipe and Foundry Company, Anniston, Ala., has secured an order for pipes to go to Jerusalem. They are intended for a pipe line from that city to Jaffa.

The Maryland Steel Company, Sparrow's Point, Md., has its rail mill at work on orders from the New York, New Haven & Hartford, the Florida Central and the Aroostook railroad.

The Worcester Consolidated Street Railway Company, Worcester, Mass., has placed the contract for the new carhouse with the Berlin Iron Bridge Company, East Berlin, Conn. The new building will be 95 ft. x 290 ft., entirely of brick and iron.

The schedule filed by the assignees of the Reading Rolling Mill Company, Reading, Pa., shows assets amounting to \$537,231 and liabilities \$391,758. Of the assets about \$120,000 are in real estate and buildings; the liabilities include \$50,000 mortgages on real estate and \$214,308 in bills payable.

The Philadelphia Engineering Works, Limited, are building a cross-compound condensing engine of 1,000 nominal H. P. for the Hudson Electric Light and Power Company. The engine will have a high-pressure cylinder 26 x 50 in., and a low-pressure 50 x 50 in. The flywheel is 22 ft. in diameter, 74 in. face and weighs about 100,000 lbs.

The receivers of the firm of Cofrode & Saylor have filed a schedule of the assets and liabilities with the court. The liabilities are reported at \$620,357, of which \$49,000 are secured by mortgage on the real property; the assets are valued at \$726,402, of which \$309,260 are in real estate, \$106,500 in stocks and bonds and \$50,651 in unfinished contracts.

The new Grant Locomotive Works, in Chicago, are temporarily embarrassed, and a meeting of the stockholders has been called to devise means to tide over the present difficulties, which have, it is said, been caused by the fact that the new plant cost more than was expected in the first place, and the company was left without sufficient working capital. It is thought that an arrangement can be made without difficulty.

Advance consular information says that the depressed state of an overstocked market during the past few years has recently led to the formation of a trust by German manufacturers of enameled sheet iron. These manufacturers comprise 30 firms in Rhenish Westphalia, Saxony and southern, northern, eastern and central Germany. The avowed object of the combine is to prevent overproduction by regulating the output of each concern. The compact is to last to the end of 1895. The principal office is in Berlin, and the president, Dr. H. Claus, of Thale, is a successful inventor of various new enameling processes.

At the general meeting of the shareholders of the Aluminium-Industrie Actien Gesellschaft, at

Neuhausen, Switzerland, held May 15th a dividend of 8% was declared on the capital paid in after writing off the required amount for the reserve capital. The business of the company has been satisfactory during the last 12 months. The price of aluminium has gone down from \$6.85 to \$1.25 per kilo, but the sales have increased to four times the amount of the previous year, a proof that aluminium has become a metal of daily use and consumption. The company, having completed its new machinery and additional works, is now able to turn out three times the amount of the metal formerly made at its works.

A few months ago we noticed a new photographic paper for copying tracings, giving dark purple lines on white ground, that has been brought out in this country. A similar paper is now being placed on the market in England by Smith & Co., Manchester. This paper is manufactured under a separate patent, but its properties do not differ materially from the American paper. The paper is placed behind the tracing in the usual way, and exposed to bright sunlight; the subsequent treatment consists solely of immersion in an ordinary water bath, which produces very quickly dark purple lines on a clear white ground.

Messrs. Beaves & Stevenson, 9 Princes street, Westminster, London, England, are introducing a form of co-ordinate diagram paper that has long been required. This is a paper in which the logarithms of consecutive numbers are plotted along the two rectangular axes and the co-ordinate lines drawn accordingly. With this paper a hyperbolic curve of the general formula  $x^m y^n = \text{constant}$ , becomes a straight line, so that the plotting and drawing in of such a curve is greatly facilitated. The paper is of great use in problems connected with the expansion of steam, the discharge of water, and the construction of ships. The only reason that a paper of this sort has not been introduced before is the great mechanical difficulty of ruling lines accurately spaced to the logarithmic scale.

#### MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, he will be put in communication with the best manufacturers of the same.

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.

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.

#### GENERAL MINING NEWS.

##### ALABAMA.

###### Calhoun County.

(From our Travelling Correspondent.)

The Woodstock Iron Company's property will be sold at receiver's sale on June 24th. This property consists of four blast furnaces, ore washers and about 50,000 acres of land.

The Hercules Foundry Company, which has recently removed its works from Pell City, Ala., to Anniston, will have its plant in operation about July 1st. The stock of this company is owned chiefly by Boston capitalists. The main building of the new works is 400 x 100 ft. The capacity, 50 tons of iron per day melted in two cupolas of 25 tons capacity each. The company manufactures soil pipe and all sanitary and plumbers' supplies, so that it does not conflict or compete in any way with the Radford pipe works, at Anniston, at which are manufactured water pipes exclusively.

The United States Car Company is working regularly and employing about 500 men, the Radford pipe works about the same number, the cotton factory about 300, and several smaller foundries and machine shops swell the number of artisans to upward of 2,000, including the railroad employees.

Despite the demand for cotton ties in this section, there is only one small cotton tie plant in the South, at Rome. At Anniston is one of the best openings for such an enterprise, for it is the center of a good cotton-producing country, and at the compress only nearly 100,000 bales of cotton are handled each year.

###### Cleburne County.

(From our Travelling Correspondent.)

A great deal has been published by the local papers respecting the Eckles gold mine, or New Discovery, at it was called, near Arbacochee. The fact that four months since the tract of land on which the discovery was made was purchased for \$125, and is to-day under bond for \$50,000, created considerable excitement. The mine or prospect is on the top of one of the steepest mountains in the vicinity, at an elevation of nearly 300 ft. above the water level. The surface indications show no outcrop or sign of a ledge or deposit, but by prospecting from a small branch, where colors were panned from the gravel, toward the northeast, it was found that for a distance of about 1,800 ft., or diagonally across a 40-acre tract, the surface soil panned showing good prospects. Near the north-

east corner of the tract, the prospector crossed the ground that panned the best, by a trench or open cut on the summit of the mountain, 74 ft. in length; in doing this work, which is about 12 ft. deep, several stringers of quartz were encountered, and slate ledges that had all the characteristics of being the walls of a vein were exposed 50 ft. apart; the inclosed or vein matter being soil of a reddish color and stringers of decomposed quartz carrying a heavy percentage of garnets and micaceous matter of a bronze color. This entire 50 ft. prospected at places very rich and of an average value of about \$10 a ton. From the exposure at this cross-cut it would appear as a placer deposit or hill diggings, but as work has been continued, the quartz predominates and is of a harder nature. A shaft sunk 40 ft. deep comprises the workings at present, with a cross-cut started at the bottom. Investigation proved that the footwall, which the shaft followed, dips nearly vertical for 36 ft., then at an angle of about 40° toward the south. In running the cross-cut at this depth the vein matter shows a greater percentage of quartz and less soil or clay; the seams or stringers of quartz, carrying the same characteristics as those in the surface cross-cut, have increased in width or thickness from an inch or two to nearly a foot, and show every evidence of ultimately forming one solid ore body. This cross-cut had only been run about 7 ft. at the time of my visit, but the intention is to continue the work until the hanging wall as it appears in the surface, cut is encountered. An average sample of the walls of this lower tunnel, also face and floor, taken in my presence, showed good results from panning, and somewhat richer than an average from the surface cross-cut. The presence of graphite is easily discernible in the ore from this property, as it is in all ore from these Cleburne County mines. This ledge of pay dirt has not only been traced across one 40-acre tract, but into the adjoining tracts on the northeast and southwest, as the prospect holes demonstrate, thereby proving the continuity of the vein in length, but as yet its thickness is undetermined, except at that point where the work described has been performed. This property would certainly prove valuable for hydraulic mining if sufficient water can be obtained, a question interested parties are now investigating; springs and creeks exist carrying considerable water at the north and south sides of the base of the mountain, but whether in sufficient quantity to be carried a quarter of a mile, as would be necessary, and furnish sufficient for hydraulic mining on a profitable basis has not been determined. The ore body as at present exposed would pay if mined by this method, otherwise the question of treatment has not been decided on. The gold is very fine and the appearance of the ore body, its character, average grade and general course of the strike of the vein would indicate that it belonged to the same ledge as the Wise mine, located about nine miles to the northeast and described in the "Engineering and Mining Journal" of May 27th.

###### Jefferson County.

Mary Lee Coal and Railroad Company.—This company's mines are at Lewisburg, six miles north of Birmingham, on the edge of the Warrior coalfield. The company has a very complete plant for breaking and washing its coal, and is now turning out about 600 tons daily. Four tunnels have been driven, the longest being now in about 3,000 ft.

###### Walker County.

Townley Coal and Coke Company.—This company has made a contract to furnish the Memphis & Charleston Railroad with 50,000 tons of coal from the Gamble mine, the deliveries to run through the present year.

#### ARIZONA.

###### Maricopa County.

Volcanic Copper Mining and Smelting Company.—This company owns claims in the Eagle Tail mountains; the veins carry copper, gold and silver. There is said to be a number of outcrops on the property, all of which give good assays. The company is stocked for \$750,000 in shares of \$1 each. It is offering to dispose of 50,000 shares at 50c. each to provide working capital.

###### Pinal County.

Atlas.—This copper mine is now being examined by Cincinnati people. It has been idle for the past three years.

Mammoth Gold Mining Company, Limited.—The cave, which recently occurred on this property, was not so serious as was at first reported, and the loss to the mine is trifling.

Mohawk.—This mine is being exploited by Connecticut parties. A mill run of 50 tons of ore has been made at the mill of the Mammoth Mining Company.

###### Yuma County.

(Reported for the "Engineering and Mining Journal.")

Bonanza.—The owners of this property, at Harqua Hala, are said to be somewhat indignant over the frequent newspaper reports that this property has been sold. The mine is for sale, however, and has recently been examined by Messrs. Bratnaber & Wartenweiler, who were the successful promoters of the Elkhorn and De Lamar mines.

#### ARKANSAS.

###### Sebastian County.

Kansas & Texas Coal Company.—This company is putting new machinery in its mine at Hunting-

ton. In addition to the hoisting engines and other machinery it is about to put in a plant for manufacturing coal bricks from slack and coal dust.

#### CALIFORNIA.

###### Calaveras County.

(From our Special Correspondent.)

Pioneer Gravel Mine, Railroad Flat.—The product of this property continues to be regular, and encouraging on that account. The channel ranges from 45 to 90 ft. wide, with gravel ranging from 2 to 10 ft. deep. The gold is coarse, the largest nugget found being valued at \$86. The last run of 40 days with only two men working, \$700, was cleaned up, not including a quantity of rich quartz. Unfortunately water is not plentiful, it only being available during and after rains.

###### Fresno County.

(Reported for the "Engineering and Mining Journal.")

Waterloo.—It is said that New York parties are now attempting to float this mine. This mine was in the market for a long time at \$23,000. At this figure it was bonded to a firm of the name of Holcomb, Beam & Bailey. These people claim to have spent \$20,000, but on the other hand it is claimed that they paid out only \$1,050 and still owe some \$12,000 on the purchase of the property. The former owner of the property was named Lambert, and Eastern vendors are E. W. Dodge, of West Gardiner, Mass., and T. McDonald, of New York. The New York address of these people is given as the corner of Exchange Place and Newstreet, and a second address at 83 Butler street, Brooklyn. It is said that great efforts are being made to float this stock in large blocks in the Eastern States, but it is believed in California that a considerable amount of money will have to be expended on the property before it can be worked successfully, if at all.

###### Mono County.

(Reported for the "Engineering and Mining Journal.")

Jackson & Lake View Mines.—A 10-stamp mill is at work on this mine, which has a ledge 18 in. to 2 ft. wide of good grade gold ore, at Lundy, 20 miles south of Bodie.

###### Nevada County.

Banner.—This mine is looking well, and it is thought that a mill will be built on it.

Champion Mining Company.—This company paid a dividend on the 15th inst. of 10c. per share.

Imperial Paint and Copper Mining Company.—New furnaces are being built on this company's property at Spenceville, and work is being pushed with considerable activity.

Live Oak.—A rich strike is said to have been made in this property.

Manzanita.—The gravel in the tunnel is improving in quality and the mine is looking better than at any time since it has been under the present management.

Orleans.—This mine, which has lain idle for a number of years, is now being worked. The rock milled runs from \$50 to \$90 per ton.

Reward Mining Company.—A contract to sink a shaft 100 ft. deep for this company has been let.

Providence Mining Company.—The mill has been repaired and is now running 30 stamps. New chlorination works have been built.

(Reported for the "Engineering and Mining Journal.")

Considerable interest is being taken in the old mines of Grass Valley at the present time. One of the latest incorporations is the Emmett Mining Company, of New York, which has purchased the Sunbeam mine, adjoining properties which it already owned. The company has let a contract to run a tunnel to tap the vein at a depth of 300 ft. The mine is on the same ridge as the Seven-Thirty, which has been producing rich ore of late.

###### Placer County.

Mayflower Drift Gravel Mining Company.—A boring machine for prospecting has been put in operation on this property. It is said to be similar to those used for the oil wells.

###### San Bernardino County.

(From our Special Correspondent.)

The camp of Vanderbilt continues to grow, there being about 800 men now engaged in the vicinity. J. Taggart and partners, who sold the claims to Mackay & Flood, are taking out \$500 per day from the Gold Bonanza, and are said to have refused \$50,000 for the property. They have a contract to take out 1,000 tons of second-class ore for the Needles reduction furnace. The branch railroad from Goffs, which is being pushed with a large force of men, will live the camp and then Mackay and his associates will erect reduction works.

###### San Diego County.

Sanford.—A rich strike has been made in this mine at Ferris. It is said the owners have refused an offer of \$150,000 for this property.

West Harmony.—Everything at this property is progressing finely. Five stamps are to be added to the 10-stamp mill.

###### Shasta County.

Gladstone Mining Company.—The mill crushes about 1,700 tons of ore per month. A number of improvements, such as the erection of a chlorination plant and the addition of 10 stamps are contemplated. There is some \$25,000 in sulphurets on hand. Since this property has been opened up some 45,000 tons of ore have been crushed.

Iron Mountain Mining Company.—Some repairs are being made in the mill, it is said, with the intention of starting up.

New London.—It is stated that this mine has been sold to San Francisco parties, and that new machinery will be put up. It was on this property that Messrs. Martin & Ballard made a failure, after expending a considerable amount of money.

#### Tuolumne County.

Platt & Gilson Mine.—This property has been sold to Messrs. John Wood & Leitchman for \$3,000. Over \$150,000 has been expended in the development of the mine without success.

(Reported for the "Engineering and Mining Journal.")

Raw Hide.—This property which was unsuccessfully worked by an incorporated company is now being worked to a profit by W. A. Nevills, of Angel's Camp, Calaveras County. He purchased the property for \$15,000 in conjunction with Mr. Martin, of Martin & Ballard, the original owners of the Copper Queen Mine, of Arizona. The present owners have done a considerable amount of development work. Expenses so far have been paid by the ore taken out in sinking, and enough has been earned to put up hoisting works and a 40-stamp mill.

(From our Special Correspondent.)

Consolidated Golden Gate Quartz and Golden Gate Sulphuret Mines.—The suit of E. C. Loftus vs. J. A. Fischer, involving the ownership of several thousand shares of stock, has been on trial before Judge Hebbard, in the Superior Court, at San Francisco, this week. Loftus, in the first instance, sought to enjoin Fischer from selling stock owned by the complainant inasmuch as it was sought by those means to force him from out the corporation. The claims in question were purchased January, 1889, by Loftus, Fischer and W. Long, the stock being allotted three-eighths to Loftus, the same proportion to Long and one-quarter to Fischer. The last named was given charge of the books of the company, and Loftus was made superintendent. Charges of swindling were preferred, one C. J. Behlon, a capitalist who was brought into the corporation for the purpose of financial aid, being particularly mentioned. Behlon is said to have advanced \$43,000, besides \$20,000 raised on notes, and Fischer was charged with having defrauded him by issuing him stock in another company than that for which he raised the money. Loftus charged, finally, that Fischer frightened Behlon so badly regarding the condition and prospects of the mines that he sold out to Fischer for \$30,000, taking his note for that amount. At this very time Fischer is alleged to have been in negotiation with Messrs. Hayward and Hobart to sell the company's interest for \$300,000. Judge Hebbard rendered a decision for the defendant. A receiver has already been appointed for the property on an application made in this county.

#### COLORADO.

##### Coal.

The strike in the coal mines of the Atchison, Topeka & Santa Fe Railway Company, which was started in Kansas, May 19th, has spread to Missouri and Indian Territory. It is now expected to affect the company's coal properties in Colorado. In Colorado the company owns the Rocky Valley and the Brookside mines, near Canon City, which have an output of 2,500 tons daily. Near Trinidad, it owns mines and manufactures coke; it has an output of 2,000 tons per day. In Garfield County, it has an output of 300 tons. All told, the company employs 3,500 men in its Colorado coal mines. The trouble arose from the refusal of the mine owners to accept the scale drawn up by the workmen, which called for the payment of 75c. per ton for mining in winter and 62½c. in summer. The proprietors offered to pay 53c. in winter and 47½c. in summer.

#### Clear Creek County.

The following mine owners, in the Yankee Hill district, which is situated between Clear Creek and Gilpin counties, have guaranteed to supply a constant quantity of ore if stamp mills are erected: Kretz & Cheney estimate they can supply 30 stamps; Morehead & Keble, 15 stamps; Utley & Joyce, 10 stamps; Hawkes Bros., 10 stamps; and in addition to this there are a number who will contract for 5 stamps. Messrs. Kretz & Cheney have offered to guarantee water power and a mill site to anyone who will build a 50-stamp mill.

#### Eagle County.

Considerable work is being done on the placer mines in this county. It is said that the developments are proving very encouraging, the gravel running from 20 to 40c. per cu. yd. Before long, it is thought a number of hydraulic plants will be in operation.

#### El Paso County.

Victor Gold Mining Company.—The agent of this company, writing from Barry, under date of May 26th, says: The shaft has gone down about 10 ft., but has now been stopped for a time, to drive another level 60 ft. below the third or bottom level. The vein in the bottom is as good as ever. The upraise has been started from the third level west to connect with the one above it at a point 90 ft. from the shaft. We had some very high grade ore here. Stopping has been commenced between the second and third levels east, and a quantity of good ore is being extracted. The second level to the east is showing up splendidly, there being

about 2 ft. of shipping ore now in the breast of the drift. There is nothing new in the first and second levels; ore is being taken out as usual. The new plant of machinery has not been started yet, but it is all in place, and will soon be at work. A telegram dated May 30th says: The net receipts for May are \$20,700. We have shipped about the same quantity of ore for May, of about the same valuation.

#### Gilpin County.

Argyle Mining Company.—The management of this company is changed. The mine is said to be in good condition; the ore bodies were opened up show from 3 to 4 ft. of milling ore, and 6 in. to 1 ft. of smelting ore. The property has paid a number of dividends. Its production from the date of discovery has been \$350,000. Last year's output was \$120,000.

Black Hawk.—It is stated that a pyritical smelting plant will be built at Black Hawk, by Professor Bartlett, who has lately been making a series of experiments.

#### Gunnison County.

Milwaukee.—The shaft is down 60 ft. and has encountered the contact. Three or four feet of carbonate ore have been opened up.

#### Lake County.

(Reported for the "Engineering and Mining Journal.")

Leadville Consolidated Mining Company.—The annual meeting of the stockholders of this company was held in New York City on May 20th. The treasurer's report shows that the company has \$9,010.48 cash on hand, with every bill and claim paid. The company has also an asset of \$6,800, but it is very doubtful whether any more can ever be realized from it. The returns for April were \$2,288.78 (of which \$1,200 was from the sale of boilers), as against \$4,216 for March. Of the April returns, \$878 went to the lessees, and of the March, \$3,424. The April output was low by reason of the usual spring floods. The committee appointed at the last meeting of the trustees reported that it had found the company's property at Leadville being thoroughly worked by the lessees. An ore body, the extent of which has not yet been ascertained, but which yields 200 oz. to the ton, has been encountered. The following trustees were elected: Peter A. Hegeman, W. H. Dike, Sheppard Knapp, R. C. Shannon, Eugene F. Daly, Edward L. Morris and C. A. Cameron. The old officers were re-elected at a subsequent meeting of the board of trustees, as follows: President, Peter A. Hegeman; vice-president, W. H. Dike; secretary and treasurer, C. A. Cameron.

(From our Special Correspondent.)

Black Prince.—It is reported that, as soon as arrangements can be completed, this mine will be vigorously worked.

Capital.—An important strike has been made in this mine, the property of the Clipper Mining Company. In May sinking was resumed in the Capital shaft. Only recently a drift was started which, after going in 65 ft., has broken into a fine body of iron ore. It will be several days before the full extent of the strike can be ascertained, but from all appearances it is a good one. This adds another mine to the city group and makes the strike of double importance, as it occurred in the extreme northern limit of the Leadville basin.

Grey Eagle.—A new body of ore assays, from which return 20% lead and 42 oz. silver, has been met with, and shipments from this will commence at once. In the upper levels the usual amount of carbonate ore is being taken out.

Lee Basin.—Negotiations to lease this mine are now going on; also for leases on the Quadrilateral, Denver City and Shamus O'Brien claims. These mines all lie in the very heart of the great ore zone of Fryer Hill, and the existence of ore bodies in this ground is known. The big flow of water has caused them to lie idle, but now that the El Paso is pumping in that section the water has been considerably lowered. Work on the Lee Basin and the other group mentioned will be an important enterprise for this camp.

Pennsylvania.—This mine, located at the head of Snake River, south of here, and owned by a large English syndicate, has recently been started up. The mineral taken out is said to be quite rich and shipments will average 50 tons daily.

Solix Tilee.—In this mine, located at Granite, the gold district of this county, a very rich strike was made this week. The property was recently leased for five years and the new lessees, after following the seam 20 ft., struck the pay streak; this has been gone in on some 30 ft., and is constantly growing richer. Last week a winze was sunk for 13 ft. on the vein with no bottom yet showing. The ore is wonderfully rich, the lessees believing that average shipments will not run less than 100 oz. gold to the ton.

Star of Hope.—The ore bins at this property are filled and shipments of iron are now made regularly of 60 tons daily. This body of argentiferous iron ore found in the north drift is of great size, streaks of good carbonate are being met with, and it is thought that a good carbonate ore body lies above the present workings.

Tiger.—Judge Dickson this week decided the case of Jennie A. Fisher and Nicholas Finney as Trustees vs. G. M. Seymour et al. in favor of the defendants. This settles the title to the Tiger lode, a well known property of this camp, which has been in dispute since August, 1881.

#### Ouray County.

American Girl.—From \$75,000 to \$100,000 has been spent in development work on this property. It is expected that high-grade galena ore will be shipped soon. The last shipment averaged 80 oz. silver and 35% lead.

American Nettle.—A tunnel 2,000 ft. long will be run, it is said, to cut the American Nettle ore body and the same body in an adjoining property, belonging to Walter H. Bruce, former superintendent of the American Nettle.

Calliope Mining Company.—The Denver "Mining Industry and Tradesman" characterizes the management and promotion of this company by D. C. Hartwell and E. J. Bent as fraudulent in the extreme. This company has declared dividends of \$10,000 a month, but it appears has paid this dividend on a small portion of the stock and that held by outsiders. Property which belonged to other companies has been claimed by the managers of this, and now the stockholders find that they have no interest in the mine in which they invested. The "Mining Industry and Tradesman" winds up by saying: "If the entire history of mining swindles can show more positive proof of perjury, falsehood, false pretense and better evidence of a conspiracy to cheat and defraud the public we have never heard nor read of it."

Iowa Chief Mining Company.—A rich strike is said to have been made in this mine.

Saratoga Mining Company.—It is said that the lixiviation plant on this property, which has been shut down for over two years, and which has never in reality been in active operation, will be started shortly. The mill is expected to treat 75 tons daily.

#### Pitkin County.

Della S.—The incline shaft is down 120 ft., and will be sunk to the 700-ft. level.

Mono Mining Company.—The 10-stamp cyanide mill on this property has started operations.

#### FLORIDA.

The total shipments of phosphates from Fernandina in May were 16,227 tons.

#### Marion County.

Foots Commercial Phosphate Company.—The new plant of this company was started up May 22d, and is now in full operation. The plant includes a washer of a new patent invented by Mr. Mayfield, of Orlando.

Bonnie May.—This company and the Oriole have been consolidated and arrangements are being made to put in a new plant of large capacity.

#### IDAHO.

##### Alturas County.

The miners in the vicinity of Hailey have signed an agreement that should silver sell at less than \$0c. per oz., wages will be cut 50c. per day, all round. If, however, it sells above \$0c. per oz., wages will remain as at present, \$4, \$3.50, \$3 and \$2.50 per day, according to the class of labor.

#### ILLINOIS.

Coreto Mining Company.—This company has filed articles of incorporation for the purpose of conducting mining and milling operations; the office is in East St. Louis, and the incorporators are E. F. Williams, J. C. Roberts, George W. Wilson and T. R. Johnston.

McKay Lead and Zinc Company.—This company has filed articles of incorporation to operate lead and zinc mines. The capital stock is \$50,000; the incorporators are: F. M. Bradshaw, H. Ferbrach and F. L. Warner; the office is in Chicago.

Stonington Coal Company.—This company filed articles of incorporation to operate a coal mine in Stonington, Christian County; the incorporators are Cornelius Drake, Theodore F. Baxter and R. W. Covington, and the capital stock is \$50,000.

#### MICHIGAN.

##### Copper.

Arnold Mining Company.—The directors of this company have called for an assessment of 50c. per share, payable June 15th, to stockholders of record June 10th. A circular will issue shortly explaining the exact situation. The mine has no debt, but the funds from the last assessment have been exhausted and more money is needed to push further work. The shaft is down 500 ft., and Captain Moyle, who is in Boston, is quoted as saying that he will double the present force of workmen.

Calumet & Hecla Mining Company.—According to the Marquette "Journal," two more furnaces have closed down at the Calumet & Hecla smelting works and the cupola closes down for three weeks.

Centennial Mining Company.—The ground in No. 1 shaft, on the Oseola lode, during the past few days has made a notable improvement, says the Houghton "Gazette." The lode is the full width of the shaft, and how much wider is not known, as the footwall has not been seen. This shaft is down nearly 300 ft.

Quincy Mining Company.—The Quincy mine produced 700 tons of mineral for May, the same as for April, but against 500½ tons for May, 1892. This makes 3,439 tons produced for five months, against 2,502 tons last year, an increase of 937 tons.

The annual meeting of the company was held in this city on May 7th, and resulted in the re-election of the old officers, as follows: President, Thomas F. Mason; vice-president, T. Henry Mason; secretary and treasurer, William R. Todd; directors, Thomas F. Mason, Nathan H. Daniels, Edwin Rice, T. Henry Mason and Samuel B. Harris. An abstract of the annual report for 1892 appears elsewhere in this issue.

**Wolverine Mining Company.**—This company's output for May was 47 tons 865 lbs. The mine did not start up until May 10th, so that a full month's work was not done.

**Iron—Gogebic Range.**

**Comet.**—At this mine the pumps have been taken up and the boiler fires extinguished. According to the local papers the indications are that operations will be suspended during the entire season. The mine employs from 80 to 100 men.

**Iron—Menominee Range.**

**Chapin.**—At this mine, shipments last week were limited owing to the damage done to the docks at Ashtabula, by the late storm. The docks at Escanaba becoming full, loading from stockpiles had to be discontinued. About 1,200 men are now employed. The new pump is doing satisfactory duty, raising easily about 1,500 gals. per minute to the surface.

**Pewabic.**—At this mine, according to the Norway "Current," about 17,000 tons of ore were mined in May. The new shaft is down about 260 ft. and lacks about 80 ft. to connect with the first level from No. 1. The foundations for the new machinery, which is expected to arrive within a few weeks, are being put in.

**MINNESOTA.**

**Iron—Vermilion Range.**

**Chandler.**—The dock agent at Two Harbors reports that up to May 30th, this mine has shipped this season 37,864 tons.

**Minnesota Iron Company.**—The dock agent at Two Harbors reports that this company has shipped 33,316 tons this season up to May 30th.

**MISSOURI.**

**Jasper County.**

(From our Special Correspondent.)

Joplin, June 5.

The coal strike is still on, and the results are beginning to tell on the lead and zinc mines of this district. Should the coal miners hold out two or three weeks longer and cause the zinc smelters to stop, this would force most of the mines to close down, and they would soon fill up with water, and they could only be drained at a great expense, so that the outlook for the future of the lead and zinc mines is anything but encouraging. The zinc ore market for two weeks has been at an average of \$20 per ton. Lead ore has ranged from \$21 to \$21.50 per thousand. Following are the sales of ore from the different camps for the past two weeks: Joplin mines, 3,056,560 lbs. zinc ore and 544,270 lead, value \$42,450; Webb City mines, 1,052,950 lbs. zinc ore and 67,220 lead, value \$11,979; Cartersville mines, 2,966,310 lbs. zinc ore and 95,970 lead, value \$34,847; Zincite mines, 224,400 lbs. zinc ore and 5,440 lead, value \$2,421; Oronogo mines, 14,300 lbs. zinc ore and 128,440 lead, value \$2,938; Wentworth mines, 47,650 lbs. zinc ore, value \$487; Springfield mines, 120,000 lbs. zinc ore and 20,000 lead, value \$1,757; Galena, Kan., mines, 3,195,000 lbs. zinc ore and 1,090,400 lead, value \$52,538; district's total value for the past two weeks, \$149,417. This is a great falling off from what should be produced, but it is a fact that many of the large producers are either closed down or only keeping the pumps running and taking out enough of ore to pay expenses.

**MONTANA.**

**Deer Lodge County.**

**Oro Mining Company.**—The tunnel is in 160 ft., and the vein on the face is said to be 4 ft. wide, of a good grade of gold ore.

**Granite Mountain Mining Company.**—The drainage tunnel started about two years ago is now 4,500 ft. long, about half the contemplated length. It will be two years before it is finished.

**Hope Mining Company.**—It is said that the body of ore on this property which has enabled it during the past 18 months to make a better record than at any period during the history of the mine is now nearly exhausted.

**Jefferson County.**

**Diamond Hill.**—This mine is said to have been sold for \$90,000 to New York people.

**Minnie Moore.**—This property has been bonded by Duluth and St. Paul capitalists for \$80,000.

**Park County.**

(Reported for the "Engineering and Mining Journal.")

For the following information concerning mines in the vicinity of Cook City we are indebted to Mr. James Ennis, Cook City, Park County, Mont.: Cook City is situated nearly at the head of Soda Butte Creek; Republic Mountain is on the south, and Henderson Mountain on the north. Operations were commenced here by George O. Eaton, in the fall of 1882, and about \$282,000 was expended in building a smelter and developing the mine. The works ran for a portion of two seasons, but are now idle. The ore of the mine is galena, carrying some \$40 per ton silver.

The work in this district, although the claims are promising, has been impaired by the fact that the camp is 60 miles from the railroad, and to build to it it would be necessary to cross the Yellowstone Park. There has been a bill before Congress, as is well known, to segregate a strip of the northeast side of the park, up the Yellowstone River, and East as far as the Lamar River, then up Soda Butte Creek. The widest portion of this strip of land is nine miles, and the narrowest one mile, and it is 40 miles long. It is said there is not much game or scenery on this, and the miners of Cook City feel injured that progress at this promising mining camp should be retarded by the government.

**Alice E.**—This mine is situated on the south side of Henderson Mountain, and is owned by an Indiana company. It has been leased by a company known as the Henderson Mountain Mining and Milling Company, which erected a cyanide mill in 1892, with a capacity of 56 tons daily. This mill started up on January 15th, 1893, and was run continuously until the end of March, when the company had to put in a new drier. The cyanide process was said to be a success, and we are informed that a percentage of both metals was saved. The mill is expected to start up again about July 1st. In the vicinity of this mine are the Miners' Delight, the Unicorn and the Wisconsin. In addition to this there are other mines which have had various amounts of development work done on them costing from \$10,000 to \$15,000.

**Daisy.**—Some \$8,000 has been expended in developing this mine, on Henderson Mountain. The ore carries gold and silver, and while specimens have run as high as \$600 per ton the average is said to be \$50.

**Homestake.**—This mine is situated on Henderson Mountain, in the New World mining district. Some \$10,000 has been expended in developing the property, on which there are 536 ft. of tunnels. The ore carries both gold and silver and is said to assay \$60 per ton.

**NEVADA.**

**Eureka County.**

(From our Special Correspondent.)

**Eureka & Palisade Railroad Company, Eureka.**—During the month of May this company received in transit to Salt Lake City, Utah, and Vallejo Junction, Cal., 2,226 tons of ore, 2,113 tons of which came from the mines of Eureka district, as follows: From the Diamond mine, 1,144 tons; Eureka Consolidated mine, 381 tons; Jackson mine, 174 tons; Richmond mine, 134 tons; Hamburg mine, 110 tons; Phenix mine, 61 tons; Dunderberg mine, 31 tons; Bullwhacker mine, 15 tons; Williamsburgh mine, 15 tons; Delaware mine, 13 tons; Ethel mine, 11 tons; Rescue mine, 11 tons, and sundry lots 13 tons.

**Storey County.**

**Belcher Mining Company.**—During the past week 54 tons of low-grade ore have been hoisted.

**Belcher Mining Company.**—During the week 49 tons of fair grade ore have been hoisted.

**Crown Point Mining Company.**—Drifting north from the west cross-cut, 150 ft. south of the shaft, the vein is 3 ft. wide of quartz with some pay ore. On the 1,100-ft. level there is a streak of milling ore 3 to 4 ft. wide. During the week 253 tons were sent to the Mexican mill.

**Justice Mining Company.**—On the south drift from the north stope on the 822 level the vein is 3 ft. wide in the face. The car samples run about \$20 per ton.

**Justice Mining Company.**—The vein on the south drift of the north stope on the 822-ft. level is 3 ft. wide in the face. The ore assays from \$15 to \$20 per ton. Ten tons of ore are stoped daily from this level, the average value of which is \$20 per ton.

**Savage Mining Company.**—Some high-grade ore is being extracted from the tenth and eleventh floors, on the 1,100-ft. level, as well as from the second floor; 124 tons of ore have been hoisted during the week from this level, with an average assay of \$21.44.

**Savage Mining Company.**—On the 1,100-ft. level, in the east cross-cut, from the south drift, according to the last weekly letter, some fair ore is being under-stoped, as well as some fair grade ore from the second, tenth and eleventh floors. Seventy-six cars of ore with an average assay value, according to the car samples, of \$30.14, were hoisted during the week from this level.

**Storey County—Comstock Lode.**

(From our Special Correspondent.)

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

Mines.	Tons Hoist'd.	Car Sample Assay.	Tons Mill'd.	Av. Bat'ry Assay.	Bullion for Week.	Bullion Shipped.
Belcher...	149	...	...	...	...	...
C. C. & Va.	225	\$36.65	190	\$23.38	...	\$21,134.04
Crown Pt.	...	...	253	20.96	...	\$190%
Kentuck..	21	30.00	...	...	...	...
Potosi....	545	25.44	525	25.00	...	\$418
Savage....	476	30.14	...	...	...	...

<sup>1</sup>Fair grade ore. <sup>2</sup>Total amount on May account \$36,475.23. <sup>3</sup>Crude Bullion. <sup>4</sup>Cars.

**Consolidated California & Virginia Mining Company.**—The bullion statement for May shows that there were worked at the Morgan mill 1,836 tons of ore. The bullion produced was as follows: Gold, \$16,773; silver, \$19,702; total, \$36,475. The yield in bullion per ton was: Gold, \$9.13; silver, \$9.86; assay value per ton per battery samples: Gold, \$10.01; silver, \$13.05; total, \$23.06.

**White Pine County.**

(From our Special Correspondent.)

**White Pine District.**—During the month of May the following shipments of ore were consigned to the Selby works, in California: C. A. Mathewson, 18 tons; Thos. Cornell, 45 tons, and Zoduni Bros., 50 tons; total, 113 tons.

**NEW MEXICO.**

**Socorro County.**

**Graphic.**—This mine, which has produced \$200,000, has been sold to Terre Haute, Ind., and Philadelphia parties; the consideration is said to be \$90,000. The ore is a high-grade silver and lead.

**OHIO.**

**Hancock County.**

Press dispatches from Findlay announces that on the 5th inst. the city drilled in a 20,000,000-ft. gas well on the Creighton farm, five miles east of the city. When the gas was struck the flow was so strong that the tools were blown out of the well. An effort to shut the well in failed, and tubing was blown higher than the derrick. This well is said to outrival the famous Karg, and the roar of the escaping gas can be heard for five miles.

**Summit County.**

**Wagoner Coal Mine.**—This mine has now a considerable force at work sinking the shafts. The main shaft recently struck water and work had to be stopped until pumps could be put in.

**Jefferson County.**

**Steubenville Coal and Mining Company.**—This company has worked out all the coal in the first seam and is now at work sinking the main shaft down to the next vein, which borings have shown will be found at a depth of 40 ft. below the old vein. A larger hoisting engine and other plant is being put in.

**OREGON.**

**Baker County.**

**Bonanza Mining Company.**—The vein on this property is 2 ft. wide and averages \$50 per ton, and very rich ore is being extracted now. The mine is easily worked, and makes but little water.

**PENNSYLVANIA.**

**Anthracite Coal.**

**Kingston Coal Company.**—The new directors of this company are as follows: Directors, Daniel Edwards, John C. Bullitt, Edmund P. Dwight, T. L. Newell and W. L. Chamberlain. Officers, Daniel Edwards, president; W. B. Chamberlin, treasurer, and Elliot R. Morgau, secretary.

**Patterson.**—According to a press dispatch from Mt. Carmel, 800 miners struck at the Patterson colliery June 7th, against the system of docking in use at that mine. It is the rule to suspend for a week every miner who sends to the surface a certain percentage of slate with a car of coal. A repetition of the offense brings a discharge.

**Bituminous Coal.**

**Clearfield & Mahoning Railway.**—This railway, extending from Clearfield to Dubois, a distance of 25 miles, through some of the most valuable coal-fields of Pennsylvania, was opened to the public on June 5th.

**SOUTH DAKOTA.**

**Custer County.**

**Spokane.**—The sale of this property has fallen through. The mine workings consist of a shaft 160 ft. deep with a number of cross-cuts to the vein. The vein is said to be of good grade silver-lead ore. The shaft will be sunk to the 200-ft. level probably.

**Lawrence County.**

**Keystone Mining Company.**—The mill is running steadily, and crushes from 120 to 140 tons daily. The mine is looking well with a large quantity of ore in sight; the vein is 40 ft. wide.

**Pennington County.**

**Black Hills Mining and Milling Co.**—This property has been attached by the First National Bank of Rapid City, which is a creditor to the extent of \$10,000 or \$12,000. No wages have been paid for some time, and the failure is due, according to the "Black Hills Times," to a lack of metallurgical ability as well as mismanagement.

**Black Hills Mining Company.**—The chlorination plant of this company started operations on May 25th. There is enough ore on hand to keep the plant running for several months.

**TENNESSEE.**

**Anderson County.**

**Tennessee Coal and Mining Company.**—The property of this company, at Bricerville and Knoxville, Tenn., was sold May 25th, for the purpose of winding up the company's affairs. The Knoxville property was bought by B. A. Jenkins, for \$5,000, and the Bricerville property, for \$25,000, by D. B. Bean.

## Washington County.

Carnegie Iron Company.—This company and the Carnegie Land Company have made an assignment to J. W. Cure. The liabilities are about \$125,000 and the assets, which include blast furnace, land, etc., are estimated at \$500,000. The trouble, it is said, was caused by the inability of the company to float an issue of bonds.

## TEXAS.

## Llano County.

Olive Iron Mine.—The Llano "News" reports that the engine, air compressor and other machinery are now in place, and active work in raising ore will soon be begun. Shaft No. 1 has been connected with No. 2 by a drift about 100 ft. long, which is in iron ore all the distance. The plant at the mine can crush and prepare for shipment nearly 1,000 tons of ore a day.

## UTAH.

## Salt Lake County.

Complaints are made in the Old Jordan mill of the rapid destruction of iron pipes due to the presence of sulphuric acid in the mine waters.

J. C. Mine.—A strike has been made in this mine. It is claimed that ore assays \$750 to the ton.

Baby McKee.—A 250-ft. tunnel has almost cut the ledge on this property.

North Last Chance.—This company is enlarging its concentrator at Bingham.

(Reported for the "Engineering and Mining Journal.")

Montezuma Mine.—This property was located in 1883, since which time considerable work has been done in the way of development. Three tunnels have been driven. The one at the top showed fine galena ore assaying 40% lead, 23 oz. silver and \$3 gold, 210 tons of which were shipped. The ore body below this tunnel level allowed the water to come in so freely that it was impossible to sink. A new tunnel was therefore driven at a lower level with good showings, cutting the vein at 20 ft. and the ore body at 110 ft. The water was found very troublesome. Three hundred and seventy-nine tons were stoped between the two levels, and the ore body was found continuous and of good quality. A winze was sunk from the lower level 30 ft. deep, but as water came in fast this work had to be abandoned. The mine then laid idle for a year, when the owners started a third tunnel on the vein from the bottom of the canyon. This tunnel was run in about 50 ft. when a shoot of fine carbonate ore was struck. This tunnel when driven in 800 ft. will strike the original shoot about 600 ft. deep on the pitch of the vein. The vein filling is blue clay and quartz. The footwall is quartzite and the hanging wall lime. The vein is from 50 to 60 ft. wide, but all the work so far done has been done on the footwall. A cross-cut to the hanging wall is now contemplated. All the ores from this property are shipped to Salt Lake City and reduced there.

The Hazel mine adjoins the Montezuma on the north and the Liberal on the south, both of which are good looking prospects. Further down the gulch, are the Amazon No. 1 and No. 2, which are working a few men with good showings.

Bingham has had a dull winter, but with spring there is considerable activity. The mines are looking well and the miners are hopeful for a bright future. The low price of silver has had to do with the dull times, and it is hoped that this troublesome question may be regulated. For our information we are indebted to Mr. W. J. Strickley, superintendent of the Montezuma mine.

## Tooele County.

(Reported for the "Engineering and Mining Journal.")

Mercur Gold Mining and Milling Company.—The manager of this company estimated that there were 160,000 tons of ore in sight on April 20th, assaying \$18 per ton, and that the cyanide mill extracted from 80% to 87% of its value. The cyanide solution is 1 1/2 of 1%. The mine is looking much better; development work is being constantly prosecuted and the plant will be increased shortly to a capacity of 200 tons daily.

## VIRGINIA.

## Craig County.

Iron Gate Iron Company.—This company has leased the old Grace furnace tract and has commenced to build a narrow-gauge road three miles long, to carry ore from the mines.

## Louisa County.

(From an Occasional Correspondent.)

The diamond drill borings on the Kent property, near Mineral City, have been so encouraging that further contracts have been let, and it is confidently expected that the continuation of the large veins on the Arminius mines will be found.

The milling plant at the Sulphur mines is again in operation and shipments are regular. Operations have again been inaugurated on the adjoining property, owned by the Virginia Pyrites Company, and a larger development is promised soon by means of the diamond drill, which will be moved there when contracts have been completed on the Kent property. The stratification of this entire section is very favorable for prospecting by means of the diamond drill, and work of this character should have been done many years ago.

A force of men are opening up a gold mine about six miles from Mineral City, and several properties in Spottsylvania County are now being prospected by new men. There is an unbroken line of gold mines from the Rappahannock River to the James River, and while too low grade for the old-fashioned methods of working they will, it is believed, be made to pay by improved processes. Some of these properties are specially adapted to working by means of steam dredges, or electrically outfitted dredges and washers.

## Wise County.

Big Stone Gap Iron Company.—The Supreme Court, at Richmond, has appointed H. C. Wood and J. K. Taggart, receivers of this company and the Big Stone Gap Improvement Company. The proceeding, it is said, is brought to secure the control of the companies for Dr. J. M. Bailey, of Bristol, Tenn., and his associates who are interested in adjoining property.

## WASHINGTON.

Kootenai Hydraulic Mining Company.—This company has about 1,000 acres of gravel averaging 50 to 100 ft. deep. It is estimated that with a ditch 5 ft. wide and 3 ft. deep, delivered on the ground with 450 ft. head, from 7,000 to 10,000 cu. yds. will be washed per day. The gravel, it is believed, will yield from 25 to 30c. per yd. Operations will be commenced in three weeks. A clean-up will not be made for several months. Meantime the work on the ditch is progressing.

## Lincoln County.

(Reported for the "Engineering and Mining Journal.")

For the following information concerning the New Egypt mining district we are indebted to Messrs. Blake, Blackburn & McCully. This district, which is 60 miles by 40 miles, is on the Spokane River, beginning 60 miles below Spokane and extending down the river to the Columbia River, lying to the south of the Indian Reservation. At Fort Spokane, near which some claims are being worked, the ores are copper, lead, silver, with a few gold veins.

## WEST VIRGINIA.

## Grant County.

Bayard Coal and Coke Company.—This company has been organized to mine coal and manufacture coke. The capital stock is \$500,000; J. W. Nihisen, president, and C. D. Coburn, superintendent.

North Branch Coal and Coke Company.—This company has been incorporated by C. Colburn, James B. Rees and James A. Millholland, of Cumberland, Md., for the purpose of mining coal and building coke ovens.

## COLORADO ORE MARKET.

## Denver.

June 3.

(From our Special Correspondent.)

For two weeks ending June 3d, there was received in this market and offered for competitive bid by the three public sampling works 740 tons of ore and concentrates. Close competition prevailed on every product, but more particularly on medium grade and heavy leads and copper ores.

No. 1. Of straight silicious ores there was sold 308 tons, which stood a treatment charge of from \$10 to \$13.50 per ton, the general average treatment charge being \$12.

No. 2. Of silicious lead ores carrying from 5% up to 15% there was sold 84 tons, which brought from 25 to 40c. per unit for the lead and stood a treatment charge of from \$8 to \$10 per ton.

No. 3. Of heavy lead ores and concentrates there was sold 249 tons running from 40% up to 70%, which sold at from 50 to 63c. per unit for the lead, nothing being deducted for treatment. These are remarkably high figures with lead only \$3.75 per hundred in New York.

No. 4. Of iron ore and concentrates (sulphides) there was sold 35 tons, which stood a treatment charge of from \$5 to \$10 per ton.

No. 5. Of copper ores (sulphide) carrying from 2% to 9%, there was sold 64 tons, the copper bringing 80c. to \$1 per unit and the treatment charges varying from \$5 to \$10 per ton.

On all of the above ores where the gold exceeded 1 oz. it was figured at \$19.50.

## MINING STOCKS.

## NEW YORK, Friday Evening, June 9.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 550, 551 and 552.]

Nothing has occurred this week in the mining stock market to modify our comments upon it published in the preceding issue of this journal. There has been the same absence of features of interest which has characterized it during the past few months. The market continues dull and depressed, which is perfectly natural considering the stringency in the money market.

The Comstocks are practically unchanged. From San Francisco come reports of improvements in

Potosi and of the usual "approaching boom." The local market has not taken much notice of these rumors. The various Comstock stocks have been in no demand to speak of. There was a sale of 100 shares of Ophir at \$1.80. Of Consolidated California & Virginia 300 shares changed hands at \$1.75 to \$1.85. Comstock tunnel stock shows sales of 2,000 shares at 9c.

The California stocks were neglected. Bodie Consolidated was traded in to the extent of 200 shares at 25c. No sales of Brunswick Consolidated were reported this week. The superintendent of the company writes as follows from Grass Valley, under date of May 31st: We have the water about controlled, still it is very quick and requires our utmost attention. This has been the worst winter we have had since 1874. There is not a mine in the Grass Valley district that can work in the bottom level. Two of the dividend payers are in a bad fix. The Omaha Consolidated is drowned out and the North Star has 300 ft. of water in the shaft. We are putting in the new hoist and hope to have it in order in a week or ten days.

Of Leadville Consolidated 400 shares were sold at 15c to 16c.

Robinson Consolidated shows sales of 200 shares at 37c. No other Colorado stock was traded in during the week.

The Victor Gold Mining Company, of Cripple Creek, Colo., has declared dividend No. 4, of 5c. per share, aggregating \$10,000. It is payable at the office of Mr. H. R. Lounsbury, No. 57 Broadway, New York City. The last two cars of ore shipped by this company brought \$3,879. The ore averaged \$205 per ton.

Deadwood Terra, which had not been traded in for a long time, this week shows a sale of 100 shares at \$1.50. Father de Smet is another Black Hills stock to show a transaction; 100 shares were sold at 15c.

There was a sale of 300 shares of Phoenix at 10c. Monte Cristo does not show any sales this week. At the close it was offered at \$2.75, with no takers.

## Boston.

June 8.

(From our Special Correspondent.)

The increased activity in copper stocks noted in my last letter after the noon hour was only temporary, the market lapsing again into extreme dullness, which has been the prevailing characteristic during the past week. The Montana stocks showed an improvement in prices during the early dealings, Boston & Montana selling up from \$20 to \$21 1/2, all of which was lost yesterday, when a block of stock was forced upon the market, part of which was sold at \$20, with recovery to-day to \$21 on sale of 300 shares. Butte & Boston advanced to \$7, but a pressure to sell it yesterday resulted in a decline of \$1 to \$6—the lowest price, if memory serves, it has touched since it was placed on the market. It sold to day at \$6 1/2.

Of the Lake Superior stocks Calumet & Hecla alone maintains its strength with sales at \$200 to \$289.

Tamarack was heavy, and considerable stock was thrown upon the market, causing a decline from \$142 to \$138, closing at the lowest price.

A lot of 50 shares of Quincy was marketed at \$112 1/2 a decline of \$2 1/4 per share from the last sale.

Oscuela dropped from \$27 to \$26 on sales of less than 500 shares.

Centennial declined to \$6 1/2 and Kearsarge from \$7 1/2 to \$6 1/2 on small sales.

Atlantic sold at \$7, same as before, and Wolverine at \$2, a decline of 1/2.

A small sale of Tamaracks is recorded at \$15, a decline of \$1.

Santa Fé sold at 2c.

There were no sales of Franklin this week. The product for May shows a falling off from last year of about 34 tons, due to the breaking of a shaft, which caused the mine to be idle twelve days of the month.

3 p. m. Boston & Montana advanced 1/4, selling at \$21 1/2. Butte & Boston sold freely at \$6, and Kearsarge sold at \$7 for a lot of 25 shares. Market closed dull.

## San Francisco.

June 2.

(From our Special Correspondent.)

The mining stock market has been so peculiarly unsteady during the week that at times it has seemed as if the brokers were co-operating with the insiders to keep prices down. No sooner would any stock develop strength than a block of that identical stock would be thrown on the market with the inevitable result that the price would sag back several points. The year 1892 showed a heavy decline over the following one in stock dealing, and it is difficult to see what profit the booking element can have in acting in this manner, but notwithstanding it seems as if they sought their profit, as of old, with the manipulators rather than their customers. In this connection it is interesting to note the dealings in the San Francisco Stock and Exchange Board during the current year compared with the same months of 1892.

	1892.	1893.
January.....	\$434,415	\$265,769
February.....	371,870	203,245
March.....	293,690	240,730
April.....	285,589	264,210
May.....	288,590	434,635
Total.....	\$1,674,145	\$1,108,589

It will be noted that with the exception of May the present year compares badly, but the increased



activity last month, it is to be hoped, has been merely the precursor of the strong market which some, who are in a position to know, maintain will develop in the near future.

The Nevada companies gathered in \$125,200 in assessments last month and the California companies \$3,000 smaller amounts than the month previous.

The North End Comstocks have shown no interesting features and are, perhaps, all the more dull in consequence of Mr. Mackay's absence after it had been generally understood that he would certainly make a prolonged stay on the Comstock. On more than one previous occasion he has, after taking personal direction of work on the lode, uncovered an ore body, and it seems as if it would again need his presence to give these stocks a fillip. Consolidated California & Virginia sold to-day for \$1.65, a decline of over \$1 on the week's trading. Ophir sold for the same figure, Mexican for \$1.15, Sierra Nevada for 80c. and Union Consolidated for 73c. All these prices are less than the ruling rates of last week.

The public interest has been centered on certain of the middle group of Comstocks, and that portion of the daily press that takes note of the stock market are most assiduous in quoting what Alvinza Hayward says regarding the outlook. In consequence the sales of this stock have been heavy during the week, the price having reached \$3.35. Next day a heavy break took place, however, a decline of 80c. being noted, and to-day Potosi sold for \$2.55, closing stronger at \$2.65 bid. While Potosi is being talked about so much, apparently for a purpose, Chollar news is limited, but in sympathy with its companion was battered down to-day to 90c. Gould & Curry sold for 68c., Hale & Norcross for 66c. and Savage for 65c.

The Gold Hill and South End Comstocks have sold very quietly, prices, of course, giving way in common with the balance of the list. Bullion was freely sold to-day at a ruling rate of 65c., and small lots of Belcher sold for \$1.20. Crown Point sold for 65c. Overman for 30c., Challenge for 25c., Justice for 5c. and Yellow Jacket for 75c.

For the first time in several months sales have been made in the Tuscarora group. To-day North Belle Isle sold for 15c. and North Commonwealth for the same price. Bodie Consolidated sold for 25c. and Bulwer Consolidated for 10c.

At the close the market was generally from one to two points stronger.

**SAN FRANCISCO, June 9 (By telegraph).**—The opening quotations to-day are as follows: Best & Belcher, \$1.15; Bodie, 20c.; Belle Isle, 10c.; Bulwer, 10c.; Chollar, \$1; Consolidated California & Virginia, \$1.70; Eureka Consolidated, \$1; Gould & Curry, 85c.; Hale & Norcross, 70c.; Mexican, \$1.20; Mono, 10c.; North Belle Isle, 10c.; Navajo, 10c.; Ophir, \$1.75; Savage, 75c.; Sierra Nevada, 85c.; Union Consolidated, 90c.; Yellow Jacket, 85c.

**London.** May 31.

(From our Special Correspondent.)

The stock market in American shares has been marked by the general timidity of buyers, but shares of companies who are promising new developments have received some attention. Holcomb Valley shares have been bought readily, and the news that the new machinery is now on its way to the property from San Francisco has given them an extra fillip. Elkhorns have figured prominently again this week; the price has weakened somewhat and the shares have lost their premium value. Poormans have been in good demand and have become strong. Last month's returns show that \$23,000 was obtained from 520 tons; and it is rumored that the coming dividend will be at the rate of 40%. There have been fluctuations in the prices of Golden Feathers, Golden Gates, De Lamars, Richmonds and Palmarejos, and all closed fractionally lower.

The news of the decision of the court in the suit with the St. Louis Co. has had a beneficial effect on Montana shares, which have gone up from 2s. to 4s. since. Buyers are of opinion that developments and improvements now possible hold out a good hope for the future of this property.

It is stated that the Eberhardt Company have shut down on the Eberhardt mine, but will continue work at the Monitor. They are intending to look out for a new property in South Africa.

Springdale Gold shares (Colorado), have made their appearance on the Mining Exchange. This company is in American hands, but sales of shares are being made in this country.

The annual meeting of the Big Creek Mining Company, working antimony mines near Austin, Nev., was held May 29th. The directors were not able to declare any dividend, on account of the low price of the metal. The policy of last year has been to develop the mine rather than to extract large amounts of ore, in order that the workings may be conducted on an improved system, rendered necessary by the continued fall in the price of the metal. Assay results prove that the great richness of the mine is maintained. As the mine is in good hands the outlook for the future of the company is not discouraging.

The Silver Mines of La Luz, Limited, working mines at La Yesca, Mex., have been reconstructed under the name "La Yesca Gold and Silver Mines, Limited," with offices at 20 Bucklersbury, London. The company has long been idle owing to mismanagement, and some months ago went into liquidation. Some of the large shareholders seeing their opportunity to get rid of hostile interests have revived the company, appointed a new board of directors

and intend to put more money in the scheme. In the new company shares are being allotted at 17s. 6d. paid up, leaving only a liability of 2s. 6d. At present no shares are being offered publicly and the information available as to the state of the mine is not very great, except that the quality and extent of the ore have yet to be proved. As the machinery and buildings are all in place, it will not be long before some results are forthcoming.

**DIVIDENDS.**

Aspen Mining and Smelting Company, dividend No. 31, of ten cents per share, \$20,000, payable June 15 at the office of the company, No. 54 Wall street, New York City. Transfer books close June 10th and reopen June 16th.

Victor Gold Mining Company, dividend No. 4, of five cents per share, \$10,000 payable June 10th at the office of H. R. Lounsbury, 57 Broadway, New York City, to stockholders of record June 8th. Transfer books reopen June 12th.

**MEETINGS.**

Puzzler Gold Mining and Milling Company, at the office of the company, Room 317, Mining Exchange, Denver, Colo., June 13th, at 10 A. M.

Homestake Mining Company, at the office of the company, Room 30, 9th floor, Mills Building, San Francisco, California, June 13th, at 11 A. M.

**METAL MARKET.**

**NEW YORK, Friday Evening, June 9, 1893.**  
**Prices of Silver per Ounce Troy.**

June.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	June.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
3	4'88½	37½	82¾	640	7	4'87¾	38¼	83¼	644
5	4'88½	37½	82¾	640	8	4'87	38¼	83¼	644
6	4'88	37½	82¾	639	9	4'87	38¼	82¾	640

The London price of silver has had a sharp advance; but the advance prices were for spot bullion. It has been difficult to sell forward supplies. Shippers to-day were unable to get offers for prompt shipments even. The flurry in prices and the timidity shown by Indian buyers, is owing to the expectation that the Herschell committee will recommend the Government to adopt measures unfavorable to future importations of silver.

The United States assay office at New York reports the total receipts of silver for the week to be 193,000 ounces.

**Gold and Silver Exports and Imports at New York, Week Ending June 3d, 1893, and for Years from January 1st, 1893, 1892.**

Week.	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1893.....	\$6,510,900	\$12,199	\$787,502	\$9,206	\$7,277,907
1893.....	67,829,488	5,729,196	13,041,551	1,166,358	73,985,475
1892.....	25,475,209	6,126,341	10,254,929	393,939	29,008,858

**NOTES OF THE WEEK.**

The extra session of Congress, so often demanded within the last few months, has now been called by the President, and the indications are that the Sherman Act of 1890 will be repealed. The New York "World," with its usual enterprise, addressed upon receipt of the President's declaration, a telegraphic inquiry to the members of both houses of Congress, asking their intentions in regard to the proposed repeal. The answers give most welcome assurance of a change of sentiment in the South and West. Out of a large number of replies received 86 Congressmen answered without equivocation or condition in favor of the repeal. This poll is emphasized by other news received from the West and South. For example, the Chamber of Commerce of Charleston, S. C., has adopted resolutions denouncing the Sherman bill and urging its speedy repeal. In the West also the sentiment hitherto in favor of silver seems to be gradually changing.

The full text of the President's announcement is as follows: "While there has been no mystery nor secrecy in regard to my intention in this matter, I think it is not amiss that our people should be informed authoritatively that the time is at hand when their representatives in Congress will be called upon to deal with a financial condition which is the only menace to the country's welfare and prosperity."

"It is well for the people to take up the subject for themselves and arrive at their own conclusions as to the merits of a financial policy which obliges us to purchase idle silver bullion with gold taken from our reserve. One does not need the eye of a financier to see that this gold thus subtracted from the Government stock is eagerly seized by other nations for the purpose of strengthening their credit at our expense."

"It does not need the art of statesmanship to detect the danger that awaits upon the continuance of this operation. Already the timidity of capital is painfully apparent, and none of us can fail to see that fear and apprehension in monetary circles will ultimately bring suffering to every humble home in our land."

"I think that between now and the meeting of Congress much depends upon the action of those engaged in financial operations and business enterprises. Our vast National resources and credit are abundantly sufficient to justify them in the utmost faith and confidence. If, instead of being frightened, they are conservative, and if instead of gloomily anticipating immediate disaster they contribute their share of hope and steadiness, they will perform a patriotic duty and at the same time protect their own interests."

"The things just now needed are coolness and calmness in financial circles and study and reflection among our people."

If the Sherman bill be repealed it is more than probable that exports of gold will cease; that foreign capital will again come here and that an era of prosperity will set in. As a matter of fact, the Sherman bill has pleased none of those who formerly advocated its passage. It has not satisfied the Western pro-silver men, because it has in no way maintained the price of silver. It has not pleased the cheap money men, because it has failed to make money cheap. Once repealed it will be possible for the government to bring before European nations some plan for the practical use of silver as money; such as the "Engineering and Mining Journal" has long desired: The amount of silver money now in existence is not less than \$4,000,000,000 and it is highly improbable that this vast wealth will be allowed to depreciate. The plan proposed by the "Journal" will give the needed stability to silver, and while necessarily restricting the output to the amount required will render the business profitable throughout the world.

We have stated above that the repeal of the Sherman bill will lead to a much-needed revival of business prosperity. On this point a London firm writes to Messrs. John H. Davis & Co., as follows: "We trust that the experience of the past few months may have its ultimate result in the settlement of this miserable silver question and that our investing clients may once more see their way to purchase American bonds, which under sound currency conditions they would buy without hesitation." English investors have tried South America, the Australias and have failed. Out of \$1,000,000,000 (paper) sent to the Argentine Republic but little has been recovered. Wild speculation was followed by subsequent depression and the great house of Baring Brothers and their clients went under. To the five Australian colonies Great Britain has sent about \$750,000,000; speculation became rampant; a collapse followed and a heavy loss to British investors is the result.

In the United States there has been no similar disastrous experience; losses have occurred, it is true, but they have been small in comparison with the total amount invested; railroad securities, bonds and stocks have averaged at least 4½ per cent. Mortgage loans have averaged 6 per cent; industrial undertakings 7 per cent., and the only thing which has prevented the continued investment of foreign capital in our country has been the overpowering fear that investments made would ultimately be paid in a depreciated currency.

In India, as in our own country, the question of the currency continues to excite grave alarm and a serious interruption to exports. Meanwhile the report of Lord Herschell's committee has not been published, but we understand that it recommends that the Indian mint shall be closed against the free coinage of silver, but with the proviso that the Indian government shall be at liberty to coin silver in case the demand arises at a fixed ratio of 16d. per rupee. The Indian government is free to choose its own time to initiate these measures, but the leading idea is that this points to a gradual transition to the gold standard on the basis of 16d. per rupee. At present the negotiations going on between Calcutta and London concerning details may retard the official publication for some time.

The export of gold has ceased, and in all probability will not be resumed for some weeks to come. Some time ago it was said that the discontinuance was probably owing to an expected outward movement of wheat. During the week ending June 3d exports of wheat reached \$700,000 and in all probability they will amount to \$1,000,000 during the present week. In face of the figures given in our issue of May 27th, representing the current indebtedness of the United States to Europe, it is not probable that these small exports will cut much of a figure in reducing the outward movement of gold. On the other hand, it is well to remember that bills are often sold three months in advance of the actual shipments.

In our opinion the present cessation of the outward gold movement is due not to possible exports of wheat or cotton, but to the demand for currency in the West. During the week some \$5,500,000 had been shipped to Chicago, and the movement has not yet ended; part of this money was sent to strengthen bank reserves, part for continued margins on wheat and part on domestic bills of exchange, owing to the increase in passenger traffic to that city. As a consequence of this outward movement the rate for money in New York has continued strong at 5½ to 7% on call loans, a rate which has kept here the money that without this disturbing cause would have been sent to Europe. Another reason for the temporary stoppage of the gold movement is to be found in the purchases of securities on foreign account, some 20,000 shares

having been bought within the week. It must be remembered, however, that these investments are not yet of the permanent kind; that the money is still owed abroad and that it must be sent whenever demanded.

During the year much has been said regarding the premium paid by Austria for our gold, and this premium was given as one of the causes for gold shipment.

In the "Neue Freie Presse," Herr Gustav von Mauthner gives a detailed report of the quantity of gold already obtained by Austria, the manner in which it was procured and the kind of gold.

The Austrian correspondent of the London "Economist" gives an account of Mr. Mauthner's report, from which it appears that when the Austro-Hungarian Government's intention of introducing a pure gold standard and redeeming the notes of the State with gold was announced, all the money markets of Europe took alarm directly, and each European State planned measures for protecting the stock of gold in its banks and in its circulation. The syndicate entrusted with the operation decided to arrange its transactions in such a manner that they would not put deposited gold into motion, but merely absorb such gold as was in motion already. Thus the syndicate, by offering a slightly higher price, obtained the gold in bars, which is regularly sent from South Africa and Australia to London, and which, when there is no other buyer, the Bank of England takes up. A second source of gold supply for the syndicate was found in the countries in Asia, Africa and America, and even the southern states of Europe, with which the transactions are not effected by bills or credit. A third means of obtaining gold offered itself in the fact that sometimes the foreign rate of exchange becomes so high that it is cheaper to send gold coins from the debtors' country to the note banks of the creditors' country than to buy securities, and this continues so long as the rate of exchange does not fall. It was a lucky chance for the syndicate that these circumstances coincided in the United States with the time of the operation in Austria, and this is the principal reason why an operation which was expected to take up a year and a half could be accomplished in four months. American papers repeatedly complained that the Austrian currency reform had drawn large quantities of gold from the United States. But the real cause why the gold left North America was that the rate of exchange was exceedingly unfavorable, and this was certainly not influenced by Austria. The drain of gold from the United States began as early as 1888, continued in 1889, was reduced to a small amount in 1890, and was very high in 1891 and 1892, long before the Austrian syndicate began its operation. After these preliminary explanations, Herr von Mauthner goes on to say: On January 11th, 1893, the contract was signed by which the Rothschild syndicate undertook 60,000,000 florins 4% Austrian gold rente, at the rate of 95 1/2%.

There was a general belief that the syndicate had purchased gold in large quantities at a very early period, but this was a mistake. Not only would a heavy loss of interest have been incurred by such a plan, but the variations in the rate of exchange could not have been turned to account if the syndicate had not left its course of action free. Not until January, 1893, did the syndicate begin to buy any gold at all. The price of gold bars in London, in connection with the low price of London securities, made it possible to buy the bars which were on the way to the London market. The currency conditions of the United States caused a continued drain of gold from New York, and gold which was on the return journey from the Balkan States and some transatlantic countries offered more opportunities of obtaining supplies. Only once was the syndicate obliged to obtain a moderate quantity of gold from Germany, under circumstances which do not lack general interest. At the beginning of March the first, 60,000,000 florins 4% Austrian gold rentes were nearly provided for by extensive purchases of American eagles. The manifesto of President Cleveland appearing at the same time and rumors of an American gold loan caused the London rate of exchange to sink so rapidly at the bourse of New York, that the firms who had sold eagles to the syndicate were not all in a position to obtain eagles in the right time. To fulfill their engagements they had to buy gold in London and Paris, so that the price of gold bars rose to 78s. 0 1/2 d. in London, and a premium of 3 1/2 per thousand was paid in Paris. The syndicate still lacked several hundred thousand pounds sterling to provide for the 60,000,000, and it was considered advisable to complete the operation, as the finance minister had expressed a wish to make another emission if a favorable opportunity offered. Now, as it did not do to enter into competition with the American firms in London, the amount was purchased in 20-mark pieces in Germany. At first it seemed as if it would be difficult to obtain the gold required for the next 40,000,000, but the assurance that the United States Government had determined not to make any attempt to regulate the currency until the autumn caused the rate of foreign exchange to rise again at the bourse of New York, and the price of gold bars in London sank to the normal rate. The gold required for this second part of the operation consisted exclusively of bars and eagles.

Except £40,000 which is still on the road, but which figures in the list, all the gold required for the 100,000,000 florins 4% gold rente has been de-

livered to the syndicate. It consists of the following kinds of metal:

Gold bars, worth in half florins.....	71,500,000
Eagles, worth in half florins.....	118,500,000
Sovereigns, worth in half florins.....	20,500,000
Twenty-franc pieces, worth in half florins.....	5,000,000
Twenty-mark pieces, worth in half florins.....	12,000,000
Divers coins, worth in half florins.....	500,000

Of the bars 50,000,000 half florins came from London; 13,500,000 from Paris; 3,500,000 from Brussels; 1,000,000 from Amsterdam and 4,000,000 from India.

The report shows how, by profiting from every favorable opportunity and operating with caution, the syndicate has been able to procure £9,500,000 of gold in less than four months. The markets were not alarmed in the least, for while the operation went on the Bank of England reduced its rate of interest from 3 to 2 1/4%; the German Imperial Bank from 4 to 3%. The Bank of France had no inducement for changing its rate of interest, which was 2 3/4% at the time.

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Mexican dollars.....	\$ .65 3/4	\$ .66 1/4
Peruvian soles and Chilean pesos.....	.59 1/2	.60
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.86	3.89
Twenty marks.....	1.71	1.78
Spanish 25 pesetas.....	4.80	4.85

**Copper.**—The market continues to be flat. During the last few days some second hand parcels of Lake have been pressed on the market, doing more harm than good, as no sales are to be heard of and buyers have certainly been frightened off. From first hands nothing is to be had at less than 11c., so under the circumstances the market is more or less a nominal one. Electrolytic copper must be quoted at from 10 3/4c. to 10 1/2c., while casting copper is very steady because of a good demand and an absence of pressure to sell at 10c. @ 10 1/4c. Arizona pig copper, 96%, is very firmly held, and none of it is to be had at less than 9 1/4c. While of late exports have been rather heavy and it is reported from Europe that all descriptions of American copper are pressed for sale, this is not found to be the case here.

The foreign copper market evinced a hardening tendency, and the price of G. M. B.s advanced about £1, touching, on Thursday, £44 for spot, and £44 7s. 6d. for three months, closing to-day at £45 17s. 6d. and £44 7s. 6d. respectively, the consumptive demand for copper being very good, as is proved by the statistics. Particularly for furnace material is there a good demand, which, as already noted in these columns, cannot be filled. We quote: English tough, £46@£43 10s.; best selected, £47 10s.@£48; strong sheets, £54 10s.@£55 10s.; India sheets, £51 10s.@£52; yellow metal sheets, 4%.

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

To Liverpool—	Copper Matte.	Lbs.	
S. S. Nevada.....	3,611 bags	403,759	\$18,000
" Tauric.....	2,221 bags	249,210	10,000
" Teutonic.....	66 casks	89,463	4,473
" Alaska.....	3,898 bags	424,612	19,000
To Liverpool—	Copper.	Lbs.	
S. S. Nevada.....	45 casks	56,250	\$6,000
" Tauric.....	3,490 ingots	56,250	6,160
To Bristol—	Copper.	Lbs.	
S. S. Landaff City.....	71 pigs	22,438	\$2,000
To Swansea—	Copper.	Lbs.	
S. S. Massasoit.....	811 pigs	229,391	\$23,000
To Rotterdam—	Copper.	Lbs.	
S. S. Veendam.....	108 casks	135,000	\$14,900
" ..	882 pigs	240,788	24,000
" ..	60 casks	9,526	1,050
S. S. Obdam.....	110 casks	138,000	15,000
" ..	5-6 bbls.	657,500	73,675
" ..	659 pigs	108,178	16,000
" ..	673 plates	86,347	9,823
To Hamburg—	Copper.	Lbs.	
S. S. Rhœtia.....	337 pigs	104,312	\$10,000
" ..	1 cask	713	74
S. S. Amalfi.....	5 casks	4,180	1,200
" ..	55 bars	6,805	1,250
" ..	70 cakes	11,319	
To Stettin—	Copper.	Lbs.	
S. S. Venetia ..	948 plates	134,466	\$15,457

**Tin.**—The low prices which we last week reported have continued to rule, to an extent, and further sales have been made at from 18 3/8 to 19c. Later, a much better feeling was manifested and a good many people came out as buyers at current values. Besides this, it is now impossible to buy anything more for shipment from abroad in time to get here before the duty becomes operative. At the close, we have to quote June at 19 1/2 and July at 19 1/4, while for later deliveries few care to sell and then only at very high prices.

The London market also has been higher than it was last week in spite of the cessation of demand from America, but it is to be especially noted that for futures the prices asked are now more in harmony with those ruling for spot, which we quote at £86 1s., and three months at £85 10s.

Lead has been rather weak and is considerably lower than when we last reported. During the week there have been rather large transactions consummated, from twenty-five hundred to perhaps three thousand tons changing hands, at prices ranging from 3 1/4 down to 3 80, a few isolated sales being

made at even less. Even at these low figures consumers show no disposition to buy, but as there is neither a surplus nor pressure to sell, it is hardly to be expected that values will decline still further.

In Europe, the prices are weak, the receipts of Austrian lead having been heavy, and had a depressing influence.

Spanish lead is now quoted in London at £9 5s. and English at £9 7s. 6d.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: Lead weak and demoralized, and it is practically impossible to give accurate quotations. There are free sellers at 3 5/8c., with few if any buyers.

**Spelter.**—The market is lifeless, as but a few sales, of retail quantities, have been made and these at about 4 30@4 35 New York, and mostly for near-by deliveries. The strike in the Western coal mines continues, and is said to have assumed greater proportions than could have originally been foretold. It is impossible to say now how long it will last.

In Europe good ordinaries are quoted at £17 1s., and specials at £17 17s. 6d.

**Antimony** is dull; Cookson's at 10%, L. X. at 10 1/2, and Hallett's at 10c.

**Nickel** is to be quoted at from 45 to 53c.

**Quicksilver.**—There is no change to report of the quicksilver market. It continues very quiet. Quotations are: New York, \$39.50; London, £6 15s.

**Platinum.**—Latest quotations are at the rate of 1,300 marks per kilo, equivalent to \$10.25 per oz. f. o. b. in Hanau; this is for wire down to 0.3 millimeter diameter and sheet down to 0.2 millimeter thickness. New York quotations are \$11 to \$11.50 per oz.

The price is advancing and higher rates are expected.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, June 9, 1893.

**Pig Iron Production.**

Fuel used.	Week ending		From Jan., '92.	From Jan., '93.
	June 9, 1892.	June 9, 1893.		
Anthracite.....	81 35,473	68 33,453	793,352	778,112
Coke.....	147 132,313	147 142,231	3,031,072	2,967,674
Charcoal.....	40 10,100	37 8,581	220,209	197,854
Totals.....	268 177,886	252 184,265	4,044,633	3,896,640

**Pig Iron.**—There is absolutely nothing new to report of this market. It continues dull and it is to-day characterized by those features which have prevailed for weeks past. The consumptive demand is about the same, and consumers persist in their hand-to-mouth policy. Foundrymen generally report a good business in their line, but at the same time they complain of the tightness of money.

Prices are without change. Standard irons are selling at current values, but now and then we hear reports of sales at very low figures. In most cases it turns out to be a sale of poor grade iron. We quote: Northern brands: No. 1, \$14.50@15.25; No. 2, \$13.75@14.50; Gray Forge, \$12.50@13.00; Southern: No. 1, \$14@15; No. 2 F., \$13@13.50; No. 1 soft F., \$13.25@14; Gray Forge, \$12@12.5; tidewater, Scotch irons; Coltness, \$21.50@22; Eglinton, \$19.50@20; Summerlee, \$20.50.

**Billets and Rods.**—There is not much actual business doing in this market. We quote: Steel billets, tidewater, \$24@25; foreign, \$28.50@29; wire rods, \$33.50@34; foreign, \$40@40.50; Swedish, \$52@53.

**Manufactured Iron and Steel.**—Nothing of importance is reported this week. Prices continue low. We quote: Angles, 1 7/8@2c.; axles, scrap, 1 9/16@2 1/16c.; delivered; steel, 1 85@2c.; bars, common, 1 5/16@1 6/16c.; refined, 1 65@1 9c. on dock; beams, up to 15 in., 1 80@2c.; 20 in., 2 10@2 3/16c.; car truck channels, 2@2 1/16c.; channels, 1 9/16@2 1/16c. on dock; hoop-steel, 1 8@1 9c.; delivered; links and pins, 1 85@2 1/16c.; plates, bridge, 2@2 1/16c.; firebox, 2 5/16@2 8c.; flange, 2 10@2 25c.; marine, 2 50@2 75c.; sheared, 1 85@2 1/16c.; shell, 1 45@2 1/16c.; tank, 1 8@2c.; universal mill, 1 80@1 90c.; tees, 1 95@2 25c., all on dock.

**Old Material.**—We do not hear of any business doing in old material. Quotations in the absence of sales on which to base them, are nominally as follows: Old iron rails, \$15.50@16; steel rails, \$11.50@13; car wheels, \$12@14.

**Rail Fastenings.**—The market for rail fastenings continues lifeless. Quotations remain: 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.**—No business worthy of mention has been done in either spiegel or ferro during the past week. Quotations are nominally as follows: 10 to 12% Spiegel \$22@22.50, 20% \$25@25.50. Ferro, \$57@57.50.

**Steel Rails.**—The Eastern rail market continues quiet. No sales of any magnitude are reported. Quotations are unchanged at \$29 mill or tidewater. Girder rails, \$31@33. Steel rails fit to relay can be had for \$20.

**Tubes and Pipe.**—Manufacturers continue to report a good business in tubes and pipe. Several good sized contracts for cast iron pipe were closed during the week. Ruling discounts on car load lots are as follows: Butt, black, 5 7/8, 10 and 5%; butt, galvanized, 50, 10 and 5%; lap, black, 6 7/8, 10 and 5%; lap, galvanized, 5 7/8, 10 and 5%.

**Buffalo.** June 8.  
(Special Report of Rogers, Brown & Co.)

Outside of the present financial situation and its attendant evils no one thing is having as much influence toward increasing the burden of pig iron producers as the Central Traffic Association. Their arbitrary course of canceling all rates, practically without warning, and after a long interval advancing them throughout the East and Canada, is paralyzing to this industry. We doubt if there is a single feature of the present situation so potent to force furnaces in this district out of blast as this.

Demand is constantly falling off and, almost universally, foundries are reducing their melts and in many instances shutting down. What an opportune time to advance freights!

We quote for cash f. o. b. cars Buffalo: No. 1X foundry strong coke iron, Lake Superior ore, \$14, No. 2X foundry strong coke iron, Lake Superior ore, \$13.50; Ohio strong softener No. 1, \$14; Ohio strong softener No. 2, \$13.50; Jackson County silvery No. 1, \$17.00; Jackson County silvery No. 2, \$16.30@ \$16.80; Lake Superior charcoal, \$18.25; Tennessee charcoal, \$16; Southern soft No. 1, \$13.65; Alabama car wheel, \$19; hanging rock charcoal, \$20.50.

**Chicago.** June 8.  
(From our Special Correspondent.)

The manufacturers of iron and steel are feeling as keenly as any other line the effect of the present crisis, and are inclined to take a rather gloomy view of the situation. The iron business from producers' standpoint has been less profitable than ever, and it would be surprising if ironmasters generally do not seek to bring about not only a reduction in the wages of ironworkers, but also in the price of raw material. Mills in this vicinity are working hard to secure a lower freight tariff to the Northwest, to enable them to compete with the Cleveland and other Ohio mills. Should they be unsuccessful it is proposed to establish a freight line with the iron ore vessels plying between south Chicago and upper lake ports, thence via rail connection to consumptive points.

A material decrease is now noticed in consumption, and more frequent requests are made to suspend shipments on contracts for a while. Neither furnace nor mill agents are pushing sales, and cash customers have little difficulty in securing very low prices.

**Pig Iron.**—As to be anticipated, there is quite a falling off in the smelting of iron, and the tendency of consumers is to run stocks down in foundry yards as close as possible. General jobbing and foundries doing special work are very quiet, and some are shut down entirely. Transactions in coke iron is limited to actual requirements, orders very rarely exceeding 200 tons, and most of them confined to earloads.

Lake Superior charcoal iron is featureless and demand exceedingly quiet.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@ \$16.75; Lake Superior coke, No. 1, \$13.75@ \$14.00; No. 2, \$13.25@ \$13.50; No. 3, \$12.25@ \$12.50; Lake Superior Bessemer, \$14.50; Lake Superior Scotch, \$14.50@ \$15; American Scotch, \$16.00@ \$16.50; Southern coke, foundry, No. 1, \$14.25; No. 2, \$12.35; No. 3, \$12.00; Southern coke soft, No. 1, \$13.00; 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@ \$19.50.

**Steel Billets and Rods.**—Quotations are merely nominal at \$24 for billets and \$32.50 for rods.

**Structural Iron and Steel.**—The lowest bidder for the new city hall at Milwaukee, Wis., was a Chicago firm, but it will probably be thrown out, owing to a technicality. New bids will likely be called for. The iron and steel required is about 2,000 tons. New business outside of small lots is very light and nothing in sight. 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, \$1.85@ \$1.95; beams and channels, \$1.85@ \$1.95.

**Plates.**—The heaviest demand now comes from upper lake ports for ship plates and for the sheets at ore docks. Locally, sales from warehouse are of light proportion. Steel sheets, 10 to 14, \$2.25@ \$2.35; 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, \$2.74@ \$3; boiler rivets, \$4@ \$4.15; boiler tubes, all sizes, 65%.

**Merchant Steel.**—Mill agents have no desire to push sales in the present condition of the market. Large buyers are holding off. 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; erucible spring, \$3.75@ \$4.

**Galvanized Sheet Iron.**—The movement from agents' warehouses has been fair during the week, but mill orders are scarce. Discounts are unchanged at 70 and 10% off on charcoal, and jobbing quantities at 70 and 7 1/2% off on the former and 70 and 10% off on the latter.

**Black Sheet Iron.**—Outside of earloads demand is very quiet, and most mills are booked up for summer delivery. Prices are steady at 280c. for No. 27 common, Chicago. Jobbers quote 3c. for iron and 3 1/2c. for steel, same gauge.

**Bar Iron.**—Manufacturers' agents, acting under

instructions from mills, are discriminating in favor of cash customers to whom concessions are accorded. Small orders for iron cut to length are more numerous from consumers to cover wants for the next 60 days. Mill quotations are lower at 147c. @ 153c., Chicago. Warehouse business is quiet at 145@ 175c. on iron or steel bars.

**Nails.**—Wire nails are much quieter, though why they should be in face of the shut down July 1, and contemplated advance to be made, is what puzzles agents. Mill lots are \$1.50 mill and \$1.60 from jobbers. Steel cut-nails are very dull and agents look for no improvement until demand for full trade comes in. Mill price is easy at \$1.22 1/2 base Chicago; and jobbers quote \$1.35 from start.

**Steel Rails.**—Orders during the past week have been solely for small lots, and though inquiry continues very light, the mills here believe that after the turn of the year business will become more active. Quotations are steady at \$30@ \$31.

**Scrap.**—Dealers are buying no material and making no sales, and prices are nominally lower all through the list. Railroad, \$13.50; No. 1 forge, \$12; No. 1 mill, \$9.00; fish plates, \$14.50; cast borings, \$5.00; wrought turnings, \$7.50; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$1.50; mixed steel, \$9; coil steel, \$15; leaf steel, \$15; tires, \$14.50.

**Old Material.**—Iron rails may be nominally quoted at \$17.50, but it is doubtful if buyers would pay that. No sales are reported in this vicinity. Old steel rails are very dull, and lower at \$10.25@ \$13.75 as to condition and length. Car wheels are lifeless at \$14.50.

**Louisville.** June 3.  
(Special Report by Hall Bros. & Co.)

Buying still continues from hand to mouth, with no indications of any early change from this policy, which has been a general one for several months. There are always exceptions, of course, and here and there are found buyers who are disposed to place round contracts for extended deliveries at present low figures. We make no change in quotations:

**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 charcoal 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.** June 8.  
(From our Special Correspondent.)

**Pig Iron.**—A liberal movement in small lots of No. 1 foundry iron has been noticed all the week, among local and out-of-town foundries, at prices ranging from \$15 to \$15.50. Buyers are picking up all the special brands that are to be had within 60 days. Makers think this indicates higher prices later on. In No. 2 there have been three or four large transactions for delivery through the summer. Users of No. 2, however, are generally well supplied. Average prices, \$14.50. For forge there has been an increasing demand, on account of mills running fuller time in order to accumulate a little stock. Bessemer is again neglected.

**Steel Billets.**—Offers have been made this week for three or four large lots for midsummer delivery, but not accepted. Buyers are willing to speculate on the weakness of makers, but find it impossible to make any better terms. Prices range from \$23.50 @ \$24.75, according to the size of order and date of delivery.

**Muck Bars.**—A good deal of business is done this week at \$23.50 for best makes.

**Merchant Bar.**—Storekeepers here and in the country report an improving demand from regular customers, growing, they say, out of the danger of a lockout in the West. Whatever the real reason may be, there is a better demand at from \$1.60@ \$1.65. The car builders are also placing heavy orders, and the outcome is that the market is decidedly stronger this week.

**Nails.**—There is considerable weakness at present in nails owing to the efforts of some factory men to unload large stocks.

**Skelp.**—Only one large sale of skelp was reported this week at \$1.52 1/2.

**Wrought Iron Pipe.**—No news from the pipe men.

**Sheet Iron.**—The storekeepers report a very active demand for sheet, but mill men have not booked much additional business.

**Plate and Tank.**—The aggregate of this week's business has been small, and the orders are for early delivery. Manufacturers think there is a good deal of business of this kind to be placed this month and later on a basis of \$1.75 for ordinary tank.

**Structural Material.**—There is nothing new in this department, apart from the usual rumors of heavy orders in the near future. The mills are all well equipped, and heavy deliveries are being made on engineering work in hand.

**Steel Rails.**—It is only in light sections that there is anything to report. Prices range from \$33@ \$36, according to weight. A number of electric roads are in the market for rails, and the mills which are equipped for the work will receive large orders.

**Old Rails.**—Old rail prices are weakening, owing to the large stocks available. Quotations, \$17@ \$17.50.

**Scrap.**—A great deal of scrap is being hurried into market.

**Pittsburg.** June 8.  
(From our Special Correspondent.)

**Raw Iron and Steel.**—The market during the week has undergone scarcely any change; buyers and sellers are disposed to wait and see the result of the meeting of the Manufacturers and Amalgamated Association, now in convention arranging the iron and steel scale for next year. This matter is certainly a very important one, as the settlement of that question will decide whether there will be an amicable arrangement or a strike, or whether there will be an increase in the non-union mills or not.

During the past year the Carnegie company and Shoemaker & Co. have declared themselves independent of the association, and unless there is a reduction in the scale others will, without a doubt, refuse to bind themselves to pay present rates.

The closeness of the money market has operated to prevent any marked improvement in the iron trade, but the situation has at least been maintained. In manufactured iron the consumption continues large and a great deal of work is in prospect. There is still plenty of competition, but it does not appear that prices have receded much; in fact, in some lines a firmer tone prevails.

The situation may be summarized as follows: Hesitation, timidity and uncertainty. The volume of business is large enough to give at least a fair average of employment, but for months past it has been taken at prices and on terms which have left no margin for profit.

Coke Smelted Lake and Native Ore.		Muck Bar.	
Tons.	Cash.	Tons.	Cash.
4,000 Bessemer, June, \$13.60		1,000 N., June, .....	23.75
3,000 B., June, .....	13.45	500 N., June, .....	23.80
2,500 B., June, July, ..	13.60	300 N., June, .....	23.90
2,500 B., June, .....	13.55	100 N., June, .....	24.00
2,000 B., June, .....	13.60	Charcoal.	
1,500 B., June, July, ..	13.60	100 No. 2 F., .....	18.50
1,200 B., June, .....	13.60	75 C. B., .....	26.00
1,000 B., June, .....	13.45	75 C. B., .....	26.50
1,000 G. F., .....	12.25	75 L. S. W. B., .....	19.50
1,000 B., June, .....	13.70	50 No. 2 F., .....	18.50
1,000 B. V. F., .....	13.00	Skelp Iron.	
500 B., June, .....	13.50	400 N. G., .....	\$1.47 1/2 4 m.
500 G. F., .....	12.25	300 W. G., .....	1.47 1/2 4 m.
500 G. F., .....	12.20	250 S., .....	1.65 4 m.
300 G. F., .....	12.15	Cash.	
300 No. 1 F., .....	14.00	<b>Ferro-Manganese.</b>	
300 No. 2 F., .....	13.00	100 80% Del., .....	59.20
150 No. 1 F., .....	14.00	50 80% D., .....	59.00
100 No. 2 F., .....	13.00	Skelp Steel.	
100 No. 1 S., .....	15.75	200 W. G., .....	140 4 m.
100 G. F., .....	12.10	Steel Wire Rods.	
50 W., .....	11.50	300 5-gauge American at mill	\$29.40
Steel Billets and Slabs.		Sheet Bars.	
1,500 B. Slabs, June, at mill, .....	22.00	150 Sheet Bars at mill, .....	28.75
1,000 B., June, at mill, ..	22.00	Blooms, Billets and Bar Ends.	
1,000 B. Slabs, June, at mill, ..	22.10	500 B. and B. E., .....	\$15.00
750 B., June, at mill, .....	22.15	Old Iron and Steel Rails.	
500 B., June, at mill, .....	22.10	300 A. F., .....	19.25
500 B., June, at mill, .....	21.90	200 S. P., .....	11.50
500 B., June, at mill, .....	21.90	100 S. M., .....	15.50

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, June 9. Statement of shipments of anthracite coal (approximated) for week ending June 3d, 1893, compared with the corresponding period last year:

	June 3,		Difference.
	1893.	1892.	
Wyoming region, .....	474,571	439,201	Inc. 35,370
Lehigh region, .....	123,277	125,180	Dec. 1,903
Schuylkill region, .....	231,472	226,894	Inc. 4,578

Total, .....

PRODUCTION OF BITUMINOUS COAL for week ending June 3d and year from January 1st:

Shipped East and North:	—1893.		—1892.	
	Week.	Year.	Week.	Year.
Phila. & Erie R. R., .....	2,519	49,568	2,519	37,618
Cumberland, Md., .....	86,107	1,678,711	86,107	1,507,927
Barelay, Pa., .....	721	27,616	721	87,222
Broad Top, Pa., .....	11,212	316,136	11,212	252,768
Clearfield, Pa., .....	71,344	1,839,066	71,344	1,638,116
Allegheny, Pa., .....	25,286	568,974	25,286	513,842
Beach Creek, Pa., .....	18,721	719,247	18,721	1,103,511
Pocahontas Flat Top, .....	63,768	1,270,267	63,768	1,057,633
Kanawha, W. Va., .....	65,800	1,368,747	65,800	1,040,909
Total, .....	346,478	7,838,352	346,478	7,239,566

Shipped West:	—1893.		—1892.	
	Week.	Year.	Week.	Year.
Pittsburg, Pa., .....	22,499	538,788	22,499	500,369
Westmoreland, Pa., .....	28,913	882,517	28,913	835,474
Monongahela, Pa., .....	13,991	291,810	13,991	241,099
Totals, .....	65,403	1,713,115	65,403	1,486,942

Grand totals, .....

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending June 3d, 1893, and year from January 1st, in tons of 2,000 lb.: Week, 92,847 tons; year, 2,365,001 tons; to corresponding date in 1892, 2,402,794 tons

**Anthracite.**

The anthracite coal trade is now undergoing a period of great quietude. During May a heavy volume of business was done, especially towards the end of the month, when the anticipation of the advance in June prices induced consumers to come forward with their orders. Almost all the heavy users of anthracite had been warned of the impend-

ing rise in values and they secured themselves in time against it. From the reports of several prominent producers, more coal was sold in May than was actually mined. This abundance of stocks now in consumers' hands or contracted for, added to the increased prices, very naturally has kept buyers away during the past week.

They are always willing to play a "waiting game" as long as they can possibly hold out. It will be some weeks before there is any new business in the market.

So far as can be learned prices are being well maintained, which is not strange in view of the inability of numerous consumers to take any more coal just now, unless extraordinary inducements are held out to them, and this is not being done. Actual selling prices are 15c. below the official schedule, which is as follows:

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash.....	\$4.00	\$4.10	\$4.40	\$4.40
Free white ash.....	3.90	4.00	4.40	4.40
Shamokin.....	4.35	4.60	4.40	
Schuykill, red ash.....	4.35	4.75	4.55	
Lykens Valley.....	5.00	5.65	6.00	5.25
Pea, \$2.75; No. 1 Buckwheat, \$2; No. 2 Buckwheat, \$1.50.				

The Reading Railroad system reports that its coal shipment (estimated) for last week, ending June 3d, was 365,000 tons, of which 25,000 tons were sent to Port Richmond, and 70,000 tons were sent to New York waters. Vessels are in moderate supply at Port Richmond, and freights are nominally quoted at 95c. @ \$1 and discharge to Boston, and 85c. @ 90c. to Providence.

The Reading Railroad Company has ordered that, until the coal trade warrants it, no coal trains will be moved hereafter on Sunday. This is done to give train hands much-needed rest and at the same time will very materially cut down expenses.

President Harris has issued a statement concerning the Reading Railroad plan of readjustment, in which he says that the issue of the proposed \$22,000,000 collateral trust bonds will not impair the rights of any of the company's securities. A syndicate representing \$29,000,000 is pledged to carry the plan into effect, if the general bondholders assent to the purchase of their coupons for five years, and the stock assents to a seven-year voting trust, but the bondholders are not required to make any subscriptions to the collateral trust bonds. President Harris says this issue of collateral trust bonds will liquidate the entire floating debt, release from jeopardy \$13,000,000 of securities now pledged for \$6,867,000 of debt, pay for all equipment, cancel all prior coupons purchased, and pay all overdue claims. This plan will preserve the integrity of the system and the valuable connections made since 1888, and insure a continuity of policy and management. But, Mr. Harris reiterates, 90 per cent. of the general mortgage bonds and 60 per cent. of the stock must signify assent before June 21st.

It is announced that Messrs. Eckley B. Coxe, Jr., and E. B. Ely have been admitted as members of the firm of Coxe Bros. & Co. Mr. Eckley B. Coxe, Jr., takes the place of Alexander B. Coxe and Eckley B. Coxe, executors of his father, Charles B. Coxe, deceased. The many friends of Mr. E. B. Ely, who has for years been Coxe Bros. & Co.'s general agent in New York City, will be glad to learn of his admission to membership in this well-known firm.

#### Bituminous.

Nothing new of importance has developed in the soft coal market since our last report. It continues very dull, and practically the same conditions prevail as for some weeks past. Some of the more prominent companies report that they are placing nearly all the coal that is being mined, but contracts are just as slow in coming in as ever. Buyers persist in holding out for further concessions, and these the producers declare that they are unable to give. The consumers hope that a reduction of through rates via main line railroads will be made continue strong, but from present indications and in the opinion of well informed sources no allowances of this nature will be made by the railroads in the near future. In the meantime, the financial stringency which is troubling other branches of business has not affected the coal trade to any great extent. We hear of no failings of importance.

For some reason or other there has been a slight falling off in car deliveries, which, however, has not interfered to any appreciable degree with the bituminous trade. At all the loading points on the Atlantic seaboard a better state of affairs prevails. The lack of small-sized coasting vessels is still felt, but by no means to the extent of two or three weeks ago. On the larger vessels there has been some disposition to shade current rates in order to make charters. It was anticipated that the lack of vessels noted in previous issues of this journal would be relieved when anthracite coal was in lighter demand than for the latter half of May, and this has happened. Ocean freight rates are without much change: From Baltimore, Newport News, Norfolk and Philadelphia to the various ports they seem to be the same, as follows, all alongside: To Boston, Salem and Portland, 95c.; to Sound ports, 85c.; Portsmouth, 95c. to \$1; Bath, \$1; Bangor, \$1 @ \$1.05; Gardiner, \$1 @ \$1.05 and towages; Saco, \$1.25 and towages; Dover, \$1.25 and towages; Newburyport, \$1.10 @ \$1.15; Lynn, \$1.15 @ \$1.25; Wareham, \$1.05. On large vessels, as intimated above, there is a shading of 5c. in the rates to those ports whither they can go. The large supply in New York harbor continues very poor.

Prices are unchanged; they range from \$3.30 alongside New York down, according to grade.

During the week a dispatch from Huntingdon, Pa., was published in the daily press to the effect that owing to the continued depression in the soft coal trade there had been a virtual suspension of work at the collieries in the Broad Top and East Broad Top bituminous regions in Huntingdon and Bedford counties. Later a dispatch from Philadelphia gave an official denial of this, stating that the Broad Top shippings are gaining.

The trade of this city has learned with regret the death of William S. Jaques, who for many years was connected with the Georges Creek coal trade. In our obituary column appears a brief notice of his demise.

#### Boston.

June 8

(From our Special Correspondent.)

In my report last week I anticipated that the recent advances in anthracite coal would make trade quiet and so it has. Retail dealers here are not worrying themselves over the advances. They have been more than counteracted by the drop in freights, and the prospects are that a little more waiting will not be amiss, as the tendency of rates is still downward. There has been so little disposition to buy on the part of dealers here that the market has not really been tested yet; when it is, the weak spots may show up. Prices quoted here are: Stove, \$4.40; egg, \$4; free broken, \$3.90; chestnut, \$4.

In bituminous coal there is but a light business being done. Owing to the decline in freight rates prices are lower. Cumberland is worth \$3.80 per ton on cars here; New River and Pocahontas, \$3.70 and Clearfield, \$3.50. Freight rates are: From New York, 70 @ 75c.; from Philadelphia, 90c.; from Baltimore, 90c.; from Newport News and Norfolk, 80 @ 85c.; to Sound Points, 75c.

This is the season when those who leave the city for the summer and are in the habit of laying in their winter's supply buy their coal for that purpose. The result is the yards are quite busy. Prices are steady. Retail prices quoted here are: Stove, \$6.25; nut, \$6.25; egg, \$8; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

#### Buffalo.

June 8.

(From our Special Correspondent.)

The advance in the price of anthracite coal has not improved trade therein. Buyers are holding off from purchasing their winter supplies. Shipments by lake are fairly active but not up to expectations of vessel men.

Bituminous coal in good demand, and the market firm as the supply is ample but not overshadowing the consumption requirements.

The only item worth reporting is that the Buffalo contractors have commenced work on a seven mile extension of the Delaware, Lackawanna & Western Railroad near Avondale, Pa., which will run through a valuable section of coal land.

The shipments of coal by lake westward from Buffalo for the week ending June 3d were 63,080 net tons, distributed as follows: 24,160 tons to Chicago, 13,400 to Milwaukee, 2,000 to Duluth, 7,000 to Superior, 1,400 to Green Bay, 1,550 to Saginaw, 800 to Menominee, 1,280 to Toledo, 1,500 to Michigan City, 800 to Port Arthur, 2,040 to Detroit, 1,750 to Bay City, 600 to Marine City, 700 to Ludington, 1,800 to Gladstone, and 2,300 to Marquette. The rates of freight were: 60c. to Chicago and Michigan City; 65c. to Ludington; 45 @ 40c. to Saginaw; 45c. to Marine City and Portage; 50c. to Green Bay; 55c. to Milwaukee and Menominee; 30c. to Duluth, Superior, Marquette, Toledo, Detroit, Bay City, Gladstone and Washburn, and 40c. to Port Arthur. Closing firm but quiet.

The following statistics show the coal movement of this port to June 1st, this year, with comparisons of previous years:

Receipts and shipments by railroad not reported, by request.

Receipts by lake thus far this season, none. Shipments by lake from opening of navigation to June 1st, 511,479 net tons, as compared with 404,370 tons in 1892 and 445,610 tons in 1891. The receipts by canal this season to June 1st, 4,560 net tons, as compared with 143 tons in 1892 and 481 tons in 1891; the shipments to June 1st, 6,296 net tons, as compared with 6,732 tons in 1892 and 5,919 tons in 1891. Lake freights from opening of navigation to June 1st, 40 @ 60c. to Chicago, 40 @ 60c. to Milwaukee, 50 @ 30c. to Duluth and Lake Superior ports, 40 @ 55c. to Green Bay, 50 @ 60c. to Racine, 25 @ 30c. to Detroit, and 25 @ 30c. to Toledo, per net ton, free on and off. A year since, on May 31st, the rates to Chicago and Milwaukee were 50c. and to Duluth and Superior ports 30c. The shipments by lake thus far show an increase over 1892 of 137,109 net tons.

The chief shipments were: To Chicago, 254,394; Milwaukee, 117,609; Duluth, 43,950; Superior, 33,480 tons.

The coal shipped by canal was carried at 60c. to Syracuse, 65c. to Utica, 90c. to West Troy, 65c. to Fultonville, 65c. to Oriskany—all gross tons, free on and off—and 35c. to Lockport, per net ton, free on and off.

#### Chicago.

June 8.

(From our Special Correspondent.)

The most prominent feature happening in the coal trade here was the large attendance at the eighth annual convention of the Coal Dealers' Association of the Northwest, which was held in Washington Hall, June 15. All the more prominent anthracite and bituminous shipping interests were represented as well as the larger wholesalers and jobbers. The meeting was very harmonious and all

seemed animated with the desire to work cohesively for the advancement of the best interests of the Association whether as producers or distributors.

The following gentlemen were elected by acclamation: R. G. Parmley, Sioux Falls, S. Dak., president; J. F. Harrol, Aurora, Ill., vice-president; T. A. Bedwell, Rockford, Ill., secretary and treasurer, and a board of 10 directors. Mr. Charles L. Dering, of Chicago, delivered a most felicitous and humorous address. Other short talks followed by Walter S. Bogle, H. S. Van Ingen, C. W. Keeler, Stephen W. Gilman, Fred Buell, Harry N. Taylor and H. A. Bischoff. The members were then invited to a lunch, June 2d, at the Casino Cafe, World's Fair Grounds, Jackson Park. Only in a very informal manner was the subject of prices and terms touched upon, but it was evident that the dealers were unanimous in agreeing that terms of settlement must be greatly abridged.

Anthracite is quiet and trade dull at the advance, though it is a fact that a large amount of coal is being shipped at May circular. The recent financial flurry and rather more than ordinary discouraging reports from all parts of the country have made shippers look more carefully even than usual into the credits of the country trade. The dealers' trade in Chicago has accepted the advance with less than the ordinary amount of kicking, but the consumer, who is compelled to pay in June the prices current last fall for coal, with a prospect of still further advances in the near future, has no word of praise for the monopoly.

The writer is fully cognizant that some of the shippers have been and are offering coal to good country buyers at current circular prices, the coal to be settled for in October, with the condition that should a break in the market occur before November a rebate equal to such a break will be made. This offer has been taken advantage of by quite a number of dealers.

Bituminous coal is very dull, and we believe that even less than the amount of last year is being mined and sold.

The shutting down of a large number of manufacturing industries has thrown quite a large increased amount of the various soft coals on this market, while the advance in freights demanded by many of the railroads will serve as a bar to the profitable placing of any additional tonnage here. It is not thought by the producers and trade generally that the situation this year on bituminous coal is nearly as bright as it was at this time last year.

Coke shows some little improvement but it is not decided, though indications are much better than they were two weeks ago. As a rule foundries are running very light.

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, \$6.25; large egg, \$5.60; small egg, range and chestnut, \$5.85. Retail prices per ton are: Large egg, \$7; small egg, range and chestnut, \$7.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.35; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$2.50; Brazil block \$2.50.

#### Pittsburg.

June 8.

(From Our Special Correspondent.)

Coal.—There have been no further coal shipments by water since our last report; the Ohio River lacked sufficient water for that purpose. In the meantime towboats have arrived with empties in large numbers; the boats were laid up on arrival to await the June rise, the empties being sent to the pools to be loaded. The lower markets are well supplied with coal all the way to New Orleans, low prices being the rule, not the exception.

Connellsville Coke.—The rates are as follows—that is, for the best quality—the prices being furnished by the second largest makers in the region, for a ton of 2,000 pounds at the ovens: F. o. b. at ovens: Furnace coke, \$1.75; foundry coke, \$2.15. Delivered at Pittsburg: Furnace, \$2.45; foundry, \$2.85. Freights from Connellsville to Pittsburg, 70c. per ton.

Production is on the increase, and shipments show a greater aggregate, while more idle ovens are going into blast. Some coke was stocked last week, but this was with the expectation of increased orders this week. Foundry trade is very good, especially in the East. The demand for furnace coke is fair, all things considered; no boom is expected, but trade will scarcely get much worse, even with the midsummer dullness. A detailed report of the operations and output shows 12,055 ovens in blast and 5,272 idle, with a total production of 120,281 tons; increase over previous week, 2,329 tons. The shipments for the week aggregated 6,834 cars, consigned as follows: To Pittsburg and river tipsles, 1,957 cars; points west of Pittsburg, 2,917 cars; points east of Connellsville, 1,960 cars; compared with the shipments of the previous week, being an increase of 154 cars.

#### CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, June 9.

Heavy Chemicals.—The heavy chemical market continues dull. The trading has been small in volume and on the whole unchanged as to prices. Owing to labor and other troubles some glassmakers have closed down a month or six weeks before their usual time. This has left them with stocks

contracted for, which are here or on the way, and which cannot be used until next fire. Not all the glassmakers can afford to carry the goods for so long a period, and in consequence of this some are offering to re-sell their lots at low prices. We heard of a lot of 5-8% alkali offering at 1.05c.

Caustic soda is quiet and absolutely unchanged. Bleaching powder is in slightly better demand. Other chemicals are without change of importance. Quotations are as follows: Caustic soda, 60%, 2.95@3.10c; 70%, 2.70@2.80c; 74%, 2.72@2.82c; 76%, 2.80@2.90c. Carbonated soda ash, 48%, 1.25@1.30c; 58%, 1.25@1.30c. Alkali, 48%, 1.25@1.30c; 58%, 1.20@1.25c., according to package. Sal soda, English, on the spot, 1c. American, 90@95c; bleaching powder, 2.25@2.37c. In special cases, carbonated soda ash and alkali will sell below the above figures.

Acids.—Manufacturers report a heavy business in the various acids during the past week. The market, however, is without new features. Prices show little or no change from our last report. We quote: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.87 1/2@2, according to quality; muriatic, 18", 90c@1.10; 20", \$1@1.25; 22", \$1.10@1.35; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 80c@1.10; mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.35 to \$3.75; glycerine for nitroglycerine, 11 1/2@12 1/2c., according to quality and quantity.

Brimstone.—The brimstone market has been very quiet during the past week. Quotations are unchanged as follows: On the spot, best unimixed seconds, \$19.50; thirds, \$18.75; forward shipments (May June and June-July), \$19.25 for best unimixed seconds, and \$18.25 for thirds.

Fertilizing Chemicals.—There is absolutely no change to report in the various conditions affecting the fertilizer market. It continues dull and quiet. Buyers are still holding off and business will not be active for some weeks yet. Prices are practically as reported in our last week's issue. We quote: Dried blood, \$2.50@2.55 per unit for high grade, and \$2.40@2.45 for low grade; azotine, \$2.50@2.60; sulphate of ammonia \$3.12 1/2@3.15 for gas liquor. No bone liquor is offering. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acidulated fish scrap, no stocks on hand; dried scrap is quoted at \$28 f. o. b. fish factory. The fishing boats have been out for the past 10 days and have done nothing. Tankage, high grade, \$27@29; low grade, \$26@28. Bone tankage, \$24@25; bone meal, \$24@25.50.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14 1/2; 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 1/2; Charleston and Savannah, \$2.127, sulphate of potash, 96-99%, basis 90%, is 4% higher.

Phosphates.—Quotations for high grade land rock f. o. b. Charleston, are \$4.50@4.75. Freight are \$2.25.

Muriate of Potash.—Arrivals during the past week aggregate 200 tons, all of which went into immediate consumption. There is no new business to report. The market is dull. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.78; Philadelphia, \$1.80 1/2; Southern ports, \$1.83.

Kainit.—This market is very quiet. 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, 2% higher.

Nitrate of Soda.—This market is quiet. Owing to the light demand and abundant stocks on hand prices have declined still further and nitrate on the spot is now held at \$1.75@1.77 1/2.

Liverpool. May 31.

(Special Correspondence of Jos. P. Brunner & Co.) The position of our market for heavy chemicals is without improvement, the demand being still of a retail character.

Soda ash is dull, and fresh orders are scarce. Spot quotations are nominal, being about as follows: Caustic ash, 48%, £4 15s. @ £5 5s. per ton; 57-58% £5 15s. per ton; carb. ash, 48%, £5 @ £5 5s. per ton; 58% £5 7s. 6d. @ £5 15s. per ton, all net cash; ammonia ash, 58%, £4 12s. 6d. @ £5 per ton, less 2 1/2%.

Soda crystals are in moderate request at £2 17s. 6d. @ £3 per ton less 5%.

Caustic soda is very slow of sale, and for some markets the quotations have been reduced, values varying considerably, according to export market; the nominal spot range being as follows, viz: 60%, £9 @ £9 per ton; 70%, £9 @ £10 per ton; 74%, £10 @ £11 per ton; 76%, £11 10s. @ £12 per ton, all net cash. Parcels under 10 tons, 5s per ton extra is charged.

Bleaching powder is quiet, but at the same time there is not much offering and £8 10s. per ton, net cash, is lowest quotation for hard wood casks.

Chlorate of Potash.—There is nothing doing on the spot, and it is difficult to give reliable quotations, but 8 1/2d. is nominal value for prompt or June delivery. We quote July, 8 1/2 @ 8d.; July-December, 7 1/2d. and possibly 7 1/4d., and all 1894 6 1/2d., less 5%.

Bicarb. of soda is in small compass and steady at £6 15s. per ton, less 2 1/2% for one cwt. kegs, with usual allowances for larger packages.

Sulphate of Ammonia.—Quotations are quite unreliable at the moment, there having been an attempt at a bit of a corner the last day or two, this being at the end of the month and some sellers being caught short. As the article here is only held in one or two hands, some speculators have been rather bitten.

Nitrate of soda is quiet and slightly easier at £9 @ £9 5s. per ton, less 2 1/2% for double bags, f.o.h. here. Carb. Ammonia.—Lump, 3d. per lb.; powdered, 3 1/2d. per lb. net cost.

Messrs. Mortimer & Wisner, the well known brokers of this city, send us the following interesting monthly statement of nitrate of soda issued on the 1st inst.:

Table with 4 columns: 1893, 1892, 1891, Bags. Rows include Imported into A. ports, Stock in store and afloat, To arrive, actually sailed, Visible supply to Sept., Stock on hand, Deliveries past month, Deliveries Jan. 1 to date, Total yearly deliveries, Prices current May 1.

Included in the deliveries of 1893 are 9,500 bags shipped to European ports.

CURRENT PRICES.

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

- Acid—Acetic, chem. pure, 1.7c @ 1.9 Commercial, in bbls. and cys., .013 @ .12 Carbonic, liquefied, 1.1c @ 1.2 Chromic, chem pure, 1.00 for batteries, .40 Hydrobromic, dilute, U. S. P., .2c @ .30 Hydrocyanic, U. S. P., .4c @ .50 Hydrofluoric, .2c @ .30 Alcohol—95%, 1.20 @ 1.25 Absolute, .35 @ .39 Ammoniated, .22 @ .28 Alum—Lump, 1.75 @ 1.85 Ground, 1.85 @ 1.95 Powdered, .04 @ .05 Aluminum Chloride—Pure, 1.25 Amalgamating solution, 1.25 Sulphate, 1.90 @ 2.60 Ammonia—Sal., in bbl. lots, .07 1/2 @ .08 Carbonate, 1.07 1/2 @ 1.08 Muriate, white, in bbls., .08 1/2 Aqua Ammonia—(In cys.) 18", .03 @ .04 20", .04 @ .05 28", .04 1/2 @ .05 Antimony—Oxymur., .04 @ .06 Regulus, .10 @ .11 1/2 Argon—Red, powdered, 1.5 Fluoride—White, powdered, 1.0 @ 1.05 Red, .06 @ .07 Yellow, .08 @ .09 White at Plymouth, 2.12 @ 2.6 Asbestos—Canadian, 3.50 @ 3.00 Italian, 2.18 @ 2.60 Ashes—Pot, 1st sorts, 4.75 @ 5 Pearl, .05 1/2 @ .06 1/4 Asphaltum—Prime Cuban, .04 @ .05 Hard Cuban, 28.00 @ 30.00 Trinidad, refined, 30.00 @ 35.00 Egyptian and Syrian, .05 @ .07 1/2 Californian, at mine, 12.00 @ 25.00 at San Francisco, 15.00 @ 20.00 Barium—Carbonate, pure, 1.45 Carbonate, commercial, .05 @ .10 Chlorate, crystal, 1.75 Chloride, commercial, .05 @ .10 pure, 1.18 Iodide, 1.40 Nitrate, .06 1/2 @ .07 Sulph., Am. prime white, 17.50 @ 19 Sulph., foreign, floated, 21.50 @ 24 Sulph., off color, 11.50 @ 15.00 Carb., lump, f. o. b. L'pool, 24.00 No. 1 Casks, Runcorn, 23.10 No. 2, bags, Runcorn, 23.15 Bauxite—Ton, 10.00 Bichromate of Potash—Sootch, 11 @ 12 American, 11 @ 12 Bichromate of Soda—1.09 @ 1.10 Borax—Refined, 1.1c in car lots, 1.0c San Francisco, .08 @ .09 Concentrated, in car lots, .07 1/2 @ .08 Refined, Liverpool 1.0c @ 1.1c

- Bromine—1.25 @ 1.35 Cadmium—1.20 @ 1.30 Cadmium Iodide—1.50 @ 1.60 Chalk—1.10 @ 1.25 Precipitated, 1.10 @ 1.25 China Clay—English, 1.10 @ 1.18 Domestic, 1.10 @ 1.18 Chlorine Water—1.10 Chrome Yellow—1.10 @ 1.25 Chrome Iron Ore—1.00 @ 1.10 Franciso, 1.10 @ 1.20 Chromalum—Pure, 1.10 @ 1.20 Commercial, 1.10 @ 1.20 Cobalt—Oxide, 1.60 @ 1.70 Copper—Sulph. English Wks. ton, 22 @ 21 Vitriol (blue), ordinary, 1.03 1/2 @ 1.03 1/4 extra, .04 @ .09 Nitrate, 1.00 @ 1.05 Copperas—Comm'n, 100 lbs., 35 @ 35 Best, 100 lbs., 35 @ 35 Liverpool, 100 lbs., 42 @ 42 1/2 Corundum—Powdered, .04 1/2 @ .09 Flour, 1.00 @ 1.05 Cryolite—Pow., 1.00 @ 1.05 Emery—Grain, 1.00 @ 1.05 Flour, 1.00 @ 1.05 Epsom Salt—1.00 @ 1.05 Feldspar—Ground, 1.00 @ 1.10 Crude, 1.20 @ 1.30 Fluorspar—Powdered, No. 1, 2.00 @ 3.00 Lump, at mine, 3.00 @ 3.50 French Chalk, 1.10 @ 1.15 Fuller's Earth—Lump, 1.10 @ 1.15 Glauber's Salt—in bbls., 1.00 @ 1.05 Glass—Ground, 1.00 @ 1.05 Gold—Chloride, pure crystals, 1.20 @ 1.20 pure, 15 gr., c. v., 15 doz., 5.40 liquid, 15 gr., g. s. v., 15 doz., 5.50 Chloride and sodium, 15 gr., c. v., 15 doz., 5.60 Oxide, 15 gr., c. v., 15 doz., 5.75 Gypsum—Calcined, 1.25 @ 1.50 Land Plaster, 1.25 @ 1.50 Iodine—Resublimed, 30 @ 33 Iridium—Oxide, 1.00 @ 1.05 Iron—Nitrate, 40%, 1.01 @ 1.04 47%, 1.02 @ 1.04 Kaolin—See China Clay. Kieserite—1.00 @ 1.10 Lead—Red, American, 1.00 @ 1.05 White, American, in oil, 1.00 @ 1.05 White, English, 1.00 @ 1.05 Acetate, or sugar of, white, 1.00 @ 1.05 Granulated, 1.00 @ 1.05 Nitrate, 1.00 @ 1.05 Lime Acetate—Am. Brown, 1.00 @ 1.05 Gray, 1.15 @ 1.17 1/2 Litharge—Powdered, 1.00 @ 1.05 English flake, 1.00 @ 1.05 Magnesia—Crude, 1.00 @ 1.05 Calcined, 1.00 @ 1.05 Brick, 1.00 @ 1.05 Manganese—Ore, per unit, 1.00 @ 1.05 Oxide, ground, 1.00 @ 1.05 Mercuric Chloride—(Corrosive Sublimated) 1.00 @ 1.05 Powdered, 1.00 @ 1.05

- Marble Dust—1.20 @ 1.50 Metallic Paint—Brown 2.00 @ 2.25 Red, 2.00 @ 2.25 Mineral Wool—Ordinary slag, .01 1/2 Ground, 1.00 @ 1.05 Mica—in sheets according to size, 1st quality, 1.25 @ 1.60 Naphtha—Black, .25 @ .30 Nitre Cake—1.00 @ 1.05 Ochre—Rochelle, 1.00 @ 1.05 Washed Nat Ox'rd, Lump, 1.00 @ 1.05 Washed Nat Ox'rd, Powder, 1.00 @ 1.05 Golden, .03 @ .05 Domestic, 1.12 @ 1.20 Oils, Mineral—Cylinder, light filtered, 1.14 @ 1.16 Dark filtered, 1.10 @ 1.13 Extra cold test, 1.20 @ 1.24 Dark steam refined, 1.17 1/2 @ 1.19 Phosphor—5 @ 5.5 Precip., red, 1.00 @ 1.05 white, 1.00 @ 1.05 Platine Chloride—Dry, 1.00 @ 1.05 Plumbago—Ceylon, 1.00 @ 1.05 American, 1.00 @ 1.05 Potassium—Cyanide, 1.00 @ 1.05 fused, 1.38 @ 1.40 Bromide, domestic, 1.28 @ 1.32 Chlorate, English, 1.18 @ 1.18 1/4 Chlorate, powdered, English, 1.18 @ 1.19 Carbonate, 1.18 @ 1.19 Caustic, 1.18 @ 1.19 Iodide, 1.18 @ 1.19 Nitrate, refined, 1.18 @ 1.19 Yellow Prussiate, 1.18 @ 1.19 Red Prussiate, 1.18 @ 1.19 Pumice Stone—Select lumps, 1.00 @ 1.05 Original cks., 1.00 @ 1.05 Powdered, pure, 1.00 @ 1.05 Pyrites—Non-cupreous, p. units, 1.12 @ 1.15 Quartz—Ground, 1.00 @ 1.05 Rotten Stone, Powdered, 1.00 @ 1.05 Lump, 1.00 @ 1.05 Original cks., 1.00 @ 1.05 Rubbing stone, 1.00 @ 1.05 Sal Ammoniac—Lump, in bbls., 1.00 @ 1.05 Salt—Liverpool, ground, 1.00 @ 1.05 Domestic, fine, 1.00 @ 1.05 Common, fine, 1.00 @ 1.05 Turk's Island, 1.00 @ 1.05 Salt Cake—1.00 @ 1.05 Salt Peter—Crude, 1.00 @ 1.05 Soapstone—Ground, 1.00 @ 1.05 Block and slab according to size. Sodium—Frustrate, 1.00 @ 1.05 Phosphate, 1.00 @ 1.05 Stannate, 1.00 @ 1.05 Tungstate, 1.00 @ 1.05 Hyposulphite, 1.00 @ 1.05 Strontium—Nitrate, 1.00 @ 1.05 Sulphur—Roll, 1.00 @ 1.05 Flour, 1.00 @ 1.05 Sylvinit, 7 @ 7 1/2, S.O.P., per unit, 1.37 @ 1.4

- Talc—Ground French, 1.00 @ 1.05 American No. 1, 1.00 @ 1.05 American No. 2, 1.00 @ 1.05 Terra Alba—French, .65 @ .80 English, .65 @ .80 American, No. 1, .65 @ .80 American, No. 2, .65 @ .80 Tin—Crystals, in kegs or bbls., 14 @ 15 feathered or flossed, .20 Muriate, single, .07 @ .12 Double or strong, 54° B., .10 @ .15 Oxymur., or nitro, .19 Vermillion—Imp. English, 1.00 @ 1.05 Am. quicksilver, bulk, .57 @ .59 Am. quicksilver, bags, .58 @ .61 Chinese, .85 @ 1.00 Trieste, .90 @ .95 American, 1.14 @ 1.12 Zinc White—Am., Dry, 1.00 @ 1.05 American, No. 1, 1.00 @ 1.05 Paris, Red Seal, 1.00 @ 1.05 Muriate solution, .07 1/2 @ .08 Sulphate crystals, in bbls., 1.00 @ 1.05

THE RARER METALS.

- Aluminum—1.00 @ 1.05 Arsenic—(Metallic), per lb., .40 Barium—(Metallic), per gram, 4.00 Bismuth—(Metallic), per lb., 2.00 Cadmium—(Metallic), per lb., 1.00 @ 1.50 Calcium—(Metallic), per gram, 10.00 Cerium—(Metallic), per gram, 7.50 Chromium—(Metallic), per gram, 11.00 Cobalt—(Metallic), per lb., 2.00 Didymium—(Metallic), per gram, 3.00 Erbium—(Metallic), per gram, 7.50 Gallium—(Metallic), per gram, 14.00 Glucium—(Metallic), per gram, 12.00 Indium—(Metallic), per gram, 9.00 Iridium—(Fused), per oz., 12.00 Lanthanum—(Metallic), per gr., 10.00 Lithium—(Metallic), per gram, 10.00 Magnesium—(Powdered), per lb., 4.00 Manganese—(Metallic), per lb., 1.10 Chem. pure, per oz., 10.00 Molybdenum—(Metallic), per gm., .50 Niobium—(Metallic), per gram, 5.00 Osmium—(Metallic), per oz., 5.00 Palladium—(Metallic), per oz., 20.00 Platinum—(Plate), per oz., 39.75 Potassium—(Metallic), per lb., 2.00 Rhodium—(Metallic), per gram, 5.00 Ruthenium—(Metallic), per gm., 5.50 Rubidium—(Metallic), per gram, 2.00 Selenium—(Metallic), per oz., 11.80 Sodium—(Metallic), per lb., 50 @ 75 Strontium—(Metallic), per gram, .60 Tantalum—(Metallic), per gram, 39.00 Tellurium—(Metallic), per lb., 5.00 Thallium—(Metallic), per gram, .20 Thorium—(Metallic), per gram, 17.00 Tungsten—(Metallic), per lb., 5.00 Uranium—(Oxide), per lb., 35.00 Metallic, per gm., .20 Vanadium—(Metallic), per gm., 22.00 Yttrium—(Metallic), per gram, 9.00 Zirconium—(Metallic), per oz., 5.00

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

Main table of New York Mining Stock Quotations, listing companies like Adams, Alice, Amador, etc., with columns for dates (June 3-9) and sales.

\*Ex. dividend. \*Dealt in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 1,400. Non-dividend shares sold, 2,300. Total shares sold, 3,700.

BOSTON MINING STOCK QUOTATIONS.

Main table of Boston Mining Stock Quotations, listing companies like Allouez, Arnold, Atzet, etc., with columns for dates (June 2-8) and sales.

Dividend shares sold, 3,124. Non-dividend shares sold, 2,678. Total shares sold, 5,802.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Large summary table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, and Dividends, listing various mining companies and their financial details.

DIVIDEND-PAYING MINES.

NON DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Date and amount of last, Total paid, Date and amount of last, Name and Location of Company, Capital Stock, Shares, Assessments, Date and am't of last. Lists various mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,390,000. \*\* 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 (June 3-9), and Sale price. Includes stocks like Am. Coal, Balt. & Ohio, Buff. R. P., Cambria Iron, Ches. & Ohio, Col. C. & I., Col. Coal, Colorado Fuel, Col. H. V. & Tol., Col. H. Coal, Cons. Coal, Del. & Hud. C., Del., L. & West., Hunt. & B. Top., Lake Erie & West., Lehigh C. & N., Lehigh Valley, Maryland Coal, Morris & Essex, New Cent. Coal, N. J. Central, N. Y. L. & W., N. Y. L. E. & W., N. Y. Susq. & W., N. & West., Penn. Coal, Penn. R. R., Phil. & Reading, Tenn. C. & I., Wheel. & L. E.

Total shares sold, 171,630

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Name, Date (June 3-9), and Sale price. Includes stocks like Adams Express, Am. Cotton Oil, Am. Dist. Tel., Am. Express, Am. Sugar Ref., Edison E. I. L. Co., Edison Gen. El., Nat. Cord. Co., Nat. Lead Co., Nat. Linseed Oil, So. Cotton Oil, U. S. Express, U. S. Rubber, Wells, Fargo & Western Union.

Total sales, 231,430.

CALIFORNIA. San Francisco.

Table with columns for Stock Name, Date (June 2-8), and Bid/Asked prices. Includes stocks like Alpha, Belle Isle, B. & Belch, Bodie, Buller, Chollar, Com'w'ith, Con. C. & V., Crown Pt., Del Monte, Eureka Con, G'ld & C'y, Hale & N., M. White, Mexican, Mono, Mt. Diablo, Navajo, Nev. Qu'n, N. B'lieise, N. Co'w'ith, Ophir, Fotos, Savage, Sierra Nev, Uni'n Con, Utah, Yel. Jack.

Colorado Springs. June 3.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Anaconda Gold, Calumet, Cleopatra, Fanny Rawlins, Gold & Globe, Gold King, Isabella, Jack Pot, Jeff Davis, Lemhi, Matoa, Ophir, Orphan Bell, Pharmacist, Summit M. & M., Work, World.

Denver.

Table with columns for Stock Name, High, Low, and Sales. Includes stocks like Anaconda, Bangkok-Cora Belle, Diamond B., Gold Rock, Justice, Puzzler, Work.

Rico. June 3.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Atlantic Cable Cons. M. Co., Atlantic Cable guaranteed, Enterprise Mining Co., Iron Dollar Silver Mines Co., Southern Cons. Treasury Stock, Unelo Ned Co.

MARYLAND. Baltimore.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Balt. & N. C., Conrad Hill, Cons. Coal, Diamond Tunnel, G'orge's Creek Coal, Howard C. & C., Lake Chrome, Silver Valley.

MINNESOTA. Duluth. June 2.

Table with columns for Stock Name, Par, Bid, and Asked prices. Includes stocks like Biwabik M. Iron Co., Cincinatti Iron Co., Clark Iron Co., Cosmopolitan Iron Co., Great Northern Min. Co., Kanawha Iron Co., Keystone Iron Co., Lake Superior Iron Co., Lincoln Iron Co., Little Mesaba Iron Co., Mesaba Moun. Iron Co., Minneapolis Iron Co., Mountain Iron Co., Shaw Iron Co., Security Land & Exp. Co., Washington Iron Co.

UNLISTED STOCKS.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Adams Iron Co., Allegheny Iron Co., Aurora Iron Co., Buckeye Iron Co., Buffalo Land & Exp. Co., Camden Iron Co., Chandler Iron Co., Chicago Iron Co., Charleston Iron Co., Champion Iron Co., Cleveland Iron Co., Columbia Iron Co., Commodore Mining Co., Comstock Iron Co., Dayton Iron Co., Detroit Iron Co., Elmina Land & Iron Co., Great Western Mining Co., Hall Iron Co., Homestead Iron Co., Horton Mining Co., Imp. Iron Mt. Mining Co., Kalkina Iron Co., Kentucky Iron Co., Lackawanna Iron Co., Macomber Mining Co., McCaskill Mining Co., McKinley Iron Co., Mesaba Chief Iron Co., Mesaba Iron Co., Mesaba Mineral Co., Minnesota Iron Co., Myrna Iron Co., Northern Light Iron Co., New England Iron Co., Ohio Mining Co., Oneota Iron Co., Ophir, gold, Pennsylvania I. & S. Co., Putnam, Republic Iron Co., Red Hematite Iron Co., Standard Ore Co., Stowell Iron Co., Towanda Iron Co., Ver. & Mesaba Iron Co., Zenith Iron Co.

MISSOURI. St. Louis. June 7.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Adams, American & Nettie, Bi-Metallic, Elizabeth, Granite Mountain, Hope, Leo, Pat Murphy, Small Hopes.

MONTANA. Helena.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Bald Butte, Benton Group, Combination, Cumberland, Elizabeth, Florence, Helena & Victor, Iron Mountain, Peorinan, Whittach Union & MacIntyre, Yellowstone.

PENNSYLVANIA. Philadelphia. June 8.

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Bloomington C. & C., Buck Mountain C., Cambria, Connellsville Gas Co., Excelsior B. & S., Locust Mt. C. & I., Penn. Steel, Penn. Gas Coal, Royal Gas, Westmoreland C., Bridgewater Gas Co., Cartiers Val. Gas, Enterprise Mining Co., Hidalgo Mining Co., La Noria Mining Co., Luster Mining Co., Manufacturers' Gas, N. Y. & Clev. G. C., Pennsylvania Gas, People's N. G. & P. Co., Philadelphia Co., South Side Gas, Tuna Oil, Wheeling Gas Co., Whoseing Air Brake Co.

London Quotations. May 23, 1893.

Table with columns for Buyer, Seller, and prices. Includes stocks like Alaska Treadwell, Alaska Ter, Almada & Tiritto, American Belle, Big Creek, De Lamar, Elkhorn, Emma, Flagstaff, Golden Feather, Golden Gate, Golden Leaf, Holcomb Valley, Jay Hawk & Lone Pine, La Plata, Maid of Erin, Mammoth Gold, Mesquital del Oro, Mex. P., Mesquital del Oro, Mex. D., Montana, Mount McCluar, New Eberhardt, New Guston, Old Mont., Old Lout, Pacific, Palmarajo, Pinos Altos, Poorman, Richmond Con. Nev., Seven Stars, Sierra Buttes, Eur., South Poorman, United Mexican, Yankee Girl.

Paris. May 25.

Table with columns for Stock Name and Francs. Includes stocks like Belmez, Golden River, Laurium, Lexington, Nickel, Rio Tinto, Ophir, Tharsis, Vieille-Montagne.

New York Mining Stocks. (Latest quotations.)

Table with columns for Stock Name, Bid, and Asked prices. Includes stocks like Alice, Alta, Belcher, Best & Belcher, Bodie, Breece, Bulwer, Caledonia, Con. C. & Va, Crown Point, Deadwood, El Cristo, Enterprise, F. De Smet, Gould & Curry, Hale & Nor, Horn Silver, Iron Silver, Kingston & Pem, La Crosse, Leadville, Little Chief, Mono, Navajo, Ophir, Plymouth, Savage, Sierra Nevada, Union, Utah, Yellow Jacket.

ASSESSMENTS.

Table with columns for Company, No., D't nqt in office, Day of sale, and Amt. per sh're. Includes companies like Alpha Con., Chollar, Con. New York, Con. St. Gothard, Der Bee B. Grav, Gray Eagle, Jack Rab't, Justice, Lady Washington, Mt. George, No. Belle Isle, Overman, Silver Hill, Siskiyou Con., Cal.