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In another column we publish a communication from Mr. EDWARD ATKINSON, of Boston, one of the soundest and most eminent writers upon economic questions of the present day. Mr. ATKINSON is known as an earnest bimetalist, and his views, from the standpoint of the political economist, unprejudiced by partisan opinions or ambitions, merit the careful attention of our readers.

THE tariff on bituminous coal has caused trouble on the Pacific slope. No anthracite coal, which is admitted duty free, exists on that coast, certain mines of British Columbia furnishing the necessary supply. Now, local producers claim that bituminous coal is being imported from British Columbia, consigned as anthracite, and have brought the matter to the attention of the Secretary of the Treasury.

THE Seven Devils district in Idaho is probably attracting more attention, at the present time, than any of the new mining regions now being opened in the Northwest. According to reports there has been a considerable influx of miners and prospectors into the region and the country immediately adjacent during the past three months, but as yet there has been nothing like a "boom," and it is not to be expected that there will be. There is no doubt that there is much rich copper ore in this district, the surface showings being large and promising. Comparatively little work has been done in any of the mines, as yet, however, and as none of the veins have been opened to any depth it is impossible to form sound opinions concerning their extent and permanency. Several of the companies which have commenced operations there are backed by ample capital, and it is certain, that the development of the mines will progress as rapidly as circumstances will permit. Work will necessarily

be slow, on account of the inaccessibility of the region and the difficulty in shipping ores, it having been within the present summer only that a wagon road has been opened to the mines. The scheme to establish communication with the district by means of a steamboat on the Columbia River does not seem to have been a success.

MR. ALFRED E. HUNT, president of the Pittsburg Reduction Company, in a paper upon the "Properties, Uses, and Processes of Production of Aluminum," read before the Society of Arts of the Massachusetts Institute of Technology, in Boston, February 12th, 1891, gave an estimate of the probable cost of aluminum when made by the electrolytic process in much larger quantities than have yet been produced. Under such favorable conditions, he believed the metal could be made for 20 cents a pound. It was not to have been expected that we should at this time, so soon after the birth of the new manufacture, see the selling price reduced to anything near the low figure named. But the manner in which the price has been reduced during the past six months has surpassed the dreams of the wildest enthusiast in this branch of metallurgy.

Three years ago aluminum was quoted at \$4. per pound. In 1888, after the Pittsburg Reduction Company commenced the production of the metal, it was reduced to \$2 per pound, which price was maintained until the early part of the present year, when aluminum over 97 per cent. pure was offered for \$1 per pound, and over 90 per cent. and less than 97 per cent. pure for 90 cents per pound. Since then the price has been still further reduced, and we are informed that recently aluminum 98 per cent. fine and better has been offered in England in ton lots for 81 cents per pound by three different concerns, the Neuhausen, the Castner, and the Hall companies, while the Cowles Syndicate Company is reported to have sold its metal f. o. b., New York, at 90 cents per pound, which must have been equivalent to 73 cents per pound at the works. We are also informed that a high-grade, pure aluminum has been sold in Germany for 68 cents per pound.

During the past week the Cowles Electric Smelting and Aluminum Company, of Lockport, N. Y., has lowered the price of commercially pure aluminum to 50 cents per pound, in ton lots. At this rate aluminum is, in proportion to its bulk and many of its useful physical properties, as cheap as copper and considerably cheaper than tin, and, if it continues to be offered at the new price, will undoubtedly rapidly come into use for many of the purposes for which those metals are now employed.

ELECTRICAL SUBWAYS.

The final report of the Brooklyn Board of Commissioners of Electrical Subways, issued two years ago, still remains the best summary statement of the municipal problem with which it deals. In one noteworthy particular the opinion and prophecy of the Board have received a striking confirmation. I refer to the matter of the corrosion of lead in conduits of creosoted wood. This evil was at one time very threatening, and so important that, although it constituted the only serious objection to the use of such wooden conduits, it might have counterbalanced, if remedy had proved impracticable, all the great advantages of that material. One concern at least, engaged in the manufacture of lead-covered cables, declined to guarantee them if laid in creosoted conduits.

The remedies suggested were two: the alloying of the lead with about four per cent. of tin—which, however, rendered the cables both more expensive and more difficult to manufacture; and the use of a fibrous covering, which was somewhat objectionable on other grounds. The Brooklyn board, however, caused careful laboratory tests and analyses to be made, and announced in its final report that, in its opinion, the corrosive agent is "phenol, which, being highly volatile, either escapes from the wood in the process of seasoning, or could be expelled more rapidly, if required, by artificial means." The frequent occurrence of the phenomenon of corrosion in different cities was no doubt due to the haste with which underground conduits were everywhere constructed during that period of spasmodic reform under "scientific" legislation. Experience has proved that the Brooklyn board was right. The two-year-old Brooklyn conduits do not now corrode lead—even pure lead—appreciably; and in some other cities where the authorities and electrical companies were almost ready, in a panic, to abandon the system, the simple lapse of time has cured the difficulty.

The underground system in Brooklyn seems to be running so peacefully and successfully that it is never heard of. If the legislature had not summarily abandoned the whole experiment, that city might now be a model in the extent, as it is confessed to be in the simplicity and perfection, of its subways. The present situation in Brooklyn is, that there is no interference with the extension of overhead wires of all kinds, and no official control of their installation. In the final report of the late board an important list of all the electric-light wires was given, with careful designation of every line where the insulation was dangerously defective. This list the Brooklyn newspapers did not reprint; nor have the city authorities, so far as I know, taken any action upon it. Meanwhile, by the lapse of later statutes, the old law of 1884, with certain amendments

of 1885, has been left in force; overhead wires are prohibited; there is no authority anywhere to authorize or control their installation; and it is the duty of the municipal government to remove them—all of which is, of course, a dead letter.

As for the situation in New York City—who can tell what it is?

R. W. R.

THE FREE COINAGE DISCUSSION.

Senator STEWART never tires of saying that the debts of the farmers and producers of this country "were more than doubled, while the price of their property was reduced more than one-half, by the demonetization of silver," but at the same time he ought to know that this statement is not true; since thus far, a gold and silver dollar have the same value. If, as he claims, the free coinage which he advocates would not depreciate silver, how would it be easier for the farmer to get a silver dollar than now, if its value in gold were the same? If, on the other hand, the silver dollar should become easier to get—that is, if it should become depreciated (as we claim it would) as compared with gold—then the gold would disappear, and there would be less money—less circulating medium—than now, and a disastrous panic would ensue. Surely, if the present amount of circulating medium is already too limited, the farmers and producers serve their own interests best by maintaining a currency in which gold and silver will both remain in circulation. They have no interest in the seigniorage on silver, and this is just where Senator STEWART and Senator JONES, of the Comstock mill ring, and other large producers of silver and gold are interested very largely. There is every indication that their personal interests alone are the foundation of their agitation of the question of free coinage.

The value of commodities, especially food products, goes down or up from causes other than the free or not-free coinage of silver, as is shown clearly in the diagram published in the ENGINEERING AND MINING JOURNAL, July 25th.

Senator STEWART complains of unfounded statements and rudeness on the part of Mr. CLEWS, Mr. CARNEGIE, and others; but, so far as we have seen—and we believe we have read the entire discussion on the silver-coinage question—Senator STEWART is by far the most reckless of all the writers in the use of statistics, either willfully or ignorantly misstating them, as we have shown on several occasions in these pages; and he is perhaps the most personal and abusive of the writers whose communications we have seen.

Senator STEWART's effrontery in his constant denunciation of the fraudulent and dishonest character of the mint bill of 1873, in which gold was made the sole standard, has been well shown by Mr. JOHN C. MICHELS, who quotes again the fact, repeatedly proved, that Senator STEWART himself not only voted for that bill, but advocated the gold standard. Now Senator STEWART declares that he did not understand the meaning of that bill, and that he "denies all knowledge of the transaction." The unblushing manner in which he misstates statistical facts easy of reference, and with which he should be quite familiar, lessens the strength of his present denial; but it really makes little difference which horn of the dilemma he chooses: whether he "has no knowledge of" or did not understand what he claims was the most important act of legislation with which he was ever connected, and which he cannot deny having voted for, or advocates now the other side of the question because his personal interest and that of a few of his Nevada friends are centered in it. A man who says he did not understand the most important act of his legislative life is surely a bad adviser to follow when we know he is advocating his personal interests.

All the gold, silver, copper, and nickel in the world, if all made legal tender and given free coinage, would not suffice to carry on the business of the world if transactions had to be settled in coin. It is the increase in facilities for exchanging products and balancing transactions that has at the same time increased the volume of business and diminished the need of coin. If Senator STEWART were as desirous as he would have people believe for the welfare of farmers and others, he would exert his powers to bring about a great central clearing-house for each county, and an international clearing house through which national balances might again be settled. The final balances would require but very little of the money of ultimate redemption, and perhaps the gold of the world would easily suffice for it, while the silver would be the small change of which Mr. MEYERS spoke in his excellent answer to Senator STEWART. By thus increasing the supply relatively to the demand he would give the farmer more money.

Senator STEWART says that an international agreement for bimetallism is not possible. We do not accept this as authoritative. On the contrary it seems to us quite possible; but if it is not brought about, what reason has Senator STEWART to think that our adoption of free coinage of silver would increase the price of silver and keep it at par with gold at our coining ratio of 16 to 1? Why does not free coinage in India do this? Senator STEWART can take all his silver bullion there and coin it, and it will not change the market price of silver a particle in the world's

market, and he certainly cannot there get a gold dollar for a silver one. No gold circulates there. Why should it here, under free coinage of silver?

Supply and demand alone control prices, but to enact free coinage of silver here would take away the chief purchaser in the world for silver, the United States Government, and it would not create any new market or demand for silver. All it would do would be to give the silver producers the seigniorage which the whole people now get, and this only so long as silver would bring nearly its coining value in gold. This would not be long, and then silver here, as in other free-coinage countries, would be worth its bullion value, whether coined or not.

There is no bimetallism possible under free coinage here—for the European countries will very gladly give us silver and take all our gold. It is only through international concert that bimetallism can become effective, and that both gold and silver can circulate together at the value ratio that may be adopted.

If "cheap silver" gives gold-standard countries an advantage over those having free coinage of silver, as Senator STEWART affirms, then why does he wish to give them an advantage over this country by adopting free coinage here?

What right has Senator STEWART to speak for "the people of the United States," or even to denounce the (mythical) "gold trust"? Was there ever a worse or more corrupt or more oppressive "trust" than that of the Comstock mill ring, for which he is the champion? and is there any community in this country where the employers are such tyrants and the employes so defrauded as that governed by the great "silver ring"?

Virginia City, Nev., has more poor, in proportion to its population, than probably any other place in the country, and that is the property of the Nevada mill ring, the strongest advocates of the rights and interests of the farmers. Surely such wordy philanthropy as they parade should show some fruits at home.

Senator STEWART says that the producers of silver "have suffered a discount of more than a hundred million dollars on the silver they mined." This is no more truthful than his quotations of statistical facts. Silver producers have sold their product at its market price, and have no more lost the seigniorage, the difference between the bullion and coinage price, than the copper or nickel producers have lost the difference between the market and coining prices of these metals. Copper was coined from time immemorial, and is yet coined. Why should not the producers of that metal clamor for the free coinage of copper? Probably, if the Comstock mill ring were copper producers, we would have the papers full of this "demand" also, and it would be claimed that, because all the gold and silver in the world would not suffice to carry on the business of the world, if we should do away with the modern conveniences of balancing transactions through clearing-house methods, therefore copper should be re-monetized and be given free coinage.

The paper manufacturers may also claim that they are defrauded, and have lost the difference in the value between the paper in \$10 or \$20 bills and that for use in letter paper, for example. But this kind of wild statement, which pervades all Senator Stewart's letters, cannot deceive many. It is the seigniorage on silver he wants; but if he should get free coinage without international bimetallism, he would do more injury to the country than many times the whole silver production is worth.

The ENGINEERING AND MINING JOURNAL urges international agreement on a value ratio, at which all nations will take silver or gold as presented, and nothing short of this will do. Free coinage, without the concurrence of other commercial nations, would be ruinous to this country.

BOOKS RECEIVED.

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

Annual Report of the Chief of the Bureau of Steam Engineering for the Year 1890. Illustrated, 77 pages. Washington, D. C., 1890.

Electric Transmission Handbook. By F. B. Badt, late First Lieutenant Royal Prussian Artillery. 22 illustrations and 27 tables, 97 pages. Published by Electrician Publishing Company, Chicago, Ill., 1891. Price \$1.

Handy List of Technical Literature. Part IV.: Handy List of Books on Mines and Mining, Assaying, Metallurgy, Analytical Chemistry, Minerals and Mineralogy, Geology, Paleontology. An alphabetical reference catalogue arranged under authors and subjects, and a short list of important works in the German language. Compiled by H. E. Haferkorn. 87 pages. Published by H. E. Haferkorn, Milwaukee, Wis., and Gay & Bird, London, 1891. Price \$1.

Second Annual Report of the Geological Society of Texas, 1890. E. T. Dumble, State Geologist. Containing: *Reports on the Iron-Ore District of Eastern Texas; Carboniferous Cephalopods*, by Alpheus Hyatt; *Report on the Geology of Northwestern Texas*, by W. F. Cummins; *Report on the Geology and Mineral Resources of the Central Mineral Region of Texas*, by Theodore B. Comstock; *Report on the Geology and Mineral Resources of Trans-Pecos Texas* by W. H. von Streruwitz. Illustrated. 738 pages. Austin, Texas, 1891.

"The Electrician" Primers. A series of helpful primers on electrical subjects, for the use of students and general readers. Vol. I, Theory, Vol. II, Practice. Illustrated. Published by "The Electrician" Printing and Publishing Company, Ltd., London, 1891. Price 2s. each.

NEW PUBLICATIONS.

TABLES FOR THE DETERMINATION OF MINERALS BY PHYSICAL PROPERTIES, ASCERTAINABLE WITH THE AID OF A FEW FIELD INSTRUMENTS; BASED ON THE SYSTEM OF DR. ALBIN WEISBACH. By Persifor Frazer, D. Sc., F. G. S. A., Professor of Chemistry, Franklin Institute, etc. Pp. 115. J. B. Lippincott Company, Philadelphia, publisher. 1891.

This is the third edition of a well-known work which has been of much value to mineralogists. The first edition was published in 1874; the second in 1877; in the third (1891) the tables have been entirely revised, not a line remaining from the preceding, so that it, practically, forms a new book.

The first edition of this work was originally meant to be a translation of Dr. Weisbach's "Tabellen zur Bestimmung der Mineralien," with improvements, but the changes and additions introduced to meet the wants of American readers made it virtually a new book, among other things the chemical formulæ of minerals being recalculated according to the "new"—really the old—chemical theory, of which no account was at that time taken at Freiberg, pre-eminently the physical school of mineralogy, where the symbol of the water molecule was still written HO.

In the last edition of Dr. Frazer's book the formulæ of former editions have been replaced by those of Dr. P. Groth, who has been made the standard authority on crystal systems and chemical formulæ, throughout the work; in color streak, hardness, tenacity, cleavage, and fracture, Dr. Weisbach has been taken as the standard, as in former editions.

A new departure has been made in some of the terms used in describing the appearance of minerals, the purpose being to secure more literal translations of the graphic and comprehensive German words, the English language lacking in many instances the exact synonyms. An example will illustrate the change. "Eingesprengt" has hitherto been rendered "disseminated" and "diffused." Dr. Frazer adopts the word "interspersed," which certainly conveys more nearly the meaning of the German word. Some of the terms that are used impress the reader, at first, as odd, through unfamiliarity. It is evident, however, they have all been carefully considered, and, we think, constitute a decided improvement in the descriptions of minerals, which are necessarily brief in a work of this kind.

According to Dr. Frazer's system, minerals are divided into three classes: I., those of metallic luster; II., those of submetallic and non-metallic luster, and III., those of non-metallic luster and white or light gray streak. The first class is subdivided into minerals of (1) red, (2) yellow, (3) white, (4) gray, and (5) black colors; the second into minerals with (1) black, (2) brown, (3) red, (4) yellow, (5) green, and (6) blue streaks; and the third into minerals (1) very sectile, (2) sectile, (3) semi-hard, (4) hard, and (5) very hard.

The determination of minerals is worked out through these series by their physical characteristics mainly, the purpose of the volume being to serve as a pocketbook for use in the field.

The synonyms of minerals have been more largely given in this than in previous editions, which is an important improvement. In some cases, sub-varieties have been added after the synonyms. Addenda to the tables are scales of hardness and fusibility, and an historical list of the elements, the last being that prepared by Prof. F. W. Clarke of the United States Geological Survey, in which atomic weights are calculated upon the basis $O = 16$. The new edition of Dr. Frazer's work is a decided improvement upon the old, and its increased value will undoubtedly be recognized by mineralogists.

MEMOIR AND LETTERS OF SIDNEY GILCHRIST THOMAS, Inventor. Edited by R. W. Burnie. 314 pages. John Murray, Publisher. London, 1891.

A brief story of a brief life is here told, and so well told that few of the many biographies of inventors that have preceded have equal power to hold the reader's attention from the first page to the last. Born in 1850, Sidney Gilchrist Thomas was unknown to fame until he was 27 years of age. Within two years thereafter he was known far and wide as one of the great inventors of the century. In another year he had contracted disease of the lungs, which caused his death before he was thirty-five. His invention, the dephosphorization of steel in the Bessemer converter, first made public in 1878, has proved of such value to the steel industry that no less than 2,600,000 tons of steel were made by his process in the year 1890. Such is the bare statement of his life and his work, but the memoirs and letters before us give us such an insight into his personality that the story of his invention, and how he made it, impresses us less than the story of himself and his character.

Sidney Gilchrist's father was a Welshman in the civil service, who was enabled to give his son a good education, preparing him for the London University, where Sidney himself chose to matriculate, with the intention of becoming a physician. His father died, however, when Sidney was not yet 17. His mother says: "Sidney sat down by his father's bedside a boy; from his grave he passed out a man." He refused to matriculate at the university, and took the first position that offered by which he could aid in supporting the family. For a short time he held a classical mastership in an Essex school, and then, disliking the drudgery of teaching, took a civil-service nomination to a clerkship in the metropolitan police courts, beginning with a salary of £90 per annum. Here he remained as junior clerk, his salary never increasing beyond £200, for 12 years. He disliked the work exceedingly, but buckled to it with energy, and mastered the practice and procedure to such an extent as to make himself an accomplished criminal lawyer. With such employment and in such surroundings who would expect that he could, even before he resigned his clerkship, become famous as a student of science and as an inventor? The means by which he was enabled to accomplish this achievement was an arrangement he made during a few years of his clerkship to get two days in the week free, which he devoted to the study of science. For 10 years he led a double life, seven or eight hours of each of his working days being devoted to earning his living by the clerkship, giving the rest of his time to his studies, chiefly in the line of chemistry and in researches in a laboratory established at home.

In 1870 he attended a course of lectures in chemistry given by Mr. Chaloner, who in the course took occasion to say that the man who eliminated phosphorus by means of the Bessemer converter would make his fortune. No doubt, says his biographer, Sidney looked forward to the realization of riches should he discover the secret of dephosphorization,

In 1873 he passed the School of Mines examination in mineralogy and in inorganic chemistry. In 1873 he began writing for *Iron*, and was a regular contributor to that journal for the next six years. In 1874 he passed examinations in steam and applied mechanics. In the same year he spent a holiday with his cousin, Percy Gilchrist, then chemist to the Cwm Avon works, in Glamorganshire, and attended the meeting of the British Association in Belfast. In 1875 he was already at work on his scheme for dephosphorization. In one of his letters he says: "I am over ears in a technical experimental investigation which is likely to last me considerably, and then perhaps to have no result; but, after all, life is very little else than the pursuit of crotchets, the pursuit being the best part of it." In the end of this year he had solved the problem, theoretically and provisionally, and it now lacked only experimental demonstration. Early in 1876 he wrote to Mr. Gilchrist, communicating his theory in detail, as well as the lines on which he thought it could be proved or disproved. Gilchrist at first deemed the whole thing a chimera, but undertook, nevertheless, to make some experiments, Thomas devising the methods and materials. In August, 1876, he writes to Gilchrist as follows:

My impression is, a biggish wrought-iron crucible would be as good for experimental converter as anything, and would be easy to try various linings in. The tuyeres might be pieces of wrought-iron gaspipe covered with fireclay and with fire clay stopper perforated laterally.

Shortly afterward Mr. Gilchrist left the Cwm Avon works and became chemist of the Blaenavon works, then under the management of Mr. Edward Martin. In the summer of 1877 Gilchrist began experiments in earnest, Thomas constantly criticising results from London and suggesting further trials. In the rough shed on the Welsh hillside many scores of "blows" were made with the greatest energy and enthusiasm; blows conducted in the late evening or night, for the chemist had to work in secrecy in his leisure hours. In the mean time Thomas snatched a day or two occasionally from his drudgery at the police court, and made hasty trips to Blaenavon. During one of these trips he overstrained his lungs by running for a train, and fell in a fainting fit. To this strain may perhaps be ascribed the emphysema which eventually set in, and which resulted in his death seven years later. The mental strain undergone by Thomas at this time was enormous. Besides his work at the police court, he continued his contributions to *Iron*, wrote papers for and attended the meetings of the Chemical Society, continued his study of the dephosphorization problem, and with it all made an exhaustive study of English and foreign patent law, and searched all the patents having any bearing upon his problem. In November, 1877, he applied for his first patent, the complete specification being filed the following May. Events, however, moved so quickly that in July, 1878, Thomas says, "I regard this patent as somewhat out of date," and, in fact, patent succeeded patent down to the day of his death.

Up to this time the cost of the experiments made a serious drain upon the inventor's purse. He had saved no less than £800 out of his salary during his 10 years' servitude at the police court, which was all to be devoted to "the cause." Early in 1878, fortunately, the financial difficulty was solved. Mr. Edward Martin, the manager of the Blaenavon works, said to Mr. Gilchrist: "I know you young men have some secret work on hand. I think it would be well if you put confidence in me." Confidence was put in him, and Mr. Gilchrist's analyses were submitted to him. He at once afforded facilities for further experiments at Blaenavon on a larger scale, and undertook personally to purchase a share in the patent. Mr. Martin threw himself into the enterprise with energy, and his suggestions and experience were found to be invaluable. In March 1878, the first public announcement of the new process was made, but it attracted no particular attention. It was during the discussion, at the meeting of the Iron and Steel Institute, of Mr. Lowthian Bell's paper on dephosphorization in vessels lined with oxide of iron. At the end of the discussion Mr. Thomas arose and said:

It may be of interest to members to know that I have been enabled, by the assistance of Mr. Martin, at Blaenavon, to remove phosphorus entirely by the Bessemer converter. Of course, this statement will be met with a smile of incredulity and gentlemen will scarcely believe it, but I have the results in my pocket of some hundred and odd analyses by Mr. Gilchrist, who has had almost the entire conduct of the experiments, varying from the very small quantity of 6 lbs. up to 10 cwt., and the results all carry out the theory with which I originally started and show that in the worst cases 20% of phosphorus was removed, and in the best I must say that 99% was removed; and we hope that we have overcome the practical difficulties that have hitherto stood in the way.

Concerning this announcement, Mr. Chaloner afterward said, in *Iron*: "We will remember the sneer as well as the smile of incredulity" which spread over that meeting. No observation of any kind was made by any one.

The experiments continued with increasing success, and now began Thomas's struggles for patents and for the introduction of the process. He writes, May, 1878: "I am up to my ears still in patents. I shall have a hard fight, but, even if beaten, fighting does one good. I have not yet heard whether they have granted my German patent. They refuse a great number." In July he writes: "I am now fighting Krupp, of Essen, and the Bochum Steel Company. As they write their objections in German, and require to be confuted from German authors, this is not easy."

In September, 1878, Thomas and Gilchrist attended the meeting of the Iron and Steel Institute in Paris. They had prepared a paper on "The Elimination of Phosphorus," which was put down for reading, but was removed to the bottom of the list of papers and left unread for lack of time. The paper was distributed among members, however. During an excursion to Creusot after the meeting Thomas discussed the process with E. Windsor Richards, manager of Bolekow, Vaughan & Company's works, at Middlesborough, and the results of the discussion secured the immediate commercial success of the process. In April, 1879, experiments were made by Mr. Richards in 30-cwt. converters in presence of some of the leading gentlemen of Middlesborough. The news of the success spread rapidly far and wide, and Middlesborough was soon besieged by the combined forces of Belgium, France, Prussia, Austria and America.

The continued success of the process until the present time is a matter of common history. It was not until May, 1879, when the commercial success of the process was assured, that Thomas resigned his clerkship in the police court, after a service of 12 years. Then followed a year of intense activity. Thomas traveled over the continent, visiting all the

important steel works, fought a powerful combination of German manufacturers formed to defeat his patents, and gained the victory over them in the courts, compromised a claim by Mr. Snelus for a patent in basic linings, and negotiated the sale of the American patents. In September, 1880, he contracted a cold at Wiesbaden, which developed into a settled cough. By the advice of his physician he spent part of the winter in the Isle of Wight. In March, 1881, he sailed for the United States, where for three months he underwent a siege of receptions, lunches, speeches, and visits to steel works which would tax the strength of one in robust health. The story of his American trip is briefly told in his own letters. The next four years were spent largely in travel in the vain endeavor to get rid of the lung disease. He tried the Continent, then Devonshire, then made a trip to South Africa, spent a short time in India and another in Australia, then hurried home by the way of the United States. The next winter, 1883-84, and the following spring he spent in Algiers, returning to Paris in July, 1884, where he remained until his death, February 1st, 1885.

A very small part of the memoir is devoted to technical matters. The book consists largely of letters written by Mr. Thomas to his mother and sister, and to a cousin, Miss Burton, and they are chiefly devoted to incidents of travel. As a book of travels it is highly interesting, showing great powers of observation, cheerfulness, and humor, with the usual hopeful spirit which so fortunately is generally characteristic of consumptives. Thomas' letters show no trace of the disease which for seven years undermined his health.

While the incentive which spurred Thomas to make this great invention was no doubt the pecuniary reward it might bring, still this reward was sought, not for its own sake, but for the good he might do with it. During his illness his great subject of anxiety was that the money be left behind him as the reward of his inventions and the fruit of his toil should be spent, after a moderate provision had been made for his mother and sister, upon bettering and making somewhat easier the hard lives of the toilers. Over and over again he impressed upon his sister the sacred trust he bequeathed to her. Her discretion as to ways and times, subject to certain general lines which he laid down, was to be absolute; but to the workers the money was in the bulk to go. His biographer concludes with the following: Thomas' plans for the disposal of his money for the benefit of the toilers have (it is probably unnecessary to say) been carried out by those loved ones he left behind, and many a life has been gladdened by the results of his labors. Truly his short life has a completeness lacking to many long ones, and of him it may, indeed, be said, *Finis coronat opus*.

CORRESPONDENCE.

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The Free Coinage of Silver.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: You ask me if the free coinage of silver dollars is necessary or desirable at the present time, or if not, under what conditions it would be desirable?

Under the present acts of legal tender the free coinage of silver dollars of the present weight would, in my judgment, bring on such a disastrous restriction of credit and for the moment so reduce prices for lack of credit, while throwing labor out of work, as to make it an act of fraud on the community.

Under other conditions there would not be the least objection to the government manufacturing coins of gold or silver named dollars to any extent that any person or persons might desire who should bring gold or silver bullion to be manufactured or coined. The coinage of metallic money is nothing but a manufacture of round discs of metal—sometimes made of gold, sometimes made of silver—at an exact weight for each coin with some alloy mixed in exact proportion.

These round discs have been named dollars. They might be named anything else without altering the conditions. So far they are worth a fraction more than the bullion, because the government has justified the weight and the fineness of the metal. So far they are worth within a fraction, after they are melted, of what they were worth in the round discs which had been stamped by the government. What possible harm could come from manufacturing as many of these round pieces of metal as any one wanted and could afford to pay for in bullion, if there were no act of legal tender under which a man who had promised a disc of gold could meet the contract in a disc of silver worth much less?

The question at issue is not a question of coinage. It is a question of the law of legal tender. If a man contracts to deliver 10,000 pounds of grain or of cotton or of wool and then offers to deliver 10,000 troy pounds of only 5,760 grains each, he is a knave. He knows that the contract obliges him to deliver avoirdupois pounds of 7,000 grains each. The man who held a contract from a seller to deliver to him 10,000 pounds of cotton, of grain, or of wool and who should allow the seller to impose troy pounds on him under the name of pound, weighing 5,760 grains each, would be a fool. The avoirdupois pound and the troy pound are both lawful in their places. One is less in weight than the other by about 18%.

The silver dollar is worth less than the gold dollar by about 18%. Now, is not a man who tries to get free coinage of silver dollars of the present weight in order to supply cheap dollars for the payment of debts a knave? Would not the man who grants a credit that will expose him to be forced to take such cheap dollars be a fool, after he had taken notice of the danger?

Men are not fools. Credit is restricted and prices are now very low, partly in consequence of the threat of this knavish action. Would not an act of Congress that would force a creditor to take cheap dollars worth 18% less than what had been promised him without the power to refuse, be a fraud? Such an act ought to be entitled *An Act to Forbid Credit by enabling debtors to defraud their creditors*.

Boston, Mass., July 31, 1891.

EDWARD ATKINSON.

"A New Departure in Matte Smelting for Copper and Silver in Reverberatory Furnaces."

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The practice at the Willows Copper (Argentiferous) Syndicate's works, at Pretoria, South Africa, as outlined in Mr. W. Bettel's communication published in the ENGINEERING AND MINING JOURNAL of July 18th, under the caption, "A New Departure in Matte Smelting for Copper and Silver in Reverberatory Furnaces," contains some very interesting and suggestive points which will be appreciated by every one engaged in the profession of smelting.

A striking peculiarity of the smelting at Pretoria is the formation of an antimonial copper speiss, which serves as the carrier, instead of copper and iron sulphide (matte) to which we are more accustomed. That this substance acts as effectively as any sulphur compound, and probably as much so as metallic lead, in extracting the precious metals, I know from my own experience. The relative efficiency of different mattes and speisses as carriers of gold and silver is a very important subject in this form of smelting, and one to which I have given an amount of attention not previously bestowed upon it, and I hope to communicate the results of certain experiments in this line in a future letter to the ENGINEERING AND MINING JOURNAL.

The accident of the furnace bottom at the syndicate's works absorbing many tons of matte is not by any means unprecedented. Instances are on record where the entire vault of a reverberatory smelting furnace has been filled up solid with matte. But as the Pretoria furnace inexplicably contained no vault, the metal penetrated the porous ground instead, sinking therein to the great but not unheard-of depth of 4½ ft. Faulty construction of the furnace and the extremely fusible and liquid character of the speiss are the apparent reasons for this misfortune, which, comparatively trifling in itself, might, through loss of confidence, very conceivably wreck an inexperienced company. To build a smelting reverberatory without the lower vault, which is the usual means of keeping the bottom cool and preventing the metal from escaping, betrays an ignorance of principle and precedent entirely inexcusable in this age of enlightenment. But if the original designer of the furnace went to the extreme of leaving out the vault, Mr. Bettel certainly went to the other, of providing in addition to the vault the smaller air passages or flues parallel to the vault and above it, and which, aside from their function of carrying and pre-heating the mixed steam and air by which the combustion is assisted, can have little or no value in keeping the hearth cool, and must inevitably in time become filled up with speiss which will surely find its way into them. This form of construction is similar to one that I advocated some years since, with the difference that I proposed using a series of round or square tubes of fireclay, placed parallel and at sufficient depth below the sole to obviate leakage, and communicating with each other and with the ashpit so as to furnish hot air for combustion. It would be in effect a kind of heat drainage, so to speak, similar to the aqueous drainage of soils by means of tiles, so much practiced by farmers. As in land drainage the tiles are placed in parallel rows near enough to control the water in the soil between them, so the fireclay tubes or tiles imbedded in the sand of the hearth would control or keep down the heat of the sand between them. It is conceivable that, following the principle to an extreme, the entire bottom of the furnace (excepting, of course, a more or less thin layer of sand at the top) might be made cellular, having two, three, or more layers of tubes superimposed, in contact, and all parallel to the length of the furnace. Air being forced or drawn through these tubes would be heated considerably therein, and would materially assist combustion if introduced into the ashpit.

On the whole, however, I do not think that this form of construction is so likely to prove satisfactory as a means of cooling the bottom as a simple system of circulating water pipes imbedded in the sand at a sufficient depth. A sort of gridiron of ordinary piping at a depth of say 15 in. below the skimming plate, and extending under all parts of the hearth, would undoubtedly control the temperature of the sand bottom and prevent the escape of metal most effectually. I am not aware that this form of construction has ever been proposed before, and I am certain that it has never been used; yet I do not hesitate to recommend it as cheap and as promising better results than either the old form of subterranean vault or the multitubular plan of Mr. Bettel and myself.

It is apparent from Mr. Bettel's description that he has changed the fireplace of his furnace into a modified form of gas producer, wherein his fuel—a very poor lignite, probably—is burned with a pre-heated mixture of air and steam. He gets as a result a mixture of water gas and producer gas, of probably low heating power, and not the ideal mixture of carbonic oxide and free hydrogen, of which he speaks so confidently. My opinion is that, if he will substitute, for his rather complicated paraphernalia of brick flues, Körting injectors, hollow walls, etc., a pair of simple Taylor gas producers, which are particularly adapted for burning such fuel, he will make a greater success in smelting, will get rid of clinkers on the hearth, and will bring the capacity of his furnace from nine tons a day, which is exceedingly low for such fusible ores, up to 16 or 18 tons, which it ought to be, considering the size of the hearth, which I believe is 12 ft. by 16 ft.

A peculiarity in all Mr. Bettel's practice presents itself. The ores being substantially oxide and carbonate of iron, it is necessary to add a silicious flux. For this purpose is selected a silicious limestone carrying less than 37% of silica, plus much lime, magnesia, alumina, and iron, the result being an excessive quantity of slag built up to approach Dr. Iles' type C. But, *cui bono!* a simple proto-silicate of iron would do as well, and all that it would be necessary to add is just enough of the neighboring river sand (92% silica) to flux the iron and prevent corrosion of the hearth. All the lime, magnesia, and alumina are useless, and worse than useless, as taking up furnace room, wasting fuel, and, by creating an excess of slag, abstracting so much more copper and silver. Even the decomposed diorite country rock would do better than the silicious limestone, as being more acid. My choice would be the river sand if I wished to tap slag and matte together, as was done formerly at the Willows works, or any aluminous clay, or shale, if I wished to skim the slag, as is usually done elsewhere. Using the limestone described by Mr. Bettel, and smelting three charges of three tons each per day, of which 16½ parts in 27½ are ore, it appears that the Willows furnace gets through with about 5½ tons of ore per day—not an enviable record when compared with the daily average of 25 tons at Argo, Colo., in similar furnaces.

I must correct Mr. Bettel's statement that no one but himself could conjecture where the metal lost in the old furnace went to. Mr. Jennings, then manager of the Willows establishment, in a letter to me under date September 18th, 1890, giving details of his work and asking my advice, speaks of the extensive and unexpected absorption of the matte by the furnace bottom, and asserts that 14 tons had then been temporarily lost. I think it due to Mr. Jennings to mention this. To sum up, I consider that Mr. Bettel's "new departure" amounts to much less than might be supposed at a first glance. I refuse to believe that he has taught us anything new, and am of the opinion that all the results of his experience lie on the unpractical side of smelting. My convictions are that it is to Anaconda and Argo, and not to Africa, that we must look for the best examples of commercial success in reverberatory smelting.

MINERAL, Idaho, July 25, 1891.

HERBERT LANG.

REPRESENTATIVE AMERICAN METALLURGISTS.

Ottokar Hofmann.

Ottokar Hofmann, one of the most prominent American mining engineers and metallurgists, was born April 30th, 1843, at Ruskberg, a mining town in the southern part of Austria-Hungary, which was founded and brought into prominence by four of his father's brothers. His ancestors for many generations had devoted themselves to the study of mining and metallurgy, and some of them won distinction from the Austrian government in recognition of their services in advancing the industry.

At the age of thirteen Mr. Hofmann entered the technical school (*Realschule*) at Vienna, and remained there for six years, completing the regular course, after which he was admitted to the Polytechnic Institute, in the same city. He continued his studies there for two years, but the impressions received from the surroundings of his childhood were too strong, and he resolved to abandon this course for the study of mining and metallurgy. For this purpose, consequently, he went to Freiberg,

sufficient lumber with him to make the necessary tanks, and the roof of the building was made of cotton cloth. Just before he left Freiberg the single hearth reverberatory furnaces had been changed into long furnaces (*Fortschaffungs Oefen*), and making use of this new device he erected one at these works, so that La Dura had not only the first lixiviation mill but also the first long-roasting furnaces.

At La Dura the lixiviation process had to compete with Brückner roasting furnaces of an early type, and pan amalgamation which had been used previously. The results were so much superior to those hitherto obtained, and the expense so much less (quicksilver in those days was quoted at \$1 10 per lb.) that the success of the first lixiviation works received general attention. The *ENGINEERING AND MINING JOURNAL* (Nov. 9, 1869) was the first to take notice of the new process. It was subsequently described by other technical papers and in Guido Küstel's book on lixiviation, published soon afterward.

Mr. Hofmann received many inquiries about the new process practiced at La Dura, and more offers to introduce it than he could accept. Of these he accepted a call from Mr. M. Alsua, of Ecuador, to introduce the process at La Trinidad, Sonora. At this mine and at Los Bronces, another property belonging to Mr. Alsua, lixiviation was in successful operation for more than eighteen years, when upon the death of Mr. Alsua the property went into the hands of an English corporation, whose manager discarded the process, erected a smelting plant and made a failure, his successor having to return to lixiviation again. Having completed his work at the Alsua properties, Mr. Hofmann's next engagement was the erection of lixiviating works at San Marcial, Sonora, for an American company. In the meantime one of his assistants introduced the process at Triunfo, Lower California, where it is still in operation—now 22 years.

While at La Dura Mr. Hofmann found that the only drawback of the process was the difficulty of manufacturing sodium polysulphide in remote mining places. Caustic soda was very expensive and not easy to obtain. He overcame this difficulty, however, by using sodium hyposulphite as solvent and calcium polysulphide as precipitant.



OTTOKAR HOFMANN.

Saxony, in 1864, and entering the *Bergakademie* remained there until the autumn of 1866, when he passed his examinations and graduated.

Although he had excellent connections at home to secure him a position in the Austrian government service, Mr. Hofmann preferred the free field of action of the western United States, and left Europe for San Francisco in the summer of 1867. Soon after his arrival in the latter city he entered the assay office of Guido Küstel as a partner. Shortly afterward the business was enlarged by the addition of metallurgical testing works, which were the first of that kind to be established upon the Pacific coast, and gave the impulse to the many others which were subsequently started. Mr. Hofmann gained much from his association with Mr. Küstel, who was an expert upon plate and pan amalgamation, chloridizing, roasting, and the Plattner process of gold chlorination, acquiring a practical knowledge of these subjects for which Freiberg did not offer the opportunity.

At this time, pan amalgamation, invented only a few years previously, and barrel amalgamation were practically the only processes by which silver ores were treated in the West. The main information sought was whether the ore was rebellious, requiring roasting, or free-milling. Küstel and Hofmann did a thriving business in reporting upon this question, and many lots of ore were sent to them from the various mining districts of the West and Mexico. Finding, however, that there were many ores, especially the ores from Mexico, containing zinc and copper, which could not be advantageously treated by pan amalgamation, either raw or roasted, Küstel and Hofmann commenced experiments with the Patena process, and found it well adapted for this purpose.

Soon after, in the fall of 1868, Mr. Hofmann received a commission from an American company, operating in Sonora, Mexico, to erect lixiviating works at La Dura, on the Yaqui River, which he accepted. Arriving there he found that a freshet in the river had washed away not only the entire works, but also the entire town with the exception of two small adobe houses. After the flood subsided the boiler, stack and engine were dug out of the river sand, the 10-stamp battery, which had resisted the flood, was removed higher up the bank, and out of this wreck the first lixiviation mill on this continent was built. Mr. Hofmann had brought

Returning to California, Mr. Hofmann did not find the western states and territories to be such a good field for the introduction of the lixiviation process as he expected, partly because pan amalgamation was still considered a process which required only muscles to be successfully operated, and partly because the foundrymen, who in those days were held in high esteem as metallurgical advisers, made a decided stand against lixiviation because it did away with pans, settlers, and other expensive machinery. Not being able to find employment in his specialty, on this account, he went to work in other branches of metallurgy and for several years filled positions as metallurgist in amalgamating mills and gold chlorination works in Nevada and California. In 1878 he was engaged to work the concentrates of the Advance mine and later those of the Colorado No. 2 mine, of Monitor, California. These concentrates were very rich, containing on an average \$333.19 in silver and \$230.84 in gold, and could not be successfully amalgamated. Mr. Hofmann, studying the question with his usual thoroughness and originality, resolved to adopt a new method of treatment. He roasted the ore with salt, applied the Plattner chlorination process, and afterward leached the ore for its silver contents. At first this system of treatment was not entirely successful. While the silver extraction was very satisfactory, only about 50% of the gold could be saved. Mr. Hofmann then reversed the operations, extracting the salts of the base-metals and silver first, and subsequently applying the chlorination process for the gold. He was rewarded with decided success, thus finding a new method of working auriferous silver.

The success of lixiviation at Monitor induced the Silver King Mining Company, of Arizona, to adopt the lixiviation process, and in 1880 Mr. Hofmann was intrusted with the erection of such works at the Silver King mine, Pinal, Ariz. Before the introduction of this process the ore was dressed and the concentrates shipped to smelters, a system which did not pay well. The financial condition of the company was not very good at that time and the lixiviating plant, roasting furnaces, etc., had to be bought on credit. After the first month of lixiviation, however, all the debts were paid, and at the end of the second month a dividend was declared, which was kept up as long as Mr. Hofmann was connected with

the company, the production being about 90,000 oz. silver per month during the two years of his engagement. Since that time Mr. Hofmann has been engaged almost exclusively in the branch of metallurgy in which he has become so eminent. In 1882-1883 he erected experimental works at St. Louis, Mo., for the Mary Murphy Mining Company, and conducted a series of metallurgical experiments with its auriferous silver ores.

In 1885 he erected a lixiviation mill for the North American Silver Mining Company, of London, at Cusihiuriachic, Chihuahua, Mexico. This mill contained all the mechanical improvements that he had made in the lixiviation process, and was considered a model plant in every respect. During the winter of 1886 and the spring of 1887 Mr. Hofmann was engaged by the Anglo-Mexican Mining Company to investigate and improve the roasting process at its mill at Yedras, Sinaloa, Mexico, which he did to the satisfaction of the company. In 1887 he was again called to Cusihiuriachic, Mexico, by the Cusi Mining Company, of New York, to improve the lixiviation process in use at its mill.

In 1888 Mr. Hofmann was engaged by the Mexican Santa Barbara Mining Company, an English corporation, to experiment on a large scale with the argentiferous zinc blende and galena ore of the San Francisco del Oro mine, near Parral, Chihuahua, Mexico, and to ascertain the most suitable process for these ores. The results of his investigations at this place were published in the *ENGINEERING AND MINING JOURNAL*, February 16th, 23d, March 9th and 16th, 1889, under the title, "Lixiviation of Argentiferous Zinc Blende and Galena Ore." This paper was unquestionably one of the most important contributions ever made to the literature of this branch of metallurgy and received widespread attention. In 1890 Mr. Hofmann was elected Managing Director of the North Mexican Milling and Mining Company, Limited, an English corporation operating mines and works at Cusihiuriachic, Mexico, which position he still holds.

The contributions of Mr. Hofmann to the metallurgy of silver ores have been of inestimable value. In his specialty, lixiviation, he stands among the foremost, and the successful development of this process, which has done so much for the mining industry of Mexico particularly, has been especially due to him. He has devoted much study to chloridizing roasting, an essential part of the lixiviation process, and has made several important improvements in this. He improved the Brückner furnace by attaching a fireplace and flue arrangement at each end of the cylinder, allowing an alternate application of fire, by which a more uniform roasting is obtained and the time reduced. Another important improvement made by Mr. Hofmann in this direction was the combination of the Howell revolving furnace and the reverberatory roasting furnace, for the proper chloridizing roasting of argentiferous zinc blende and galena ores.

The improvements made by Mr. Hofmann in the lixiviation process proper have been of equal importance, both in its mechanical and chemical parts, so that there is a marked difference between the method used in the American lixiviation mills of the present day and that originally introduced at Joachimsthal. One of his most important inventions was the continuous system of "trough lixiviation," described in the *ENGINEERING AND MINING JOURNAL*, September 10th and November 26th, 1887, for the rapid and economical extraction of silver, by which the solution of the base metals is almost instantaneously effected in a running stream of the solvent.

Mr. Hofmann has been a frequent contributor to the *ENGINEERING AND MINING JOURNAL*, the *Transactions of the American Institute of Mining Engineers*, and other technical publications. These articles, embodying the results of the careful, intelligent, and exhaustive investigations undertaken during his long experience in his special branch of silver metallurgy, form an important part of its literature.

STONE-COAL IN THE LEAD BLAST FURNACE.*

By Arthur S. Dwight, E. M., Pueblo, Col.

Mr. Neill's experiments with bituminous coal in lead-smelting open up many interesting possibilities regarding the line to be followed in the future development of this branch of metallurgy. In Colorado, particularly, the large number of smelting works erected within the past few years has caused the keenest competition, reducing smelting margins on ores of all characters to figures which will barely cover cost. Indeed, on certain kinds of ores there is a loss of \$2 or \$3 per ton. Under the pressure of these conditions, lead smelters have been forced to adopt every plan which gave any promise of reducing the cost of treatment, whether by cleaner and better metallurgical work, by saving in labor, or by cutting down general expenses per ton, through the building of additional stacks and the treatment of a greater total tonnage. The last-named means for reducing cost of treatment has proved somewhat disappointing. It is, indeed, in vain to expect a profit from smelting a greater tonnage of ore on which there is a loss unless that loss be well within the item of general expense as assessed on the smaller tonnage.

Mr. Neill's saving of 25c. to 30c. per ton in the cost of smelting by substituting coal for a portion of the coke is therefore most important, and in many cases would change loss into profit. From a technical standpoint his experiments seem to have been remarkably successful. The good behavior of his furnaces is evidence that there may be some decided advantages in the coal, even where the commercial saving would not be so great as in Leadville. But it certainly seems like pushing things to an extreme to make a shaft furnace, 12 ft. high, manufacture its own coke, and have that coke ready to burn before the tuyeres in less than 4 hours' time.

To the writer it seems that there is a better field for cheapening the cost of smelting by doing without charcoal, which is more than twice as expensive as coke, and is now used solely on account of the greater tonnage it will allow to the smelter as compared with coke alone. At the works of the Colorado Smelting Company, at Pueblo, Col., the proportion of fuel used is 128 lbs. coke and 35 lbs. charcoal to 1,000 lbs. ore charge (slag being neglected).

In this connection it may be interesting to note the results of an experiment to replace coke with anthracite in a lead blast furnace. The credit for this experiment is due Mr. Alfred Ropp, at present connected with the Selby Smelting and Lead Company, of San Francisco, and the details are published with his permission.

* Discussion of the paper by J. W. Neill read at the Cleveland meeting of the American Institute of Mining Engineers, June, 1891. (See *ENGINEERING AND MINING JOURNAL*, July 25th, 1891.)

In 1887, while Mr. Ropp was in charge of the Tomichi Valley Smelter, at Gunnison, Colo., his supply of Crested Butte coke got very low. Some selected anthracite, of about goose-egg size, from the neighboring mines of Crested Butte, was on hand in the works, and, as coke was very dear, he decided to try replacing some of the coke on his charges with this anthracite. It is important to note that *no charcoal* was used. Ten per cent. of the coke was first replaced with anthracite. The smelting capacity of the furnace was slightly reduced; the slag, however, remained clean; *i. e.*, it carried 0.4% to 0.8% lead, and was low in silver. The percentage of anthracite was gradually increased until 60% of the original charge of Crested Butte coke had been replaced with anthracite. The smelting capacity of the furnace diminished as the proportion of anthracite increased. The slag remained about the same in lead and silver; likewise the matte, the latter containing about 8% lead and 4% copper.

During the whole of the experiment the speiss was of the coarsely crystalline variety, showing that plenty of iron was reduced. The top of the charges remained cool and the crucible free. The tuyeres seemed to darken and get somewhat harder as the percentage of anthracite was increased. There was about 7½% of zinc in the charge during the experiment, but it seemed that less zinc accretion was formed on the walls than when coke alone was used. As to the manner of feeding, the charges of ore and fluxes and the fuel charges were distributed in even layers over the whole section of the furnace.

The experiment lasted 12 days, and at length, when 60% of anthracite was used, the capacity of the furnace was decreased one-third.

Under the conditions prevailing in Gunnison, particularly on account of the high cost of labor, the experiment was not a commercial success. The furnaces employed were water-jacket furnaces 80 ins. x 37 ins. in section at the tuyere level, and 9 ft. from tuyeres to feed floor. Had they been higher, it is very likely that the results might have been better. Another condition that made the furnaces run more slowly was the extreme fineness of the charges, which became more and more effectively troublesome as the coke was cut down.

In both of the experiments, one with bituminous coal and one with anthracite, there are several advantages that command notice: (1) Cool tops; (2) open crucibles; (3) good reduction, with clean slags and mattes low in lead; (4) less zinc accretions.

The fact that Mr. Ropp used no charcoal and worked with a very low furnace and a charge less coarse than the average, should be borne in mind in comparing the results of the two experiments.

The common points of advantage demonstrated in both cases are of sufficient importance to justify very extended experiments by lead smelters with the use of coal in their shaft furnaces.

THE YANKEE GIRL ORE BELT, COLORADO.

Written for the Engineering and Mining Journal, by W. Weston, M. E.

In your issue of June 20th I notice that you state that the "Sheridan" vein, or, as it has always been hitherto known, the "Smuggler" vein, in the San Miguel mining district, has produced in the neighborhood of \$3,000,000, and has upwards of four miles of workings. I think there is an error in this statement, as, from the most reliable information I can gather, the gross output from the different workings on this vein on the claims variously known as the Mendota, Sheridan, Smuggler, and Union has been very largely in excess of the above figures. I am of the opinion that, reckoning the low-grade ore on the dumps of these mines, the gross output will come nearer \$7,000,000.

In 1881 I wrote a pamphlet on the principal mines and prospects of Ouray county, and at that time the properties above named were in the hands of the original owners, and had but little work done on them. In my description of the Smuggler vein I wrote as follows: "I do not hesitate to say that I believe this is and will prove, for permanence and richness of the ore body, the most extraordinary vertical-fissure gold and silver bearing lode yet discovered in the State of Colorado." During the ten years that have elapsed the output has amply proved the correctness of my prediction.

I will here also mention the fact that the splendid outcome of the Red Mountain mines has been mainly due to the enlistment of English capital for their development; and when I say Red Mountain mines I mean what is locally known as the "Yankee Girl Ore Belt"—that is to say, a strip of country extending along the western flank of Red Mountains, Nos. 1, 2, and 3, and marked on the surface by quartzose reefs richly impregnated with pyrite in the unweathered portions and very often showing outcrops of low-grade ore, this strip of country extending from the Congress mine, near the summit of the Continental water-shed, down to the Candice mine at Ironton, a total distance of about four miles.

The pioneer Red Mountain mine in the English market was the Guston, and the fact of its turning out such a bonanza enabled the owners of the Yankee Girl, American Belle, Silver Bell, and others to sell their properties in London. In 1884, when living in Ouray and mining in Red Mountain, I introduced the Guston mine to London parties, who after some nine months' correspondence failed to purchase, either because they could not raise the money or because they did not think it good enough, I do not know which. But in the spring of 1885 the late Colonel Loftus Tottenham, M. P. for Winchester, visited Ouray, and I showed the Guston to him, it being then only a prospect, but with a large outcrop or chimney of low-grade lead ore, which would not pay to ship, and finally secured from the owners a bond upon it for him, the ultimate result being that it was sold, most of the then purchasers being, I believe, members of the Carlton Club and friends of Colonel Tottenham. In a letter of mine to Colonel Tottenham in July, 1885, after he had returned to London, I find the following regarding an examination I made of the Guston surface, which has a well-defined reef, ridge, or "blow-out," and which is well known now to mark the probable existence of an ore chute with depth: "In examining this ridge on the surface I found it all quartzose, and in the center of it there is an outcrop of galena. I think this quartz ridge is our vein, as it were, and that we shall get our ore with depth in this ridge or reef of quartz." This prediction proved true, for, as the first manager of the property, I discovered pay ore at about 200 ft.

below the apex of this ridge, and now the published returns of the company show a profit of about \$75,000 per month, and the output of the mine in 1890, as reported to the Director of the U. S. Mint, was \$1,173,051. Up to June, 1890, over a year ago, dividends and bonus had been paid amounting to nearly \$500,000, while the price paid the original owners of the property was but \$100,000.

To leave the subject of predictions, and continue that of the discovery of good ore with depth: just across the creek from the Guston discovery was the Robinson where a small tunnel was run in the end of a similar quartzose ridge, which was, in fact, a continuation of the same reef. In the floor of this tunnel the quartzose vein matter contained small bunches or stones of very low-grade galena, carrying, say, 9 or 10 oz. silver per ton, and that was all; but 200 ft. beneath this reef the first pay ore was encountered, 118 sacks being taken out, which ran 120 oz. of silver to the ton. This ore was galena and iron pyrites with a little gray copper, which last probably carried most of the silver. It is from this mine that the Yankee Girl is now getting the bulk of its wealth.

Concerning the Silver Bell improvement from worthless pyrites on the surface to 150 oz. ore at 250 ft. in depth, I wrote in my article in the ENGINEERING AND MINING JOURNAL of March 21st.

The richest ore struck on this great ore belt at or near the surface was in the Colorado Boy last month, which I also mentioned in my former article. The recent strike was made over 100 ft. from the ore chute described therein as having been exposed by the original owner, and only 50 ft. below the surface. Surface indications, and the existence of one of the knolls or quartzose reefs already referred to, led the manager of the company, the Mine Owners' Trust, Limited, owning this mine, to prospect in that direction. Drifting 100 ft. farther a month later he was able to report that he had struck ore. The top of the ore chute only was cut; in the floor of the drift it showed a streak of solid mineral about 10 in. wide. Samples of this strike varied in value from 60 to 400 oz. of silver per ton. The average value of this ore can only be accurately determined,

two leasers on the mine, one of whom was a metallurgist, put up a small plant in Silverton, reduced the ore, and sold, as nearly as I can ascertain, some \$3,500 worth of metallic bismuth. The Enterprise claim is down the mountain from the St. Lawrence, and a long tunnel has been run across it to the latter's side lines, and when connected with the St. Lawrence shaft will drain the whole property at considerable depth. If present negotiations are carried out the two mines will be worked in conjunction. They adjoin the town of Red Mountain, are in thick timber, and within half a mile of the railway station.

The Copper King, in my opinion, is also one of the coming bonanzas. It shows ore on its outcrop for upwards of 200 ft., and underground in a tunnel for the same distance, and out of this was taken some 250 tons of ore that was sold to the San Juan Smelter, at Durango, averaging \$50 per ton. The original owners got into trouble and debt, attachments and liens were filed, etc., when Messrs. Donellan and Everatt, the original owners of the Sheridan, who sold out to the present Sheridan Mining Company, stepped in, bought the mine and cleared off the indebtedness, put on a good plant, and commenced a shaft to cut the ore at 300 ft. before attempting to stoop. This shaft is already down 270 ft., but sinking has been discontinued temporarily on account of the very large influx of surface water. This has nearly ceased, and the owners will resume sinking again soon. In the mean time English parties are negotiating for the property.

In writing of the Red Mountain mines I have cited numerous instances where a low-grade ore on the surface changed to extremely rich ore with depth, but I do not wish to be understood as supporting the theory, so often advanced by the prospector and mine seller when showing low grade surface croppings, that it will "get better as you go down"; in fact, as far as the San Juan region is concerned, I do not consider that "richer with depth" applies outside of the Red Mountain district. Most of the vertical true fissures that had worthless ore on the surface, and have been developed, have demonstrated that the ore was no better with



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of course, when the first shipment is made, and this will be done as soon as a hoisting and pumping plant is erected and the ore followed down.

In the race for next bonanza honors there are many in the field, but I think the first to come in will be the Colorado Boy (if sinking is begun at once on it), the White Cloud, Genessee-Vanderbilt, and the Red Mountain Silver Mines, Limited. Later on, if arrangements are perfected which are now being made to work them, I expect to see the Copper King and St. Lawrence-Enterprise recorded as pay mines.

The White Cloud is an extension of the Guston on the same vein, and is being developed by the New La Plata Mining and Smelting Company, Limited. It has on its outcrop one of the finest quartzose reefs in the district, the surface of which shows rich mineral and large quantities of honeycombed quartzose matter, from which the mineral has been leached out. But at the bottom of the shaft, which is now down 50 ft., good ore is beginning to come in, and at from 150 to 160 ft. from the surface I think pay ore in shipping quantities will be discovered.

The St. Lawrence and Enterprise are adjoining claims and on the same ore belt as the Hudson and the National Belle, owned by the American Belle Mines, Limited. Mr. T. E. Schwarz, in one of his reports on these mines, says: "The ores on these properties consist of enargite or black copper, iron pyrites and sulphide of bismuth, and carry 15% to 30% copper and from 25 oz. to 200 oz. silver per ton. Assays of St. Lawrence ore from near the surface have shown 35 oz. silver." The bottom of the St. Lawrence shaft, which is about 100 ft. deep, is just passing into the original sulphide ores, which are found at depth in the adjacent mines. The Enterprise shows a quartzose reef boldly outcropping on the surface, and the original owners developed a very strong body of ore in it in three different levels, and also in the shaft which they commenced but from which they were driven, as in so many other instances, by influx of water. The Enterprise ore carried a large percentage of bismuth, and some four or five years ago

depth, and most [of those that had rich ore on the surface found that its richness continued with depth and in some instances increased. The Mendota, Sheridan, and Smuggler had rich ore on the outcrop; so also had the Virginus, which is now, I believe, over 1,000 ft. deep. The Wheel of Fortune in 1879 shipped ore by pack animals over 30 miles to Van Giesen's Lixivation Works, at Lake City, the cost of packing being \$35 per ton, and the treatment about \$40. So did the Yankee Boy mine. The three last mines are in the Sneffels district, and their ore is as good at depth as at the surface, and this will undoubtedly hold good in that district.

This fact must be a source of encouragement to the projectors of the great Revenue Tunnel, which is now in, I believe, some 3,000 ft. and will cut the Virginus, Terrible, Sidney, Monarch, and a great many other mines having rich surface mineral, at depths varying from 1,000 to 2,000 ft. In the rage for phenomenal ore deposits like Leadville, Aspen, Red Mountain, and the Ouray gold belt, the old-fashioned vertical true-fissure veins have been neglected by the capitalists, but there are hundreds of these veins in the Sneffels district with no development on them beyond surface "gophering."

The Sneffels district has several grand basins at an average altitude of about 10,000 ft., viz.: Imogene, Silver Creek, Sneffels, Virginus, and Yankee Boy basins. All these are heavily wooded with fine timber, and with powerful creeks flowing down through them. The mountains on each side are full of veins, which can be seen cutting through the summits at from 12,000 to 13,000 ft. above sea level, and I see the time at hand when with a railway now in the valley at Ouray, eight miles distant, and with the transmission of power by electricity, which is so rapidly coming into vogue, those beautiful parks or basins will be full of mills and other mining plants, and they will resound with the cheerful pemonium of blasts and steam whistles, which at present exist in the Red Mountain district of San Juan alone.

TWO ROPE HAULAGE SYSTEMS.*-I.

By R. Van A. Norris, Wilkesbarre, Pa.

Within the past two years the Susquehanna Coal Company has put into operation two rope haulage systems, designed by their chief engineer, J. H. Bowden, which are believed to have some novel features. The first of these was erected in December, 1888, to take the empty mine cars from No. 5 breaker back to No. 4 slope. The cars are hoisted from the slope in trips of five cars each (see map, Fig. 1), and run by gravity to the

considered advisable to have the "take-up" on the driving end. This was done by mounting the driving sheave on a truck, and driving by means of a square shaft sliding in a cast-iron sleeve to which the driving pinion was keyed (Fig. 2), the end of the square shaft working in a clamp box provided with wheels running on an angle-iron track. The tension was put on the rope by an iron bucket pulling on a three-to-one chain tackle, the bucket being loaded with scrap iron. The rope was a $\frac{1}{2}$ -in. diameter steel hemp-center rope, 19 wires to the strand, and was driven by a plain 6-ft. sheave (Fig. 3 and Fig. 3a) with the groove filled with babbit metal, an experiment which it was thought would give

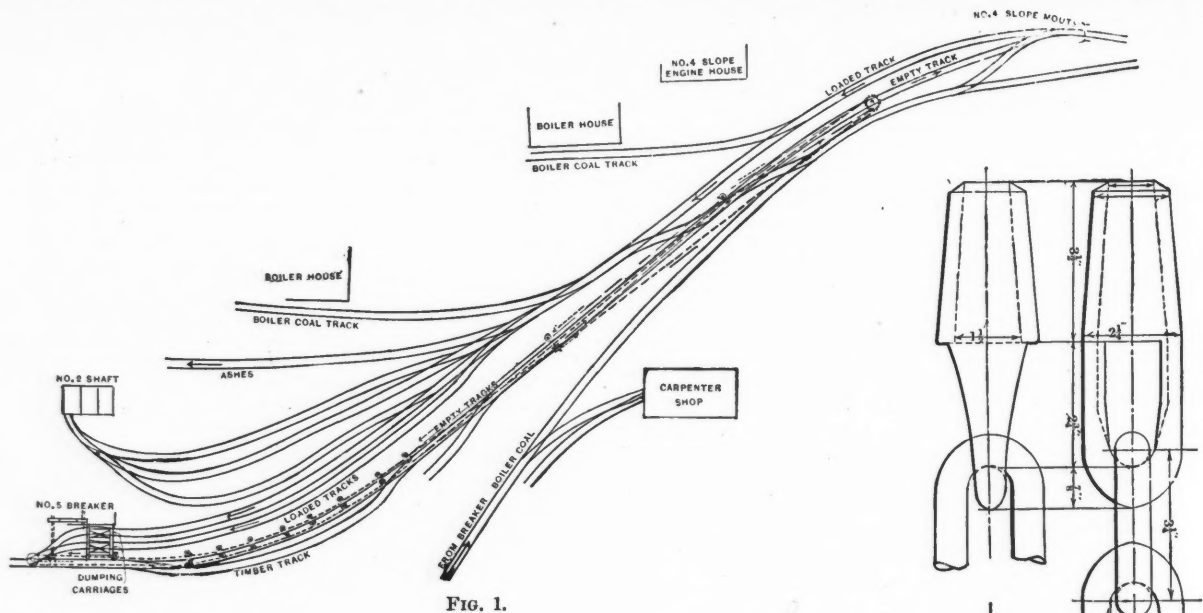


FIG. 1.

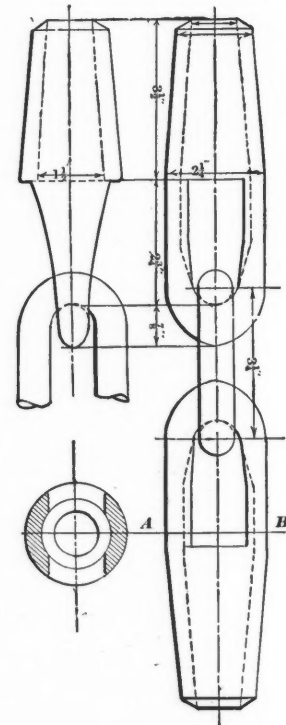


FIG. 10A.

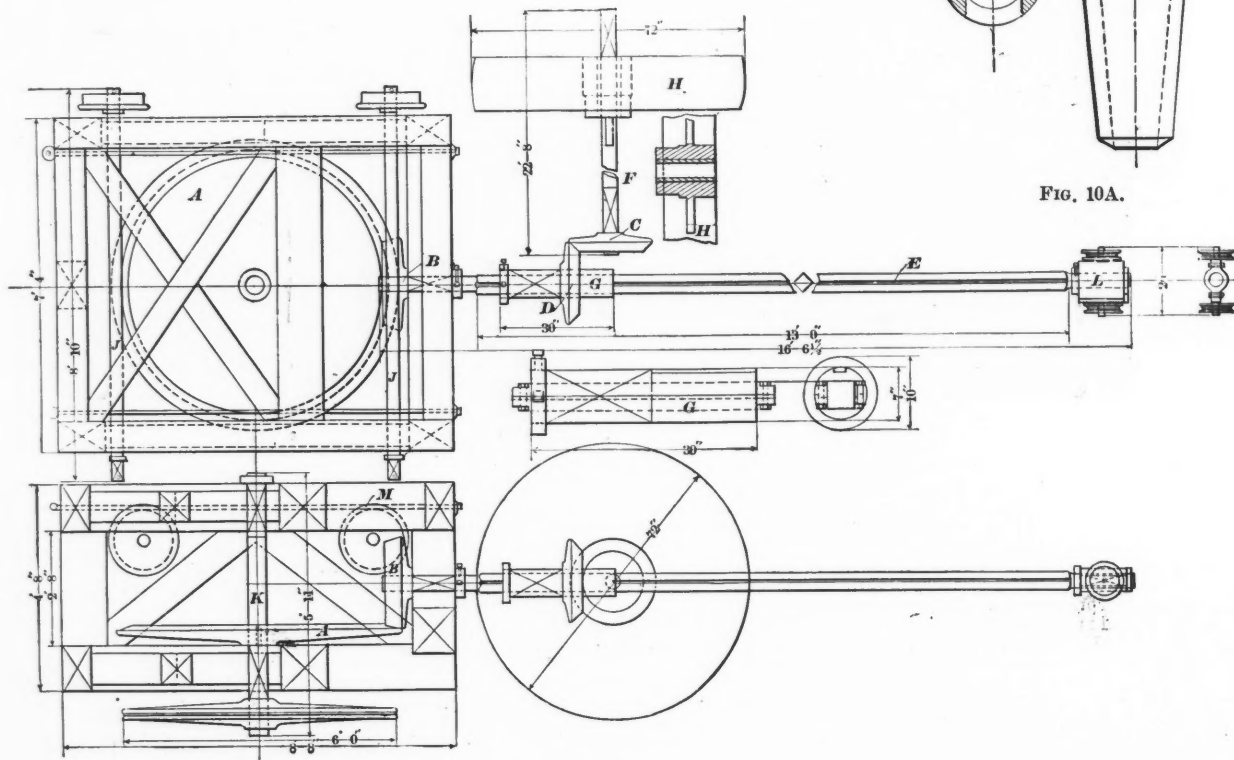


FIG. 2.

breaker, where they are hoisted to the top in self-dumping cages, lowered, then bumped off and back-switched onto the empty track. The problem was to transport 600 cars per day up a grade varying from $1\frac{1}{2}^\circ$ to 7° , and around a reverse curve, for a distance of about 600 ft., while the coal for shaft and slope boilers, about 40 cars per day, was hauled from the breaker across these tracks, so that arrangements had to be made to allow the mine locomotive to run to the breaker on the empty track. On these accounts, and because of the number of switches in use, it was decided to run the rope overhead 10 ft. in the air to clear the locomotive. The rope had to be driven from the breaker engine, an 18 in. \times 48 in. plain slide-valve engine, which was found to have ample power to spare, and it was

the rope a grip without the wear on it incident to a V-groove, and as the rope merely took a half turn on the sheave, some such plan was considered necessary. This babbit lining has proved a complete success, the rope at first cutting it to the shape of the strands, but afterward wearing smooth. It has shown but 3-16 in. wear in two years of use, and has slipped only twice to my knowledge, and then with a new rope freshly oiled, when an attempt was being made to haul a loaded car.

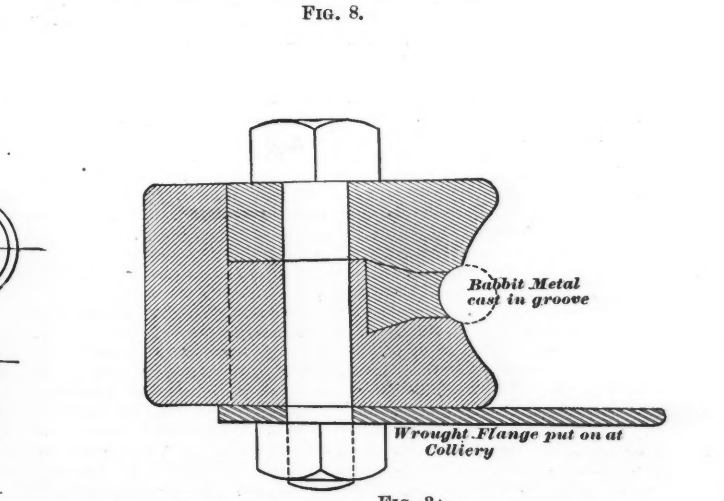
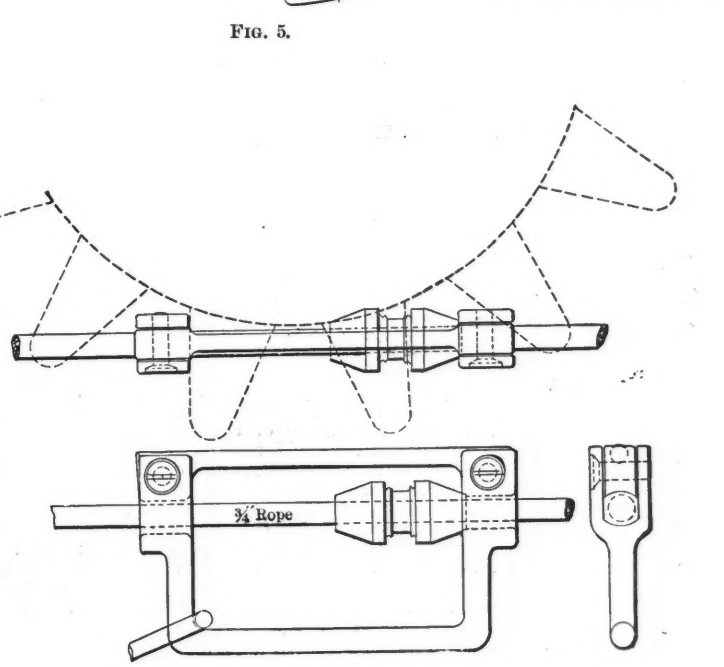
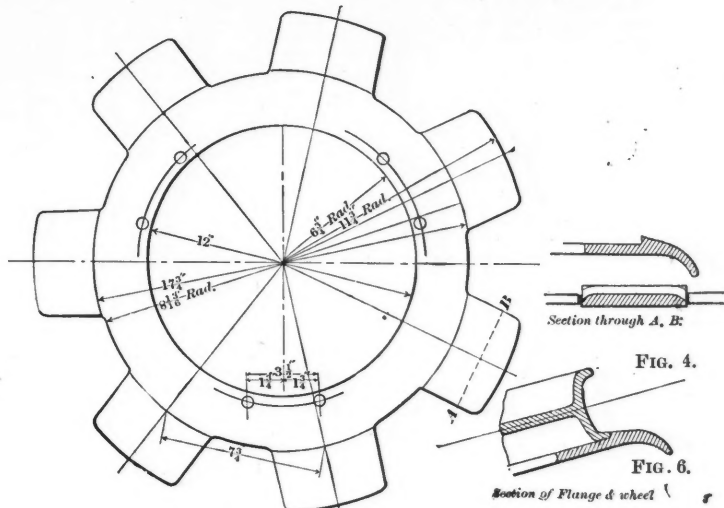
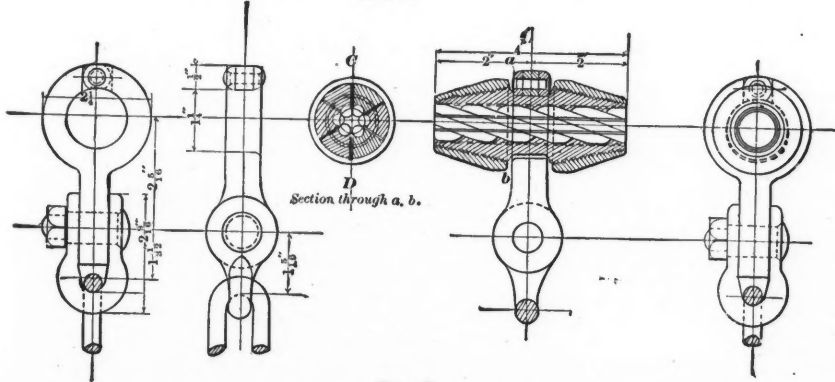
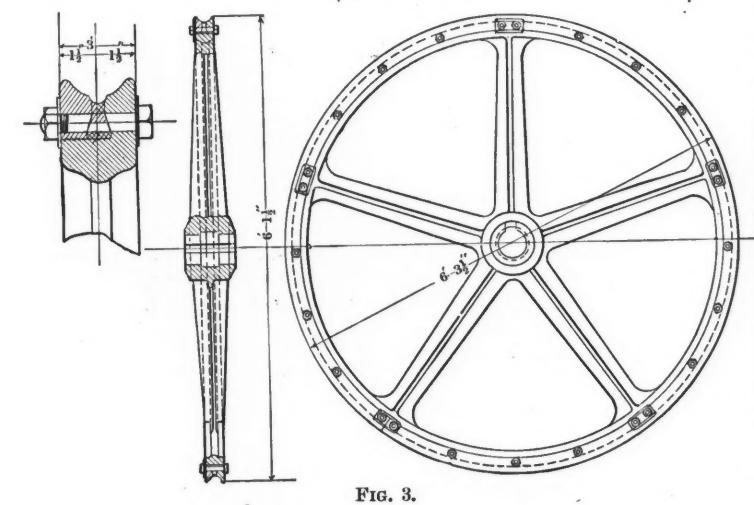
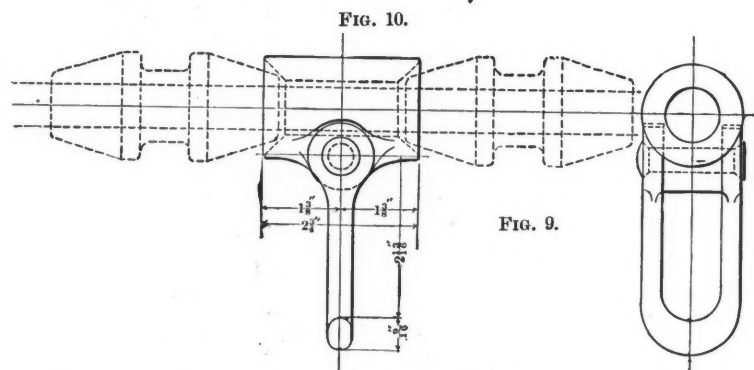
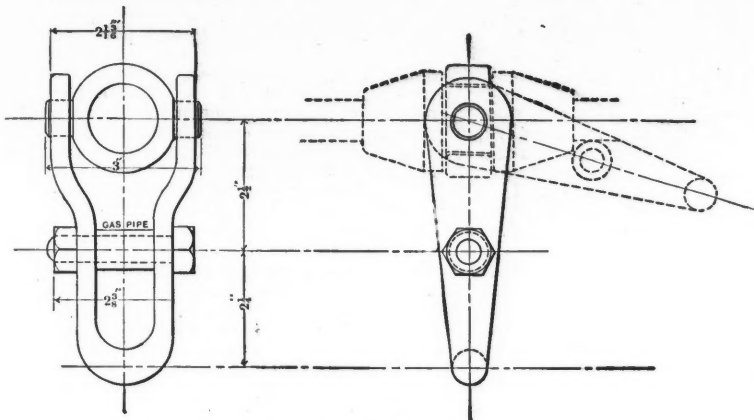
The end sheave at the slope was similar to the driving sheave in every particular, and shows no appreciable wear on the babbit lining.

The rope was at first run as shown by the dotted lines (Fig. 1), but owing to the pull across the car at the slope end, which tended to derail cars, it was afterward changed to the position shown by the full line, the return rope crossing over the pulling one. Great difficulty was experi-

* Read at the Providence meeting 1891) of the American Society Mechanical Engineers.

enced in keeping the rope up to height. At first the 16-in. sheaves (Fig. 5) with very small flanges were used, the tension of the rope being relied on to keep it up, but it was found that it was necessary to put a strain of five tons on the rope, and even with this destructive strain it would occasionally pull down off the pulleys. An attempt was made to remedy this by bolting the flanges (Fig. 4) to the pulleys, allowing the pulling chain to

The matter of attaching the pulling chain to the rope was one of no little difficulty. The first attempt was a patent clamp cone (Fig. 7) with the chain attached to a clamp in the middle, allowing the rope to revolve without tangling the chain, which returned to the breaker hanging from the rope. It was not supposed that the small leverage, $2\frac{1}{2}$ in., would kink the rope to any extent, but this supposition proved erroneous, the



drop through the fingers. These, when the sheaves were tilted up to an angle of 15° , answered the purpose well, but it was found that they wore the rope badly, and finally the curved fingered flange (Fig. 6) was tried, with complete success, though that could be improved by making the fingers narrower and increasing their number. Similar fingers were finally put on the end sheave, and a solid flange 3 in. wide on the driving sheave (Fig. 3). The tension on the rope was finally reduced to 3,200 lbs.

rope breaking with exasperating regularity and promptness at the cone, and the long hanging chain catching on various impediments and bringing the rope neatly to the ground. Next a yoke (Fig. 8), of a length sufficient to take in two of the fingers, and held in place by one of the clamp cones (Fig. 7), was tried; this had a ring sliding on it into which a loose chain was hooked; it worked beautifully for three or four days, until it had been pulled sufficiently out of shape to catch the fingered sheave and

carry two sheaves with their supports to the ground, when it was voted a failure. Then two cones were put together, with a swivel-ring between them (9), which worked successfully for over a month, and then the rope broke between the cones. The plan (Fig. 10) was designed to avoid these troubles by pulling in the line of the rope, and, we believe, would have overcome the difficulty and retained the clamp cones, which were very easy to attach and space properly, and worked well around the curve pulleys; but before this was ready the problem had been solved by doing what we had been trying to avoid; the rope had been cut in seven pieces, and each piece connected by two forged cones with a link between (Fig. 10a), the cones being securely leaded to the rope, and the pulling chains, hooked into the links, removed at the slope and sent back on the loaded trips to the breaker. The rope, however, still shows a tendency to break at the cones. A number of ways of taking hold of the car were tried, half a dozen forms of hooks being made, tried and discarded; either they would slip off the cars or they would dig into the wood so that they could not be readily detached. Finally a $\frac{1}{2}$ -in. pin was driven in the sidebar of each car, and the end of the pulling chain provided with a ring which was slipped over the pin, giving a certain and easy hooking and disengagement, but with the disadvantage of pulling the car from the side. The rope was originally designed to run at a speed of 250 ft. per minute, but it was found that in hooking onto the side of the cars the jerk tended to derail them, and the pulley on the engine shaft was changed to give a speed of 180 ft. per minute, which proved satisfactory.

To provide for instant stoppage of the rope in case of accident, and whenever there were no cars to move, or the locomotive was passing, a Dodge hub friction clutch was placed on the driving shaft, and two $\frac{1}{2}$ -in. hemp ropes, one for starting and one for stopping, were carried the full length of the haul and attached to the clutch lever. The whole has now been in successful operation for two years, two boys doing the work which previously required five mules and their drivers. At first only one car was pulled at a time, but now two are attached, the rope being connected to the rear one. The jerk of starting was found by dynamometer tests to be about 25% of the weight of the cars, and the tractive force, corrected for grade, exerted in carrying them, after the start, from 2% to 4% of the weight, varying with the angle of the rope across the car.

(To be concluded).

THE FREE COINAGE DISCUSSION.

MR. JOHN A. GRIER'S REPLY TO MR. CARNEGIE.

Mr. John A. Grier, of Philadelphia, makes a long reply in the Philadelphia *Inquirer*, June 13th, to Mr. Carnegie's article published in abstract in the *ENGINEERING AND MINING JOURNAL*, July 11th. From this reply we make the following extracts:

This money question has been freely and ably discussed by a large class of political economists who in a straightforward, scholarly way advocate gold monometallism. This is a fair, debatable question, but there is not one, as far as I have been able to find, however hostile he may be to our system, who does not squarely admit the fact that the value of gold is regulated like all other commodities. The same rigid economic law of supply and demand that regulates the value of all other commodities regulates gold.

Mr. Carnegie says, "No country can have two standards." Now, what do we mean by a standard? Do we not mean an agent of valuation? Do we not mean a measure of the exchangeable value or a standard of payment? Have not gold and silver been the joint agents for the commercial world in the performance of these duties for more than 20 centuries, and frequently at the same time in the same nation? This was notably the case in France from 1803 to 1874, and the bullion value of these metals varied there less than 1% during this period. Bimetallism was the established policy of our own government from 1792 to 1873, but on account of our financial weakness and imperfect coinage laws the burden of these duties was imposed for years alternately on silver and then on gold. However, let it never be forgotten whichever metal was used least it always exercised a certain latent reserved force on prices. About the year 1873 the quiet, unnoticed, and fearfully unjust battle was commenced against this use of silver, and gold monometallism was set up as a new idol for human worship. Senator Evarts, in the United States Senate, in 1888, admirably described this demonization of silver by calling it "the capital error—the stupendous blunder of European statesmanship." To deny the fact that a nation can have two money standards is to shut your eye to the history of finance. A nation can not only have two standards, but two standards often seem to be necessary for their mutual steadiness in value. The cheaper metal will always have the preference for coinage, but this preference constantly tends to raise the value of the cheaper one, while the temporary discarding of the dearer metal tends to decrease its use, its demand, and hence its value. It is the philosophy of bimetallism in one sentence. This automatic action of the two metals causes the bimetallic system to be so important. Honesty and wisdom demand the greatest steadiness in the purchasing and measuring value of our coins, and practical bimetallism tends to give this to us. We might as well object to a skillful clockmaker using two metals in the construction of his compensating pendulum rod. In fact, the use of two metals is the secret governing the construction of the regulators of all accurate timekeepers. The experience of the world has thoroughly and successfully tested this principle in monetary affairs. Gold and silver have been found pre-eminently fitted for this duty.

Since 1873 we have been partially testing the British system of finance, so much lauded by Mr. Carnegie, and it has brought upon the commercial world an untold amount of misery. Gold, measured by the products of human labor, is constantly appreciating, or, what is the same thing, we have an injurious world-wide fall in prices. The limited use of silver by the United States has been of great service in checking this evil since 1878. Gold monometallism is very far from having a unanimous indorsement in Great Britain. On the installation of Disraeli as rector of the University of Cambridge, November, 1873, he said, in reference to the financial change then going on: "It is the greatest delusion in the world to attribute the commercial preponderance and prosperity of England to our having a gold standard. Our gold standard is not the cause of our commercial prosperity, but its consequence." In 1879 this eminent statesman, with the eye of a prophet worthy of his Jewish blood, said, "Gold

is every day appreciating in value, and every day as it appreciates the lower become prices." In fact, such is the tremulous condition of British finances that we should not be surprised if they would soon follow our example and readopt silver as we have done. For many years such a policy has been advocated by a large and influential body of British statesmen and financiers.

Mr. Carnegie derisively cries, "Silver for the republic and gold for the monarchy!" We reply, "Gold and silver for our republic and monarchies can and will regulate their own affairs." The use of silver as one of our money-measuring metals is as firmly fixed as a settled policy of this nation as our republicanism.

Let us ask, is it not the gold dollar which has appreciated in value rather than the silver dollar which has depreciated? A silver dollar crushed into a shapeless mass is no longer money; yet this lump of metal will exchange for a larger quantity of the average commodities used in common life in our markets or in the markets of the world than either the gold or the silver dollar would in 1872, before this unfortunate outlawry of silver commenced. Let it be a fact riveted in your minds that this extraordinary greedy grasping of the commercial world for gold since that time, caused by the outlawry of silver, has raised the value of gold as a commodity, and by this enhanced value prices are now governed. It is the sole object of bimetalists to change this or equalize this strain and duty on the two metals. As there is a wide distinction between free coinage and the American system of bimetallism adopted by our government all I am contending for in this article is the wisdom and honesty of this system. I have some faults to find with it because it is too much restrained. We have not acted with sufficient liberality toward silver in the amount purchased nor its use after it has been coined. We made no proper provisions for its coinage after June 30th, 1891.

MR. JOHN JAY KNOX'S REPLY TO SENATOR STEWART.

Mr. John Jay Knox, in the *Evening Telegram* of 23d June, gave a very conclusive answer to some of Senator Stewart's unfounded assertions. We print the letter in full, as follows:

The advocate of the free coinage of silver would have the country believe that those in favor of the gold standard are opposed to the use of silver as money. They say that as there is not gold enough for the coinage of the world the discussion is ended. They would have everybody believe that the advocates of the gold standard are the enemies of silver and of the silver miner and of the laboring man who receives silver coin in payment of his daily wages. They make erroneous statements, answer their own statements, and say the discussion is ended.

Now, what are the facts? The Director of the Mint, in one of his latest tables, estimates the amount of gold coin in the world at 3,727 millions of dollars and the amount of silver coin in the world at 3,820 millions of dollars. So it seems that there is 100 millions more of silver coin in the world than of gold coin, and that the free-coinage silver men are wrong, and that there is no prejudice against silver coin, and that those who believe in the gold standard are not engaged in a warfare against silver. If the East, which contains 1,000 millions of people, prefers all silver and no gold, the West certainly, which contains only 500 millions of people, should have a right to prefer a gold standard—certainly, when it is the pleasure of the people of the West to use with the gold millions of ounces of silver in subsidiary coin. England, Germany, and the United States to-day use more than 700 millions of silver coin and yet maintain the gold standard. The Latin Union, also, which has long since closed its mints to the coinage of silver, but keeps them wide open for gold, uses 830 millions of silver coin maintained at the value of gold by the high credit of the French Government and of the Bank of France.

The silver miner, under the present law, has a sure market for 60 millions worth of silver every year, for the government buys it all at a price above that of the London market. Under a free-coinage law the government will cease to be a purchaser of silver. Every holder of bullion can take it to the mint and have it manufactured into stamped dollars. The result will be the silver standard. Then these stamped pieces of silver will have a purchasing power of the value of the bullion therein, and no more. Our neighbor, the Republic of Mexico, enjoys the benefits of free coinage, and their dollar piece is a legal tender for all amounts. The purchasing power of the Mexican dollar at home and abroad is exactly equal to its bullion value. If the result of a free-coinage act is the silver standard, the silver miner will lose his chief purchaser, which is the government. Silver will be worth even less in coin than in fine silver bars. In brief, the Silver Coinage Act, so far as the silver miner is concerned, will "kill the goose that lays the golden egg."

The Bank of France holds 250 millions of silver coin, which was manufactured years ago when the price of bullion was at least 20% higher than now. It holds its silver at a loss of \$50,000,000, and other European banks all hold large amounts of silver at a great loss which was purchased many years ago. If the advocates of free coinage are correct in their theory that we can open our mints to silver and yet maintain gold payments, then the banks of Europe will have the opportunity, as silver advances in value, gradually to transfer their silver hoards from their own vaults to the vaults of our treasury and recoup a large portion of their loss.

It will be evident to the foreign banks that hold large amounts of silver coin that, if they sell their coin to our government at 10% or 20% advance, when we are upon the silver standard they can buy other silver bullion at a great profit. It is plain, therefore, that as silver advances in value the foreign bullion will cross the ocean to realize the handsome profit, so long as the tempting offer is held out by such foolish statutes as an act providing for the free coinage of silver.

The following is an extract from Mr. John Jay Knox's remarks before the Coinage Committee of the House of Representatives, during the last session of Congress, in reference to the coinage act of 1873:

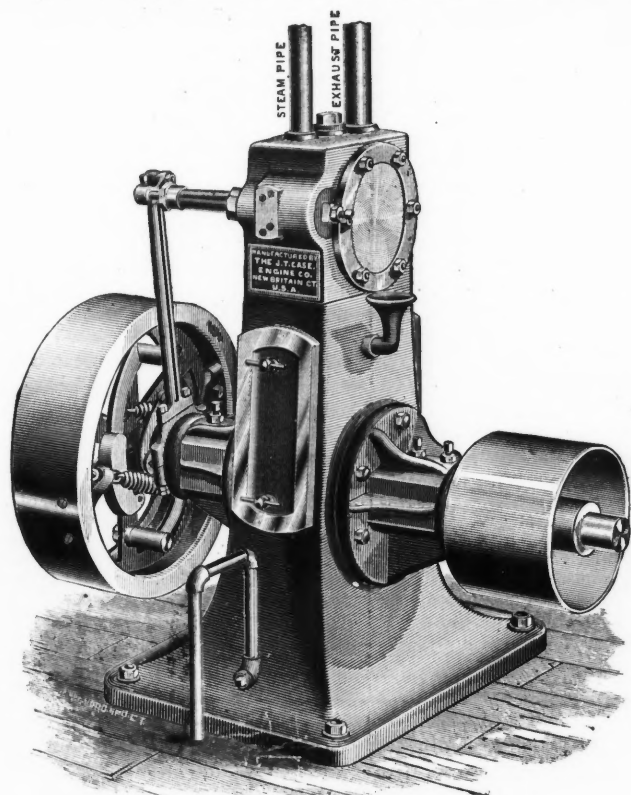
The full legal-tender quality was taken from the subsidiary coinage in 1853, and not as much as \$2,000,000 of the silver dollars, which was the only legal tender after that date, was coined from 1853 up to 1870. Moreover, these \$2,000,000 were not coined for the purposes of circulation, but for the convenience of the manufacturers of silverware. The country had been really upon the gold standard since 1834. The mint in San Francisco was established in 1854, and only \$29,700 of full legal-tender silver coins were issued from that mint up to the year 1873.

Every business transaction on the Pacific Coast was upon the gold standard. The government officers during the War of the Rebellion were paid in greenbacks, which were immediately converted into gold coin. The legal-tender notes did not circulate. Neither the coin certificates nor the silver dollars to-day circulate to any extent upon the Pacific Coast. The people there make all their payments, that are made in money of any kind, virtually in gold coin. All the promissory notes given upon the Pacific Coast to-day are payable in gold coin, and all contracts are payable in the same way.

There was an indifference shown by senators and members of Congress on the Atlantic Coast in reference to the provisions for coinage contained in the act of 1873, but the indifference was still greater by the representatives of the Pacific Coast. Their discussions in Congress showed that their interest was chiefly in the refining of gold and the removing of the coinage charge from gold, and finally in the issue of a trade dollar in place of the then existing dollar of 412½ grains. The proposition to issue the trade dollar originated upon the Pacific Coast and was discussed many years before the passage of the coinage act of 1873.

THE CASE AUTOMATIC CUT-OFF PEDESTAL ENGINE.

The J. T. Case engine, which is now being introduced by E. T. Copeland, embodies several interesting features. The engine is simplicity itself, as the only moving parts are cylinder, piston and crank shaft, and the lightness of these parts with the direct action makes it possible to attain a very high degree of speed with very little vibration. The automatic cut-off as applied in this case is of the plug-valve type perfectly



balanced, and made with a slight taper so that it may always be kept tight. This valve is governed by an eccentric from shaft, but differs from the ordinary shaft governor, inasmuch as it does not diminish the throw of valve and so throttle the steam on light loads, but has always the same amount of travel, the regulation being effected by its rotating the eccentric on shaft, thus giving valve proper amount of lead over the crank. The admission of the steam and its release from the cylinder are attained by the rocking movement of the latter, which forms the valve motion.

The cylinder works at the top with open head, so that the steam pressure is between piston and the case in which cylinder is inclosed, relieving the cylinder from all steam thrust, which obviates all friction at this point, and at the bottom the same thing is accomplished by balancing chamber in face of cylinder having the same area as piston. By this method no power is required to rock the cylinder, it being steam-balanced and frictionless. The expansion segments are so arranged that the cylinder can at all times be kept tight by simply moving two taper keys. The engines are capable of attaining a speed up to 2,500 revolutions, with a piston speed of 830 ft. per minute, which is unprecedented in so small an engine, the size being 2 H. P. and 2-in. stroke. They are automatically oiled, the crank disk running in oil, and thus carrying it to shaft bearing, whence it returns by gravity to a settling pot in base, where the water is drawn off and oil is used over again.

The water overflow is shown by pipe out of base (see accompanying illustration), which rises to the common oil level. Reversing attachments can be applied to any of these engines. They are made to run either on floor, ceiling or bracket in sizes from 2 to 15 H. P.

At the Starling hydraulic mine, in Jackson County, Ore., a tusk of a mastodon was washed out recently from beneath 50 ft. of gravel. The tusk was 4 ins. in diameter, and was porous and crumbling. Other bones of the same prehistoric animal have been found in the mine at different depths.

COAL PRODUCT OF WEST VIRGINIA, KENTUCKY, TENNESSEE, VIRGINIA, GEORGIA, AND NORTH CAROLINA.*

By John H. Jones.

WEST VIRGINIA.

The Appalachian field passes southward from the Pennsylvania State line, covering almost the entire State of West Virginia. A detached arm, extending southwestward through Allegheny and Garrett Counties, Maryland, and Mineral and Grant Counties, West Virginia, constitutes what is known as the Elk Garden district. This basin continues southwestward through Tucker and Randolph Counties along the valley of the Otter Fork creek. Nine distinct seams underlie this district, including the Big Vein, which has a thickness of from 14 ft. to 16 ft., the others varying from 2-5 ft. to 7 ft., all being of a character to admit of profitable development. The main body of this great field in West Virginia lies between a line drawn from the Maryland state line in Preston County southwestward through Mercer County to the Virginia state line and the western boundary of the State, and includes all but six of the 54 counties, although mining operations on a commercial scale are carried on in only 16 counties.

The coal measures of West Virginia are a continuation of those described in Pennsylvania. The Pittsburg bed at the bottom of the upper productive measures is found in the northern portion, the Middle coal measures in the Kanawha Valley region and the Lower coal measures in the Flat Top region. No state in the Union is more favored in the extent and diversity of its mineral deposits than West Virginia. Her coal embraces all grades of bituminous, steam, cooking and gas coals of the highest qualities. The natural waterways, improved slack-water navigation and increasing railroad facilities are important factors in the development of the resources of the State, which must soon be accorded a leading position in wealth and industrial prosperity.

The coal product of West Virginia for the year ended June 30th, 1880, as reported to the Tenth Census, was 1,829,844 short tons, valued at \$2,013,671, an average of \$1.10 per ton at the mines. The quantity mined during the calendar year 1889, as reported to the Eleventh Census, was 6,231,880 short tons, valued at \$5,086,584, an average of \$0.82 per ton at the mines.

The capital invested in West Virginia coal mines in 1889 was \$10,508,050, of which \$6,501,267 was in land (107,521 acres), \$2,160,249 in buildings and fixtures, \$1,255,965 in tools, implements, etc., and \$590,569 in cash, not included in the foregoing items.

KENTUCKY.

The coal areas of Kentucky represent both the Appalachian and the central or Illinois fields. The Appalachian field covers the entire eastern section of the State to the extent of 10,000 square miles, and underlies wholly or in part 30 counties. Operations on a commercial scale are conducted in the following counties in the southeastern district, namely, Bell, Knox, Laurel, Pulaski, and Whitley, and in the northeastern district in Boyd, Carter, Johnson, and Lawrence counties. In addition, small local mines are reported in Breathitt, Clay, Elliott, Floyd, Harlan, Jackson, Knott, Leslie, Letcher, Madison, Magoffin, Martin, Menifee, Morgan, Owsley, Perry, Pike, Powell, Rockcastle, Wayne, and Wolfe Counties.

In the western part of this State the lower extremity of the central or Illinois field extends over an area of about 4,000 square miles, underlying the counties of Butler, Christian, Crittenden, Daviess, Edmonson, Grayson, Greenup, Hancock, Henderson, Hopkins, McLean, Muhlenberg, Ohio, Todd, Union, and Webster. Twelve coal seams are identified in this district, but only five are worked to any extent; while in the eastern as well as in the western portion of this State as many as 10 or 12 distinct seams have been noted, but one or two of them attain such uniformity of thickness and persistency of area as to warrant extensive mining operations.

The character of the coal is generally semi-bituminous, free-burning and non-coking, but the various seams comprise all varieties, from bituminous shale to the finest grades of cannel coal. Some fair coking coals are mined in Hopkins County, in the western district, and in Bell County, in the southeastern district. This State possesses some of the finest beds of cannel coal known in the country, which are found in both the eastern and western districts, and the product is distributed widely for domestic grate fuel in the eastern cities, competing successfully with the English cannels. Indeed, much of it is shipped abroad into markets hitherto controlled by Australian and English coals.

The product of coal in Kentucky during the census year ended June 30th, 1880, was 946,288 short tons, valued at \$1,134,960, an average of \$1.20 per ton at the mines. During the year 1889 the total product was 2,399,755 short tons, valued at \$2,374,339, an average of \$0.99 per ton at the mines.

The capital invested in Kentucky coal mines in 1889 amounted to \$6,581,380, of which \$3,877,995 was in land (128,100 acres), \$1,364,523 in buildings and fixtures, \$1,007,951 in tools, machinery, etc., and \$330,911 in other cash items.

TENNESSEE.

The great Appalachian coalfield passes through the State of Tennessee, bearing from northwest to southeast, a width of about 70 miles westward from Cumberland Gap, through the counties of Fentress, Scott, Campbell, and Claiborne, at the north, to Franklin and Marion Counties, about 30 miles westward from the Tennessee River, at the south, and embraces 21 counties in which coal deposits are known to exist. The local or trade divisions of the coalfields of Tennessee are designated as follows:

East Tennessee Division.—Jellico District, Elk Valley District, Careyville District and Big Creek District, Campbell County; Cumberland Gap District, Claiborne County; Poplar Creek District, Morgan County, and Coal Creek District, Anderson County.

Middle Tennessee Division.—Sequatchie District, Marion County; Valley District, Hamilton County; Walden Ridge District, Rhea and Roane Counties; Tracy City District, Grundy and Franklin Counties, and Plateau District, Scott County.

Small local mines exist in several counties not named above, but the product is small and irregular, and consumed mainly for domestic purposes and for smelting.

*Abstract of Census Bulletin No. 94.

While the general character of the coal of Tennessee is bituminous, considerable diversity exists in the various sections. In the northern portion high grades of gas and cannel coal are abundant, while to the southward the coal is more soft and friable and better adapted for coking and steam purposes.

No less than eighteen distinct seams of coal have been identified in some of the higher points of the Cumberland Mountains, but many of these are not of a character to permit development. The workable veins range from 2 to 7 ft. in thickness, and generally belong to the upper measures. The following is a list of the railroads which furnish transportation facilities for the Tennessee coal: East Tennessee, Virginia & Georgia railway; Cincinnati, New Orleans & Texas Pacific railway; Alabama Great Southern railway; Nashville, Chattanooga & Saint Louis railway; Louisville & Nashville railway.

The product during the year ended June 30, 1880, as reported to the Tenth Census, was 495,131 short tons, valued at \$629,724 at the mines, an average of \$1.27 per ton. During the year 1889 the total production was 1,925,629 short tons, valued at \$2,338,309 at the mines, an average of \$1.21 per ton. The increase in production during the decade was nearly five-fold, while the value at the mines was nearly four times as great as in the previous census year.

The capital invested in Tennessee coal mines in 1889 amounted to \$4,362,711, divided as follows: Land (133,552 acres), \$2,457,850; buildings and fixtures, \$1,046,454; tools, implements, etc., \$638,095; cash, \$220,312.

VIRGINIA.

The coal fields of Virginia may be divided into three prominent areas: First, the Richmond coal field, embracing the counties of Amelia, Chesterfield, Goochland, Henrico and Powhatan, with traces in Dinwiddie and Hanover, situated in the Triassic sandstone areas in the vicinity of Richmond. The coal from this field is a bright black bituminous, varying materially in hardness and in the quantities of impurities. In that part of the field lying north of the James River an unusual and interesting formation of natural coke exists, which bears a striking resemblance to the artificial product and is found to be a very desirable domestic fuel. Second, the middle or subcarboniferous coal field, along the western border of the State, in that portion designated the "Appalachia." No mining operations have as yet been opened in this district. Third, the Pocahontas coal field, which embraces parts of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell and Wise Counties, at the southern edge of the famous Flat Top region, including the Clinch Valley field, containing the lower productive coal measures of the Appalachian field. The finest grades of steam, gas and coking coals are obtained from these districts, and the exceptional transportation facilities provided by the Norfolk & Western Railroad system to the westward and to tidewater at Norfolk have distinguished this region as one of the most important in the country.

The total output of the State of Virginia during the year ended June 30th, 1880, as reported to the Tenth Census, was 43,079 short tons of bituminous coal, valued at \$99,802 at the mines, and 2,817 short tons of anthracite, valued at \$8,290 at the mines. During the calendar year 1889 the quantity of bituminous coal mined in this State, as reported to the Eleventh Census, was 865,786 short tons, valued at \$804,475, an average of \$0.93 per ton at the mines. This great increase during the decade is attributed entirely to the developments in the Flat Top and Clinch Valley districts.

The total capital invested in Virginia coal mines in 1889 was \$1,055,516; buildings and fixtures, \$363,270; tools, implements, etc., \$273,178; cash, \$25,378.

GEORGIA AND NORTH CAROLINA

Georgia.—In the northeastern counties of the State of Georgia an area of about 200 square miles is underlaid by the eastern edge of the Appalachian coal field near its southern extremity, embracing portions of Dade and Walker Counties. The Georgia Mining, Manufacturing and Investment Company has an extensive colliery at Coal City, which is connected by a lateral line with the Nashville, Chattanooga & St. Louis Railroad. The character of the coal is semi-bituminous and yields a fair quality of coke. A large portion of the product at this mine is manufactured into coke for use at the furnaces of the company.

North Carolina.—Coal deposits exist in Stokes and Rockingham Counties along the Dan River and Chatham and Moore Counties in the valley of Deep River. The State Board of Agriculture has given much attention to the exploration of these beds. Mr. H. B. Robson, the engineer who has been conducting these explorations, in his report to the Department of Agriculture upon the Dan River field, says:

"From a careful observation of the coal areas encountered hitherto, I think I have found rapid transformation from soft to hard crystalline coal in the hill slope beds. I hope to find this latter condition in the deposits of the valley. This result will be of vast importance to the State, as well as to the district, adding to the coal resources not less than 40,000,000 tons of accessible coal. . . . The Dan River coal deposits may be taken as available for fuel consumption between Leaksville and Germantown, a distance of about 50 miles, the width of the basin between outcrops being about 3½ miles. No coal has been found on the north western edge of the basin, but in the southeastern edge two available coal seams are found which reach their maximum thickness (3 ft. and 7 ft. southwest of the Dan River and within 10 miles of the southwestern end of the deposit."

The census investigation for the calendar year 1889 failed to find any coal operations in this region excepting a few unimportant country banks, the product of which was so small and uncertain that answers to inquiries could not be obtained.

The only company in the State mining coal upon a commercial basis is the Egypt Coal Company, which is developing a property of about 2,700 acres in Chatham County, near Egypt Depot. The product for 1889 was small, as mining was only begun in December of that year, but the progress made bespeaks a profitable industry. A capacity of 500 tons per day has already been reached. This mine is connected with the Cape Fear & Yadkin Valley Railway.

The number of acres of coal land owned in these counties was 20,733, and the value of mines and improvements was as follows: In land, \$348,300; in buildings and fixtures, \$58,000; in tools, implements, live stock, machinery and supplies, \$283,000; cash capital, \$35,200; total, \$724,500.

STATISTICS OF PRODUCTION.

The statistics of the production of coal and expense of mining in the States West Virginia, Kentucky, Tennessee, Virginia, Georgia and North Carolina during the census year 1889 are summarized as follows, the product being stated in short tons of 2,000 lbs.:

Expenditures.

STATE.	No. of employes.	Wages.	Supplies and materials.	Miscellaneous.	Total mining expense.	Contract work.	Total.
West Virginia	9,952	\$3,888,712	\$462,591	\$443,394	\$4,794,697	\$17,099	\$4,811,796
Kentucky	5,260	1,756,363	237,321	117,765	2,111,449	45,099	2,156,548
Tennessee	4,108	1,609,310	271,390	219,268	2,099,968	13,324	2,113,292
Virginia	1,555	621,266	46,754	13,456	681,476	932	682,408
Georgia	740	265,464	102,655	6,546	.....	51,400	426,065
No. Carolina							

Production.

State.	No. of Mines	Total product.	Value at mines.	Average price.	Disposition of product.		
					Shipped.	Used locally.	Made into coke
West Virginia	1,111	6,231,880	\$5,086,584	\$0.82	4,764,900	530,655	936,325
Kentucky	1,841	2,399,755	2,374,339	0.99	2,111,010	270,287	18,458
Tennessee	82	1,925,689	2,338,309	1.21	1,334,424	52,135	539,130
Virginia	58	865,786	804,475	0.93	732,881	20,635	112,210
Georgia	.....	226,156	339,382	1.50	46,321	15,199	164,645
No. Carolina							

* Statistics of Dade County, Georgia, and Chatham and Stokes Counties, North Carolina.

Herr L. Grabau, of Hanover, intends to erect a factory at Trotha, near Halle-am-Saal, Germany, for the manufacture of aluminum by his improved sodium process.

Rights of City to Coal Underlying Streets.—Where the title to public streets is vested in fee in the city in trust for the public, the city may recover from any one who mines coal from beneath the streets the value of the coal so mined, although the use of the streets is not thereby impaired or affected. And this recovery may be had without deciding the question as to whether or not the city would have a right to mine or sell the coal itself.—*Union Coal Co. v. City of La Sell, Supreme Court of Illinois, 26 N. R. Rep. 506.*

Electrolytical Purification of Vitriol.—The small quantity of water that cannot be eliminated from ordinary vitriol by rectification is said to be removable by electrolysis, being decomposed into oxygen and hydrogen before the acid itself suffers change. In order to avoid the decomposition that might occur, M. Léon has recently patented a process in which platinum electrodes of large area, kept cool by the circulation of water through them, are used. The bath itself is also cooled.

The Action of Nitric Acid at Different Strengths and Temperatures upon Iron.—According to MM. Henri Gautier and G. Charpy, *Comptes Rendus*, cxii, 25, nitric acid attacks iron at every degree of concentration, but the action may take place in two different manners, the one rapid and attended with an escape of gas, and the other slow and without a production of gas. At 15° C. the attack is slow in the case of acids of a specific gravity higher than 1.12; at 60° C. the action is similar only for ordinary commercial acids of greater specific gravity than 1.38. The existence of these two modes of action explains very simply the phenomenon known as the *passivity of iron*, which corresponds not, as it has been hitherto supposed, to the absence of all action, but merely to a slow action without the liberation of gas.

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, AUGUST 4TH, 1891.

- 456,942. Rock Drill. Charles Cummings, Oakland, Cal.
 456,951. Stone Drill. James W. A. Gullick, California, Ark.
 456,953. Protective Tip for Ingots. William R. Hinsdale, Newark, N. J.
 456,955. Ball Bearing. Henry Howard, Providence, R. I.
 456,957. Machine for Molding and Condensing Round Bars. John R. Jones, Philadelphia, Pa.
 456,967-456,968. Ore Concentrator. Charles E. Seymour, Hurley, Wis.
 456,978. Blasting Plug. Reuben J. Bolt, Boston, Mass., Assignor to Frances E. Holliday, same place.
 457,002. Process of Making Nitro-glycerine. Ebenezer K. Mitting, Chicago, Ill.
 457,003. Hot Air Furnace. Daniel J. Murnane and Laurence J. Treacy, St. Louis, Mo., Assignor to the Champion Heating and Ventilating Company, same place.
 457,022. Pump and Pumping Engine. William H. Bailey and Gustave Lindermann, Salford, England.
 457,063. Apparatus for Charging Furnaces. George R. Ward, Munhall, Pa., Assignor to one-half to James Purves, same place.
 457,145. Ore Sampling Machine. Henry L. Bridgman, Blue Island, Ill.
 457,146. Crushing and Grinding Mill. Thomas C. Cadwgan, Springfield, O., Assignor by mesne assignments to the O. S. Kelly Company, same place.
 457,168. Windmill. R. B. Sinclair, Alameda, Cal.
 457,194. Water Motor. Samuel B. Goff, Camden, N. J.
 457,202. Blast Furnace. Hugh Kennedy, Sharpsburg, Pa.
 457,205. Alloy and Method of Producing It. Henry Marbeau, Paris, France, Assignor by mesne assignments to the Nickel-Steel Syndicate, Limited, London, England.
 457,206. Means for Transmitting Power. Joseph Meier, Newark, N. J.
 457,213. Stone Cutting Machine. David Rettiger, Strong City, Kans.
 457,231. Method of Manufacturing Rock-Faced Artificial Stone. Charles W. Stevens, Lansing, Mich.
 457,233. Fireproof Ventilator and Heater. Benjamin Suffron, Peebles, O.
 457,234. Evaporator. Magnus Swenson, Fort Scott, Kan.
 457,237. Machinery for Making Rolled Wire Nails. William O. Tyers, Smethwick, Assignor to the Nettlefolds, Limited, Birmingham, England.
 457,244. Deep Well Pump. John Bean, Los Gatos, Cal.
 457,245. Apparatus for Burning Natural Gas. Charles D. Betts, Warren, Pa., Assignor of two-thirds to Lewis Betts and William H. Pickett, both of same place.
 457,256. Process of Obtaining Sulphate of Zinc from Zinciferous Ores. Charles F. Crosemlre, Newark, N. J.
 457,284. Windmill. Horace C. Lyman, Monon, Ind.
 457,314. Dredging Apparatus. Robert H. Fraser, Bourne, Assignor to Frederic A. Lockwood, Boston, Mass.
 457,321. Apparatus for Forming Sand Molds. John J. Kinzer, Jr., Pitsburg, Pa.

PERSONALS.

Col. V. K. Spear has been appointed superintendent of the Ora Bella mines, at Bayard, Ariz.

Mr. J. N. Porter has resigned the management of the Florence and Iron River mines, Michigan.

Mr. George Cowie has been appointed superintendent of the Youngstown Coke Company, Limited, Lemont Furnace, Pa.

Mr. E. E. Olcott, mining and metallurgical engineer, of New York, has just returned from a professional trip to Chihuahua, Mexico.

Mr. Frank A. Bird, of Salt Lake City, Utah, has been appointed assayer at the dressing works of the Anchor Mining Company, Park City, Utah.

Mr. J. C. Dickey, superintendent of the Ute & Ulay Mines, Limited, Lake City, Colo., has resigned his position. He has been succeeded by Mr. Alexander Ballantine.

Messrs. Taylor & Brunton, mining engineers, proprietors of sampling works at Aspen, Colo., have made arrangements to erect large sampling works at Salt Lake City, Utah.

Mr. Benjamin Guggenheim, treasurer of the Philadelphia Smelting and Refining Company, of Pueblo, Colo., has been appointed general manager of that company.

Mr. M. J. Sheridan, president of the Chicago Metal and Mining Stock Exchange, is making a two-months trip through the Rocky Mountains, visiting the principal mining districts of Colorado, Utah, and Montana.

Mr. T. S. Austin, superintendent of the Rio Grande Smelting Company, Socorro, N. M., has accepted a similar position with the Great National Smelting Company, of Monterey, Mexico, whose works will probably be blown in the first of next year.

Mr. E. F. Ayton, mining engineer, superintendent of the Bote Mining Company, of Zacatecas, Mexico, passed through this city this week on his way to England, where he will remain about two months and then return to Mexico.

Mr. Baird Halberstadt, mining engineer, of Pottsville, Pa., has been appointed assistant geologist on the Geological Survey of Pennsylvania. His duties will be to complete a bituminous map of Pennsylvania similar in make-up to the map of the anthracite region already issued by the Survey. In this map all of the mines will be located, and in the report to accompany it there will be a short account of each mine, section of the bed worked, together with other valuable information.

OBITUARY.

Thomas Lamb, a well-known inventor and machinist, died in Philadelphia, Pa., on the 4th inst.

J. L. Ringwalt died on the 29th ult., at the age of 73 years. He was for sixteen years editor of the *Railway World*.

Col. Ira Tripp, prominent in railroad and coal circles in the Lackawanna region, died in Wilkesbarre, Pa., on the 4th inst., aged 77 years.

Chas. C. Beckwith, an old California pioneer, died last week at Murray, Idaho, after a lingering illness. He was also an army veteran, having served under General Connor in Utah and Nevada.

George K. Anderson, Register of the United States Land Office at Folsom, N. M., died at the Sisters' Hospital in Trinidad, Colo., on the 3d inst. Mr. Anderson was once a wealthy operator in oil in Pennsylvania and an active politician.

INDUSTRIAL NOTES.

The Maryland Steel Company, at Sparrow's Point, Md., commenced making Bessemer steel on the 1st inst.

The Gowanus Smelting Works, of Brooklyn, N. Y., took fire on the 6th inst., and were damaged to the amount of \$2,500.

The scale conference of green-glass bottle manufacturers and workmen came to an abrupt ending on the 5th inst., and a strike or lockout is said to be probable.

The Cambria Iron Company, of Johnstown, Pa., contemplates rebuilding the wire works destroyed by flood. They will cost \$1,000,000, and will employ 500 men.

The King Iron Bridge and Manufacturing Company, of Cleveland, O., has been awarded the contract for an iron bridge across the Ontonagon River, at Ontonagon, Mich.

In the ordnance department of the Bethlehem Iron Company's works at Bethlehem, Pa., an ingot mold for the manufacture of armor plate weighing 100,000 lbs. was successfully cast on the 4th inst.

At a meeting of citizens of Birmingham, Ala., on the 3d inst., \$102,000 was subscribed toward a million-dollar steel plant. The citizens were asked by the promoters for \$150,000, and the other \$48,000 is said to be in sight.

The Colorado Coal and Iron Company's Bessemer works at Pueblo, Colo., will be running in full blast by Aug. 15, it is expected. A large amount of money has been spent in improvements at the works during the past six months.

Mr. H. M. Flagler, of the Standard Oil Company, has authorized positive denials of the statements that the Standard Oil Company or any of the Standard Oil party had any interest, direct or indirect, in the Economic Gas Company that has been organized in opposition to the Chicago Gas Company.

The Cedar Mountain Steel Company was recently organized at Knoxville, Tenn. The company has bought 20 acres of brown hematite iron ore on the Doe River, five miles above Elizabethton, and will immediately put up a 30-ton blast furnace to make steel ingots by the Canby direct process.

The Salem Wire Company, of Findlay, O., has settled its difficulties with its employes. It is understood that the managers refused to sign the scale prepared by the Amalgamated Association, but presented one of their own. According to this scale the men are required to put in more hours, but are paid better wages. The mill will resume with 350 employes.

The Provincial Natural Gas Company and the Carroll Brothers, of Sherkston, Ont., have been in dispute as to the location of pipes crossing the Niagara River for the purpose of supplying natural gas to the city of Buffalo. The matter has now been decided by the Canadian government. The two crossings already made by the Provincial company are confirmed, while Carroll Brothers are to secure a crossing for their pipes about 400 yards distant.

The Duquesne Tube Works Company, which recently erected large additions to its plant at Duquesne, has decided to increase the capital stock from \$100,000 to \$150,000, and will shortly add a rolling mill to its capacity. For some months past the Westinghouse Airbrake Company, at Wilmerding, has been running its works about 35 hours per week, and the force of employes was reduced to a considerable extent. A week ago several departments were put on full time, and now the entire plant is in full operation.

Carnegie, Phipps & Co., Pittsburg, Pa., have been awarded a contract, by the Secretary of the Navy, for ten 3-in. protective deck plates, upper layers, the award being made in view of the exhaustive trials made by the Navy Department with the result of demonstrating the superiority and greater tensile strength of nickel steel as a resistant armor for naval vessels. The relative cost of these plates as compared with pure steel will be studied, and if satisfactory terms can be made this kind of armor will be adopted in the construction of the armored cruisers "New York" and "Cruiser No. 12."

S. R. Seyfert & Co. attempted to resume operations at their large rolling mill at Seyfert's Station, near Reading, Pa., on the 4th inst., after four months' idleness, with non-union hands. Enough puddlers presented themselves to start four furnaces, but the firm was prevented from starting up on account of trouble with the rollers, who refused to go to work, and the mill remains closed. The firm says that the rollers had promised to go to work, but that their refusal to do so is due to the interference of the Amalgamated Association officers. The firm succeeded in starting their works two days later.

The Springfield Iron Company, of Springfield, Ill., has brought suit in replevin in the United States Circuit Court against the Carbon Iron Company, of Pittsburg, Pa., to prevent the removal of about \$20,000 worth of steel ingots and plate now in the yards of the former company. The Carbon Iron Company operated the steel plate mill of the Springfield Iron Company under lease, it being stipulated that the lessees should leave the property in as good shape as they found it. About two weeks ago the mill burned down, and now the Carbon Iron Company refuses to build, and is preparing to remove its property from the State. The United States Marshal has placed a custodian in charge of the property. The Carbon Iron Company has a large contract for steel armor for government cruisers now being built at San Francisco, and the fire seriously interfered with its operations.

Concerning the report current last week that the interests of Messrs. Cooper, Hewitt & Co., of New York, had been transferred to an English syndicate, Mr. Edward Cooper said: "We have had nothing to do with getting up any syndicate, foreign or American, to buy our iron works. Some time since a responsible American party asked us if we would sell them, and we named a price which we would be willing to take, but no contract of any kind has been entered into." The works referred to, Mr. Cooper said, were those of the Trenton Iron Works and the blast furnace at Durham, Pa. The valuation of the properties, he added, was

a matter of private concern altogether. A price had been named which was acceptable to the firm of Cooper, Hewitt & Co., and was apparently so to the promoters of the proposed purchase, and if the latter came forward with the money they would get the property.

The Town Council of Amsterdam, Holland, has sanctioned the proposal, laid before it by the Executive, to the effect that a large piece of ground, situated in the so-called petroleum harbor, and belonging to the town of Amsterdam, shall be let for a period of 10 years to the American Petroleum Company of Rotterdam (see *ENGINEERING AND MINING JOURNAL*, July 18th). It will be used for the purpose of maintaining there two capacious tanks, holding at least 40,000 barrels. For a total superficial area of 15,850 sq. m. the American Petroleum Company will have to pay the town a yearly rental of about 16c. per sq. m. The proposal excited much opposition on the part of the Amsterdam Petroleum Company and independent traders whose petitions to the Town Council stated that their undertakings might be ruined if the lease were granted. They asked the Town Council to reject the proposal chiefly upon the ground that the American Petroleum Company, of Rotterdam, is merely an offshoot of the Standard Oil Company, which, with the aid of the Rothschilds, means to maintain a monopoly of the petroleum trade and industry to the detriment of the public interests involved. The Chamber of Commerce of Amsterdam had adopted resolutions to the contrary effect, the preponderating opinion in the chamber being that the Standard Oil Company is powerful enough to obtain a footing and command a market in Amsterdam whether the people like it or not, and that it was, upon the whole, better to allow that company to establish tanks in a suitable spot upon terms which would be not only remunerative to the town, but would also allow an effective control to be exercised over its doings.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office. No charge will be made for these services.

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

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

GOODS WANTED AT HOME.

- 2,340. A mineral indicator. Alabama.
2,341. A cheap fertilizer mixer. South Carolina.
2,342. Thirty-lb. steel or 30 to 40 lb. iron rails with fish plates, spikes, bolts, etc., for five miles dummy road; also a second-hand dummy motor or light saddle tank locomotive, closed coach, and six freight cars. Georgia.
2,343. French huffs and set of dogs for cutting quartered oak. Tennessee.
2,344. Machinery for working soapstone. South Carolina.
2,345. Appliances for hydraulic lifting; rotary pumps preferred. South Carolina.
2,346. Manganese as pure as possible. Connecticut.
2,347. A steam shovel capable of extracting stumps, to work in a mixed loam and clay soil in a thickly timbered section where an over-burden of some 6 ft. of earth must be removed. Pennsylvania.
2,348. A large quantity of hoiler and tank plate; also bar iron. Pennsylvania.
2,349. A light logging outfit for 3 miles of road. Locomotive, 6 logging cars and 3 miles of 16 or 20 lb. T steel rails with fastenings and spikes. Virginia.
2,350. Phosphate mining machinery. Massachusetts.

AMERICAN GOODS WANTED ABROAD.

- 2,337. A magnetic separator to separate magnetite from blende. France.

GENERAL MINING NEWS.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—Official reports show that the Tracy Division of this company has mined during the first six months of 1891, 185,870 tons of coal, an increase of 12,679 tons over the same period in 1890. The shipments for the first six months of 1891 foot up as follows: coal, 101,199 tons; coke, 57,300 tons; total, 158,539 tons. Showing an increase in ship-

ments over the same period of 1890 as follows: in coal, 23,733 tons; in coke, 8,399 tons. Total increase, 32,123 tons in six months in 1891. The large increase in shipments of coal over amount of increase in mining, is explained by the fact that over 200 coke ovens were idle a large part of this time, and run of mines coal shipped in place of coking. The increase in coke shipments were from a large quantity of stock coke, now all disposed of. All ovens are in good repair, 444 being now in full blast.

During the month of July output was as follows: 36,228 tons coal, against 27,947 in July, 1890, an increase of 8,281 tons, or over 31%.

Shipments foot up as follows: coal, 15,652 tons; coke, 12,302 tons; total, 27,954; an increase over July, 1890, of 6,725 tons. This whole year has been very prosperous to this division of the company, and with every prospect that it will continue.

The company has now for August a larger demand for its products than it can fill promptly. Its men all work full time, and several drifts work night and day.

ARIZONA. GILA COUNTY.

OLD DOMINION COPPER COMPANY.—This company has decided to erect a complete new smelting plant and to connect the mine with the new works by a wire rope tramway. The proposed improvements will be made in accordance with the plans of Supt. A. L. Walker. Orders have already been placed for the machinery required, and the work of grading is now well under way. Ground for the smelting plant, and the roadway leading to it, were purchased several months ago. The smelter will be situated south of the present works, nearly 500 yds. distant. The building will be 170x100 ft., and there will be three 42-in. round water-jacket furnaces, which will have a total capacity of 200 tons. The rock breaker and engine will be placed in the new ore bins at the mine, and the ore, after being crushed, will be conveyed from the bins to the smelter, a distance of 1,225 ft., by a wire rope tramway of the Bleichert system. The furnaces, engines, boilers, blowers and blast pipes will come from Fraser & Chalmers, Chicago, and the tramway from Cooper, Hewitt & Co., of Trenton, N. J.

ARKANSAS. CARROLL COUNTY.

Some excitement has been created by the discovery of silver about 8 miles east of Eureka Springs. The discovery has been made on land belonging to Messrs. Baker and Pendergrass, attorneys, of Eureka Springs. A vein of lead ore carrying a considerable amount of silver has been found at a depth of 10 ft., the vein going down vertically.

CALIFORNIA. AMADOR COUNTY.

Of the Grass Valley Mines, according to the San Francisco Report, the Idaho has produced about \$12,000,000, the Eureka (now idle) \$6,000,000, Allison Ranch \$1,000,000, North Star \$5,000,000, Empire \$5,000,000, and New York Hill \$3,000,000, and many others have produced large amounts. It is estimated that the district has produced \$100,000,000 since its discovery.

(From our Special Correspondent.)

BAY STATE MINING COMPANY.—The property owned by this company comprises four full claims, held under a United States mineral patent. The mine was operated over 20 years ago to some extent, the ore then milled yielding \$350 per ton, not including sulphurets. Three shafts have been operated. The north shaft has been sunk 80 ft., and the middle shaft also has been sunk to the same depth, the two being connected by a trench. A crosscut run from the middle shaft encountered a vein of quartz 98 ft. in width. Four hundred feet north of the middle shaft, the third shaft has been sunk to a depth of 60 ft., disclosing a ledge 18 ft. in width and giving evidence that the supply of good ore within the boundaries of the claim is fairly abundant. Last year a bond on the mine was secured by W. T. Jones, for many years a mining superintendent in the employ of Alvinza Hayward. The bond does not expire until October, 1893. A company is being formed to work the property for the sum of \$40,000, payable \$10,000 in cash at the expiration of the bond, and 30,000 shares of stock in the new company, said stock to be unassessable so long as it is held by the original owner; if transferred, however, in whole or part, to outside parties, such stock shall then be liable to assessment in common with all other shares of the corporation. Two hundred thousand shares are being issued, the capital for working purposes to be provided by assessments on the capital stock, said assessments not to exceed 1c. per share per month. Most of the stock has been subscribed for, and soon this mine ought to be added to the hullion producers of the county.

BUTTE COUNTY.

GOLDEN GATE ALLUVIAL SYNDICATE, LIMITED.—The Feather River was turned into the flume of this mine on the 27th ult. The structure carried the entire volume of water without difficulty. The subflume will be completed soon and the work of pumping begun. Barring accidents, it is expected that the work of mining the river bed will begin within two or three weeks.

HUMBOLDT COUNTY.

It is reported that Owen B. Clark, of Wilkes-

barre, Pa., has made an important discovery of petroleum at Mattole, the new oilfield, not far from Eureka. He has been prospecting for the past four months, and has thoroughly examined the region from Petrolia to the Inland Mountains, a distance of 62 miles, and reports that he finds a well-defined ledge of oil-bearing sandstone running from Joel's Flat, near Petrolia, in a southeasterly direction to Inland Mountain on the Trinity County line. The quality of the oil found throughout the whole length of this ledge is said to be first-class.

TRINITY COUNTY.

(From our Special Correspondent.)

TRINITY GOLD AND MINING COMPANY.—The five claims owned by the company are showing up well this year. Last week what is known as the upper place was cleared up, the result being \$7,000. The lower place is estimated to contain about \$12,000, also ready to clean up. The mines are situated in Oregon Gulch Mining District, four miles from Weaverville. The width of deposit worked at present is about 400 ft., the yield per cubic yard being 17c. The fineness of the gold is .895; top and bottom, percentage saved in sluices, fifty nine-sixtieths; one-sixtieth in under-current; nine-tenths saved in first eight boxes. Owing to limited water supply the yearly runs have been calculated by the hour, the average yield being, from run of 376 hours, \$3,000; average per hour, \$21.28. The run this season will be longer on account of heavy snows in the mountains.

SAN DIEGO COUNTY.

BANNER MINING COMPANY.—Mr. D. C. Lane has returned to Julian and taken charge of this company's properties. This is a new corporation with a capital stock of \$3,000,000. A few men have already been put to work on the Cincinnati Belle, one of the dozen or more properties owned by the company.

(From our Special Correspondent.)

The \$200,000 being subscribed for the iron plant has, so it is reported, all been gathered in, save about \$25,000 to \$30,000, and the people of San Diego, from the wealthy merchant down to the humble artisan, are subscribers to the scheme. It is to be hoped that Dr. Eames will be more fortunate out here than when he floated a similar scheme in the East some years ago. At present that enterprising gentleman, having satisfied himself as to the abundance of ore in the immediate neighborhood, is off on another exploring trip, in search, it is said, for petroleum or some equivalent in the way of fuel. W. W. Stewart, E. W. Morse, Jorris & Son, and others of the old-timers have figured in the lists published in the daily papers of subscribers in sums averaging from \$500 upward, but it is noticeable that a great number of the prominent business men having large interests in Southern California have not yet seen fit to give their quota to the fund. Many mechanics and other workmen are down for sums from \$25 up. The subsidy will not be entirely a cash one, but will be made up of cash, notes, loans, etc.

COLORADO.

It is expected that the Rio Grande Southern Railway will be completed to Trout Lakes by September 1st, and that cars will be running into Rico by October 1st, the last section of the road being graded with the exception of a few cuts and fills.

LA PLATA MINES, LIMITED.—The directors of this company (reconstructed from the New La Plata Mining and Smelting Company) have issued their first annual report, in which it is stated that the two installments of 3d. each per share, called according to the terms of reconstruction, cleared off the liabilities of the old company, including the debentures, and no charge whatever now exists on the property of the company. The mine developments were provided for out of the third installment on the shares, a large proportion of that call remaining in reserve at the end of the year. The cash capital in reserve and uncalled on the 400,000 shares issued, with 4s. credited as paid, was over \$3,000 at the end of the year. This position remains practically unaltered up to the present time. For the first time in the history of the concern since it has been an English company a clear profit is shown for the year. Although formerly the mines yielded large returns, the profits of that department were swamped by the unfortunate losses in the smelting business, which was put an end to in 1887. The smallness of the amount (\$638) brought forward as profit is due mainly to the ground not having been sufficiently opened out and drained. The company has up to the present time been debarred from deriving profit from the important discovery in the Gnesen mine in consequence of the continuance of water in the workings.

CLEAR CREEK COUNTY.

MENDOTA.—The workings in this mine are now so extensive that it is proposed to light them throughout with electricity. The ore body in the Mendota has certainly been wonderful in size and extent, says the Georgetown Courier. It has been practically continuous for 300 ft. east and 1,200 ft. west of the Victoria tunnel and for 500 ft. above it. In the deep shaft now being sunk from the tunnel level, at a depth of 75 ft. the ore body is as large as ever.

CUSTER COUNTY.

GEYSER MINING AND MILLING COMPANY.—A station 20 x 40 ft. in size has been cut at the 1,450-ft. level, and drifting has been commenced.

EAGLE COUNTY.

QUARTZITE.—It is reported that this group of mines at Nolan, comprising the Epsom, Valley and Henderson claims, has been sold to St. Louis and Nebraska parties for \$30,000 cash. There has been little development work done on the property, but the surface showing is said to be good.

GUNNISON COUNTY.

COLORADO MARBLE COMPANY.—It is said that this company will construct an electric tramway ten miles long, to transport marble from its quarries on Yule Creek to Crested Butte.

HINSDALE COUNTY.

UTE & ULAY MINES, LIMITED.—It is expected that the new plant of machinery will be in operation by October 1st, when the mines will begin to make a larger output than ever before. Development work now in progress is showing up large bodies of ore. The management of the company informs us that it will probably declare a dividend before the close of the year.

MONTROSE COUNTY.

MONTROSE PLACER MINING COMPANY.—This company, operating on Mesa Creek, has just made a clean-up of \$80,000 after a run of six weeks with one giant, according to local papers.

PITKIN COUNTY.

COWENHOVEN MINING, TRANSPORTATION AND DRAINAGE COMPANY.—The Cowenhoven tunnel, driven into Smuggler Mountain, was completed on the 29th ult., when the breast reached the Bushwacker-Alpine line. The work was commenced two years ago and has progressed steadily under the direction of Mr. D. W. Brunton, mining engineer, of Aspen. The dimensions of the tunnel are 7½ x 7½ ft. and its length 3,950 ft. The breast of the tunnel is 1,168 ft. below the collar of the Park Regent shaft, and between 500 ft. and 600 ft. below the lowest workings of the Bushwacker mine. A raise is now being made to connect with the latter.

SMUGGLER MINING COMPANY.—Judge Hallett, in the United States Circuit Court at Denver, last week, granted the application of this company for an injunction against the Standard Mining Company, which, it is claimed, is working in Smuggler ground, taking out large and valuable quantities of ore. The disputed ground formerly belonged to the Fulton Mining Company. When the latter applied for a patent for its property an agreement was made to deed this tract to the Smuggler company to avoid an adverse suit. The Fulton company did not carry out this agreement, and afterward sold its property, consisting of the J. C. Johnston and Chatfield claims, to the Standard Mining Company.

PUEBLO COUNTY.

PUEBLO SMELTING AND REFINING COMPANY.—The directors of this company have placed \$100,000 of the company's authorized \$500,000 7% mortgage bonds (\$278,000 already issued) with Mr. Arthur Burnham, of Boston, for sale, in order to increase the company's quick capital. It is stated that last year the company made \$80,000 in operating from February to November. The depreciation in the value of silver caused a heavy loss, which lapped into this year, making a net loss in operations the first three months of 1891 of \$21,418. In April the net profits were \$13,261, in May \$36,116, and in June \$15,357, leaving a net profit for the half year of \$43,316; to this is to be added interest on last year's silver operations paid this year, \$14,800, making the net earnings for the six months \$58,116. The gross smelting profits for the first six months of 1891 were \$139,534; but in the foregoing figures all interest charges are deducted, leaving the balance as earnings upon the \$1,072,800 capital stock. The new issue of bonds is offered at par.

RIO GRANDE COUNTY.

GOLCONDA GOLD MINING COMPANY.—The controlling interest in this company, hitherto owned by ex-Senator Bowen, has been transferred to an Eastern syndicate, which has also acquired a large amount of other property on the east slope of South Mountain, at Summitville. For the present operations are to be conducted under the title of the Golconda Gold Mining Company. The new combination comprises 560 acres of mineral land in all, and includes the Golconda, Iowa, and Bobtail mines. Mr. Charles I. Palmer has been appointed manager of the company. The company proposes to drive a tunnel 3,000 ft. long, which will cut the vein at a depth of 500 ft., or 300 ft. below present workings. A powerful plant of machinery will be erected, and as large a force of men as possible put to work in the mine at once.

HOLY MOSES MINING COMPANY.—According to careful estimates, states a local paper, the Holy Moses mine has been developed so that the ore reserves now amount to 35,000 tons. About 30% of the ore is said to assay 100 oz. to 125 oz. of silver per ton, the remainder being milling ore averaging from \$20 to \$25 per ton. The vein is 16 ft. between walls at the widest point yet opened. The Ethel mine is by no means so well developed, but is considered a very promising property.

SAN MIGUEL COUNTY.

SAN BERNARDO MINES, LIMITED.—Accounts for June show as follows: Ore sales, \$11,752.56; expenses for the month, \$6,020.73; ore shipped in addition, but not yet realized, \$3,833.70 (estimated).

SUMMIT COUNTY.

IDALIA & DIAMOND B. MINING AND MILLING COMPANY.—Henry E. Woods, of Chicago, has brought suit against this company and the lessees now operating its mines to set aside the transfer of the latter to the company. In November, 1887, a deed of trust on the Idalia mines was given to A. F. Beattie, trustee, to secure two notes for \$1,902. The notes were not paid and the holder of them caused the sale of the property by the trustee. By the sale the mines came into possession of the company, which has since developed them into a promising property from an almost worthless prospect. Mr. Woods now comes forward with an attempt to set aside the foreclosure under a charge that there was no consideration for the debt incurred.

WIRE PATCH MINING AND MILLING COMPANY.—The mine and mill on Farncomb hill, Breckenridge, has been leased to Harry Farncomb for two years.

CONNECTICUT.

TOLLAND COUNTY.

The new soapstone quarry recently opened at Stafford Springs promises to be a success. The work thus far has been entirely preliminary. The outside bed of hard rock has been taken off and a fine bed of soapstone is displayed. A mill will be erected at once. Prominent business men of that place are interested in the enterprise.

FLORIDA.

LEON COUNTY.

(From our Special Correspondent.)

LA PIERRE PHOSPHATE AND MANUFACTURING COMPANY.—This company has been organized by B. C. Mudge & Co., of Boston, Mass., for the purpose of developing a large tract of phosphate lands, comprising 1,669 acres, situated about four miles west of Tallahassee. The capital stock of the company is \$1,500,000. The sum of \$300,000 was paid for the property. A large plant will be erected. It is stated that the company is under contract to commence mining operations within 90 days. A branch road will be built connecting with the Florida Central & Peninsular Railroad.

MARION COUNTY.

(From our Special Correspondent.)

OHIO PHOSPHATE COMPANY.—George H. de Golyer, Ira Bond and A. F. Herald, of Cincinnati, have organized this company for the purpose of developing and working phosphate mines near Sparr. The capital stock is \$50,000, all paid in, with privilege of increasing to \$100,000.

IDAHO.

ALTURAS COUNTY.

RED CLOUD MINING COMPANY.—Local papers assert that the Red Cloud mine is showing more ore at the present time than any other property in the Wood River district. About 80 men are employed on the property. The company paid its regular monthly dividend of \$10,000, making \$73,000 paid since last autumn.

KOOTENAI COUNTY.

A vein of nickel ore, 7 ft. wide, has been uncovered near Hope. According to local papers the assays which have been made of samples taken along the outcrop show that the ore is rich.

LATAH COUNTY.

FREE COINAGE.—It is reported that a promising ledge has been struck in this property, in the Ruby Creek mining district. It is said that the ore so far uncovered will average from \$50 to \$150 per ton.

SHOSHONE COUNTY.

CŒUR D'ALENE SILVER-LEAD MINING COMPANY.—On the 400-ft. level of the Poorman mine a drift follows the ledge for a distance of nearly 400 ft., or within 17 ft. of the Tiger line. According to the *Wallace Miner* the ledge lies between almost perpendicular walls, and has an average width of 6 ft. With some exceptions the entire width of the vein is good concentrating ore. Lying against each wall and varying in width from 6 to 18 ins. are continuous bodies of clean galena. At the bottom of the shaft, 500 ft. from the surface, the ledge has been followed for a distance of perhaps 40 ft. in each direction. Mr. Simon Healy, superintendent of the mine, stated that the ledge was even stronger and the ore better at that depth than in the levels above. By September 1st the management expects to have the electric plant in operation. The power-house is now in course of construction. The flume for water power is about two miles in length, which is already completed. The water will have a fall of 800 ft. At present about 200 men are employed at the mine.

WASHINGTON COUNTY.

Developments in the Seven Devils district continue to excite attention. It is now reported that a promising ledge-bearing free-milling gold ore has been discovered seven miles from Helena. The American Mining Company has closed contracts for the erection of a smelting plant at the latter place for the reduction of copper ore from its mines. A wagon road has been built from

Baker City, Ore., to Helena, and a four-horse stage line is to be put upon the road between the two towns at once.

ILLINOIS.

COAL.

Coal has been struck on the Patterson farm at Tuscola, Douglas County, at a depth of 146 ft. The seam is said to be 5 ft. in thickness and the coal of excellent quality.

INDIANA.

OIL.

The first report of operations in the Indiana oil field, which is now attracting considerable attention, shows that work is confined to wells in Adams, Blackford and Joy counties. Four wells were completed during the month just ended, with a total production of 253 barrels daily. There were 5 wells drilling, and 7 rigs up and building.

INDIAN TERRITORY.

CHOCTAW COAL AND MINING COMPANY.—This company has been organized in Illinois to open coal mines in the Indian Territory. The capital stock is \$500,000. The other incorporators are M. M. Lindley, C. J. Lindley, R. Searless and T. N. Foster.

IOWA.

Reports come from Spencer, a small town 20 miles east of Mitchell, on the Omaha line, that a syndicate has purchased extensive stone quarries of jasper granite in the vicinity of that place and will work the same on an extensive scale. The company intends to employ 200 men. Side tracks have been surveyed by engineers of the railroad and work will begin immediately.

KENTUCKY.

BELL COUNTY.

It is reported that a syndicate of English and American capitalists has just purchased 160,000 acres of land immediately north of Middlesborough and almost adjoining the property of the American Association, Limited. The land is said to contain coking coal, iron, and other minerals. The average price paid was \$11 an acre.

MASSACHUSETTS.

ESSEX COUNTY.

PIGEON HILL GRANITE COMPANY.—This company was organized June 28, making the following statement: Fixed capital paid in, \$30,000; assets, land and water power, \$21,140; buildings, \$6,400; machinery, \$5,500; cash and debts receivable, \$19,220; manufactures and merchandise, \$8,650; miscellaneous, \$33,153; total, \$94,063. Liabilities: capital stock, \$30,000; debts, \$23,043; reserve for depreciation, \$41,020; total, \$94,063.

NORFOLK COUNTY.

PROUT BROS. GRANITE COMPANY.—This company was incorporated July 1, with a capital stock of \$20,000 divided into 200 shares, to acquire and operate granite quarries at Quincy. The directors are: Barnabas Clark, president and treasurer; George Prout, Jr., and Richard Prout.

WORCESTER COUNTY.

In the month of June 3,763 tons of granite were shipped from Milford for building purposes.

MICHIGAN.

A special despatch from Chicago says that the iron mining companies which dropped out of the contest with Chicago grain shippers for the Lake fleets a few days ago re-entered it on the 4th inst. The calls of the iron furnaces supplied from the Lake Superior region for more ore were too urgent to be longer ignored. On ore from Escanaba \$1.10 a ton to Lake Erie ports was freely bid on the 4th inst. It was an advance of 20 cents a ton in twenty-four hours.

COPPER.

ALLOUEZ MINING COMPANY.—The Allouez mill has been shut down again on account of the lack of water.

ATLANTIC MINING COMPANY.—This company produced 212 tons of mineral during July, against 215 tons the previous month, and 207 tons during July, 1890. For seven months the product foots up 1,501 tons of mineral, against 1,385 tons last year, an increase of 103 tons.

CALUMET & HECLA MINING COMPANY.—This company produced 3,944 tons of mineral in July, against 4,126 tons in June, and 3,727 tons in July, 1890. For seven months the product aggregates 25,785 tons, against 24,959 tons in 1890, an increase of 826 tons.

The annual meeting of this company is to be held in Boston on the 19th inst. at 10 A. M. to elect directors, etc. The following is the report of Mr. Alexander Agassiz, president of the company, for the fiscal year ending April 30, 1891, which is to be presented at the meeting.

"During the past fiscal year we have produced the equivalent of 30,192 tons and 996 pounds of refined copper. The price of copper, which was 17c. in November, 1890, steadily fell to 12½c. in May, 1891, and is now 13c. During the period of falling prices consumption was much below the average, home market most limited, and transactions for export not important. An active demand followed this interval of dullness, both for this country and Europe, and the company is at the present time in an excellent position as regards the future disposition of its product. In spite

of our large expenditures for construction, which, as usual, are charged to the cost of production, this has not been increased, and we may well look to its material decrease with our constantly improving facilities, as well as our diminishing outlay for equipments. Out of the profits of our business there were declared four dividends of \$5 each during the fiscal year. The Lake Superior water supply has been very generally distributed on our mining location. We also supply the village of Red Jacket, charging the corporation a moderate rate for the water consumed. The shaft cars introduced last year to convey the men in and out of the mine have continued to work satisfactorily, and we are placing additional men's cars at three other shafts. Two of the shafts at the old mine, one at the Hecla and the other on the Calumet side, have been thoroughly remodeled, and will shortly be ready for duty.

"During the past year we have had an unusually large force at work sinking shafts 6, 7 and 8 at the South Hecla. The sinking of 6 was pushed most vigorously. It is now joined with old workings, and the accurate connections established by sinking and raising in this shaft from four different points are very creditable to the engineering department. Our underground work is now well connected with a careful surface triangulation of the mining location and referred to a few points determined with the greatest possible accuracy. The close connection of the cross-cut from the 36th level with the vertical shaft plainly showed how carefully the underground work has been checked during its progress. Shafts 7 and 8 have also been sunk rapidly and will soon supply us with excellent stopping ground. Our openings are again gaining on the stopping, and at our present rate of production we must have from 16 to 17 years of ground opened. The Red Jacket shaft has now reached a vertical depth of 2,463 ft. Sinking has been discontinued there during the erection of the new sinking engines; these are now in place, in a separate building. In the mean time we are pushing the driving of two cross-cuts to connect it with the 39th and the 43d levels of the Calumet. The cross-cut at the 36th level has been successfully finished. The engine-house for the Red Jacket shaft has been completed, and the foundations for two new pairs of hoisting engines laid. These are now on the ground, and will be erected during the coming season. The boiler-house and its accompanying stack have also been built during the past year. The building is ready for the boilers.

"We shall have tributary to the Red Jacket shaft a long extent of territory on either side of the three cross-cuts. This ground has been fully tested by our old shafts and levels, and extends the whole length of the old mine. About three-sevenths of our rock supply came from the old mine during the past year, a slight increase from the former years. One of our large triple compound engines has been put into commission. The second engine will follow as soon as we commence hoisting rock from No. 2 Hecla shaft. The third engine must remain idle until No. 3 Hecla is repaired. The hoisting drums formerly devoted to the service of Hecla shafts 1, 2 and 3 have been removed, and their places taken by a large pair of compressors which had been on the ground for a considerable time. They are at last fully occupied. Our boiler capacity has been materially increased during the past year. Three large 90-in. Belpaire boilers have been received, two for the Hecla end of the mine location and one for the Calumet branch. Two smaller 64-in. boilers have been placed at the Lake Superior water-works. We have continued at the South Hecla to wall off the levels from the shafts as fast as they became exhausted, thus greatly reducing the risk of fire at that end of the mine. In the old mine the shafts are kept well sprinkled by the patrol, and, whenever practicable, we have also isolated them from the old abandoned workings, reducing to a minimum the risk from fire. Our electric pumping plant has been greatly delayed, owing to the difficulties encountered by the contractors in meeting our requisitions. These have now been overcome, and we may expect the machinery to be delivered during the coming fall.

"Two additional shafthouses have been remodeled into shaft rockhouses, thus reducing materially the cost of breaking and handling the rock at those points. The change of the remaining shafthouses and the alterations in the line of our railroad will be prosecuted as fast as practicable, the large rock breaker introduced last year working successfully, and enabling us to dispense with steam hammers. At the stamp mills we have completed the building intended for our new pumping plant. One of the large pumps, with a daily capacity of 60,000,000 gallons, has been erected, tested and found to work satisfactorily. We have completed the erection of the 50-foot sand wheel for the Calumet mill, and are erecting its mate for the Hecla mill.

"There have been no changes at the Calumet & Hecla smelting works at Torch Lake. Your directors have purchased at Buffalo a tract of land, well located on the river, where they propose to erect additional smelting facilities, preferring to increase the company's smelting plant where the market for coal and other supplies has greater advantages than at Torch Lake. The officers of the mine have been most energetic in pushing the erection of the large equipment we have in hand,

and the work has been well done. Their relations to the men have, as in former years, continued excellent, though it is becoming more difficult, from the number of men who do not speak English, to deal directly with our employes. We have increased our force at the mine office by appointing a land agent, whose principal business is to take charge of the leasing of houses, lots, and to look after the interests of our employes more closely than we have been able to do heretofore."

The assets and liabilities April 30th, 1891, were:

Assets.		
Cash at mine office.....		\$41,388
Cash at New York office.....		6,773
Cash at Boston office and copper at 11 cents.....		3,483,879
Bills receivable at Boston and mine.....		551,184
Total.....		\$4,083,224
Liabilities.		
Drafts in trans.....	\$8,105	
Employes' aid fund.....	3,172	
Bills payable.....	212,866	
Loans payable at Boston.....	93,000	
Notes payable at Boston.....	200,000	
Mine equipment.....	350,000	
Smelting works.....	200,000	
Machinery contracts.....	374,511	
Total.....		\$1,441,454

Excess of assets.....\$2,641,770

In comparison with the previous year, the amount of cash and copper is \$1,702,301, or 93% larger, while bills receivable is \$580,635, or 51% smaller. Bills payable at \$295,751, or 141% larger, and mine equipments, smelting works and machinery contracts is \$149,311, or 19% larger. We make the following comparisons:

	April 30, 1891.	April 30, 1890.	April 30, 1889.
Cash and copper.....	\$3,532,040	\$1,829,739	\$2,305,199
Bills receivable.....	551,184	1,131,819	292,905
Total.....	\$4,083,224	\$2,961,558	\$2,598,104
Liabilities.			
Drafts in trans.....	\$8,105	\$7,171	\$8,652
Employes' fund.....	3,172	3,112	2,849
Bills payable.....	505,866	210,115	194,766
Equipment, smelting works, etc.....	924,311	775,000	530,000
Total.....	\$1,441,454	\$995,398	\$736,267
Balance assets.....	\$2,641,770	\$1,966,160	\$1,861,837

CENTENNIAL MINING COMPANY.—The Lake papers refer to this company as entering the list of producers. The *Portage Lake Mining Gazette* speaks of the result of the work of stamping copper rock as proving highly satisfactory. It also says: "If the mine proves to be what the management hopes for, another mill will be erected on an advantageous site to provide extensive stamping facilities." The *Michigan Mining Journal* says of the mine that the first 15 tons of mineral produced was really the output of a four days' run, which means a product of at least 60 tons of mineral a month from one head. The rock supplying this head is being hoisted from No. 6 shaft, and is not being taken from the large stock pile of selected rock which has accumulated during the past year. The amount of rock stamped indicates that it will average fully 2%. The openings of No. 6 shaft continue to look favorable and can very easily supply the present demands of the mill, while No. 4 shaft stands ready to furnish a good quantity of paying rock when called on. The dam is well filled with water, notwithstanding the extraordinarily dry season, and no annoyance can arise from that quarter.

FRANKLIN MINING COMPANY.—The July product of this mine was 202 tons, against 203 tons in June and 246 in July last year. This makes 1,415 tons produced in seven months, against 1,489 tons produced for seven months last year, a decrease of 74 tons.

KEARSARGE MINING COMPANY.—The mine is said to be looking better than ever before, the bottom of the No. 2 shaft being in good ground. The bottom drifts south will supply some good stopping ground, so that when the upper levels are worked out there will be no difficulty in keeping up the product.

QUINCY MINING COMPANY.—This company produced 570 tons of mineral in July, against 570 tons in June, and 451 tons in July last year, making 3,599 tons produced since January 1st, against 2,075 tons in 1890, an increase of 524 tons.

IRON—GEOBIC RANGE.

ESCANABA RIVER LAND AND IRON COMPANY.—The body of ore struck some time ago at the "old Smith mine" has proved to be of considerable extent and of good quality. At the present workings, which are below the workings of the Swanzy, the ore is of fine quality, perfectly clean, and 68 ft. in width. It is a Bessemer ore. The company has already orders for the ore, and expects to make some shipments this season.

SECTION THIRTY-THREE IRON MINING COMPANY.—This company has declared a dividend of \$2 per share, and is said to have a surplus of \$100,000 still remaining in the treasury.

IRON—MARQUETTE RANGE.

REPUBLIC IRON MINING COMPANY.—This company paid a dividend of \$1 a share Aug. 3d. Officials of the company say they are unable as yet to give any information regarding the extent of damages, but they express the opinion that the fire has

not caused great loss. A venturesome miner, clad in a complete suit of divers' armor, went underground on the 30th ult. He fought the flames with a small hose sufficiently to make his way into the mine for some distance. He found that the fire was burning down to the sixth level.

MISSOURI.

Mr. Arthur Winslow, State Geologist, reports as follows concerning the work of the Missouri Geological Survey in July: Work on the iron ores was begun during the latter part of the month, and inspections were made in Callaway and Wayne counties. Zinc and lead deposits have been examined and reported upon in Newton, McDonald, Barry and Lawrence counties. The occurrences and distribution of coal have been studied in Carroll, Chariton, Howard, Monroe, Buchanan, Nodaway, Gentry and Davis counties. Detailed mapping has been prosecuted in Macon, Madison, St. Francois and St. Genevieve counties, and about 160 square miles have been covered. The work on paleontology and general stratigraphy has been actively prosecuted in the north-eastern part of the State along and adjacent to the Missouri River. The quaternary formations in Buchanan, Jackson, Saline and adjacent counties have received special study. A work recently started looking toward obtaining an estimate of the total amount and value of the mineral products of the State up to the present date, has been given special attention during the past month, and is now well advanced. In the office the proofs of Bulletin No. 5 have been corrected, and this publication will soon be ready for distribution. It consists of a paper on the age and origin of the crystalline rocks of Missouri, and of one on the clays and building stones of certain counties tributary to Kansas City. Considerable progress has been made in the preparation of Bulletin No. 6 and in the draughting of maps for publication. The granites and porphyries in Madison County have further been studied and their areas mapped, and the distribution of the geological formations has been outlined in a part of Greene County. Inspections of building stones and of clay deposits have been made in Stone, Jefferson, St. Genevieve, Mississippi, Stoddard, Scott, Cape Girardeau, Madison, Iron, Wayne Butler, Greene, Webster, Phelps and Crawford counties.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Aug. 3.

Saturday evening closed a very prosperous week among the lead and zinc mines of this district. There was only a slight advance in the ore market, but the sales were large. \$25 per ton was paid for good clean zinc ore; low grade ruled at \$22@23 per ton. Lead ore was in good demand at \$25 per thousand.

Following are the sales as far as reported: Joplin mines, 1,342,990 lbs. zinc ore and 188,490 lbs. lead; value, \$20,156.25.

Webb City mines, 515,080 lbs. zinc ore and 39,880 lbs. lead; value, \$6,793.

Carterville mines, 1,853,350 lbs. zinc ore and 136,020 lbs. lead; value, \$24,713.

Zincite mines, 228,750 lbs. zinc ore; value, \$2,850. Carthage mines, 187,600 lbs. zinc ore; value, \$2,244.

Galena, Kans., mines, 911,210 lbs. zinc ore and 260,380 lbs. lead; value, \$14,409.

District, total value, \$71,165.25.

Pittsburg, Kans. smelter output: R. Lanyon & Co., 189,750 lbs.; S. H. Lanyon & Bro., 98,900 lbs.; W. & J. Lanyon, 96,850 lbs.; Granby M. & S. Company, 97,000 lbs.; Weir City Zinc Company, 186,600 lbs.; Pittsburg & St. Louis Zinc Company, 70,000 lbs.; total, 737,100 lbs. Coal output for same week, 12,000 tons.

Professor Jenney, of the U. S. Geological Survey, has just returned from a trip into Arkansas, and is again engaged upon his geological work in this district.

The Home Mining Company, operating a 40-acre tract of land in the south portion of the city, has been prospecting and developing its property for some time. Last week it commenced producing a very fine grade of zinc ore, and from present appearances it has opened up some bodies of mineral of considerable extent.

Col. H. H. Gregg, who was recently appointed commissioner from Southwest Missouri to the World's Fair, will commence active work in behalf of the lead and zinc interests of this district. It is to be hoped that he will meet with the co-operation of every mine owner in the district, so that its mineral resources may be properly placed before visitors at the World's Fair.

Mr. H. S. Wicks was in the city last week from Chicago, and closed a deal for 80 acres of mineral land in the Roaring Springs camp, which is located about four miles southwest of Joplin. This section of the mining district will soon be a typical mining camp, as it is rapidly filling up with prospectors and mine operators who are opening up some fine bodies of ore. Some capitalists from Harrisburg, Pa., have been operating there for the past year, and have a very fine concentrating plant in operation, producing ore steadily.

Armill's mineral addition to the city of Joplin, which was platted off into acre lots last fall, is now coming to the front as a valuable tract of mining land. Several shafts have been sunk, and bodies of lead and zinc have been opened. Mr. Jas. Leeper, who put down the first shaft and

found the ore, will commence this week putting in a heavy pumping plant to drain the ground.

The scheme for a Joplin zinc smelting plant is again being revived by local capitalists, who say that the smelter must be built and by Joplin capital.

MINNESOTA.

IRON—VERMILION RANGE.

Ore shipments from Two Harbors for the season, as reported by the superintendent of docks, up to July 29, are as follows: Minnesota, 208,180 tons; Candler, 151,371 tons; Total, 360,551.

McCOMBER.—A well-defined vein of ore has been struck in the west drift over 100 ft. from the mouth of the shaft at the 110 ft. level. Crosscutting will be commenced at once.

MONTANA.

ANACONDA MINING COMPANY.—The Boston *Traveler* states that Mr. J. B. Haggin is now in Chicago arranging for the construction of a line of railroad from Butte to Anaconda. He says that the Anaconda mine has not yet been sold, but admits that negotiations for its sale are still in progress.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The July output of refined copper amounted to 1,860,000 lbs. This comparatively small product was occasioned by the extensive repairs made to the smelting plant at Butte during that month, which repairs have now been completed.

DEER LODGE COUNTY.

CHAMPION MINING COMPANY.—Last month's clean up at the Champion mine resulted in three bars of bullion containing 4,287 oz. silver. The roads between the mine and mill are rapidly improving, and it is not probable that rain will again interfere with the delivery of ore this season. The force at the mine is therefore being gradually increased, and it is stated that a full force of miners soon will be at work on the property.

JEFFERSON COUNTY.

LITTLE BOULDER.—Work is progressing on the Little Boulder placers belonging to Frank Harlow & Co. The bedrock flume is being pushed, and it is expected that some gold may be taken out before the water gives out this summer.

PARK.—This is the first silver-lead mine in the Park district, upon which a considerable amount of capital was expended. It is located at the head of the right fork of Indian Creek. Extensive developments have been made and a fair amount of ore has already been shipped. For a long time past the product has paid the cost of the development work. The lower tunnel is now being driven through a large body of galena ore, the width of the tunnel not extending to either foot nor banging wall.

MEAGHER COUNTY.

CORNUCOPIA.—This mine is being developed quite rapidly. There are three locations being worked at present. A tunnel on the Albatross is 50 ft. long and one on the Cornucopia 225 ft. long; both these are following good leads of mineral. The shaft on the Cornucopia is 200 ft. deep. Cross-cuts will be driven to the veins from this shaft. In the shaft the workmen will have much water to contend with, the flow being such as to require the service of a No. 7 Knowles pump running all the time. Over 50 men are employed at the mine.

CUMBERLAND MINING AND SMELTING COMPANY.—This company has ordered two more 60-horse power boilers for its works. These will give the plant a capacity of 240 horse power and permit operation of another stack which the company contemplates erecting.

HOOVER GOLD AND SILVER MINING COMPANY.—Articles of incorporation for this company have been filed by John Thompson, Jos. A. Beloit and Chas. Nelson. The prospects to be developed are the Abyssinian, the B. & F., and the J. J., all located on Hoover Creek, near the Monarch and Neihart road. The Abyssinian has a 4-ft. vein of galena ore between granite and porphyry; the B. & F. has a 3-ft. vein of galena carrying copper, a true fissure between granite walls; and the J. J. has a strong and promising lead, not yet, however, showing ore in paying quantity.

NORTH STAR MINING COMPANY.—Articles of incorporation of this company have been filed by G. C. Giles, D. Carpenter, F. C. Kress and M. Henderson. The capital stock of the company is \$500,000, divided into shares of \$1 each. Monarch is the principal place of business. This company owns the Great Falls lode, situated in Quail's gulch, Monarch mining district. The property has a large vein of lead carbonate ore, which the company intends to develop.

QUEEN OF THE HILLS MINING COMPANY.—This company has awarded a contract to the Thomson-Houston Electric Company for a complete mining plant. C. L. Parker, superintendent of the mine, says: "The plant will consist of electric pumps, drills and hoists. The hoists are for use in a 2,000-ft. shaft, but for the present will only be used 1,000 ft. The machinery will be completed and ready for shipment as soon as the railroad is finished to Neihart, which will be in about 60 days, and inside of 90 days the plant will be in operation. Three drills will be operated at once, and within six months, or as development goes on, three more will be added."

YELLOWSTONE MINING AND SMELTING COMPANY.—This company, of Castle, held a meeting of stockholders on the 27th ult., for the purpose of reorganization by selling the mines and property to a new company to be organized upon the assessment plan. While there was not a sufficient amount of stock present to comply with the requirements of the law, it was found that the plan could be accomplished when necessary details were arranged. Operations will at once be resumed at the mine. Work is being pushed on the water-works, the ditch being nearly completed to the reservoir, now in course of construction. Twenty-five thousand dollars will be at once expended on this improvement.

SILVER BOW COUNTY.

BUTTE & BOSTON MINING COMPANY.—This company's mines have again increased their copper production, the output during July being 140,000 lbs. more than in June. The full figures respecting this company's product to date this year are as follows:

Year to date—	Matte, pounds.	Fine copper, pounds.
January.....	1,131,628	710,625
February.....	1,942,617	1,047,350
March.....	1,972,287	1,106,978
April.....	3,065,012	1,636,439
May.....	3,051,382	1,588,135
June.....	2,965,447	1,535,000
Total six months.....	14,123,473	7,624,527
July.....	3,238,000	1,675,000
Jan. to July 31.....	17,361,473	9,299,527
Silver product—	Value.	
January.....	\$20,928.90	
February.....	21,829.77	
March.....	28,129.59	
April.....	29,314.63	
May.....	26,845.55	
June.....	24,000.00	
Total six months.....	\$15,048.44	
July.....	21,000.00	
Jan. 1 to July 31.....	\$172,048.44	

NEVADA.

ELKO COUNTY.

SAN FRANCISCO, July 30.

(From our Special Correspondent.)

BELLE ISLE MINING COMPANY.—The line cross-cut 350-ft. level has been extended 33 ft., total from turn-table 113 ft., and has cut a good vein of rich ore which extends both ways into Belle Isle and North Belle Isle. The vein below the 350 level is down about 50 ft., with rich ore in the bottom.

COMMONWEALTH MINING COMPANY.—The face of the north drift, 4th level, shows some fair-grade ore. No. 1 winze from east cross-cut is down 13 ft., all the way in low-grade ore. The bottom is all in ore and looks well.

DEL MONTE MINING COMPANY.—No. 2 drift, third level, is in 17 ft., a small seam of high-grade ore showing in the face of the drift.

NORTH BELLE ISLE MINING COMPANY.—The upraise on the east vein shows seams of rich ore. The south drift, 500-ft. level, shows some good ore in the footwall.

NORTH COMMONWEALTH MINING COMPANY.—Last week there were hoisted 8 cars of ore from the first level, the average car sample assay being \$314 per ton. The north drift, 4th level, has been advanced on the vein 13 ft.

LYON COUNTY.

EMERSON.—This mine, which is located near the Ludwig copper mine in Mason Valley, about 15 miles from Greenfield, owned by Messrs. Emerson, McConnell and O'Hara, is said to be showing some good ore. A tunnel of 200 ft. has been run on the ledge, the character of the rock improving at each step. A small lot of ore from this mine was worked at the Taylor mill in Silver City some time ago, and, according to the *Dayton Times*, it yielded about \$20 per ton. The rock carries gold, and very little silver. Mr. Emerson and his partners will erect an arrastra near Hinds' hot springs, where there is sufficient water to run it. About 150 tons of rock are now ready for crushing, and will be worked as soon as the arrastra is built.

STOREY COUNTY—COMSTOCK LODGE.

The following is the statement of ore from Comstock mines milled, with the battery assay values for week ending July 25th:

Mine.	Tonnage Extracted.	Milled.	Assay value.
Con. Cal. & Va.....	2,295	2,450	\$22.66
Chollar.....	520	520	10.20
Justice.....	197	197	16.28
Savage.....	507	530	18.19

BENTON CONSOLIDATED MINING COMPANY.—At the annual meeting of the stockholders of this company, held in San Francisco on the 29th ult., 104,942 shares were represented and the following Board of Directors elected for the ensuing year: J. T. Hill, president; J. S. Knowlton, vice-president, and E. Howard, E. Hestres and V. B. Allen, directors. V. B. Allen was re-elected secretary. The financial statement of the secretary showed a credit of \$77,201.09.

LADY WASHINGTON CONSOLIDATED MINING COMPANY.—At the annual meeting of the stockholders of this company held in San Francisco on the 29th ult., 94,718 shares were represented, and the following board of directors elected for the ensuing year: Monroe Thompson, president; R. N. Graves, vice-president, and J. P. Martin, S. G. Whitney and L. Osborn, trustees. L. Osborn was re-elected secretary and E. D. Boyle superintendent. The secretary's financial report showed a credit of \$14,809.03.

(From our Special Correspondent.)

SAN FRANCISCO, July 30.

ALTA SILVER MINING COMPANY.—On Tuesday the water was got off the 1,450 station, after considerable trouble and delay. Judging from the strong influx the upper Gold Hill mines are being heavily drawn from.

BELCHER MINING COMPANY.—The face of the south drift from the 200-level east raise continues in quartz showing bunches of ore. The west cross-cut, 300 level, is out 108 feet, the face being in porphyry with streaks of quartz through it.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—Last week there was shipped to the Carson Mint bullion having an assay value of \$37,857.42. Bullion remaining in the assay office of the assay value of \$20,500. The various openings on the 1,300, 1,500, 1,600, 1,650 and 1,750 levels have yielded the average amounts of ore during the week. On the 1,100 level ore of good quality is being stoped out below the sill floor of south drift.

CROWN POINT MINING COMPANY.—At the 1,700-ft. level the company is now cutting out for station pumps, and last week a blower was started above the 1,500 station, blowing air to the 1,700 station. The water in the Belcher incline has lowered 3 ft. 6 ins. during the last week.

CHOLLAR MINING COMPANY.—The west cross-cut on the north line, Hale & Norcross 1,500 level, is out 25 ft., the face in porphyry streaked with quartz. The new station at the 1,500 level in the incline is completed.

GOULD & CURRY MINING COMPANY.—The east cross-cut, 65 ft. above the 200 level, has advanced 16 ft. through low-grade ore. The west cross-cut has now a total length of 92 ft., face in soft porphyry. Upraise No. 2, 200 level, from the north drift, has been carried up 10 ft., face in hard quartz showing well in places.

HALE & NORCROSS MINING COMPANY.—A better outlook is noted in this mine just at present. West cross-cut No. 1, started from the south drift, 1,450 level, 18 ft. south of the station, has been advanced 20 ft., exposing a strong body of low-grade quartz.

SAVAGE MINING COMPANY.—The west drift from the new station, Potosi tunnel level, has been advanced 30 ft. On the 1,100 level the north drift from Hale & Norcross side has been extended 230 ft. from south boundary, the face of the drift continuing in low-grade quartz. On the 1,400 level west cross-cut was advanced 16 ft. in low-grade quartz.

NEW JERSEY.

SUSSEX COUNTY.

SAYRE & VANDERHOOF.—Work is still progressing at this copper mine, near the Ogden mine. The shaft has now reached a depth of 150 ft. It is claimed that a very good vein of ore has been found.

NEW MEXICO.

GRANT COUNTY.

MAMMOTH GOLD MINING COMPANY.—This company's mine at Pinos Altos is said to be looking well. Development is going ahead on the 300-ft. level, the north and south drifts being now in about 30 ft. each. In the south drift 48 in. of good ore shows up in the face. There are now about 800 tons of ore ready for treatment. The mill is nearly completed, and the manager expects to start the stamps very soon.

MOUNTAIN KEY MINING COMPANY.—The Mountain Key mine is keeping its 15 stamp mill working day and night. Work is going on in all the levels. The first, second, sixth, and seventh levels are being worked by the company, the third and fourth are under lease, and the fifth is being worked by contract. The seventh level has been started at a depth of 710 ft., and the drift, which is being run south, is now in about 40 ft. In the lower levels the ore averages from 8 in. to 10 in. in width. The average width of the ore streak has gradually increased from the top downward. At the seventh level the working shaft ran out of the ore chute, which is pitching toward the south.

NEW YORK.

CATTARAUGUS COUNTY.

The Olean bluestone plant, destroyed by fire a few months ago, has been rebuilt upon a very much larger scale than heretofore, and has just been again put in operation. Six sets of gangways have been put in, operated by a powerful engine, and all the required facilities supplied for handling the stone at the quarry economically and conveniently. The company has its own gas and water lines, which have been put in this season, the gas for supplying the boilers being conveyed by its private line.

NORTH CAROLINA.

DAVIDSON COUNTY.

(From our Special Correspondent.)

EUREKA.—Baltimore parties are having this mine examined with a view of purchasing. Capt. William Lewis, formerly of the Baltimore & North Carolina gold mine, has been engaged to superintend the work. The mine has been unwatered, the machinery overhauled, and some new machinery installed.

GUILFORD COUNTY.

(From our Special Correspondent.)

GOLD KING MINING COMPANY.—This company has been organized at Greensboro for the purpose of developing mineral lands in this county.

ROWAN COUNTY.

NEW GOLD HILL COMPANY, LIMITED.—Mr. R. Eames, Jr., manager of this company, writes that he is making experiments to determine the best method of treatment for the ore. In the meantime development work in the mine is going steadily on, and a considerable quantity of material is being uncovered.

OHIO.

COAL.

COLUMBUS & HOCKING COAL AND IRON COMPANY.—The annual report of this company for the year ending March 31st, 1891, shows: Gross earnings, \$1,190,010; net, \$147,637; charges, \$78,375; surplus, \$69,262. Dividend, \$8,249; surplus, \$61,013; rentals, royalties, discounts, etc., \$47,440; surplus, \$13,572. After adjusting old accounts, etc., the actual surplus at date was \$8,010. The balance sheet shows obligations of \$130,041; cash in treasury, \$27,332, and total resources of \$947,044.

OIL.

The report of operations in the Ohio oil-fields for July shows that there were 144 wells completed, with a daily new production of 8,461 barrels and 19 dry wells. This is an increase of one completed well and one dry hole over June, while the new production shows an increase of 1,794 barrels daily. In new work there are 90 wells reported drilling, 137 rigs up and building, being an increase of 14 rigs over June, while the drilling-wells were the same as for June. The feature of the month's work was the drilling in of what is said by oil men to be the largest oil well in the world. When drilled in there was an indicated capacity of 40,000 barrels a day. The well, which is the property of the Ohio Oil Company, is located in Hancock County. It is shut in and only a limited quantity is taken from it daily.

PENNSYLVANIA.

COAL.

A fall of coal occurred on the 1st inst. at the Boston colliery, in Plymouth. Two miners were killed.

Henry Floersheim, a prominent coal operator of Finleyville, complains that he is unable to fill contracts on account of a shortage of cars. He has a number of individual cars, but asserts that the Baltimore & Ohio Railroad Company is using them for other purposes than those for which intended. An official of the Baltimore & Ohio Railroad informed a reporter of the *Pittsburg Times* that the company was not using Mr. Floersheim's cars, but as he is crowded with orders he of course wants his cars back sooner than the company can deliver them. The difficulty at the Floersheim mines over the employment of colored men has been settled. One of the mines, the Germania, is filled with colored men, while the Nottingham has only white diggers.

Fifteen hundred men working in the collieries of the Lehigh & Wilkesbarre Coal Company, the Delaware & Hudson Canal Company, the Laffin Coal Company, and the Keystone Coal Company met at Plains on the 1st inst., to take measures compelling the companies to obey the law requiring payment of wages every two weeks. A committee was appointed from each mine, and these committees have drawn up a petition to the companies asking that the bi-weekly system shall be put in operation on the 15th inst. If the companies refuse to reply within a week, or their answer is not satisfactory, the matter will be referred to Robert Watchorn, of Scranton, factory inspector of this section of the State. If his efforts should not cause the desired results, it is said that a general strike will be ordered. Officials of the companies say that the proposed system would work them serious loss, and the companies will not adopt it unless compelled.

CALIFORNIA COAL COMPANY.—This company's slope is down to the coal, and its air shaft is almost down. A large force of men is now working on the new plant, and it will be finished as soon as possible. Work is also progressing satisfactorily on the company's other new mine, which is about a mile further up the Monongahela River. These two mines when in operation will give employment to nearly 400 men.

PHILADELPHIA & READING COAL AND IRON COMPANY.—All of this company's collieries in the Schuylkill coalfields shut down on the 6th inst. for the remainder of the week. Over production is said to be the cause.

PLYMOUTH COAL COMPANY.—At the Dodson colliery the Ross vein has finally been cut by the tunnel, driven a distance of 382 ft. The seam of

coal opened is 8 ft. thick and it is estimated that there is enough to keep the colliery in steady operation for 25 years without touching the beds underlying the Ross.

OIL.

The field report of the Pennsylvania oil country for July shows 334 completed wells, of which 67 are dry. This is an increase of 30 completed wells and a decrease of 5 in dry holes from June figures. The new production is 6,543 barrels, an increase of 1,280 barrels. From the June report the new work consists of 420 wells drilling and 182 rigs, an increase of 13 and a decrease of 52 respectively, making a net decrease in new work of 39 wells.

SOUTH DAKOTA.

LAWRENCE COUNTY.

The first practical test of the pyritic smelting process in the Black Hills was made by Seth Bullock at the Iron Hill mine, recently says the *Black Hills Times*. The basic ores of that mine were mixed with the dry gold-silver ores of Ruby Basin and pyrite from Galena, also carrying a little gold and silver, and the process was a gratifying success, as demonstrated by the treatment of over 400 tons of ore. Two runs were made, an experimental one of four days, and a more thorough test of eight days' continuance.

HIGHLAND.—A large cave-in recently occurred in stope No. 5, on the 300-ft. level, the largest stope in this mine. The falling rock took out the timbers from the fifteenth to the eleventh floor, and over 500 tons of rock fell to the latter, piling on top of a large amount of waste rock, with which the stope had been filled. The timbers in the stope were completely demolished.

KEYSTONE CHLORINATION WORKS.—The clean-up at these works, which is now being made, will, it is estimated, yield about \$6,000, being the result of about 10 days' run. Many delays have been caused since the starting up of the works on July 1, various parts of the machinery having to be moved and changed. The plant is now running smoothly and treating on an average 20 tons of ore per day. The new rolls will be in operation about the 15th inst., and another barrel about Sept. 1. This will increase the capacity to at least 50 tons per day.

UTAH.

BEAVER COUNTY.

MONTE CRISTO MINING AND MILLING COMPANY.—This company has been organized with a capital stock of 200,000 shares of \$5 each, to acquire the Monte Cristo and Amelia mines, with the stamp mill, mill site and certain water rights belonging thereto. J. G. Jacobs, of Salt Lake City, is president of the company; J. H. Dupaix, of Minersville, vice-president; J. P. Bache, of Salt Lake City, secretary; and O. R. Zipt, of Salt Lake City, treasurer. These, with E. W. Wilson, of Salt Lake City; H. H. Lull, of Minersville, and James Lowe, of Beaver City, constitute the board of directors. The Monte Cristo mine is opened by two tunnels 550 ft. and 196 ft. in length respectively, and is said to show six well defined veins. Of the capital stock 40,000 shares remain in the treasury.

JUAB COUNTY.

BULLION, BECK & CHAMPION MINING COMPANY.—Trumbo, Badlam *et al.*, of San Francisco, minority shareholders in this company, have brought suit against the directors to compel the latter to pay into the treasury the sum of \$325,000. The plaintiffs allege as one cause of action that the defendants have taken out ore to the value of \$200,000 from a vein running under a claim of John Beck's, and have not accounted to the company for that sum of money, as they should have done. The second cause of action is based on the allegation that John Beck was allowed the sum of \$125,000 on a claim set up while lessee of the Bullion-Beck & Champion during the litigation with the Eureka Hill Mining Company. The plaintiffs allege that the claim was a spurious one, and should never have been allowed. Of the 100,000 shares composing the capital of this company, about 25,000 are held in San Francisco and 75,000 in Salt Lake City.

SALT LAKE COUNTY.

FLAGSTAFF, LIMITED.—A dispatch from the mine to the London office states that an important discovery has been made in the face of the seventh level, where a breast of ore 6 ft. wide has been uncovered. The indications are said to be excellent in the sixth level also.

OLD JORDAN MINING AND MILLING COMPANY.—The shareholders of this company will hold a meeting in Salt Lake City, August 28th, to act upon propositions to sell its property or to consolidate with the South Galena Mining Company. In case neither of these plans is adopted, ways and means for meeting the company's indebtedness are to be considered.

SOUTH GALENA MINING COMPANY.—The shareholders of this company are to hold a meeting upon the 28th inst., to vote upon the question of consolidation with the Old Jordan Mining and Milling Company.

SUMMIT COUNTY.

MEEARS SILVER MINING COMPANY.—Excellent progress is being made with the No. 2 shaft, which is now down 130 ft. The company placed 5,000 shares of treasury stock at \$1 per share. This

block of stock was applied for ten times over; it was divided among nine persons.

VERMONT.

WASHINGTON COUNTY.

The Jas. Gazely quarry at Barre has shipped 800,000 paving stones this season, and Morse & Webster, of the same place, are shipping 6,000 daily.

VIRGINIA.

TAZEWELL COUNTY.

(From our Special Correspondent.)

The Tazewell barytes mills, owned by Messrs. W. W. & M. L. Perry, have resumed operations. The mineral is said to be of very high grade, and mined within a few feet of the mill. The capacity at present is three tons per day of 12 hours.

WASHINGTON.

KITITASS COUNTY.

(From our Special Correspondent.)

Reports continue to arrive, and are being substantiated to some extent, of the splendid gold finds made in the Menatash Cañon, 15 miles from Ellensburg. Fine nuggets and dust are being found daily, and several good silver ledges have been discovered and claims taken up. The whole county is excited by the find and prospecting parties innumerable are fitting out.

WEST VIRGINIA.

BOONE COUNTY.

A vein of the celebrated "block," or Black Band, coal was recently discovered on Lens Creek by a party of railway surveyors. It is said that the coal is of as good quality as any of the kind mined in the region.

WISCONSIN.

LAFAYETTE COUNTY.

Curwon, Miller & Co. are prospecting a black-jack and bone mine at Buzzard's Roost, three miles north of Benton, on land owned by Harker, Stephens & Co., of Cuba City. They are taking out 50 to 60 tons of ore per month.

While drilling a well on Bryan O'Neil's farm, at 40 ft. a big run of mineral was struck, and for 25 ft. farther down the drill went through a number of good sheets of mineral and blackjack. The ground has been leased to a party of miners who have already commenced work.

IDA MINING COMPANY.—This company, which was recently organized to operate at Benton, has struck a 10-in. vein of blackjack and lead ore at depth of 85 ft.

WYOMING.

SHERIDAN COUNTY.

OMEGA MINING COMPANY.—This company has been organized with a capital stock of \$100,000 to purchase and develop mines, principally placers, in the Bald Mountain district. The headquarters of the company will be at Sheridan.

FOREIGN MINING NEWS.

AUSTRIA.

The Bohemian lignite production rose in 1890 to 12,119,800 tons, against 10,880,100 tons in 1889. The Eastern Tepitz-Brux-Komotauer District turned out almost 88% of this total. The advancing price of the coal in Germany and the favorable condition of the River Elbe for navigation have been the main factors in this result.

CANADA.

PROVINCE OF BRITISH COLUMBIA.

LEROI MINING AND SMELTING COMPANY.—This company has been registered under the British Columbia act relative to foreign companies, for the purpose of carrying on the business of mining, smelting, milling and reduction of ores of all kinds; to buy, sell and deal in mines; to work same, and to erect plants of all descriptions for the above purposes. Head office, Trail, B. C. Capital stock, \$2,500,000, in 500,000 shares of \$5 each.

PROVINCE OF ONTARIO.

CANADIAN COPPER COMPANY.—The company has purchased 13 acres of land on the Valley Railway, near Brooklyn Station, O., on which it has already commenced the erection of a copper nickel plant. It is expected that the works will be put in operation some time during October. The Gardner process will be used. The *Canadian Mining and Mechanical Review* states that the company is now shipping a very large order of matte to the Oxford Copper Company of New York to be refined, after which the nickel will be used in the manufacture of nickel-steel armor plate for the United States Government. The contract calls for 4,000 tons, equal to about 3,200,000 lbs. of fine copper and nickel, valued at about \$300,000. This will clean out all but about 3,000 tons of matte in the company's yard, and brings this year's shipments to over 5,000 tons so far. Before long the new Bessemer plant will be at work, the three converters now being put in position, and the boilers, cupola furnace, hydraulic cranes, and accumulators being already in place.

PROVINCE OF QUEBEC.

BELL'S ASBESTOS COMPANY, LIMITED.—The directors declared an interim dividend of 2s. 6d. per share, free of income tax, for the half-year ended June 30, being at the rate of 5% per annum. Last year 10% was paid.

BRISTOL.—These iron mines were shut down in July, as some 10,000 tons of ore had been got out, and there was no room left to store any more. Considerable additions to the plant have been made in the shape of two roasters, crushers, and an elevator. These have a capacity of about 100 tons per day. The intended output of the mines will be from 2,750 to 3,000 tons per month.

GENERAL PHOSPHATE CORPORATION, LIMITED.—Complete surveys of all the properties of this company have been made by Mr. E. Rainboth, and topographical maps are now being prepared with a view to obtaining estimates for laying in a permanent plant at High Falls and Ross Mountain. Whether the motive power will be steam transmitted by air pipes utilized and applied by electric transmission is now under consideration. This is rendered urgent by insufficient water for the boiler power on Ross Mountain. The output has been low of late, partly on account of this, but the exploratory works so far done have proved the deposits to be extensive and permanent. It remains, therefore, to work them on a large scale in order to arrive at a reduction in the working cost. It is reported that the company has been successful in placing its debentures in London.

PHOSPHATE OF LIME COMPANY.—The output from the mines at High Rock, operated by this company, continues to be large. During June the quantity shipped was about 600 tons, while during July it was about the same. The sale of the High Rock property to the General Phosphate Corporation is said to be very nearly completed.

FRANCE.

In the Department l'Hérault, near Villeveyras, deposits of hauzite have been discovered, the three varieties found showing the following composition: I. SiO₂, 9%; Al₂O₃, 70.38%; Fe₂O₃, 5.12%; H₂O, 15.50%. II. SiO₂, 10.40%; Al₂O₃, 68.50%; Fe₂O₃, 3.44%; H₂O, 17.66%. III. SiO₂, 14.98%; Al₂O₃, 64.84%; Fe₂O₃, 5.38%; H₂O, 14.80%.

JAPAN.

Recent advices from Japan state that the famous coal mines at Takashima are flooded, and have been abandoned. The leading coal mines are now those known as the "Meiki" mines, which are owned by Messrs. Mitsui & Co.

MEXICO.

HIDALGO.

SAN RAFAEL MINING COMPANY.—This company, which works the San Rafael, Sorpresa and Soledad mines, makes a very good showing as the result of its operations during the six months ending June 30, 1891, says *El Minero Mexicano*. In the San Rafael mine the directors paid dividends ahead during the year 1890, amounting to rather less than \$60,000, and during the first six months of the current year they have paid in advance dividends to the amount of rather more than \$75,000. These dividends are represented by 3,306½ tons of ore now in the hands of the ore buyers, who have advanced upon the ore the money for the dividends. The Sorpresa mine paid off during the six months its outstanding debt of nearly \$14,000, leaving a cash surplus of nearly \$800, and a quantity of ore on hand to the amount of 391½ tons, which is of better grade than that of the San Rafael. Mr. Juan B. Blasquez, the mining engineer in charge of the exploitation, has purchased in the United States four machine drills, which will be set to work during the month of August to make communication between the drifts of the San Rafael mine and the Soledad shaft, which will enable the extraction to be much increased. A new hoisting engine will then be put in. It is stated that the costs of working the mines have been somewhat lowered during the past six months, so that for the San Rafael mine the expense of extraction and treatment has averaged only \$24.49, while in the Sorpresa mine it has been even less, only amounting to \$16.17 per ton. During the same time the ore has been constant in all the drifts of the San Rafael mine, and besides these a chimney of much richer ore has been found in the 285 drift. In the Sorpresa mine ore has been found at the depth of 300 meters and in the Soledad mine ore has been found in a small vein at the depth of 165 meters. A comparison of the data given in the report shows that the company, during the years from August 31st, 1874, to June 30th, 1891, has produced 77,270½ tons of ore. The average cost has been \$27.50 per ton and the average product has been \$37.75 per ton. All of the above has come from the San Rafael and Sorpresa mines, the Soledad being a non-producer, although its expenses enter into the total costs that are charged up to the other two mines.

SONORA.

OSO NEGRO MINING COMPANY.—This company is an American concern working a mine of the same name in the Arizpe district of Sonora about 160 kilometers south of the United States boundary line and about 60 kilometers from the leading town of the district. This company has some 500 men at work, mostly in the mine, though there is quite a number in the mill. This latter has 20 stamps, although preparations are making to increase the number to 40 stamps at an early date. There are about 10,000 tons of ore on the dump ready for treatment and the ore in the mine seems to get richer with depth. The company exports about \$40,000 worth of silver a month.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Aug. 7.

The general features of this market remain unchanged. A prominent member of the Building Material Exchange, of this city, thinks that the labor disturbances of the past few months are to a great extent, responsible for the listless demoralization of the market. In this opinion we concur.

Lime.—About 20,000 barrels of Maine lime arrived during the past week, and were disposed of without any difficulty whatever. The demand for it was very good, and no trouble was experienced in obtaining full prices. Some 5,000 barrels of St. Johns lime also came in, and were sold quickly at ruling prices.

Very little Maine lime is on the way. Stocks in the Rockland, Rockport, and Thomaston district are so light that vessels are obliged to wait until the lime is burned. Ruling quotations are as follows: Rockland, common and finishing, \$1 per bbl. State lime (Glens Falls), 90c. St. Johns lime, common, 85c.; finishing, \$1. It may be remarked that very little St. Johns finishing comes to this market. Of the total quantity of lime sent by this district to this market, fully nine tenths was common.

Brick.—The condition of this branch of the building material market continues exactly as reported in this column last week. During the week under review between 2,000,000 and 3,000,000 bricks changed hands, but arrivals are large and the supply is greater than the demand. Mr. Wm. K. Hammond, the well-known dealer of this city, estimates that there is a surplus here, all the time, of from 2,000,000 to 5,000,000. We quote this week: Haverstraws, \$4.75@5.25 per M., with an occasional load at \$5.50. Uprivers, \$4.25@5. Jerseys, \$4@4.50. Pale, \$2@2.50.

Lath.—The lath market is in fairly good condition just now. Receipts are light, and the supply is far from being excessive. The St. Johns mills are still shut down. We quote \$2.15@2.25.

NOTE OF THE WEEK.

A number of bricklayers in Omaha, Neb., struck on the 3d inst. for 8 hours. A number of the manufacturers of Omaha "have clubbed together and will test the eight-hour law in the courts."

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Aug. 7.

Heavy Chemicals.—The main features of this market show little, if any, change over last week. There is a very fair demand for some chemicals, and no difficulty is encountered in supplying it. By our Liverpool letter it will be seen that the recent action of the Alkali Company in appointing agents here has been received, naturally, with considerable disfavor by the brokers there.

Caustic Soda.—There has been a fair demand for this chemical, and arrivals have been fairly large. There has been also a brisk request for goods for future delivery. We quote: 60%, 3.25@3.30c., and 70 to 74%, 3.05@3.10c.

Carbonated Soda Ash.—This chemical continues exceedingly quiet; actual business has been very light, but there has been some inquiry for fall deliveries. Our quotations this week are: 48%, 1.60@1.62½c., and 58%, 1.50@1.55c.

Caustic Soda Ash.—There has been rather a better inquiry for caustic ash since our last report. Some sales are reported at 1.50@1.60c.

Alkali.—Of the 48% variety several sales are reported, the time of delivery extending into next year. The price paid was 1.50@1.60c., according to quantity and delivery.

Sal Soda.—This market continues firm, and stocks are light. The English variety has been in good demand, and sales have taken place at 1.07½@1.10c. The domestic brands have been also in good request, and are pretty well sold up.

Bleaching Powder.—There has been more or less uncertainty in regard to this chemical. Some sales of bleach to arrive are reported at 1.90c. The agents of the Alkali Company here, through whom hereafter sales must be made, decline to fix quotations, but 1.90@2c. is probably about the correct price.

Acid.—No change has taken place in this market. Manufacturers report business good as to volume, but not quite so good as to prices. Filling old contracts is what they are doing now, very little new business being reported, except in the case of muriatic and nitric; these acids are in fair request for prompt delivery.

Some vague rumors concerning the absorption of several acid factories both here and in the West by a well-known firm were started last week. They gained in definiteness this week, with the final result that three versions were freely circulated among the trade. The first was that the Grasselli Chemical Company had entered into negotiations for the purchase of the Nichols Chemical Company's entire plant. The second version was that the Nichols Company intended to buy out the Grasselli Company; and finally that the two companies had formed a combination, a sort of offensive and defensive alliance. It is needless to add that these rumors were absurd; the representatives of the two companies were seen and answered that such reports had no foundation, and that no such step had

been even thought of for an instant. It seems like old times, when the "combination" (peace to its ashes!) and the "outs" were respectively the subject of interesting gossip, and rumors were more numerous than the sands of the sea.

We repeat our last week's quotations: Acid, per 100 lbs. in New York and vicinity: Acetic, \$1.65@1.75; alum, \$1.55@1.75; muriatic, 18°, 80c@81; muriatic, 20°, 90c@91; muriatic, 22°, \$1@1.20; nitric, 40°, is selling for \$4.50, and from that upward according to quality, etc.; nitric, 42°, \$5@5.6; oxalic, 7½@7½c.; sulphuric, 60°, 75c@81; sulphuric, 60°, 85c@81; tartaric, 33@34c.

Blue Vitriol.—Low prices still prevail. We hear of the sale of small lots at 3½c., and 3½c. has been obtained for fair-sized orders. There was a rumor that the Omaha & Grant Smelting Company had thrown a lot of 1,000 barrels on this market, but no one seemed to possess any knowledge of this, and it is in all probability a canard.

Brimstone.—A better feeling prevails in this market. There have been several arrivals during the week, and quotations for spot goods are given; \$26 for best unmixed seconds, and \$25.50 for best unmixed thirds. This advance is due to the higher freights.

Fertilizing Chemicals.—The market for fertilizers is as dull and quiet as it can be. Dealers are beginning to look forward to the latter part of this month for a marked improvement due to the commencement of the fall trade. We quote this week: Sulphate of ammonia 3.05@3.10c. Bone sulphate, at 3.02½@3.05c. Dried blood, \$1.95@2 per unit. Tankage \$10@12. Azotine, 1.95c. Bone meal, \$22.50@23.50; raw, \$24@26. Fish scrap, \$21.50@22.50. Acidulated fish scrap, \$11.50.

Double Manure Salts.—We quote the syndicate price of 1.10@1.12½c. for 48%. For 90% to 95% basis, 90% foreign invoice, weights and lists, 2.07½@2.10c. Lots under 50 tons proportionately higher.

South Carolina phosphate rock is unchanged. We quote for land rock \$7@8, wet and dry respectively, f. o. b. vessels at mines, and \$7.25@8.25 f. o. b. cars. There is but little high-grade river rock in the market. Low grades taken from marshes are selling at about \$7.25.

A decision has been given by Judge Fuller, of the Supreme Court, in the case of the State of South Carolina vs. the Coosaw Mining Company, which we give in full:

"Two motions have been argued: 1. To remand. 2. To continue the order granting a preliminary injunction and appointing a receiver. My conclusions are:

"First.—That upon the face of this record the motion to remand ought not to be entertained. The question of jurisdiction was adjudicated by this court on the 21st of April, 1891, and cannot be re-examined at this stage of the proceedings. But if the question were open the result would be the same, as I concur in the opinion of the district judge filed here on April 21st, 1891. (45 Fed. Rep., 804.) The motion to remand is therefore overruled.

"Second.—As to the motion to continue, etc., the contention of the defendant is that it has by contract with the state, in virtue of the act of 1876, the exclusive right to mine all the phosphate rock within a defined part of Coosaw River for all time at a royalty of \$1 per ton. The defendant carried on its mining operations prior to 1876 in the particular locality under an act of 1870 which gave the right to mine for the full term of 21 years at \$1 per ton. The act of 1876 made this right exclusive, and it is argued perpetual because it was provided that defendant, as well as other companies, should have the right so long, and no longer, as it should make the returns and pay the royalty prescribed. The royalty thus referred to was fixed by act of 1870. It was decided in the State vs. Pacific Guano Company (22 S. C. 59) that the rule of construction applicable to the right to mine in the beds of navigable streams containing phosphate is the ordinary one in the instance of grants of public rights, namely, that the grant is to be construed strictly in favor of the State and against the grantee.

"I concur in that view, and applying the rule here it forbids the conclusion that the legislature intended an indefinite grant, by the terms used.

"The act of 1876 must necessarily be read in connection with that of 1870, and this being done it seems clear that duration of the exclusive right as claimed was not thereby enlarged. This conclusion is strengthened by an examination of the many acts in relation to phosphate mining referred to on the hearing of this motion, which show the policy of the State to have been to limit the duration of the right to mine, a policy which it cannot be properly held the State intended to depart from by the act of 1876. It follows that the claim of defendant to the exclusive right to mine within the mentioned territory indefinitely at \$1 per ton, cannot be sustained.

"Third.—This being so, and in view of the provisions of the act of 1880, an injunction ought to go against the defendant restraining it as prayed until it shall take out a license under the latter act and otherwise comply therewith, and such an order may be substituted for the order made by the state court, which should be vacated so far as is inconsistent with the order so entered.

"Fourth.—Pending the filing of the foregoing memorandum and entry of the order therein agreed to, the parties having agreed to submit the case on the hearing already had, and their

stipulations in that behalf having been fully considered, a final judgment and decree may be entered in accordance with the result above indicated.

"The acts of 1870 and 1876 must be construed *in pari materia*. Under the first act the state gave the grantees for 21 years the right to mine in its navigable streams. This grant was upon the condition that the grantees should pay annually \$1 a ton on each ton dug and mined and that they make a return of their operations annually, or oftener if required. This was not an exclusive right (Bradley vs. the Phosphate Company, 1. Hughes). It was upon condition, that is to say, it existed so long as the conditions were fulfilled, and no longer. The act of 1876 proposed modification of this contract in four particulars.

"1. The time for making the returns was definitely fixed at the end of each month. This was an advantage to both parties.

"2. The royalty was made payable on each ton dug, mined, and shipped, not on the rock mined. This was in favor of the grantees.

"3. The royalty was made payable quarterly, not annually, this provision to go in effect immediately and royalty for the two quarters of the current year to be paid at once. This was in favor of the State.

"4. The right to mine thereto, if not exclusive, was made exclusive on the account of the acceptance of the State's proposals.

"The original contract was unchanged in every other respect. The royalty remained the same, \$1 per ton. The grant was wholly on condition, that is to say existed, so long as, and no longer than, the conditions were fulfilled. The duration of the grant during which these conditions were of force was unchanged—21 years from 1870.

"This is a reasonable construction of a doubtful act by which the doubt is resolved in favor of the sovereign grantor; it is a familiar rule of construction that when a statute operates as a grant of public property to an individual, or the relinquishment of a public interest, and there is a doubt as to the meaning of its terms or its general purpose that construction will be adopted which will support the claim of the government rather than that of the individual.

"Nothing can be enforced against the state. MELVILLE W. FULLER, Chief Justice.

"August 3d, 1891.

"Simonton, judge, concurring."

Kainit.—Four vessels discharged their cargo during the week, but that as well as everything that is expected to come for some months in advance, is sold ahead. We quote \$8.75@9.25 according to quantity.

Muriate of Potash.—The arrivals at the various ports during the week aggregated 1,200 tons, all of which was placed on old contracts. We quote \$1.77½@1.82½, according to quantity.

Nitrate of Soda.—Nitrate is quiet at \$1.80, for spot.

NOTES OF THE WEEK.

It is reported from Pittsburg that a bitter struggle between the window-glass manufacturers and their employés seems to be inevitable. The annual joint wage conference was held on the 31st ult., but no settlement was reached, and the conference finally adjourned without fixing a date for another meeting. The workers' scale demands an increase of 8% in wages of gatherers, and that no cutter shall carry out glass, while the manufacturers ask for an all-round reduction of 10% to equalize wages with the northern district. Both sides are firm and refuse to make any concessions. A shutdown will affect about 6,000 employés.

Liverpool. July 29.

(Special Correspondence of Jos. P. Brunner & Co.) Trade in heavy chemicals is slack at present, and since our last report the new arrangement of the "Alkali Company" with reference to the sales of bleach for the States and Canada has been the principal topic of conversation here.

The general opinion is that the "Union" has made a mistake in its policy, but from the very outset the concern has been unfortunate, somehow or other continually treading on the corns of its clients.

With regard to the chemical trade generally, prices are about unchanged.

Soda Ash is quiet and prices are unaltered, as follows: Caustic ash, 48%, £5 2s. 6d.; 58%, £4 7s.; carbonic ash, 48%, £5 7s. 6d.; 58%, £6 10s. per ton net, cash. For special brands a premium is demanded.

Soda Crystals are selling to a fair extent at £3 5s. @ £3 7s. 6d. per ton net, cash.

Caustic Soda receives little attention, and the article is hard to move. Nearest spot values we quote as follows: 60%, £9 10s. @ £9 15s. per ton; 70%, £10 15s. @ £11 per ton; 74%, £11 15s. @ £12 per ton; 76%, £13 and upward per ton; all net cash.

Bleaching Powder.—For the States and Canada the nominal price of hardwood is £8 per ton, net cash. The Alkali Company will only sell through its New York agents. There are resellers, however, at a little under £8, but orders are scarce. For quarters other than the United States and Canada the "Union" price for hardwood is £7 10s. per ton, net cash. The premium of 10s. per ton demanded from American consumers will hardly be appreciated on your side.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Birmingham, Ala., Pittsburg, St. Louis, London, and Paris, see pages 180 and 182.]

NEW YORK, Friday Evening, Aug. 7.

The week under review can lay no claim to superiority in activity over its predecessors. Indeed, it was quieter. The total number of shares sold last week was 30,635, of which 4,935 were dividend and 25,700 non-dividend shares. This week there was a total of only 20,110 shares, of which 4,640 were dividend shares, and 15,470 non-dividend.

Our esteemed contemporary, the Wall Street News, is wiser than it wots of when it prints the following paragraph pseudo-ironically entitled "An Actual Occurrence." "I am going to Europe next week," said a conservative investor, "and I want to buy and put away something which is likely to show me a profit when I return in the fall, and about which I need not worry."

"Everything is cheap nowadays," said the bull broker, rubbing his hands; "railroad bonds were never cheaper, and as for stocks, what do you think of the dividend payers at present prices? There is Burlington—"

"Oh, I want to be conservative, very conservative, in fact. Haven't you some good mining stocks?"

Of the Comstocks there was a single sale of 10 shares of Consolidated California & Virginia at \$5.75; Crown Point was steady at \$1.35@1.70, higher than it was at any time last week. Hale & Norcross was dealt in, on a limited scale, at \$2.10@2.25. Ophir was quiet at \$3.50@3.65, and Savage at \$1.95@2.25. Sierra Nevada shows sales of 252 shares at \$3.15@3.25, and Yellow Jacket, 400 shares at \$1.90@2. Gould & Curry disposed of 470 shares at \$1.70@1.80. Trading in Alta amounted to 600 shares at 70@75c.

Best & Belcher was quiet at \$3@3.25; Chollar appeared in more request this week at \$2.40@2.90. There was a single sale of Comstock Tunnel stock at 15c. Mexican shows transactions aggregating 610 shares at \$2.45@2.90. Of Potosi 330 shares were sold at \$5@5.88; of Union Consolidated, 300 shares at \$2.50@2.75, and 500 shares of Utah at 95c@1\$.

Of the Tuscaroras, Nevada Queen was the only one that was dealt in. Of this stock 1,000 shares changed hands at 24@27c.

The alleged transactions in Astoria aggregated 6,500 shares at 1c this week. Large sales of Belmont and Brunswick continue to be reported. Of the first stock 1,500 shares were sold at 80@81c, while of Brunswick 1,700 shares were sold at 9@10c. Emmett shows sales of 700 shares at 65@70c. There were sales of 1,000 shares of Standard at 91c@1.20. No other California stocks were dealt in.

Alice is the only Montana stock that was dealt in this week. The agent of the company in New York assures us that the mine never looked better than it does at present. Three hundred shares were sold at \$1.75.

Of the Black Hills stock Deadwood Terra had one of 100 shares sale at \$1.20. Colorado mines are represented by Leadville Consolidated, of which 600 shares were sold at 9@10c. Strange to say, no other Colorado stocks appear in the sales list this week. There was one sale of 10 shares of Ontario at \$39.50.

Boston. Aug. 6.

(From our Special Correspondent.)

There has been a little more activity in copper stocks during the past week, but at the expense of values. The feeling seems to be prevalent that there will be no improvement in the price of ingot copper at present, and investors are in no hurry to increase their holdings of stocks, while the speculative element is entirely wanting. The declaration of a dividend of \$5 per share by the Calumet & Hecla was followed by a decline in the stock from \$245 to \$240, which was subsequently recovered. This makes the third dividend for the year. On payment of this dividend the total amount of returns to the stockholders foots up to \$36,350,000.

Tamarack declined early in the week to \$146, with subsequent sales at \$149. To-day an order to buy a small lot carried the price up to \$153. Quincy dropped to \$97 with later sales at \$98, a net decline of \$2 for the week.

The Montana stocks were fairly active and show no material change. Boston & Montana sold at \$40 1/4, with recovery to \$42, and later sales were made at \$41 1/4. Butte & Boston touched \$13 1/4, with later sales at \$13 1/4, a loss of 1/4 for the week.

Atlantic was heavy, declining from \$14 to \$12 1/2. Kearsarge also fell off 1/2, with sales at \$10 1/2. Osceola declined from \$36 to \$33 1/4, with recovery to \$35.

Centennial declined from \$14 1/4 to \$13 1/4. This mine has actually become a producer. The product for July was a little over 26 tons, and the management expects to make a good showing for August. Allouez declined to \$1 1/4. The mine has been obliged to shut down again for want of water. There was only one sale of Franklin this week, of 50 shares at \$15, a decline of 1/2. Huron was a trifle better, selling at 90c. Santa Fe was steady at 50c. National sold down to \$1 1/4, a decline of \$1 1/4 from last sale, June 25.

By Telegraph.—Calumet 246, Tamarack up 2 to 155, Osceola 34 bid, Montana 41 1/4, Butte 14 1/4.

Denver.

Prices and sales for the week ending Aug. 1st, 1891:

Table with columns: Company, Opening, H., L., Closing Bid, Sales. Lists various mining companies like Alleghany, Amity, Bangkok-C-B, Bates-Hunter, etc.

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

Lake Superior Iron, Gold and Silver Stocks

(Special Report by A. M. Helmer, Milwaukee, Wis.)

Table listing various iron, gold, and silver stocks with prices and sales. Includes Gogebic Range, Anvil, Ashland, etc.

San Francisco. July 30.

(From our Special Correspondent.)

During the early part of the week the Comstock shares showed an inclination to advance to higher prices, but since then the tendency has not been so apparent, and yesterday and to-day they were weaker. Consolidated California & Virginia has been in demand at \$5.50, a decline of 25 cents from Wednesday's ruling. Mexican at \$2.35, Sierra Nevada at \$3.25 and Ophir at \$3.35 ruled steady with light sales.

Potosi and Bullion are at present the strong features of the market, but for what reason is not apparent; not, so far as is known, on the strength of any promising developments in the mine. To-day Potosi advanced 50 cents, selling at \$4.75, while Bullion sold at \$3.35, an advance of 40 cents per share.

Best & Belcher sold for \$3.10, and Gould & Curry for \$1.55, a trifling improvement on previous rates.

While the improvement in the middle group of Comstocks was for the most part merely nominal, the Gold Hill stocks sold irregularly and gave signs of manipulation. Alta at 75 cents, Alpha at 95 cents and Yellow Jacket at \$1.90, sold at an advance of a few cents, but the remainder of the

group were weaker. Confidence sold for \$4, an advance of \$1 since the 25th inst., the date of the last sale.

No trading has been done in outside stocks; no special activity is anticipated for some little time. The general depression in all businesses at this time of the year, and the tightness of money during the moving of the crops, have an influence on the stock market, and until the money begins to return for produce marketed there will not be any great revival in business.

St. Louis. Aug. 5.

(From our Special Correspondent.)

Mining matters remain inactive and business altogether is very dull. At present the interest taken in stocks is very slight and the demand is so light that several days have passed without a transaction.

Since the first of the month only 1,100 shares of stock have been sold and this small amount of business was done in the most important stocks only.

Elizabeth was one of the stocks to decline during the past week, and from an opening bid of \$1.70 has gradually fallen to \$1.45. On Friday 100 shares sold at \$1.70. On Tuesday 300 shares sold at \$1.50 @ \$1.47 1/2, and to-day \$1.45 was bid.

Granite Mountain opens at \$24 and closes at \$23.50. During the week 10 shares sold at \$24.

Mickey Breen was another stock on the market, 200 shares selling at 50c. The value of the stock was pretty well maintained throughout the week, and from an opening of 50c the market closes at 47 1/2c.

Yuma had two sales, one of 300 shares at 41 1/4, and the other 200 shares at 42 1/4c. The stock closed firm at 41 1/4c.

Central Silver was stronger, 100 shares selling at 3 1/4c; the market closed firm at 4c.

Bi-metallic is quoted at \$34.50, 50c. above the opening bid; no sales.

Montrose was very quiet at 62 1/2@63 3/4c, closing at the latter figure.

Silver Age is quoted at 90c. At the opening bid the stock was weak at 82 1/2c, but it has been improving during the week.

Salt Lake City.

Prices and sales for the week ending Aug. 1, 1891.

Table with columns: Name and Location of Company, Open-Ing, High-est, Low-est, Clos-Ing, Sales. Lists companies like Alice, Mont, Alliance, Anchor, etc.

ASSESSMENTS.

Table with columns: COMPANY, No., When levied, D't'ng't in office, Day of sale, Am't. per share. Lists companies like Alliance, Anchor, Best & Belcher, etc.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.) The oil market has been dull and heavy for the past week. Cash oil is a drug in the market and has recorded the lowest prices in a long time past. At one time to-day 50 cents per barrel was the best bid made for cash oil. This may in a measure be attributed to the developments in the Ohio oil re-

gions, and the latest dispatches from there indicate that Ohio has now the highest oil well in the world, and if it were permitted to flow to its full capacity, reports say that it would produce over 100,000 barrels every 24 hours. This is nearly double the size of any previous well ever completed, and puts in the shade most of the wonderful Russian wells heretofore reported.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Aug. 1.....	62 1/4	62 1/4	62	62	6,000
3.....	63	63 1/2	63 1/4	63 1/2	6,000
4.....	64	64	60 1/2	60 1/2	55,000
5.....	60 1/2	60 1/2	59 1/2	60	31,000
6.....	60	60 1/2	58 1/2	58 1/2	44,000
7.....	58	59	51 1/2	52	156,000

Total sales in barrels..... 298,000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Aug. 1.....	60 1/2	60 1/2	59 1/2	60	49,000
3.....	63	63	63	63	5,000
4.....	.....	.....	.....	.....	.....
5.....	.....	.....	.....	.....	.....
6.....	.....	.....	.....	.....	.....
7.....	.....	.....	.....	.....	.....

Total sales in barrels..... 54,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Aug. 6.
STATEMENT of shipments of anthracite coal (approximated) for the week ending August 25th, 1891, compared with corresponding period last year.

Regions.	Aug. 1, 1891.	Aug. 2, 1890.	Difference.
Wyoming Region, Tons	464,828	381,595	Inc. 80,233
Lehigh Region "	131,051	109,969	Dec. 21,081
Schuykill Region "	299,427	232,160	Inc. 67,267
Total.....Tons	895,306	726,715	Inc. 168,591
Total for year to date Tons	21,828,441	18,894,450	Inc. 2,933,991

PRODUCTION OF BITUMINOUS COAL for week ending August 6th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1891.		1890.
	Week.	Year.	Year.
Phila. & Erie R.R.....	3,055	111,195	77,905
Cumberland, Md.....	.....	.....	2,153,633
Barclay, Pa.....	3,512	107,845	87,242
Broad Top, Pa.....	9,052	288,834	303,495
Clearfield, Pa.....	726,041	3,585,918	2,254,937
Allegheny, Pa.....	216,281	944,092	753,665
Beach Creek, Pa.....	46,302	1,353,079	1,100,883
Pocahontas Flat Top.....	42,916	1,427,073	1,127,670
Kanawha, W. Va.....	37,915	1,343,049	1,194,802
Total.....	1,085,074	9,363,695	9,541,842

WESTERN SHIPMENTS.

Pittsburg, Pa.....	21,671	791,858	503,395
Westmoreland, Pa.....	227,251	1,439,909	765,732
Monongahela, Pa.....	133,961	467,144	273,923
Total.....	382,883	2,698,911	1,543,050

Grand total..... 1,467,957 11,062,606 10,597,232

Anthracite.

The production for the week ending August 4th was 895,306 tons, an increase of 168,591 tons over the corresponding period of 1890. This makes the total production for this month 3,456,507 tons. The total production of the year up to date is 21,828,441 tons, an increase of 2,933,991 tons over 1890. The anthracite market may be described, in the words of a prominent sales agent, as one of "quiescent expectation." Very little, if any, new business has been done, but it may be said that the prospects of better times in the trade are more promising at present than they have been for quite a long time. It would be manifestly unreasonable to expect that material benefit should result in a week's time from any step, no matter how wise, tending to the amelioration of the condition of the coal trade—a trade that many pessimistically inclined persons have again and again declared to be hopelessly sick; thus, it cannot be said that actual, positive benefit has already accrued from the unanimous desire to prevent over-production manifested at the meeting of the presidents last week. But it is evident, to judge from the feeling that prevails throughout the trade, that the wisdom of their decision, and the sincerity displayed by the various companies, will before long result in a better state of affairs than at any time during the present year.

There is already more inquiry for coal. Consumers are commencing to be satisfied that the agreement will be kept this time, and they are almost convinced now that it is impossible to induce the sales agents to make offers, no matter how desirable the order may be, below the schedule prices. We hear of no attempt on the part of those concerned in the agreement to offer lower prices. We have received information that the Reading's collieries suspended work on Friday and Saturday of this week, in pursuance of the policy decided upon by the president. The Lehigh Valley stops carrying coal on the 7th and 8th of this month; the Central Railroad of New Jersey on the 8th; and the latter will also do this on the 14th and 15th. In addition to restricting their outputs, we are told that these companies will carry

no coal on Saturday for some weeks. Should this policy be adhered to—and there seems to be but little doubt that it will be—the latter part of this month will see a general improvement in the anthracite trade. The unanimity and the sincerity of the companies to keep faith this month are encouraging.

Bituminous.

There is nothing new to report of the bituminous market. A large amount of soft coal is being mined in the different regions, but very nearly the entire output is placed on old yearly contracts. The allotments of the Seaboard Soft Coal Association do not seem to interfere with this.

We hear of no new business doing. Consumers have very good stocks on hand, the result of the exceedingly low water freights from Norfolk, Newport News, Baltimore and Philadelphia—the lowest ever known. The cause of the prevailing low freights is attributed to the fact that a great many very large vessels have been brought recently into use. A few years ago, 2,000-ton coal-ships were unknown in the trade. As it is now, a trip of one of these big ships is equivalent to three or four trips of the smaller craft formerly in use. We hear freights quoted at 60¢@65c. from Newport News, Norfolk and Baltimore, and 55¢@60c. from Philadelphia.

The local market is very quiet, and prices, generally, are maintained. No reports of serious labor difficulties come from the coal regions.

Boston.

(From our Special Correspondent.)

The report of last week fully covers the anthracite situation as it is to-day. There has not been any perceptible change in the demand, which continues quiet. Agents have great confidence in the future of the market, and almost to a man are holding up to prices. Some few individuals are making concessions, but it is hard to say to what extent. The firmness of the situation is being gradually conceded by buyers, and it will not be a great while before they will be operating in the market. They are slow to put any faith in the talk of curtailment, and their having this doubt is partly responsible for the present state of affairs. The action of the coal company presidents as regards curtailment is expected to help the market into a strong position. The reported price for stove, \$3.75, at New York is looked upon as a canard by agents.

Bituminous coal is unchanged. Large supplies are reported at all shipping points. The trade appears to have all it wants for some time and consequently there is very little new business passing. Prices rule easy.

As intimated, freights have followed their inclination to decline and this week find a much lower rate. Vessels continue to be plentiful. From New York 50¢@55c. is quoted; from Philadelphia 60¢@65c., and from Baltimore 60¢@65c.

The retail market continues to move in a quiet and steady way. The demand is gradually picking up and before long dealers hope to see it commence in earnest. They all have good-sized supplies on hand and are buying only at intervals to piece out. The prices are unchanged and firm.

Buffalo.

(From our Special Correspondent.)

The anthracite coal trade is without any improvement and prices are unchanged. The movement by lake is larger, but the retail-trade orders are few and far between. Bituminous coal continues dull and quotations given are nominal. The prompt action of the Car Service Association in imposing demurrage charges prevents accumulation of loaded cars here, as the mine operators have had to suffer losses by forced sales lately or incur heavy expense which could only be avoided by the means stated. Coke is quiet and unchanged.

The schooner "Pomeroy," laden with 800 tons of coal from Charlotte to Port Huron, took fire on Lake Ontario on Monday last. Vessel and cargo were partial loss only.

The breaks on the Erie canal have been repaired and navigation was fully resumed on Sunday last.

The coal movement by lake has improved and freights are steady at unchanged quotations. The rates here during the week were as follows: 50c. to Chicago, Milwaukee, Racine, Escanaba, Ft. William and Cheboygan; 30c. to Duluth, Superior and Port Huron; 25c. to Detroit, and 40c. to Gladstone. The quantity of coal shipped hence by lake from July 30th to August 5th, both days inclusive, was 69,130 net tons, distributed about as follows: 32,900 to Chicago; 20,620 to Milwaukee; 5,750 to Duluth; 4,300 to Superior; 700 to Gladstone; 650 to Port Huron; 750 to Escanaba; 1,800 to Ft. William; 300 to Cheboygan; 100 to Bay City; 1,300 to Detroit and 25 to Hancock.

Railroad receipts and shipments of coal at this port are not reported by request. Receipts of coal by lake thus far this season have been nil. Shipments of coal by lake westward for month of July, 311,500 net tons, as compared with 244,320 tons in 1890, and 263,330 tons in 1889; for season to August 1st, 1,144,250 net tons, as compared with 841,290 tons in 1890, and 918,930 tons in 1889. The receipts of coal by canal for month of July, none, as compared with 5,666 net tons in 1890, and 11,008 tons in 1889; the shipments, 6,146 net tons, as compared with 1,887 tons in 1890, and 1,227 tons in 1889. The total receipts of coal by canal this season to August 1st, 481 net tons, as compared with 8,180 tons in 1890, and 30,948 tons in 1889; the shipments, 16,849

net tons, as compared with 3,490 tons in 1890, and 2,493 tons in 1889. The aggregate shipments of coal westward thus far this year, as compared with 1890, show an increase of 302,960 net tons, and with 1889 of 225,320 net tons.

The shipments of coal by lake from Buffalo this season to August 1st were distributed about as follows:

Buffalo to	Net tons.	Buffalo to	Net tons
Chicago.....	427,880	Washburne.....	5,090
Milwaukee.....	286,165	St. Clair.....	600
Toledo.....	34,377	Marine City.....	350
Duluth.....	101,860	Portage.....	1,350
Green Bay.....	20,370	Pt. Burwell.....	30
Detroit.....	7,660	Kelly Islands.....	510
Gladstone.....	10,670	Serpent River.....	420
Superior.....	82,540	Parry Sound.....	50
Racine.....	22,140	Lake Linden.....	1,886
Ashland.....	3,350	Pt. Arthur.....	1,580
Saginaw.....	17,435	Manitowoc.....	1,350
Cheboygan.....	12,680	Menominee.....	4,720
Kenosha.....	8,210	Pt. Rowan.....	65
Manistique.....	60	Amherstberg.....	530
Houghton.....	650	Marquette.....	1,600
Bay City.....	4,510	Marquette.....	11,600
Ludington.....	1,117	Ft. William.....	8,660
Owen Sound.....	1,000	Huron, O.....	300
Depere.....	1,210	Cheboygan.....	1,050
Hancock.....	25	Windsor.....	680
Sault Ste. Marie.....	550	Bay Mills.....	600
Mackinaw.....	2,030	Vessels from Tonawanda not reported at Custom house.....	52,606
Sandusky.....	200		
Put in Bay.....	250		
Kincardine.....	400		
Escanaba.....	1,230	Total.....	1,144,550

Lake freights hence during July, 1891, were as follows: 60¢@50c. to Chicago and Milwaukee; 40¢@30c. to Duluth and Lake Superior ports; 30c. to Toledo; 25c. to Detroit and Bay City. A year ago the Chicago rate was 50c. and Duluth 30c., and in 1889 and 1890, 60c. and 40c. respectively.

Chicago.

(From our Special Correspondent.)

The situation is unchanged, but conditions generally are working toward improvement. Coal shipments to this point are decreasing, both by lake and all-rail, and as comparatively little buying has been done as yet, demand when it commences in earnest will come with a rush. The market is still very shaky, and prices continue low, with little prospect of any immediate improvement, the principal cause of which is the large stock and anxiety to sell. Another factor which influences prices and injures trade is the increased number of men engaging in the commission coal trade, who to secure business are willing to divide with customers. This, of course, only affects the small trade, but it necessarily adds to the downward trend of prices. As compared with a year ago, the market is less active and prices weaker. Dealers and consumers are withholding orders, which they may have cause to regret if prolonged. General freight agents are issuing circulars to agents throughout the West, notifying coal dealers of the great danger of a coal famine next winter unless they order and lay in their stocks immediately, as they predict a car famine in consequence of the heavy movement of grain. There is more truth than poetry in this, as on all sides the same thing is heard of—demand for cars greatly exceeding supply.

For bituminous coal there is a continued good inquiry, and a number of large contracts ranging from 3,000 to 10,000 tons were placed last week, with others pending, most of which are for scattered deliveries. Hocking and other Ohio coals are in good demand, and there is a fair degree of activity in Indiana "block" and Illinois. The inside figures on block coal have been advanced a trifle, from \$2.35 to \$2.40, and all prices are much firmer.

Coke is in light demand outside of regular contracts to the steel companies and furnaces, and quotations on Connellsville are steady; on other grades they are more or less irregular.

Prices of anthracite per ton of 2,000 pounds f. o. b. Chicago are: Lehigh lump, \$6.75; large egg, \$5; small egg, range, and chestnut, \$5. Retail prices per ton are: Large egg, \$6; small egg, range, and chestnut, \$6.

Prices of bituminous per ton of 2,000 pounds f. o. b. Chicago are: Pittsburg, \$3.25; Hocking Valley, \$3; Youghiogheny, \$3.40; Indiana block, \$2.40@ \$2.50; Illinois block, \$1.90@ \$2.

Coke.—Connellsville, 72-hour, per ton f. o. b. Chicago, \$5.05; crushed, \$4.75; Walston, \$5; New River, \$5; West Virginia, \$4.50.

Pittsburg.

Aug. 6.

(From our Special Correspondent.)

Coal.—We can report a firm and active market for export as well as home demand. The return to coal from natural gas in the near future will be large, as consumers of the latter generally have stood fully as many advances as they intend. There is plenty of mining to do. Miners, for reasons only known to themselves, show but little inclination to work, although the rate for mining is all they claim. The late rise, although not sufficient for coal-boating purposes, was at the same time a very beneficial one, as it enabled the boats that went out on the previous rise to bring their empties home, which will give steady employment to miners who desire

shows little change. Orders individually small, but large in the aggregate, are reported. We quote: Best English tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3½c.; open-hearth machinery, 2.50c.; open-hearth spring, 2.60c.; tire steel, 2.50c.; toe calks, 2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Material.—A good steady business is reported. The prospects of a good business for the balance of the year are very promising, and manufacturers cannot complain, although just now they are of the opinion that the prevailing prices are too low. Our quotations are: Universal plates, \$2.20; bridge plates, \$2.10; beams, \$3.10.

Old Rails.—Nothing is doing in this market. A small lot was sold last week at \$21.50.

Wrought Iron Scrap.—Very quiet at \$19@21. Chicago. Aug. 6.

(From our Special Correspondent.)

The pig iron market at this point continues dull, and Southern iron continues very weak for nearly all grades. Northern iron is not quite so strong as it was, on account of the pressure of Alabama furnaces and the low prices at which their output is offered.

Finished iron of all kinds is in better demand—plates, sheets, bars, etc. Steel rails and general track material are in better demand and for larger quantities. Some slight advances are reported in certain specialties of merchant steels, and demand is good. Old material and scrap begin to show some animation, but offerings of iron rails are light and at once absorbed by dealers and consumers.

Pig Iron.—Lake Superior charcoal iron is no weaker than a week ago, and upon investigation we find that current reports of sales at less than \$17 f. o. b. Chicago have no foundation, a sale of several hundred tons being made last week at those figures to one of the shrewdest and heaviest consumers in this market. The outlook generally for this quality of crude iron is hazy and less encouraging than that for coke pig, as stocks are accumulating at many furnaces in the North as well as in the South. Local coke iron is in fair demand for small quantities, and the same applies to "American-Scotch" and silveries. It is, however, conceded that confidence in the market here is weakening and lower prices predicted in Southern iron and charcoal brands generally. Some Northern furnaces being anxious for orders and many manufacturers of Lake charcoal iron have materially modified their views regarding prices and future prospects.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$17@17.50; Lake Superior coke, No. 1, \$15.25@15.75; No. 2, \$15@15.25; No. 3, \$14@14.50; Lake Superior Bessemer, \$17.00; Lake Superior Scotch, \$17@17.50; American Scotch, \$17.75@18.25; Southern coke, Foundry No. 1, \$15.75; No. 2, \$15.25; No. 3, \$14.50; Southern coke, soft, No. 1, \$15.50; No. 2, \$14.50; Ohio silveries, No. 1, \$18; No. 2, \$17; Tennessee charcoal, No. 1, \$17.50; No. 2, \$17; Southern standard car wheel, \$21@22.50.

Structural Iron and Steel.—Some local viaduct and bridge work will be in the market shortly. Demand generally for other structural material is light excepting the requirements for the World's Fair. Quotations for car lots f. o. b. Chicago are as follows: Angles, \$2@2.10; tees, \$2.60@2.70; universal plates, \$2.35@2.45; sheared plates, \$2.30@2.40; beams and channels \$3.20.

Plates.—Business is of a satisfactory character, though there is no strengthening in values. A fair demand obtains for mill lots and the outlook is good for a steadily increasing trade. Steel sheets, 10 to 14, \$2.70@2.80; iron sheets, 10 to 14, \$2.60@2.70; tank iron or steel, \$2.50@2.70; shell iron or steel, \$3@3.25; firebox steel, \$4.25@5.50; flange steel, \$3.25@3.40; boiler rivets, \$4.25; boiler tubes, 2½ in. and smaller, 55%; 3 to 6 in., 65%; 7 in. and upward, 55%.

Merchant Steel.—A good demand continues and we hear of some advances of ¼c. on special steels. Several large inquiries are in the market and the outlook is bright for further contracts. Best grades are moving more freely, but inferior tool steel is quiet. Prices remain unchanged: Tool steel, \$6.75@7; tire steel, \$2.30@2.50; toe calk, \$2.50@2.65; Bessemer machinery, \$2.20@2.30; Bessemer bars, \$2@2.10; open-hearth machinery, \$2.60@2.75; open-hearth spring, \$2.75@3; crucible spring, \$3.75@4.

Steel Rails.—An inquiry for 2,500 tons for a Texas road and others for larger quantities are in the market, which, together with the demand for small lots, render the market more active. Many inquiries are received for more prompt shipments, and quotations on good-sized lots are now \$31.50 to \$32.50 and higher for carloads. Several orders for iron splice bars aggregating upward of 3,000 tons were placed during the week at 1.87½@1.90c., the contracts calling for specification iron. Ordinary quotations are: \$1.85@2 for steel and \$1.85@1.95 for iron; spikes at \$2.15@2.20 per 100 lbs. track bolts; hexagonal nuts, \$2.85@2.90.

Galvanized Sheet Iron.—This specialty is in excellent demand for mill lots and from agents' warehouses, and discounts are becoming more firm, though unchanged, at 67½% off on Juniata and 67½% and 5% off on charcoal.

Black Sheet Iron.—There is a more free inquiry for carloads for early delivery, and August will be an active shipping month on account of anticipated advances in freight rates in September. Mill quotations for current month are 2.90c. Chicago for No. 27 common; dealers' price 3.1c., for same gauge, from stock.

Bar Iron.—Bar iron continues in fair demand, and local mills quote 1.65@1.70c., though the former is an inside price for fancy specifications. Inquiry continues good from carbuilders and other large consumers. It is noticeable that much of the business talked of in July is not yet contracted. Valley mills quote 1.55c. at mill. Dealers report an increasing demand from stock and prices steady at 1.80@1.90c.

Nails.—Demand is improving but prices from makers standpoint are very unsatisfactory and irregular; local manufacturers of steel-cut are getting well booked up, though at very low prices. Dealers quote \$1.75 in small lots from store. Wire nails are working into better shape, and \$1.90 at mill is bottom for large orders. Jobbers quote \$2.15 from store.

Scrap.—Demand is quietly improving, No. 1 railroad and forge moving more freely; other grades are also in better inquiry, and prices advancing. Quotations are: No. 1 railroad, \$19.50; No. 1 forge, \$18.50; No. 1 mill, \$14.50; fishplates, \$21; axles, \$24; horseshoes, \$19; pipes and flues, \$13; cast borings, \$8; wrought turnings, \$10.50; axle turnings, \$12.50; machinery casting, \$12.00; stove plates, \$8; mixed steel, \$11; coil steel, \$14.50; leaf steel, \$15.50; tires, \$17.50.

Old Rails and Wheels.—Several lots of iron rails sold during the week at \$23@23.50 and offerings are eagerly snapped up at \$23. Some small sales of old steel rails were made at \$14.75 for short and \$17 for selected lengths. Old car wheels are dull at \$15.50.

Louisville. Aug. 4.

(Special Report by Hall Bros. & Co.)

The market remains about as last week, consumers being well supplied for several months, in fact many claim that they have no orders to use up what iron they have. There is light demand for iron, though there have been several thousand tons of coke and charcoal iron sold during past week, for delivery as far ahead as twelve months, at confidential figures. There does not appear to be in sight any immediate improvement of affairs; reports have stocks of iron accumulating in most all directions. It is believed that the fall months will bring on an improvement. We quote, as last week:

Hot Blast Foundry Irons.—Southern coke, No. 1, \$14.25@14.50; No. 2, \$13.50@14; No. 3, \$13@13.25. Southern charcoal, No. 1, \$16@17; No. 2, \$15.50@16. Missouri charcoal, No. 1, \$17@17.50; No. 2, \$16.50@17.

Forge Irons.—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.75@12.

Car Wheel and Malleable Irons.—Southern, standard brands, \$19@19.50; Southern, other brands, \$17@18. Lake Superior, \$20@21.

Philadelphia. August 6.

(From our Special Correspondent.)

Pig Iron.—There is not the slightest change to be noted in the pig iron department of the iron trade at this time. There is some accumulation of stocks in the lower grades, and as the demand is not equal to the output, prices must get lower unless the demand increases within a short time. There is a small supply only of good foundry irons, and, therefore, the prices are held firm. The general demand for these best-grade irons is somewhat better than for the last few weeks. The outlook for the immediate future still remains good, but when the improvement is going to set in earnest is a question. No. 1 Foundry is selling at \$17.50 @ \$18; No. 2 Foundry, \$16.50 @ \$17; Grey Forge, \$14.50 @ \$15.

Foreign Material.—There is nothing to note in the way of sales of ferromanganese at this time. Quotations are \$64.50.

Muck Bars.—A few sales have been made at \$26.50 and \$27, but higher prices cannot be obtained just now. The market remains inactive. Holders do not shade asking prices unless in extreme cases.

Steel Billets.—There is a trifle more business to note in steel billets and slabs during the past week, but prices are rather inclined to be weak. Only small lots, however, have been taken, and these at \$27.75 delivered. Freight rates are said to have been cut in a few instances recently. Nominal quotations, \$28@28.25.

Skeip Iron.—In skeip iron we are unable to note any recent transactions at the present time. Quotations remain as last quoted.

Bar Iron.—There is quite a supply of bar iron on the market at the present time, with only very few small sales. Prices therefore are weak. Several railroad companies are in need of material at this time, but money is scarce, and as sellers want cash for most sales there are very few orders being placed. Quotations \$1.70@1.80 for city deliveries; interior points, \$1.60@1.65.

Plate and Tank Iron.—There is no large demand in this branch of trade just now, though things are moving along smoothly, with orders

for small lots being placed. Large orders are expected almost any day, as there is a great deal of work contemplated which will require much material. Tank plates are quoted at 1.95@2.05c. for iron, and 2.10c. for steel; refined, 2.20@2.30c.; firebox, 4@4.25c.

Structural Material.—There has been a slight restriction in output for the past two weeks in this department of the iron trade, and therefore mills are kept quite busy filling back orders. There is very little new business coming, and prices remain where they have been for some time past. Quotations as follows: Angles, \$2@2.10; sheared plates, \$2.05@2.10; tees, \$2.50; beams, \$3.10.

Sheet Iron.—There is nothing done in thin sheets, but some heavy sheets are selling at this time with prices very low. Standard makes, best refined, are quoted at 3@3.50c.

Wrought Iron Pipe.—Some little business has been doing in pipes, but prices are low. Nominal discounts 55% for butt-welded, black; butt welded, galvanized, 45%; boiler tubes, 60%.

Steel Rails.—Things are going along in the same monotonous way in the steel rail trade; small lots at \$30 are once in a while called for, but there is very little demand of any kind.

Old Rails.—A few car-loads of old iron rails have recently been sold at \$22.50 delivered, but there is very little demand. Quotations for steel \$17.50@18, and some little activity.

Scrap.—No. 1 Railroad Scrap, \$20.50@21; market inactive.

Pittsburg. Aug. 6.

(From our Special Correspondent.)

Raw Iron and Steel.—Trade during the past week shows no signs of improvement. It must, however, be taken into consideration that when so large a number of iron men are absent, on their annual vacations, activity in the iron business is not to be expected. By the first of September the absentees will have returned and business will open up in earnest, and, unless all signs fail, the fall and winter trade in iron and steel will be very large.

The July sales of raw iron compare with those of July, 1890, as follows: For five weeks, ending August 1st, last year's sales were 125,830 tons; sales the same time this year, 225,065 tons; increase, 99,085 tons. The stock of iron in first hands at present is not large.

As regards the position in iron at present, there is no cause for uneasiness, except that the volume of business is too limited; prices are low, and as stocks are light, there is very little dead wood to carry. The advance of 25 cents per ton in iron ores was quite a surprise to many persons.

There seems to be no room for further reductions in prices of pig iron, at least at present cost of manufacture, for there is hardly a living profit in any line at the figures now ruling. The increasing output of pig iron, in the absence of a corresponding increase in the demand, is creating some apprehension as to the ability of the market to stand the pressure. As usual the largest inquiry was for the better grades of pig iron such as that of city furnaces whose reputation is No. 1. Southern irons are not fancied; in fact they have been neglected for some time. The situation in general is very similar to that of last week. Sales have been very much restricted; prices show scarcely any change.

Coke Smelted Lake and Native Ores.

1,000 Tons Grey Forge.....	14.00 cash
1,000 Tons Bessemer, City Furnace.....	16.25 cash
1,000 Tons Bessemer.....	16.00 cash
1,000 Tons Bessemer.....	16.00 cash
1,000 Tons Grey Forge.....	14.00 cash
500 Tons Bessemer.....	16.00 cash
500 Tons Off Bessemer.....	15.25 cash
500 Tons Bessemer.....	16.00 cash
500 Tons Bessemer.....	16.00 cash
500 Tons Grey Forge at Valley Furnace.....	13.75 cash
300 Tons Grey Forge at Valley Furnace.....	13.50 cash
200 Tons Grey Forge.....	14.00 cash
200 Tons No. 2 Foundry.....	15.00 cash
150 Tons No. 2 Foundry.....	15.25 cash
100 Tons No. 1 Foundry.....	16.50 cash
100 Tons No. 3 Foundry.....	14.90 cash
100 Tons Silvery.....	16.00 cash

Charcoal.

150 Tons Warm Blast.....	21.00 cash
100 Tons Warm Blast Southern.....	20.00 cash
100 Tons No. 2 Foundry.....	21.00 cash
100 Tons Cold Blast.....	26.00 cash
50 Tons Cold Blast Nos. 2 and 3.....	26.00 cash

Steel Slabs and Billets.

1,500 Tons Steel Billets, Aug., Sept.....	25.50 cash
1,000 Tons Steel Billets, Aug.....	25.50 cash
1,000 Tons Steel Billets.....	25.50 cash
500 Tons Steel Billets, at mill.....	25.50 cash
300 Tons Steel Billets.....	25.75 cash

Muck Bars.

1,000 Tons Neutral.....	27.10 cash
800 Tons Neutral.....	26.75 cash
500 Tons Neutral.....	27.00 cash
100 Tons Neutral.....	26.50 cash

Ferro-Manganese.

100 Tons 80%, Domestic, Pittsburg.....	66.50 cash
450 Tons American fives, at works.....	36.50 cash

Bloom Ends.

400 Tons Bloom Ends Scotch Basic.....	24.30 cash
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Scrap Material.

200 Tons No. 1 R. R. Scrap, net.....	19.00 ash
150 Tons No. 1 R. R. Cast, gross.....	13.50 cash
100 Tons Iron Axles, net.....	26.00 cash
50 Tons Iron Axles, extra hammered, net.....	28.00 cash
25 Tons Steel Axles, net.....	27.00 cash
25 Tons Iron Axles, net.....	27.75 cash
25 Tons Iron Axles, net.....	27.50 cash

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

Table with columns: NAME AND LOCATION OF COMPANY, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6, Aug. 7, SALES. Lists various mining companies like Adams, Alice, Aspen, etc.

Table with columns: NAME AND LOCATION OF COMPANY, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6, Aug. 7, SALES. Lists various mining companies like Alpha, Alta, American Flag, etc.

*Ex dividend. †Dealt at in the New York Stock Ex. ‡Assessment paid. §Assessment unpaid. ¶Dividend shares sold, 4,640. Non-dividend shares sold, 15,470. Total New York, 20,110.

BOSTON MINING STOCK QUOTATIONS.

Table with columns: NAME OF COMPANY, July 31, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6, SALES. Lists various mining companies like Atlantic, Bodie, Bonanza Development, etc.

Table with columns: NAME OF COMPANY, July 31, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6, SALES. Lists various mining companies like Allouez, Arnold, Aztec, etc.

Boston: Dividend shares sold, 4,243. Non-dividend shares sold, 2,505. Total Boston, 6,748.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6, Aug. 7, SALES. Lists various coal companies like American, Cambria Iron, Cameron Coal, etc.

Deadwood.

The following are the closing quotations:

Table with columns: Bid, Ask'd. Lists various mining stocks like Anna, Bullion, Carthage, etc.

San Francisco Mining Stock Quotations.

CLOSING QUOTATIONS.

Table with columns: NAMES OF STOCKS, July 31, Aug. 1, Aug. 3, Aug. 4, Aug. 5, Aug. 6. Lists various mining stocks like Alpha, Alta, Belcher, etc.

Aspen.

Highest and lowest prices for the week ending Aug. 1:

Table with columns: Name, Price. Lists various mining stocks like Argentum Junata, Aspen Deep, etc.

‡Sales in New York, 10,335. In Philadelphia, 10,569. Total sales, 49,510. †Par value, \$100.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

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

Notes and footnotes at the bottom of the page, including company names and dates: Adams, S. Silver, L., Lead, C., Copper. *Non-assessable. †This company, as the Western, up to December 10th, 1891, paid \$1,400,000.

STOCK MARKET QUOTATIONS.

Table with columns: COMPANY, Bid, Asked, Baltimore, Md., July 30. Includes Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Birmingham, Ala. Aug. 5.

Table with columns: COMPANY, Bid, Asked, Birmingham, Ala., Aug. 5. Includes Ala. Coal & I. Co., Ala. Conn. C. & C. Co., etc.

Helena, July 29.

Table with columns: COMPANY, Bid, Asked, Helena, July 29. Includes Bald Butte, Montana, Buckeye, Montana, California, Montana, etc.

Pittsburg, Pa. Aug. 6.

Table with columns: COMPANY, Bid, Asked, Pittsburg, Pa., Aug. 6. Includes Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, etc.

Table with columns: COMPANY, Bid, Asked, St. Louis, Aug. 5. Includes People's Natural Gas, People's N. G. & P. Co., Philadelphia Co., etc.

St. Louis, Aug. 5.

Table with columns: COMPANY, Bid, Asked, St. Louis, Aug. 5. Includes Adams, Colo., American & Nettie, Artec, N. Mex., etc.

Trust Receipts.

Table with columns: Description, Price, Sales, H. L. Includes American Cotton Oil, National Lead, etc.

Trust Stocks, Aug. 7.

Table with columns: Description, Price, Sales, H. L. Includes Am. Cotton Oil, Am. Sugar Refineries, Distillers' & Cattle Feeders, etc.

Foreign Quotations, London, July 29.

Table with columns: COMPANY, Highest, Lowest, London, July 29. Includes Almada, Mex., Amador, Cal., American Belle, Colo., etc.

Table with columns: Description, Price, Paris, July 23. Includes United Mexican, Mex., U. S. Placer, Colo., West Argentine, Colo., etc.

Paris, July 23.

Table with columns: Description, Price, Paris, July 23. Includes Belmez, Spain, Callao, Venez., Callao Bis., Venez., etc.

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Table with columns: Description, Price. Includes Acid-Acetic, No. 8, pure, 1,040, Carb. Commercial, in bbls. and cbsy., Carbonic, liquefied, etc.

Table with columns: Description, Price. Includes Litharge-Powdered, English flake, Magnesite-Greek, Manganese-Crude, Oxide, ground, per lb., etc.

Table with columns: Description, Price. Includes Phosphorus, Plumbago-Ceylon, Potassium-Kieserite, Potassium-Cyanide, Bromide, Chlorate, English, Chlorate, powdered, Carb., etc.

THE RARER METALS.

Table with columns: Description, Price. Includes Aluminum-Pure, per lb., Arsenic-(Metallic), per lb., Barium-(Metallic), per gram, etc.