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CONTENTS.

	Page
Let the Comstock Stockholders Unite.....	611
The Cyanide Process	611
The Decadence of Nevada as a Mining State.....	612
Books Received	612
New Publications.....	588
Manufacture of Mn O ₂	613
Calculation of Slag Components.....	613
The Million Dollar Verdict Against the Mill Ring.....	J. L. 612
Faulting in Veins.—I.....	John A. Church 613
* Electro-Chemical Manufacture of Chlorate of Potash at Vallorbes, Switzerland.....	Translated by A. C. Knapp 5
Introduction and Development of Magnetic Separation of Iron Ore.—I	Axel Sahlin, M. E. 616
The Building Stones of Great Britain.....	617
Magnetic Iron Rust.....	618
The Tricks of Miners.....	Dan de Quille 618
* Improved Pocket Wire Gauge.....	619
* An Improved T-Square.....	619
* Magazine Hack Saw.....	619
The Mineral Production of New South Wales.....	61
* Electric Alarm for Overheated Bearings.....	620
Josephinite, a New Nickel-Iron.....	620
On the Best Form of Safety Fuses.....	620
Digest of Opinions of the Interior Department Relating to the Mining Industry.....	621
Recent Decisions Affecting the Mining Industry.....	621
The Utilization of Wind Power.....	621
* McLeod's Speed Reducer.....	621
Patents Granted.....	621
Notes: Mining in Madagascar, 613—An Interesting Hindoo Ceremony, 614—Iron in Japan, 614—Cupro-des-cloizite in Mexico, 617—Proposed Manufacture of Rails by the Mannesman Process, 620—The Gold Production of the Guianas, 621.	
Personals—Obituary—Industrial Notes—Machinery and Supplies Wanted.....	622

* Illustrated.

MINING NEWS:	Great Britain..... 627	Boston..... 632	Chicago..... 629
Arizona..... 623	India..... 927	Coal Stocks... 632	Pittsburg..... 629
California..... 623	South America.. 627	San Francisco.. 632	METALS..... 629
Colorado..... 624	Transvaal..... 627	Baltimore..... 634	IRON:
Idaho..... 624	MEETINGS..... 628	Deadwood..... 634	New York..... 630
Kansas..... 625	DIVIDENDS..... 628	Helena..... 634	Buffalo..... 630
Michigan..... 625	ASSESSMENTS... 628	Pittsburg..... 634	Chicago..... 630
Missouri..... 625	MINING STOCK	St. Louis..... 634	Louisville..... 631
Montana..... 625	MARKETS:	Trust Stocks.. 634	Philadelphia.. 631
Nevada..... 625	New York..... 628	Aspen..... 634	Pittsburg..... 631
Pennsylvania.. 626	Boston..... 628	London..... 634	CHEMICALS AND
South Dakota.. 627	New York..... 628	Paris..... 634	MINERALS..... 627
Utah..... 627	San Francisco.. 628	MARKETS:	CURRENT PRICES
Wyoming..... 627	Pipe Line..... 628	COAL:	Chemicals..... 634
FOREIGN:	MINING STOCK	New York..... 628	Minerals..... 634
British Guiana.. 627	TABLES:	Boston..... 629	Rarer Metals.. 634
Canada..... 627	New York..... 632	Buffalo..... 629	ADVT. INDEX..... 19

THE head of the Comstock mill ring, which has at last been convicted of conspiracy and fraud, is U. S. Senator John P. Jones. How long will United States Senators be willing to have a common thief as an associate?

THE stockholders of the Chollar Silver Mining Company are the next to ask the Comstock mill ring to disgorge. Mr. M. W. Fox, who has just won his suit in Hale & Norcross, has applied to the court to become a party plaintiff in the case commenced some time ago by a certain Theodore Fox against the Chollar, and which it was rumored was to be compromised. Very interesting revelations are promised.

THE United States Mint at Carson City, Nev., has been used by the Comstock mill ring as a "fence" through which they converted their stolen bullion into legal money. T. R. Hofer, cashier of the mill ring's Bullion and Exchange Bank, is the chief clerk, and practically the acting superintendent of the Carson Mint, and in his dual capacity was the "Mother Mandelbaum" for the ring. It is high time this disgrace to the United States Mint should cease.

THE appalling disaster of fire and flood at Titusville and Oil City, Pa., recalls the Johnstown flood of a few years ago in its tragic details, with the added horror of a river of fire cutting off all possibility of rescue. The bursting of a dam on the upper waters of Oil Creek let loose a flood that was in itself sufficient to have carried death and disaster in its path, but one of the first structures to be carried away by it was an immense tank of naphtha, which not only covered the torrent, but filled the air with this inflammable substance. A spark from a passing locomotive soon ignited it and converted the torrent literally into a river of fire, which burned all the buildings in its path that withstood the torrent, so that the unfortunate victims, more hopeless far than those on board a burning ship at sea, whether in their houses or endeavoring to escape to the neighboring hills, were surrounded and engulfed in a lake of fire. Nothing more terrific or hopeless can be imagined by the mind of man.

The destruction of tanks of petroleum kept up the supply of fuel, so that nothing combustible above the surface of the flood was left. It is estimated that fully 300 lives were lost.

LET THE COMSTOCK STOCKHOLDERS UNITE.

The magnificent victory gained over the "mill ring" by Mr. M. W. Fox should so encourage stockholders as to induce them at once to join the Mining Stock Association of San Francisco, in pursuing the thieves who have robbed other mines than the Hale & Norcross, until they have been forced to make restitution and have been landed in the penitentiary. There can now be no doubt of the possibility of recovering vast sums from these robbers, for the associates in the "mill ring" are millionaires, and they are held individually liable for the full amount of the verdict. It is quite probable that if the stockholders of the different mines were to join and commence suits a good many millions of dollars could be recovered, and in addition the management of the mines could be changed, which would result in receiving dividends instead of paying assessments, and would increase the value of the stocks by many millions of dollars.

Stockholders would thus, in forcing the millionaire thieves to disgorge, have the double satisfaction of making an enormous profit on the present value of their investment, and of doing the mining industry an incalculable service.

The impunity with which the Comstock Mill ring thieves have robbed the mines, and the success with which they have used their ill-gotten millions to buy positions of honor, whether in the United States Senate, or in the society of San Francisco, of New York, of Paris, or of London, has been the most pernicious object-lesson that the mining industry has ever had, and has unquestionably been the incentive to much of the dishonesty that has almost become characteristic of mining enterprises, and that has frightened from this inviting field many millions of dollars that prudent capitalists would have invested but for this reputation.

Punish the thieves, and mining will become, as it deserves to be, the most popular field for the investment of capital.

THE CYANIDE PROCESS.

The representatives of the cyanide or so-called MCARTHUR FORREST process are very greatly disturbed by what the ENGINEERING AND MINING JOURNAL recently said concerning it, and in characteristic manner call us name-casters instead of giving the details of mill runs to prove that we were in error. Probably no one pays very much attention to the interested statements of Senator TABOR's organ, the Denver Stock Exchange Journal. The ENGINEERING AND MINING JOURNAL will continue to state all the actual facts it can obtain and will be extremely well pleased if ultimately it is shown that the cyanide process has been made a success. The only detailed specific records that have yet been made public were those published in the ENGINEERING AND MINING JOURNAL long before the MCARTHUR-

FORREST patents were taken out in this country. Now that the question is raised we shall shortly publish information that may determine who the actual inventors were, or at least that will show the invention to be older than is generally supposed. We shall be pleased to hear from anyone who has experimented with cyanide solutions for the extraction of gold and silver from their ores.

The cyanide process is, as we stated, undoubtedly well adapted to certain kinds of ores, more especially to those containing both gold and silver. The conditions which interfere with its success in all cases are, apparently, not yet well understood, but continued investigation and experiment should, and no doubt will, determine these and widen the field of its usefulness.

The question, who owns the process, or is it public property? is important to those who propose using it, but has nothing to do with its technical achievements.

There is no occasion for billingsgate in discussing this process—instead let those interested cite working results capable of verification, and give proof of priority of invention. The ENGINEERING AND MINING JOURNAL will be pleased to publish and discuss such communications.

THE DECADENCE OF NEVADA AS A MINING STATE.

As the production of this former Queen of Mining States has fallen off from a maximum production in 1878 of \$19,546,513 in gold and \$28,130,350 in silver, a total of \$47,676,814, or nearly 50% of the total production of the United States, to \$3,520,000 in silver and \$2,679,675 in gold, a total of \$6,199,675 in 1891, while other States, such as Colorado and Montana, notably, as well as Utah and Idaho, have progressed wonderfully, the causes that have produced this depression are worth reviewing.

Of course, the failure of the Big Bonanza is the primary cause. When the great treasure chamber between the 1,050 and 1,850 levels of the Consolidated Virginia was exhausted production fell at once. But when we consider that Colorado and Montana have progressed despite the failure of the great bonanzas at Leadville, Colo., and the practical exhaustion of the rich gold and silver veins of Butte, Mont., it would seem that, since Nevada is beyond question generously supplied with mineral deposits, as is evidenced in the successive bonanzas of Virginia City, Reese River, Aurora, Eureka, White Pine, Pioche and Tuscarora, not to mention the smaller ones of Cornucopia and Candelaria, some malign influence must be accountable for retarding and injuring the sole industry of that State. Among Nevada's drawbacks may be mentioned the remoteness of the undeveloped portion of the State from railroads; the avaricious policy of the roads where they can be reached and the absence, due, perhaps, to this cause, of centrally located competing "custom" reduction works. Of these there are none save the mill at Reno and a smaller one in former days at Rye Patch.

Had the Central Pacific Railroad pursued the fostering policy of the Denver & Rio Grande Railroad, branches would have been built enabling the miners to ship their ores, instead of compelling them to erect expensive reduction works at the mines, usually dry crushing silver mills, the heavy cost of which absorbed what would otherwise have been a handsome profit on the mine. It is safe to say that such branches would have been as profitable, in almost every instance, as the Virginia and Truckee, the Eureka & Palisade or the Carson & Colorado, all Nevada roads, owned by others than those interested in the main trunk system of the State.

At last the Union Pacific has shown a tendency to relieve the situation at Pioche by extending their line from Milford, and it seems possible that the Raymond & Ely and the Meadow Valley mines, which formerly paid nearly 5,000,000 in dividends, will be enabled to make a profit on ores which in early days would have been considered fit for the waste dump only. It is probably also that a through line from Salt Lake to San Francisco passing through Eureka and White Pine counties will give a new lease of life to the mines of Treasure Hill. A branch built to Belmont and Tybo and extending through the Mud River country and Eldorado Cañon to the Colorado River would develop a country where mines at present almost inaccessible could be worked at a profit.

There is, however, another malign influence which has cast its blighting shadow over the State of Nevada, and that is the Comstock Mill ring. This infamous combination owns the entire political and judicial organization of the State. It defrauds the mine owners and has always encouraged stock gambling by the miners, for by this means it gets back nearly all their earnings; at the same time it keeps up wages in the entire State, for the mine stockholders pay these and the mill ring finally gets them. The miners, though getting higher wages when at work, are nevertheless worse off than in any other Western State, while the mines in other portions of the State are handicapped by having to pay "Comstock wages." Since the courts as well as the political representatives of the State are "owned" by the mill ring, no man can get redress for any wrong done by its tools. The curse of the Comstock mill ring is upon the State of Nevada and no capitalists will willingly risk investments under its blighting shadow.

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.

A Dictionary of Electrical Words, Terms and Phrases. By Edwin J. Houston, A. M. Second Edition. The W. J. Johnston Company, Ltd., New York, 1892. Pages 562. Price, \$5. Illustrated.

Florida, South Carolina and Canadian Phosphates. By C. C. Hoyer Millar. Published by The Scientific Publishing Company, New York, 1892. Pages, 223. Price, \$2.50. Illustrated.

Jahrbuch der Chemie. Vol. I. Edited by Richard Meyer. Published by H. Beechhold, Frankfurt, Germany, 1891. Pages, 544. Illustrated.

Miners' Pocket-Book. By C. G. Warnford Lock. Published by E. & F. N. Spon, London and New York, 1892. Pages, 472. Price, \$5. Illustrated.

Mining Rights in Colorado. Lode and Placer Claims, Possessory and Patented, from the District Organizations to the Present Time. Seventh Edition. By R. S. Morrison. Published by the Claim & Hardy Co., Denver, Colo., 1892. Pages, 441. Price, \$2.25.

NEW PUBLICATIONS.

REPORT OF THE CITY ENGINEER OF PROVIDENCE. Pp. 105. Illustrated.

This work containing many records of meteorological observations in Providence, contains also much interesting data of the sewage improvements in that city.

A DICTIONARY OF ELECTRICAL TERMS AND PHRASES. By Edwin J. Houston, A. M. Second edition. Rewritten and greatly enlarged. New York: The W. J. Johnston Company, Limited, publishers. 8vo., pp. 562-570. Illustrations. \$5.

The advance sheets of this excellent work have reached us. As far as dress is concerned it is more elaborate than the first edition and the contents have been added to, making it practically a new work. Some 5,000 subjects are treated of, with as many cross references. When the volume is issued we shall review it more at length.

BRICKS FOR STREET PAVING. An account of tests made of bricks and paving blocks, with a brief discussion of street pavements and a method of constructing them. By M. D. Burke, C. E. Robert Clark & Co., 1892. Cincinnati. Pages 86. Price 50 cents.

These tests were made by Mr. Burke while investigating the material to be used in paving streets in Avondale, Ohio. Some fifteen samples, each variety being from a different establishment, were submitted to chemical analyses and tests for determining their absorption, specific gravity, transverse strength, crushing strength and resistance to abrasion and impact. As a result of the author's investigation he recommends a number of important additions to specifications for paving bricks and furnishes much general information concerning them. The work is a valuable addition to the existing literature on the subject.

ZWICKER'S INSTRUCTOR FOR MACHINISTS, FIREMEN AND ENGINEERS. By Philip Henry Zwicker, Practical Engineer and Machinist. Geo. A. Zeller, Publisher, St. Louis. Size, 4 x 6 ins; 127 pages. Price \$1.

An unfavorable impression of this book is created by the title page, on which, in addition to the portion of the title above quoted, are the words, "The only practical work published," and an inspection of the book confirms the impression. The best that can be said of it is that it is not as bad as some other so-called practical books of the same kind. A sample of its style is the following:

An eccentric is a subterfuge for a crank; it is something out of center. A cam has no definite meaning; it has 1, 2, 3 or 4 motions; they are used on poppet valve engines.

Q. Can a perfect vacuum be found?

A. No; about 9 to 1% of the atmosphere, which is 14.7 lbs. per sq. in.

A TEXT BOOK OF RETAINING WALLS. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. John Wiley & Sons, New York. 122 pages. Price \$2.

Professor Merriman's well known reputation as a writer on those engineering subjects in which mathematical ability is necessary to their comprehension is a guarantee that this work is one well adapted for the use of engineering students who desire to be grounded on the fundamental theory of retaining walls. It is very brief, concise in style, and the mathematics is not formidable if the student is willing to take for granted the author's statement as to the conditions which render certain expressions a maximum instead of applying the calculus to prove it. The chief fault of the book is its brevity. When recent literature contains so much valuable matter on the subject of retaining walls, dams, etc., such as the discussions and reports on the Quaker Bridge and Croton dams, and of accidents to dams, like that which caused the Johnstown flood, the book might have been greatly improved for the use of engineers in practice if it had contained a degree of this matter, and other data from existing walls and dams, together with a comparison of the author's theory with practice.

ANNUAL REPORT OF THE STATE GEOLOGIST OF THE STATE OF NEW JERSEY FOR THE YEAR 1891. Pp., 270, with a map.

The work of the New Jersey Geological Survey in 1891 was devoted to the Pleistocene formations of the northern portion of the state, an examination of the oak and pine lands of the southern portion of the state, a report on water supply and water power, and, in co-operation with the United States Geological Survey, under the direction of Professor Raphael Pumpelly, a study of the crystalline rocks of the Highlands of Northern New Jersey. The preparation of a geological map, which will show by appropriate colors and symbols the various surface formations as distinguished from the underlying rock formations, commonly shown on geological maps, also in co-operation with the United States Geological Survey, has been begun, the United States Geological Survey undertaking the study of the crystalline rocks, while the State Survey will devote its attention to mapping the surface formations. A large portion of the work is devoted to the glacial and water drifts which cover such a large area of that state, and it is almost needless to say that this work has been pursued

with all the characteristic thoroughness of the survey in previous years. In addition it contains considerable information on the active iron mines in the northern portions of the state, with a few notes on zinc veins.

KENTUCKY GEOLOGICAL SURVEY. By John R. Procter, Director. Pp. 28, with maps showing progress of work.

During the year eastern Kentucky coal fields have been thoroughly examined and much time has been spent on a detailed examination of the coals of McGoffen and Floyd counties, anticipating a report on the eastern Kentucky coal fields as a whole. The valley of the Kentucky River and the valley of the Cumberland have been thoroughly inspected and a thorough development of the beds of coal of the Lake Mountain region, an area of about 100 square miles, has been planned and carried forward to completion. A report is in course of preparation. The geological work in western Kentucky will have considerable bearing on the development of the coal mining interest of the western coal fields. The recent developments have shown that extensive bodies of excellent brown iron ores exist in the vicinity of these fields. It is stated that experiments made within the past two years give favorable indications that several of the western Kentucky coals are suitable for cooking purposes. All told since the formation of this survey in 1880 the topography and geology of western Kentucky has been completed in 13 counties, an aggregate of 4,870 square miles, and 17 counties have been completed in central Kentucky with an aggregate of 4,826 square miles. Topography has been completed and geology partially completed in five counties in south central Kentucky, an aggregate of 1829 square miles.

THE NATIONAL MANURING OF FIELD PLANTS. Two lectures by Prof. Paul Wagner, Ph. D., Director Agricultural Research Station, Darmstadt. Translated by G. G. Henderson, D. Sc., M. A. Second edition. Pages, 32. Illustrated. Published by C. & E. Albert, London.

These series of lectures give the results of a number of extremely interesting experiments in the manuring of field crops conducted by the author. A large portion of the lectures are devoted to the use of the Thomas phosphate powder, which in the opinion of the author is the most efficacious of all fertilizers; that is, when the cost per unit of phosphoric acid is taken into consideration. According to the author's statement, one pound of soluble phosphoric acid at the time of writing was 3½d., and one pound of phosphoric acid in Thomas' phosphate powder was 1½d., or, for an expenditure of £5, 367 lbs. of phosphoric acid in super-phosphate were obtained, against 1,000 lbs. of phosphoric acid in Thomas' phosphate powder. The work is of extreme interest not only to the manufacturer of basic slag but to the agriculturist where such fertilizers can be obtained. The development of the phosphate slag industry in America has not progressed to that degree which was at first anticipated, the Pottstown Iron Company being the only producing works in the United States, although there are large quantities of high phosphorus iron ores in the Southern States which will undoubtedly be utilized in time. In view of the excellent results chronicled by Professor Wagner it may seem possible that such an industry will be stimulated.

REPORT OF THE RAPID TRANSIT COMMISSION TO THE MASSACHUSETTS LEGISLATURE. Pp. 296 with plans and illustrations.

This work by the committee, and including a number of prominent engineers, organized June 3d, 1891, is a compilation not only of all existing information on rapid transit in large cities, but of much which has been due directly to the labors of the commission itself. During the 51 hearings given by the commission a number of very ingenious inventions were described and many intelligent suggestions were made varying from sidewalk tunnels to bicycle railroads. The work contains also the report of the Engineer-in-Chief, Mr. George S. Rice, of Newton, in which he describes the existing street conditions in Boston, and recommends the construction of elevated railroads. The Advisory Board of Consulting Engineers, Messrs. Theodore Cooper, A. Fteley and Frederick P. Sterns, have made a thorough analysis of the situation and recommend a circuit elevated railroad as a distributed medium for connecting links between the radial lines. In considering an underground system, while they say that at the present time they are unable to determine with accuracy the actual cost of a tunnel, they state that in their opinion a double track tunnel of sufficient magnitude would cost more than \$2,000,000 per mile. The elevated system proposed by the Engineer-in-Chief, including the total mileage of 8.17 miles, compensation for land and buildings taken and damages to property, would cost about \$28,448,000.

This work is of great value to any one interested in the question of rapid transit in large cities.

VALVE GEARS FOR STEAM ENGINES. By Cecil H. Peabody, Associate Professor of Steam Engineering at the Massachusetts Institute of Technology. John Wiley & Sons, New York. 126 pages, with 33 full page plates. Price \$2.50.

This work is intended as a text book for engineering students, the author's aim being to give the learner a firm grasp of the principles of valve gears and some facility in their application, rather than to make an exhaustive treatise on the subject. Each type discussed is illustrated by one or more examples selected from good practice. In the presentation of the elementary principles both geometrical and analytical methods are used, but in the application geometrical methods are used exclusively. Zeuner's valve diagram is used, because it is widely and favorably known and the author believes it to be at least as good as any other. The plain slide valve and its modifications, shifting eccentrics, link motions and radial, double, and drop cut-off gears are all discussed as fully as the size of the book permits. A good feature is the combination of a skeleton model with construction for laying out link motions and other complicated gears. About 20 pages are devoted to an analytical discussion of link motions, which bristles with formulæ and may well be skipped, and taken for granted by all except those who have a liking for difficult mathematics. With this exception the book is readable, although with some effort, by anyone acquainted with elementary geometry. The book is well adapted for students, and is worthy of a place in a practicing engineers' library, alongside of the older treatises on the same subject.

Mining in Madagascar.—In Madagascar only 7,419 oz. of gold were produced. There are eight mines in operation at which 1,000 to 1,200 workmen are employed.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Construction and Maintenance of Roads.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I wish to thank you for publishing my essay on "Road Making" in your issue of April 23d, 1892. I have been awarded one of the prizes; but the reward was due more to the standing and reputation of the ENGINEERING AND MINING JOURNAL than to any intrinsic merit in my essay.

EUGENE L. MUNDIN, POLYTECHNIC INSTITUTE.

WORCESTER, Mass., June 6, 1892.

Manufacture of Mn O₂.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I hear that at Tennant's Chemical Works in the north of England an oxide of manganese (Mn O₂) is made which carries 80% of Mn, and is worth from \$50 to \$56 a gross ton in New York. Can you tell me how this is made?

O. B.

KINGSTON, N. M.

[Years ago, Tennants' recovered manganese from still liquor by Dunlap's process. We are unable to say if they continue to use the process and sell the oxide of manganese, instead of using it for chlorine manufacture. The method was as follows:

1. The excess of acid in chloride of manganese liquor is neutralized and the iron precipitated by adding an excess of carbonate of lime.
2. The precipitate is settled, the solution of chloride of Mn. is decanted, and sufficient milk of carbonate of manganese to finally precipitate all Mn. when agitated and heated by steam under pressure of 2 to 4 atmospheres, is added.
3. The precipitated carbonate of Mn. is filtered, washed (if for colors), roasted to 600 degrees Fahr. for say 48 hours, during which time it passes from white to light brown, dark brown and black, and finally contains about 70% Mn O₂.

Various colors, brown, green, black, etc., may be obtained. It is possible a better method may be suggested or even in use.—Ed. E. & M. J.]

Calculation of Slag Components.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the ENGINEERING AND MINING JOURNAL of March 5th, 1892, I noticed the article on "Calculation of Slag Components." There are some points which I do not understand, and which I should like to have explained, if you can find it convenient and agreeable to do so.

First: What do you mean by the expression,

$$\text{Total, FeO} = \frac{a}{c} \text{SiO}_2 \text{ and } \frac{a}{b} \text{CaO?}$$

Second: In your equation, why do you say: $\cdot 30x + 6 + \cdot 03y$, etc. = why not $\cdot 30x + \cdot 06 + \cdot 03y$?

If you will be kind enough to clear up this little difficulty, I shall be under many obligations.

GEORGE B. WARDMAN.

SAN PEDRO, N. M., May 16, 1892.

[1. The hypothesis is made in the first place in the given slag that the total FeO = a, total CaO = b. and total SiO₂ = c. Then FeO or a = $\frac{a}{c}$ SiO₂ or c. That is that FeO = FeO, or a = a, c cancelling out. The second equation, FeO = $\frac{a}{b}$ CaO, is similar. These equations are made simply to express values of FeO in terms of the other components, and permitting of substitution of figures when a slag is to be calculated.

2. As 100 lbs. of the third ore is taken, 6 lbs. or 6%, is a positive integer, not a mere expression of percentage.—Ed. E. & M. J.R.]

The Million Dollar Verdict Against the Mill Ring.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: While congratulating you on the superb victory which has been gained as much through your stand in the matter as the steadfast purpose of Mr. M. W. Fox and the Mining Stock Association, backed by the masterly assistance of their attorneys, and the somewhat novel precedent in California of an uncontrollable judge, I must remind you that this success is but a step in the purification of the management of Nevada mines. Others on the Comstock are equally reprehensible; there should be an accounting in the case of the Yellow Jacket, Chollar and Overman, not to mention the Kentuck, from which the late C. C. Stevenson, Governor of the State, made a fortune estimated at \$3,000,000, while the stockholders received nothing! At last it seems as if public interest had been awakened, and it is to be hoped that before this beneficial investigation ceases the management of the mines of Tuscarora, Elko County, Nevada may be subjected to the same method of analytical research, with, it is to be hoped, as good results as in the case of the Hale & Norcross.

The affairs in Tuscarora have notoriously been rotten for many years, and the mines in that camp (and there are no better mines in Nevada) show but \$1,274,950 in dividends against \$1,606,500 in assessments.

The profits to the ring, Messrs. Bell, Grayson and associates, is not easy to estimate, but it is generally believed to be very large. Hoping that you can pursue a line of inquiry in the case of Tuscarora, I remain grateful for your efforts in behalf of Comstock stockholders and legitimate mining.

NEW YORK, June 8, 1892.

J. L.

Faulting in Veins.—I.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Absence from the city has prevented earlier attention to the various answers and criticisms upon my communication respecting faulting in veins. I am glad to see so many responses for, like Mr. S. F. Emmons, I am intensely interested in the subject. From some expressions in the letters of my respondents I judge that my position is misconceived. Mr. Stephen H. Emmons, for instance, takes my remarks "to mean that ore

veins do not as a rule occupy fault fissures, and that as yet no evidence exists to prove the motion of one vein wall relatively to another." Not at all. I have not said anything like that; my point was that when there are no other evidences of motion a vein cannot be proved a fault by finding slickensides, striæ and clays in it unless slickensides, striæ and clay are really a proof of faulting, and that this has not been shown. That is to say, it has not been proved that rubbing is the only way in which they are formed.

In general my criticism was directed to the loose employment of evidences which have not been critically determined to be proof of faulting, and to the declaration of phenomena which either look like ill considered assertions or seem to be advanced as facts when they are actually no more than intellectual conceptions necessary to the rounding out of a theory.

For instance, Mr. S. H. Emmens says that "every mining engineer must have frequently noticed horses that have presumably been formed by the relative vertical displacement of the walls of a vein of irregular dip, in fact by the very action to which Professor Church seems to allude when he says "it seems to be impossible for such interlocked walls to move on each other without shearing off the projecting bosses."

Now, Mr. Editor, I am one mining engineer that never saw that, though I have worked in veins with irregular interlocked walls and hunted anxiously for such evidences. Moreover, I do not recollect any report that describes such a phenomenon. Theoretically, it seems to me that Mr. S. H. Emmens' assertion has consequences he does not dream of. When a crevice of irregular dip is subjected to such powerful faulting that the irregularities are sheared off you have a new crevice of regular dip. If ore had been deposited and a vein finished before the faulting the movement would show itself in displacement of the vein at the sheared portions and the ordinary indisputable proof of faulting would be supplied. Can Mr. Emmens point to such a case? If the vein were formed after the faulting it is probable that it would not follow the line where the old crevice had been closed by powerful compression, but would take the straight line of the new fracture, and thus we come back to Mr. Williams' assertion that regularity of dip may be evidence of faulting, and we also come back to my question, what proof is there that veins with irregular interlocked walls (for such veins exist) have faulted. If Mr. S. H. Emmens will describe such a case he will not only add to the knowledge of one humble but eager student, but I think he will provide the makers of geological text-books with a new illustration, for I do not remember any case where such an occurrence is figured or cited.

I regret to see that the letter of Mr. S. F. Emmens exhibits the self-sufficiency which mars too many of the publications of the United States Geological Survey. The facts and views he presents are not discoveries of his own, but are taken from Daubrée, Heim, and still earlier students of fault phenomena. Their works are open to any one who chooses to read them, but Mr. Emmens lectures from them as if their studies were curios of which he possessed the only examples. He would do well to read them again and learn that the labors of a lifetime, however important, may be expressed without aggressive egotism and without attempting to pose as an ultimate authority in science. The theory of faults and veins is not so well settled that fair criticism of any kind can be ridiculed with impunity. He, as a geologist, may consider these subjects closed and finished, but I, as a mining engineer, know that the men of my profession, who are brought face to face daily with the phenomena of veins, are not satisfied with the explanations offered them, and feel that there is much to be discovered yet, and that the existing body of belief is confused and contradictory.

His present communication, like most of his writings, shows the uncertain tenure of half-comprehended deductions, and while he takes a bold stand he hastens to contradict himself by showing that it is an untenable position.

In his third and fourth paragraphs he undertakes to place himself squarely against my assertion that "no one has given the least proof that the slow movement which rocks are supposed to have could produce a polish," but he first abandons polish as a non-essential, next he shows that pressure is as important as movement, and he finishes by declaring that *molecular deformation and striated surfaces* are the result, and therefore the proof, of motion and pressure. In the sixth paragraph he denies the frequency of repeated movement in faults and sustains me in saying that the motion of fault-walls is not to be compared to artificial polishing. It seems to me that Mr. Emmens' confusion of ideas is due to a failure to distinguish between the different phenomena he discusses. Confining ourselves for the moment to slickensides (which are distinct from striæ) we find that geologists recognize three modes of its formation:

1. Rubbing.
2. Deformation, as when a plastic substance like clay is forced through an opening. In this I include what Daubrée calls pure crushing; "*un simple écrasement dans l'intérieur des roches.*"
3. Deposition of such a substance as pyrite under such conditions (perhaps of pressure) as will produce a surface composed of those extremely fine parallel lines which we know as polish.

I have no new method of formation to disclose unless the friction of clay under pressure mentioned below is new, but I maintain my original contention that if there are three modes in which slickensides can be formed we have no right to use the discovery of slickensides in a vein as a constant proof of only one of them—rubbing, and therefore faulting. I think Mr. Emmens' letter sustains me fully, for though he says (paragraph 4) that nature presents many instances of polish produced by slow and regular movement, he goes on to prove it so far as faults are concerned by *striæ*! He does not give one instance of slickensides produced in that way, and seem to have forgotten that *striæ* and slickensides are not the product of the same action.

He adds in addition the well-known case of glacial action which does produce a polish as well as striations, but I think his illustration is unfortunate. We shall probably never know the rate at which the great glacial sheets moved over the world, but we may assume it to have been more rather than less than the rate of existing glaciers, or say from 9½ to 15½ in. per 24 hours. Assuming an average of 1 ft. a day, 365 ft. per year, 36,500 ft. per century, we have quantities which I believe far exceed those which geologists have had in mind when they have spoken of slowness of movement in connection with faulting and with great plications of strata lasting through geological epochs and accomplished so slowly that even

rigid rocks are not cracked by them. Mr. Emmens has mentioned slow motion in many of his writings, and in reading them I have never got the impression that he meant such a rate as *seven miles* per century! Nor do I think any other geologist would call that slow for rock movements.

There is another reason than speed why ice sheets polish. Daubrée showed that the furrow cut by a pebble varied in section as the pebble wore away, and that when the pressure was strong enough to crush the pebble and produce fine powder, polishing might succeed striations. He also made an observation that gives the vein geologist a valuable hint, *i. e.*, that soft rocks polish hard ones, and he suggests that soft bodies like ice may under pressure produce polish. I am aware that the polishing action of glaciers may be in part maintained by the extremely fine powder that is itself a product of fine polishing, and which gives glacial streams their milky discoloration. But I agree with Daubrée in thinking that without this powder ice itself may be an efficient polishing material.

An ice sheet presents conditions favorable to polishing which we may safely say are *never* present in faults. A rock lying under an ice sheet may, in one year, be rubbed by a ribbon of ice 365 ft. long which, unlike Daubrée's pebbles, presents at the end of the year exactly the same surface as at the beginning, works under the same pressure and with precisely the same soft polishing material. Surely no one will pretend that such conditions exist in faults. Even if we admit the rapid movement of 365 ft. per year, the uniform shape and hardness of surface could not be maintained. The walls would act like Daubrée's pebbles, large projections obliterating the track of small ones, coarse sand or rough surface destroying polish, and all producing furrows that diminished as the projections move away.

Daubrée's suggestion has value in the study of slickensides, for, if ice can polish under the moderate pressure of a glacier, why cannot polish be produced on the walls of a fissure by powerfully forcing clay over them? Let us assume a crevice with clay of any composition in it, which, in order to avoid controversy, we will say has been created so. Subject this crevice to such a compressive force, without vertical or longitudinal movement, that the clay begins to flow, could not the result be polishing? We know that no vein or fissure has uniform conditions over its whole area. There will be clay in one place and not in another, soft rock here, hard rock there. Pressure may produce a transference of the soft material from one locality to another, and under this great pressure the softest and most comminuted material might become a powerful polishing agent. Such an action would explain the fact that we do not find the whole surface of a fissure covered with slickensides, and we would not have to call in the supposition so commonly employed now, that slickensides once formed have been removed by solution, etc., the fact being that slickensided surfaces probably offer greater resistance than rugose surfaces to the attack of solutions.

I am inclined to give this probable mode of making slickensides considerable importance, for I have noticed frequently slickensides that seemed to be formed by a *smear* of plastic material thinly spread over a surface that might have considerable roughness. I have produced precisely the same effect in making those round tables with cement surface which are used in concentrating works. A bed of coarse concrete is first laid down, the coarser and more angular the better, and the smooth surface is given by spreading pure cement in a layer which is as thin as paper over the projections of the bed, but of course filling in the depressions.

The action suggested might even form striations, for while the efficiency of the clay as a polishing agent would be in direct proportion to its softness and fineness, the movement of coarser material, pressed out by the same force, would produce striations. In fact, when we consider the condition of a fissure containing a mass of clay, in which are embedded pebbles of all sizes and operated on by a strong compressive movement, we have precisely the condition of glacial erosion, only much intensified. Given an outlet, movement of the plastic mass must take place. The pebbles become cutting tools that score the solid walls over which they are forcibly pressed. The clay is at once the tool holder and a polishing powder.

If the discharge of the squeezed out clay takes place at the outcrop of the fissure, the general movement and the resulting lines of abrasion will be substantially vertical. I do not mean to press this idea too far, for in general I should say that the results of this scoring would not exhibit so much uniformity of direction as we find in the striation of vein walls. But is this uniformity of direction so positive as we imagine it to be? It is partly because the literature of vein geology does not contain critical answers to such questions of detail as this that I have ventured to call a halt and challenge the received opinions upon some fundamental assumptions in the science.

NEW YORK, June 1, 1892.

JOHN A. CHURCH.

(To be Concluded.)

An Interesting Hindoo Ceremony.—The ancient ceremony of tala-baram, or weighing the Maharajah of Travancore against an equivalent weight of gold, was performed this year with great pomp, the present Maharajah being an orthodox Hindoo and a stickler for tradition. Months before the ceremonies his Government bought a great quantity of gold, the greater part of which was converted into coin. After presenting an elephant to the shrine, the Maharajah entered the temple and mounted one of the scales, his sword and shield being laid in his lap. In the other scale the newly struck coins were put in by the first and second princes until the Maharajah rose in the air, the priests chanting Vedic hymns. In addition to this the band played and the guns fired. Afterward the coin used was distributed among about 15,000 Brahmans.

Iron in Japan.—Some time ago, says *Iron*, Mr. Otsuka, a mining engineer, discovered an iron mine at Kamaishi, in Iwate Prefecture. The precise place of the find is called Daisensan, and Mr. Otsuka now estimates the deposit to contain nearly seven million tons of iron. A vernacular paper, in mentioning the fact, refers to the steel works projected by the Japanese Government, and points out that since the quantity of iron required annually for the use of the works was estimated at forty thousand tons, this new mine at Kamaishi is capable of supplying the factory for 142 years. "Who will say," asks the journal, "that Japan under these circumstances is not in a position to produce her own iron?" But the real trouble, it is understood, is not lack of good iron ore, but absence of fuel in the neighborhood of places where ore is found. It was on account of this difficulty that the Kamaishi mine had to be abandoned after the government had expended large sums in endeavoring to work it profitably.

ELECTRO-CHEMICAL MANUFACTURE OF CHLORATE OF POTASH AT VALLOBES, SWITZERLAND.

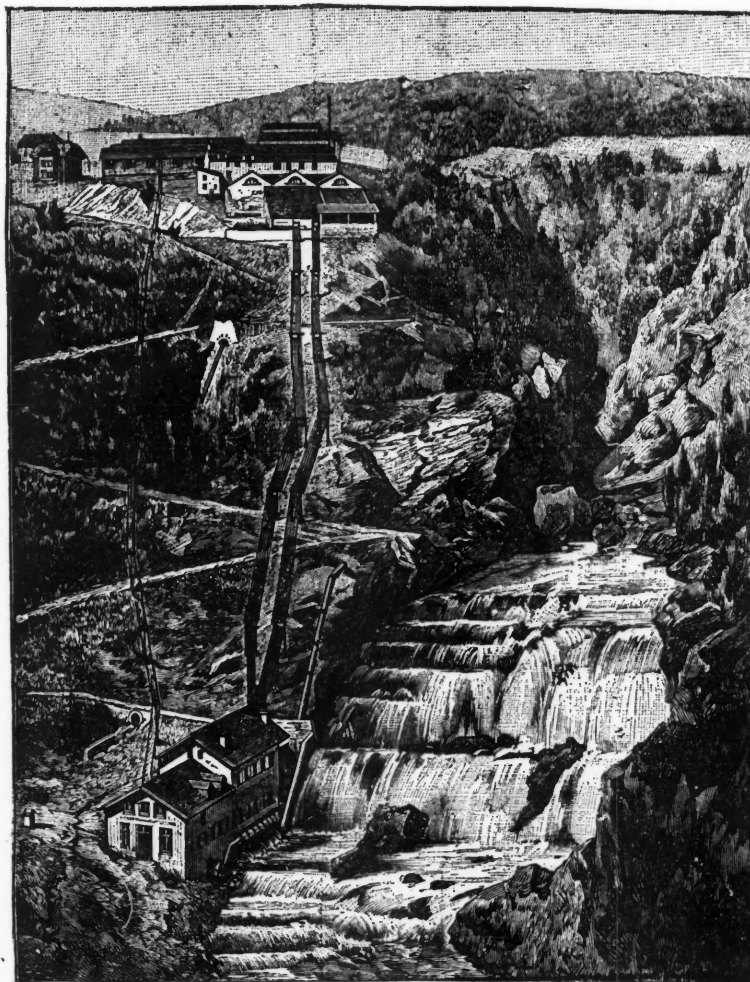
Translated for the Engineering and Mining Journal by A. C. Knapp.

It has been known for a long time that if a solution of chloride of potassium is submitted to electrolysis under certain conditions chlorate of potash will be formed. This formation of chlorate of potash is produced by a secondary reaction; the electric current frees the chlorine at the anode and potassium at the cathode; the chlorine is transformed into hypochlorous acid, which forms hypochlorite of potash, and this is transformed into chlorate and chloride of potassium. Messrs. Gall and De Montlaur have succeeded since 1887 in manufacturing this substance commercially, and at the Exposition of 1889 exhibited electrolytic chlorate of potash made at the works of Villers-sur-Hermes (Oise), France.

To be able to compete advantageously with the chemical manufacture of chlorate it was necessary to overcome many difficulties which have been studied and are now solved. Since the 26th of June, 1890, the commercial manufacture of chlorate has also been carried on by the Electro-Chemical Company at Vallorbes, Switzerland, near the French frontier; it is a model electro-chemical manufactory. To make one kilogramme of chlorate of potassium per hour it takes 20 H. P.

Each dynamo gives a tension of 150 volts at the poles. They have established a kind of three-wire distribution, that is to say, in one-half of the series of baths the positive poles are connected to the negative poles of the other half. The common point of the two groups of series is connected to a cable insulated from the earth; the end of this cable terminates with a copper strip connected with the 10 machines by means of 10 conductors, one-half going to the positive poles of five machines and the other to the negative poles of five others. The result of this arrangement is that they can stop a series of baths by stopping the corresponding dynamo. There are 270 baths, of which the rectangular ones are for electrolyzing. These baths have partitions separating the cathodes from the anodes, preventing the reducing action of the hydrogen upon the chlorate of potassium formed. Although it may have the form of chlorate, it is necessary to make the potash produced react at the cathode upon the free chlorine at the anode.

The cathodes are iron plates; the anodes are made of thin sheets of platinum, about 0.1 mm. thick, supported by an iron frame protected by rubber. The electrodes are fixed on the bottom of the baths. These are electrically insulated from the floor by porcelain cups filled with oil, allowing the workmen to touch the baths. A 25% solution of chloride is distributed in the baths. It is arranged that the electromotive force shall be about five volts at each bath. The temperature is raised and the cur-



GENERAL VIEW OF THE INSTALLATION AT VALLOBES.

A little calculation will show that at the ordinary price of coal the electrolytic process is not practical if steam is used, so hydraulic power must be utilized. They have done this at Vallorbes, the motive power being taken from the Orbe River, which falls 30 meters with 3,000 H. P. It is at the picturesque waterfall of Saut-du-Day, represented by Fig. 4, that the factory is situated.

The hydro-electric factory is composed of two parts: the old portion, which has been in operation since 1890, is seen on the left of Fig. 4; the other part is new. The old part has 10 Thury dynamos of 160 H. P. each, nine working continuously day and night, the tenth being in reserve. Each dynamo is driven direct by a turbine of the Jacob Riether system, shown in Fig. 2. The turbines and dynamos make 350 revolutions per minute. The turbines are one metre (39.37 in.) in diameter.

The Thury dynamos are six-pole machines, weighing six tons each, and develop 100,000 watts. They have been working for 18 months, with but two unimportant stoppages for repairs.

Fig. 3 gives the general plan of the hydro-electric works, old and new. In the old part can be seen the 10 dynamos and turbines mentioned; the new part has 10 dynamos of 700 H. P. each. These dynamos, constructed for a pressure of 150 volts, are Thury dynamos of a new type, operated by turbines.

The electro-chemical works receive the current by cables of large size; the distribution of electric energy to the baths is done in a particular way

which is regulated, which furnishes the necessary temperature for the transformation of the hypochlorite into chlorate. The chlorate of potash formed crystallizes in the bath and is almost insoluble. After some hours it is taken out, washed and strained. By recrystallization a perfectly pure chlorate is obtained. When the chloride of potassium is formed, hydrogen is also formed by the secondary reaction of the potassium upon the water. The volume of hydrogen is about 100 cubic meters per ton of the chlorate obtained; it is disengaged in bubbles, which takes with it a certain quantity of the solution. The room containing the electrolyzers is perfectly ventilated by chimneys. The chloride of potassium taken up by the hydrogen falls upon the roofs of the works, forming a white coat.

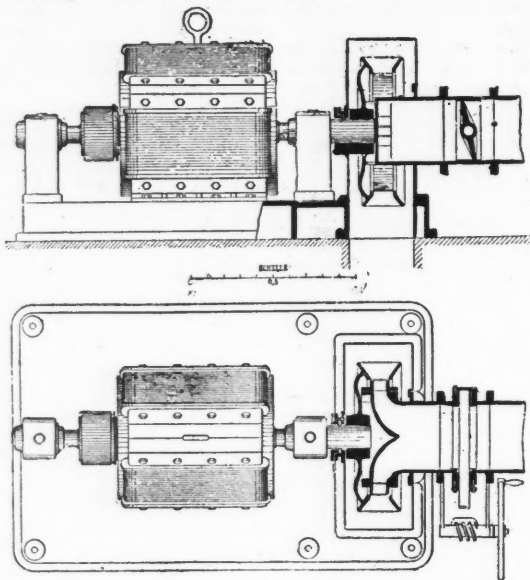
The quantity of liquid treated daily exceeds 50 cubic meters. The recrystallization of the chlorate and chloride solution necessitates the handling of enormous quantities of the solution; all this work is done by pumps driven by electric motors. Before the new installation of the two dynamos of 700 H. P., the Vallorbes works delivered to commerce over a ton per day. It has produced 400 tons per year. The net cost of electrolytic chlorate will be, it appears, 30% to 40% less than chemical chlorate.

The installation of the hydro-electric works cost 260,000 francs (\$52,000) for the mechanical work, which for 3,000 H. P. (86 francs, \$17.20 per H. P.) is low. With the dynamos, construction, etc., the cost of the establishment is less than 600,000 francs (\$120,000); less than 200 francs (\$40) per H. P.

From a chemical point of view there are many advantages; the first materials are abundant and cheap; it has no obstructing residue, and the

electro-chemical process is absolutely independent, and is not tributary to the great chemical works which were, until now, the only manufacturers of chlorate.

The enlarging of the Vallorbes factory will double the output. The



COMBINED DYNAMO AND TURBINE.

installation of this factory marks the first step in the electro-chemical industry, and, from an electric and hydraulic point of view, the only one of its kind.

This installation does great credit to the founders of the works, Messrs. De Montlaur & Boucher.

INTRODUCTION AND DEVELOPMENT OF MAGNETIC SEPARATION OF IRON ORE—I.

Written for the Engineering and Mining Journal by Axel Sahlin, M. E., New York.

PART—I. THE IMPORTANCE AND USE OF CONCENTRATES.

As late as 1872 pig iron was made in the United States by a large number of small furnace plants, scattered broadcast over the land, mainly relying on local ores, fuel and flux. The steel makers' imperative demand for quality, coupled with the rapidly declining value of pig iron, soon forced the greater number of these "home industries" to shut down permanently, and new plants of gigantic dimensions in some cases have sprung up to take their places. These of necessity have become centralized in districts where ample communication and superior raw materials close at hand have warranted their construction, and as a consequence we can to-day distinguish four distinct geographical groups of blast furnaces, the Eastern, the Ohio Valley, the Lake Front and the Southern group. Not included in either of these, there are a number of detached works scattered from Maine to Texas and from Georgia to Washington; but their output and importance as compared to that of either of the four groups is so insignificant that in this general sketch they may well be left out of consideration.

To impart to the layman, not directly familiar with iron or ore questions, an idea of the demand and pressing need for concentrates and the consequent prospective magnitude and importance of this new industry of concentration of iron ores, it may be well to briefly point out the general conditions as to supplies, transportation and in raw materials, in each of the above mentioned groups of blast furnaces.

The Eastern furnaces have the great advantage of large home market, intelligent and comparatively cheap labor, and ample means of communication. The scarcity of native high grade ore is, however, the greatest drawback to successful iron making in the East. It has compelled two of the largest iron producers in this section to open extensive mines in Cuba. A considerable part of the ore supplied is also drawn from the Lake Superior mines, distance about 1,500 miles, and yet another part comes from Europe and Africa, whence importations are made possible by the proximity to the harbors of the Atlantic coast. And yet inexhaustible quantities of low grade magnetites are found in every Eastern state, which, if suitably prepared and purified would tend to make this section independent of foreign ore, and enable its iron manufacturers to compete more successfully with the growing West and South. Without such a supply of local ores the making of pig iron in the East, in the opinion of many, has seen its best days.

The Ohio Valley has the advantage of cheap and excellent fuel, but high grade ores must even here be imported from the Upper Lake regions, a distance of 800 to 900 miles, involving two separate handlings of the ore before it reaches the furnaces. Central location and excellent and cheap fuel will, however, without a doubt for long time to come insure to Pittsburg and vicinity a most prominent place as an iron producing center.

The Lake shore offers exceptional advantages for the making of high grade iron, as nearly four-fifths of all the Bessemer ore produced in the United States is mined within easy reach of the inland seas, and the rolling stock of the railroads, returning empty after delivering the surplus of Western produce to the Eastern ports, enables the transportation companies to offer exceedingly low rates for carrying fuel westward, so that Connellsville coke at times has been put down in Chicago at almost the same cost as in Pittsburg.

The South is not yet a producer of Bessemer iron, and a future Southern steel industry will naturally have to be based in main on the basic and perhaps also on the direct steel processes. Yet deposits of low grade

magnetites are found in several of the Southern States, especially in North Carolina and Tennessee, where the Cranberry field contains a solid stratum of 42% ore, extending over 25 miles in unbroken length and measuring several hundreds or even thousands of feet in width, low in phosphorus and sulphur, but impregnated with epidote and other silicious minerals. From it alone ore enough may be recovered by separation to supply an acid steel industry of magnificent proportions.

While thus the South and the West at present have a sufficient supply of native ore, the Ohio Valley and the East are greatly in need of cheaper raw material, and anything that can be done to supply these sections with high grade ores at low cost will increase the prosperity of their furnaces. It now appears to be the mission of the separating process to produce the much needed local Bessemer ore.

Jigging and washing plants have long been used and are in some places doing good, if also somewhat extravagant work. They have the advantage of applying to hematites, as well as magnetites, and thus reach a wider field than the magnetic separator. We defer description of their *modus operandi* as not strictly pertaining to our subject.

Beside furnishing improved ore, these plants have filled the most important mission of demonstrating the practicability of using a large percentage of fine ore without running the risk of clogging up the blast furnaces. Ten or twelve years ago it would have been next to impossible to find a market for concentrates. The pet theory of the metallurgist then was that the charge should necessarily consist of good sized lumps; the limestone was seldom broken smaller than 6 in. or 8 in. cubes. Of two available ores, that which was coarser always had the decided preference. Old-fashioned and inefficient blowing machinery may to some extent have justified the importance given to the size of the ore, but later experience has shown that the blast pressure in an anthracite furnace when working on, say, 50% of fine concentrates only increases from 1 lb. to 1½ lbs. per square inch. It has been a long and hard struggle before concentrates have at last obtained a recognition as a standard ore of anything like equal value per unit of iron with first-class ores. It has been almost necessity that enforced this recognition.

How difficult has been the task of convincing the metallurgical profession of the value of concentrates has been strikingly told by Mr. Austin Gorham, who, at the time as general agent of the Chauteaugay mines, was first placing large quantities of fine concentrated ore on the market. In 1883, Mr. Gorham succeeded in placing a sample of 100 tons with a large Pittsburg firm. The next year the same firm ordered 500 tons, and the Lackawanna Iron and Coal Company gave the new ore a trial by taking a 200 ton lot. In 1885 the same concern used 5,000 tons, and in 1886 20,000 tons. In 1888 the whole product of the works, or 80,000 tons, found ready sale, and the heaviest buyer was yet the same Lackawanna Iron and Coal Company, who, five years previously, had given the fine ore the first trial.

Except among ultra-conservative metallurgists, concentrates to-day have few antagonists among American blast furnace managers. It has been proven beyond a doubt that dirty ore, not fine ore, causes the periodical scaffolds and deposits on the bosh walls, known as dirt troubles. Progressive managers even crush the limestone used as flux, though in so doing a certain percentage will necessarily be ground almost as fine as flour. The incorrect theory that concentrates would run like hot sand through the porous column of the blast furnace charge has also been exploded. It seems certain that, as soon as the ore has reached a zone where a temperature of, say, about 500° centigrade prevails, a partial reduction takes place, which renders the ore pasty, and causes it, in its descent, to cling to the lumps of fuel and flux. Thus the remarkably slight increase of blast pressure in the furnace using fine concentrates is fully explained. The great specific gravity of concentrates high in iron, under normal conditions, prevents any considerable carrying off of the same with the escaping gases.

The question as to what percentage of the entire ore mixture can advantageously be made up of concentrates has not been definitely settled. One of the large Eastern steel companies producing a Bessemer iron, than which none better is made in America, work on a mixture containing 50% of concentrates, all of which pass a 53 mesh screen, while the other 50% are made up of earthy Cuban hematites and other ores equally fine. The author has it on best authority that no difficulty in handling this charge has been experienced. The output from the furnaces has rather been increased than the contrary. The economy in fuel and flux has proven quite considerable, and the quality of the metal is fully up to the standard. The manager does not anticipate any difficulty if the available supply of concentrates would permit him to increase the amount used to 75% of the entire ore mixture.

Mr. N. M. Langdon describes in his paper on "The Use of Concentrates in the Port Henry Furnaces," read before the Institute of Mining Engineers, how he commenced using a burden containing 1% of concentrates, gradually increasing the amount until 10% of all the ore charged was in the shape of concentrates crushed to pass a 20-mesh screen. No deleterious effects were noticed in the working of the furnaces.

The manager of a blast furnace plant in Western Pennsylvania has stated to the writer that he experimentally ran one of his furnaces entirely on concentrates averaging 62% of iron and crushed to a fineness of 12 mesh. The furnace was working regularly, but unfortunately the supply of concentrates gave out, so that the experiment had to be interrupted.

Numerous furnaces all through the East are now continuously using from 20% to 50% of concentrates. The amount used being limited, rather by the available supply than by any reluctance to increase the percentage.

On the other hand there are yet a certain number of furnace managers, who on one ground or another contend against concentrates. Some even on the very ground of their richness. The general opinion, however, is that concentrates have come to stay, and that they will play a most important part in the maintenance and prosperity of the iron industry in the East, as well as becoming the means of rendering available and valuable numerous deposits of magnetic ore scattered all over the continent.

No country, possibly excepting Sweden, possesses such a wealth of magnetic iron ore as America; in the New England States numerous isolated mines are found, the Appalachian range composed in great part of crystalline Archæan rock, contains great veins and strata of magnetite

throughout its length from Canada through Eastern New York, Northern New Jersey, Eastern Pennsylvania, Maryland, Virginia, North and South Carolina and Georgia. While in some places this magnetite is rich and pure enough to command a market in its natural state, the far greater percentage of outcroppings is too low in iron or too impure to be of value without separation. In Michigan, Wisconsin and Minnesota other inexhaustible strata of similar ore are found. The same is the case in the new state of Washington, where mining operations have been commenced. Colorado, in New Mexico and, no doubt, most of the other states of the far West, contain deposits which as yet can hardly be said to be available for iron making.

In short, there exists in America an inexhaustible supply of low grade magnetite, which through separation only can be made of value.

(To be continued.)

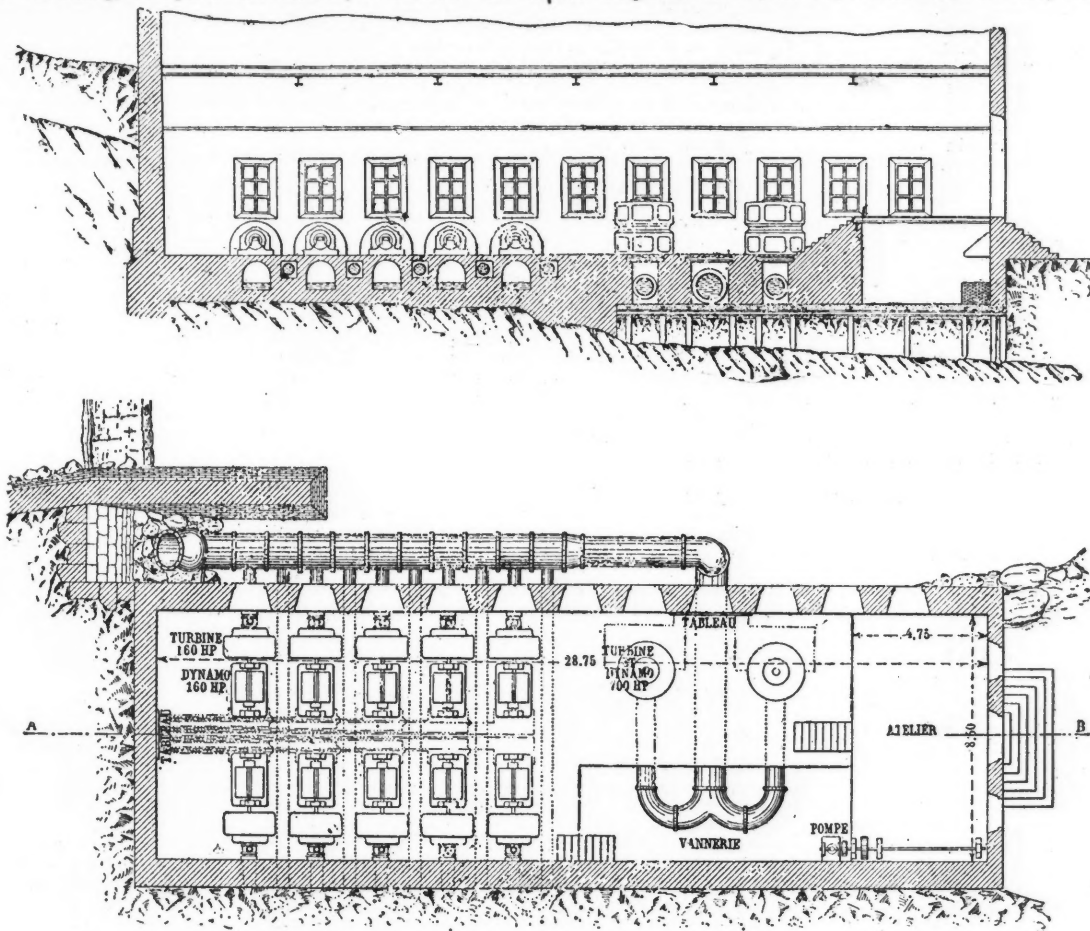
THE BUILDING STONES OF GREAT BRITAIN.

An exceedingly valuable paper on the building stones of Great Britain by Prof. T. Hudson Beare appears among the latest batch of publications issued by the English Institution of Civil Engineers. He gives the results of very exhaustive crushing, absorption and elasticity tests carried out at

lows: The compressive forces produce lateral dilatation, and consequently a tension at right angles to the line of pressure; now under the great pressure in the testing machine the lead flows laterally and the friction thus caused between it and the face of the cube sets up a very considerable additional tensile stress, the result being that the cube is torn asunder into a series of prisms parallel to the axis of pressure. In some experiments he conducted with cubes of stone, with and without the lead sheets, it was found that their presence reduced these crushing strengths by from 35-52%.

MAGNETIC IRON RUST.

At the recent meeting at Hobart, Tasmania, of the Australasian Association for the advancement of Science, Prof. Liversedge, of the University of Sidney, read a suggestive paper on the rusting of iron. The author remarked that in books upon chemistry it was usually stated that iron rust was composed of the hydrated sesquioxide of iron; but on examining a very large number of specimens of rust from many different places and from iron articles of various kinds, and formed under very varied conditions, he found that in almost every instance the rust contained more or less magnetic oxide; indeed, in some cases the rust, although presenting



PLAN OF THE VALLORBES WORKS. (See page 615.)

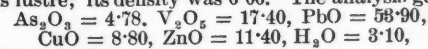
University College, London, on specimens of stones from representative quarries in Great Britain, and he says that it is his intention to follow these up with experiments on building stones from all parts of the world. The tables will be of the greatest value to English engineers and architects, as the standard compilation hitherto used is getting out of date. This old compilation was made in 1839 by the British Government for the purpose of selecting the most suitable stone for the new Houses of Parliament, and curiously enough, after having gone to this trouble and expense they chose a dolomite which has proved incapable of resisting the attacks of the atmosphere in London.

The majority of the granites tested naturally came from the neighborhood of Aberdeen. The Scotch say that there is enough granite round Aberdeen to supply a handsome tombstone for every inhabitant in England, and they would very much like to fulfill the contract at once. The crushing load of this granite averages 1,250 tons (of 2,240 lbs.) to the square foot, but some quarries yield granites whose crushing strength is from 1,320-1,360 tons. The sandstones of Halifax, Yorkshire, gave a mean crushing load of 1,025 tons per square foot. We hoped to see some facts with regard to the granites and serpentines of Donegal, Ireland, but they are not mentioned in the paper at all. On the west coast of Ireland there are mountains of excellent granites and magnificent serpentines waiting for somebody to work them.

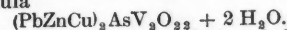
An interesting point in the testing of materials is brought out in the report. It has been hitherto a common practice to interpose a sheet of lead or thin pieces of wood between the piece of stone to be crushed and the dies of the testing machine. The idea is, of course, that this arrangement would secure a perfectly uniform pressure all over the cube in consequence of the lead or wood yielding and accommodating itself to the inequalities of the surface of the stone. Professor Beare's experiments, however, showed that the introduction of lead or wood very largely reduces the crushing strength of the specimen. This he explains as fol-

lowing: The compressive forces produce lateral dilatation, and consequently a tension at right angles to the line of pressure; now under the great pressure in the testing machine the lead flows laterally and the friction thus caused between it and the face of the cube sets up a very considerable additional tensile stress, the result being that the cube is torn asunder into a series of prisms parallel to the axis of pressure. In some experiments he conducted with cubes of stone, with and without the lead sheets, it was found that their presence reduced these crushing strengths by from 35-52%.

Cupro-des-cloizite in Mexico.—In *Chemiker Zeitung* Signor F. Pisani says that the rare mineral, cupro-des-cloizite is found in fair quantity in the argentiferous-lead deposits of Zacatecas in 5-10 millimetre thick crusts. In its exterior the mineral is similar to the Tyrolese prehnite. The streak is light yellow; it is only transparent in very thin flakes; it has a resinous lustre; its density was 6.06. The analysis gave:



from which the formula



After investigation of the existing analyses of des-cloizite, cupro-des-cloizite, psittacinite, mottramite, tritochorite, eusynchite, aräoxen, and blackenbuschite, Signor Pisani came to the conclusion that there were only the following independent minerals: (1) Des-cloizite, analyzed by Damour; (2) the cupriforous des-cloizite, analyzed by Rammelsberg. To the first eusynchite could be added, to the second psittacinite, provided it were not a separate species. At all events, dechenite, which contains zinc, may be considered identical with eusynchite.

THE TRICKS OF MINERS.

Written for the Engineering and Mining Journal by Dan de Quille.

Among those who came to the Comstock camps in the rush caused by the silver excitement were many mere adventurers—men who knew next to nothing about mining, and who had no intention of settling down to hard work of any kind. They came over the mountains from the California towns and camps because they thought the newly discovered silver mines offered a promising field for all manner of trickery, and such swindling operations as are practiced by men who live by their wits. The one thought of these fellows was to make a "raise" in some way and then "skip" the country. Probably there were also a considerable number of men who at first hoped to make a big strike by honest prospecting, in whom were presently developed streaks of latent trickery when they found themselves unsuccessful and flat broke.

There were in the new camp a set of fellows who might be termed "owl" prospectors—men who haunted the saloons and gambling games all night and then retired to their dens and slept during the greater part of the day. Toward evening, when the miners were coming into town from their work, the "owls" would make their appearance amid the throng that filled the main street, pretending to have just come in from a prospecting trip among the hills. Dressed as miners, they would have their canvas overalls and woolen shirts freshly daubed with yellow clay, and would drop mysterious hints of being on the track of a big thing. Soon they would have "on their string" some of the men of money who were on the watch to cheaply get hold of mining property. These mine-hunters were many of them in business in San Francisco, Sacramento and other California towns, as keepers of stores, shops and the like, and knew nothing of mines or mining, therefore were just the men to be caught by the pseudo prospectors.

At that time a man had only to take from his pocket a piece of quartz and pretend to be examining it with a magnifying glass in order to at once become the center of an eager crowd. Such being the case, the owl prospectors had no trouble in hunting up subjects. They came of their own accord. They would almost force their eagles and double eagles into the hands of the pretended prospectors, saying: "You may need this while tracking up your vein, and if you need a little more let me know. All I ask is for you to give me some kind of a show when you make your location and record your claim."

Once the bogus prospectors had thus tapped a few purses they reported progress daily in the work of tracing up their rich "float," and took up regular collections for tools, powder, fuse, and all manner of imaginary expenses. Once a man had begun to contribute, he continued to do so in the hope of presently getting his money back. The sham prospector, therefore, always felt sure of his victim as soon as he had made a first bleeding.

Men might in those days be heard to say: "I am doing no prospecting myself, but I have half a dozen men out scouting the hills in various directions," little suspecting that their men were snoozing in dug-outs, brush shanties and old tunnels, studiously keeping out of sight during working hours.

The owl prospectors always had in tow plenty of men who were ready to treat all the "chain lightning" they could hold; indeed there were men who were jealous of the privilege of "filling them up" and who were suspicious and distressed if they saw their pet prospectors accepting the alcoholic hospitalities of other parties.

In those wild and exciting times men were to be seen on the streets holding piles of twenty-dollar pieces that reached from their waists to their chins, shouting their offers for "feet" in various mines. At that time interests in mining claims were sold by the foot—men talked of "feet" instead of "shares." The streets were full of men anxious to buy feet in almost any kind of vein that yielded a prospect in silver, however small. They had come over from California to invest, and did not wish to return without being able to boast of having an interest in a silver mine. Big prices were then paid for "feet" in many outside claims that never yielded a paying amount of either of the precious metals, for at that time people, even the best of miners, saw no reason why almost any of the big quartz veins of the country should not turn out to be as rich as the Comstock when properly explored. Men then said: "As all quartz veins on the western slope of the Sierras are gold bearing, so all on the eastern slope carry silver."

As all the country eastward to the Rocky Mountains and northward to the Arctic was then a virgin mining field, honest but impecunious prospectors willing to venture out into the wilds of the mountains and deserts could have any kind of "grub-stake" they asked for. They were in demand. In the rocky wilds of the great mountain ranges seen towering through the purple haze far to the east of the Comstock camps, there were possibilities that might exceed the imaginings of even the most sanguine. It would be almost like exploring another planet. In finding the Comstock, near the base of the Sierras, we seemed to have just touched upon the edge of a vast unexplored mineral world. But those who went forth into the unknown wilds would be obliged to brave the danger of being killed by the Indians, and a whole legion of other dangers.

However, if they were ready to risk their lives, many others were very ready to risk the money required. The prospectors could have the best of riding horses, all the pack mules they wanted, the best of weapons and the choicest of provisions—outfits good enough for so many English lords. Money with which to fit out a party of half a dozen men in the very best style could be raised in 20 minutes any day, if it were known that the prospectors were going into some new and unexplored section of the country. The men who undertook these distant and dangerous expeditions were almost, without exception, courageous and honest; they always did the best they could for the men who sent them out. Yet there were a few parties who obtained splendid outfits and then slipped back over the mountains to California, being too cowardly to venture into a region where there was danger of losing their scalps.

The tricky prospectors were found among those who had not the courage to strike out into the virgin wilderness. Their operations were conducted within a circuit of 20 or 30 miles of the Comstock towns. A trick of these was for a pair of them to take up a mining claim in some out of the way place, putting into their location notice the names of eight or ten men known to have money. They would then start a shaft or tunnel and

this done would every month call upon the men they had selected for partners and collect from \$10 to \$20 from each. The men selected to be thus assessed were business men and such others as could not well spare time for a trip of investigation to a distance of 15 or 20 miles into rugged mountains. Some pairs of such prospectors would make three or four "wild-cat" locations and collect money regularly from as many different sets of partners. Occasionally they would do a little work on one or other of their locations—just enough to swear by—but most of their time was spent in reading blood-and-thunder literature, hunting or loafing in neighboring camps.

There were some men who while thus drawing money, provisions and supplies on a worthless wildcat location would be working and spending all on a mine some miles away which they individually controlled.

A man who was supposed to be developing a promising quartz vein in the Como Mountains, twenty miles east of Virginia City, who brought in ore samples and made collections of coin fortnightly and who seemed fast nearing a bonanza, was finally ascertained to be giving his individual attention to wood-chopping. He was doing nothing at all at mining. During a whole summer he regularly collected assessments, loaded his burro with provisions, jingled the extra double-eagles in his pockets and meandered up through the mountains to his Como wood ranch. He was cutting wood for sale to the mining works and once in two weeks, when on his way to the city, stopped at an old tunnel on Gold Cañon and procured samples for the detection of his milch kine in town.

A druggist in Silver City paid a fellow assessments regularly every month for over a year, under the impression that he was delving in a tunnel on a claim near Genoa, where he had set him to work, whereas he was all the time at work on a claim of his own twenty miles away, in quite another direction.

Very little successful "salting" of claims was done in the early days. There were men among the adventurers who understood the various dodges of planting gold dust in placer mines, as practiced by miners in California inclined to such rascality; but to "salt" a mine with silver was impossible. The trick was tried in several ways, but the ore of the Ophir and other leading mines, which it was necessary to use, possessed an appearance and characteristics so peculiarly its own that it was everywhere recognized almost on sight—it contrasted too strongly with the quartz of outside mines. The few attempts made were by dumping quantities of the very lowest grade of Comstock ore into the bottom of shafts or winzes where a strong flow of water had been struck, and whence it could only be fished out in small quantities. But nothing was made at such games by those who attempted them; they found themselves objects of ridicule and their mines stood condemned by their own action.

In one instance, in 1863, a quantity of silver coin was melted, granulated by being thrown into cold water, and then tamped into holes made in clay seams at the bottom of a shaft by driving down a drill. This was in an outside mine called the North Ophir. For a day or two there was a big excitement about free silver having been found in the bottom of the shaft that could be panned out in grains and nuggets the same as gold, but the trick was exposed before much had been done in the way of disposing of stock in the mine. The assayers at once found that the metal produced contained precisely the amount of copper that is used as an alloy in our silver coins, and it was even reported that the date was found on one piece of coin that had not thoroughly melted.

Before buying a mine off (or outside of) a well known vein—as the Comstock or other large lode—mining men claim the right to explore it in their own way. They pay no attention to either the decomposed ore or the solid quartz already dug out. Their examination is extended so far into the firm and virgin quartz as to make sure that they are obtaining reliable samples. The mining "pig" cannot be sold in the "poke."

There were some in the early days who tried salting their claims by pulverizing the rich ore of the Comstock and mixing it with decomposed material in their shafts and tunnels, but the trick was discovered as soon as it was found that nothing of value could be obtained from the solid quartz. Such an attempt always gave a mine a "black eye," as the miners phrased it, and soon the game was given up as a losing one.

Men of the confidence stripe sometimes played off as coming from mines found in some distant and secret place small pieces of the richest Ophir ore, obtaining from credulous persons loans or gifts of money, "square meals," or drinks, according to what they thought their dupe would stand. Those who practiced this game were generally careful to select samples that contained no quartz. The peculiar grain and crystallization of the Comstock was not easily mistaken—was too well known—but a lump of pure sulphide of silver from one place would be much like a lump of the same ore from another locality. Men who played this dodge would claim to have found the ore they exhibited in some wild region, from which they had been obliged to retreat on account of Indians or some other trouble or mishap.

Able and accomplished liars at times appeared in this line who were capable of holding a long list of gullible contributors for several weeks with no other aid than a few well selected pocket samples of Ophir ore. They were never quite ready to head a party to visit the scene of their find. First they must have money to pay a big board bill they pretended to owe; then a horse and weapons, and finally when they could invent no new excuses, and were about to be cornered, they skipped between two days for California. Even the Piute Indians got hold of this game and managed to draw from their white brothers presents of blankets, coin and other good and useful things. Indeed it was at one time supposed that the Indians knew of whole mountains of silver to which they could lead the way could they be induced to yield up the secret. In some instances Indians did lead parties of miners on wild-goose chases through the mountains, guiding them hither and thither while the "grub" lasted and then disappearing in the wilds.

A trick was successfully played upon a party of San Francisco men in 1861 by some Silver City miners who were prospecting a vein of gold-bearing quartz. The vein was very "spotted" and the pockets when found were small. The miners had a shaft down about 25 ft. on their vein, and having reached a rich pocket that covered the whole bottom were anxious to sell, as they might sink 50 ft. further without finding another spot as rich. In Virginia City they found three men of money from San Francisco who wished to invest in a mine, and who were well pleased with the samples of ore shown them. The San Franciscans agreed

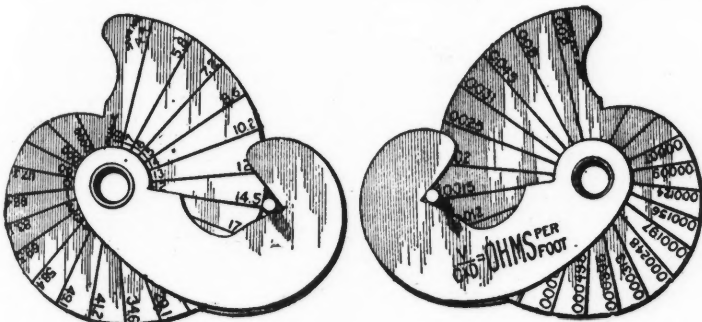
to go to Silver City in a few days and examine the mine, when, if they found all satisfactory, they would pay the price asked—\$20,000.

With the San Francisco trio was a fourth man who was impecunious, but not contentedly so. This man "approached" the miners on the sly, and saying he had great influence offered to talk the San Francisco men into buying the mine, provided he were given a share of the spoils. It was agreed that he should have \$500 if a sale were made. Then it was arranged that on a certain day the Silver City men would not go near their mine, that they should be at work at another place a mile away. On that day their confederate was to take his friends, the San Francisco capitalists, to the mine on the sly and assist them in prospecting the bottom of the shaft in the most thorough manner; he telling them he had ascertained that the owners would be at work on another claim for a day or two.

The three San Franciscans bit at once. They thought it would be a clever trick to steal a march on the "honest miners." They dug into all parts of the bottom of the shaft and obtained wonderful prospects. Free gold was visible in almost every piece of quartz they dug out. In short, they readily paid the \$20,000 asked for the mine and set to work in the shaft expecting to get their money back in less than a month. They had not gone down over 2 ft., however, before they were in barren quartz. They did much work but never found anything except a few insignificant pockets. The worst of it was that they dare not complain of their bad luck, for as soon as they had secured the mine they had boasted to many friends of the cunning way in which they had prospected the bottom of the shaft. It was long before they heard the last of their mining venture. When they talked of there being a big thing in a mine their friends would ask them if they had been prospecting it "on the sly." The \$500 which their honest friend received changed his luck; he remained in the country and presently secured a fat State office.

IMPROVED POCKET WIRE GAUGE.

The little implement shown at full size in the illustration is finely finished in German silver, and is designed to be a great convenience to electricians, linemen, and all having occasion to use wire for any electrical purpose. By placing the wire in the V-shaped opening between the movable arm and the edge of the gauge, and moving the arm around until the wire is closely held, the shoulder of the arm and its radial line will indicate: (1) The American or Brown & Sharpe gauge of the wire, (2) the safe current it will carry in ampères, and (3) the ohms resistance per foot

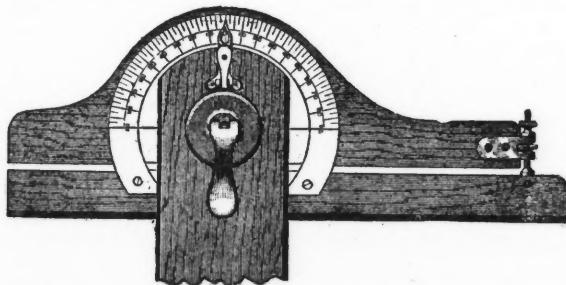


of copper wire. Then by formula as stamped on the arm, may be readily determined the size of wire required to carry any number of lamps any distance.

The figures on the front of the gauge, near the centre, indicate the Brown & Sharpe wire gauge, and those on the outer edge show the ampères the wire will safely carry before raising its temperature 30°. On the back of the gauge is given the ohms resistance of a foot of copper wire of any size, as shown by the gauge. This resistance is multiplied by seven to find that of a foot of iron wire, or by thirteen to find the resistance of a foot of German silver wire. This very useful implement is manufactured and sold by the Novelty Electric Company, whose factory and warerooms are at 50 North Fourth Street, Philadelphia, Pa.

AN IMPROVED T-SQUARE.

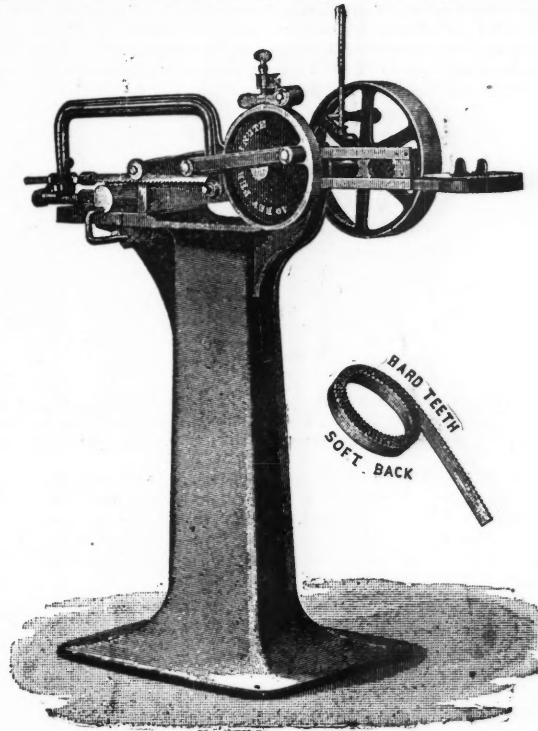
The T-square which is shown in the accompanying illustration is the invention of E. L. Deane, of Holyoke, Mass. The square is so arranged that not only can the desired angle be laid off, but the square may be set at or near the desired angle and then be accurately set by the clamp.



The units at the upper end of the head operate upon a center, which coincides with the main pivotal point. This adjustment compensates for any inaccuracies in the drawing board. The protractor is also arranged for adjustment by means of the set screws shown; thus, the blade may be made to take any desired position. The blade is held in place by means of an eccentric clamp instead of the milled nut, as generally used.

MAGAZINE HACK SAW.

This machine is manufactured by C. H. Tucker, Jr., & Bro., of New York. It is designed to cut metal bars or rails by the application of power. A belt may be run to the saw, and connected to the small pulley in the cut shown. The pulley is arranged to be thrown in or out of gear by means of the upright rod attached to the connecting collar. When connected the power is transmitted to the saw through the crank disk, and connecting rod shown. Arranged on the saw guide is an adjustable friction block. The crank disk is slightly eccentric, and the friction block bearing on the disk, just as the saw commences the back stroke, lifts the



saw sufficiently to have it complete the entire back stroke without touching the material on which it is operating.

The saw is similar to a band saw, except that it is not endless. One end of the band is fastened in the outer end of the saw frame by means of an ordinary clamp; the band then passes through the inner clamp, and thence to a magazine cup, where it is coiled, in a form as shown in the cut. The work is held in position during the cutting operation by an ordinary side clamp. The saw is held in position by a moving slide. It is claimed that it will cut perfectly at any angle; also, that the life of the saw is greater than that of any other form on account of there being no wear on the back stroke.

THE MINERAL PRODUCTION OF NEW SOUTH WALES.

The following table from the *Engineer* gives an idea of the mineral production of New South Wales:

MINERALS.	Quantity,	Quantity,	Value, 1890.		Value, 1891.	
	1890.	1891.	£	s. d.	£	s. d.
Gold.....oz.	127,280.64	153,335.62	460,284	16 2	558,305	12 3
Silver.....oz.	496,552.20	729,590.05	95,410	0 0	134,850	0 0
Coal.....tons	3,060,876.48	4,037,929.30	1,279,088	19 5	1,742,735	12 6
Shale....."	56,010.00	40,349.00	104,103	7 6	78,160	0 0
Coke....."	31,087.00	30,310.35	41,147	3 7	34,473	5 10
Tin....."	3,608.75	3,144.52	329,841	0 0	271,412	0 0
Copper....."	3,745.90	4,525.55	173,311	0 0	205,033	0 0
Iron....."	3,413.44	4,122.81	39,948	12 2	36,101	0 3
Antimony....."	1,026.00	914.85	20,240	8 6	22,065	0 0
Bismuth....."	2.10	0.40	306	0 0	500	0 0
Silver, lead and ores....."	131,039.65	147,779.70	2,667,114	0 0	3,484,739	0 0
Manganese....."	100.00	138.20	325	0 0	340	0 0
Oxide of iron and pig iron....."	455.30	228.75	884	0 0	434	0 0
Zinc Spelter....."	210.45	218.60	2,378	0 0	2,622	0 0
Lead, pig....."	126.00	190.65	1,387	0 0	2,025	0 0
Limestone (flux)....."	41,136.00	74,057.00	41,989	5 9	65,337	6 2
Alumite....."	220.00	704.00	3,000	0 0	1,888	0 0
The Noble Opal.....lbs.	195	.....	15,600	0 0	.....	.....
Sundry minerals.....tons	973	788.95	7,252	0 0	3,217	0 0
Cobalt....."	.....	1.15	.....	.....	470	0 0
Fireclay....."	.....	16.80	.....	.....	55	0 0
Lime....."	.....	410.00	.....	.....	958	0 0
Marble.....packages	.....	635	.....	.....	2,577	0 0
Stone (buildings).....No.	.....	4,735	.....	.....	5,205	0 0
Stone (ballast).....tons	.....	619	.....	.....	713	0 0
Grindstones.....No.	.....	471	.....	.....	311	0 0
Slates....."	.....	31,234	.....	.....	351	0 0
			£5,283,840	13 1	£6,665,069	17 0

* The greater part of the silver produced is exported in the shape of silver lead.

† Not manufactured from the ore, but from old iron.

NOTE.—24,000 carats of emeralds were got at Emmaville, but the value is not known.

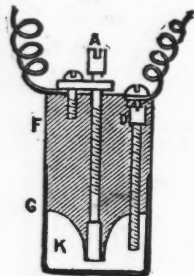
Increase in value: Gold, £98,020 16s. 1d.; silver, £39,443; coal, £463,706 12s. 1d.; copper, £31,782; antimony, £1,816 11s. 6d.; bismuth, £194; silver, lead, and ores, £817,595; manganese, £15; zinc spelter, £244; lead (pig), £438; limestone (flux), £23,368 5d.; cobalt, £470; fireclay, £55; lime, £958; marble, £2,577; stone (building), £5,205; stone (bal-

last), £713; grindstones, £311; slates, £351. Total increase, £1,487,260 1s. 1d.

Decrease in value: Shale, \$25,943 7s. 6d.; coke, £6,673 17s. 9d.; tin, £58,429 4s.; iron, £3,847 11s. 11d.; oxide of iron and pig iron, £450; alumite, £1,112; the noble opal, £15,600; sundry minerals, £4,035. Total decrease, £116,090 17s. 2d. Net increase, £1,487,260 1s. 1d.

ELECTRIC HEAT ALARM FOR OVERHEATED BEARINGS.

The system consists of an automatic device which is situated on the bearing, and which closes a local battery circuit when the bearing reaches a certain temperature. The battery circuit is connected to a drop annunciator with an alarm bell, which may be situated in the engineer's office or in any convenient place, the annunciator having a number on it for every bearing equipped with the device. As soon, therefore, as the



alarm bell rings the engineer has but to look at the annunciator to learn at a glance which bearing is running hot, and by quick attention can either cool off the bearing, or at least prevent any damage from occurring.

In using the apparatus the center plug is removed, and the hollow screw A is inserted. The screw is then turned down until the bell rings; then it is adjusted for any desired temperature. The screw D is always connected with the battery and the bell or annunciator to A. The use of two colored wires is advised. The device is manufactured by the Electric Heat Alarm Company of Boston.

JOSEPHINITE, A NEW NICKEL-IRON.

Mr. W. H. Melville describes in the *American Journal of Science* a new nickel-iron which has been found in Oregon. It exists mixed with silicates in the form of pebbles and smooth boulders, and on analysis the proportion of iron to nickel by molecular volume is 2 to 5. The alloy is strongly magnetic. The pebbles are in color greenish black with bright areas of the grayish white alloy. The greenish black portions consist of course of silicate, and when broken show greenish yellow and deep green colors and a resinous luster resembling noble serpentine. Other pebbles contain also a silicate insoluble in hydrochloric acid; this silicate is compact and on fracture shows a slight brown color and vitreous lustre, while exposed surfaces are reddened by ferric oxide. The analysis of the pebbles and silicates are as follows;

ANALYSIS OF PEBBLES.			
Per cent.		Per cent.	
Nickel free, Ni.....	60.45	H ₂ O below 100° C.....	0.81
Cobalt, Co.....	0.55	H ₂ O above 100° C.....	1.12
Iron, free, Fe.....	23.22	CO ₂	trace
Pyrrhotite, Fe ₇ S ₈	0.55	Volatile matter.....	0.70
Chromite, FeO, CrO ₂	0.12		
Magnetite, FeO, Fe ₂ O ₃	0.50	Nickel combined.....	100.55
Copper, Cu.....	0.23	Iron combined.....	0.25
Arsenic, As.....	0.04	Sulphur.....	1.79
Chlorine, Cl.....	0.04	Chromium.....	0.22
Silicates (anhydrous).....	12.26		0.04

ANALYSIS OF SILICATES.				
Composition.	Insoluble silicate.		Soluble silicate.	
	Per cent.		Per cent.	
SiO ₂	45.63		38.23	
Al ₂ O ₃	6.58		2.31	
Fe ₂ O ₃	8.77		15.88	
(Ni, Co)O.....	undetermined.		2.49	
CaO.....	11.03		12.14	
MgO.....	28.01		19.85	
Na ₂ O.....			0.35	
H ₂ O above 100° C.....			8.72	
Total.....	100.02		100.00	

Of special interest is the metallic portion. Two analyses gave:

	(1)	(2)	At. ratio.
Fe.....	23.36	23.09	0.41
Ni.....	60.47	60.43	1.03

From this ratio is deduced the formula Fe₂Ni₅.

The following table gives a comparison of a few examples of nickeliferous iron which form an instructive series:

	Catarinite.	Oetibbehite.	Awaruite.	Josephinite.
Iron.....	63.69	37.69	31.02	23.22
Nickel.....	33.97	59.69	67.63	60.45
Atomic ratio F: Ni..	1.14:0.58	0.66:1.02	0.55:1.17	0.41:1.03
Formula.....	Fe ₂ Ni	Fe ₂ Ni ₂	2(FeNi ₂)	Fe ₂ Ni ₅

The origin of the pebbles has not yet been ascertained. They occur in large quantities in the placer gravel of a stream in Josephine County, Oregon, and it is supposed that they have come from some dike hitherto undiscovered.

Proposed Manufacture of Rails by the Mannesman Process.—According to the *Revue Industrielle*, a proposition is on foot to make steel rails by the Mannesman process. The rails will be hollow and the interior space will be filled with sand or other material. Preferably the sand will be placed in the interior before the rail is quite completed, and in the final operations it is hoped that the heat from the metal will be sufficient to fuse the mass into a solid block. It is claimed, though it is not apparent on what ground, that for equal weights of metal a greater strength can be obtained by this process than with the solid rails; but conclusive tests have yet to be made.

ON THE BEST FORM OF SAFETY FUSES.

The danger in blasting in a coal mine does not arise entirely from the shot itself; it also arises in some cases from the fuse communicating its flame to the surrounding atmosphere. Various methods have been proposed for making the safety fuse really safe. No doubt electric ignition is the safest of all, but the apparatus is too cumbersome for its general adoption. Until some other method receives greater favor than safety fuse ignition it is well for us to see by what means the old system can be made as safe as possible. In *Les Annales des Mines* M. Janet, engineer in the French Corps des Mines, gives a long and exhaustive article on this subject, and as it is a useful one in showing what has been done in this direction we give an abstract of it herewith.

M. Janet gives the following as the causes by which firedamp may be ignited by the standard "safety," burning 1-1/4 metres per second: (1) By the incandescent substance used to light the end of the fuse; (2) by the sparks issuing from the end at the moment of lighting; (3) by the little explosions that the fuse may cause while burning, and (4) by the gases due to the combustion of the explosive, which appreciably precedes the detonation, when the fuse, penetrating too deeply into the cartridge, is brought into direct contact with the explosive.

The last cause of danger, which no appliance can prevent, has the great disadvantage of making the safety of the colliery dependent on the experience of a miner; but this disadvantage has been lessened since the firing of shots in mines subject to outbursts of gas has been intrusted to special hands.

The little explosions result from two distinct causes, viz., (1) the presence, in the central core of powder, of grains of appreciable size, and (2) insufficient strength in the outer covering. All powder used for fuses should therefore be very carefully sifted, and the covering should consist of several thicknesses of material. The white "safety" is preferable to the black, because the tar used to coat the latter might be ignited by a little explosion.

It is generally believed that *amadou*, or German tinder, will not ignite firedamp, though no direct experiment has, to the author's knowledge, determined the question; and sparks of flint and steel have been proved by the recent experiments of the French Explosives Commission to be without danger in an explosive mixture. The practice of lighting German tinder through the gauze of a safety lamp is, however, likely to cause serious danger from several causes; and so are the sparks emitted from the ends of the fuse when lighted by the tinder.

The emission of sparks from the end of the fuse projecting from the shot hole is of short duration; and it is probable that a sufficient coefficient of safety is afforded by admitting that the sparks do not ignite after the fuse has burnt 10 cm. All, therefore, that is required to suppress danger from this source is to arrange a close chamber, or at any rate one inclosed by wire gauze, for lighting the fuse in such a manner as not to fire an explosive mixture of firedamp. The appliances available for fulfilling this condition may be divided into two classes, viz., those serving for an indefinite number of lightings, and which, therefore, must be removed when such lighting is accomplished; and those which, serving for only one lighting, are left in place, permitting the firemen to retire at once after effecting the ignitions.

The appliances of the first category are evidently very inferior as far as safety is concerned. As it is necessary to wait until the fuse has burnt 10 cm. before it ceases to be dangerous, and as the rate of combustion is about a metre per minute, six seconds must be allowed to elapse between the lighting and removing the apparatus; and it is too much to expect the fireman to wait so long, when any irregularity in the composition of the fuse may bring about an explosion that might blow him to atoms. Instead of counting six seconds, however, he may hold the fuse 10 cm. from the end, when he will become aware, by the sensation of heat, that the powder has burned up to that point.

M. Janet then describes several appliances which have been designed for permitting the fuse to be lighted without the possibility of igniting an atmosphere impregnated with gas; hardly any is sufficiently perfect to recommend its general adoption.

M. Lagot proposed, in 1881, the use of a coal impregnated with salt-petre, burning without flame. The end of the fuse is pushed into the containing tube until it touches the nitrated coal. As the orifice is of the same diameter as the fuse, the flame remains inclosed in the tube.

A substitute for the incandescent body may be found in two substances capable of causing, by their simple contact, a sufficient elevation of temperature to fire the charge. Messrs. Davey, Bickford, Smith & Co., of Rouen, supply a lighter, consisting of a thin metal tube, open at both ends, containing a small glass capsule with a little sulphuric acid. The capsule is hermetically closed and surrounded by a piece of muslin impregnated with chlorate of potash and sugar, kept in place, on one side by a groove in the tube, and on the other by a piece of fuse, forming cushion, and leaving sufficient length of tube free to receive the end of the fuse in communication with the shot. The other end of the tube is closed by an obturator, which permits the passage of the gases generated by the combustion of the ignition charge and of the fuse, but no sparks or flame. The fuse is fixed in the tube and the capsule crushed by a special pair of pincers; the acid, encountering the chlorate of potash, ignites the muslin and then the powder of the fuse, thus warning the fireman to shelter. These lighters have been tried, generally with success, at the collieries of Anzin, Ferfey, Bessèges and Carmaux; and though there have been misses, blowing out and bursting of the tube, which may be accounted for by an inefficient application, the author's experiments lead him to the conclusion that this appliance is calculated to render service in careful and experienced hands.

Another system, which consists in inserting the fuse in a pistol barrel and igniting it by a percussion cap, is employed at the Lens Collieries, in the Pas-de-Calais. The gun-metal barrel of the pistol is taper in form, so that the fuse can be inserted tightly. To prevent the fuse from being blown out the pistol barrel is surrounded by a cylindrical chamber to receive the gases from the explosion of the cap and the combustion of the fuse. This appliance generally answers well and makes few misses; but the fireman must not remove it until he feels by the heat that the fuse has burnt to 10 cm. from the end.

A safety lamp invented by Messrs. Johnson and Howat, has been ex-

perimented upon, at the request of the French Explosives Commission, by the Anzin Company, with favorable results. In order that the lamp may remain safe, it is necessary that the flame be carefully isolated from the surrounding atmosphere. The fuse is therefore introduced through a tube, which traverses the lamp from top to bottom, and is provided at the top with a cylindrical cap and a double gauze. The ignition is effected by an iron wire, 1 mm. in diameter, heated to redness in the flame of the lamp and brought by a mechanical paw or finger into contact with the end of the fuse. The holes both for the wire and the fuse are provided with obturators displaced only during insertion. M. Petit, engineer at the Anzin Colliery, has proposed some modifications, including the addition of a flange to the wire. The fireman must also in this case keep the fuse in the tube until combustion has gone on for 10 cm.

Another system consists of rendering a piece of tinder incandescent by the compression of air in a close chamber, the resulting elevation of temperature being sufficient to fire gunpowder. An appliance depending on this principle has been devised by M. Bourdoncle, at Decazeville, in Aveyron.

While the last named igniter, the Lagot tube, the Lens pistol and the Johnson and Howat lamp all have the disadvantage of obliging the fireman to stay for a few seconds near the shot to be fired, the chlorate of potash igniters permit of his retiring immediately.

DIGEST OF OPINIONS OF THE INTERIOR DEPARTMENT RELATING TO THE MINING INDUSTRY.

MINING CLAIM—MILL SITE—RE-PAYMENT—CONSTRUCTION OF SEC. 2337, REV. STATS.

1. The first clause of Sec. 2337, U. S. R. S. contemplates the allowance of a mill site entry only where the land is used or occupied for mining or milling purposes at the time the application for a patent is made.

2. An entry is allowed on insufficient proof submitted without fraud or concealment is "erroneously allowed" within the meaning of the act of June 16th, 1880, providing for repayment.

3. The act clearly contemplates, that at the time application for a patent is made, and the entry allowed, the land in question is used or occupied for mining or milling purposes. It provides that where non-mineral land, not contiguous to the vein or lode, is used or occupied by the proprietor of such vein or lode for mining or milling purposes, the same may be entered as a mill site.

4. The act does not contemplate the performance of conditions subsequent, or the future compliance with law. No mill site entry should be allowed unless it is shown that the conditions of the law have been complied with.—*In Re Hudson Mining Company*. [Secretary to First Comptroller, May 18, 1892].

MINING CLAIM—PUBLICATION OF NOTICE—EQUITABLE ACTION.

1. Where the published notice of application is not sufficiently explicit in the matter of description, but the posted notice is in due form, the defect may be cured by equitable action in the absence of protest or adverse claim.

2. As in the case of *Hoffman et al. v. Venard et al.* (14 L. D., 45) an application for a mineral patent cannot be allowed where the description of the claim in the published notice of application is not in accordance with the field notes of survey.—*In Re Alabama Quartz Mine*. [Decision Commissioner of General Land Office, modified, May 23, 1892.]

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

State Court Mining Decisions.

MINING LEASE—CONSTRUCTION—COAL—RIGHT OF WAY.

A contract granted the coal lying under and upon certain land, and the right to erect machinery and shops thereon, in consideration of a royalty on the coal, required a certain minimum amount thereof to be paid for each year, whether removed or not, and stipulated that if the quality or quantity of the coal rendered the mining thereof impracticable, the grantee might "abandon the contract and yield up said coal mine and privileges." It was held by the Court, that since a further provision that the grantee should have the right of way through, over or under the said land to transport coal from adjoining lands, and to use five acres of other land on which to erect buildings in consideration of a fair rental, related only to mining in adjacent lands belonging to the grantee, such provision formed a separate contract; and the grantee, by surrendering the mine or exhausting the coal, did not lose his right of way through the same to the coal in his adjoining land; and a further stipulation that if the coal could not be mined with profit the mine might be abandoned, in no way affected the right of way through such mine.—*Appeal to Supreme Court from Mercer County, Penn.*; *Stewart et al. v. The North Western Coal and Iron Company*. [Decision, May 28th, 1892.]

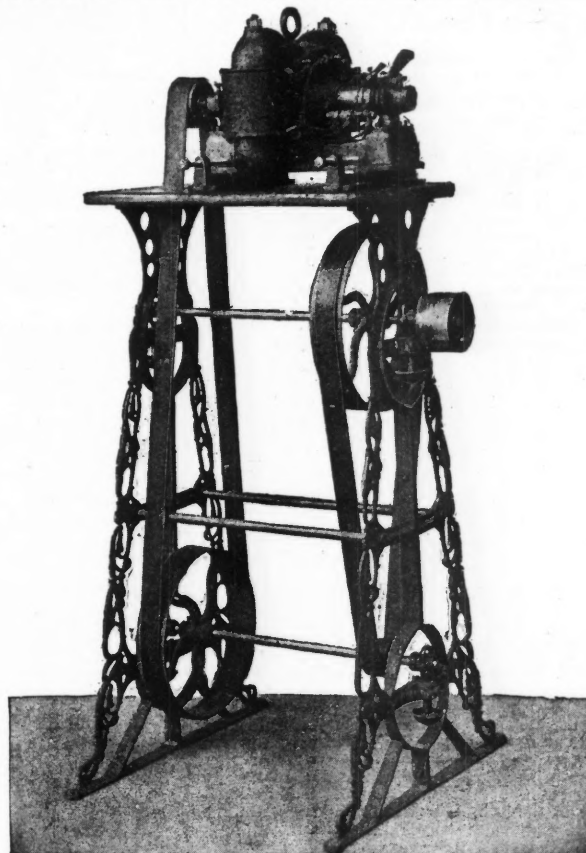
THE UTILIZATION OF WIND POWER.

In an article on this subject in *La Lumière Electrique*, M. G. Pellissier points out that we obtain far more mechanical power from the movements of the atmosphere than is generally supposed, and prophesies that when the coal supplies are exhausted, wind power will be the most important source of energy. Last year the tonnage of the sailing fleet of the world amounted to 21,000,000, and there are thousands of windmills at work in Europe and America. Nevertheless, many long-established windmills have been and are being replaced by steam power, and the few instances of the application of wind power to dynamo-driving have not proved economically encouraging. The main cause of this is the great irregularity of aerial currents both in direction and velocity. Recent experiments at the top of the Eiffel Tower have shown that at moderate altitudes these irregularities tend to disappear. M. Angot has published the results of observations made simultaneously at the top of the Eiffel Tower (305 metres) and at the Bureau Central Météorologique (500 metres distant from the tower), at an altitude of 20 metres. Figures given by M. Angot show that the speed of the wind at a height of 305 metres is on the average some three times as great as it is at an altitude of 20 metres and that its direction was more constant.

Sir William Thomson some years ago came to the conclusion that so far, at any rate, as its electrical utilization was concerned the thing was out of the question by reason of the high prime cost and poor efficiency of the windmill. This conclusion has been traversed by A. R. Wolff, of New York, who is of opinion that the windmill is the most economical of all prime motors where small powers are to be dealt with; the impossibility of the extensive electrical utilization of wind power being, according to him, due solely to the poor quality of the modern accumulator.

McLEOD'S SPEED REDUCER.

The reduction of motive speed requires more or less belting and shafting according to the work required. The accompanying illustration shows a belt stand for reducing speed which obviates the necessity for overhead shafting. The belt from the motor is carried to the pulley on the lower shaft of the stand. From a small pulley on this shaft the belt is carried to



a large pulley on the upper shaft. The power may be transmitted direct from pulley on the outer end of this shaft direct to the driven shaft without any overhead arrangement. The stand also makes a convenient place for the motor. It is manufactured by McLeod, Ward & Co., of New York.

The Gold Production of the Guianas.—Some official statistics have recently been published with regard to the production of gold in French, British and Dutch Guiana. Though the discovery of gold in French Guiana took place in 1856, yet it only began to be seriously worked in 1864. Since the latter date 35,817 kilograms have been exported. The production in 1891 was 1,502½ kilograms, and was less than the average of the last 16 years. The tax on entering the city of Cayenne is 10 francs per kilogram and a duty of 8% is paid on exportation. The number of men employed on the placer mines of French Guiana is 1,800. Of the nine quartz mining concessions granted up to date, two are being worked, but great difficulties stand in their way. In 1891 101,297 oz. of gold were produced, compared with 62,616 oz. in 1890; 28,282 oz. in 1889; 14,570 oz. in 1888; 11,906 oz., in 1887, and 6,518 oz. in 1886. The production in Dutch Guiana was 814 in 1890, an increase on 1889, but not so great as in 1887.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office: TUESDAY, JUNE 7TH, 1892.

- 476,256. Method of and Apparatus for Extracting Aluminum. Michael Emme, Atlanta, Ga.
- 476,274. Apparatus for Purifying, Moistening and Attemperating Air. Louis C. Huck, Chicago, Ill.
- 476,383. Ingot Protector. William R. Hinsdale, Newark, N. J.
- 476,467. Well Drilling Machinery. Joseph G. Lee, Dallas, Tex., Assignor of one-half to Gideon T. Macon, same place.
- 476,497. Amalgamator. Alva M. Stetson, Oakland, Cal., Assignor of one-half to Thomas R. Hayes, same place.
- 476,500. Concentrator. James Tulloch, Angel's Camp, Cal.
- 476,548. Depurator. John Nixon, Farmland, Ind.
- 476,627. Tile or Brick Cutter. Egbert M. Freese, Plymouth, O.
- 476,639. Coating Metals and Alloys with Oxides. Alexander E. Haswell and Arthur G. Haswell, Vienna, Austria-Hungary.
- 476,701. Evaporating Pan. Harrison F. Thurston, Centre Bartlett, N. H.
- 476,705. Brick Machine. William C. Vaneman, Anderson, Ind.

PERSONALS.

Mr. John A. Church, mining engineer, of this city, has gone to Nevada on professional business, which will occupy his attention for at least a month.

Dr. Francis Wyatt, consulting and analytical chemist, of this city, has gone to Florida to investigate phosphate properties, on which subject he is a recognized authority.

Messrs. Ricketts and Banks, mining engineers, of this city, will have their engineer engaged in professional business in the West during July. During a portion of this period he will be able to attend to additional business.

Mr. Rawlinson T. Bayliss, formerly general manager of the Montana Company, Limited, leaves England on the 18th inst. for a visit of inspection of the company's properties.

Mr. Thomas Alva Edison has received the Albert medal of the Society of Arts for the present year in consideration of the distinguished services rendered by him in the field of electricity.

Mr. John Hays Hammond, mining engineer, of San Francisco, has resigned from the commission appointed to examine the mineral resources of the Navajo reservation on account of pressing professional business in Idaho and California.

Dr. Geo. A. Koenig, of the University of Pennsylvania, has been elected successor to Dr. Keller in the chair of chemistry by the board of control of the Michigan Mining School. Dr. Koenig is a graduate of Heidelberg University, and has studied chemistry under Bunsen, of Heidelberg and Rose and Rammeisberg, of Berlin; also metallurgy and mining at Freiberg, and mechanical engineering at Karlsruhe.

The Summer School of Mines of the Massachusetts Institute of Technology is established for the month of June at the coal mine of Cox Brothers & Company, in Drifton, Pa. The party is in charge of Professor R. H. Richards and Professor H. O. Hofman, and consists of 14 students, including five of this year's graduating class. The four principal kinds of work to be done by the students will be surface surveying, underground surveying, surface work around the breaker, shops, etc., and underground practical mining.

OBITUARY.

George R. Ellis, F. C. S., assayer and analytical chemist, formerly of Butte City, Mont., but recently of Nelson, B. C., died in that city on the 16th inst. Mr. Ellis was a young man of much promise.

Mr. P. W. Willans, of the firm of Willans & Robinson, Thames-Ditton, England, died on the 23d May in the 41st year of his age. He was the inventor of the inclosed central-valve high speed engine which was first to be used for driving dynamos direct. His researches on condensation were of great value. As a practical and theoretical man he was the finest steam engineer in England. Fully 80% of the power in the public electric lighting installations in England was supplied by his engines.

SOCIETIES.

An "Institution of Mining and Metallurgy" has been inaugurated at London, England. Its objects are the same as the American Institute of Mining Engineers. Mining has not hitherto received much attention from technical societies in England, and the improvements, advancements and progresses in appliances and methods applicable to metalliferous mining, ore dressing and metallurgical operations have not been properly recorded and discussed in that country. Various societies, some of whose interests verge on the special subjects involved in metalliferous mining and in metallurgy, have, it is true, occasionally opened their doors to papers on subjects of particular interest to mining and metallurgical engineers; but, inasmuch as the preponderating majority of the members of such societies are not interested in the subjects in question, the appearance of such papers has necessarily been fitful and irregular. These points were ardently urged as points in favor of the establishment of such an institution as the Institution of Mining and Metallurgy. The new institution opens its career on June 15th, when a paper is to be read on "The Tin Mines of the Malay Peninsula; a Field for the Electrical Transmission of Power," by Mr. Becher.

The regular meeting of the Engineers' Society of Western Pennsylvania was held in Pittsburgh May 17th. The paper of the evening was read by Mr. John W. Seaver, on "Iron Mill Buildings." The paper as read before the society contained a complete enumeration of the various points in the design of a building and a specification of loads to be allowed, for quality of material required, unit strains of members, etc. The chemical section held its meeting on May 24th. The final report on committee on Handy's phosphorus method showed that it would be necessary to modify the procedure in analyzing ferromanganese and speigel. The phosphorus and carbon in these materials resisted oxidation by permanganate solution. Evaporation to hard dryness gave complete oxidation. A paper was read by Mr. C. P. Van Gundy on "Manganese Estimation in Iron and Steel by Textor's Method, Modified." His results showed that the method, with slight modification, gave accurate results through a very wide range of mangan-

ese percentage. Chairman Langley then described a new method of estimating copper in iron and steel. Mr. Handy spoke of difficulties encountered in estimating the percentage of tin in tin plate, and described how it had been successfully done.

INDUSTRIAL NOTES.

The Charlotte Iron Company, Charlotte, N. Y., are making preparations to go into blast.

The Fulton Iron Works, at San Francisco, Cal., have been destroyed by fire. The loss is very large.

Lightning struck a large tank of the Standard Oil Company's, at Findlay, O., on the 9th inst., and the resulting fire caused a loss estimated at \$55,000.

A large addition is to be made to the Standard Iron Works, at Etnaville, near Wheeling, W. Va. The extension will give employment to 150 additional workmen.

The plant of the Midland Steel Company at Muncie, Ind., is nearing completion, and will probably commence operations within a few weeks, giving employment to about 200 to 300 men.

The Hudson Iron Company, of Hudson, N. Y., will, on the completion of the present blast, tear down their two stacks, both built in 1851, and erect instead a modern furnace to cost about \$150,000.

The plant of the insolvent Deoxidized Metal Company, at Bridgeport, Conn., has been sold to F. W. Smith, one of the largest creditors, who will organize a new company to operate the works on a larger scale.

The Roanoke Coal & Coke Company has been incorporated at Rolfe, W. Va., with a capital of \$10,000. W. H. Walters, J. W. Deharl, of Freeman, and others, are the incorporators. The principal office will be at Rolfe.

At the annual meeting of the Bessemer Land and Improvement Company, at Bessemer, Ala., held recently, Mr. H. M. McNutt, secretary and treasurer of the company, submitted propositions for the building of a steel plant at this place.

George Westinghouse, Jr., on Saturday signed the contract recently awarded to him for supplying the World's Fair with 92,000 electric lights at \$4.25 each, a total of \$391,000. Mr. Westinghouse's bond of \$1,000,000 has been reduced to \$500,000.

Fire is raging at the Standard Oil Company's Acme Refinery at Olean, N. Y. A benzine tank exploded on the 9th inst., throwing burning fluid in all directions. Other tanks and buildings are in flames. One man is reported to have been burned to death.

The Lidgerwood Manufacturing Company, of New York, makers of hoisting engines and cableways, have broken all previous sales records during the month of May just passed, having shipped 127 engines and 45 boilers, an average of five engines per day.

At the Bertha Zinc Works of Pulaski City, Va., which recently changed hands, 10 smelting furnaces are in operation, and with improved machinery recently added the waste pile of the past 10 years is being worked over at a profit. More than 1,000 hands are now employed at the works.

The General Electric Company, in a circular to the holders of trust receipts exchangeable for stock of the General Electric Company, states that rights to subscribe to the 5% gold bonds of the company are assignable, so that any person acquiring "rights" by assignment may make a subscription in like manner as if he were a stockholder of such trust receipts exchangeable for stock.

The Alan Wood Company is about to tear down a part of one of the old rolling mill buildings at the Schuylkill Iron Works at Conshohocken, Pa. It is a frame building, erected in 1856. It is to be replaced by an iron fireproof structure. The company's mills have been running to full capacity up to the present, but the building operations will necessitate shutting down a portion of them temporarily.

The Bessemer department of the Worcester Steel Works, at Worcester, Mass., has been sold to the Indiana Steel Company, of Indianapolis, Ind., and the machinery will be removed to the latter city. The Worcester works will hereafter confine themselves to the open hearth process, under which the works were run successfully some years ago. Four new furnaces will be put in and a foundry will be built in connection with the mill for making castings.

The Tennessee Coal and Iron Company will take title to the De Bardeleben Company, in spite of opposition of a Nashville stockholder, who has been forced to sell his stock bought on margin. It is understood that the old De Bardeleben bonds will stand as a first lien, and that \$8,000,000 new Tennessee Coal and Iron common stock, will be issued, \$6,000,000 to be paid for De Bardeleben property, and \$2,000,000 for betterments.

Statement of the Colorado Fuel Company from operation of mines and sales of coal for 10 months to April 30, shows: Net earnings, \$272,978, increase \$22,816. The net earnings for 10 months in excess of interest on bonds, and dividend on preferred stock for entire year are \$82,638. Required for in-

terest on bonds 12 months, \$56,100; for 8% dividend on preferred stock, \$134,240; total \$190,340. The above earnings do not include earnings from stocks and bonds owned by the company.

The new Dora furnace of the Pulaski City (Va.) Development Company blew in on the 23d ult. After one week's run the furnace is said to be producing now 100 tons of high grade of iron per day, and within a month the company expects to produce from 120 to 130 tons per day. This company also owns the Eagle furnace, the Raven Cliff, the Little Wythe, the Beverly and the Speedwell, all old charcoal furnaces, which will be dismantled.

The Indiana natural gas pipe line companies have entered into a combination, and will by agreement join in supplying gas to cities and factories in Central Indiana from this center of the gas field. The main purpose of the combination is to give the Chicago Pipe Line Company stronger competition and to reduce expenses. The companies will draw their supply from the field where the Chicago syndicate has its leases. At a conference a committee was appointed to perfect the details of the agreement and make large purchases of pipe.

As 5 shares of common stock of Thomson-Houston Electric Company represented by trust receipts are exchangeable for 3 shares of the common stock of the General Electric Company, and 4 shares of the preferred stock of the Thomson-Houston are exchangeable for 1 share of the preferred stock of the General Electric, the privileges attaching to the certificates or receipts representing said common and preferred stock of the Thomson-Houston respectively on the equivalent of 3 rights for every 5 shares of the Thomson-Houston common stock and 1 right for every 4 shares of the Thomson-Houston preferred stock.

The Iron and Sheet Steel Manufacturers' Association, the Galvanized Iron Manufacturers' Association, and the Tin Plate Manufacturers' Association, the interests of which organizations are identical, held a joint meeting in Pittsburg on the 2d inst to agree upon a wage scale to be presented to the Amalgamated Association at its meeting next week. A scale satisfactory to all present was prepared. The Iron and Steel Wage Committees of the Amalgamated Association of Iron and Steel Workers met in Pittsburg the same day to prepare the scales for the coming year. It is probable that the present scale will be continued.

The Colorado Iron Works, of Denver, is an enterprising, prosperous concern. With the advantage of proximity to the mines and familiarity with the wants of practical men, it had the disadvantage of higher cost of manufacture as compared with Eastern works to contend with. That the balance has been in its favor is evident from the steadily increasing capacity and output of the works and the extension of its business shown through the establishing of offices in other and Eastern cities, and the taking of large contracts in competition with the largest and best equipped of its competitors. The Eastern representative of the Colorado Iron Works, whose headquarters are in Chicago, has just closed a contract for the complete plant of the Cheyenne, Wyo., Smelting & Refining Company. This plant consists of five smelting furnaces, 42 ins. x 120 ins., of a smelting capacity of about 60 tons a day each, 8 reverberatory roasting furnaces, engines, boilers etc., and a complete sampling mill.

The recent city assessment of Pittsburg gives the following values of the property of producers of pig-iron and other crude steel and iron material within the city limits: A. M. Byers, \$808,409; Crescent Steel Company, \$900,000; J. Painter Sons & Co., \$602,843; Singer, Nimick & Co., \$1,241,652; Jones & Laughlins, \$5,000,000; Pennsylvania Tube Works, \$2,500,000; Carnegie Bros. & Co., \$3,069,442; Carrie Furnace, \$500,000; Carnegie, Phipps & Co., \$4,103,211; Dillworth, Porter & Co., \$1,106,152; Lindsay Steel Mfg. Co., \$877,322; Brown & Co., \$1,000,000; Zug & Co., \$792,248; Howe, Browne & Co., \$850,000; Schoenberger & Co., \$2,500,000; Park Bros. & Co., \$1,950,000; Hainsworth Steel Co., \$500,000; A. French Spring Co., \$963,000; Keystone Rolling Mill Co., \$632,150; Moorehead McCleane Co., \$1,321,459; Keystone Bridge Co., \$1,774,000; Republic Iron Works, \$1,500,000; Oliver & Roberts Wire Co., \$1,600,000; Oliver Iron & Steel Co., \$1,850,000; Philips, Nimick & Co., \$881,786. Total, \$38,832,674.

The Thomson-Houston Electric Company have just published their catalogue of electrical mining machinery, comprising complete mine equipments. It is a pleasure for the Engineering and Mining Journal to review such a commercial catalogue in its columns, the excellency of this publication commanding so much favorable comment. The Thomson-Houston Electric Company have been the foremost in the development of electrical mining machinery, and this catalogue not only contains plates of their improvements, but contains specifications and costs of work with their various appliances. In one of the new machines described is an electric rock breaker of the Blake type, geared directly to a motor, the whole being mounted on the same bed plate. The percussion drills, which have been, after considerable experiment, worked with some success, are described, as are the coal cutters. Pumps, hoists, mining locomotives and tramways are also given some space. The publication is to be

greatly commended not only on account of its wide range of information, but for its excellence in dress and manner of presenting the subject.

Mr. W. R. Brixey, who, for over 12 years was Superintendent of Day's Kerite Works at Seymour, Conn., has been placed in supreme command at New York in the business management, with the title of general manager and Eastern agent. Under his aggressive policy appointments have been made as under: F. W. Cushing, general Western agent, 225 Dearborn Street, Chicago; Julius Andrae, Milwaukee, Wis.; Houlston, Hubbard & Co., Cincinnati, O.; California Electrical Works, San Francisco, Cal. Day's kerite has been before the public for over a quarter of a century, and is extensively used by the Western Union Telegraph Company and the leading telephone companies throughout the country, especially where important cables are to be laid which require to be absolutely proof against water and acids. The recent successful laying of an 18 conductor Day's kerite cable for the Metropolitan Telegraph and Telephone Company across the Hudson, 5,300 ft. in length, put another feather in their cap, and ranks them as the most successful cable manufacturers in the country. For the electrical transmission of energy in mining, kerite being acid proof and gas proof, is especially suitable.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

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

Any one wishing to communicate with the parties whose wants are given in this column can obtain their 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 goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

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

GOODS WANTED AT HOME.

2,696. An 18-in. turbine water wheel and a 25 H. P. return flue boiler and automatic engine; either new or second-hand. South Carolina.

2,697. A saw hammering outfit; also a 56-in. circular saw. South Carolina.

2,698. Estimates for a charcoal iron blast furnace; capacity 75 or 80 tons. New York.

2,699. Diamond drill (2 in. core) complete. New York.

2,700. A small quartz mill or pulverizer or combination plant, crusher and pulverizer, for use on phosphate rock, quartz and plumbago. Texas.

2,701. A steam revolving case crane; either new or good second-hand. Florida.

2,702. A 45 H. P. second-hand locomotive boiler. Maine.

2703. A dynamo with a capacity of 30 to 40 incandescent lights with all necessary fittings, lamps, etc. Arkansas.

2704. A 25-H.P. return tubular boiler, half-arch front, all fixtures complete. South Carolina.

2705. Three hundred feet of bridge in 2, 3, 4 or 5 spans. Must be in good order and built to carry engine weighing 40 tons on 12-ft. wheel base and train of 60,000-lb. leaded gondola cars. Ohio.

2,706. Wrought iron highway bridge 70 ft. clear span and 14 ft. roadway, to weigh from 11,000 to 12,000 lbs.; state price f. o. b. works. South Dakota.

GENERAL MINING NEWS.

ARIZONA.

A bill has been introduced in Congress by Mark Smith, delegate from Arizona, appropriating \$5,000 for the survey of the coal lands of the White Mountain or San Carlos Indian reservation.

(From our Special Correspondent.)

A contract has been let for a \$100,000 toll road from Phoenix to Globe. This highway will open up an immense mineral belt, principally copper and silver. The greater part of the money has been subscribed by Baltimore capitalists interested in Globe mines, the balance being raised locally.

Bonanza and Golden Eagle Mines.—The report is current that these mines, situated in the Harqua Hala district, have been sold. The purchase price is set at \$750,000. The properties are in the neighborhood of the Hubbard & Bowers mines, and are, perhaps, the most important mines in the territory, as they regularly ship ore each month running from \$40,000 to \$80,000. D. O. Mills has been visiting the property.

Gila County.

Old Dominion Copper Company.—This company is just now producing more copper than any other concern in the Southwest, the Copper Queen Com-

pany not excepted, says the "Arizona Silver Belt." The daily output is about 35,000 lbs., with three furnaces in blast. However, it is not expected that this large production will be continuous, but for the year 1892 the output will doubtless exceed that of any previous year.

Pima County.

Peer Mining Company, Quijotoa.—This mine is the only one now working in the Quijotoa district, says the Tucson "Weekly Citizen." The Silver Bullion, belonging to Sternberger Bros., of Philadelphia, Pa., has been shut down for the summer on account of the heat and scarcity of water. Some placer gold mining is going on at Horse Shoe.

Mohawk.—This mine is, says the Tucson, Ariz., "Weekly Citizen," the first southerly extension of the Mammoth Gold Mine, Limited, which has been steadily reducing ore with a 50-stamp mill for years, and which ore has steadily improved with depth. They are now down 600 ft., and find that the ore has improved in quality and the ledges are broader and stronger than they were near the surface. The shaft was 60 ft. deep when work was commenced, showing 10 ft. of good ore; at 110 ft. they again cross-cut, and found the ledge to be 50 ft. in width, carrying some free gold. The development work is still going on, and another shaft, now down 60 ft., is being sunk, and work of cross-cutting is still going on in the first shaft.

Yavapai County.

Copper Basin.—The leaching and smelting works, says the Arizona "Daily Miner," are now running regularly, and shipments of copper are being made. Thirty-five men are employed at the works and mine.

CALIFORNIA.

(From our Special Correspondent.)

For some time past there have not been lacking indications that the anti-hydraulicers had, to some extent at least, repented the alliance formed with the mining men. To say that this feeling is general among the farmers would be untrue, for after years of depression they are quite as willing as the miners that the old-time prosperity be revived, but the small contingent of malcontents who have apparently made it their pleasure, as it surely is their business, to indulge in continuous complaints and fill the State with their howling, have again made themselves heard. In one particular it must be confessed they just now have right on their side. At the recent conventions the utmost harmony existed between the agriculturists and the miners, and it was understood that, pending the work in Congress tending to the repeal of the law affecting hydraulic mining, all such mining should cease save in those counties where it has been carried on without interruption. Every miner was supposed to exert himself in the interests of right and justice and see that no monitors were worked in his district. It is to be regretted that this unwritten stipulation has not been rigidly observed, for the selfish action of a few men is likely to recoil upon the many who are working honestly to obtain what is now generally conceded to be almost a necessity. Agents of the Anti-Debris Association have just filed a report after visiting Nevada, Sierra and Plumas counties, and it appears that they found that 29 monitors had been worked during the season, 11 of which are now in active operation. In none of these instances have efforts been made to restrain the debris. Some of these mines are being worked by Chinese, but these Celestials are in the minority.

Eldorado County.

American River Syndicate (Limited).—The Delmatia mine, Eldorado County, handled at its mill in the 13 months from July, 1890, to August, 1891, 43,000 tons of rock. Between the 1st of August and the 31st of December the machinery dealt with 19,000 tons of rock. The gold was extracted at the average cost for milling and mining of 50 cts. per ton. In October there were crushed 4,449 tons, which were mined and milled at a cost of 43 cts. per ton. The mill is run by electricity. Most of the ore comes from open surface cuts.

Mono County.

Bodie Consolidated Mining Company.—A seam of ore has been cut in the north drift from the east cross-cut just above the 550 level. About 8 ins. of \$30 ore is showing in the south drift from the upraise above the 400 level.

Mono Mining Company.—North drift from west cross-cut 600 level was extended 6 ft. Upraise from east cross-cut, same level, was extended 12 ft.; there is a very rich seam of ore in this upraise. West cross-cut from north drift 2, same level, was extended 11 ft. We are taking out pans and settlers at the Bulwer mill and moving them to the Bodie.

Monterey County.

New Idria Mining Company.—On May 24th the famous McGarrahan Claim bill was passed by the Senate. There was no opposition to it. The bill authorizes the title of William McGarrahan to the Rancho Panoche Grande in California to be submitted to the Court of Claims. The subject matter of this measure has been before Congress 25 years; the controversy over the title to the lands in question dates back nearly 40 years. Many bills for the relief of McGarrahan have been introduced in Congress and the House has passed three of them, but all have failed finally. Though the case has nominally been carried on between McGarrahan on the one side and the United States on the other, the real contestant of McGarrahan's title has been the New

Idria Mining Company. That company secured possession of the New Idria Quicksilver Mine about the time McGarrahan purchased the tract of land and has held possession ever since. The main question to be decided is, whether Vincente P. Gomez, under whom McGarrahan claims, had such a title to the land as was protected by treaty with Mexico, commonly known as the treaty of Guadalupe Hidalgo. If he did, then the faith of the Government is pledged to its protection. The claim was originally brought before the Fortieth Congress, and the House Committee on the Judiciary told the story in an elaborate report. In 1844 Manuel Micheltorena, then Governor of Upper California, in accordance with a Mexican custom to confer lands upon deserving officials and citizens, granted to Vincente P. Gomez a tract of land, then considered almost valueless, in the present counties of Fresno and Monterey, Cal. The property was then, and is now, known as the "Panoche Grande Rancho." The making of this grant has been denied, and this denial constitutes the principal ground from which has sprung the prolonged litigation, which the present bill seeks to bring to an end. The proof of the existence of the grant was declared to be satisfactory by the Judiciary Committee of the Fortieth Congress in its published report. In 1853 the Board of Land Commissioners, at the hearing on the evidence, decided that Gomez had given satisfactory proof of the existence of the grant, but had failed to prove that he ever occupied or improved any part of the land, and on the ground of non-occupancy decided the grant invalid. Gomez appealed to the District Court, which confirmed his claim. But through what is claimed to be a clerical mistake, the decree of the court was for three leagues of land instead of four, and was unsigned by the Judge. Gomez supposed the question of title settled, and, in December, 1857, sold the property to McGarrahan. Later the error was discovered, and Feb. 8th, 1858, an amended decree was entered, as of June 5th, 1857, covering the four leagues, and duly signed. About the time McGarrahan purchased the tract some prospectors discovered mineral deposits on it, unknown to McGarrahan, and they took possession of it as "squatters." The interest of these squatters was later vested in the New Idria Mining Company. March 15th, 1858, the United States appealed from the decree of the court, as it was their practice to do in all cases adjudicated against them, and on July 8th, 1858, 13 months after the final decree of confirmation, a motion was made by special counsel of the United States in the case, without notice to the claimant, to have the decree opened. Legal proceedings followed, the effect of which was to perfect the title to the rancho in McGarrahan. The New Idria Mining Company then resorted to numberless expedients to defeat his title. Fraud and want of jurisdiction were charged in order to reopen the case. Finally, after years of litigation, McGarrahan succeeded in acquiring five distinct confirmations of his title. The committee summed up as follows: "Additional evidence has been submitted and circumstances disclosed which have induced your committee to conclude that the relief prayed for by Mr. McGarrahan ought to be extended to him, and this may very readily be done. The title to the land claimed, and which he asks that he may be allowed to purchase, is now vested in the Government of the United States, and it is merely a question whether he shall be permitted to secure that which, in the judgment of your committee, he acquired title to by virtue of the Mexican grant aforesaid, or it shall fall into the hands of a corporation known as the New Idria Mining Company, which has been resisting his claim for years and paying the expenses of the efforts of said company out of the proceeds of the mines, the title to which rests in the United States." This was in 1868, and McGarrahan has been prosecuting his claim ever since. His friends now believe that his patience is about to be rewarded. Should the bill pass and the Court of Claims adjudge in McGarrahan's favor, the United States must indemnify him for such land as may hereafter be disposed of by the Government within the limits of the grant and for the value of the minerals extracted less the value of the improvements made upon the lands and the cost of mining. The right of appeal to the Supreme Court by either party is granted.

Nevada County.

Eldorado Gold Mining Company.—This company of Chicago men has purchased the Nichols quartz mine of Grass Valley. The price named is \$50,000, of which \$1,000 has been paid down, and the balance will be paid in installments, extending over a period of four years, the payment being secured by a mortgage. The company expects to begin the work of development without delay, arrangements having already been entered into for a suitable plant. The Nichols claim has yielded, first and last, and from superficial workings only, about \$200,000. H. B. Nichols and a partner a few years ago extracted \$18,000 from an open cut in two or three months.

Placer County.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forrest Hill.—A shipment of bullion valued at \$4,800 has been received from the mine.

San Diego County.

Stonewall Mine, Julian.—The reported sale of this mine in the Engineering and Mining Journal of May 21st for \$2,000,000, has been officially denied by both Waldo Waterman, superintendent, and his

brother, Dr. J. S. Waterman. These denials are confirmed by the fact that the sheriff of San Diego County is now advertising for sale the Cuyamaca Grant (20,000 acres), on which is situated this mine, together with all buildings. This would include the hoisting works, mill and other mine buildings. This sale is under a decree of foreclosure to satisfy a judgment in favor of the Sather Banking Company, of San Francisco, and will take place on the 22d inst. This effectually disposes of all the many rumors that have been circulated in the past year or two in regard to the sale of this property for a fabulous sum.

COLORADO.

Colorado Coal & Iron Company.—In an interview published in the "Wall Street Journal," Secretary Curtis, of this company, says that the company has reached a stage in the development of its resources which renders the operation of an iron and steel plant practical. From a start of one pig-iron furnace of 80 tons' capacity, three years ago, it has developed, at a cost of between \$1,250,000 and \$1,500,000, a complete iron and steel plant. Two Bessemer furnaces, 120 tons' capacity each, are now in operation, while a third of like size will be blown in shortly. Heretofore great difficulty has been encountered in using the more common ores of the company. While being very high in iron, they carried sulphur to such an extent that not more than 12% could be used in a furnace charge, the balance being obtained from the company's mines some distance away. Recently the Davis-Colby roasting kiln was employed, with satisfactory results, and 50% of the ore is now used. This was the greatest obstacle encountered, and its practical solution has materially contributed to the future possibilities of the plant. The company possesses its own coking coals and fluxes and has excellent railroad facilities. In order that it may not be entirely dependent upon its mill for revenue and also as a consumer of inferior grades of iron, a large pipe plant has been built.

Dolores County.

Enterprise Mining Company.—The total shipments for May aggregated about 120 cars. The large ore house is now entirely completed. All the men have been transferred to the tunnel with the exception of those working in the Jumbo shaft, and these will be transferred as soon as the necessary buildings are erected.

El Paso County.

Anaconda Mining Company, Cripple Creek.—It is reported that a good ore body has been encountered in the Anaconda tunnel at a depth of 208 ft. Assays on the ore run well in gold. The company has not been permitted to ship a pound of ore since May 25th, owing to the injunction suit reported in the Engineering and Mining Journal some time ago, but it has several thousand tons of ore on the dump ready for shipment as soon as the injunction shall have been dissolved.

Gilpin County.

Running Lode, Central City.—The owners of this mine, it is said, have put 38 men to work in the property. The shaft is down 400 ft. and has encountered a body of silver ore which is said to run well.

Hinsdale County.

Golden Fleece, Lake City.—An important piece of development work was completed on this mine on the 1st inst. The lower level, in 298 ft., was connected with the upper level, in 170 ft., the distance between the two being 112 ft. The ore in the lower level begins 113 ft. from the mouth and continues for 130 ft. with an 8-ft. body of ore. The raise was started from the center of this ore chute. Henry Monell, the superintendent, expects to make arrangements to put up a mill.

Lake County.

(From our Special Correspondent.)

The Silver Cord tunnel, without doubt the greatest enterprise ever undertaken in this section, was completed last week, and directly unites a territory embracing nearly a hundred producing claims. The tunnel has its outlet at California Gulch, near the Rio Grande Railroad track, where a concentrating mill of large capacity has already been erected and put in running order. From California Gulch it extends into Iron Hill a distance of over 4,000 ft., connecting with the 1,400-ft. level of the Silver Cord mine, and will immediately be carried on into the Mike and Starr workings to the northeast, about 4,000 ft. further, after which it will be extended into Brece Hill; in all, making an entire length of nearly 10,000 ft. when completed. By means of this tunnel a great saving of expense will be enjoyed by owners of producing mines through which it passes, as the distance to the smelters from those points is lessened by almost half, and the cost of transporting the ore to the surface will be greatly decreased. It is estimated that at least 1,000,000 tons of low grade concentrating ore are now in sight in the mines which have been opened up by this tunnel, and that at least twice as much mineral of a similar character will be disclosed before the tunnel is completed.

Crown Point Mining Company.—The ore chute recently opened up in the Carson lease on the Crown Point is shortly to be developed through the Weir shaft to the west as a means of working it to better advantage. A drift is to be driven from the 400-ft. level to catch the chute, and as this is at a point some distance higher up than that at which the work was formerly carried on, it is thought that by this

means the water that invests the shaft can be handled at a much reduced cost.

Delcker Mining Company.—A strike of very rich mineral was made in the old tunnel of the Delcker lease on the Kaiserine a few days ago. The ore is found in a vein 10 ins. in width, and runs in the neighborhood of 400 oz. silver to the ton. This vein was encountered at a distance of 500 ft. from the surface, and leads in the direction of the famous Imes ore channel, a short distance to the north.

Eagle Consolidated Mining Company.—The Penrose has about been cleared of water and is about ready to start up again. A big station is to be cut at the 402-ft. level in order to put in additional pumps, so that if the large compound pump should give out the water can still be held at the level until the refractory machinery can be repaired.

Eqnator Mining Company.—The new tunnel which was driven to catch the ore chute on its dip which was encountered in the old tunnel, has succeeded in getting some distance below the ore body, as a result of which an upraise will have to be run, and the chute will thus be worked from a point some distance lower than was at first intended.

Maid-Henriette Mining Company.—The great mine after which this company takes its name has again started up in full blast, and is now working more men than formerly.

Mike & Starr Mining Company.—An incline has been started on this claim, and has so far reached a depth of about 60 ft., to connect with the Silver Cord tunnel on the west at a point about 100 ft. below the present depth of the shaft. The incline has already succeeded in opening up a considerable body of mineral, consisting principally of low grade concentrating ore, but this will not be developed until connections have been made with the tunnel, when this mine will be developed from that point.

Sixth Street Mining Company.—A big station is also being cut at the 415-ft. level of the Sixth Street shaft, into which will be placed a large pump, and it is estimated that the Leadville basin will be emptied within the next three weeks.

Silver Queen Mining Company.—In the tunnel on this claim, at a point about 300 ft. from the entrance, a large body of silver ore averaging 300 oz. to the ton was disclosed last week, and shipments will begin at once. This strike opens up a new territory in Lake Park, and has stimulated a vast amount of prospecting in that vicinity.

Surprise Mining Company.—A fine body of good ore has been encountered in the southeast drift of the Surprise, which leads in the direction of the Maid of Erin chutes, and indicates that the hill in that vicinity contains much more ore than has yet been taken out.

Ouray County.

Rochester Consolidated Mining Company, Ouray.—The Potosi, 7-30, and several other Mount Smuggler properties formerly owned by Messrs. Bruunson and Strant, the Highland Lassie, a shipping mine owned by Wright Brothers, together with the United States Depository, Millionaire, Fragment, Electra and Highland Chief, have all been consolidated into one company, to be known as the Rochester Consolidated Mining Company, and to be under the management of B. A. Ackerly, of Rochester, who is now on the ground. The United States Depository, in the upper workings of which is a good showing of ore and a well-marked vein, will receive attention first. Shipments from there, it is expected, will shortly commence. The new company will have a strong force of men at work pushing the lower tunnel into the mountain, which is now in 460 ft. An electric plant will also be put in, ample water-power for which has already been secured. The other properties of the company will all, it is said, be developed this season. They are silver mines, though some gold is occasionally found.

Yankee Girl.—A special meeting of this company was held in London on the 25th ult. to consider the proposition of Mr. George Crawford, of Colorado, of selling to the company certain property formed of the Scotch Girl, the Irish Girl and Dutton claims adjoining the Robinson mine. Mr. Stuart Pixley, the chairman, said that these properties were in close proximity to those of the New Guston Company, and it was expected that the purchase of these claims would prevent any litigation, owing to the fact of the vein of the Robinson mine passing out of the side line in depth. The available capital of the company, it is stated, is £2,753 8s. 6d. The price of these adjoining claims is £39,000. After a consultation some time previous it was determined to appoint a committee to consult with Mr. Crawford in New York, which made the following arrangements with the vendor: Mr. Crawford stated, in the first place, that he is willing to supply all necessary money for development work out of his own pocket, allowing the operations to be carried on under the direction of the company's superintendent. In the second place, that as soon as Mr. Crawford has made profits amounting to \$300,000 the claims will belong to the company free of any expense. After a certain amount of discussion, in which Mr. Crawford's policy and dealings with the company were complimented to a high degree, the proposition was accepted.

Pitkin County.

Mollie Gibson Consolidated Mining & Smelting Company, Aspen.—According to the Aspen papers,

the disputes and differences between Mr. J. J. Hagerman and Mr. H. B. Gillespie have been settled, though it could not be ascertained on what terms.

Summit County.

According to the "Summit County Journal," the shipments of ore and concentrates from Breckenridge for the month of May amounted to 520 tons, making a total for the year to date of 2,478, against 2,211 tons for the same period last year, a gain for 1892 of 267 tons.

The Decatur Mines, Limited.—This company, owning a group of silver and lead mines 12 miles from Keystone, held its annual meeting in London on the 23d ult. Mr. F. A. Thompson, the chairman, stated that the 300-ft. McNulty tunnel cuts the vein at about 100 ft. in depth. From the point of intersection a drift has been run south 313 ft., which has developed a small stope of good ore. The Grant tunnel, 35 ft. beneath the preceding tunnel, has run 380 ft. through the vein, a considerable portion of which, it is said, has been discovered. The Kulu tunnel, 150 ft. below the McNulty tunnel, has cut the vein to 225 ft., but drifting has not exposed the ore bodies as discovered above. Large quantities of low grade concentrating ore, it is stated, are being saved at the mine for future treatment. It is said that during practically six weeks of working \$15,000 profit has been made, by which it is estimated that the future profits will be, at least, \$100,000 a year. The local management in Denver have secured John D. Murphy as manager. The chairman stated that there was a forfeiture if the company should not make the first payment within 60 days after July 29th, during which time the management would have an opportunity of extracting sufficient ore, if possible, from the mine to pay all expenses and this payment. The chairman evaded the question asking how it was proposed to raise this money should the mine not be profitable. This matter seems to be in considerable doubt at the present time.

IDAHO.

Alturas County.

Champlain.—After a period of inactivity covering two years this property is about to resume operations, says the Wood River "Times." Mr. Bailey, who is part owner and manager, is looking for miners. As the property is already opened up it will require but a small crew. The Champlain mill is a Huutington, of 20 tons capacity, with two Duncan concentrators attached. Mr. Bailey would give the McArthur Forrest cyanide process a trial, but it appears that those who have the handling of it in this State want an excessive royalty, so that its use in working low grade ores is out of the question.

Kootenai County.

The strike of the Coeur d'Alene miners is affecting the trade of Missoula, Mont., and its Board of Trade has, according to the Butte "Miner," adopted resolutions recommending that a board of arbitration be formed with the hope of settling the difficulty.

Helena & Frisco Mining Company.—This mine, near Gem, is reported to have 53 non-union men employed, but the old-timers pay little attention to them, as no ore is being run through the mill.

Surprise Mining Company.—According to A. Klockmann, in the Spokane "Review," there are now about 100 prospectors in the country working around the foothills and waiting for the snow to leave the mountain tops, which will be in about one month. The last 15 miles to the summit is yet without a trail. There are strong indications of placer gold in the same district; in fact, some coarse gold has already been found, which gives additional zest to the work of prospecting. Many believe that the Priest Lake country will in time prove richer than the Coeur d'Alenes. The difficulty of getting in and out is the great barrier at present. The interest over the recent mineral strike at Kootenai station continues to increase. The Surprise Mining Company has been formed, with H. A. Stude president and E. M. Gillette secretary and treasurer. Assays show an average of \$8 in silver and 25% lead. Work has been done so far to a depth of 15 ft. and shows the body of ore increasing in extent.

Shoshone County.

Argentine Mining Company.—All the men of this company, says the Spokane "Review," have been laid off. The reason given is that the machinery for the new concentrator has not arrived, and it will not be economical to do further work until the ore can be run through the concentrator.

Bunker Hill & Sullivan Mining Company.—The changes in the Bleichert tramway of the Bunker Hill & Sullivan have been completed, says the Spokane "Review." They were made by the manufacturers, the Trenton Iron Works. The brake station in town has been taken out, the cables being now continuous from the ore bin at the mine to the concentrator two miles distant. The tightening weights are at each terminal. The cables have been raised 100 ft. higher over the town, reducing the rise in crossing the divide west of the town. This change reduces the danger of accidents by the clutches becoming detached, and increases the carrying capacity of the tramway. It is now believed that it will do the work as warranted—viz., 400 tons of ore down and 100 tons of back loads every 10 hours. The back loads are provisions for the boarding-house, steel, tools, cordwood, timbers, etc., for the mine. At the concentrator two Gates spring crushers are being placed in position to supersede the Blake crushers. They weigh 5 tons each.

Gem, Wallace.—It is reported that Charles Kipp and Ben A. Kipp, of Milwaukee, Wis., have sold this mine to an English syndicate for \$980,000. The property is a lead and silver mine, and was bought three years ago by Kipp Brothers for \$30,000.

Last Chance Mining Company.—Work is progressing in the Sweeney tunnel of this mine, says the Spokane "Review," the water having been reduced so far as to permit operations. The tunnel, after cutting the ledge, was driven directly under the old stopes in the upper works that were filled with water. The great pressure of the water opened crevices in the ledge that admitted sufficient water to entirely fill the big bore a distance of 100 ft. from the face toward the mouth of the tunnel.

KANSAS.

Cherokee County.

During the week ending June 4th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,479,470; rough ore, pounds sold, \$22,130; zinc ore, pounds sold, 925,650; lead ore, pounds sold, 193,840. Sales aggregated a total value of \$15,396.

MICHIGAN.

Copper.

Calumet & Hecla Mining Company.—At the 20th level in No. 12 shaft, South Hecla, there is a very fine run of copper ground. It looks like a shoot from the south and is about 8 ft. wide. For a number of levels this shaft has been out of the shoot which started in at the north end of the Osceola and which has yielded so much copper. And the new shoot looks very much as if it came over from the Osceola. The bottom of No. 12 must be about 1,000 ft. or over from the Osceola boundary. A cross-cut from the southern part of the amygdaloid workings might strike something of value. This new shoot may in time explain the better ground in south end of Tamarack No. 1.

Osceola Mining Company.—The production of mineral from this company's property for the month of May was 336¼ tons against 335 tons for April and 300¼ tons for May, 1891. For five months the product has been 1,648¾ tons, against 1,500¼ tons last year, an increase of 148 tons.

The Quincy Mining Company.—A force of about ten men are engaged in removing the dirt from the mouth of the old adit of the Quincy. The adit was driven and worked for exploring purposes, but has been abandoned for 28 or 30 years, and three or four years ago the dirt caved about the mouth of the opening and closed it up. The adit connects with two shafts on the hillside, and old miners say when it was driven the show for mineral was very good. The company now propose to open it again when the locality will be thoroughly explored. The ties are being removed from the incline, part of which will be used for timbering at the mouth, but as it runs through heavy ground before entering the solid rock, new timbers will be necessary for inside work. It is hoped the work will bring the company good returns and extend the interests and value of the property.

Tamarack Mining Company.—Visible indications are much better than a year ago. The ground at the bottom of both shafts is excellent, and whenever the Osceola vein has been opened it is better than the average in the Osceola mine itself, says the Calumet "Conglomerate." This is a very persistent vein and its richness in the Tamarack means much to this region. From all signs one must draw the conclusion that it alone would make an enormously rich mine on both Tamarack and Calumet and Hecla properties. There is certainly a greater feeling of security concerning Tamarack here now than there ever has been before, notwithstanding the esteem in which it has been held as an investment.

Tamarack Junior.—A letter from Superintendent Daniell, of this mine, according to the Boston "Transcript," states that the lode in No. 2 shaft has widened to 4 ft., with indications of greater width as greater depth is attained. The character of the lode has improved. The lode has increased in width 2 ft. during a week. In the No. 1 shaft there is a marked improvement, this time on the third level, and the openings going south all show well.

Iron—Menominee Range.

Chapin Iron Company.—The Chapin mine is to be assessed at a larger valuation than was placed on Iron Mountain last year. Superintendent McNaughton placed the valuation at \$1,800,000, which was considered a fair valuation by the board of review, and it stands at that. In addition the forty owned by the company is assessed at \$38,000, personal property \$40,000, and their interest in the Hydraulic Power Works \$85,000, making a total of \$1,973,000. Including other small pieces of property, the Chapin Mining Company will pay taxes in this county on a total valuation of nearly if not quite \$2,000,000. The Ludington mine valuation is placed at \$70,000, Hamilton \$40,000, Millie \$60,000, and Pewabic \$70,000.

Mastodon Iron Company.—Capt. E. S. Roberts is putting down a stand pipe in the swamp immediately north of the Mastodon mine, in the hope of locating a lens of ore which is thought to exist in that locality. The sand debris from the cave-in which occurred at the mine two years ago is being run down to the foot-level and will there be used as filling, thereby giving clean space for the removal of the ore above, which will be taken out as rapidly as possible. There yet remains a considerable quantity of ore in

the southeast deposit, which will occupy the attention of the management when the time comes. The stockpile is of good weight, and Capt. Roberts is of the opinion that things will be in condition by the first of the coming month to ship ore.

Delta County.

Delta Steel & Iron Company.—The "Escañaba "Mirror" says the deal for the location of the Delta Steel & Iron Company has been closed, and that the company will locate its works in that city. The company is incorporated with a capital stock of \$1,500,000, and will give employment to between 800 and 1,500 men.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, June 6th.

The mines opened up a week ago completely flooded, as on Sunday night there was a perfect deluge, causing great damage throughout the entire lead and zinc belt. Many properties have shut down to wait for fair weather. Zinc ore has been in good demand at \$26 to \$26.50 per ton. Some reserve stocks were sold at the advanced price. The Eleventh Hour Company of Cartersville sold 1,000 tons at \$26 per ton. Lead ore opened at \$24 per thousand and closed at \$24.50. Following are the sales from the different camps: Joplin mines, 1,250,565 lbs. zinc ore and 143,810 lead, value \$30,900.75; Zincite mines, 48,910 lbs. zinc ore and 2,250 lead, value \$581.25; Oronogo mines, 2,660 lbs. zinc ore, 20,000 lead, value \$505.40; Carthage mines, 189,000 lbs. zinc ore and 500 lead, value \$2,487; Galena, Kan., mines, 947,340 lbs. zinc ore and 198,840 lead, value \$15,750; district's total value, \$84,699.40. Aurora, Lawrence County, mines, 190,000 lbs. zinc ore, 413,200 lbs. silicate and 180,000 lead, value \$9,090. Lead and zinc belts' total value, \$84,699.40. The most important transaction of the week was the closing up of a sale of a 40-acre lease on the Rex. M. T. S. Co. land to an English syndicate for \$20,000. The property was examined and recommended by W. B. Jeffery, mining engineer, of London. This is a new property, but as far as developed is proving very productive. The Gregory mine was the first to strike the ore body on this lease, and was also the first to open the ore on the 1,000-acre tract. This mine is now paying an average of \$500 per week. There are three other properties that have cut the ore and commenced washing. Up to the present time the English capitalists have been unfortunate in their investments in southwest Missouri, but they now have secured a promising property. Mr. Haxter, president of the Empire Zinc Company, came in from New York last week and spent several days in looking over the company's mines and smelter here. Mr. Samuel J. Smith and Col. J. L. Motter have organized the St. Joe Mining Company, and taken a lease on 10 acres of the 1,000-acre tract.

MONTANA.

Beaver County.

Jay Hawk & Lone Pine Consolidated Mining Company, Limited.—A special general meeting of this company was held in London on the 24th ult., to receive the report of Mr. J. W. J. Lavington concerning the company's property. Mr. Lavington said that the 700-ft. level had been extended westward 100 ft. from the shaft in high grade ore, but the end of the drift had arrived at a fault. Extensions, however, are being made to cut the lode again. The 850-ft. level is 75 ft. on the lode and contains 4 ft. of good ore. The shaft has finally reached the depth of 950 ft. going downward, and is in rich ore. The Jay Hawk mill, says Mr. Lavington, is not adapted to treat the ore of the mine, 60% only being saved. The two mills of 20 stamps were able to crush about 32 tons per day, and Capt. Prideaux, the manager, recommended that the Jay Hawk mill be shut down and the Lone Pine mill be increased to 15 stamps. This improvement was made, and now the Lone Pine mill is crushing all the ore produced. The hauling of the ore from the mine has been admitted to be a serious and expensive question, but it is expected to be satisfactorily settled. The total amount received from the sales of silver from this property up to the present time has amounted to £19,059, 105,000 oz. being sold at an average cost of 88 cts. per oz. The American cost was £12,907. In addition to this £1,124 has been paid for alterations in the mill and £3,186 is to be paid for the debts of the old company. These expenses included in the London office charges of £1,551, leaves a balance of £3,359. Mr. Lavington states that a production of \$7,000 a week will be made in the future, while mining expenses, according to the manager, will not exceed \$2,250 a week. The chairman stated that in all probability a dividend would be paid during this month.

Gallatin County.

Riverside.—A tunnel has been run in on the vein about 800 ft., says the "Daily Inter-Mountain," which now reaches a depth of 700 ft. on the dip of the lead. The vein averages about 6 ft. wide, with a good grade of concentrating ore throughout most of the development, besides several chutes of high grade ore which have been cut. It is proposed to work the mine in a systematic manner, and not put up expensive reduction machinery until the mine is sufficiently developed to justify a move of that kind. So far all the work has been done by hand, but a steam power plant and an air compressor are now being put in, and hereafter Ingersoll rock drills will

be used. A straight two-compartment shaft has been started near the mouth of the tunnel and is now down 20 ft. It will be sunk 200 ft., and the lead will then be thoroughly prospected at that depth. If it proves to be as good there as it is above a reduction plant will be put in.

Jefferson County.

Elkhorn Mining Company, Limited.—The report of the manager of this property states a profit of \$37,523. Bullion valued at \$8,200 was produced during the week ending May 21st.

Iron Rod.—P. A. Largey has ordered, says the "Daily Inter-Mountain," a 20-ton mill for the Iron Rod mine in Jefferson County. The mill will be run by the cyanide of potassium process, and the contract for its erection has been let to Montana manufacturers. The Iron Rod ore contains a large percentage of antimony and acid sulphates. It was found that those ingredients neutralized the effects of the cyanide of potassium, but experiments were made to overcome the difficulty by the addition of lime.

Kit Carson.—J. R. B. Coon, of Butte, has taken lease and bond on this mine, says the Helena "Independent," for \$60,000, the bond to run one year. The owners are Hauser, Holter and the Beatties, of Helena, who form a company, the stock of which has been placed in escrow in a Helena bank.

Montana Mining Company.—This company is now directing efforts to reach the surface from the Nine Hour mine, which task they expect to accomplish in about ten or fifteen days by way of the old Nine Hour shaft.

Lewis and Clark County.

Silver Wave Mine.—This property, says the Helena "Daily Journal," is about to resume operation after a shut down of some months, under the personal management of Mr. Albrecht, one of its owners, but on a more extensive scale than any time heretofore. This property, which produced several hundred tons of shipping ore during the few months of last summer, netted its owners something like \$10,000. It will again, in a few weeks, be on the shipping list, the owners having contracted with the East Helena smelter for the delivery of 600 tons of ore from the mine during the next three months. Between the 100-ft. and the 150-ft. levels is a block of ore from 4 to 8 ft. wide to draw from. It is the intention of Mr. Albrecht to continue sinking immediately from 50 to 100 ft. deeper, drifting therefrom to the main shoot of ore.

Meagher County.

Queen of the Hills Mining Company.—This company has, says the Neihart "Herald," run in a tunnel the distance of 1,400 ft. and has in sight a body of ore which is estimated to contain from 30,000 to 50,000 tons. This is low grade averaging 30 oz. of silver to the ton, and will not pay to mine and ship. The Queen cannot be called a low grade proposition because sufficient depth has not been attained to prove it as such. So far the workings have proved the deeper they have gone the richer the ore is found to be. On the surface the present ore body will assay 17 oz. in silver to the ton, and as depth has been obtained the value of the ore has increased until it has reached 60 oz. in silver to the ton.

Silver Bow County.

Butte & Boston Mining Company.—The new buildings will be slightly larger than those destroyed in the recent fire, and will be built with a view of rendering another conflagration impossible, says the Anaconda "Standard." They will be constructed entirely of steel and iron and will be covered with corrugated copper. All the braces, stays, cross-pieces and supports will be of either iron or steel. In addition to this measure of precaution, however, Captain Palmer will have hydrants placed at all available points throughout the different buildings, so that an abundant water supply may be had at a moment's notice. While the new buildings will be larger than the ones that were burned down the capacity of the smelter will remain the same as before. The plans for the buildings have just been drawn by Leonard & Ray. The main smelter will be 304 ft. long by 54 ft. wide. The building which will be erected over the O'Hara furnaces will be the next largest in size and will be 210 ft. by 105. The small O'Hara furnaces will be covered by a building 128 ft. by 54, and the Bruckner building will be 124 ft. by 48 ft. The furnaces were not much damaged by the fire, and can be easily repaired by the time the buildings are up. About 400 men were laid off at the time of the fire, and as many of these as can be used will be put to work on the new buildings.

NEVADA.

"Judge Hebbard is the best friend Nevada ever had. He has done more for the mining industry there and throughout the Pacific coast than any other man who has arisen."—"S. F. Argonaut," June 6th, 1892.

Elko County.

(From our Special Correspondent.)

Coptis Mining Company, Tuscarora.—Considerable quantities of high grade ore are being taken out. The mill started up last week, the first sample giving \$75.36 in gold and \$15.08 in silver. Eighty-two per cent. of the assay was saved.

Nevada Queen Mining Company, Tuscarora.—There has been received from the Union Mill Company \$30,000 on account of ore. The Grand Prize

concentrator is now running on ore from this mine, and crushed 473 tons and 100 tons Combination last week. There were extracted from the openings on the second level last week 117 cars of ore, showing per average battery assay \$269.80 per ton, and 610 cars second-class ore, showing an average assay from concentrator of \$29.72 per ton. The third level produced four cars of ore, averaging \$375 per ton, and eight cars of ore averaging \$45 per ton. The official report for the week represents the outlook in the mine as very favorable, as follows: "South of west intermediate drift, second level, is all first-class ore, and will average about \$200 per ton; on north side 1½ ft. of first-class, balance second-class. Stopes started 15 ft. from chute 1 have broken into the ore from the footwall up, 14 ft., no hanging wall as yet. The ore extracted is one-fourth first-class, average assay \$190 per ton, the balance second-class, average assay from battery \$29.72 per ton. East intermediate stopes from chute 2 have 2 ft. \$185 per ton; west stopes from same chute the ore is over 4 ft., average \$220 per ton. East intermediate from No. 3 chute advanced 16 ft.; south from same 15 ft. and west 5 ft., connecting with No. 5 chute. From No. 5 have run 12 ft. toward No. 6, and east from No. 6 5 ft., 1 ft. of first-class ore in both drifts. No. 7 and No. 6 chutes have been connected, exposing ore all through. South drift on west vein has been run 15 ft., exposing 1 ft. of ore, assaying \$250 per ton. North drift extended 9 ft., 1 ft. of fair-grade ore. Stopes between the south and north drifts are looking well. No. 1 winze from south drift is down 20 ft., exposing 1½ ft. of first-class ore, but not looking so well in the bottom."

Storey County—Comstock Lode.

Alta Mining Company (official).—No. 2 winze 19 ft. in quartz yielding low assay. Started two cross-cuts, one 60 ft. north of the shaft and the other 50 ft. south, which have been driven 9 ft. and 6 ft. respectively. Both are in favorable material. The south drift from No. 2 upraise was advanced 11 ft. in low-grade quartz. Car samples assay from \$5 to \$14 per ton. Our pump column is giving us trouble, owing to its oxidized condition. It is leaking badly in different places and the only remedy is to repair it with new 12-in. columns.

Consolidated Imperial Mining Company (official).—Some fair ore from old fillings and small streaks found on the upper levels is being mined and sent to the Brunswick mill for reduction.

Crown Point Mining Company (official).—The face is in clay, quartz and porphyry and small streaks of low-grade quartz. Are still opening out on the pay streaks on the 160-ft. level and are saving a few carloads of ore from that daily. Have shipped to the Mexican mill during the past week 237 tons and 120 lbs. of ore, the average battery sample of which was \$24.20 per ton.

Challenge Consolidated & Confidence Mining Company (official).—The joint Confidence & Challenge north drift on the 200-ft. level is being repaired. The joint Confidence & Challenge raise from the north drift on the 200 level is up 106 ft. The top shows quartz having no value. We are still taking out ore from old fillings and small streaks on the upper levels, which is being sent to the Brunswick mill.

Consolidated California & Virginia Mining Company (official).—1,600 level: We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted. The ore streak on the east side of the old stope timbers has become narrower and of purer quality. 1,650 level: We have continued prospecting west from the upraise, 35 ft. above the sill floor, which was carried up 59 ft. above the southwest drift. Ore of fair quality has been extracted from drift now east from winze 3 (down 73 ft.) in working upward from that point. From the north end of the California ground on the west side we are working in the old stopes and extracting therefrom some ore of fair quality. From the bottom of the winze sunk 28 ft. in this locality through the old timbers, on the east side of the northwest drift, a south drift has been advanced in a porphyry and quartz formation of low assay value. 1,750 level: In east cross-cuts 1 and 3 from the main south drift, in working upward from the sill floor, we have continued to extract some milling ore. 1,800 level: Along the south end of the drift running south from the cross-cut run east from the winze 1, sunk from the 1,750 level, we have continued to extract some ore from the sill floor upward of milling value. Winze 2, started in the drift run north from this same east cross-cut, has been sunk 15 ft. Its total depth is 30 ft., continuing in a quartz formation carrying a low assay value. There have been extracted from all parts of the mine during the week 1,078 780-2,000 tons.

Hale & Norcross Mining Company (official).—900 level: We are extracting ore from above this level and repairing the main drift; we hoisted from this level during the week 233 cars of ore. 1,000 level: The south drift from the 900 north winze, started last week, has been advanced 15 ft.; its face shows some fair-grade ore; we have laid a track and timbered this drift as we have advanced; this level furnished 15 cars of ore during the week. 1,100 level: From the far north and south stopes above this level we are stopping out ore; there is no change of importance in these stopes since last report; we are doing considerable repairing on this level, and hoisted from the same during the week 140 cars of ore. 1,300 level: We are stopping out ore below this level,

north and south from the winze. We are also working at the new station and chute at the head of the main incline, and retimbering the north drift from the station. We extracted from this level 38 cars of ore during the week.

Kentuck Consolidated Mining Company (official).—Stopping is being done on the ore streaks above the 160 ft. level north lateral drift, which is being followed south and upward. We are saving from one to two tons per day of fair grade ore, and have about 90 tons on hand in the dump on the surface, which we will have milled during the coming month.

Overman Mining Company (official).—Extracted from 1,100 and 1,200 levels 82 tons and 1,825 pounds of ore. Car samples average \$28.22 per ton. The battery assays average \$22.33 per ton.

Ophir Mining Company (official).—1,465 level: Work was resumed in the drift running south 101 ft. below the sill floor on the 1,465 level, from the Mexican into the Ophir ground, and 10 tons of ore were extracted and raised to the surface. The average assay value of this was \$19.95 per ton. The face of the drift is in porphyry and quartz, carrying an assay value of \$19.50 per ton.

Potosi Silver Mining Company (official).—The south drift, 1,150 level, is out 50 ft. from the winze; it shows about 2 ft. of ore which yields fair assays. The winze is down 323 ft. below the 1,500 level; bottom in low-grade quartz. Extracted and sent to mill in the past week 423 600-2,000 tons of ore from the 930, 1,100, 1,150 and 1,250 levels. On hand at mill, 80 1,200-2,000 tons; average battery assay, \$22.19. Sent to the mint, 417 lbs. of bullion.

Savage Mining Company (official).—We have hoisted 527 cars of ore from the 500, 950, 1,100, 1,400 and 1,450 levels; shipped to the Nevada mill 525 tons and milled 525 tons; average car-sample assay, \$23.16; average battery assay, \$21.29; bullion yield for the week, \$7,822.50. We are prospecting on the different levels.

(From our Special Correspondent.)

Brief allusion has already been made in these columns to the independent attitude taken by the residents on the lode with regard to certain of the favorites of the mill ring who heretofore have done much of the dirty work for their employers. The "white slaves" showed signs of revolt against their masters, and for a time it seemed as if at the coming elections they were about to make an independent effort to free themselves—so far, at least, as politics is concerned—from the incubus that weighs them down. Their feeble effort, however, was crushed in its incipency; the "white slaves" have again been whipped into submission, and—ye gods, will it be believed!—Evans Williams, Superintendent of the Nevada mill, organizer and manipulator of the "Little Joker," principal of the Bullion and Exchange Bank at Carson, and "right bower" of the thievish gang of conspirators, Messrs. Jones, Hayward and Hobart, has been sent as delegate-at-large to the Republican convention at Minneapolis. R. P. Keating, ex-Superintendent of the Hale & Norcross mine, who placed with his own hands the brand of "thief" upon his brow, and shared with ex-President Levy the shame of first looting the mine, and then, content with their ill-gotten gains, sought to evade an accounting by escaping from the jurisdiction of the California court, like any other larcenist who saw San Quentin looming ahead—this fellow has been sent to Chicago in similar capacity as Williams, in the Democratic interest. By these appointments Senator Jones will be well represented in both conventions, and certainly what these two appointees lack in honesty they try to compensate for in effrontery.

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

Mine.	Tons hoisted.	Car Sample assay.	Tons milled.	Average bat. assay.	Bullion for the week.	Bullion shipped.	Bullion retained.
Con. Cal. & Va.	1,078	29.07	980	22.96	...	\$46,806.04	...
Crown Point.	...	...	237	24.20	...	...	...
Hale & Norcross	1426	22.37	427	15.89	...	...	...
Ophir	...	10	19.95	...	...	...	...
Overman	82	28.22	...	21.33	...	8,292.11	...
Potosi	...	...	...	...	...	...	...
Savage	527	23.16	525	21.29	7,822.50	...	...
Yellow Jacket	...	...	406	...	...	...	...

* Total amount to May account, \$50,175.23.

† Cars.

Chollar Silver Mining Company.—Toward the close of last year the Engineering and Mining Journal made mention of several suits commenced by Theodore Fox and his attorney, H. G. Sieberst, against Comstock mining companies, and among others one against this corporation. There is no necessity to dilate on the purpose of Mr. Fox in instituting these suits; his record has heretofore been given. Mr. Sieberst is a gentleman of large cranial and abdominal development, who acted as one of the attorneys for the defense in the Hale & Norcross suit. Before a decision had been handed down in that memorable suit he saw fit to sue Messrs. Hayward, Hobart, Levy, Bridge, Sell and the Nevada

Mill & Mining Company for \$20,000, his fee in assisting in the defense. For some time, it appears, he had to hunt from pillar to post for his fee, but it is reported that his claim has been satisfied—but not with any such sum as \$20,000. To-day Martin W. Fox intends to continue his self-appointed task of acting as a "thorn in the flesh" to the Comstock thieves. He will appear before Judge Hebbard and petition that his name be inserted as party plaintiff in the suit filed against the directors of the Chollar company. By taking this course of action Messrs. Theodore Fox and Sieberst will not be able to settle the suit out of court, as on a previous occasion, and while these gentlemen may lose a few thousand dollars the public will benefit if the suit results, as it most assuredly will, in a decision being again obtained against the dummy directors and their thieving backers. It will be remembered that during the trial of the Hale & Norcross suit Hayward, Hamilton, Hobart and others of the clique owning stock in the Nevada mill, all professed the most dense ignorance as to how they became financially interested in that money-making concern. When the Chollar suit comes to trial these gentlemen will, each and every one, be given the lie direct, and the true history of their connection with the Nevada (Chollar) mill made plain. Meantime an assessment of 50 cts. per share has been levied on Chollar stock.

Hale & Norcross Silver Mining Company.—At last a full and detailed statement of the working of the 110 tons of ore, for a test at the Occidental mill, has been made known. The figures, as given below, have upset the equanimity of Messrs. Evan Williams, Keating and other of the old-timers, and as a natural consequence has given great satisfaction to the multitudes who are in favor of honest methods in mining.

One hundred and ten tons of ore, worked at the Occidental Mill; average assay value—gold, \$5.16; silver, \$10.08. Total per ton, \$15.24. Total (silver at \$1.29-29), \$1,876.40. Produced 4,300 lbs. concentrates having a gross value (silver at \$1.29-29) of 970.37; silver 414.9 ozs. @ 80% c. \$360.00, gold 19.034 ozs. @ \$19,361.65. Total, \$721.85. Cost of working, \$51.81; net proceeds, \$669.84.

Assay value.—Gold, .845, 174.67 oz.; silver, 1.98, 256.12 oz. Total, 430.80 oz.

Bullion product.—Gold, \$393.46; silver, \$576.91. Total, \$970.37.

By pan process.—Gold, \$95.85; silver, \$391.33. Total, \$487.18.

It will be noted that the concentrates were 59.18% of the yield, and yet Evan Williams and his henchmen very calmly sat on the witness stand during the Hale & Norcross trial and deliberately perjured themselves by saying that the concentrates were of no value. In the light of the above showing no wonder the mill men were glad to claim the concentrates as their own. An interesting query arises: On the basis of the above test, what amount of bullion did the mill ring get away with unlawfully after milling 90,000 tons of Hale & Norcross ore which often ranged to \$40 and \$50?

White Pine County.

New Eberhardt.—The mine manager reports as follows: Eberhardt—No. 3 cross-cut west advanced for the week 10 ft.; total length, 193 ft. The outlook for ore in this drift is quite favorable; the whole face of the drift seems to be a mixture of decomposed quartz, manganese and black spar, although of no material value. Five samples taken from the face of this drift yesterday by me assayed as follows: \$4.40, \$3.14, \$3.56, \$4.71, and \$3.14. Monitor Mine: At this place there has been nothing new met with. We are still taking out the usual 14 tons of ore, of an average of \$42.42 per ton.

PENNSYLVANIA.

Coal.

Work on the addition to the Pyne breaker at Taylorville is partly under roof. The new breaker will be used for a "bony crusher." It is 98 ft. wide, 75 ft. long and 68 ft. high.

The Union Coal Company, of Shamokin, is making preparations for two new collieries which it is proposed to work ere long. From what can be learned the company will sink a shaft at the one colliery, and the other will consist of a series of slopes. The breakers will be large and will employ from 1,000 to 1,500 men and boys. One will be erected on the Deeter farm near Maysville, the other near Green Ridge. The company owns extensive tracts of coal lands at both these places.

It is reported that two of the largest collieries in the Wyoming region, the Avondale, of the Delaware, Lackawanna & Western Railroad Company, and the Nottingham, of the Lehigh & Wilkesbarre Company, have been compelled to shut down on account of the filling up of the workings with surface water which has flowed in through cave holes, as a result of the recent heavy rains. It will probably be two weeks before the pumps will be able to overcome the water.

Leisenring & Co. are opening a new slope at their Oak Hill colliery, near Mount Laffee, Schuylkill County, which will have a depth of 1,000 ft., and will be used principally for lowering the men and timber. It will have a single track, and will also be used for hoisting coal. An opening was made from the bottom by working a breast to within 15 ft. of the surface. Men are now engaged in widening and timbering it. The foundations for a new hoisting engine are in course of construction.

Mining circles are interested in the prospective

transfer of the only remaining large tracts of undeveloped coal lands in the Schuylkill region not controlled by corporations, it having leaked out that Pennsylvania Railroad capitalists have secured an option on the Silverton and Tuscarora lands and have begun prospecting operations thereon. The former lands are located near Minersville, on the line of the new extension the Pennsylvania Company is constructing west from Pottsville, and just as soon as some old litigation is settled the new owners will take possession. The Tuscarora lands are a little west of Tamaqua, and contain nearly 2,000 acres of valuable deposits. On the eastern border of this tract the Reading Company is opening an immense new operation at Silver Creek. The Tuscarora lands are owned by the estates of F. B. Gowen, P. W. Sheaffer, and others, whose representatives have repeatedly refused offers of over \$1,000 an acre for the property. The Sheaffer family are friendly to the Pennsylvania Railroad, and it was through them that Scranton mining experts recently secured the Chamberlain tract, on the northern outskirts of Pottsville, for the Pennsylvania people. President Frisbie, of the Schuylkill & Lehigh Railroad, and the Leisenrings recently, it is said, offered \$1,500 an acre for this tract, but could not get it. Between 2,000,000 and 3,000,000 tons of coal per annum could be readily shipped from the Tuscarora tract. The Sheafers expected to consummate the deal without publicity, and refuse to affirm the authenticity of the report, but sufficient has leaked out conclusively to prove that the Pennsylvania can have the tract, and will take it, if "prospecting" warrants the payment of the high price demanded. That this tract is very valuable is evidenced by the fact that in its present state of wild mountain land it is assessed an average of several hundred dollars an acre.

Berwind-White Coal Mining Company.—It is announced that this company will furnish the greater part of 225,000 tons of bituminous coal for the New York & New England Railroad.

SOUTH DAKOTA.

Inter-Ocean Mining Company.—Development work on the mines of the company is being steadily carried on, says the Black Hills "Daily Times." Bear Gulch or Nigger Hill district, in which it is situated, is famous for its rich placer ground, in which large nuggets and coarse gold is a feature. All the tributaries as well as the main gulch have been worked since 1877, with very good success.

Lawrence County.

The output of the Homestake properties for the last half of May amounted to \$210,000, according to the "Black Hills Times." Besides this, the Golden Reward produced \$19,500 for the same period. The latter will ship in a day or two about \$1,500 worth of concentrates from their last clean-up, which swells their production to \$21,000 for 16 days' run. These two companies ship regularly on the 3d and 17th of each month, and numerous smaller shipments are made intervening. The Big Missouri yield is not yet known, but is claimed will make the total a quarter of a million. Aside from these the small shipments are accorded little attention, but will no doubt amount to upward of \$50,000 per month.

Deadwood & Delaware Smelting Company.—This company is now paying Denver rates on all gold, silver and lead ores, says the "Black Hills Times," thus placing Deadwood on the same basis as the noted Colorado City, as far as an ore market is concerned for smelting ores and concentrates. The new stacks ordered some months ago from Fraser & Chalmers, under written contract to be delivered in 60 days, were shipped last Saturday from Chicago and should arrive this week. Dr. Carpenter, superintendent and manager of the works, is using all efforts to accumulate enough ore to keep the plant in constant operation, with every prospect of success. Various mines that are now shipping their products to Omaha, Aurora, Denver and other outside smelters, can do equally as well, it is claimed, by selling their ores to the Deadwood & Delaware Smelting Company, who are in the market as purchasers of a single ton or car load lots. The Homestake Company is now disposing of about two carloads of concentrates per day to this company, the product of the Perfection tables now in successful operation at the Homestake mills.

Welcome Mine.—This property, according to the "Black Hills Times," which has been virtually at a standstill owing to the inflow of water, has resumed operations. A force of men was started to work recently to clear the mine of water. It is expected that the shipments of ore will be commenced not later than June 10th.

UTAH.

Juab County.

Centennial-Eureka Mining Company.—This company, says the Tintic "Miner," has started to enlarge the shaft from the surface to the 400-ft. level to a double compartment and man-way. A great many other improvements are being made to correspond with the new plant.

Mammoth Mining Company.—This mine has made a draft of part of its force, says the Salt Lake "Tribune," on account of the low price of silver and the loss consequent to shipping much at present quotations. Below the 1,000 level in the shaft another strike of ore is reported, the extent of which is not known. The shaft is to be sunk 1,200 ft. at present, after which it will probably be necessary to put in a new hoist to attain further depth. The extent of ground covered by the Mammoth Company's claims

—some eighty acres—with the finding of ore below the 1,000 level, point to a large production for some time to come.

Salt Lake County.

Gold Hill.—A mill is now being erected, the machinery for which is now on the ground or will be in a very short time. The mill will have a capacity of at least 50 tons a day, and will be in operation within a very short time.

Mercur Mining Company.—The mill, says the Salt Lake "Tribune," has been slightly enlarged, and now has a capacity of about 35 tons per day, and more tanks will be put in before long. The ore body has been further explored, and has been opened up in two additional places. A tunnel was started 200 ft. down the hill, and at a depth of 16 ft. the ore vein, 10 ft. wide, was struck, and 150 ft. up the hill the vein was struck 6 ft. wide, all the same character of ore.

WYOMING.

Albany County.

(From our Special Correspondent.)

Keystone Mining Company.—The Keystone mill, having abundance of water to drive their turbine wheel, has started up. They are now running 15 stamps, and crush some 20 tons of good ore a day. Having 500 tons of free-milling gold ore on the dump, they will probably run some time, at least until either water or ore gives out.

FOREIGN MINING NEWS.

BRITISH GUIANA.

The government, in order to raise revenue to meet the deficit caused by the McKinley tariff and to defray expenses of increased military protection to the colony caused by alarmist views as to the Venezuelan boundary question, have passed gold mining laws which are seriously hampering that industry. American citizens have memorialized Washington through Dr. Carroll, the United States Consul, to protect their vested interests in the colony. Portuguese citizens are memorializing their government in the same manner. The British inhabitants of the colony are holding public meetings and are sending home delegates to Lord Huntsford, Colonial Secretary. The United States Consul has already cabled Mr. Lincoln, United States Minister at London. If the Colonial Office does not stop the operation of these laws there will be serious disturbances here, as many nationalities have their interests at stake. The enforcement of these mining laws will paralyze the gold industry, which is the only hope of the colony, there being a falling off in sugar exports of over \$25,000,000 in the last seven years. Most mercantile houses are depending on the gold industry and a financial crisis is imminent.

CANADA.

Ontario.

The Port Arthur "Weekly Herald" reports the discovery of a vein of zinc not far from Schreiber, and near the railroad. The vein is from 30 to 40 ft. wide and on the surface is considerably fractured. It carries the zinc disseminated throughout the vein. An assay is said to have given 50% zinc.

Badger.—This mill, according to the Port Arthur "Weekly Herald," resumed operations on the 24th ult.; the mine is also being worked. There was some slight trouble that necessitated the closing down of the mine and mill for a few days, but the trouble has been amicably settled, and the mine will be worked steadily by a large force of men.

Empire.—This mine, says the Port Arthur "Weekly Herald," is still in the pay streak that was struck last winter, and a gang of five or six men have been steadily at work there since last fall sinking and developing on the location. The vein in one shaft is divided in two, but at a distance of about 100 yds. another shaft has been sunk which shows a union of the two veins into one solid and compact pay streak. Besides the silver in the vein there is found plumbago.

Port Arthur.—The "Duluth News" reports the discovery of a vein of silver ore about 20 miles from this place. The find is in the neighborhood of the Badger, Beaver and Rabbit Mountain mines.

GREAT BRITAIN.

It is reported that a discovery of tin has been made at Dolcoath mine, Cornwall, at nearly 2,500 ft. below the surface, the deepest point tin has ever been discovered. The mineral is said to be rich and of large extent.

The long strike of the Durham coal miners, which commenced on March 12th, was ended on the 1st inst., and the men will immediately resume work at the reduction in their wages which the strike was inaugurated to prevent. A meeting of representatives of the Durham Miners' Federation and of the Coal Mine Owners' Association was held on the 1st inst., at which the question of wages was discussed at great length. For a time the masters held out against letting the men return to work at the 10% reduction which the miners offered to accept, and insisted upon making a 13½% reduction. Finally, however, they changed their attitude and accepted the proposition made by the men to go back to work at a 10% reduction.

INDIA.

Mysore Gold Mining Company (Limited).—This company has declared an interim dividend (free of

income tax) of 3s. per share payable on June 14th. This dividend absorbs the sum of £33,750, and in addition to this capital expenditure to the amount of £10,413 has been charged against revenue.

SOUTH AMERICA.

Venezuela.

Callao Bis (Limited).—The report of the directors of the Callao Bis (Limited) states that the exhaustive report of Messrs. R. J. and W. Frecheville upon the property of the company, which was issued to the shareholders in January last, furnished complete information as to the then position and prospects of the works in progress. The quantity of quartz crushed during the year 1891 was 6,689½ tons, and the quantity of gold produced 8,712 13-20 oz., which realized £33,744 10s. 6d. It will be remembered that the company's mill was not started until June 23d last, and that prior to that time the quartz had to be carted to a hired mill in the neighborhood; also that 10 stamps only were used during the year, the addition of 10 stamps to the company's mill not being completed until January of the present year. The total mine expenditure, together with freight and agency expenses paid at Bolivar, shows at £47,099 14s. 5d., but this includes such heavy items as removal and re-erection of mill, erection of buildings and plant, etc., which it has been found difficult to apportion, and the accounts for the past year are, therefore, presented in the same form as previously. With regard to the cost of production, Messrs. Frecheville's report estimated that with 20 stamps running and with the grade of quartz then in sight, the output of gold may be expected to reach 1,500 oz. per month, and that this should leave a profit of £1,000 to £1,200, and the same time pay the cost of the further development of the mine. Should nothing unfavorable occur the accounts for the current year will undoubtedly show a satisfactory result. The directors, therefore, consider that they may congratulate the shareholders not only upon the maintenance of the good prospects which they had the pleasure of alluding to in their last report, but also upon the mines commencing to yield a profit upon the working.

TRANSVAAL.

Latterly capital has given DeKaap the cold shoulder on account of the numerous failures of gold mining companies. It is generally believed here that the failures have been due to recklessness, over-capitalization and incompetency of the many officers, such as presidents, secretaries and directors. To show that the gold is there and that it can be worked profitably by capable men, the following recent case may be quoted: The Republic Gold Mining Syndicate collapsed a short time ago, and the whole of its possessions were sold at a nominal price. Licenses, however, must be paid for claims, and as the new owners had no desire to be further troubled with calls and so forth, they were not long in finally disposing of most of the claims, including those which Mr. Alfred recommended the old syndicate not to touch, namely, the block known as "Trichard's Luck." Mr. Tom Andrews, a man well known for his ability in reopening abandoned mines, tried his hand at this property, and with his usual audacity first tackled the block which was esteemed the worst by the late company, viz., "Trichard's Luck." In the six months from October, 1891, to March, 1892, he treated 1,161 tons of rock from this mine and obtained 1,081 oz. of gold. This is an instance of the superiority of individual effort over the irresponsible management of companies.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, June 10.

Heavy Chemicals.—The market for heavy chemicals is practically as last reported. In some cases there has been a fair demand for spot goods, but on the whole the trade has continued very quiet and lacking in features of interest. The arrivals of carbonated soda ash and alkali have been quite free, but they were generally of goods contracted for. Caustic is quiet; some contracts for future delivery have been made at the prices fixed by the agents. There is nothing new to note of bleaching powder or sal soda. Both remain quiet. From our Liverpool report it will be seen that the market there is, if anything, duller than our own. Prices are as follows: Caustic soda, 70 per cent., 2-95 @ 3-10c.; 74%, 2-97½ @ 3-12½c.; 76%, 3-12½ @ 3-25c.; 77%, 3-12½ @ 3-25c. Carbonated soda ash, 48%, 1-55 @ 1-60c.; 58%, 1-47½ @ 1-52½c. Alkali, 48%, 1-55 @ 1-60c.; 58%, 1-47½ @ 1-52½c. Sal soda, English, 1-05 @ 1-10c. Bleaching powder, 2-15 @ 2-20c. on the spot, according to quantity.

Acids.—The acid market is in good condition. Manufacturers continue to report a good business; indeed, we are informed by some, that they are overcrowded. This plethora of orders is attributed to causes which we have mentioned in preceding issues. In a nut shell, it is due to an increase in the consumption and a decrease in the production. Prices continue unchanged in New York and vicinity. We hear that in Connecticut low prices continue to be made. We quote this week: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.00 @ \$2 according to quality; muriatic, 18", \$1; 20", \$1.12½ @ \$1.25; 22", \$1.25; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 90c. @ \$1.10; mixed acids, according to mixture: oxalic, \$7.25 @ \$7.75. Blue vitriol is quoted all the way from \$3.25

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	
Phila. & Erie R. R.	647	37,518	47,361
Cumberland, Md.	72,605	1,507,927	1,805,075
Barclay, Pa.	3,901	87,222	76,741
Broad Top, Pa.	11,325	252,768	225,617
Clearfield, Pa.	70,274	1,638,116	1,831,314
Allegheny, Pa.	19,922	513,812	588,312
Beach Creek, Pa.	40,172	1,103,511	1,007,267
Pocahontas Flat Top.	42,096	1,657,653	1,061,372
Kanawha, W. Va.	45,271	1,610,909	1,020,744
Total	307,123	7,239,566	7,663,833

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending June 4th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 95,970 tons; year, 2,402,704 tons; to corresponding date in 1891, 1,314,758 tons.

Anthracite.

Though the coal combination is quiet at present, it is generally expected among the wholesale dealers that there will be another advance in the price of anthracite at the beginning of next month and others later on. The investigating committees of the three States, New York, New Jersey and Pennsylvania, are still continuing their search for a legal loophole by which to destroy the deal. It is very doubtful whether they will be able to do so, for it is hardly likely that such an operation would be decided on without the very best legal advice having been obtained. Even if the committees did decide to test the legality of the combine by an action the litigation would be so protracted that the much needed relief would not come before a permanent injury had been done to the trade.

The best way to destroy the power of the deal would be for the public to begin to buy bituminous coal, but this course is not very likely to be carried out to any extent until matters become much worse than they are at present. What we expect will happen is that some of the cautious members of the deal will protest against a further raise, fearing long and expensive lawsuits, which would be disadvantageous to them even though they were decided in their favor. At the present time it appears that the 3,000,000 tons output agreed on for June will be too large and that in consequence the demand on wholesale dealers will not be particularly brisk for the next few weeks. The amount allotted for May, 2,750,000 tons, has been greatly exceeded. The actual figures are not to hand yet, but they will probably be some 3,350,000 tons. The output in the Wyoming district especially is at present larger than the amount allotted. Circular rates are obtained everywhere, and there is no hunting for new business.

Bituminous.

The bituminous coal dealers report no great increase in new business, but that their regular customers are taking their usual quantities at the same rates as before. There is no sign yet of users transferring their favors from anthracite to bituminous in consequence of the high prices forced on them by the combine. The *Commercial Bulletin* states that an attempt will shortly be made to form a combine in Western bituminous coal, but this we look upon as an impossibility, for bituminous coal is too widely scattered all over the Union.

The report published last week that the Philadelphia & Reading Railroad Company was intending to compete with the Pennsylvania Railroad Company in the matter of carrying bituminous coal to Buffalo and to this city is likely to prove true. The Reading people say that they certainly intend to get all the business in this line that they can, but that they have no intention of cutting rates. If they do, however, and a rate war in bituminous coal commences, we expect to see the two companies also quarrel in the anthracite deal and so overthrow it.

Freights from Philadelphia, Baltimore and Norfolk, to Boston and Sound ports, have advanced, although the trade in those ports is reported as being dull, with cutting on the part of Clearfield operators to \$3.15 on board cars, and concessions by the Georges Creek operators to \$3.45 on board cars.

NOTES OF THE WEEK.

A report says that several hundred acres known as the old Decatur tract, on the Moshannon branch of the Pennsylvania R. R., in the Clearfield district, have been purchased or leased in the interest of the Philadelphia & Reading and Beech Creek R. R.'s. The report goes further on to say that the Beech Creek R. R. will be extended from Phillipsburg to Houtzdale, and thence across to Altoona. A shaft will be sunk in the Decatur tract. Several attempts have been made to mine the Decatur tract, but so far always to the loss of those undertaking it.

The Union Coal Company, of Shamokin, Pa., is making extensive preparations for the two new collieries which they propose to erect before many months go by. The company will sink a shaft at the one colliery, and the other will consist of a series of slopes. The breakers will be unusually large, and will probably employ from 1,000 to 1,500 men and boys. The company owns extensive and highly valuable coal land at both these places, and will profit largely by the contemplated move.

Boston.

June 8.

(From our Special Correspondent.)

The principal topic of discussion in the coal circles here is the rumored advance in prices to be effected about July 1st by the coal combination. Of course as no body has any actual knowledge of the matter,

all sorts of speculations are indulged in. One says stove is likely to be advanced 25 cents per ton, while the other grades will be untouched. Another says he thinks that at most the advance on stove will be 10 cents, making the price 4.25, which will enable the combination to satisfy the individual mine owners, yet make a comparatively better profit than they are now making under ruling prices. The same party thinks it possible that egg and free broken may be advanced 10 cents per ton, but not beyond that as soft coal will come too closely into competition.

As for the market here very little can be said. The demand is light, yet prices rule very strong.

We quote net prices f. o. b.: Stove, \$4.15; egg, \$3.90; free burning broken, \$3.75; chestnut, \$4.05; Lykens Valley net at Philadelphia, free broken, \$4.50; egg, \$4.90; stove, \$5.40; chestnut \$4.50.

In soft coal there is very little doing. In fact there is so little doing that the companies are anxious to secure business and continue to offer concessions. Clearfield coal can be obtained without any difficulty at \$3.15 on cars here. George's Creek can be also had as low as \$3.45 on cars here.

Freight rates have stiffened considerably during the week, especially from the soft coal ports. From Baltimore rates are made at 85 cents. From Philadelphia as high as 85 cents is reported. Rates to Bath, Me., from Philadelphia are also up.

We quote: from New York to Boston, 60c.@65.; from Philadelphia to Boston, 75@85c.; to Portland, 80c.; to Bath, 85@90c.; to Providence, 70@75c.; from Baltimore to Boston, 85c.; Newport News to Boston, 70c.@75c.; Sound points, 70c.

The retail demand is not quite as good as it was. The trade seems to be temporarily well stocked. Prices remain very firm, however.

We quote: Stove, \$6; nut, \$6; egg, \$5.75; furnace, \$5.50; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6. Wharf prices 50c. less than the foregoing.

Buffalo.

June 9.

(From our Special Correspondent.)

In the absence of any news of importance relative to the anthracite and bituminous coal trade of Buffalo, the following statistics and items may be interesting to those who watch the movement, etc., of the former: Lake freights firm with light movement. The shipments from this port from June 1st to 7th, both days inclusive, aggregated only 49,550 net tons, distributed about as follows: 20,550 to Chicago; 7,500 to Milwaukee, 6,600 to Duluth; 3,030 to Toledo; 350 to Bay City; 400 to Traverse City; 1,420 to St. Clair; 700 to Green Bay; 400 to Saginaw; 1,200 to Gladstone; 5,200 to Superior, and 1,200 to Racine. The rates of freight were 60c. to Chicago (an advance of 10c.); 50c. to Milwaukee; 40c. to St. Clair, Gladstone, Marine City and Saginaw; 60c. to Green Bay and Manistique; 70c. to Kenosha; 65c. to Racine; 80c. to Traverse City; 30c. to Duluth, West Superior and Bay City, and 25c. to Toledo.

Beginning July 1st, private consumers of regular gas will be charged \$1.20 per 1,000 cu. ft. If not paid within 10 days, then 20c. will be added.

Movement of coal by canal at this port for first week in June: Receipts, none; shipments, 923 net tons.

Canal freights from May 12th to 31st, inclusive, were: Seven boatloads of coal to Syracuse at 50c. gross ton; one boatload to Oriskany, 60c. gross ton, and two boatloads to Hudson, 80c. gross ton; all free on and off.

The following statistics show the coal movement of this port to June 1st this year, with comparisons of previous years: Receipts and shipments by railroads of coal not reported. Receipts by lake thus far this season, none. Shipments by lake from opening of navigation to June 1st, 404,370 net tons, as compared with 445,010 net tons in 1891, and 354,010 net tons in 1890. The receipts by canal this season to June 1st, 143 net tons, as compared with 481 net tons in 1891, and 967 net tons in 1890. The shipments to June 1st, 6,732 net tons, as compared with 5,919 net tons in 1891, and 223 net tons in 1890. Lake freight rates from opening of navigation to June 1st, 40@60c. to Chicago, 40@50c. to Milwaukee, 30@25@20@30c. to Duluth and West Superior, 40c. to Green Bay, Sheboygan and Saginaw, 25c. to Toledo and Detroit, 45@60c. to Racine and 30c. to Bay City. A year since the rates were 50c. to Chicago and Milwaukee and 30c. to Duluth and Superior.

The shipments of coal from this port by lake from opening of navigation this year to May 31st were distributed about as follows:

To	Net tons.	To	Net tons.
Chicago	163,130	Owen Sound	460
Milwaukee	86,930	Marquette	3,600
Duluth	34,408	Manitowac	800
Superior	37,085	Racine	4,200
Gladstone	9,900	Saginaw	6,050
Ashland	2,000	Windsor	1,240
Green Bay	430	Marine City	640
Bay City	1,100	Cheboygan	650
Toledo	20,790	Detroit	3,400
Sheboygan	2,740	Kenosha	700

With reference to an allusion in last letter to the Buffalo Coal Exchange, that institution has nothing to do with coal contracts, it simply looks after the interests of the retail trade and traders of the city. The bids for 4,000 tons of anthracite coal for the Erie County almshouse, jail and penitentiary have been received, ranging from \$4.36 to \$5 on grate, from \$4.15 to \$4.85 on egg, from \$4.20 to \$5 on stove and from \$4.50 to \$5 on chestnut. It seems probable that T. H. Grantier & Co. will receive the contract, as his figures are the lowest in three classes. The firm of P. & G. Groben will furnish our fire

department with 1,500 net tons Pittsburg lump steam coal, at \$1.80 per ton for the current year.

The Pennsylvania Coal Company has bought land along the river front at Toledo, O., and will build coal and iron ore docks thereon at a cost of \$500,000. The company, it is said, will make Toledo their principal shipping point on the lakes, thus competing directly with the Hocking Valley and Ohio Central.

Chicago.

June 9.

(From our Special Correspondent.)

The coal trade and dealers are devoting more time to politics just now than they are to anthracite. The more recent advance has just thrown a "wet blanket" on all trade, excepting retail and even that shows a considerable falling off. The public is apparently very slow to appreciate the cold fact that the consolidated companies are on a firmer foundation than they ever were before. However, unpalatable this may be to the public, it is nevertheless true, and the sooner they realize it the better it will be for them and all concerned. Business in a wholesale way is exceedingly light, country dealers who usually have paid frequent visits to town at this season, talking trade and fixing up contract, are absent. They make the claim that there is an uncertainty as to further changes being made, and until that is removed by the coalition giving some assurance that the present circular will not be less during the season the present stagnation will continue. *Au contraire*, let it be known that the quotations will remain unchanged and activity would be noticed in every direction. Especially would this buying movement be noticed in city trade, as the best paying domestic consumer ordinarily lays in his stock of 25 to 100 tons during the summer months and naturally expects to buy it cheaper than those who buy later in the season. They argue if they cannot do this, why deprive themselves of the use of the money for several months.

It is rumored that certain shippers are selling smaller sizes of coal for large egg and at large egg prices. Customers' attention is called to the beautiful and desirable size of their large egg coal this year for domestic consumption. Some of the larger dealers have propounded the question as to what good the trade reports are to the general trade at the present time, and why all the articles in all the coal trade papers are of a "bullish" tendency and of advisory character to the "combine"? They, the dealers, have to do just as the consolidated companies tell them, and it seems to them that the usefulness of such papers have passed away, as far as the retail and jobbing trade is concerned. Prices are said to be well maintained, though rumor has it that they are not.

Bituminous coal is dull. Some large shippers say it is light, and some operators report it very quiet. Trade is, to say the least, very unsatisfactory, both as to the movement and price, though not especially so for the season, and on the whole it is better so far as regards tonnage than it was a year ago. Circular prices are shaded according to the exigencies of the seller.

Coke is in fair demand only. Many of the larger structural foundries are not smelting as much iron as usual, hence that grade shows some little falling off. Crushed coke is quietly but steadily gaining. Straight basin Connellsville is steady, but other makes only fairly so.

Quotations are: \$4.65 furnace; \$5.05 foundry, crushed; \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$2.10 foundry; New River foundry, \$4.90; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.35; large egg, \$5.35; small egg, range and chestnut, \$5.60. Retail prices per ton are: Large egg, \$6.75; small egg, range and chestnut, \$6.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are; Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

Pittsburg.

June 9.

(From our Special Correspondent.)

Coal.—We have still a good boating stage in the Ohio River. Only a portion of the Monongahela mines are in operation; coal is being shipped as fast as mined. Shipments since our last to Cincinnati, 406,000 bushels; to Louisville, 926,000 bushels—total, 1,332,000 bushels. Coal men would prefer low water, as the lower markets are abundantly supplied for some time to come, and prices are down to a very low figure. Two thousand six hundred acres of the choicest coal lands in Sewickly Township, Westmoreland County, have been sold by Major Dick, acting for the Markle heirs, it is understood to the Penn Gas Coal Company. Several big coal works will be built on the land during the summer. The Baltimore & Ohio Railroad will run a branch road from Sewickly station to this field. The land and coal was purchased at what is considered a very low figure, the consideration being \$125 per acre. Mr. Dick has 2,000 acres for disposal.

Connellsville Coke Region.—Trade continues weak with no immediate prospect of an improvement. The average in the running order of the ovens has dropped down and so has the shipments. Week's shipments, 108,810 tons against 112,950 tons the previous week, being a decrease of 4,140 tons. In blast, 11,080 ovens of which 30 plants, with 4,791 ovens, made six days; 28 plants, with 5,259 ovens, made five days; nine plants, 423 ovens, four days; plants with 507 ovens, three days. There are 14 plants idle. The Frick Coke Company did not keep

up its average run last week. Eight of the plants of the McClure Company made full time, six days; 4,733 ovens made five days; 507 ovens, four days. The distribution of coke was as follows: Pittsburg, 1,700 cars; east of Pittsburg, 1,334 cars; west of Pittsburg, 3,041; total, 6,075 cars. Western shipments decreased 59 cars; Eastern increased 59; Pittsburg and river shipments feel off 200 cars.

METAL MARKET.

NEW YORK, Friday Evening, June 10, 1892.
Prices of Silver Per Ounce Troy.

June.	Sterling Exch. ge.	London. Pence.	N. Y. Cents.	Value of sil. in \$1.	June.	Sterling Exch. ge.	London. Pence.	N. Y. Cents.	Value of sil. in \$1.
4	4.88	40½	88½	.682	8	4.88	41½	89½	.693
6	4.88	*	88½		9	4.88	41½	89½	.692
7	4.88	40½	89	.686	10	4.88	40½	89	.686

* Holiday.

The market has shown some disposition to advance, and this movement has been accelerated by the efforts of the Eastern banks to strengthen themselves in view of the failure of the Oriental Bank and the weakness of credit incident thereto. The market closes with an uncertain tendency.

The United States Assay Office at New York reports the total receipts of silver for the week to be 98,000 ounces.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	Prices.		Sales.
	H.	L.	
June 4.....	.....	.....	.....
June 6.....	.....	.....	.....
June 7.....	.....	.....	22,000
June 8.....	91	90½	26,000
June 9.....	90½	89½	16,000
June 10.....	89½	.....	50,000
Total sales.....	.....		114,000

Domestic and Foreign Coin.

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

	Bid.	Asked.
Trade dollars.....	\$.70	\$.75
Mexican dollars.....	.69	.69¾
Peruvian soles and Chilian pesos.....	.65½	.67
English silver.....	4.83	.....
Five francs.....	.95	.95
Victoria sovereigns.....	4.89	4.92
Twenty francs.....	3.89	3.92
Twenty marks.....	4.74	4.76
Spanish doubloons.....	15.55	15.70
Spanish 25 pesetas.....	4.79	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	.89	.90

Copper.—There has been no perceptible change in the situation since last week, the market continuing in its dull and monotonous condition, with matters generally rather in favor of buyers. Some of the Lake companies which up to now have been rather reluctant in meeting present values, have, during the week, shown more disposition to do so, and some second-hand copper has also been more eagerly pressed for sale.

However, the consumption of copper continues quite good, and the business in electrical wire is as satisfactory as it has been for some time past, while that in brass and other material partly or in whole composed of copper is also quite steady in volume. We quote Lake at 12c., New York. Casting copper is somewhat easier at 11½@11¾c., while Arizona pig copper, the only description remaining firm, cannot be had below 10½c. Manufacturers are again pursuing a hand-to-mouth buying policy, but if there should be the least improvement in demand, the effect would most probably be a stiffening in prices, for, after all, there is not much copper lying around unsold.

In London the market has ruled steady, with the small variations tending downward, G. M. B.'s opening at £46 15s.@17s. 6d. for spot, and £47 5s.@7s. 6d. for futures, and closing at £46 5s.@10s. for spot and £46 12s. 6d.@15s. for three months. For manufactured sorts we quote: English tough, £48@£48 10s.; best selected, £50 10s.@£51; strong sheets, £56 10s.@£57; India sheets, £54@£54 10s.; yellow metal, 5¼d.

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

To Hamburg—	Copper Matte.	Lbs.	
S. S. Moravia.....	1,454 bags	161,464	\$12,000
To London—	Copper Matte.	Lbs.	
S. S. Mississippi.....	2,069 bags	242,269	\$15,000
To Liverpool—	Copper Matte.	Lbs.	
S. S. Alaska.....	2,266 bags	240,464	\$12,000
" Others.....	2,224 "	240,587	12,000
" Nevada.....	2,269 "	240,580	12,000
To Liverpool—	Copper.	Lbs.	
S. S. Mysia.....	1,325 bars	224,046	\$24,400
To Rotterdam—	Copper.	Lbs.	
S. S. Amsterdam.....	599 pigs	164,670	\$17,500
" Spaarndam.....	452 "	112,276	11,400
To Havre—	Copper.	Lbs.	
S. S. La Champagne.....	325 pigs	116,434	\$14,000

Tin has not only fully maintained its position, but strengthened it, though the business done has been less than in the preceding weeks. As the stocks in this country have increased hardly any it would seem as if the market had advanced solely on its merits, and not because of the duty of 4c. per pound coming into effect July 1st, 1893, which, so far, has been discounted to but a slight extent. Under the circumstances we should think that the advance will proceed until it has reached the prospective duty limit, although, of course, there may be periods when prices not only do not advance, but recede slightly, only, however, to reach a higher level at the next movement. To-day's prices are: for June and July, 22c., and for delivery through the balance of the year, 22-25c.

In London the advance has not been as great as last week, but it has been steady, and amounts to from 10s.@12s. 6d. for spot and about 7s. 6d. for futures, the opening prices having been £100@£100 5s. for spot and £99 12s. 6d.@£99 15s. for futures; the closing figures being £100 12s. 6d.@£100 15s. for the former and £100@£100 2s. 6d. for the latter.

Lead has, this week, been very irregular, prices having suffered a sharp decline, one of the reasons being the large offerings from second hands and another the great desire of the refiners to sell forward deliveries. There is no apparent change in the general outlook, with the exception that the Cœur d'Alene mines may at any moment start up to their full capacity, and as during all the time that source of supply had been closed to smelters prices have not gone up, it would seem as if in the probable opening thereof, lay the reason for the smelters being anxious to sell ahead. To-day's price is 4-10, New York.

Abroad, in London, the market is also somewhat easier, and we have to quote for Spanish, £10 15s., and £10 17s. 6d. for English.

Chicago Lead Market.—The Post Boynton Strong Co., telegraphs us as follows: "This market has ruled quiet with only a fair demand. Sales for the week will amount to about 700 tons, mostly futures. There is little or no inquiry for spot metal, but in futures there is considerable interest and consulars are disposed to take hold. We do not look for any decided change one way or the other, but think with favorable weather values are likely to advance a few points. The market closes with 4.05c. asked."

St. Louis Lead Market.—The John Wahl Commission Co., telegraph us as follows: "Pig lead under liberal offerings and only a scant demand has declined to 3.97½c. and even at that figure the metal has more sellers than buyers."

Spelter is a little firmer, as far as spot is concerned, at 4-85@4-95 New York, but for futures there continues to be no demand except at very low prices. There is still a scarcity of spot owing to the recent floods in the West.

London, too, is a little easier, the quotation for spot being £22 7s. 6d.@£22 10s., with futures as unsalable as ever.

Antimony is steady, Hallett's at 11¼, Cookson's at 14¼, and L. X. at 12¼.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 10.

Pig Iron.—Pig iron merchants have made no change in their standard quotations during the past week. They say that prices have now reached their lowest possible limit; buyers, however, do not think so, for they do not exhibit any anxiety to stock before the turn of the tide sets in. Trade is mostly confined to small lots on prompt delivery. Merchants are very precise in their statements that schedule rates are obtained, but we very much doubt this; in fact some merchants say that it is likely that they will have to consider the desirability of making a new list soon. We may expect, however, that a slight improvement will set in within the next two months, but it will only be slight. It is unpleasant to think that the "boom" has gone out of American iron, and that the demand in future will be of the humdrum sort, such as is customary in the old countries; we are not yet in a position to say that this is so, though in some quarters it is regarded as certain. Southern pig shows a weakness amongst those whose brands are not so well known, and who are unable to hold out any longer. Quotations are: Northern 1 X, \$16; No. 2 X, \$15; Southern, No. 1 X, \$15.50 to \$16; No. 2 X, \$14.50 to \$15.

Speiseleisen and Ferro-Manganese.—It is not much use giving any quotations for these materials, as there is no demand. Buyers consider \$61 too much for ferro-manganese and have therefore held aloof.

Steel Rails.—Eastern mills are still short of orders, but they do not intend to cut rates as they do not think that such a course would bring business. Quotations are still \$30 at mill and \$30.75 tidewater.

Rail Fastenings.—This market is still dull in sympathy with the steel rail market. Nominal quotations are: fish and angle plates, 1'65@1'70c.; spikes, 1'95@2c.; bolts and square nuts, 2'70@2'80c.; hexagonal nuts, 2.80c.

Merchant Steel.—The market continues quiet and even, and there is no reason to expect any al-

teration just at present, quotations are given as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6½c. to 7½c.; special grades, 13c. to 18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; open hearth machinery, 2'25c.; open hearth spring, 2'50c.; tire steel, 2'25c.; toe calks, 2'25c. to 2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipes.—There is nothing fresh in this market. Trade is a good average. Prices are the same as last week. The ruling discounts are as follows: Butt, black, 57½%; butt, galvanized, 47%; lap, black, 67%; lap, galvanized, 55%; boiler tubes from 3 in. to 6 in., 60%; above 6 in. and below 3 in., 55%. The proposed international trust in copper, if brought about, will cause an improvement in steel tubes, but as yet it is too early.

Structural Material.—The news in this department is that makers are expecting to receive a slight increase in orders shortly, but as yet no improvement is to be noted. We hear rumors to the effect that some new office buildings are to be erected in the neighborhood of Wall street; these will give a slight impetus to trade. Prices may be taken as follows: Beams, 2'30@2'50c.; angles, 2@2'10c.; sheared plates, 1'90@2c.; tees, 2'40@2'60c.; channels, 2'40@2'50c. Universal plates, 2@2'10c.; bridge plates, 2@2'10c. on dock.

Cotton Ties.—The English makers apparently think that the bill for taking the tariff off cotton ties will pass the Senate and obtain the sanction of the President. Consumers here do not share the opinion as they are still giving out their usual large orders ahead to makers.

Buffalo. June 10.

(Special report, by Rogers, Brown & Co.)

Lake Superior charcoal irons are the favorite at present, with a considerable degree of quietude in foundry irons.

The charcoal situation is in such a state that a concession of from 15 to 50 cents below the market price will sell almost anything that deserves the name. A firm front, however, sells no more of the higher priced and more popular irons than is necessary to make the mixture complete or tone up the effects of some poor iron which may have strayed in. Low prices for malleable work are unquestionably responsible for this state of affairs.

Great firmness is shown by the stronger furnaces, who are refusing orders for large amounts wherever concessions are asked on quoted rates.

We quote for cash f. o. b. cars at Buffalo. No. IX. Foundry Strong Coke Iron Lake Superior ore, \$15.75; No. 2X Foundry Strong Coke Iron Lake Superior ore, \$14.75; Ohio Strong Softener No. 1, \$15.75; Ohio Strong Softener No. 2, \$14.75; Jackson County Silvery No. 1, \$18.00; Jackson County Silvery No. 2, \$17.00; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17.00; Southern Soft No. 1, \$14.65; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. June 9.

(From our Special Correspondent.)

In response to inquiries why we have reported a seemingly better condition in the Chicago iron market than in those of other cities, we would say that there are eight coke foundry iron furnaces in this district which we call local, six of which are out of blast. The two in blast are "Iroquois" and No. 3 of the Illinois Steel Company, together producing about 400 tons a day. There are upward of 80 foundries in this city, some smelting 25 to 40 tons a day, and none less than 3½ to 5 tons, so that consumption locally is greater than output. Secondly: Symptoms of stiffening were noticed several weeks ago in Southern coke iron, and during the past week it developed into an actual advance of 60@75c. a ton on Nos. 1 and 2 soft iron.

Some weeks ago the latter was offered at \$12.50; to-day the same iron commands \$13.10 in 100-ton lots and upward, and \$13.25 to \$13.35 in car loads. There is very little Southern strong foundry iron sold here as the local manufacturers quote just enough less to secure the greater portion of the business. This Southern soft is largely displacing Ohio softeners in foundry practice, as it is found to work equally as well with proper care in mixing in the cupola. We have only two iron rolling mills in operation in this vicinity: Springfield and Milwaukee. The National Forge Mill and the Calumet Mill are both idle.

The hardening tendency in values of certain grades of Southern coke iron which has been going on for several weeks has stiffened the market on local coke foundry iron. Transactions on the latter were quieter on the whole, though there are still quiet a number of inquiries pending for the season's requirements of agricultural implement makers, which will be closed soon. There is usually a little lull after the heavy buying such as characterized the market last month, which was for local iron, when some 20,000 to 30,000 tons were booked; fully as much, if not more is expected to be placed under contract during June. The revival of the State Street Elevated Railway is again assuming shape, and prospects are very favorable for the road being built. An enormous amount of structural steel will be required.

The striking boilermakers are still out. It is said that there is some weakening on the part of the men, but no overtures have been made; hence local plate trade is at a standstill. The season's contracts made by the implement trade are for a much greater tonnage than last year, and values on most specialties are lower. In steel rails the main feature is

smaller amounts and quick shipments. Steel billets and wire rods are in fair demand, and the Joliet mills of the Illinois Steel Company are running full on these and other specialties; the rail mill is not running.

Pig Iron.—For local coke iron the amount of business done, during the week under review, was light as compared with the one previous. A number of large deals are still in negotiation which will be placed under contract soon. The limit of low prices has apparently been reached by furnaces here, though many consumers by holding off seem to believe that when they buy it will be at a further reduction. On the other hand some large buyers have closed contracts at current rates. In Lake Superior charcoal iron there is no change, excepting that furnaces are less willing than they were a month ago to make any concessions on \$16.50 for long scattered deliveries. Actual business is for small amount at from \$16.50 to \$17. Southern soft iron continues in good demand and one agent booked orders last week aggregating 1,100 tons of No. 2 at \$13.10; some brands sell at \$13.25 and carloads \$13.35. These figures are 60c. to 75c. higher than they were a month ago, and have aided considerably in strengthening the position taken by local manufacturers. Southern wheel iron is in better inquiry.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$17@17.50; Southern coke, foundry No. 1, \$14.75; No. 2, \$14.25; No. 3, \$13.75; Southern coke, soft, No. 1, \$13.75; No. 2, \$13.25; Ohio silveries, No. 1, \$17.50; No. 2, \$17; Ohio strong softeners, No. 1, \$17.50; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

Steel Billets and Rods.—Inquiry is fair for billets and 4 x 4 are quoted at \$24.50 Chicago delivery. Steel rods are \$34.50 and in good demand.

Structural Iron and Steel.—Demand for architectural iron and steel work is good, and the agent of a Pittsburgh concern will accept no contracts for future delivery without the strike clause. There is the usual scarcity of orders for cast structural material. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, \$1.80@2; tees, \$2.20@2.30; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.05@2.25.

Plates.—Demand from outside points is steadily improving on account of the boiler-makers' strike. There is practically no city business. Prices show more weakness. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2 1/4 in. and smaller, 55%; 7 in. and upward, 65%.

Merchant Steel.—Season's supply contracts continue a feature from the implement makers. Competition is very close and low prices prevail, but on some specialties better prices are obtained than a year ago. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.25@2.30; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Business is good, both in city and from outside points, though discounts are lower, stocks of best makes are badly broken, and standard sizes and gauges hard to get from mill. Discounts easy at 70 and 10% on mill lots and 70% off on Juniata and 70 and 5% off on charcoal from warehouse. An extra 2 1/2 to 5% is given on large orders.

Black Sheet Iron.—Some activity is noted in demand, though the continued wet weather has somewhat checked inquiry. Quotations are firm at 2'85@2'90c. basis of No. 27 Chicago, for delivery before July 1st. Steel sheets are 10c. higher. Dealers quote 3@3'10c. from stock.

Bar Iron.—This market certainly gains each week which brings it nearer to July 1 and the settlement of the wage scale. For various reasons some mills are not at all anxious for implement makers' orders running through the entire year. Regular quotations are 1'57 1/2@1'62 1/2c. with half extras added, and 1'65c. for all muck bar. Jobbing orders are quoted at 1'75@1'85c., rates according to quality.

Nails.—Steel cut are in fair demand from factory for late summer deliveries at \$1.60 for regular average; good buyers claim to get this shaded on round lots. Jobbers quote \$1.65 in small lots, and business from the country has been greatly interfered with by the continued wet weather. Wire nails are quiet from mill and irregular in price, quotations ranging from \$1.60@1.70. Jobbers are selling at \$1.65@1.70 in small lots.

Steel Rails.—Demand is lighter and the orders now coming forward are for prompt shipment. Quotations are unchanged at \$31@32.50. Eastern mills have taken carload orders at \$32.75 f. o. b. Chicago. Other track supplies are in very moderate demand at \$1.70 for iron or steel splice bars; spikes, \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65@2.70; square, \$2.55.

Scrap.—Larger dealers look for no change in present depressed condition until end of July. Prices are nominal only, as no fair offer is refused: No. 1 railroad, \$16; No. 1 forge, \$15; No. 1 mill, \$10.50;

fish plates, \$18; axles, \$21; horseshoes, \$16.50; pipes and flues, \$7; cast borings, \$6.50; wrought turnings, \$9; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.50; coil steel, \$14; leaf steel, \$15; tires, \$15.

Old Material.—Iron rails are hard to move at holder's figures, \$18@18.50, consumers offer \$17.50. Steel rails are very dull at \$12 for mixed lengths, and \$13.50@14 for selected. Car wheels are quoted at \$15@15.25.

Louisville.

June 4.

(Special Report by Hall Brothers & Co.)

A very quiet state of affairs rules in iron circles, and the outlook for any early change for the better is not promising. Most all of the buyers are still pursuing the hand-to-mouth policy; but there are of course some exceptions to this rule, but generally purchases are made to cover known requirements only. Notwithstanding this state of affairs, and while there is an excessive supply of iron, still in certain districts of the South stocks seem to be gradually reducing, and the demand sufficient to take the daily output about as fast as made, which is an encouraging feature to the producers, and, as a result, many of them are endeavoring to hold prices firmer.

Hot Blast Foundry Irons.—Southern coke No. 1, \$14@14.25; Southern coke No. 2, \$13@13.25; Southern coke No. 3, \$12.75@13; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16; Missouri charcoal No. 1, \$17@17.50; Missouri charcoal No. 2, \$16.50@17.

Forge Irons.—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.50@12.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

Philadelphia.

June 9.

(From our Special Correspondent.)

Pig Iron.—The week has passed without a single feature deserving mention, unless it is that more Southern iron has been offered. These offerings are at old quotations, which are far enough below Pennsylvania figures to send business that way as soon as buyers are prepared to purchase. A number of mill men have been asking makers what they would take for certain large quantities of iron within 30 days, but no sales have taken place. Founders are buying hand-to-mouth lots. The whole situation is without life, and it is simply impossible to present any facts or discover any symptoms of a general improvement. This is a disappointing statement to make at this time. No. 1 Pennsylvania foundry is \$16, with variations for quality and size of order; No. 2, \$15, and forge, \$13@14. Bessemer pig is very dull at \$15.

Muck Bars.—It is impossible to find signs of activity. Makers are selling a little iron from day to day, and quotations are given at \$24@24.50, though this price does not represent the best makes.

Steel Billets.—For a week or two very little new business will probably be reported. Manufacturers pretend to be tired of making billets at the quotations that have been ruling for two or three months, and say that prices must improve, but probabilities are that buyers will have the advantage during the summer, as they have had since the opening of spring. The limits are \$24.50@25, Philadelphia delivery.

Merchant Iron.—The storekeepers are selling all the iron that is being moved, and there is talk this week that some of the bar mills when they shut down will not resume very soon. The demand is certainly irregular and unsatisfactory. The possibility of trouble with workmen in the West is being watched closely.

Wrought Iron Pipe.—Very little business has been presented for in fact a month for pipe, but the demand for tubes is said to be good, and all sizes are in request at quotations ranging from 55 to 65%.

Sheet Iron.—The only activity to be spoken of this week is in galvanized of all kinds, for which there seems to be quite a run. Some of the orders are large. The mill owners report favorable indications in this branch. There is also a fair demand for Bessemer sheet in a retail way.

Plate and Tank Iron.—Offers were made this week for tank steel at 1'70, and business is likely to shape itself upon that basis. Flange iron, 2'30 for steel.

Structural Material.—Quotations are 1'80 for bridge plate, 1'90 for angles, and 2'10@2'20 for beams, tees and channels. Those in charge of these industries have nothing whatever to add to previous reports. Small orders amounting to eight or nine hundred tons have just been booked.

Steel Rails.—The only difference in the steel rail trade is that several roads have placed orders for repairing requirements. Prices are \$30. The anticipation indulged in a month or two ago is that by June a great many roads would place orders for the summer and fall. As yet this has not been done, and at the offices there is no opinion expressed as to what is likely to take place.

Old Rails.—There are no more old rails wanted than can be had at \$19.50 for iron and \$16 for steel.

Scrap.—No. 1 is \$17.50; cast borings, \$9.50; car wheels, \$15.50.

Pittsburg.

June 9.

(From our Special Correspondent.)

Iron and Steel.—"Wait until after the iron scale is satisfactorily arranged and the necessary repairs

to the mills have been completed," is what you hear when you inquire. Well, as that part of the business is something that we don't control, we have to be satisfied with the answer and wait! The condition of the pig iron market has not been so satisfactory as we would like to see, yet there are evident signs of improvement. We said last week that prices for standard descriptions have evidently touched bottom; there is a better and stronger undercurrent. We see nothing in the market since to change that opinion.

The sales of Bessemer pig during the past 10 days have been large for the season; there are still buyers who require that description of iron who are beginning to realize the fact that delays may be dangerous. A valley furnace man informed us that he had a standing offer for all the Bessemer he could make from now until the first of January at \$14.25 cash, which he refused to accept; it is still open. The June price of Bessemer for the past five years was: 1888, \$17.25; 1889, \$24.50; 1890, \$16.50; 1891, 15.75; 1892, \$14.25. The difference between highest and lowest, \$10.25 per ton. A leading iron dealer, now dead, who had made a large fortune and gave this advice: "When you can purchase pig iron below the cost of production, if you have the money, buy it. I have done so for years and made money."

Another iron man whose furnaces are running exclusively on Bessemer said: "We have sold no iron for some time; we are piling it up and will keep it until we can obtain better prices." The increased inquiry for steel billets, noted in our last, has been maintained; holders ask an advance and are refusing to sell at last week's figures. The June price of steel billets the past five years was: 1888, \$29.25; 1889, \$37.25; 1890, \$26; 1891, \$25; 1892, \$22.90. Difference between highest and lowest, \$14.45. Grey Forge Pig: 1888, \$15.50; 1889, \$17.75; 1890, \$14.25; 1891, \$13.25; 1892, \$12.75. Difference between highest and lowest, \$5 per ton. Ferro Manganese: 1888, \$54; 1889, \$105; 1890, \$65.50; 1891, \$63; 1892, \$62.50.

Difference between extreme prices, \$51 per ton. An Eastern dealer has this to say: "For certain kinds of iron a more active demand was reported, but that the feeling is one of extreme despondency cannot be denied. Prices remain at the lowest; until new figures are made, on a still lower scale, such a thing as an advance under present conditions being almost beyond serious consideration. The trade recognize the fact that supply and demand need closer attention than anything else; that being accomplished, other things will readily adjust themselves.

This feature will doubtless be very thoroughly looked into within the next thirty days, and it is not too much to say that some steps will be taken to place matters on a better footing than they have been for the past six months. This applies to every department of trade. The great and important question to be settled is, will there be a strike? From all that can be learned it looks that way. Iron men say that last year's prices are not to be thought of; on the other hand, report says the new scale will ask an advance in some cases.

Coke Smelted Lake and Native Ores.

4,000 Tons Bessemer, next four months	\$14.25 cash.
3,000 Tons Bessemer	14.25 cash.
2,000 Tons Bessemer	14.20 cash.
2,000 Tons Bessemer	14.25 cash.
2,000 Tons Grey Forge	12.75 cash.
2,000 Tons Bessemer	14.15 cash.
1,250 Tons Bessemer	14.25 cash.
1,200 Tons Bessemer, Wheeling delivery	14.20 cash.
1,000 Tons Grey Forge	12.75 cash.
1,000 Tons Grey Forge	12.75 cash.
600 Tons Grey Forge, July	12.75 cash.
500 Tons Bessemer	14.25 cash.
500 Tons Grey Forge	12.75 cash.
250 Tons Grey Forge	12.75 cash.
250 Tons No. 2 Foundry	14.25 cash.
200 Tons No. 1 Foundry	15.25 cash.
200 Tons Grey Forge	12.75 cash.
100 Tons No. 1 Silvery	16.75 cash.

Charcoal.

100 Tons Cold Blast	25.50 cash.
75 Tons Warm Blast	20.00 cash.
50 Tons No. 3 Foundry	20.00 cash.
25 Tons Cold Blast	24.00 cash.

Steel Billets and Slabs.

1,000 Tons Steel Billets, at maker's mill	22.50 cash.
1,000 Tons Steel Billets, June	22.60 cash.
700 Tons Steel Billets	22.60 cash.
500 Tons Steel Billets, prompt	22.80 cash.

Muck Bar.

500 Tons Neutral, June, July	24.80 cash.
400 Tons Neutral	24.40 cash.
350 Tons Neutral	24.40 cash.

Skip Iron Advancing.

1,000 Tons Narrow Grooved	1.60 4m.
750 Tons Wide Grooved	1.62 1/2 4m.
500 Tons Sheared Iron	1.85 4m.

Skip Steel.

500 Tons Wide Grooved	1.45 4m.
500 Tons Narrow Grooved	1.40 4m.

Ferro-Manganese.

100 Tons 80%, seaboard	59.30 cash.
50 Tons 80%, domestic	62.50 cash.

Bloom, Beam, R. & C. Ends.
1,000 Tons Rail and Bloom Ends, July, Aug., Sept

Steel Wire Rods.

750 Tons American Fives, July	32.00 cash.
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Scrap Material.

200 Tons No. 1 R. R. Scrap, net	16.00 cash.
200 Tons Wrought Turnings, net	12.00 cash.
150 Tons Cast Borings, gross	7.00 cash.
100 Tons Wrought Turnings, net	11.50 cash.
100 Tons Cast Borings, gross	6.75 cash.
100 Tons Iron Axles, net	23.50 cash.

Old Iron and Steel Rails.

1,000 Tons Old Iron Rails	20.50 cash.
500 Tons Old Steel Rails	15.35 cash.
500 Tons Old Steel Rails	15.50 cash.

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

Main table for New York Mining Stocks Quotations, listing various companies and their stock prices from June 4 to June 10, 1892. Includes columns for Name and Location of Company, H. L. prices, and Sales.

*Ex-dividend. †Dealt in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 6,750. Non-dividend shares sold, 16,300. Total shares sold 23,050.

BOSTON MINING STOCK QUOTATIONS.

Main table for Boston Mining Stock Quotations, listing various companies and their stock prices from June 3 to June 9, 1892. Includes columns for Name of Company, H. L. prices, and Sales.

Dividend shares sold, 3,298. Non-dividend shares sold, 10,310. Total shares sold, 13,608.

COAL STOCKS.

Table for Coal Stocks, listing various companies and their stock prices from June 4 to June 10, 1892. Includes columns for Name of Company, H. L. prices, and Sales.

Total shares sold, 342,362.

San Francisco Mining Stock Quotations.

Table for San Francisco Mining Stock Quotations, listing various companies and their closing stock prices from June 3 to June 9, 1892. Includes columns for Name of Stocks and Closing Quotations.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

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

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. + This company as the Western, up to December 10th, 1881, paid \$1,400,000. † Non-assessable for three years. ‡ The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia 19,000,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1888, the Copper Queen had paid \$1,350,000 in dividends. ¶ This company paid \$190,000 before re-organization in 1890. ** This company acquired the property of the Raymond & Ely Company which had paid \$2,075,000 in dividends.

STOCK MARKET QUOTATIONS.

Aspen. June 6.

Table of stock market quotations for Aspen, June 6. Includes items like Argentinum Junata, Aspen Deep Shaft, Best Friend, etc.

Baltimore, Md. June 9.

Table of stock market quotations for Baltimore, Md., June 9. Includes items like Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Pittsburg, Pa. June 9.

Table of stock market quotations for Pittsburg, Pa., June 9. Includes items like Allegheny Gas Co., Bridgewater Gas Co., Charliers Val. Gas, etc.

St. Louis. June 8.

Table of stock market quotations for St. Louis, June 8. Includes items like Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., etc.

Deadwood. June 4.

Table of stock market quotations for Deadwood, June 4. Includes items like Bullion, Caledonia, Calumet, Cambrian, Carthage, etc.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending May 28, 1892:

Table of stock market quotations for Helena, Mont. Includes items like Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., etc.

Trust Stocks.

Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations June 10:

Table of Trust Stocks quotations. Includes items like Am. Cotton Oil, Com., Am. Sugar Refineries, Com., etc.

Foreign Quotations.

London. May 28.

Table of foreign quotations for London, May 28. Includes items like Alaska Treadwell, Amador, Cal., American Belle, Colo., etc.

Paris. May 26.

Table of foreign quotations for Paris, May 26. Includes items like East Oregon, Ore., Forest Hill Divide, Cal., etc.

CURRENT PRICES.

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

Table of current prices for various commodities. Includes items like Acetic, No. 3, pure, 1,040, Hydrocyanic, U. S. P., Alcohol-95%, etc.

Powdered, # lb.

Table of powdered and other materials. Includes items like Marble Dust, Metallic Paint, Mineral Wool, Mica, Naphtha, Nitro Cake, etc.

THE RARER METALS.

Table of rarer metals. Includes items like Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, etc.