

ALPHABETICAL INDEX TO ADVERTISERS.

- Indicates every other week or monthly advertisements. -

Table with 3 columns: Advertiser Name, Page Number, and Advertiser Name. The table is organized alphabetically by advertiser name, with sections for A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y. Each entry includes the advertiser's name and a corresponding page number.

WIRE ROPE MANUFACTURERS.

BRODERICK & BASCOM ROPE CO.
SOLE MANUFACTURERS OF

Established 1875. **"POWER" ROPE.** St. Louis, Mo.

THE MOST POWERFUL ROPE MADE.
SEND FOR ILLUSTRATED CATALOGUE

A. LESCHEN & SONS ROPE CO., ST. LOUIS, MO.

Sole
Manufacturers
of



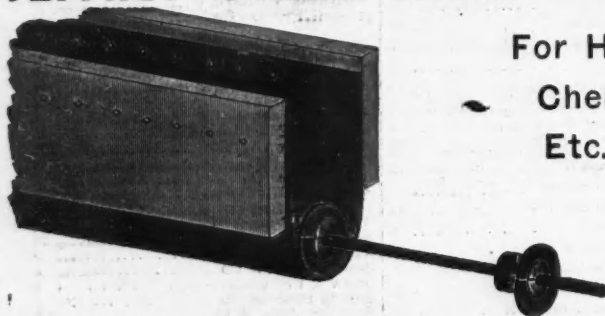
**BEST
ON EARTH.**

[TRADE MARK REGISTERED.]



Perforated Metals
FOR ALL USES IN
Mining and Ore Dressing.

JEFFREY STEEL CABLE CONVEYORS



For Handling Coal, Ores,
Chemicals, Refuse, Etc.,
Etc.

Simple in Construction.

SEND FOR CATALOGUE.

THE JEFFREY MFG. CO., COLUMBUS, O.
Also, 163 WASHINGTON STREET, NEW YORK.

AN OUTLINE OF QUALITATIVE ANALYSIS.

BY DR. JOHN A. MILLER.

There has for some time been an openly expressed desire for some brief and concise textbook of qualitative analysis in which the various characteristic reactions would be summed up comprehensively for ready reference. The value of such a book to the student is apparent. Instead of burdening the mind at the beginning with many details, not of primary importance, he has before him only those which are characteristic and are used in ordinary analyses to distinguish one element from another. This prevents waste of time in unnecessary study and, what is of still greater importance, presents the matter in such light that it is simplified and clearly before him, thus permitting a thorough grounding in the elemental part before confusing details need be treated.

For Further Particulars See Page 31.



JAMES LEFFEL

WATER WHEELS

110 Styles and Sizes. Upright and Horizontal.
80 YEARS CONTINUOUS BUSINESS
affords every facility for adapting them to

Electric, Mining, Irrigating and Manufacturing
purposes. Easy working gates. We guarantee highest power, with smallest quantity of water, at full and part gates. Successfully operating under heads of 2 to 400 feet. Write us for fine pamphlet, and state your wants.

THE JAMES LEFFEL & CO.
SPRINGFIELD, OHIO, U. S. A. | 110 LIBERTY STREET, NEW YORK

**DIXON'S PURE, FOLIATED, DRY AMERICAN GRAPHITE
PERFECT LUBRICATOR.**



Its enduring qualities are several times greater than those of any oil. Unlike either oil or grease, it is not affected by heat, cold, steam, acids, etc., and acts equally well under the most varying conditions of temperature and moisture. Its natural impurities contain substances fatal to anti-friction purposes, namely, quartz or grit. Its proper selection, sizing and perfecting for lubricating purposes is a matter requiring large skill, much machinery and great experience. We have made this a special study, and, by methods of sizing and dressing, peculiar to ourselves, have produced a graphite unequalled for purity, for correct size of flake and unrivaled for lubricating qualities.

Manufactured and Warranted Only by the
JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

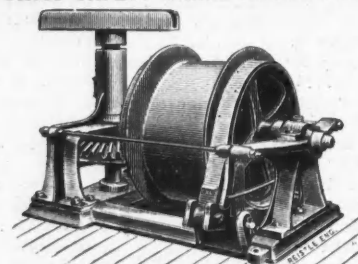
W. S. TYLER Pres. PROCTOR PATTERSON, Sec. & Treas



MANUFACTURERS
EXTRA HEAVY
Double Crimped
STEEL, IRON,
COPPER
AND BRASS
BATTERY
Mining Cloths.
Cleveland, O.
FRASER & CHALMERS
AGENTS,
CHICAGO, ILL.

Williamsport Wire Rope Co.,
MANUFACTURERS OF
Iron, Steel and Galvanized
WIRE ROPE
Hoisting and Haulage
Ropes a Specialty.
CORRESPONDENCE SOLICITED.
WILLIAMSPORT PA.

THE DAVIS SAFETY BRAKE HORSE HOISTER.



This Hoister is built entirely of iron and steel, and is provided with a patent Automatic Safety Brake, holding the load at any point, and making the working of the Hoister perfectly safe.

A Feature Not Possessed by Any Other Horse Hoist.

These Hoisters are built in five sizes. Capacity of machine No. 1, with one horse and single line, 800 pounds, 75 feet per minute. Price, complete with sheaves, \$100.

SEND FOR CIRCULAR.

THE F. M. DAVIS IRON WORKS CO., Denver, Colo.

"THE IRON & COAL TRADES REVIEW."

Established 1866.

With which is incorporated The Bulletin of the British Iron Trade Association.
The recognized organ of Iron, Coal, Steel and Allied Trades of Great Britain. Weekly, Price 6d. £1 10s. 4d. yearly, post free, to all countries in Postal Union.
Latest market quotations in Britain and abroad. Efficient correspondents in all parts of the country. Reliable trade reports.
Offices: 222, 225 Strand, London, England.

THE BULLIONIST.

ESTABLISHED 1866.

Yearly subscription to countries within Postal Union, \$7.00, prepaid.

A Weekly Financial and Commercial Journal for Bankers, Merchants and Investors. Contains full reports of all the principal Joint Stock and other Meetings of the week. Special Financial Notes.

Office: 27 THROGMORTON ST., LONDON.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
 Bostelmann, Louis F.
 Bullock, M. C., Mfg. Co.
 Burleigh Rock Drill Co.
 Clayton Air Compressor Works.
 Hazensahl, W.
 Ingersoll-Sergeant Rock Drill Co.
 McKiernan, S. G. & Co.
 Norwalk Iron Works Co.
 Penn Diamond Drill & Mfg. Co.
 Rand Drill Co. (See Diamond Drills.)

Amalgamators
 Bucyrus Steam Shovel & Dredge Co.
 Gates Iron Works.

Anti-Friction Metals
 Hiertz, T. & Son. National Lead Co.

Architects and Builders
 Berlin Iron Bridge Co.
 Pencoyd Bridge & Construct. Co.

Assayers' and Chemists' Supplies
 Almsworth, Wm.
 Baker & Adamson.
 Baker & Co.
 Berge, J. & H.
 Bullock & Crenshaw
 Denver Fire Clay Co.
 Goldsmith Bros.
 Henry Hill Chem. Co.
 Hoskins, Wm.
 Miners' Assay Office.
 Overbrook Chem. Co.
 Attorney, Corporation
 McIndoe, I.

Rabbit's Metal
 Epping, Carpenter & Co.

Band Wheels
 Poole, R., & Son Co.

Bankers and Brokers
 Amr. Level & Mfg. Co.
 Sandell, E.
 Bieher & Sohne.
 Billings, Robt. & Co.
 Grant, E. R.
 Handy & Harman
 Hicks & Sprague.
 New Mexico M. Ex'ge.

Belting
 Candler, G. O. & Co.
 Groetzinger & Sons.
 Hendrie & Boltzoff
 Mfg. Co.

Belting Clamps and Lau.
 J. B. & Co.
 McComb, James & Co.
 Blowers
 Garden City Sand Co.

Belting
 Poole, Wm. B. & Sons.
 Scaife, Wm. B. & Sons.
 (See Machinery.)

Brass Castings
 Epping, Carpenter & Co.

Brass Rolling Machinery
 Poole, R., & Son Co.

Brattice (Hoth)
 Mineralized Rubber Co.

Brick Machinery
 Fletcher, S. K. Freese, E. H. & Co.

Bridges
 Berlin Bridge Co.
 Pencoyd Br. & Son Co.
 Pittsburgh Bridge Co.

Buckets
 Scaife, Wm. B. & Sons. (See Machinery.)

Cable Railways
 Gaubler-Griffin Sus. Ry. Bridge Co.
 Poole, R., & Son Co.

Carbons
 Bishop, Victor, & Co.
 Bostelmann, Louis F.
 Car Wheels
 Whitney & Co.

Cement
 Atlas Cement Co.
 Chain and Link Belting (See Belting.)
 Chemicals
 Baker & Adamson.
 Bullock & Crenshaw.
 Henry Hill Chem. Co.
 Overbrook Chem. Co.
 Chlorine Liquid
 Pickhardt, Wm. & Kuttroff.
 Clutches, & Friction
 Poole, R., & Son Co.

Coal
 Maryland Coal Co.
 Newell Coal Co.
 Potts, F. A., & Co.
 Stickney, Conyngham
 & Co.
 Ward & Olyphant.

**Coal Berwind-White Coal
 Mfg. Co.**

**Castner & Curran
 Consolidation Coal Co.**

**Coal Bross & Co.
 Haddock, Shook & Co.**

Coal Cutters
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co. (See Machinery.)

Coal Tipples
 Youngstown Bridge Co.

Coke Ovens
 Sheffield Car Co.

**Concentrators, Crushers, Pulverizers,
 Separators, Etc.**
 Allen, Ed. P. & Co.
 American Mining & Milling Machinery Co.
 Heckett Foundry & Machine Co.
 Blake, Theo. A.
 Boston Ore Machinery Co.
 Colorado Iron Works
 Fraser & Chalmers.
 Frue Vanner Concentrator.
 Gates Iron Works.
 Hendrie & Boltzoff Mfg. Co.
 Krom, S. H.
 Krupp, F.
 Mechanical Gold Extractor Co.
 Raymond & Ros. Imp. Pulv. Co.
 Steadman Foundry & Mach. Co.
 Totten & Hogg.
 Waburn-Swenson Mfg. Co. (See Machinery.)

Conduit, Fibre
 Fibre Conduit Co.

Copper Dealers and Producers
 Abbott, Wheelock & Co.
 American Metal Co.
 Atlantic Mining Co.
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Boston & Mont. M. Co.
 Butte & Boston M. Co.
 Canadian Copper Co.
 Central Mining Co.
 Copper Queen Mfg. Co.
 Detroit Cop'z Mfg. Co.

Copper Rolling Machinery
 Poole, R., & Son Co.

Contractors and Miners' Supplies
 Bucyrus Steam Shovel and Dredge Co.
 Pollock, Wm. B. & Co.
 Pratt & Whitney Co. (See Machinery.)

Corrugated Iron
 Berlin Iron Bridge Co. Scaife, W. B. & Sons.
 Cradcliff, Graphite, Etc.
 Denver Fire Clay Co. Steadman's Foundry &
 Garden City Sand Co. Machine Works.
 Obermayer Co.

Cryolite Steel Castings
 King & Andrews Co.

Crushed Quartz
 Garden City Sand Co.
 Cupola
 Garden City Sand Co. Obermayer Co.

Dermatogingine
 Groetzinger & Sons.
 Bishop, Victor, & Co.
 Lexow, Theodore.
 Diamond Drills
 Bostelmann, L. F.
 Bostelmann, L. F.
 Bullock Mfg. Co. M.C.
 Hazensahl, W.
 Lexow, Theodore.
 (See Air Compressors and Rock Drills.)

Drawing Materials
 Altmeyer, Theo. & Son.
 Queen & Co.

Dredges
 Bucyrus Steam Shovel & Dredge Co.
 Southern Co.

Dredging Machines
 Poole, R., & Son Co.

Dump Cars
 Hunt, C. W. Wright & Adams Co.
 Trux Mfg. Co.

Educational Institutions
 Columbian University.
 Correspondence School of Mines.
 Harvard University.
 Mass. Inst. of Technology.
 Michigan Mining School.
 Missouri School of Mines.
 Pennsylvania Military College.
 R. se Polytechnic Institute.
 School of Mining
 Scientific Machinist Co.

Electrical Machinery and Supplies
 General Electric Co. Okonite Co. Limited.
 Jefferson Mfg. Co. Okonite-Houston In-
 King & Andrews Co. ternational Co.

**Elevators, Conveyors and Hoisting
 Machines**
 Brown Hoisting and Convey. Mach. Co.
 California Wire Works.
 Cooper, Hewitt & Co.
 Hunt, C. W., Co.
 Jeffrey Manufacturing Co.
 Scaife, Wm. B. & Sons.
 Union Wire Rope Tramway Co.
 Vulcan Iron Works.
 (See Wire Rope Tramway and Machinery.)

Elevator, Grain, Machinery
 Poole, R., & Son Co.

Emery Wheels
 New York Belting & Packing Co., Ltd.

Employment Bureaus
 Engineering Employment Bureau.

Engineers, Chemists, Metallurgists
 Adams, W. H.
 Askew & Russell.
 Baker & Co.
 Blandy, John F.
 Blauvelt, Harrington.
 Boggs, W. R., Jr.
 Boss, Clarence M.
 Boss, M. P.
 Brodie, Walter M.
 Burfield, J. E.
 Burlingame, E. E.
 Butters, Charles.
 Campbell, Preston H. C.
 Carpenter, Franklin R.
 Cary, & Moore.
 Case, Wm. H.
 Cazin, Franz.
 Chandler, W. H.
 Channing, J. Parke.
 Clement, Victor A.
 Collins, J. H. & Sons.
 Courts, Wm. M.
 Crawford, J. B.
 Darling, L. B.
 Davis, Floyd.
 Davis, Lewis K.
 De la Bouglise, Geo.
 Dewey, Frederic F.
 Dickerman, Alton L.
 Dickinson, H. P.
 Donald, J. T.
 Drysdale, Dr. W. A.
 Ede & Burwell.
 Engelhardt, E. C.
 Kretzette, Jr. W. M.
 Fearn, Percy L.
 Flak, W. W.
 Forbes, George.
 Freedland, Francis T.
 Froehling, Dr. Henry.
 Furlong, W. H.
 Gooding, F. W.
 Hann, O. H.
 Halse, E.
 Hammond, John Hays
 Hampton, W. Huntley
 Hardman, John E.
 Hastings, John B.
 Hoffman, Ottokar.
 Hollbaugh, J. R.
 Hooker, Lawrence.
 Howard, Chas. M.
 Hunt & Robertson.
 Inne, F. W.
 Jennings, E. P.
 Jones & Jones.
 Kennedy, Julian

Engineers' Instruments
 Altmeyer, T. & Son.
 Brandis' Sons.
 Bullock & Crenshaw
 Gurley, W. & L. S.
 Engines
 Armstrong Brothers.
 Buckeye Engine Co.
 Bullock, M. C., Mfg. Co.
 Racine Hardware Co.
 Scoville Iron Works.
 Stillwell-Bierce &
 Smith-Valle Co.

Excavators
 Bucyrus Steam Shovel & Dredge Co.
 Southern Co.

Fans, Steam
 Cole, Wm. E.

Fertilizer Machinery
 Poole, R., & Son Co.

Fibre Conduit
 Fibre Conduit Co.

Fire-Brick and Clay
 Denver Fire Clay Co. Garden City Sand Co.
 Poole, R., & Son Co.

Flour Mill Machinery
 Poole, R., & Son Co.

Fluorapatite
 Obermayer Co.
 Poole, R., & Son Co.
 Poole, R., & Son Co.
 Obermayer Co.
 Obermayer Co.
 Poole, R., & Son Co.
 Star Turner Co.
 Frouces, A. B. & Co.
 Sheffield Car Co.
 (See Machinery.)

Fuses
 Moore, S. L., & Son Co.
 Fuses, Powder
 Climax Fuse Co.

Gas Engines.
 Weber Gas & Gasoline Engine Co.

Gas Works
 Pollock, Wm. B. & Co. Wm. R. D. & Co
 Gauges, Recording, Etc.
 Allen, Chas. A. Bristol Mfg. Co.

Gearing
 Poole, R., & Son Co.

Grain Elevators
 Poole, R., & Son Co.

Grease, Graphite, Etc.
 Dixon, Jos. Crutch' Co.

Hangers
 Poole, R., & Son Co.

Heavy Machinery
 Poole, R., & Son Co.

Hopper, Sacks
 Mueller Mfg. Co.

Hose, Rubber, Etc.
 Allen, Chas. A.
 Mineralized Rubber Co.
 New York Belting & Packing Co., Ltd.

Injectors
 Young Lock Nut Co.

Inspection and Tests
 Hunt, Theobald W. Co.

Insulated Wires and Cables
 Okonite Co., Ltd.

Insurance Companies
 Hartford Steam Boiler Inspect'n and Ins. Co.
 Mutual Life Insurance Co.

Iron Castings
 Poole, R., & Son Co.

Ladders
 Obermayer Co.
 Lamps, Miners'
 Stieren, Wm. E.
 Lead, White, Machinery
 Poole, R., & Son Co.

Locomotives
 General Electric Co. Porter, H. K. & Co
 Hunt, W. C. Mfg. Co. Thomson - Houston
 International Co.

Machine Molded Gearing
 Poole, R., & Son Co.

Wachinists
 Poole, R., & Son Co.

Marine Railways
 Poole, R., & Son Co.

Machinery
 Etna Fdy. & Mach. Co. Overland Mach. Co.
 Allen, Edw. P., & Co. Penn Diamond Drill &
 Amer. Mining & Mill- ing Machinery Co. Poole, Wm. B. & Co.
 Armstrong Brothers. Poole, Robt. Son & Co.
 Beckett, Pulv. & Mach. Co. Raymond Bros. Imp.
 Machine Co. Pulv. Co.
 Bestman, J. F. Scaife, W. B., & Sons.
 Boston Ore Mach'y Co. Scoville Iron Works.
 Buckeye Engine Co. Steadman Fdy. & M. Co.
 Busch, W. C. Mfg. Co. Tanton Iron Works.
 Carpenter, Geo. B. & Co. Vulcan Iron Works.
 Colorado Iron Works. Walbr'n-Swenson Mfg.
 Exeter Mach. Wks. Co. Mfg. Co.
 Fraser & Chalmers. Krupp, F.
 Girth & Wedg. Co. McKiernan, S. G. & Co.
 Hendrie & Boltzoff Mfg. Co. Mech'l Gold Extr. Co.
 Hendrie & Boltzoff Mfg. Co. Mecklenburg Ir. Wks.
 Hendrie & Boltzoff Mfg. Co. Mor. & Sam. L. & Son.

Metal Dealers
 Johnson, Matthey & Co.
 Abbott, Wheelock & Co. Lewison Bros.
 American Metal Co. Mathison Sm'ling Co.
 Am. Zinc Lead Co. Orford Copper Co.
 Baker & Co. Phelps, Dodge & Co.
 Bath, Henry & Son. Picher Lead Co.
 Eureka Co. State Ore Sampling Co.
 Goldsmith Bros. Victor Chemical Co.
 James & Shapspeare.

**Metallurgical Works and Ore Pur-
 chasers' Processes**
 American Zinc Lead Co.
 Baker & Co.
 Balbach Smelting & Refining Co.
 Baltimore Copper Works.
 Canadian Copper Co.
 Goldsmith Bros.
 Kansas City S. & Ref. Co.
 Ledoux & Co.
 Mechanical Gold Extractor Co.
 Orford Copper Co.
 Pennsylvania Salt Mfg. Co.
 Ricketts & Banks.
 Russell Process Co.
 St. Louis Sampling & Testing Works
 State Ore Sampling Co.
 Waburn-Swenson Mfg. Co.

Miner Cars
 Sheffield Car Co.
 Mining and Milling Machinery
 Hunt, C. W. & Co.
 Atlantic Mfg. Co.
 Roston & Mont. Mfg. Co.
 Butte & Boston Mfg. Co.
 Central Mfg. Co.
 Copper Queen Mfg. Co.
 Detroit Copper Mfg. Co.
 Eureka Co.

Moulding Sand
 Garden City Sand Co.

Nickel
 Canadian Copper Co.

Nuts, Lock
 Young Lock Nut Co.

Oil, Fuel
 Star Turner Co.

Ore Cars
 Trux Mfg. Co.

Ore Testing Works
 Hunt & Robertson.
 Ledoux & Co.
 Packing and Pipe Coverings
 Brandt, Handolph.
 Jenkins Bros.
 Kearsarge Mfg. Co.
 Mineralized Rubber Co.
 Patents
 Atkins J. L.

Perforated Metals
 Aitchison, R., Perf. Metal Co.
 Harrington & King Perforating Co.
 Hendrick Mfg. Co.

Periodicals
 Arms and Explosives, Iron & Coal Trades
 Australian Mfg Stand'd Review.
 El Minero Mexicano. Indian Engineering.
 Electrical Plant & Jour. of Assoc. of En-
 gineering Societies. gineering Societies.
 Financial Times. Mining Journal.

Phosphates
 Tremholm, Paul C.

Phosphor Bronze
 Phosphor-Bronze Smelting Co.

Pile Drivers
 Bucyrus Steam Shovel and Dredge Co.

Pipes
 Pollock, Wm. B. & Co. Wyckoff & Sons, A.
 General Electric Co. Waburn-Swenson Mfg. Co.
 Poole, R., & Son Co.

Platinum
 Baker & Co.

Plumbago-East India
 Obermayer Co.

Portland Cement
 Atlas Cement Co.

Powder
 Atlas Powder Co.
 Lavin & Rand Powder Co.
 Lau, J. H. & Co.

Publications
 Allison Coupon Co. Financial Times.
 Arms & Explosives. Iron & Coal Trades Rev.
 Australian Mining Jour. of Assoc of En-
 gineering Societies.
 Electrical Plant & Mining Journal.
 Electrical Industry

Pulleys
 Poole, R., & Son Co.

Pumps
 Etna Fdy & Mach. Co. Knowles Steam Pump
 Work.
 Allen, Chas. A. McGowan, John H., &
 Blake, Geo. F., Mfg. Co. Co.
 Cameron, A. A. Steam Pulsometer Steam
 Pump Co.
 Gouids Mfg. Co. Scoville Iron Works,
 Stillwell-Bierce &
 Groetzinger, A., & Sons. Smith-Valle Co.
 Jeaneville Iron Wks. Worthington, Henry.
 Quarrying Machines

Quartz
 Bostelmann, L. F.
 Ingersoll-Sergeant Rock Drill Co.
 Rand Drill Co.
 Sullivan Machinery Co.
 Union Wire Rope Tramway Co.

Quicksilver
 Eureka Co.

Railroad Supplies and Equipment
 Carpenter, Geo. B. & Co. Porter, H. K. & Co.
 Garden City Sand Co. Robinson & Orr.
 Hunt, C. W., Co. Young Lock Nut Co.
 (See Machinery.)

Regulators, Damper, Heat, Etc.
 Eddy Valve Co. Mason Regulator Co.
 Lunkenheimer Co. (See Air Compressor.)
 Rock Drills. See Air Compressor.)
 Rolling Mill Machinery
 Poole, R., & Son Co.

Roofing
 Berlin Iron Bridge Co. Phelps, Dodge & Co.
 Holton Iron & Steel Pittsburgh Bridge Co.
 Roofing Co. Scaife, W. B. & Sons.
 Pencoyd Bridge and Const. Co. Youngston's Bridge Co.

Rope Wheels
 Poole, R., & Son Co'

Rubber Goods
 New York Belting & Packing Co., Ltd.

Safety Lamps
 Wm. E. Stieren

Screens
 Aitchison, R., Perf. Metal Co.
 Exeter Machine Works Co.
 Harrington & King Perforating Co.
 Tyler, W. B., Wire Works Co.
 (See Machinery.)

Screen Plates
 Harrington & King Perforating Co.

Separators
 Harrison Safety Boiler Works.

Shafting
 Poole, R., & Son Co.

Shoes and Dies
 Chrome Steel Works. Crescent Steel Co.
 Shovels (Steam) Bucyrus Steam Shovel & Dredge Co.
 Southern Co.

Smelting and Refining Works
 Balbach S. & Ref. Co. Penna. Salt Mfg. Co.
 Baltimore Cop'z Wks. Penn Smelting and
 Kansas City S. & Ref. Co. Refining Works.
 Mathison Smelting Co. Phelps & P. - Bronze
 Orford Copper Co. Smelt. Co.

Steam Fans
 Cole, Wm. E.

**Steel Rails, Castings, Rolls, Drill
 Steel**
 Aitchison, Wheelock & Co. King & Andrews Co.
 Bethlehem Iron Co. Moore, S. L., & Son Co.
 Chester Steel Cast. Co. Roberts, A. & P., & Co.
 Chrome Steel Works. Robinson & Orr.
 Crescent Steel Co. Whitney, A., & Sons.
 Exeter Machine W. Co. (See Meta. Dealers.)
 Garrison, A., Fdry. Co.

Tanks
 Pollock, Wm. B. & Co.
 Scaife, Wm. B. & Sons.
 Williams Bros.

Tapping Machine, Gas Main, Etc.
 Mueller Mfg. Co.

Telegraph Wires and Cables
 Okonite Co. Ltd., The.
 Tin Plate Rolling Machinery
 Poole, R., & Son Co.

Tools
 Pratt & Whitney Co.

Tubes
 Pollock, Wm. B. & Co. Williams Bros.
 Jenins Bros. Co.
 New York Belting and Packing Co., Ltd.

Turbines
 James Leffel & Co., The.
 Poole, Robt. & Son Co.
 Stillwell-Bierce & Smith-Valle Co.

Turbine Water-Wheels
 Poole, R., & Son Co.

Valves
 Eddy Valve Co. Lunkenheimer Co.
 Jenins Bros. Co. Mason Regulator

Ventilators
 Bullock, M. C. Mfg. Co.

Vulcanite Emery Wheels
 New York Belting and Packing Co., Ltd.

Waburn
 Milton Mfg. Co.

Water Pressure Reducers
 Mueller Mfg. Co.

Water Pressure Regulators
 Mueller, E., Mfg. Co.
 Poole, R., & Son Co.

Well Drilling Machinery
 Bostelmann, L. F.
 Penn Diamond Drill & Mfg Co.
 Sullivan Machinery Co.
 Williams Bros.

Wheels, Car
 Sheffield Car Co.

White Lead Machinery
 Poole, R., & Son Co.

Wire Cloth
 Aitchison, R., Perf. Metal Co.
 Harrington & King Perforating Co.
 Tyler, W. B., Wire Works Co.

Wire Rope
 Aitchison, Wheelock & Co. Lechen, A., & Sons
 Co. R. P. Co.
 Broderick & Bascom. Phelps, Dodge & Co.
 Rope Co. Phillips, J. A. Sons & Co.
 California Wire Wks. Bopeways Synd. Ltd.
 Carpenter, Geo. B. & Co. Trenton Iron Co.
 Cooper, Hewitt & Co. Williamsport Wire
 Hunt, C. W., Co. Rope Co.

Wire Rope Tramway
 Brown Hoist. & Convey. Machine Co.
 California Wire Works.
 Colorado Iron Works.
 Cooper, Hewitt & Co.
 Hunt, C. W., Co.
 Hoebling, J. A., Sons & Co.
 Trenton Iron Co.
 Vulcan Iron Works.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

Positions Vacant.

1332 WANTED—A MANAGER THOROUGHLY familiar with the manufacture of alum. Address ALUM, ENGINEERING AND MINING JOURNAL.

1334 WANTED—MINING ENGINEER and assayer, speaking and writing Spanish, for silver mines; salary \$75. Address, with full particulars as to experience and references, ZACATEC, ENGINEERING AND MINING JOURNAL.

1335 WANTED—FIRST-CLASS ENGINEER for large steam plant. One familiar with both theory and practice. Answer with references and salary required, to PROCTOR, ENGINEERING AND MINING JOURNAL.

1336 THERE IS AN OPENING ON THE editorial staff of the ENGINEERING AND MINING JOURNAL. Preferably a mining engineer and metallurgist familiar with our Western mining districts, and who has had experience in reading exchanges and newspaper work. Address, stating experience and salary expected, STAFF, ENGINEERING AND MINING JOURNAL.

1337 WANTED—A COMPETENT FOREMAN for converting department of copper plant. Must have experience in blowing copper. Give full particulars and references. Address "DURANGO," ENGINEERING AND MINING JOURNAL.

1338 WANTED—ASSISTANT IN ANALYTICAL laboratory; one experienced in analysis of ores, coals, limestones, phosphates, etc., and assaying of gold and silver ores. Address, with references, stating age, experience and salary expected ANALYTICAL, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

Advertisements for SITUATIONS WANTED will be Charged only 10 cents a line.

MECHANICAL AND METALLURGICAL Engineer, graduate, seven years' practical experience in the West as designer and builder of mills, smelters, special works, mining machinery, etc., and fully acquainted with the latest requirements, desires a suitable position of responsibility. Best references. Address M. & M. E., ENGINEERING AND MINING JOURNAL. No. 16,625, July 7.

OPEN FOR ENGAGEMENT. HAVE HAD charge of the mining engineering department of the Michigan Mining School for the past four and one-half years. Practically experienced in all kinds of mine surveying, in railroad and in general engineering work. Well acquainted with mining on Lake Superior. F. W. DENTON, Houghton, Mich. No. 16,602, July 21.

SITUATION AS MINING ENGINEER, AS- sistant superintendent, or with manufacturer of mining machinery; technically educated; experienced; familiar with the mining of large bodies of ore; large mining acquaintance; references furnished. Address L. S., ENGINEERING AND MINING JOURNAL. No. 16,603, July 21.

AN ALL-ROUND CIVIL ENGINEER (thoroughly American) familiar with Spanish language and customs, capable of taking full charge, willing to be an assistant. If with general contracting firm prefer an interest to salary; at present second chief engineer; employers as reference. Experienced in handling, reconnaissance, preliminary, location, construction and men, both as engineer and superintendent. Parties needing the same (especially those interested in South American enterprises) address CHARACTER, ENGINEERING AND MINING JOURNAL. No. 16,597, Aug. 4.

POSITION WANTED AS ASSISTANT TO mine manager or mining engineer, by a recent graduate of the Columbia College School of Mines. Address METAL MINING, ENGINEERING AND MINING JOURNAL. No. 16,590, 14.

EMPLOYERS NEED WHEN ENGINEERS INSTRUMENT-MEN DRAUGHTSMEN CHEMISTS

ESTABLISHED 1890 PROMPT. HONEST. EXPERIENCED.

RELIABLE

ALL KINDS ALL TIMES

ENGINEERING EMPLOYMENT BUREAU SYRACUSE N.Y.

Contracts Open.

ARC LIGHTS.—Rome, N. Y.—C. A. Fowler invites bids until Aug. 6 for furnishing 150 arc lights for one, three or six years.

STEEL, TIN, BRASS, WIRE, ETC.—Sealed proposals, in triplicate, will be received until July 13, 1894, for furnishing silver, steel, tin, brass, iron, copper and brass rivets and burrs; iron, brass and copper wire; nails, screws, tacks, bolts, nuts, leather, paints, oils, chemicals, paper, cleaning and polishing materials, files, lumber, etc., during the fiscal year ending June 30, 1895. All information furnished on application to COLONEL A. R. RUFFINGTON, Ordnance Department, Rock Island, Ill.

BREAKWATER.—Newport, R. I.—Sealed proposals, in triplicate, for stonework at Stonington breakwater, Conn., will be received until July 17. Full information furnished on application. W. H. BIXBY, Captain Corps of Engineers, U. S. A.

BRIDGE.—Cathlamet, Wash.—O. M. Harvey invites bids until July 10 for constructing a draw-bridge.

ELECTRIC WIRES.—Dallas, Tex.—T. F. Nash, judge of Dallas County, invites bids until July 9 for placing electric wires in the court-house.

U. S. ENGINEER OFFICE, NEWPORT, R. I.—Sealed proposals, in triplicate, for stonework at Stonington breakwater, Conn., will be received here until July 17th, 1894. Attention of bidders is invited to Act of Congress approved August 1st, 1882, Sections 1 and 2 (Public No. 189). Full information furnished on application. W. H. BIXBY, Captain Corps of Engineers, U. S. A.

BRIDGE.—Winnipeg, Man.—Sealed tenders, addressed to the undersigned, for the construction and erection of an iron or wooden superstructure for Mary- and street bridge will be received at the office of the Clerk of Committees up to July 12th. Plans and specifications can be seen and forms of tenders obtained on application to the City Engineer. Each tender must be accompanied by a marked check, made payable to the order of the City Treasurer, for the sum called for in form of tender supplied, which will be subject to the usual rules of forfeiture in case of failure to enter into a contract with approved sureties. J. C. SPROULE, Chairman Committee on Works.

WATER TOWER.—Toledo, O.—The Board of Trustees of the Toledo State Hospital will receive sealed proposals until July 10th at said hospital for the construction of a water tower. Bids will be received for a part or all of the work. Each bid must be accompanied by a bond or other guarantee in the sum of \$300, as an assurance that if the work is awarded to the bidder he will enter into a contract for the faithful performance of the work in compliance with the plans and specifications. Plans and specifications can be seen either at the office of E. O. Falls, architect, Nasby Building, Toledo, or at the office of the superintendent at the Toledo State Hospital. H. A. TOBEY, Secretary.

STEEL STAND-PIPE.—Zanesville, O.—Sealed proposals will be received by the trustees of water-works until July 14, for furnishing all materials and constructing a steel stand-pipe 25 ft. in diameter and 100 ft. high; also for excavating, furnishing all material and performing all labor in the construction of a masonry foundation for such stand-pipe. Alternate proposals will also be received for furnishing all materials and performing all labor in the construction of a steel stand-pipe 25 ft. in diameter and 80 ft. in height; also for doing the necessary excavating, furnishing material and performing labor for the foundation for the same to a height of 20 ft. above grade line. All in full accordance with the detail drawings, specifications and forms of proposals to be furnished by the city. Bids for the stand pipe and foundation will be received and considered separately or together. Specifications, forms of proposal and forms of contract are on file in the office of the secretary and drawings ready for the examination of bidders. Accompanying each proposal for stand-pipe and foundation must be a certified check of \$500, payable to the city treasurer of Zanesville, as a guarantee to be forfeited if the bidder fails to enter into the contract awarded to him. Accompanying each separate proposal for stand-pipe and for excavation and foundation must be a certified check of \$250, payable to the city treasurer. W. R. BAKER, President.

TUNNEL.—Deadwood, S. D.—The Black Hill Canal and Water Company will receive bids for the construction and building of a 650-ft. tunnel at the head of Sawpit gulch through the ridge to Sheeptail gulch, near the Carbonate road, said tunnel to be 5 ft. wide and 6 ft. high.

WATER-WORKS.—Bellevue, Ia.—Sealed proposals will be received until July 9, for the construction of a system of water works. Bids will be received for different parts or for the whole as specified in specifications. Plans and specifications can be seen at the office of L. Bittner, chairman of the Water Works Commissioners. All proposals to be addressed to WM. G. STUART, City Clerk.

BRIDGE.—Red Wing, Minn.—Sealed proposals for the superstructure of a bridge to be built over the Mississippi River will be received by the Common Council, at the Council Rooms, until July 13th. The work will comprise two 94-ft. deck spans, one 430 ft. through span, one 220 ft. deck span and about 150 ft. of trestlework, all of steel, together with the necessary wooden flooring and sidewalk rails. The work will be let on the basis of pound price for the material erected and per 1,000 ft. b. m., of lumber in the work. A check in the amount of \$500, properly certified, and made payable unconditionally to the order of the City Treasurer of Red Wing, must accompany each bid. Proposals must be upon blank forms furnished for that purpose, and any not in conformity with this notice will be considered as informal and be rejected. Plans and specifications are on file and can be seen and blank forms of proposals obtained at the office of the engineer, Charles F. Loweth, 94 East Fourth street, St. Paul, and L. P. Wolf, City Engineer, Red Wing. C. A. ERICKSON, Chairman Bridge Committee.

BRIDGE.—New Westminster, B. C.—Separate sealed tenders, properly indorsed, will be received by D. Robson, City Clerk, City Hall, until July 31st for the construction of a combined railway and traffic iron bridge over Fraser River at New Westminster. Plans, specifications and forms of tender may be seen at the City Hall. A set of printed specifications and forms of tender and blueprints of plans will be furnished to any person applying on payment of \$20. Persons tendering may furnish alternate plans with tenders based thereon for the several parts of the work, but such plans must provide for a first-class combined railway and traffic bridge with steel and iron superstructure. A. M. HERRING, Chairman Bridge Committee.

PUMPING MACHINERY.—Shelbyville, Ky.—Sealed proposals will be received, from manufacturers only, at the office of the Shelbyville Water and Light Company until July 10th, for the pumping machinery, boilers, heater and feed pump, with all attachments, fittings and trimmings; for the pipe and specials, hydrants, valves, valve boxes, lead and jute; for the stone, brick, cement, lime, sand and in detail, and all free on board cars or delivered on the ground, Shelbyville. Proposals will also be received for the steel filter set up ready for connections (on foundation furnished) and the steel reservoir of tower erected complete (on brickwork furnished). Plans can be seen and specifications obtained at the office of the secretary, Shelbyville, and at the office of GEO. CADOGAN MORGAN, Engineer, 49 Major Block, Chicago.

POWER HOUSE.—Detroit, Mich.—Sealed proposals for power house and office building for the 800-ft. lock, St. Mary's Falls canal, will be received until July 28. Information furnished on application to O. M. POE, Colonel Corps of Engineers.

THE JOURNAL
—OF THE—
Association of Engineering Societies

publishes the papers of nine societies, including the Boston Society of Civil Engineers and the Western Society of Engineers, and a valuable INDEX of CURRENT TECHNICAL LITERATURE.

JOHN C. TRAUTWINE, Jr., Secretary,
419 Locust St., Philadelphia, Pa.

"Electrical Plant & Electrical Industry."
An Illustrated Monthly Magazine and Review of Electrical Matters.

EDITED BY H. CUTHBERT HALL.

Published on the 1st of each month.
Single Copies, 6d.; by Post, 8d. Annual Subscription, 6s.
Offices: 52 QUEEN VICTORIA ST., LONDON, ENGLAND

'ARMS & EXPLOSIVES.'
A Technical and Trade Journal. Published on the First of the Month.

A Journal for Manufacturers of Guns, Explosives, Fuses Etc.; for the Allied Retail Trades, and for Colliery Proprietors, Quarry Owners and Mining Engineers.

Subscription, 7s. per annum, Post Free.
EDITORIAL AND PUBLISHING OFFICES:
EFFINGHAM HOUSE, ARUNDEL ST., STRAND, London, England.

CHLORINE LIQUID
For Extraction of Gold.
FOR SALE BY
WM. PICKHARDT & KUTTROFF,
98 LIBERTY STREET, NEW YORK.

The Most Successful Process for the Extraction of Gold.

IMPROVED BARREL CHLORINATION.

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

JOHN F. ROTHWELL,
ENGINEERING AND MINING JOURNAL, New York.

MACHINERY AND SUPPLIES FOR SALE.

**STEEL RAILS,
NEW OR SECOND-HAND.**

We can furnish any weight of New Rails. We also have for immediate delivery 400 tons of Second-Hand 60 lb. Steel T Rails, 100 tons 35 lb. Girder and 300 tons 45 lb flat steel; all well fit to relay, and cheap.

**ROBINSON & ORR,
No. 419 Wood Street, Pittsburg, Pa.**

FOR SALE OR TO LEASE

ON GOOD TERMS,

A Manufacturing Water Power Plant, stone buildings, 1,300 horse-power, fully equipped with turbines; suitable for a wood pulp mill, electrolytic refining works, or metal rolling mill; advantageously situated. Address **MANUFACTURING, ENGINEERING AND MINING JOURNAL.** No. 16,587, tf

FOR SALE.

A new Bilharz Concentrator, lately exhibited in the section of Chicago Iron Works, Mining Building, World's Fair. Original cost, \$575. Will be sold very cheap. Is now in Butte, Mont. Address **H. M. MARTIN, 901 Columbus Bldg., Chic go.** No. 16,591, July 7.

FOR SALE.

One 12-in. Second Hand Sturtevant Mill for crushing and grinding ores. In good condition. Address **Room 21, 5 Wabash Ave., Chicago, Ill.**

FOR SALE.

1 Ryan-McDonald Saddle Tank Locomotive, weight 7 tons.
30 Ryan-McDonald 2 cubic yard side Dump Cars.
1/2 mile 30-lb. steel T Rails. All new.
Complete outfit will be sold cheap for cash.
Address **J. E. THURSBY,
45 Broadway, N. Y.**

FOR SALE.

A New Steam Dredge,

Built by Marion Steam Shovel Company; capacity of dipper, one cubic yard; daily capacity of dredge, 600 to 900 cubic yards per 10 hours. Also 5/8-ton Locomotive and 15 side-dump cars of two cubic yards capacity. 36-in. gauge; together with about 5,000 ft. 16-lb. iron rail.

The above machinery is new (locomotive and cars built by Ryan, McDonald & Co., of Baltimore, Md.), and is now in Florida, where it will be sold cheap for cash or approved paper.

Address **L., P. O. Box 542,
Syracuse, N. Y.**

FOR SALE.

Several flat-top black walnut and mahogany desks, with seven black walnut, cane-seated arm chairs to match. Address

**SCIENTIFIC PUBLISHING CO.,
253 Broadway, New York.**

FOR SALE.

One A. Cutler & Son roll-top, 60-inch mahogany desk, in first-class condition. Address

**SCIENTIFIC PUBLISHING CO.,
253 Broadway, New York.**

**THE
MIDLAND RAILWAY
OF KENTUCKY.**

—THE SHORT LINE BETWEEN—

CINCINNATI AND FRANKFORT

—AND—

Frankfort, Georgetown and Paris.

**C. D. BERCAW,
General Passenger Agent.**

MISCELLANEOUS WANTS.

WANTED—PARTNER OR PARTNERS TO organize a stock company for manufacturing a patented automatic coal, clay and freight conveyor. In demand; \$3,000 stock already insured for \$1,500, or for the sale of the same. Illustrated catalogue on application. Address **L. BOUDREAU, No. 170 E. Spruce Street, Manchester, N. H.**

WANTED.

EXPERIENCED CONTRACTORS

to join in sinking a deep shaft through wet ground. Must be able to command \$100,000; very large profits can be made on the job.

SHAFT.

ENGINEERING AND MINING JOURNAL.

THE SO-CALLED SQUIRTING OFF (PARTIAL CRACKING OFF) OF (IN) ENAMEL can be remedied even in the most obstinate cases, against a small payment, by a safe and efficient process. Acknowledgments can be furnished. Address **I. A., 9933 Rudol Mosse, Berlin, S. W. (Germany).**

**THE GOLD AND SILVER
EXTRACTION COMPANY**

TRADE MARK.

**OF AMERICA,
LIMITED.**



(MACARTHUR-FORREST PROCESS)

MACARTHUR-FORREST

Process.

**CAPITAL,
£ 110,000 Sterling.**

TO MINEOWNERS and others having Refractory Gold and Silver ores hitherto untreatable at a profit, the **MacArthur-Forrest (Patent) Process** of gold and silver extraction offers a solution of the difficulty.

Advisory Board in the United States: **THOMAS W. GOAD, Mgr.** **HUGH SUTLER, Asst. Mgr.** **JOHN F. BELL,** **P. GEORGE GOW.** DENVER COLO.

OFFICE:

McPhee Building, - Denver, Colo.

WE BEG TO ANNOUNCE THAT OUR

Mr. Ede, M. E., leaves here early in April to examine mineral properties in **NEW MEXICO, UTAH, Colorado, Oregon and South Dakota.** He will undertake other work for private parties or companies. Twenty years' experience. Reference exchanged.

**EDE & BURWELL, Mining Engineers,
21 QUINCY STREET, CHICAGO.**

Contracts Open.

Continued from page 18.

WATER-WORKS.—Sealed bids will be received by the Trustees of the **Carey Water-Works, Carey, O.,** at their office until August 1st, 1894, for material and performing the necessary labor for the construction of a complete system of water-works. Specifications and forms for bidding can be had of the secretary after July 15th, 1894. Plans will also be on file in the office of the secretary after that date. **H. F. GRAVES, President; GEORGE ASH; J. A. GIBBS, Secretary, Water-Works Trustees. J. S. HUMPHREY, Designing Engineer.**

WATER-WORKS.—Sealed proposals will be received by the Village of **Coxsackie, N. Y.,** until July 20, 1894, for furnishing the materials and constructing a system of water-works for said village. There will be required about 852 tons of cast-iron pipe, 6 tons of special castings, 45 fire hydrants, 32 gate valves, 30 valve boxes, a concrete reservoir dam, etc. Bids will be received for furnishing materials above or for constructing the works complete. Proposals must be addressed to the President of the Board of Trustees, and must contain a certified check or its equivalent, made payable to the President of the Board of Trustees of Coxsackie, N. Y., in an amount equal to two (2) per cent. of the amount of the bid. Plans may be seen and specifications and blank forms of proposal procured at the office of the village clerk, **Coxsackie, N. Y.,** or at the office of the engineers, **Voorhees & Wilmer, Rooms 65 and 66 Chapin Block, Buffalo, N. Y.** The right is reserved to reject any and all bids. **THOS. B. ALCOTT, President Board of Trustees; WILLIAM K. REED, Village Clerk.**

ELECTRIC LIGHTING.—**Rome, N. Y.**—Bids for lighting the streets of the city with electric lights will be received until August 6th. Proposals must be for one, three and six years, for 150 arc lights, more or less, of 2,000 candle power, to be lighted every night from sunset to sunrise. Also for same lighted from one-half hour after sunset till one-half hour before sunrise and from one hour after sunset till one hour before sunrise. A preliminary bond of \$2,000 must accompany each proposal. For further particulars address **A. D. CHARLES A. FOWLER, Chairman of Lamp Committee. K. S. Putnam, Chamberlain.**

FUEL OIL.

.....

Star Burner Co.

Cut will appear next week.

**30 & 32 W. Monroe Street,
CHICAGO, ILL.**

DIVIDENDS.

Rico-Aspen Consolidated Mining Company.

A Dividend of Two and One-half cents per share, twenty-five thousand dollars, has been declared payable July 10th, to stockholder of records on July 5th. Transfer books close July 5th, and reopen July 15th. Transfers of stock to be made at the general office of the company, **Denver, Colo.,** or at the office of **Winthrop M. Tuttle, 22 William street, New York, or Elliot, Johnson & Co., Philadelphia.** **A. B. ROEDER, Secretary.** **DENVER, Colo., June 28, 1894.**

STANDARD CONSOLIDATED MINING COMPANY, OF BODIE, CAL.

SAN FRANCISCO, Cal., June 18, 1894.

DIVIDEND NO. 85,

Of **TEN (10) CENTS** a share, is payable here and at **Farmers' Loan & Trust Company, New York, July 25th.** Transfer books close July 14th. **J. W. PEW, Secretary.**

Received Too Late for Classification.

ASSAYER AND CHEMIST DESIRES POSI- tion; is a graduate with many years' experience in Colorado and Mexico; speaks Spanish fluently and can give first-class references as to character and capacity. Address **T. X. W., ENGINEERING AND MINING JOURNAL.** No. 16,648, July 21.

METALLURGIST AND CHEMIST OF eight years' experience as assistant superintendent, superintendent and consulting metallurgist of lead refining, lead concentrating, pyritic smelting, copper smelting and copper refining works, will be at liberty shortly to take new position. Familiar with the latest metallurgical processes and improvements in the winning of metals from their ores, and the treatment of furnace and mill products. Terms reasonable. Address **SMELTING AND REFINING, ENGINEERING AND MINING JOURNAL.** No. 16,650, July 21.

AN ALL ROUND MAN OPEN FOR EN- gagement, will go anywhere as a machinist or mine foreman. Practically experienced in both branches. Address **TEMPERANCE, ENGINEERING AND MINING JOURNAL.** No. 16,647, July 14.

A GRADUATE CIVIL ENGINEER AND student of mining and geology wants position. Specially fitted for prospecting and exploring. A I references. Address **PROSPECTOR, ENGINEERING AND MINING JOURNAL.** No. 16,648, July 21.

METALLURGIST OF WIDE EXPERIENCE in the building and operation of concentrating works, lead and copper smelting works, copper converting works, silver refineries, etc., will be at liberty in a few months to make new engagement. Should like to correspond with any company requiring a superintendent either for the construction of new works or the operation of existing works. Terms very moderate. Address **CONSTRUCTION, ENGINEERING AND MINING JOURNAL.** No. 16,649, July 21.

AN AMERICAN OF MIDDLE AGE, WITH scientific education and long experience in purchasing and smelting argentiferous lead ores, desires position as agent or superintendent of works. Speaks and writes Spanish; satisfactory references. **R. M. T., ENGINEERING AND MINING JOURNAL.** No. 16,645, July 21.

1339 WANTED—CHEMIST AND AS- sistant to superintendent of copper smelter. Young active man, competent and reliable in analytical laboratory work, willing to work at all hours when needed, with several years' practical experience in smelting copper ores in blast furnaces and in roasting said ores. Location of works in the Southern States. State experience, age, and salary wanted. Address **SMELTER, ENGINEERING AND MINING JOURNAL.**

THE HASENZAHL
DIAMOND BIT ROCK DRILL
 FOR HAND AND OTHER POWER.
 Brings out a Core. Write for Particulars.
WM. HASENZAHL, Mfr.,
 49 East Second Street, Cincinnati, Ohio.

HUNT & ROBERTSON,
 77 PINE ST., NEW YORK,
ANALYSTS & ASSAYERS,
 MINING ENGINEERS.
 Specialty Made of Copper Metallurgy.

THE CANADIAN COPPER CO.
 HEAD OFFICE:
 Room 201 Perry-Payne Bldg., Cleveland, O.
 Miners and Smelters of Copper-Nickel
 Ores at Sudbury, Ontario, Can.
COPPER AND NICKEL.

BALTIMORE
Copper Smelting and Rolling Company
 (THE BALTIMORE COPPER WORKS).
 Office: KEYSER BUILDING,
 BALTIMORE, MD.
INGOT COPPER. SHEET COPPER.

J. STOCKLY CARY, Chemist and Assayer Dep't of Mines and Mining; Chemist of National Bureau of Awards. World's Columbian Exposition.
 JOHN E. MOORE, formerly with Rattle, Nye & Hollis, Rookery Building.

CARY & MOORE,
 Analytical and Consulting Chemists, Samplers and Assayers,
 1760 Monadnock Bldg., CHICAGO, ILL.
 Specialty: Coal and Coke Analyses.

THE AMERICAN METAL CO.
 LIMITED,

80 Wall Street (P. O. Box 957), NEW YORK.
 114 Laclède Building, ST. LOUIS, MO.
COPPER, COPPER ORES AND MATTES, TIN, LEAD, SPELTER, ANTIMONY, NICKEL, ALUMINUM.
ADVANCES MADE ON CONSIGNMENTS.
 Agents for Henry R. Merton & Co., London; Metallgesellschaft, Frankfurt-on-Main; Williams, Foster & Co., Limited, Swansea, Eng.; Pascoe & Co., Limited, Swansea, Eng.; Falbach Smelting & Refining Co., Newark, N. J.

ORFORD COPPER CO.,
COPPER SMELTERS

Works at Constable's Hook, N. J., opposite New Brighton, Staten Island. Copper Ore, Mattes, or Bullion purchased. Advances made on consignments for refining and sale. **Specialty made of Silver-Bearing Ores and Mattes.**

SELL
INGOT AND CAKE COPPER.
 President, **ROBERT M. THOMPSON,**
 Office, 37 to 39 Wall Street, New York.

JAMES & SHAKSPEARE,
 ENGLAND.

1 Metal Exchange Buildings, London, E. C.,
 AND
 17 Irwell Chambers West, Liverpool.

METALS, MATTES AND MINERALS.

Cable Address, **METALLURGY, LONDON.**
 Use A B C Code, 4th Edition.

Established 1845.

W. & L. E. GURLEY, TROY, N. Y.
 Largest Manufacturers of Civil Engineers' and Surveyors' Instruments. Send for Illustrated Circular Price List showing latest improvements.

LEDOUX & CO.,
 9 Cliff Street, New York.
Assayers and Engineers.

ORES, BARS, BULLION AND ALL FURNACE PRODUCTS SAMPLED AND ASSAYED.
Public Ore Yards and Sampling Works.
 ADVANCES OBTAINED ON CONSIGNMENTS. PRINCIPAL BANKS AND METAL BUYERS ACCEPT OUR CERTIFICATES AS FINAL.

ASSAYERS BY APPOINTMENT TO NEW YORK METAL EXCHANGE.

RICKETTS & BANKS,
 104 John St., New York.

ORES TESTED!

Complete Ore Milling and Testing Works or making practical working tests of ores to determine the Best Method of Treatment. Milling, Metallurgical and Chemical Processes investigated.

Assays and Analyses!

CIRCULARS AND TERMS ON APPLICATION.

DR. HENRY FROEHLING,

Chemical and Metallurgical Laboratory.

7 South 12th Street, Richmond, Va.

Assays and analyses of ores, furnace products, clays, limestones, phosphates, waters, coals, oils, gases, etc. Price lists of analyses on application. Mines and mineral properties in the South examined.

HASTINGS, JOHN B.,

Consulting Mining Engineer.

Office: Broad St. House, Old Broad St., London, E. C., England.
 Present Address: Boise City, Idaho, U. S. A.

INDUSTRIAL CHEMISTRY.

Improvement and Invention of Processes and Products. Utilization of Wastes and Unapplied Substances. Experimental Investigation of Technical Problems. Expert Examinations and Tests. Formulas, Counsel and Opinions.

PETER T. AUSTEN, Ph. D.,
 99 Livingston St., BROOKLYN N. Y.

HENRY BATH & SON,
 London, Liverpool and Swansea,
BROKERS.

All Description of

Metals, Mattes, Etc.
 Warehouses, Liverpool and Swansea.

Warrants Issued under their Special Act of Parliament.

NITRATE OF SODA.

Cable Address: - **BATHOTA, LONDON.**

FRANCIS M. SIMONDS, E.M., Ph. D.,

Experimental, Analytical and Assay Laboratories.

20 Platt St., cor. of Gold, NEW YORK.

SPECIALTIES: Special Laboratory for Students and Business Men. Experimental Work on Chemical and Metallurgical Processes.

THE HARRINGTON & KING PERFORATING CO.
 CHICAGO.



METALS PERFORATED AS REQUIRED
FOR MINING SCREENS OF ALL KINDS.

FOR USE IN

MILLING AND MINING MACHINERY,
 REDUCTION AND CONCENTRATING WORKS,
 WOOLLEN, COTTON, PAPER AND PULP MILLS,
 RICE, FLOUR AND COTTONSEED OIL MILLS,
 SUGAR AND MALT HOUSES,
 DISTILLERIES, FILTER PRESSES,

STONE, COAL AND ORE SCREENS,
 STAMP BATTERY SCREENS,
 BRICK AND TILE WORKS, FILTERS,
 SPARK ARRESTERS, GAS AND WATER WORKS,
 OIL, GAS AND VAPOR STOVES,
 COFFEE MACHINERY, &C., &C.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A.
 Eastern Office, No. 284 Pearl St., New York.

LEWISOHN BROTHERS,

P. O. Box 1247. 81 and 83 FULTON STREET, NEW YORK.

Advances made on Copper, Matte and Ores.

Agents for the following Mining Companies: Boston & Montana C. C. & S. Mining Co. Tamarack Mining Co.; Butte & Boston Mining Co.; Osceola Consolidated Mining Co. Arizona Copper Co., Ltd.; Kearsarge Mining Co.

HIGH GRADE HOISTING ENGINES AND DRUMS.

We have some of the heaviest plants in the world in Iron, Copper and Silver Districts of United States.

OUR CORLISS ENGINES ARE DESIGNED EXPRESSLY FOR HOISTS

SEND FOR CATALOGUE.

OTHER SPECIALTIES

Diamond Core Drills.
 Rock Drills and Air Compressors.

Cable Address:
"BULLOCK."

M. C. BULLOCK MFG. CO.,
 37 Canal Street, Chicago, Ill.

THE ENGINEERING AND MINING JOURNAL



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

Vol. LVIII. JULY 7. No. 1.

RICHARD P. ROTHWELL, O. E., M. E., Editor.
 ROSSITER W. RAYMOND Ph. D. M. E., Special Contributor.
 SOPHIA BRAEUNLIQH, Business Manager.
 THE SCIENTIFIC PUBLISHING CO., Publishers.

SUBSCRIPTIONS TO THE ENGINEERING AND MINING JOURNAL are PAYABLE IN ADVANCE. Price: For the United States, Mexico and Canada, \$5 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7.

The address slip on the paper will show date of expiration of subscription. Subscribers wishing their address changed will please give the name of the old post-office as well as the new one.

NOTICE OF DISCONTINUANCE.—The JOURNAL is not discontinued at expiration and is sent to subscribers until an explicit order is received by us, and all payment of arrearages is made, as required by law. The courts invariably hold a subscriber responsible to the publisher for the subscription price of all papers received until the paper is paid for in full up to date and ordered discontinued. PAPERS RETURNED ARE NOT NOTICE OF DISCONTINUANCE.

ADVERTISING RATES furnished on application. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO.

THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS:

R. P. ROTHWELL, Pres. & Gen'l Mang.
 SOPHIA BRAEUNLIQH, SEC'Y & TREAS.

P. O. BOX 1833.
 253 Broadway, New York.
 Cable Address: "Rothwell, New York."
 Use A B C Code, Fourth Edition.

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

CHICAGO OFFICE: "The Rookery," Room 531.

CONTENTS.

	Page.
"The Mineral Industry"	1
Gold Mining in Alaska	1
The New Tariff Bill	1
The Railroad Strike	1
The MacArthur-Forrest Cyanide Patent	1
* The Receivership of the Harney Peak Company	2, 5
The Poorman Consolidated	2
Books Received	3
Cost of Treating Tailings by the Russell Process	3
A Volumetric Method for Lead Analysis	A. C. Beebe 3
The Nicaragua Canal Bill	3
Mining Locations at Cripple Creek, Colo.	E. Skewes 4
Zinc Ore vs. Franklinite Ore	4
Dividends Paid by Mining Companies	4
The Economy of Gas Engines	5
Iron Making at Birmingham, Ala.	E. C. Pechin 6
* A New Centrifugal Tar Separator for Gas-Works	7
* A New Oil Testing Machine	7
* The Microscopic Metallurgy of Copper Alloys	M. Guillemin 8
Dressing Lead and Zinc Ores in Missouri and Kansas	Geo. T. Cooley 9
Patents Issued	10
Personal, Obituary, Societies, Technical Schools, Industrial	11
Notes: The Panama Canal, 3—Vessels Recently Built in the United States, 3—Employment of Women in Indian Mines, 4—Coal Discovery in Trans-Caucasia, 4—British Iron and Steel Exports, 6—Remarkable Mineral Exhibit, 6—Tin Mines of Mergui, 7—New Fast Vessel for the British Navy, 10—Russian Railroads in Central Asia, 10—Coal Washing in England, 10.	

* Illustrated.

MINING NEWS.	West Virginia... 15	Buffalo..... 17	Salt Lake City 22
Alabama..... 12	Wyoming..... 15	Chicago..... 17	London..... 22
Alaska..... 12	FOREIGN NEWS.	Philadelphia.. 18	Philadelphia.. 22
California..... 12	Bolivia..... 15	Pittsburg..... 18	Aspen..... 24
Colorado..... 13	Brazil..... 15	Cartagena..... 18	Colorado Springs 24
Florida..... 13	Br. Columbia.. 15	METALS..... 18	Duluth..... 24
Georgia..... 13	Chile..... 15	CHEMICALS AND MINERALS.	Helena..... 24
Idaho..... 13	Great Britain.. 15	Pittsburg..... 20	Pittsburg..... 21
Illinois..... 13	Japan..... 15	MINING STOCKS:	St. Louis..... 24
Indian Ter. 13	Ontario..... 15	New York..... 21	Shanghai..... 24
Iowa..... 13	South Africa... 15	Boston..... 21	Paris..... 24
Maryland..... 13	So. Australia.. 15	San Francisco. 21	Coal Stocks... 22
Michigan..... 13	LATEST MINING NEWS.	London..... 21	Ind. and Trust. 22
Minnesota..... 14	NEWS..... 16	Paris..... 21	MINING CO'S... 23
Montana..... 14	MARKETS:	Dividends.... 21	CURRENT PRICES:
Nevada..... 14	COAL:	Assessments.. 24	Chemicals.... 24
Oregon..... 14	New York.... 16	STOCK QUOTATION:	Minerals.... 24
Pennsylvania.. 14	Buffalo..... 16	New York..... 22	Rarer Metals. 24
South Dakota. 14	Chicago..... 16	Boston..... 22	ADVT. INDEX. ... 15
Tennessee.... 14	Pittsburg.... 17	San Francisco. 22	ADVT. RATES. ... 33
Texas..... 14	IRON:	Baltimore.... 22	
Utah..... 15	New York.... 17	Denver..... 22	
Virginia..... 15			

It is with great pleasure that we have to announce that the large first edition of the second annual volume of "The Mineral Industry" is already exhausted and it is necessary to print a second edition. We shall be greatly obliged to readers of this book, who may have noticed any errors in it, if they will kindly notify us of them, that we may insert a table of errata in the next edition.

The revival of interest in gold mining is felt in Alaska as well as elsewhere in our territory, and the advices from that region show that there is likely to be a marked increase in the amount of work done on the mines this year. Prospecting is active all through the territory, and on the mineral locations already known there has been a considerable increase in activity. Old mills are being started up and new ones erected, while development work is extended wherever there is an opportunity. In the Juneau district several companies are at work evidently hoping to rival on a smaller scale the continued success attained in the great Alaska-Treadwell mine, and to remove the distrust caused by some of the earlier failures. While success cannot be predicted for all these ventures, there is no doubt that some of them may do well, and that a notable increase in gold production may be expected.

Placer mining is attracting much attention also, and the local papers report the arrival of prospecting parties by every steamer. The remote Yukon region has a larger number of men in it this year than ever before, including several parties equipped for working on a considerable scale.

The new tariff bill, as noted in another column, has finally passed the Senate, and has been returned from that body to the House of Representatives, where the many amendments and material changes made in the Upper House will now come under discussion. That there will be a disagreement no one doubts; in fact, so certain has it been considered, that the Senate has already appointed a conference committee, which is a somewhat unusual action to be taken in advance of a recorded disagreement. We have not considered it necessary to give in full detail the amendments made to the original bill in the Senate, although our readers have been kept apprised of their general tenor. The principal changes, as we have already stated, in the mineral and metal schedules have been in increases of duty in several directions and in the removal of coal and iron ore from the free list. The final form of the bill will be fixed by the conference committee, as has been the case with all tariff bills for many years. Just what that form will be it is impossible now to say; most probably a compromise, in which some, at least, of the Senate amendments will be incorporated, but in which some will be entirely rejected and others modified, bringing the bill nearer to its original form than it now stands. At any rate it is probable that the House will act quickly—that being the general disposition of its members in this matter—and the country will have the satisfaction of seeing the question settled before the end of the present month. With few exceptions we believe that business men and manufacturers have reached the point where the fact of the settlement will be of more importance to them than its exact form.

The railroad strike, to the cause—or rather absence of cause—of which we referred last week, has assumed a threatening form during the present week. The managers of the movement seem to have concentrated their forces in Chicago, where they have gone to the length of endeavoring to stop all traffic and to prevent entirely, by force, the operation of the railroads. The General Managers' Association, which had been anticipating a movement of this kind for some time past, has refused to negotiate with the strikers in any way, and has used all possible efforts to keep its lines open, throwing upon the authorities the task of keeping the peace.

So far the local government has been unequal to this task, but a new element has now been brought in. Acting on the opinion of the Attorney-General that its authority is sufficient under the rights to control interstate commerce and the movement of the mails, the National Government has taken part, and all the available troops of the regular army have been ordered to Chicago to assist in preserving the peace and in keeping the railroads open. That this action will meet with general approval there is no doubt, and that the strikers will be forced to give way in the end and to abandon their wholly untenable position is also certain.

The second center of the strike is in California, where the operation of the railroads has been almost entirely stopped by mobs at Sacramento, Los Angeles and other points. Here also the Federal Government has intervened, and will use the force at its command to stop interference with traffic.

The African Gold Recovery Company, which works the MacArthur-Forrest cyanide patents in the Transvaal, is making a bold bid for the prolongation of its patents by proposing to the government of the South African Republic that the process shall be made a government monopoly for 20 years, subject to a small fixed charge to be paid to it. At the present time the process is being assailed in many quarters, where it is held

that the MacArthur-Forrest patents could not be upheld in a court of law, and where an action for infringement is being courted by the open use of the process without a license from the Gold Recovery Company. The company probably by this time considers its claims on the patent rather doubtful, so the transfer of the process to the government will be welcome. It would, however, reap another advantage, for the patents, even if kept intact, have only seven more years to run; considering everything, it is better to accept a reduced income for 20 years than to continue with the present return for at the most seven years. The proposition is that the government shall take over the process entirely, patent rights or no patent rights, as an ordinary monopoly, charging $7\frac{1}{2}$ per cent. royalty on the gold produced by the process, and paying a certain fixed proportion of this to the company. Of course the main reason alleged by the company for this change is that it will benefit the mining industry. At present the charges are not fixed at a proportion of the gold produced, so that large producers pay a smaller proportion of their output, and the smaller companies pay relatively higher. Under the new proposition the proportion would be fixed all round, and this is the benefit alleged by the company to be derivable from the change. The whole mining community is up in arms against it, partly because it practically perpetuates the patents, which are now generally considered shaky, and partly because it opens up unpleasant prospects of a tax which may be increased at any moment for the purposes of raising extra public revenue. In the latter direction the scheme is open to misuse which would damage the mining industry most seriously. The prospects of the scheme being adopted are very uncertain so far. The company, as we have heretofore noted, recently began a suit in the courts of the South African Republic for infringement of its patent. This suit has not yet come to a hearing, though great preparations have been made for the trial.

THE RECEIVERSHIP OF THE HARNEY PEAK COMPANY.

According to the original theory of the law a receiver is an officer of the court appointed to care for a property in litigation; he should be a person competent to manage its affairs and should moreover be entirely disinterested, so that he will not regard the interests of any party to the litigation, but simply hold the property ready to turn over to its proper owners in as good condition as may be. In late years, however, practice has changed materially from this original theory, the alteration beginning with the great number of railroad receiverships caused by the panic of 1873. The doubtful precedents then established have been followed in too many cases, and there has gradually grown up the system of "friendly" receiverships for the purpose of "protecting" companies, and also the custom of appointing as receivers, not disinterested and capable persons, but officers of the defendant corporations, too often those whose management is directly responsible for its condition. It is true that such officers may be the persons most familiar with the property and its management; but it is also true that they will inevitably have a bias in favor of one of the parties to the contention. A court must leave a large discretion to the receiver, and so long as there is no actual defalcation or malfeasance, his judgment is usually a controlling influence. In the railroad receiverships, which are the most conspicuous instances at hand, more than one notable case could be cited in which the receiver's authority has been used to coerce creditors and to force the adoption of an unfair plan of reorganization. At the best the "friendly" plan of appointment is dangerous, and the whole system is open to grave abuses.

We have cited the cases of railroad companies because their receiverships have been more numerous and more important than those of any other class of corporations, but the remarks apply quite as well to mining companies, and the same rules and considerations should govern in their cases also.

We mentioned last week the fact that Dr. Albert R. Ledoux had been appointed by Judge Lacombe receiver of the Harney Peak Tin Mining Company, the case which is the immediate text for our remarks. This appointment is worthy of more particular mention, because in this instance the judge has wisely departed from the ordinary practice of making lawyers or other non-technical men receivers of mining, manufacturing and transportation companies, men who, whatever their individual ability may be, can have no technical knowledge of the matters intrusted to them, and has also selected a man entirely disinterested as between the parties to the litigation.

Dr. Ledoux has been engaged since 1880 as an expert in mining and metallurgical matters and assaying in this city, and is a frequent contributor to the "Engineering and Mining Journal." It will be remembered that he carried on the investigation of the tin field in the Kings Mountain region in North Carolina. If there is anything to be gotten out of the Harney Peak mines or company it can best be done by some one familiar with the business of mining and able to decide metallurgical questions. In fact the appointment is a most excellent one, and it is to be hoped that it will be confirmed after the hearing next week.

THE POORMAN CONSOLIDATED.

On February 17th last we published in these columns certain statements concerning the Poorman Consolidated Mining Company, in which we doubted whether the company owned the mills it claimed, and we said that the shares of the company "are being industriously worked upon the London market by certain promoters" and that "the company had recently undergone a transformation, being now, we are told, a New Jersey organization," and we warned the stockholders that the responsibility of promoters might thereby be evaded. We also said that unearned dividends had been paid on the stock.

The company found itself aggrieved by the statement that it had paid dividends and that it did not own a mill, and on this, and no doubt with the hope of stopping the "Engineering and Mining Journal" from telling the truth, it brought suit for libel against the publishers of this paper. The "Journal" declined to be frightened, and, while making its own investigations, it offered the Poorman company's representatives to publish over their name and on their responsibility any correction they wished to make in our statements. Of this this they declined to avail themselves.

We have since had occasion to refer again to this company* and to ask for information as to the dividends declared by the Poorman company in 1892 and 1893, when certain returns of bullion production were published in the London papers and large dividends were paid on the stock. We also asked for some information as to the relations of the directors of the Poorman company with the "Mercantile Assets Company," of New Jersey. That is familiarly known as "the Little Joker of the Poorman."

We have had no explanations of these matters from the company or its officers, but our investigations have led us to certain conclusions which should certainly interest a good many of the Poorman shareholders who lost the money they invested in this stock on the "boom" caused by the fraudulent dividends paid in 1892 and 1893.

The company's libel suit against the proprietors of the "Engineering and Mining Journal" was apparently based upon the recent transformation which converted the old English organization into a New Jersey company, and what was said of the old company did not apply to the new, though the same interest remained in control and only the name was slightly changed.

The unearned dividends which we referred to as having been paid were paid by the old company in 1892 and 1893, on the product returns as published in London papers, which were as follows:

October, 1892.....	Produced 470 tons.	Realized \$24,150.
November, 1892.....	" 495 "	" 25,370.
December, 1892.....	" 510 "	" 26,400.
January, 1893.....	" 535 "	" 27,650.
February, 1893.....	" 525 "	" 27,500.
March, 1893.....	" 515 "	" 27,750.

We have undoubted evidence that these returns were altogether fraudulent, and consequently the dividends paid out of these non-existing profits were also fraudulent, and we believe that those who then purchased stock on faith in these published returns can make the then directors of the company personally responsible for their losses. Some of the same parties control or are largely influential in the New Jersey company as they controlled the old English company, and it is easy to understand why they should be very desirous of getting the old stockholders to exchange their shares for stock in the New Jersey company.

The ownership of the two mills that the Poorman Consolidated Company claims is not quite as the company represents. The Leonard mill is the small old mill which we had supposed the company owned, but the official records show that it was sold by R. H. Leonard on July 28th, 1893, to the Idaho Milling Company, a New Jersey corporation. This deed was recorded only on April 17th, 1894, or two months after our article had appeared in these columns, and from this record it appears that the Poorman Consolidated Company does not yet own this mill though it claims to do so. Is "the Idaho Milling Company" still another "Little Joker" to the Poorman? And who are its stockholders and what arrangement exists between this company and the Poorman company?

The Ralph or Ruth mill, along with a three-eighths interest in certain mining claims, are stated in the Idaho official records to have been conveyed Aug. 3d, 1893, by Leach & Shanks to Smith & Adams for \$12,000, and the deed was recorded the same day.

There was no other record until April 17th, 1894, so that as far as the public had any knowledge the mill did not belong to the Poorman company at the date of our remarks. On April 17th, 1894, there was recorded a deed dated October 16th, 1893, in which Smith & Adams conveyed the same property to T. N. Shanks for \$6,902.84, and on April 17th, 1894, a deed dated October 18th, 1893, from Shanks to the Poorman Consolidated Mines, Limited, was recorded with consideration of one dollar, but the property conveyed did not include the mining claims, but only the mill and certain houses. From this it would seem as if these deeds were recorded, if not actually executed, of which there may be reasonable doubt, two months after our statement appeared.

* See "Engineering and Mining Journal" for February 17th, March 24th, April 14th and May 12th, 1894.

We may add that a telegram just received by us announces the total destruction of the "Poorman" mill by fire.

The Poorman company now claims to have "large quantities of very rich ore," and to be milling the same; though it has not yet published any returns. The company has refused to allow the well known expert whose absolute integrity and disinterestedness are unquestioned, Capt. John W. Plummer, superintendent of the De Lamar mines, Idaho, to examine the Poorman mines and mills as the representative of the "Engineering and Mining Journal," and to report their condition for publication in the "Engineering and Mining Journal."

While our representative has not been admitted, we are not deprived of all information as to what the mines contain; and we deem it well to remind the London investing public of the 1892-93 transactions of the Poorman promoters, and not allow themselves to be carried away by the present obvious attempts to "boom" this stock, which have already resulted in a great advance in its price.

Our investigations have given us much further interesting information, which we shall use later on—if the company will favor us by bringing its libel suit into court.

We have, however, already suggested several useful fields for the investigation of the Poorman shareholders, and we commend to our London contemporaries, who may not be interested in the deals past or present of this company, that they also investigate the matters here referred to.

BOOKS RECEIVED.

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

Unsere Kohlen. By Dr. Karl Ochsenius. Essen, Prussia; G. D. Badeker. Pamphlet, pages 14; illustrated.

Breaking Strains and Weights of Steel Wire Ropes. London and Birmingham, England; John & Edward Wright. Pocketbook; tables.

L'Epoque Eburneene et les Races Humaines de la Periode Glyptique. By Ed. Piette. Saint-Quentin, France; Charles Poette. Pamphlet, pages 28.

Notes on Cripple Creek Ores. By Dr. Richard Pearce. Paper read before the Colorado Scientific Society. Denver, Colo.; published by the Society. Pamphlet, pages 8; illustrated.

Sanitary Chemical Character of Some of the Artesian Waters of Denver. By Professor William C. Strong. Paper read before the Colorado Scientific Society. Denver, Colo.; published by the Society. Pamphlet; pages 10.

CORRESPONDENCE.

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

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

The Cost of Treating Tailings by the Russell Process.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: During the period from May 24th to December 8th, 1893, the Blue Bird Mill, at Butte, Mont., treated 15,797 tons (dry weight) of tailings from amalgamation in its Russell process plant. The latter consists of four ore vats 17½ ft. diameter and 9½ ft. depth, with the necessary precipitating plant, etc., and was erected in 1889 at a cost of \$20,000 for treating 60 tons of roasted ore per day. Its capacity for tailings proved to be about 100 tons per day, with a rate of lixiviation of about 8 in. per hour. The charge for one ore vat was 70 tons (dry weight).

The cost of treatment per ton of tailings, according to official figures furnished by Mr. C. A. Hoyt, was as follows: Hauling tailings from the pits to the vats, \$0.35; labor in lixiviation, \$0.35; chemicals, \$0.43; pumping water, \$0.06; superintendence and miscellaneous, \$0.32; making a total of \$1.51 per ton. Operations were suspended on account of the low price of silver. Mr. Hoyt does not state the value of the tailings and the percentage of silver extracted. The Bi-Metallic company in Montana has recently finished a lixiviation plant for working tailings from amalgamation. This plant has 12 ore vats of 22 ft. diameter and 10 ft. depth, which will hold 150 tons each. The capacity of the whole plant is expected to be not less than 300 tons per day.

At the Ontario Mill, Park City, Utah, the construction of a lixiviation plant was commenced last year, but only the building was completed. Construction was suspended on account of the drop in the price of silver, although nearly all the materials were on hand. It is expected, however, that this plant will be finished this summer. The plant, with 10 ore vats of 17 ft. diameter and 9 ft. depth, will have a capacity of 200 to 250 tons per day for Ontario tailings, or for Ontario ore, about 150 tons per day, in case it should be used for ore after the supply of tailings is exhausted.

OCCASIONAL.

A Volumetric Method for Lead Analysis.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: As I have found the existing volumetric methods for the analysis of lead more or less unsatisfactory, on account of the lack of a sharp, characteristic end reaction, I have devised the following scheme, which combines accuracy with rapidity.

It depends upon titrating a solution of acetate of lead free from alkali salts by means of ferrocyanide of potassium, using a saturated solution of uranium acetate as an indicator. The end reaction, which is formed by adding a drop of the solution, being titrated to the uranium solution on a porcelain plate, is a delicate pink, changing, after standing some time, to brown. The ferrocyanide solution can be standardized with either lead sulphate or lead acetate. Eleven grams of ferrocyanide in one liter

of water will give about a 1% solution. The uranium acetate solution should have a little free acetic acid in it, or the sharpness of the end reaction is affected.

The method for analysis is as follows: Dissolve the substance to be analyzed in nitric acid, using a little hydrochloric acid if necessary. When the decomposition is complete add sulphuric acid and evaporate till white fumes of sulphuric anhydride are given off. Dilute with water and cool. Add to the liquid its own volume of common alcohol, and allow it to stand a short time. Filter and wash with hot water. Then wash the residue into about 50c. c. of a cold saturated solution of ammonium carbonate with some of the carbonate solution. Stir frequently and vigorously for about 15 minutes. Filter and wash both residue and filter very thoroughly with hot water. Dissolve the lead carbonate in hot dilute acetic acid. Cool and titrate with a solution of ferrocyanide of potassium.

Barium and calcium do not interfere with the results. Arsenic is eliminated by the method of treatment. Antimony compounds can be made soluble by the use of tartaric acid in the decomposition of the substance. Should iron, copper or zinc be present, a very thorough washing of the lead sulphate will be necessary. If any substance is found to interfere seriously with the results, the copper and arsenic groups can be separated from their acid solution by means of sulphuretted hydrogen. The resulting sulphides can be dissolved in nitric acid and the regular method of analysis followed.

I have used the method as given above with excellent results. As, however, there are many artificial and natural products I have had no opportunity to try, I will regard it as a favor if other chemists will send me criticisms or suggestions concerning this scheme.

ALFRED C. BEEBE,

Chemist for the Chicago & Aurora Smelting and Refining Company.
AURORA, Ill., May 24, 1894.

THE NICARAGUA CANAL BILL.

The sub-committee having this matter in hand has reported a bill to the House Commerce Committee in Washington, which is, in its general features, as follows:

The capital stock of the Maritime Canal Company, of Nicaragua, shall consist of 830,000 shares of the par value of \$100 each, which shall be non-assessable, and no more than this number shall ever be issued except by consent of Congress. When the words "Nicaraguan Canal" are used, they include all the real and personal property, franchises, railroads, piers, channels, dams, locks, embankments, and other works necessary or incidental to the construction, equipment, maintenance and operation of the canal.

If the Maritime Canal Company shall, within nine months from the passage of this act, show to the satisfaction of the Secretary of the Treasury that all of its stock heretofore issued, except that given to Nicaragua and Costa Rica, has been called in and canceled, and that all bonds and obligations of all kinds have been satisfied, the Secretary shall subscribe for 700,000 shares for the United States, and in addition 10,000 shares of non-assessable capital stock, to be delivered to such persons as may be designated by the stockholders of the Maritime Canal Company, whose stock has been surrendered and canceled. When this bonus is given to the company, the offices of directors of the present company shall be declared vacant except such as represent Nicaragua and Costa Rica.

The new board is to consist of 11 directors, one each named by Nicaragua and Costa Rica, one by the stockholders of the canal company and eight by the President of the United States. Not more than four of the latter shall belong to any one political party. Their compensation shall be \$5,000 per annum, and each shall make a personal inspection of the canal at least once every year. When this board is reorganized, the Secretary of the Treasury shall pay, to the old stockholders of the canal company, capital stock equal to the amount they have already expended, provided this sum does not exceed \$4,500,000. The government reserves the right to repurchase this stock at par any time, together with 3% per annum from date of issue. Dividends must be paid from the net earnings and shall never exceed 5% of the par value of the stock.

The construction of the canal is to be under the supervision of government engineers. The act is to be void unless the company complies with its requirements within nine months from its passage.

To secure the means to construct and complete the canal and meet the expenditures the Maritime Canal Company is authorized to issue bonds of \$50 to \$1,000 to an amount not exceeding \$70,000,000, to be dated July 1st, 1895, and payable July 1st, 1925, but redeemable by the United States at any time after July 1st, 1905, with interest at 3%. These bonds are to be secured by a first mortgage on the canal property, which mortgage is to contain a provision for a sinking fund sufficient to pay the bonds at maturity, and the bonds are also created a first lien on the property of the canal in favor of the United States.

It is not likely that this bill will pass the Senate in this form. It has been prepared in this way so as to get through the House on the regular calendar, and when passed will go to the Senate, where Senators Morgan and Sherman, together with others who have taken an active part in this matter, will put it in better shape for final acceptance. As the bill stands now it can hardly be considered a satisfactory one for the company, and it is altogether improbable that they will accept it.

The Panama Canal.—A cable dispatch from Paris says that the liquidator of the Panama Canal Company has signed an agreement with a new company, which has a capital of 1,500,000,000 francs, and undertakes to complete the canal.

Vessels Recently Built in the United States.—The records of the Bureau of Navigation show that during the present fiscal year there were built in the United States and officially numbered 339 wooden sailing vessels of 24,271 tons, and 221 wooden steam vessels of 29,948 tons. During the same period 3 iron or steel sailing vessels were built of 4,749 tons, and 27 iron or steel steam vessels of 26,920 tons. These sailing vessels aggregated 342 in number and 29,021 tons in measurement. The steam vessels aggregated 243 in number and measured 56,869 tons. The entire number of vessels built and numbered was 590, the tonnage being 85,890. No unrigged vessels were included in the above statement.

MINING LOCATIONS AT CRIPPLE CREEK, COLORADO.

Written for the Engineering and Mining Journal by Edward Skewes.

The Cripple Creek area, according to a little pamphlet published by the Cripple Creek Chamber of Commerce recently, covers about 12 square miles. The present writer has heretofore placed the area of the district at 15 square miles. In this article he will place the area at the maximum, namely 18 square miles. The 18 square miles contain in other districts but 11,520 acres, equal to 1.115-20 lode mining claims. From the 11,520 acres, 1,400 acres have to be deducted for agricultural purposes, patented long before Cripple Creek became famous as a gold producer, leaving 10,120 acres for mining purposes, equal to 979 full claims and a fraction of nearly two-thirds of a claim.

Let us see what Cripple Creek has done and can do. In 10,120 acres, Cripple Creek prospectors can locate 550 placer locations, containing 11,000 acres, which, if not a miracle, is a species of legerdemain bordering on the supernatural, but "presto," and 6,150 lode mining claims, equal to 63,550 acres also appear, and are accommodated on 10,120 acres, or a total of 74,550 acres is condensed (farmer's phrase) and concentrated (miner's term) into a 10,120 acre area. Every one will readily admit that in old established camps like Central City, Black Hawk, Georgetown, etc., such a feat of compression of acreage would be impossible, but old camps must take a back seat in such matters.

Every miner and prospector knows that 6,150 claims, distinct and separate veins, cannot be found on such a small area. Take the area to be six miles north and south, and three miles east and west, and what do we find? We find that in every 8 to 16 ft. there is a vein which can be traced for the three and six miles; or, in other words, there are east and west veins which can be traced for three miles every 16 ft., and the north and south veins can be traced six miles and yet are only 8 ft. apart. Geologists, and even broad-minded philosophers, assert that "nature abhors straight lines." Grant, for argument's sake, that one-half of the supposed veins are north and south, and the remainder east and west veins. Does that improve matters? You simply have a checker-board on a large scale. Can any one say "I have seen that number of veins in such a small area in any part of the world"? If so I would say, shun that camp. I repeat without fear of contradiction that there are not 6,000 veins in this camp; on what grounds, then, can locators or even present owners of claims devoid of veins rightfully or legally claim possession?

There was one redeeming feature with the prospectors of this camp—they were so magnanimously unselfish, as a rule, that they refused to locate their claims with the course of the vein, but located transversely or at right angles. The prospectors wanted only 300 ft. I do not know of but one single claim where it has been demonstrated that the vein leaves both end lines; there may be more, but I do not recall them at present. The veins that can be traced for over 1,000 ft. are very few in number. The number of amended location certificates filed amount to 750, or 12-19%; a fairly good average of those who acknowledge their error.

In this district about 500 patents have been applied for, and 465 advices filed at the Land Office. I can enumerate four claims on which the number of advices is 40. The number of compromises during the advertising period have been legion.

Mining men do not want to fight fraud with fraud: they do not want to locate real estate merely; they leave such work to the inexperienced and the unscrupulous, with the result that the whole of a new mining district is in the hands of comparatively a few persons.

Claims have been patented with the ostensible object of selling town lots and for real estate speculation. Such a course may have been the primary object for what the miners of the Pacific Coast agitated 25 years ago in mass meetings, but I hardly think so. Unfortunately a vein in legal phraseology has not the same definition as miners construe it, or even as writers of geological textbooks consider the term. A mass of mineral in the body of the mountain is capable of an indefinite expansion.

On the other hand, perhaps, there is some show of reason for the indiscriminate and wholesale location of mining claims, as the whole area is more or less mineralized, and almost every kind of rock will give a "trace" of gold. Apropos, it is reported that one of the assayers gave "two big traces." The average of over 300 samples of "country rock" personally taken gave 87 cents per ton in gold.

ZINC ORE VS. FRANKLINITE ORE.

Written for the Engineering and Mining Journal.

The old question of ownership of the ores on a part, at least, of Mine Hill, at Franklin, Sussex County, N. J., has been revived. The New Jersey Zinc and Iron Company recently brought a suit of ejectment against the Lehigh Zinc and Iron Company; the case was tried at Newton, N. J., during the month of May last, with an imposing array of counsel and experts on both sides, and resulted in a disagreement of the jury.

Briefly stated, the contention between the parties is substantially as follows: The plaintiffs, the New Jersey Zinc and Iron Company, claiming under its deeds all the zinc ores, contends that all the ores on Mine Hill—exclusive of the vein of magnetite—are zinc ores, and therefore its property; the defendant, the Lehigh Zinc and Iron Company, claiming under its deeds the franklinite ores, contends that the ores are all franklinite, or at least were so regarded at the time the conveyance was made, in 1848, excepting, however, any veins or beds of red zinc ore as then known, which it was conceded were conveyed to the plaintiff. On the other hand the plaintiff conceded any veins or beds of pure franklinite to the defendant. But no such beds, either of franklinite alone or of red zinc ore alone, can be found. The defendants are in possession of the "locus in quo," the central part of Mine Hill.

In support of the claim that these ores are zinc ores, the plaintiff showed that these ores are now successfully used to make both spelter and zinc oxide at its works in Newark, and also claimed that they are so used in the works of the defendant. They produced expert evidence to show that willemite, the anhydrous silicate of zinc, is very abundant at Mine Hill in close association with franklinite, while red oxide of zinc is not abundant and nowhere occurs in a distinct bed or layer alongside of the franklinite, as at Sterling Hill. They showed that willemite can now be

worked successfully for zinc, and that it is really a zinc ore of commercial value.

The defendants, while conceding that willemite under the present state of the arts can be commercially utilized for zinc, and may now be called a zinc ore, was not so utilized at the time of the conveyance in 1848, and was not then known as a zinc ore, or as existing in great quantity in mixture with the franklinite, that the bed in which it is found was then known as franklinite, and was reserved as such by the deeds. They cited many authorities to show that the anhydrous silicate of zinc abroad was not regarded as a valuable ore of zinc; that when found in mixture with calamine, the hydrous silicate, it was rejected as far as possible as undesirable; that it did not yield to the reducing agents at the heat possible with safety to the zinc retorts especially if any flux like lime was used. They contended that the Mine Hill willemite, or troostite, was also useless for the production of spelter or oxide until the invention of the Wetherill furnace in 1852. This furnace with its perforated cast-iron hearth and air blast permitted charges of willemite mixed with anthracite to be worked at a very high temperature without injury to the hearth, so that in this manner the zinc silicate in the "franklinite ore," so called, contributes its portion of zinc to that yielded by the pure franklinite, so that the ore reserved and known as franklinite in 1848 has now become a valuable ore of zinc as well as of spiegel iron.

Numerous experts in mineralogy and in the metallurgy of zinc were called on both sides of this controversy. The plaintiffs secured the attendance of Messrs. Chas. H. Williams, of Pennsylvania; Professor Kemp, of Columbia College; Mr. Stone, the chemist of the company; Mr. Cook, of New Jersey, and Mr. Moebius, who was formerly familiar with the ores and methods in use at Stolberg. The defendants called Prof. G. J. Brush, of Yale University; Prof. W. P. Blake, general manager of zinc works in Wisconsin; Mr. Frank L. Nason, of New Brunswick, N. J.; Mr. Fred Canfield, of Dover, N. J., and Mr. John Price Wetherill and Superintendent Converse, of the Lehigh Zinc Works.

The whole range of the literature of the zinc and franklinite deposits, and of the metallurgy of zinc, was examined, and most of the original authorities were produced in court, as well as numerous specimens of the ores from both Mine Hill and Sterling Hill in illustration of their composition and appearance, and of the changes in color produced by exposure to the weather.

It was shown by the venerable Col. James L. Curtiss, by Professor Blake and Professor Brush, that at the time of making the deeds and for some years later there were two distinct beds of ore at Sterling Hill known as red zinc ore and as franklinite ore, and that there was evidence of a similar division of the ore bed at Mine Hill. The structural conditions of the beds on the two hills were illustrated and compared by Professor Blake by means of cross-sections and diagrams in colored crayons on a blackboard, representing the plications or folds of the beds at both places in deep synclinal troughs and the probable former connection of the ore beds on the two hills, the intervening portion not now to be found, having been denuded and swept away by the ice of the glacial period.

The case was an extremely interesting one, both from a legal and technical point of view, and was ably conducted on the part of the plaintiffs by Thos. N. McCarter and John R. Emory, and for the defendants by Messrs. Richard Wayne Parker, Gilbert Collins, Dickinson Thompson and George Northrop.

The Employment of Women in Indian Mines.—At a largely attended meeting of the representatives of the Indian Mining Association held at Calcutta on June 20th, a resolution was unanimously carried expressing strong disapproval of any attempt of the government to interfere with the existing labor system in the mining districts. We are told that Mr. Grundy, the British delegate, was present at the meeting, says "Indian Engineering." We suppose Mrs. Grundy, who is the principal objector to the employment of women in mines, was unable to undertake the journey.

Coal Discovery in Trans-Caucasia.—The British Consul at Batoum, in a report to the Foreign Office, mentions the recent discovery of coal in the Government of Elisabetopol. The deposits have been discovered in the district of Kazakh. In the opinion of experts the coal is in quality superior to that obtained from the mines at Kirbul. A very heavy expenditure would be required to open up the newly discovered coalfield, and capitalists do not seem disposed to embark in this class of enterprise. At the same time, it must be admitted that the absence of proper roads, and the distance from the Trans-Caucasian Railway, are serious obstacles to the profitable development of the mines. The coal has been discovered at a point 60 versts (about 40 miles) from the Trans-Caucasian Railway.

DIVIDENDS PAID BY MINING COMPANIES DURING JUNE, 1894.

NAME OF COMPANY.	Paid in June.	Paid since Jan.	NAME OF COMPANY.	Paid in June.	Paid since Jan.
Alaska-Tred., Alaska	.....	\$75,000	Horn Silver, Mont.	.....	\$50,000
American, Mont.	.....	21,658	Iron Mount., Mont.	.....	20,000
Bald Butte, Mont.	\$25,000	100,000	Kennedy, Cal.	\$48,000	288,000
Belden Mica, N. H.	6,000	30,000	Mayflower Gravel, Cal.	10,000	60,000
Boreel, Colo.	.....	500,000	Mercur, Utah.	.....	25,000
Bullion, B. & C. Utah	.....	25,000	Morning Star Drift, Cal.	9,600	48,500
Cent.-Eureka, Utah	.....	15,000	Moulton, Mont.	.....	20,000
Cal. & Hecla, Mich.	.....	50,000	Moose, Colo.	.....	12,000
Champion, Cal.	3,400	20,400	Napa Con., L. Cal.	.....	20,000
Cop. Queen Con., Ariz.	.....	100,000	Omaha, Cal.	.....	21,600
De Lamar, Idaho	.....	200,000	Quincy, Mich.	.....	200,000
Elkhorn	32,813	66,622	Rico-Aspen, Colo.	.....	25,000
Elkton, Colo.	6,000	36,000	Smuggler, Colo.	.....	50,000
Franklin, Mich.	.....	80,000	Standard Con.	.....	20,000
Golden Fleece, Colo.	12,000	72,000	Tamarack, Mich.	.....	200,000
Golden Reward, S. D.	5,000	30,000	Union, Colo.	.....	6,000
Harqua Hala, Ariz.	.....	36,000	Victor, Colo.	.....	15,000
Hel'na & Frisco, Mont.	.....	15,000	W. Y. O. D., Cal.	.....	3,000
Homestake, S. Dak.	18,750	112,500			
Hope, Mont.	.....	25,000			
			Total	\$515,162	\$3,767,784

Readers of the "Engineering and Mining Journal" will confer a favor on the publishers if they will notify the "Journal" of any errors or omissions in the above table.

THE HARNEY PEAK TIN MINING COMPANY.

Since our last issue but little of importance has developed in connection with the suit brought by the English stockholders against the Harney Peak Tin Mining Company.

We understand that the stockholders who are bringing action against the company do not claim the entire absence of tin in paying quantities on the properties in question, but that these properties have no such value as was represented by the promoters. When, in 1882, certain New York investors heard of the tin existing in South Dakota and decided to form a company for the purpose of buying up all the tin in that region, most of the prospectors in that section dropped gold and other metals and began to locate tin. This boom caused fictitious values to be set on alleged tin-bearing properties. The prevailing opinion of mining men in the vicinity of the Black Hills seems to be that tin exists there, but as practically no work has ever been done in the production of this metal, it is next to impossible to fix fair values on such property.

Aside from the Harney Peak company two other companies were or-

ganized to mine tin in this region, but neither of these has done anything, owing to lack of sufficient capital.

Dr. Ledoux, whose portrait we give herewith, is a resident of New York, and a member of the American Institute of Mining Engineers. After studying three years at the School of Mines of Columbia College, he went to Germany to complete his scientific education, studying under Hoffman and others in Berlin, at the University, and under Sartorius von Waltershausen at Goettingen. From the latter university he received, in 1875, the degrees of A. M. and Ph. D. Returning to this country, after a year in a laboratory in this city, he was appointed State Assayer of North Carolina, and spent three years in that State, employed by the Geological Survey and the Department of Agriculture. In 1880 Dr. Ledoux came back to New York, where he opened an office and laboratory. He is now senior member of the firm of Ledoux & Co., mining engineers and metallurgists, and president of the corporation known as the Ledoux Chemical Laboratory. Dr. Ledoux has had an extensive experience not only in the assaying and sampling of ores, furnace material, etc., at this port, but in the examination of mines and the advising of metallurgical and other companies in their technical details, and in general work as a consulting engineer and metallurgist.



DR. ALBERT R. LEDOUX.

ganized to mine tin in this region, but neither of these has done anything, owing to lack of sufficient capital.

Mr. Stephen Untermeyer, the president of the Harney Peak company, stated to a representative of this paper that "The American stockholders will make a most bitter fight against the unfounded statements made in the complaint entered by the English stockholders, who represent but 24,000 shares out of the 150,000 shares altogether."

He further stated that "Every report that has been made, upon the faith in which the American people have been acting, has, of recent years, been made by English experts or shareholders."

The whole suit, he claims, is an attempt to force the American party to postpone the foreclosure of a mortgage of \$150,000 which they hold on the property, and which was made back in 1886. He claims further that the English plaintiffs have not kept to their agreement, and that the suit is a cover for certain parties who want control of the property.

July 11th is the day set for the defense to show cause why the appointment of Dr. Ledoux as temporary receiver should not be confirmed and made permanent. It is probable that such evidence as can be produced by the defense will then be brought forward.

The appointment of Dr. Ledoux, who is well known in this country as both a capable and a fair minded man, should it be confirmed by the court after the hearing next week, is probably the best thing that can be done for the true interest of the stockholders, as he will undoubtedly act in the interest of all concerned, and will certainly endeavor to get at the facts of the case and the true value of the property, concerning which he will be a competent judge.

When the tin-fields of North Carolina were discovered, Dr. Ledoux was engaged to develop them by prospecting, and did so in a most thorough manner, the results of his investigation being published in the "Engineering and Mining Journal" at the time.

Dr. Ledoux, in addition to being a member of the Institute of Mining Engineers, is a Fellow of the New York Academy of Sciences and of the American Association for the Advancement of Science, and holds several honorary degrees and memberships from different institutions and societies.

THE ECONOMY OF GAS ENGINES.

In a paper read before the British Institution of Gas Engineers at the recent meeting in London, Mr. Bryan Donkin gave a number of facts as to the extent to which gas engines are used and the degree of economy they have attained. He said that, according to Mr. Dowson, gas engines for electric lighting, developing about 7,000 H. P., had been sold in England, and Otto engines for 11,000 H. P. in Germany. Messrs. Crossley informed him that the numbers of Otto gas engines in use in England was about 20,000, and he might assume that there were about nearly double this number for all kinds of gas engines. At Chateau Lay an Otto gas engine, feeding about 650 glow lamps, consumed 1.2 lbs. of fuel per indicated horse-power-hour for the manufacture of its Dowson gas. At the Chelsea flour mill, a 60 nominal H. P. twin-cylinder gas motor with Dowson gas, used during a full load test about 0.87 lb. of anthracite and coke per indicated horse-power-hour. The engine had a cylinder 17

in. in diameter by 2 ft. stroke, and made 156 revolutions per minute. It had been at work about two years. At the Leven Tweed mills there were, he said, four gas engines with Dowson gas, developing about 200 H. P. These engines used, during a six-days test, 1½ lbs. of anthracite per brake-horse-power hour. With coke from the gas works the consumption was 1½ lbs. per hour. At Godalming paper mills there were gas engines giving 400 indicated H. P., with an average consumption of 1 lb. of fuel per indicated horse power per hour. At a weaving mill in Halifax there were four gas engines of about 200 indicated H. P., using 1¼ lb. of gas coke per horse power per hour. At the Uxbridge Water-Works a water-pumping test was made in February, 1892, using generator gas. The consumption was 1 lb. of coal per indicated horse power, or 1½ lbs. per horse power of water lifted per hour. The approximate power was 16½ indicated H. P. The whole of Crossley Brothers' large works are driven by gas engines, using Dowson gas, made from anthracite coal. There are eight gas motors from 12 to 30 nominal H. P., indicating collectively about 325 H. P. The firm stated that the consumption was from 1 lb. to 1½ lbs. per indicated horse power hour. The net cost to them of the anthracite fuel, labor, interest on capital, and repairs worked out at about 5 cents per 1,000 cu. ft. Comparing this with average town gas, and allowing for the difference in thermal value, the equivalent cost would be about 20 cents per 1,000 cu. ft. A single-cylinder gas motor, indicating 280 H. P., driving a large flour mill in France, was lately seen by Mr. Donkin working with generator gas from French coal. The preliminary trials gave about ¼ lb. per indicated horse power hour. The engine will give a maximum of 320 indicated H. P. when loaded to its full capacity.

IRONMAKING AT BIRMINGHAM, ALA.—II. COAL AND COKE.

Written for the Engineering and Mining Journal by Edmund C. Pochin.

(Continued from Page 606, Volume LVII.)

The coke used in the furnaces at and near Birmingham, Ala., is made from the coals of the Pratt and New Castle seams of the Warrior field. At the Blue Creek mines near Bessemer the New Castle is about 1,000 ft. lower than the Pratt. It runs from 7 to 9 ft. in thickness, and is lower in ash and sulphur, the coke from unwashed run of mines giving about 8 to 10% in ash and .75 in sulphur. The bulk of the furnaces, however, use the Pratt coal.

Until comparatively lately the fuel was the weak point in Alabama iron-making. Careless mining and faulty preparation gave a coke so high in ash and sulphur as to insure high fuel consumption, decreased output and much off-grade iron.

In the past the public have been deluged with analyses showing excellently, but book and newspaper analyses show one thing, actual results quite another. It is not unsafe to say that for many years the coke used in the district averaged over 16% in ash and over 1.5% in sulphur. It stands to reason that if the run of mine had been used the showing would have been better; but as a rule the lump was sold and the screenings made into coke. As worked near Pratt, the seam averages 4 ft. 6 in., with a slate parting of from 1 in. to 2 in., 8 in. from the roof. A curious feature on the southern outcrop is a vertical drop of the coal for many feet. At slope No. 2, Pratt mines, the coal dropped vertically 125 ft. At the outset this disturbance caused much annoyance and expense, but Mr. Erskine Ramsay, mining engineer, Tennessee Coal, Iron and Railway Company, tells me that this faulting has been so accurately located as to cause no uncertainty whatever in the establishment of new workings. On the northern outcrop no faulting has shown up and the coal has thinned to 4 ft. More careful mining and separating the slate from the coal has helped the coke, but the great improvement has come by the use of washers. At the Sloss furnaces the Luhrig Washer Company erected a large and expensive washing plant at its own risk, to be paid for if it did its work satisfactorily. This result does not seem to have been reached, as I was told that not only had the Sloss company refused to pay for it, but had asked for its removal. As I watched it the plant seemed to me to be cumbersome and unhandy, giving very incomplete separation of the coal and slate. The percentage of good coal carried over in the tailings was quite noticeable, but that the coke was improved was beyond question. An average of 183 samples of coke made from this washed coal gave:

Volatile matter.....	2.51	Ash.....	11.22
Fixed carbon.....	86.27	Sulphur.....	1.55

It will be noted that the sulphur still remains high owing to imperfect separation. The good effect of the washing is shown by the fact that the consumption of coke per ton of iron had been reduced from 3,500 lbs. to 2,750 to 2,800 lbs.

It is proper to state here that the uniform reduction in the fuel used in the district is not wholly owing to the improvement in the coke, but also to improved practice, getting a more fusible slag. I was told that in former years the alumina in the slag ran from 18 to 20%. The following were given as representative slags now:

	Soft.	Foundry.
Alumina.....	14	14
Silica.....	38	36
Lime.....	42	46

To dilute 5% of alumina in its soft ore used, one concern purposely adds to its mixture 7% of a silicious fossil ironstone, carrying 42% of silica to 34% of iron.

The simplest and most effective coal washer I have ever seen is the Robinson, two of which are in operation at the Pratt mines.

It occupies a small space, is of very few parts, takes very little fresh water, the water being used over and over again; has little to get out of order, and will give 50 tons of thoroughly washed coal an hour. There is a loss of from 7 to 9% in weight. When one looks at the tailings and notes the almost entire absence of small coal, he can readily appreciate what this kind of washing is doing for the coke. The following is the average composition of several thousand tons of coke made from this washed slack:

	72-hour coke.	48-hour.	Ash.....	72-hour coke.	48-hour.
Vol. matter.....	52	54	10.33	10.43	
Fixed carbon.....	89.15	89.04	Sulphur.....	1.27	1.13

It will be noted that in its chemical composition this coke is quite as good as much Connellsville, but in its physical structure it is inferior. It is hard and bright, but too dense and wanting in cell structure. Another important step in advance is about to be taken in the use of a disintegrator, which will undoubtedly here, as elsewhere, greatly improve the physical condition of the resultant coke.

In the last Robinson washer at slope No. 2 some marked improvements have been introduced by Mr. Ramsay, one of special importance, the use of a sludge tank, which removes much of the fine slate and sulphur which formerly went over with the coal. What this coke is doing is best shown by its working at two Ensley furnaces. On an ore mixture averaging from 37 to 40% these furnaces have averaged from 193 to 200 tons a day, with an average monthly fuel consumption of 2,460 lbs. per ton, and most of this foundry iron.

COST OF COAL AND COKE.

Prior to the late strike the miner in the Pratt seam was paid 45 cents a ton; at Blue Creek 10 cents less. Everything as it comes from the mine is weighed. At these prices an able-bodied man can readily make from \$2.50 to \$3.50 a day.

Taking this as a basis, and adding to it all other expenses, it can be confidently assumed that the cost of coal at the ovens will average from 75 to 90 cents, according to location, some plants having their ovens at the furnaces, and others at the mines, the former paying freight on coal.

Call the loss by washing 10%. The coal will yield 60% in coke. Say 30 cents for coking. Excluding any royalty, in my judgment, the lowest average cost of Pratt seam coke at any furnace must at the present time be put at \$1.75, and this will vary up to \$2.25. The Bessemer furnace working on Blue Creek coal probably shades this 15 cents a ton. With the present careful attention given to the mines, it seems to me that those who can now make it at the figure \$1.75 may be considered an outside price, and that the tendency in the future will be to reduce this, as minor economies are introduced. A late notable economy is the utilization of the waste gases from the ovens for the raising of steam. At one of the openings visited, No. 2 slope, practically all of the steam needed for pumping, hoisting and washing is raised in this way from one bank of ovens, at an already monthly saving of 1,500 tons of coal formerly burnt under boilers. It is by no means improbable that the next advance will be the making of by-products, giving still cheaper coke. At this writing a strike is on in the field, but I do not believe that it can be maintained. Too large a portion of the labor is negro, and this element cannot be kept in line by "walking delegates," especially in view of the fact that there are nearly 2,000 convicts at work in the district; of course, with a decided advance in the price of iron, the wages of all workmen will advance in proportion, but this will not change the general situation.

LIMESTONE.

The main supplies come from Blount County, 20 miles distant. The following fairly represents this stone:

Silica.....	3.78	Carbonate of lime.....	86.26
Oxide iron.....	2.44	" " " " " " " " " "	7.05
" alumina.....	.75		

The cost of this stone f. o. b. quarries was given me as 65 cents a ton, with 25 cents freight to Birmingham. On the outskirts of the town is found an excellent dolomite, which I saw in partial use at one furnace. Its analysis is:

Silica.....	1.00	Carbonate of magnesia.....	42.90
Alumina.....	1.00	Phos. and sulphur.....	Trace
Carbonate of lime.....	55.00		

The large quantity of carbonate of lime in the hard ore renders so small a weight of limestone necessary as to make its cost per ton not a matter of serious importance. We are now in a fair position to appreciate the actual figures of cost, which will be given in the next article.

(To be continued.)

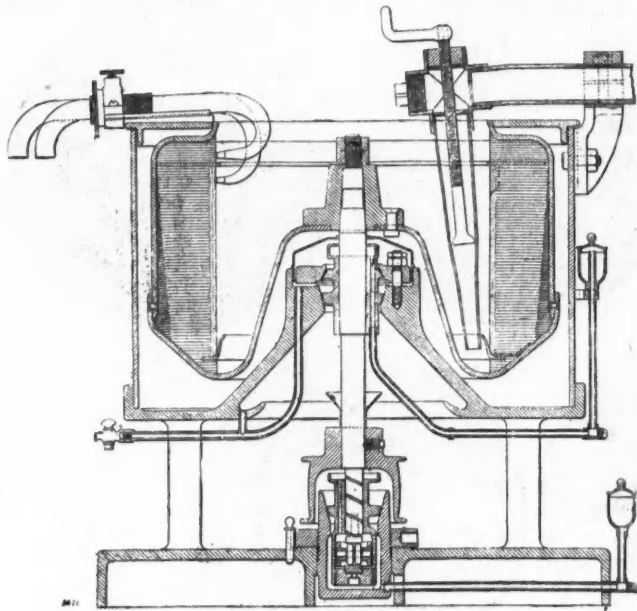
British Iron and Steel Exports.—For the five months ending May 31st, the total exports of iron and steel from Great Britain were 956,034 tons, as compared with 1,127,264 tons for the corresponding period in 1893, and 1,082,454 tons in 1892. The exports in May were 238,914 tons, valued at £1,646,516, against 285,429 tons, valued at £1,927,819, in May, 1893.

The imports of iron ores for the five months were 1,875,169 tons, against 1,821,035 tons for the corresponding period last year.

A Remarkable Mineral Exhibit.—One of the most interesting metallurgical exhibits at the Antwerp Exhibition recently opened is that of Johnson, Matthey & Co., of London. This exhibit represents the greatest value in the smallest space that could be possibly imagined, the reason being that the whole of it consists of manufactures of platinum, gold, osmium, iridium, palladium and similar precious metals. The total value of the exhibit is about \$100,000. From a strictly metallurgical point of view, the international standard meter and kilogram are the most interesting features of the exhibit, as the platinum-iridium alloy (90% Pt and 10% Ir) is by far the purest metal that has ever been produced, the platinum employed having a purity of 99.998773% as determined by MM. Deville, Debray & Stas. This is by far the purest metal obtained on a commercial scale, and such purity is usually only met with in small quantities prepared for laboratory purposes. The total amount of platinum used by Johnson, Matthey & Co. in making these standards was 250 kilos. Next to these standard measures and weights the most interesting items in the exhibit are the two sulphuric acid concentrators. One is made entirely of platinum and is capable of producing 22,000 lbs. of 94% sulphuric acid per 24 hours; its value is \$18,750. The other is made of platinum, but is plated internally with an alloy composed of 95% gold and 5% platinum; this internal surface is found to resist the attacks of impurities in the acid much more effectively than platinum alone. The exhibit also includes a multitude of other manufactures of platinum and its alloys, and specimens of all the allied rarer metals. Among them is an ingot of pure palladium weighing 1,000 oz. and valued at \$85,000. This firm has an unrivaled reputation for its perfect work in the precious metals, and the establishment of their business dates back so far as 1725. As some criterion of the magnitude of their business it may be mentioned that a small and comparatively unimportant department of it is the refining of the whole of the South African gold production that is shipped to England,

A NEW CENTRIFUGAL TAR SEPARATOR FOR GAS-WORKS.*

It is well known that tar, as extracted at gas-works, contains quite a large proportion of water, in many cases as much as 10% or more. The separation of this water from the tar is essential for most purposes for which tar can be used, and this separation takes place owing to the difference of density, in ordinary tar wells if sufficient time be given, but in general commercial tar, as delivered from the gas-works, rarely contains less than 7 to 8% of mechanically combined water. The machine which we illustrate has been introduced at the East Gas-Works of Copenhagen, Denmark, for the purpose of facilitating the separation of the water. As will be seen, the machine is essentially a centrifugal separator. The tar to be separated is first heated to about 92° Fahr. to reduce its viscosity, and is then delivered into the machine by the down pipe shown to the right of the engraving. The tar, being the heavier, is separated from the water, and urged against the outside of the separator, flowing upward to the top of the rapidly rotating vessel. The water also flows up, but forms a separate layer inside the tar. Near the top of the centrifugal is fixed a plate, there being a narrow annular space between it and the outside of the centrifugal. This space is narrower than the layer of tar, and hence only tar is able to pass through this plate to the upper surface of the plate. Two fixed collecting pipes are curved over the edge of the centrifugal, as shown in our engraving; one of these pipes having its nozzle above the plate, collects purified tar, whilst the other one, having its nozzle below the plate, picks up the inner ring of water which has been separated from the tar. It is stated that the separation is so complete that the purified tar contains only 1% of water. The machine has to be stopped three times a day for cleaning, as



CENTRIFUGAL TAR SEPARATOR.

any grit and dirt in the tar adheres to the walls of the machine and is removed by special scrapers, the operation taking about half an hour. About 2,800 galls. of tar are purified in a day's work at Copenhagen, about 4 H. P. being required for driving the machine. The patentees of the separator are Messrs. Burmeister & Wain, of Copenhagen, but the machine is being introduced by Messrs. C. H. Petersen & Co., Copenhagen.

Some particulars as to the practical working of the machine were given in a paper read before the North of England Gas Managers' Association, at Newcastle, on May 5th, and from this we make an abstract. In the first place, the power required is very small (4 brake H. P.) and, according to the Copenhagen practice the sulphate of ammonia obtained from the liquor saved more than pays for the cost of operating the machine, including high charges for interest, depreciation and repairs. The figures given for labor would not, of course, apply elsewhere, as wages are low in Denmark, but this does not affect the final result, for the labor is the same for the old and the new styles. In the Copenhagen practice they obtain about 10½ galls. of tar per ton carbonized, and the sulphate of ammonia works out at 22½ lbs. per 30 galls. of liquor (or 22½ lbs. per ton carbonized). The prices they obtain are, of course, slightly different, but the proportion (when comparing with expenses) is again the same. They obtain on an average 11 ore (2.75c.) per lb. sulphate of ammonia, and their expenses for extraction of sulphate of ammonia from the liquor is 6 ore (1.50c.) per lb.

The figures of the balance sheet clearly show that if they only got their profit from the sulphate of ammonia—if they sold the spun tar at the same price as the green tar—they would only save about 72c. per day, including all charges for working, interest, etc. As, however, they obtain a higher price for their tar when delivered water free (the exact figure is 16½% higher) they find that on such a small amount as 2,800 gallons of green tar they save about \$6.20, which is a very satisfactory result. But not only do the gas companies profit by this, but the distillers also save liquoring the spun tar; the saving comes to as much as 12%, it is said. Since these gas works have adopted this system they have never found any difficulty in the sale of their tar at a remunerative figure as they did in former times. The spun tar seems to sell itself, and they readily obtain the higher price for it, and in the summer are quite unable to keep up with the demand.

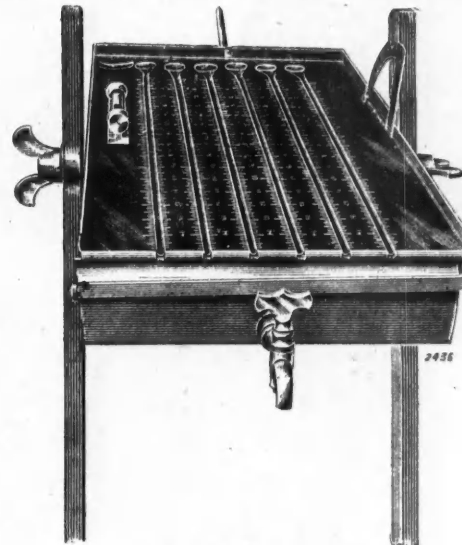
* Abstract of article in London "Engineering."

A NEW OIL TESTING MACHINE.

The "fluidimeter" is a new form of instrument for ascertaining the degree of fluidity of several oils at various temperatures in one operation, recently patented by Mr. H. Joshua Phillips, of Ebbw Vale, England. The annexed illustration is from a photograph of the instrument.

It consists of a copper bath about 18 in. long, 9½ in. wide, and about 1¼ in. deep. At the top end is provided one hole for a thermometer, and another for pouring in water, oil, or other liquid at definite temperature. It will be seen from the engraving that at the top of the bath there are six cups, and these are connected with the bottom by gutters (the instrument can be made with one cup and gutter, or any number), all of definite capacity. The cups hold 1½ cubic centimeters, and are ¾ in. wide and ⅙ in. deep, and the gutters are ⅙ in. wide and ⅙ in. deep; they are graduated in ¼ in. the length of the bath. There is a glass plate provided for covering the bath to keep away air currents, and there is a receptacle at the bottom of the bath for receiving the oils as they flow down, and also a tap for letting out the liquid from the bath when required. The whole bath is swung upon elevated bearings from two studs protruding from the centers of the longitudinal sides, and can be fixed by means of thumb-screws. A protractor is fitted on the center of the right side of the bath, with an index on the support, and by the aid of these the bath can be tilted to any desired angle. The whole top surface of the bath is silver-plated.

The manner of testing is as follows: We will suppose that it is desired to know the fluidity or viscosity of five samples of cylinder oils at 180° Fahr., compared with a standard which answers the purpose required. The bath is filled with water at 180° Fahr., and maintained at this temperature by a small Bunsen flame; in the mean time about 5 cubic centimeters of the oils to be tested are poured into labeled test tubes and put into a bath of water maintained at 200° Fahr. When the oils are at 180° Fahr. the bath is tilted at an angle of 5° from the operator, and the oils



PHILLIPS' FLUIDIMETER.

poured into the cups, preferably from a pipette, until they all reach a fixed point on the gutters about an inch away from the cups. Should some of the oil run over this mark, filter paper is used to suck up the oil from the edge until they are all exactly upon the same level. The bath is now tilted at angle, say of 5°, to the operator, and the length of time noted that the oils require to reach the bottom. The ratio of the degrees of fluidity can thus readily be obtained.

Experiments have been conducted to see how far the ratios of viscosity or fluidity of different temperatures agree with the existing forms of apparatus. The following results were obtained in comparing the viscosity of rape oil at different temperatures with Redwood's viscometer, assuming the rate of flow of pure rape oil to be 1" at 180° Fahr.:

	Phillips' fluidimeter.	Redwood's viscometer.
At 180° Fahr.	1.00	1.00
" 140° "	1.59	1.56
" 100° "	3.19	3.14
" 60° "	7.50	7.37

It is very essential that oils used for lubricating various kinds of machinery should have specific degrees of fluidity best suited to the pressure and temperature that they have to work at, more especially in the case of mineral oils, which are now largely used by engineers, and may vary in fluidity from the almost solid hydrocarbons, passing through all degrees up to such thin oils as kerosene, etc.

In large engineering establishments, where sometimes about a dozen samples of oil are sent by merchants for approval, the degree of fluidity at various temperatures is sufficient data to know whether further examination of an oil is necessary—that is to say, if an oil is found to be too thin or too thick at the working temperature, compared with a standard, it may be rejected, and the more extensive examination undertaken only of those oils that compare favorably in fluidity with the standard oil. The advantage claimed for the "fluidimeter" is that the fluidity of several oils can be determined quickly at the same time at any specific temperature. Those who are accustomed to the examinations of oils will appreciate any suggestions for economizing time, since the exhaustive analysis is a tedious business.

The Tin Mining Industry of Mergui.—The exports of tin from Mergui for the year ended March, 1894, were 1,463 cwt. valued at 90,282 rupees, as against 1,042 cwt., valued at 62,071 rupees, for the year ending March, 1893. The increase was 40.39% in quantity and 45.45% in value.

THE MICROSCOPIC METALLURGY OF COPPER ALLOYS.*

By M. Guillemin.

The examination of the structure of copper and its alloys has proceeded on the same lines as that of steel by M. Osmond and others. In brief, the method has been to take a polished section of the metal and submit it to the etching action of an acid; then to take through the microscope an enlarged photograph of the section. Experience showed in a short time that it was possible to see at a glance the class to which the metal or alloy could be assigned. Thus, for example, in several ingots of copper from the same melting the degree of purity would differ considerably, and the nature of the impurities could be at once determined.

When aluminum is contained in the alloy the appearance of the section resembles somewhat that of veins in marble or conglomerate. These will appear even when the proportion of aluminum is so small as almost to escape detection by chemical analysis.

In tin-bronze a small percentage of phosphorus produces a characteristic marking, which has been compared with a pine branch; this is more marked near the outside, where solidification first begins, than at the center.

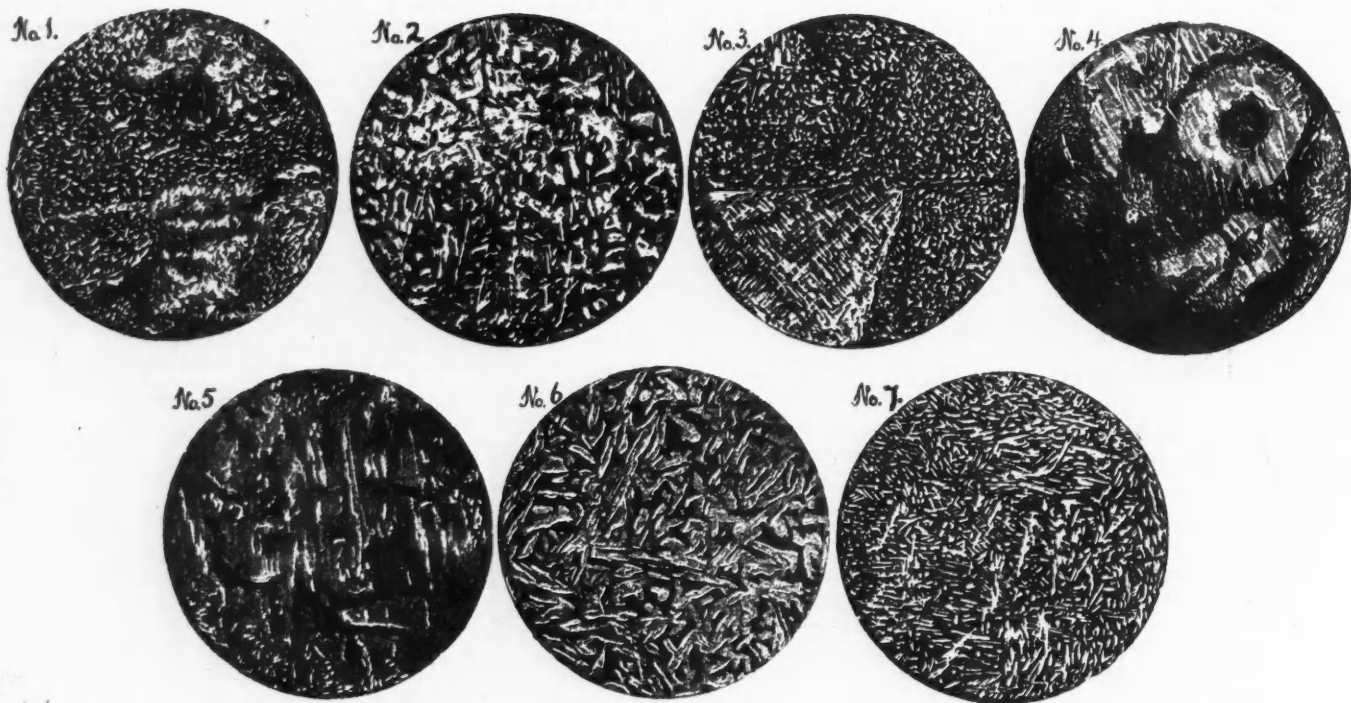
According to the experiments of MM. Riche and Berthelot, it is often the case that the composition of the central core differs materially from that of the portion near the surface.

In an alloy containing phosphorus a proportion of zinc exceeding 4%

bronze, semi-hard, melted in a crucible and cast in a sand mold at a moderate temperature. No 7 is a hard manganese bronze melted in a reverberatory furnace and cast in a sand mold at a moderate temperature. These will serve to show the characteristic appearances of the metal under the microscope and to justify the prediction of M. Osmond that the application of the micro-photographic process to other metals would be as fruitful in results as with steel.

As an example of a practical application, we may note the preparation of what is called "Roma" bronze by MM. Mathelin and Garnier, after the experiments of M. Guillemin, because in the preparation of this alloy the indications given by the microscope were followed entirely and the results have been excellent. This Roma metal is malleable bronze containing copper, phosphorus, tin, aluminum and manganese. It can be drawn out cold after reheating and forging. At a low temperature it has a resistance almost equal to that of mild steel, and it has the advantage over other bronze alloys of preserving almost all its strength at a high temperature, so that it can be used in parts of steam engines, such as valves. It has been adopted by the French Navy for screws for vessels, for torpedo-tubes, plates and rivets, and it also shows great resistance to the action of sea-water. As it exercises no influence on the compass, plates of this metal have been used in making the submarine boats with which experiments are now being conducted.

As to the method of operation adopted by M. Guillemin, the first step was the polishing of the section. This was done in very much the same manner as M. Osmond did with steel, with a series of emery papers grad-



MICROSCOPIC SECTIONS OF COPPER ALLOYS.

makes the micrographic reaction less clear and legible. It is sufficient, however, to heat the alloy to a point where the excess of zinc will vaporize, to bring out again the characteristic phosphorus marking. If to deoxidize the bronze some other reagent than phosphorus be used, the markings will be altogether different.

For a given alloy also the section will show under the microscope whether the alloy has been melted at a high or low temperature and whether it has been slowly and gradually cooled. It will also show whether the metal has been hammered or stamped; whether it has been rolled, and in what direction the rolling has been done. Cold rolling of the more malleable alloys produces very nearly the same micrographic characteristics as hot rolling. On the other hand, with certain alloys cold rolling, hammering or drawing produces new molecular arrangements, and the etched sections are entirely different from those of the same metals worked hot.

In the white alloys containing tin, copper and antimony, called "anti-friction metals," the presence of impurities can be readily recognized under the microscope, and their proportion—especially in the case of lead—can easily be determined.

To sum up, micrographic analysis of the kind described, permits us to determine quickly the nature of a bronze or industrial alloy by the simple inspection of the surface polished and then etched, and we can determine also if it has been melted at a proper temperature and if it possesses the various qualities or strength, resistance, etc., desired. We can tell also if it has been simply cast, or if it has undergone mechanical work, such as rolling, hammering, stamping or drawing out. The accompanying illustrations show a number of sections taken by M. Guillemin. No. 1 is from an ingot of copper imperfectly refined. No. 2 is an ordinary bronze, having silicon in light excess. No. 3 is a phosphorus bronze containing zinc. No. 4 is a phosphorus bronze cast at an excessively high temperature, and the section shows the effect of the great heat in a marked way. No. 5 is a manganese bronze melted in a reverberatory furnace and cast in sand at a very high temperature. No. 6 is a manganese

usually growing finer, and finishing with what is known as rouge powder, which is used in polishing jewelry, the latter removing the scratches or marks made by the emery as far as possible. For the etching, nitric acid was used, diluted with four times its volume of water. The general method of proceeding was to plunge the metal cold into the acid bath for 15 seconds, then wash it off with cold water and examine. If the etching was not considered deep enough another immersion in the acid of 15 seconds followed. For some alloys two immersions were sufficient, but for those having a considerable portion of tin four or five may be necessary. A solution of 10 grams of sulphuric acid in 100 grams of water also gave good results. M. Guillemin also tried with success a feeble electric current in a bath of sulphuric acid diluted to one tenth. Whatever method may be employed for etching, when the desired point is reached the metal is washed in cold water, then in alcohol, and then dried with a gentle heat. When dried it is carefully rubbed with a chamois skin and rouge powder to remove the metallic oxides which may cover the etching and obscure it. This must be done carefully.

The apparatus used was a Nacet microscope, having two movements in a perpendicular direction and also a movement of rotation. These three movements are necessary to examine the whole surface of the section and to choose the point where the image can be best fixed by photography. The microscope is surmounted by a dark chamber for the photograph, the whole arrangement being shown in Fig. 8. The section etched is fixed on a glass plate by means of wax, so that it can be properly arranged on the field of the microscope. In photographing, as the alloys having a copper base possess a color which varies from yellow to red, and is sometimes greenish, it is necessary to make use of plates sensitive to one or the other of these colors. With certain sections of bronze ordinary photographic plates will give no image whatever. The greatest difficulty consists in lighting the surface to be examined. Most of the arrangements employed with steel were entirely insufficient for the bronze alloys on account of the color, and it was necessary to use a source of light at once intense and absolutely constant. M. Guillemin adopted an incandescent electric light, using a special arrangement made under his direction. This is shown in Fig. 9.

* Abstract of paper read before the Academie des Sciences, Paris; published in "Le Genie Civil."

It consists of a small incandescent lamp of four lights with a reflector. The parallel rays from it fall upon a second exterior convex reflector which furnishes luminous rays of great intensity. This apparatus is mounted on a stand which can be moved at will in any direction desired, so that either direct or oblique light can be obtained. For vertical lighting M. Guillemin tried all the arrangements of M. Osmond, but gave them up for various reasons. He finally followed the method of Professor Martens, using a prism of reflection placed in the objective. Usually this is placed as near as possible to the object to be lighted, either above or below the first lens. Different arrangements of this prism are shown in Figs. 10 and 11.

In photographing the employment of the ortho-chromatic plates, which are acted upon much more slowly than ordinary sensitive plates, makes care and time necessary. The exposure varied from 5 seconds where the object was magnified 85 diameters to 5 minutes where it was magnified 350 diameters, and 10 minutes for 800 diameters. In spite of all the delays it was found possible to secure photographs of from four to six sections in four hours, including all the preparation and the mechanical modifications.

DRESSING ZINC AND LEAD ORES IN SOUTHWEST MISSOURI AND SOUTHEAST KANSAS

Written for the Engineering and Mining Journal by Geo. T. Cooley.

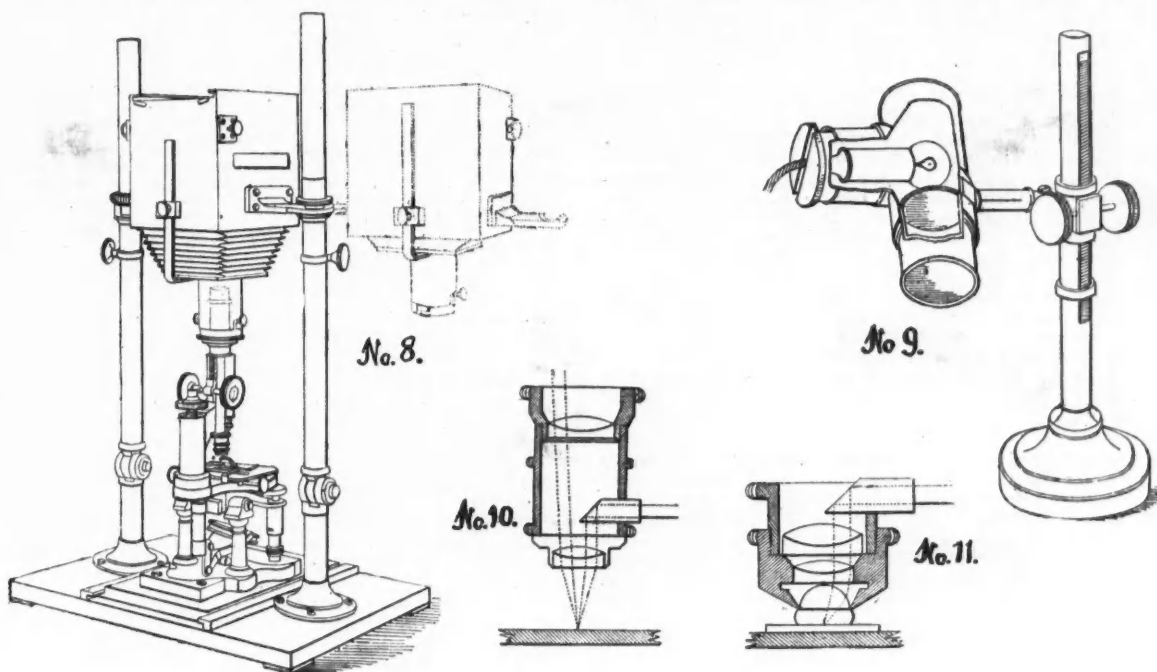
The ore produced from the mines of these districts is found in many different forms and is associated with a number of different gangues, such as chert rock, limestone, calcite, iron pyrites and a mud sediment. Many of the mines produce lead and zinc ore so closely blended that they cannot be separated except by crushing. The question of concentration

and drawn from the spitzkasten is discharged into a small V-shaped stay-box in one section of the spitzkasten. This enables the jigman to control the flow of slimes. Material finer than one m. m. is sometimes again jigged, though not often.

The process of sorting ore by jigging is always performed in water. Dry-jigging has not been attempted anywhere except in an experimental manner. There is but one kind of jig in general use, and that is the side piston jig. The form in which piston and sieve are placed in adjoining compartments of the jigbox with free communication beneath them, so that the water can be forced in rising current through the sieves by a descending stroke of the piston, answers best to the combined requirements of good ore separation.

The number of sieves in one jig depends upon the number and the difficulty of the separations that are to be made. Jigs with three sieves answer well for easy work, such as the galena from a light gangue rock. Four sieve jigs are more extensively used for coarse jigging when the rough ore carries two classes of mineral with a gangue of slate and shale. Five sieves may be used to advantage if the gangue is a heavy one, such as black chert or baryta; for these the separation requires that the material be subjected to a more prolonged jigging action. A jig with fine sieves is also adapted where three distinct kinds of ore have to be separated.

It is immaterial where, in each division of the jig, an automatic discharge is placed for drawing off, the concentrates upon the jig sieve will flow in any direction, acting like a liquid of heavy specific gravity. The experience gained in this respect has led to the use of a number of siphon discharges. One form suitable for coarse ore is known as the Heberle gate, and consists of an aperture in the side of the jig above the level of the sieve. This aperture is fitted with an adjustable slide by which the upper and lower limits of the opening are regulated by a C shaped piece



APPARATUS FOR MICRO-PHOTOGRAPHY OF COPPER ALLOYS.

or ore dressing depends solely on the difference in the specific gravity of the ore and the gangues. The specific gravity of the lead ore is 7.6, and of zinc blende 3.9 to 4.2; iron pyrites, 4.8 to 5.1.

The equipment of a modern dressing plant of 120 tons capacity per day of 20 hours work, on the rough ore, as taken from the mine, is as follows: First, one stationary boiler of not less than 85-H. P. with feed water heater, feed pump, one engine of 50 H. P. and all connections, one crusher with jaws at least 16 in. wide with opening 9 in., two sets of Cornish rolls with shells 14 by 24 in.; one stationary rod screen or grizzly. This part of the plant is frequently constructed on a good prospect property and the ore cleaned by sluicing and on hand jigs until the prospect is developed into a steady producing mine, and will warrant the completion of the ore dressing plant. The dressing department embraces jigs, sizing screens, spitzkasten, sand jigs, elevators and supply pump. All of the various machinery is driven by one main line shaft, which is supported by the heavy beams and framework of the jigroom.

These plants are centrally located from the several hoisting shafts of the mines, and the rough ore is conveyed by elevated tramways to the crusher platform where it is dumped on the grizzly, and the fine material that passes between the bars goes direct to one main elevator. The coarse ore and gangue rock which passes over the grizzly falls on the crusher platform and is fed through the crusher. This broken material goes to the main elevator, which carries it to the sizing screen. That which passes through continues to the roughing jig. All material too coarse to pass through the screen is returned to one set of the rolls, recrushed and returned to the screen. This is the roughing system, as only one sizing screen is used. The roughing jig reduces the pulp to about 75% ore. All of the fine material that passes through the bed drops into the hutch boxes and is drawn off at will. The material remaining on the sieves is partially drawn off and returned to another set of rolls, recrushed and then elevated to the sizing screen as before.

The elevators are so constructed with fine wire screens as to allow the overflow of water and sand to escape, this being conveyed to a shute elevator which conducts it to the spitzkasten. The material that is settled

of sheet steel which is fastened as a guard with its back and sides vertical in front of the inner face of the aperture, and reaches down as near to the sieve surface as is possible, while still leaving room for pieces as large as the particular size treated to pass between its lower edge and the sieve. The steel guard prevents the light jigged product from escaping through the gate. While the concentrates flow beneath it into the small space it incloses, and rising in this space on the siphon principle, a certain quantity of the mineral is discharged at each pulsation of the jig.

In the Western practice the piston area is made fully as large as that of the sieve. The advantage of the large piston is that the jigging is performed with a short stroke on a regular evenly distributed movement of the water through the sieve. This is of great importance in this system of jigging through a sieve on which rests a bed of ore to prevent the water forcing its way with great disturbance through certain parts of the bed, while at others the fine material may be packing. The usual length of the sieve is from 36 in. to 42 in., dependent upon the difficulty of the sorting. For sieves of 42 in. the corresponding piston should have two piston rods. The area of the channel communicating between the piston and sieve compartment of the jig tank is never less than that of the piston itself, so that throttling the water cannot occur. The piston always has 1/2-in. play on its vertical sides. Its upper face, when in its highest position, is not more than 1 in. above the level of the sieve, so that it is always covered with water and is never in danger of drawing air. The width of the sieves vary from 16 in. to 24 in., being governed by the capacity required. In coarse jigs each sieve is usually placed from 1 1/2 in. to 2 in. below the preceding one, and the top level of the successive dams between the sieve is lowered in the same degree. In fine sand jigs the difference in levels is less—sometimes 1/2 in. between the first and second sieves, 1/4 in. between the second and third and nothing between the third and fourth. The advantage of a short, rapid rising flow through the sieves, succeeded by a state of quiet water upon them, or at most by a general descending current, was recognized at an early date, though experience has since modified ideas in regard to the actions of the jig.

The piston jig in its actions upon the ore is very similar to the hand

jig. A strong rising current with a sharp and well defined beginning and end, lifts the entire mass of ore and gangue almost bodily and unbroken from the sieve. Then follows the fall of the material, but not with the velocity of falling particles in quiet water. The speed at which the jigs are run is never less than 100 double strokes per minute for the coarsest work, and it increases as the material becomes finer until a speed of 200 double strokes are obtained. Higher speeds reaching 300 double strokes per minute are advocated for fine jigging. Whether there is really an advantage in such speed for any kind of fine ore is not yet beyond dispute. The ordinary capacity varies from 35 to 60 tons, with an average requirement of 2 cu. ft. of water per minute for each sieve. The principal cause for the low efficiency lies in an irregular or insufficient ore supply. Fine sand or slime jigs have a capacity of treating 12 to 15 tons per day with an average supply of 1 to 1½ cu. ft. of water per minute for each sieve. Slime dressing is seldom carried further than the slime or meal jig and a spitzkasten classifier. There are at present no washing tables, yielding results which can be regarded as complete, and giving full satisfaction to the mine operators of this district.

A New Fast Vessel for the British Navy.—The new British torpedo-boat destroyer, "Hornet," is the second of 42 very fast, powerfully armed vessels which are to be built and commissioned for the special service of destroying an enemy's torpedo-boats, says "Industries and Iron." She has attained the extraordinary record of 27½ knots, or 32 miles per hour. In this vessel Messrs. Yarrow have exceeded their previous accomplishments in speed, as well as in construction. The vessel is free from vibration even when her two sets of triple expansion engines are working at a rate of 400 revolutions per minute. Her predecessor, the "Havock," was provided with two locomotive-type boilers, and attained a speed of 26½ knots. The new vessel has an improved type, with water tubes, patented by the builders, substituted. These new vessels are of longer dimensions, and have better accommodations than even the largest of the torpedo-boats. The hull, which is built of mild steel, is 180 ft. in length by 18 ft. 6 in. beam, and 10 ft. 6 in. depth molded, the draft of water being 5 ft. forward and 7 ft. 6 in. aft, with 30 tons of armament and stores on board. Her coal supply of 55 tons will enable her to steam at 10 knots per hour over 3,000 miles, and, by storing on special occasions a deck stock of coal, she is able to cover 4,000 to 4,500 miles. The armament consists of a 12-pounder quick-firing gun on the conning-tower forward, three 6-pounder quick-firing guns on each side, and a 6-pounder quick-firing gun on a pedestal with platform abaft. The torpedo armament consists of a bow torpedo tube, and two swivel tubes on a turn-table aft. Three 18-in. torpedoes of 10 cwt. each are carried. Officers and crew number 43 hands. Her fighting power is from three to four times that of the most dangerous torpedo-vessels. Ships of the "Hornet" type are fitted with appliances for forced draft, though only a pressure of air is employed sufficient to give a constant and regular supply of air to the furnaces. The total weight of the new boilers in the "Hornet" is 11 tons less than those of the "Havock"; and so satisfactory has been their performance that other builders for this class of vessels have adopted them in their contracts.

Russian Railroads in Central Asia.—The most important work now in progress is the extension of the trans-Caspian line from Samarcand to Tashkend. Considerable railroad progress is being made in Caucasia, chiefly in the direction of building lines to connect the agricultural and mining districts of that region with the seacoast or with the Russian trunk lines. The Austrian consul at Batoum has reported to his government the opening of about 200 miles of railroad in Caucasia last year. The most important of these extensions is the line—about 165 miles long—from Beslany, on the Rostov-Vladikavkas line, which is connected with the Russian system, to Petrovsk, a port on the Caspian. The Rostov-Vladikavkas company, which owns this line, is endeavoring to place the means of communication between Russia and the trans-Caspian states on as satisfactory a basis as possible. With this object it made arrangements with the steamship companies Kavkas & Mercury and Mas for a regular service of boats between Petrovsk and Usun-Adan—the Caspian terminus of the railway to Samarcand—and has established warehouses and petroleum tanks in both ports. This company also has agencies at all important stations along the line from Usun-Adan to Samarcand, and owns 40,000 camels, by means of which goods are conveyed to the railway from remote districts. The region is rich in cotton and wool, raisins, hides and corn. In December last, in the warehouses at Usun-Adan, 16,000 tons of cotton, 1,900 tons of wool, and over 2,500 tons of grain were awaiting transshipment to Petrovsk. A line of railroad connecting Chiaturi—where there are manganese works of considerable importance—with Kvirili, on the Rostov-Vladikavkas line, was opened for traffic at the end of last year. The construction of a line from Stavropol to Caucaskaia has lately been completed, and the railway is now being extended from Caucaskaia to Bogaty-Rodnik, about 76 miles. A line to connect Tiflis (Michailovo) with Kars is also in course of construction; the line from Michailovo to Borjom, about 31 miles, is complete; that from Borjom to Achlazich, 30 miles farther, is being constructed, and a line is being surveyed to connect the latter town with Kars, a distance of about 60 miles.

Coal Washing in England.—At the Middleton Colliery, in Yorkshire, England, from 900 to 1,000 tons of coal per day are wound from the Broom Pit by means of an engine having 26-in. cylinders by 4 ft. 6 in. stroke, and a 14-ft. drum. The boiler pressure is 80 lbs. per square inch. When the coal is raised it is weighed and tipped into screens worked off a shaft running at 100 revolutions per minute, provided with 2½ in. holes, which separate the smaller from the larger pieces. The latter are carried by a conveyor to Nicholson's patent revolving spiral loading apparatus, designed to drop the coal into trucks without breakage. The smaller pieces are sorted by hand, and the shale and stone again sent down the pit for banking. Such of the remainder as is not sold as engine coal is crushed and washed. The machinery used is the Baum washing plant, by means of which it is claimed that seams which contain 20% to 25% of dirt can be worked so as to produce coal of a marketable quality, while under normal conditions it would be impossible to work them to a profit. The coal to be washed is lifted to a height of 85 ft. by an elevator at the

rate of 75 tons per hour, and tipped into a revolving multiple drum screen, by which it is separated into five different sizes—viz., trebles, doubles, singles, peas and coking dust, the latter running through a ½ in. mesh. The four larger sizes are carried down separate channels by means of water currents into the jigging or washing machines, in which the water is agitated by compressed air at 1½ lb. pressure per square inch, introduced and exhausted by means of piston valves, actuated by eccentrics. The unwashed coal rests upon wire gauze sieves, and the agitation sorts it into upper layers of coal and lower ones of clay-slate, or dirt. The waste material forming the lower layers passes under slides to the bottom of the jiggers, and is drawn off to an elevator by spiral conveyors, the elevator delivering it to a hopper, whence it is carried away in trucks. The coal which forms the upper layers is floated by the water over the slides into iron culverts, and carried to masonry hoppers containing water, which prevents breakage of the coal as it falls to the bottom. When full of coal the water is drawn off, and the coal, after standing a very short time for draining, is dropped through sliding doors direct into the railway trucks. The water bringing the coal to the hoppers, which is continually overflowing and being drained off, is conveyed to large settling tanks, where the fine coal in suspension is allowed to settle, and finally sent to the coking ovens along with the small coal under ½ in. in size from the multiple screen drum, after the latter has been passed through a Carr disintegrator.

PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

TUESDAY, JUNE 26TH, 1894.

- 521,812. Steam Boiler. Frank Prox, Terre Haute, Ind. Sectional boiler forming two annular chambers inclosing a fire space.
- 521,814. Water Motor. Alfred A. Raubold, Gremshuhlen, Germany. Vertical casing inclosing a screw and having a siphon connection with the water supply.
- 521,822. Gas Generator and Burner. Clifford F. Sanford, Findlay, O. Combination of generating chamber, mixing tube, cover and nozzle.
- 521,844. Steam Boiler. Henry N. Barth, Chicago, Ill. Horizontal cylindrical boiler having internal firebox and water-tubes passing through firebox.
- 521,850. Water Tube Steam Boiler. Leonard D. Davis, Erie, Pa. Combination of upright water chamber and water tubes passing through firebox.
- 521,857. Tujere. John G. Habelt, Boston, Mass. Combination of blast pipe and damper, the damper being moved by a rod.
- 521,862. Ventilating Fan. William H. McConnell, Nelsonville, and Frank A. Ray, Congo, O. Cylindrical casing with fan of the screw type.
- 521,863. Steam Boiler Furnace. Orel D. Orvis, Chicago, Ill. Down-draft furnace with partition forming a double firebox.
- 521,883. Excavator and Elevator. Henry P. Holland, San Francisco, Cal. Pneumatic excavator and elevator, consisting of casing, elevator tube and header.
- 521,888. Elevator and Dump. William L. Oakes, Decatur, Ill. Combination of elevator shaft, wagon-way, pit and bins for ore, coal, etc.
- 521,898. Process of and Apparatus for Extraction of Gold or Silver from Ores. Joseph W. Sutton, Chelmer, Queensland. The process consists in pulping the ore, chlorinating the same, leaching the pulp and precipitating the metal.
- 521,899. Process of Separating Gold from Its Chlorid Solutions. Joseph W. Sutton, Chelmer, Queensland. The process consists in the use of a vehicle for gold in the solution, which is then treated with a suitable reagent.
- 521,906. Magnetic Separator. Henry Carmichael, Malden, Mass. Combination of a movable carrier, magnets and a receptacle.
- 521,910. Heat Motor Plant. Robert D. Kinney, Philadelphia, Pa. Boiler and engine with arrangement for superheating the steam.
- 521,942. Ball Bearing Drilling Swivel. William W. Swan, Andover, S. Dak. Combination of a cylindrical swivel with a well-drilling rope.
- 521,979. Mine Trap Door. George J. Herth and George Bonenberger, Evansville, Ind. Combination of trip-arm and levers for opening and closing the door.
- 521,991; 521,992. Process of Manufacturing Metallic Powders. Joseph Sachs and Ernest Huber, New York, N. Y. The process consists in interposing a metallic conductor in a finely divided state between the electrodes in an electrolytic bath.
- 522,026. Dump Car. Peter Peterson, Chicago, Ill. Combination of swinging side doors, rocking lever and chains.
- 522,028. Process of Purifying Illuminating Oils. Walter B. Price, San Francisco, Cal. The process consists in treating the oil with nitric acid, nitrous acid or nitric peroxide and then distilling with sulphuric acid.
- 522,037. Water Tube Steam Boiler. John W. Van Dyke, Lima, O. Combination of water tubes and steam drum.
- 522,059. Steam Boiler Furnace. Albert J. Hodgson, Palmyra, Wis. Assignor of two-thirds to Rees W. Dugan and Bradford Shinkle, Covington, Ky. Combination of grate, closed ash-pit and blast-pipe leading into firebox.
- 522,065. Steam Engine for Air Pumps. Henry Krentz, St. Louis, Mo. Combination of steam and air cylinders, with pistons connected by a hollow rod.
- 522,066. Steam Turbine. Carl G. P. de Laval, Stockholm, Sweden. Combination of turbine wheel, steam nozzle and shaft. (See "Engineering and Mining Journal" of September 30th, 1893, p. 341.)
- 522,077. Steam Boiler. Thomas Miller, Jersey City, N. J. Horizontal cylinder boiler with connecting water legs.
- 522,093. Means for Making Metallic Bodies. Hartley C. Wolle, Bethlehem, Pa. Combination of rotating mold and mandrel.
- 522,131. Process of Preparing Steam. Joseph Van Ruymbeke, Chicago, Ill. Assignor of one-half to William F. Jobbins, same place. Arrangement of chambers for superheating steam.
- 522,151. Method of Heating Metals Electrically. Charles L. Coffin, Detroit, Mich. The method consists in connecting the metal with one terminal of a generator and bringing it in contact with a liquid electrode connected with the other terminal.
- 522,172. Concentrator. Charles Wallace, Denver, Colo. Assignor of two-thirds to Cyrus A. Payne and William E. Moses. Oscillating percussion table with hopper feed and rakes or scrapers carried on a moving apron or belt.

Great Britain.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

WEEK ENDING JUNE 23D, 1894.

- 12,979 of 1893. J. W. Hall, Bristol. Smelting lead-zinc ores and making a pigment direct from the product.
- 13,654 of 1893. G. Lunge, Zurich, and F. M. Lyte, London. Method of producing caustic alkali and nitric acid by mixing alkaline nitrates with ferric oxide, and subjecting the porous mass to the action of heated air and steam.
- 24,551 of 1893. I. Wantling, J. Johnson and E. Zimmerman, Peoria, Ill., U. S. A. Improvements in coal cutting machines; original U. S. patent 475,833.
- 8,085 of 1894. P. C. Choate, New York. Producing pure zinc from complex ores by electrolysis; first heating the ore with a reducing agent and collecting the fume; then reheating the fume mixed with carb n to eliminate the constituents more volatile than zinc; then casting the distilled remainders into anodes for insertion in an acid bath.
- 8,646 of 1894. S. Lesem, Denver, U. S. A. Improvements in rock drills operated by solenoids.

PERSONALS.

Prof. P. H. Rollins has been appointed biologist of the Florida Agricultural College.

Mr. Elwin Smith, mining engineer, of Boston, is now in Arizona examining mines in Graham County in the interest of parties in Boston.

Mr. C. Jefferson Clark, mining engineer, is now visiting Mashonaland and Marabeleland in South Africa. He was recently at Bulawayo accompanied by a party of practical miners mostly from America.

Mr. R. H. Dunshee, who left the Bimetallic Mining Company in Montana some time ago to go to New Mexico, has returned to Montana as superintendent of the Combination Mining Company near Phillipsburg.

Prof. A. P. Coleman has been appointed geologist and mineralogist on the staff of the Ontario Bureau of Mines, will spend the summer months of each year in making a geological survey of one or more sections of the Province. This summer he is at work in the new gold region on the north shore of Rainey Lake. Professor Coleman is a graduate of Freiberg and has been for some time professor in the School of Practical Science at Toronto.

OBITUARY.

Bernard Lauth died at Howard, Pa., on June 25th, aged 74 years. He was a promising man in the iron industry, both as a manufacturer and as an inventor.

William J. Boothe died in Alexandria, Va., on June 27th. He was at one time one of the prominent men in the Cumberland, Md., coal trade, having been general superintendent of the American Coal Company for many years.

Samuel Bonnell Van Dusen died in New York on July 2d, aged 76 years. He was born in Philadelphia and spent his early life in that city, coming to New York in 1861. He engaged in the wholesale coal business with his brothers under the name of Van Dusen, Brother & Company, and continued in this business until 1875, when the metal firm of Dickerson, Van Dusen & Company was formed.

Henry C. Parsons was fatally shot at Clifton Forge, Ga., on June 29th. He was 57 years old. He was born in Maine, and, going South after the close of the war, settled in West Virginia. He there engineered the completion of the Chesapeake & Ohio Railroad, and was the inspiring spirit in the building of a road from Huntington to Cincinnati and in many other great enterprises. He purchased from the State the franchise of the James River & Kanawha Canal, and as a result of this the Richmond & Allegheny Railroad was built. He had recently been brought into prominence through his scheme to build a railroad to South America passing through 15 South and Central American countries. He was the owner of the Natural Bridge property.

SOCIETIES AND TECHNICAL SCHOOLS.

Colorado Scientific Society.—The regular meeting was held in Denver July 2d. The principal paper of the evening was read by Prof. Charles S. Palmer and was on the "Differentiation of Silver."

Atlanta Technological School.—The commencement exercises of this school were held in Atlanta, Ga., June 26th, the class of 10 being graduated. The school now numbers 120 students, and a large enrollment is expected next year.

Engineers Club, of Cincinnati.—The regular monthly meeting of the club was held June 21st. Mr. A. A. Stuart presented a paper on "Problems Growing out of the Construction and Operation of Elevated Railways." There will be no meetings in July and August.

Northwestern Electrical Association.—The summer meeting will be held in St. Paul, Minn., July 18th, 19th and 20th. Representatives will be present from Illinois, Iowa, Michigan, Wisconsin, Minnesota and Dakota, and probably from other States. A number of interesting papers will be read.

Chemical and Metallurgical Society of South Africa.—At the regular meeting held in Johannesburg, May 19th, Mr. W. Bettel, lately chosen president, delivered his inaugural address, which treated chiefly of the cyanide, chlorination and other chemical processes for the extraction of gold. He pointed out the lines upon which improvement might be expected. The imperfections in the present processes and the necessity of adopting scientific methods if success is to be attained. An interesting discussion followed, in which a number of the members took part.

Michigan Mining School.—The following article appears in the June number of the "Zeitschrift für Praktische Geologie," published in Berlin. It gives some idea of the standing of the Michigan Mining School abroad:

The Mining School at Houghton, Mich., was founded in 1885, by the Legislature of the State of Michigan, and the course of instruction began September 15th, 1886. During the first year there were only 25 students, while in the latter years the

number has grown to the neighborhood of 100. This is a good indication of the zeal of the instructors as well as of the merit of the course of study. This school of mines surpasses in numbers all other similar schools in the United States. The course of instruction of this Houghton School is not based upon the plan of the German academic electives. It is rather modeled upon that of the gymnasiums or Real-Schule, and thus has a definite outline of work, proceeding from the simple to the complex subjects. A great portion of the hours is devoted to practical exercises, so that, after from three to four years, a diligent student is not only capable of passing his examinations, but is also ready to step into practical life as a mining engineer. The admission to the mining school presupposes an age of 20 years and sufficient preparation, especially in mathematics. The regular course of instruction comprises three years of 45 weeks each, in each week about 42 teaching or practice hours. During these three years 452 hours are devoted to mathematics, 284 to physics, 508 to drawing, 966 to chemistry, 105 to assaying, 182 to metallurgy, 783 to mechanical engineering, 555 to surveying, 492 to mining engineering, 336 to mineralogy, 168 to petrography, 411 to geology; making a total of 5,490 hours. A fourth year of at least 500 hours will eventually be added to the course to permit further development in chemical and engineering work. Although the institution has not existed eight years, the equipment in every department is very complete. As an example of this the petrographical outfit may be cited. It embraces 4,104 crystals and crystal models, 27,310 minerals, 11,575 rocks, 3,000 sections of rocks and minerals. Also 38 microscopes adjusted for petrographical work, with the accessories; spectroscopes, goniometers, polariscopes, etc. The library is characterized by completeness in recent mining literature.

INDUSTRIAL NOTES.

The Warren-Scharf Asphalt Company has about completed an asphalt mixing plant at Charleston S. C.

The Electric Heat Alarm Company, of Boston, on July 1st, occupied a new factory and offices in that city.

The Muncie Muck Bar Company, of Muncie, Ind., has signed the scale of the Amalgamated Association.

The Hollidaysburg, Pa., Iron Works and the Portage Iron Works, at Duncansville, Pa., started on July 2d.

The Phoenix Iron Company, of Phoenixville, Pa., held its annual meeting last week and re-elected all the old directors and officers.

The Lalanc & Grosjean Works at Harrisburg, Pa., resumed work in all departments on July 2d, after a shut-down of four weeks.

Fannie Furnace at West Middlesex, Pa., has been leased to Pickands, Mather & Co., of Cleveland, O., and is being repaired and put in readiness to start.

The Radford Pipe and Foundry Company, Radford, Va., is increasing the capacity of its works and making a number of improvements in the plant.

The new firm of Rogers & Dennis at Ocala, Fla., is building several calciners for phosphate works; also a cremator for the refuse of the city of Ocala.

The Elliott Car Company, Gadsden, Ala., has bought the machinery and material of the Bluffton Car Wheel Works and will transfer the plant to Gadsden.

The Whiting Foundry Equipment Company, with office in Chicago and works at Harvey, Ill., will succeed to the Detroit Foundry Equipment Company.

The blast furnace at Embreeville, Tenn., is being put in order ready to go into blast at an early date. The company owns a 200-ton furnace and a large tract of land.

The Continental Wire Mills, of St. Louis, will start up about the end of July their new plant at Granite City, Ill., which has just been completed and run on an extensive scale.

J. G. Speidel has formed a partnership with H. P. Roeper, recently with the Harlan and Hollingsworth Company, and will manufacture hoists, elevators and cranes in Reading, Pa.

The business formerly conducted under the name of the Wheeler & Tappan Company, Chicago, will hereafter be transacted under the name of the Tappan Steam Pump Company.

Princess Furnace at Glen Wilton, Botetourt County, Va., which went out of blast recently on account of inability to procure coke has started up again, having secured a supply.

The Western Iron and Steel Company, of Tacoma, Wash., has bought the machinery of the old rolling mill at Burlington, Ia., and will remove it to Washington. P. M. Joyce, of Youngstown, O., will have charge of the work.

At Wheeling, W. Va., last week the plate mill of the Bellaire Nail Works started up. Some additional furnaces at the La Belle mill were also put

at work. The Riverside bar mill also put on an additional force of 75 men.

The Ashland Iron Company, of Baltimore, has been dissolved and W. G. Hoffman, Jr., appointed receiver to wind up its affairs. The proceeding is an amicable one and was decided upon at a recent meeting of the stockholders.

The Edge Moor Iron Company is building a new iron building 60 x 250 ft. in the shipyard of the Harlan & Hollingsworth Company, at Wilmington, Del. The same company is also building an iron shed for the drying kiln of the same firm.

The blast furnaces of the Illinois Steel Company in Joliet, Ill., closed down on July 3d on account of a scarcity of coke. The other departments will soon close. Oil is being used in most of the factories in Joliet, and it is scarce because of the railroad strike.

The Rice & Sargent Engine Company has been incorporated at Providence, R. I., for the manufacture and sale of steam engines. The officers are R. A. Robertson, president; Z. Chafee, vice president; John W. Sargent, secretary; and Richard H. Rice, treasurer.

The Abendroth & Root Manufacturing Company, of New York, makers of water tube boilers, have opened Chicago offices at 1422 Monahan Building. Mr. Geo. K. Hooper, who has represented the company at Rochester, N. Y., for the past two years, has taken charge of the office.

The Pittsburg Tin Plate Works at New Kensington, Pa., have given a contract to the A. Garrison Foundry Company, of Pittsburg, for the erection of a plant for rolling sheets for tinning. The plant is to have two sets of rolls and be so arranged that two more can be added whenever necessary.

Randolph & Clowes, Waterbury, Conn., recently made some seamless drawn copper tubes 16 in. in diameter for the new passenger steamer "North-west," which is to run between Buffalo and Duluth. A special hydraulic machine was made for the purpose of manufacturing these and other large pipes.

Thomas Carlins' Sons, Allegheny, Pa., have an order for a steel derrick with mast 90 ft. high and boom 87 ft., to have a lifting capacity of 20 tons. This firm recently shipped four 60-ft. and one 30-ft. steel derricks, to be used in the erection of the Her's Island dam on the Ohio River, near Pittsburg.

The Eastern Forge Company, of Portland, Me., has made an arrangement by which the unsecured creditors will be paid 50% cash and the balance in preferred stock. The secured creditors will waive their claim to interest and the works will be carried on. The conference committee of creditors has been appointed to assist the management.

The Union Foundry and Machine Company, of Pittsburg, recently shipped to the Britton Rolling Mill Company at Cleveland, O., two gear wheels, each 7½ ft. in diameter and 16 in. face, weighing about five tons. The same company has an order for a gear wheel 17 ft. in diameter and 20 in. face, with a pinion to match it 6 ft. in diameter.

The Columbia and Susquehanna iron companies of Columbia, Pa., started on July 5th. For the past five weeks these mills were closed, because there was no coal on hand to run them, due to the miners' strike. The price to be paid for puddled iron will be \$2.75 per ton, the wages of the other men to be formed from this basis. About 1,000 men and boys will be employed at the mills.

The Amalgamated Association iron scale at Jones & Laughlin's, Pittsburg, Pa., has not been signed, and a resumption of work there is not expected for a week. The presence of President Battelle and several other members of the Association of Iron and Steel Sheet Manufacturers here gave rise to a report that a conference would be held at which the scale dispute would be adjusted. Secretary John Jarrett denied it.

At Lebanon, Pa., the iron situation is given as follows: The Colebrook furnaces are receiving daily shipments of coke, and will be put into blast early next week. The Lebanon Valley furnace received enough coke to insure steady operations. The Lebanon furnaces received a large supply of coke. The Bird-Coleman furnaces at Cornwall will be placed in operation in two weeks, by which time it is expected coke will have been received.

President Garland, of the Amalgamated Association, has received the signatures of the following firms to the wage scale: Cherry Valley Iron Company, Leetonia, O.; Union Rolling Mills Company, Cleveland, O.; Tudor Iron Works, East St. Louis, Ill.; East Chicago Iron and Steel Company, East Chicago, Ind. The Falcon Iron and Nail Company, Warren, O., has signed the sheet scale, and the Ellwood, Ind., plant has signed the tinplate scale.

The largest barge ever built in Chattanooga is in course of construction at Perry's shipyards, says the "Tradesman." It is being built for the Chicago & Texas Railroad. It will be 228 ft. long and 36 ft. wide and its capacity will be the transportation of 14 cars. The railroad company proposes using it between Grand Tower, Ill., and St. Louis for hauling railroad cars. M. O. Crumpler, of the Interstate Lumber Company, has the contract for the work receiving it over all the bids of shipbuilders along the Ohio River.

The Youngstown Bridge Company, Youngstown O., has the contract for a large head-frame for shipment to Salt Lake City, Utah; a two-span four-track bridge for the Baltimore & Ohio Railroad at Bessemer, Pa.; a suspension bridge with eyebar cables, and two braced arch spans, over Mill Creek in Mahoning County, Ohio; also several large contracts at Springfield, Ill., and in Bell County, Texas. Among other work there are several spans in Oregon, and some trusswork for the American Sugar Refining Company in New Orleans.

Advices from Reading, Pa., state that the anthracite blast furnace at Temple, Pa., which recently shut down for repairs and want of coke, is expected to resume shortly, when 1,000 tons a week will be turned out. A large portion of the iron on hand has been sold, and daily shipments are made. Sheridan Furnace No. 2 is ready to go into blast as soon as a supply of coke is received. No. 1 is in blast and using anthracite. Robeson Furnace, which has been relined, is only awaiting the arrival of coke to go into operation. Its capacity is 1,100 tons a week.

Mr. John S. Kennedy, of Chambersburg, Pa., has invented and patented an apparatus for breaking pig iron, which consists in lifting the beds of iron, when cold, by means of an overhead crane, and taking them to a breaking table, which may be located at the end of the cast house for a single blast furnace or centrally located for a plant of two or more. By a series of vertical hammers, striking a cushioned blow, the sow is broken from the pigs and broken to length, and the pigs are broken at their centers. In case of strong iron the sows are first broken and then the pigs, but when the iron is weak the sow and pig hammers strike the bed simultaneously, breaking it at one operation. No movement of the bed is necessary after it is placed on the breaking table.

The Florida Dredging Company is a new concern recently organized in Jacksonville, Fla., to do a general dredging business. The incorporators are E. S. Cartter, of St. Louis; J. A. Bryan, of Tampa (both experienced dredging men), A. D. Stevens, J. E. and A. R. Merrill, of the Merrill Stevens Engineering Company. Mr. Cartter is the president; A. R. Merrill, vice-president; J. E. Merrill, treasurer; Mr. Stevens, secretary and chief engineer, and Mr. Bryan, general manager. Already the company has two or three contracts on hand and is now getting dredges in shape for the work. One is the building of a retaining wall in front of Daytona and the filling in behind the wall. For this work a lighter is being built, on which will be rigged a combined 10-in. suction pump with cutter, and a yard and a half clam shell dipper, run by a boiler of 75 h. p. A dredge is also being fitted up at Tampa for some work of filling in at St. Petersburg. The capital stock of the company is \$100,000.

MACHINERY AND SUPPLIES WANTED.

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

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

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

GENERAL MINING NEWS.

ALABAMA.

The miners' executive committee has been holding still another meeting for conference with the operators, but it is not expected to result in any agreement. The truth is that the strike is over, but the old miners do not seem to appreciate the fact. The Tennessee Coal, Iron and Railroad Company, with other companies, is filling the mines with non-union men, chiefly negroes, and arrangements have been made to protect them from any interference of strikers as soon as it may seem necessary. The coal output is gradually reaching its normal summer condition. The Tennessee Coal, Iron and Railroad Company has put two furnaces—the Little Belle at Bessemer and No. 1 furnace at Ensley—in blast, in addition to those which were already going. Nos. 3 and 4 at Bessemer and Nos. 2 and 4 at Ensley. At Bessemer Nos. 1 and 2 furnaces are being thoroughly overhauled and gotten ready to start up at short notice. The outlook, we are informed, is better, as there is an evident determination to keep up the economies forced upon the district, though there has been so far no actual increase in prices of iron.

Calhoun County.

(From our Special Correspondent.)

Anniston Pipe and Foundry Company, of Anniston.—This is really the only manufacturing plant a present in active operation. This company, which is a new organization, having no connection with the Radford Pipe Company, of Virginia, which had this plant under lease for several months, has 5 pits in operation, and a daily capacity of 200 tons of finished pipe. The sizes manufactured are from 3 to 36 in. internal diameter; and shipments have been

made to different points throughout the entire country. As present the iron used at this plant is purchased at Birmingham, but while the Woodstock coke furnaces were in blast that iron was used exclusively.

Woodstock Iron Company, of Anniston.—The property of this company, which, besides the four blast furnaces and ore washers located in Anniston, also comprises 50,000 acres of mineral, timber and farm lands in Coosa, Talladega, Calhoun, St. Clair, Etowah and De Kalb counties, 20,000 acres being situated in the immediate vicinity of Anniston was sold some time since at receiver's sale by a special master in chancery to a bondholders' committee. That committee has now about completed its plans for reorganization, which at an early date are to be submitted to the stockholders, and, if acceptable, the organization of a new company will be perfected, including the election of a board of directors and officers. The committee has had all the furnaces examined by an expert and the cost of repairs estimated, so that immediately after the organization is completed it is proposed to thoroughly repair the coke furnaces, increase the boiler capacity and make such other improvements as will increase the producing capacity from 125 tons each daily to 175 tons each. W. G. Ledbetter, one of the receivers and president of the old company who still has charge of the property, also informs me that this committee purpose submitting a plan for the sale of the land owned by the company to agriculturists and horticulturists in small tracts at low prices on yearly payments. This land was purchased originally to supply ore and charcoal for use in the furnaces, the bulk being for the timber, a large quantity of that land being situated outside of the mineral belt and in the agricultural districts of the State.

In the past this company has mined about two-thirds of the ore consumed at the furnace on its own property, and a very large proportion of that quantity from the immediate vicinity of Anniston; but in future, Mr. Ledbetter informs me, the policy of the new organization will be to mine all of the ore treated, from its own lands. Under the old management a mammoth ore washer having three sets of double logs under one roof was erected, and operated for some months, but never to its full capacity, owing principally to the fact that the brown ore banks on which it was erected were not sufficiently developed to admit of a sufficient number of tram tracks being laid to furnish ore; but this defect is being overcome, and when operations again commence it is proposed to mine from these banks by such a system as will keep the washer supplied to its full capacity, and at the same time reduce the cost of mining to a minimum. The ore in the vicinity of Anniston is of the brown hematite (limonite) variety, and carries a lower percentage of phosphorus than is usually the case with the Alabama ores, except in this county as well as Talladega and Shelby counties, hence the popularity of the charcoal carwheel pig manufactured in the past by the Woodstock company. Although a large quantity has been mined both at the Washer Hill and Rocky Hollow banks, yet to-day within the corporate limits of Anniston and immediate vicinity there is, so far as an estimate can be made as to quantity in brown ore banks, apparently an almost inexhaustible supply still remaining.

Cleburne County.

Lucky Joe Gold Mining Company, of Cincinnati, Ohio, with local postoffice address High Tower, Ala., has recently resumed mining operations on the property in this county. It will be remembered that last year this company erected a Fraser & Chalmers 10 stamp mill complete, which was operated for about six weeks, and shut down. After the mill was shut down prospecting work of considerable extent was done, but late in the fall all operations were abandoned. The present work being done is of a prospecting and development character, and it is expected that the stamps will be dropped again soon on this ore, which at the outcrop assayed an average of \$7 a ton, but the first work proved that mining was not being performed on a permanent ore body, consequently the mill was shut down and prospecting to discover the main ore body, if any such existed, was instituted. Future developments are being watched at this property with great interest both in Cincinnati and locally.

(From our Special Correspondent.)

Annie Howe Extension Gold Mining Company.—This property has been leased by Julius Houston, of Arbacoochee, who owns the old 10 stamp mill on the Hicks-Wise mine; he has a force of men taking out ore from below the old workings, which were abandoned by the company some years since; this he proposes to treat by amalgamation and concentration. The ore is higher grade than is usual in this district, being highly sulphureted quartz, with the pyrites showing in large cubes; it carries about \$15 a ton in free gold, and apparently quite rich concentrates; but the vein is very narrow, averaging some 3 or 4 in. at the depth of the present workings. The vein dips toward the southeast at an angle of about 15°; it is banded between walls of pyritiferous slate and talcose schist, and has the lenticular or kidney structure typical of the Annie Howe vein proper to the northeast on the adjoining property. Mr. Houston has worked ore from the northeast extension of this vein, which yielded from \$20 to \$25 a ton by mill runs in free gold, besides the concentrates, and expects the ore he is now mining will average from \$40 to \$50 a ton including the concentrates. On account of the thinness of the

vein and its lenticular structure the cost of mining is necessarily high, but four men, at the time of my visit, were taking out about 10 tons every two weeks, which, including cost of dynamite, running pump and all cost of mining, would make the ore cost on the dump about \$8 a ton. Consequently, if the values are saved in the mill and the concentrates properly treated, this mining ought to be carried on at a profit.

Arbacoochee Mining and Milling Company.—Arbacoochee work is progressing on the Lee mine, owned by this company, but the arrastras for treating the ore are not yet completed owing to the delay in the arrival of machinery from Cincinnati. Ore is being mined and crushed ready for treatment. The results of this treatment will be watched with a good deal of interest, because it is claimed it will settle the difficulty heretofore experienced because of the graphite associated with the ore.

Pice Mine.—This mine, near Arbacoochee, was recently bonded by D. W. Vaughn, of Heflin, who has had some prospecting done, which it is claimed showed a body of quite high grade ore at the bottom of an incline shaft sunk some time back and abandoned for the reason that the workmen got off the ore body, which is a black quartzite, deriving its color from the high percentage of graphite it carries. Separated from this ore body by a granite vein a quartz vein occurs bedded in mica schist country rock. This is 6 in. thick at the outcrop, and widens at 18 ft., or the present bottom of the prospect hole, to about 2 ft. It is a whitish sugary quartz, plentifully stained with yellow, and apparently y free milling.

Section 5.—By this name the property owned by the Arbacoochee Gold Mining Company, of Heflin, Ala., is locally designated, is the section which yielded a large amount in placer gold in the 40's and on which a hydraulic plant was erected some years since, and operated by lessees from time to time with varying results as to success. It has been optioned to Eastern parties for \$30,000 for a period of one year and 10% of the yield as a royalty. It is reported that these lessees will operate the hydraulic plant, but their names have not yet been made public. A vein of highly sulphureted white quartz, somewhat decomposed and stained with iron oxide, discovered on this section, is about 6 to 8 in. thick, and bears all the characteristics of the Annie Howe vein, which was one of the first quartz discoveries in this section of the State, having its lenticular structure and flat dip. A sample of this ore thoroughly roasted and treated by stiff amalgamation yielded \$40 a ton. Sufficient work, though, has not been done to warrant any opinion as to average yield. This vein is undoubtedly a southwestern extension of the Annie Howe, although the quartz outcrop does not maintain its continuity above the surface, yet the strike can be easily traced by the ledge of pyritiferous slate which forms the hanging wall of the Annie Howe vein.

Jefferson County.

Coaldale Brick and Tile Company.—This company has taken a contract to furnish a large quantity of brick to the city of Birmingham, and will commence work at once on the execution of the contract.

ALASKA.

The Alaska "News" reports a number of placer miners at work at Yakutat and Cook's Inlet.

The steamer "Rustler" left Juneau, June 12th, having Bob Sankey, Tom Graham, Bill McTaggart, George Porter and James McMahon for Dyea en route for the Yukon River. Sankey, Porter, Graham and McTaggart intend working bars on the Lewis River during low water, and will winter at Sixty-mile. They took a large supply of provisions, as, having experience in paying high prices at the Yukon trading points, they preferred to get their supplies here. This makes 415 going to the Yukon country this spring, says the "Alaska News."

Alaska-Treadwell Gold Mining Company.—The June clean-up was as follows: Shipment of bullion, \$43,178; ore milled, 19,331 tons; sulphurets treated, 353 tons. Of bullion there came from sulphurets, \$12,107. The estimated gross expenses for June have been \$21,661, leaving a surplus of \$21,517 for the month.

Berners' Bay.—The 20-stamp mill at this point is running steadily on ore of a fair grade.

Silver Queen.—F. C. Hammond is running five stamps and four Frue concentrators on ore from the Silver Queen mine at Sheep Creek, and is busily engaged in opening up the mine and blocking out the ore for stoping.

Unga.—Work is going on at this mine, owned by the Alaska Commercial Company. The ore carries a considerable proportion of sulphurets. The company has arranged to add 30 stamps to the mill.

CALIFORNIA.

Amador County.

Gover Mining Company.—It is reported that creditors of this company have asked to have it declared insolvent because its property has been allowed to remain under a \$10,000 attachment since May 28th last.

Mono County.

Bodie Tunnel and Mining Company.—James K. Lynch has sued this company for \$16,723, due on a promissory note executed June 30, 1890, bearing interest at the rate of 7%. It is said that interest

up to April 30th last has been paid on the note, but no principal.

Napa County.

(From an Occasional Correspondent.)

The most extensive deposit of magnesite known in the State is in this county. The property is owned by Henry G. Staab, of San Francisco, and is at present under lease to Stanley & Bartlett. The supply is practically unlimited. The mines are about 11 miles from the railroad station. At present the material is quoted as follows: No. 1 raw ore, \$6 50 per ton f. o. b.; No. 2, \$5.50; No. calcined ore, pure white, \$25 per ton f. o. b.; No. 2, straw tint, \$16; No. 3, dark color, \$13. An analysis of the raw ore made by Professor Henry G. Hanks is as follows: Magnesia, 50%; carbonic acid, 43%; iron, 1 to 2%, altogether absent in some specimens; silica and alumina, 3 to 4%. The calcined material contains no carbonic acid and is reduced to about one-half the weight of raw ore. From this magnesite furnace linings have been made for the Pacific rolling mill in San Francisco, where it was subjected to a temperature of 4,000°.

COLORADO.

El Paso County.

The last spike on the Florence & Cripple Creek Railroad was driven on July 2d. Hereafter trains will run regularly to and from Cripple Creek, thus doing away with all staging.

Gilpin County.

Delmonico.—This property on Quartz Hill is being developed by an eastern company which has already let a contract to sink the main shaft 200 ft. deeper, the contract starting at a depth of 170 ft. Nearly 30 ft. have been sunk and the reeve matter now occupies the entire width of the shaft and all of it consists of high grade milling ore, says the Central City "Observer." A portion of the milling ore is streaked with galena and iron which is certain to form a solid body of smelting ore at a point not very far below. The lode is supposed to be the same as the great Alps vein.

Minnesota Mining Company.—Another 50 ft. lift in the Minnesota shaft has been completed. Sinking will be resumed next week. The shaft is now down 162 ft. A meeting of the company will be held to determine the extent of the next lift to be sunk and to transact other business connected with the mine. The next contract will be 50 or 100 ft., and the company will go deep enough to reach the point where the vein becomes solid again as it is now divided by keyrock into two streaks, one on each wall. There were 7½ cords of milling ore which were saved while sinking the shaft, recently run through the mill, cleaning up 9 oz. of gold on the plates. One and a half tons of tailings netting \$7 a ton, were received from each cord of ore. This same milling ore if stoned out will run from 3 to 3½ oz. gold to the cord, says the Central City "Observer," but when saved while sinking the shaft the value is run down considerably by the waste rock which is mixed with it. The lessees of the Minnesota are developing it in a systematic manner, completing the sinking of the shaft before running any levels and carefully timbering the shaft as they go down.

Lake County.

(From our Special Correspondent.)

There is a good demand for first-class iron ore in Leadville, and the smelters are in the market for all they can get. The iron tonnage has usually been very large, but it has been curtailed of late owing to the low price of silver. The principal iron producers at present are the Bison, 50 tons daily; Catalpa & Crescent, 40 tons daily, and the Starrs, Small Hopes and Commercial companies. During the next few days a number of leases will be added to the list of iron shippers.

Aladdin Mining Company, Leadville.—This company is capitalized at \$1,000,000, and has secured titles to nine claims known as the Veza group. Work will commence next week, and a deep shaft will be sunk to the contact. Messrs. L. D. Roubush, John Harvey and others are at the head of the enterprise.

Commercial Mining Company, Leadville.—A good strike was made this week in the Clipper shaft. The drift started at the 465 ft. level was run in through solid formation a distance of 140 ft., at which point it opened out into a streak of lead carbonates similar to that found in the Walcott ground. A little farther this developed into a body of iron ore which, however, cannot be shipped at the present low price of silver.

Garbutt, Leadville.—This property lies close to the Little Johnnie mine and some important work is being done. The shaft is down 400 ft. and drifting to catch the extension of the Johnnie ore chute has been commenced. In sinking the shaft a number of good streaks of gold ore were encountered, but it is the main ore chute that Manager Henry Smith is after.

Marian Lease, Leadville.—The Marian lease of the R. A. M. has ceased shipments from its big ore body for the present, because they did not cover smelting charges. Some prospecting work for higher grade ore bodies is being done.

Resurrection Mining Company, Leadville.—This is another new enterprise in the Leadville gold belt, with D. H. Moffat, Eben Smith et al. at its head. The proposition is to resume operations on the New Year's group, which consist of 12 claims, and from which the old New Year's Company took out

\$750,000 from the first contact. The new company will sink a new shaft to the lower contact, where it is known that a gold ore chute exists. The property comprises 80 acres of ground.

Sultan.—Work has been resumed and the tunnel already in 150 ft. is being driven forward. It is expected to get beyond the quartzite in a few months, when good ore will be encountered.

Walcott Mining Company, Leadville.—The Indiana and Estey leases on the Walcott ground are averaging shipments of 40 tons daily of first class lead ore. Considerable important development work is also being carried on.

Welden, Leadville.—Mr. Schlessinger, one of the principal owners of the Welden, is ready to begin work on a new shaft in the city limits this week. Recently the owners of the Welden purchased a large part of the Starr placer and are now enabled to sink their new shaft directly on the line of the celebrated Orion ore chute. The surface improvements for the new shaft are complete and cost \$10,000.

La Plata County.

(From our Special Correspondent.)

Baker Contact.—While nothing yet is definitely known as to the outcome of the bonds on this property, the owners have gone to work and are now shipping ore to the Lewis mine for treatment. Only the very best can pay expenses in this manner, but in the contact matter there is a multitude of veins and spurs carrying a value of from \$20 to \$100 per ton in free gold.

Bessie G.—Shipments have commenced from this mine to the Durango Smelters, and while the mine has not given as good results as in previous years the two lessees have taken out about 300 sacks, which they say will average about \$70 per sack.

Midnight.—In the town of La Plata a lime contact was disclosed some weeks ago and work commenced on this property. Two tons were shipped to Durango Smelter and satisfactory returns were obtained, some of the ore running 126 oz. silver with a little copper and some gold. However, the discovery was made on the La Plata Placer Company, which in the mean time secured patent on their land. The owners of the placer now declare that no ore can be mined or shipped. The question is now, if the patent of the placer company can be broken, as the existence of this contact was known and locations made on the same even before any placer company was thought of, although the present company in its affidavit swears that no lode or lead of any kind was known at the time of application.

San Miguel County.

Roy Johnstone.—This group in Prospect Creek Basin has been leased and bonded for one year by Messrs. T. L. Beam, Chapin and Whiteman for \$150,000, the first payment to be made 60 days from date of the bond and lease. This group is composed of 12 lode mining claims bearing gold, with large true fissure veins from which the lessees have taken sufficient assays to convince them of their value, says the Telluride "Republican." A large force of men will be put to work immediately and a pack train put on to convey the mineral to the Beam mill, which is now building.

FLORIDA.

Hillsboro County.

Alafia River Phosphate Company.—The final payment on the tract purchased by this company has been made, and it is said that the work will be begun at once on the erection of a plant.

Polk County.

Local papers state that 200 acres of phosphate land, near Phosphoria, has been sold to Messrs. Bates and others of Boston who propose to begin mining operations at once. The price paid for this tract is said to have been \$227,000.

GEORGIA.

Lumpkin County.

Crescent.—This claim, near Dahlonega, has been leased to John Marlow, who is working from the surface down and has taken out some good ore.

Findley Mine.—At this mine, near Dahlonega, 20 stamps are running on ore and 20 more are ready to start up as soon as the supply of ore is increased, which will be done when the erection of the new pump is completed, giving a better supply of water. It is said that some good ore was struck recently in the tunnel.

Hand.—The damage to the wheel at this mill has been repaired, and the mill was started up again last week on full time.

Richmond County.

Blue Diamond Granite Company.—This company, of Augusta, has recently taken contracts for stone for several large buildings, also a large contract for paving blocks for the city of New Orleans.

IDAHO.

Alturas County.

Yellow Jacket.—It is understood that this company has placed orders for a 40-stamp mill to be erected at the mine. The mill is expected to be ready by next fall.

Owyhee County.

Banner Group.—On this group of mines in Coffee Gulch the lower crosscut from the main shaft has just touched the Roger ledge. The upper tunnel is

being cleaned out and will be extended northward about 100 ft. The tunnel to the Banner ledge has been cleaned out and work has been commenced drifting on the ledge. In the Webster tunnel an upraise has been started to the surface for ventilation and about 30 ft. of it has been completed.

Florida Mountain Tunnel.—Work has been started on this enterprise, which is intended to drain and develop the different ledges on Florida Mountain. It is proposed to run the tunnel in about 3,000 ft., ending at the Black Jack mine. About 1,000 ft. in it is expected to cut through a number of claims, the principal ones being the Leopard and the Naked Truth.

Tip Top.—In this claim on Florida Mountain a discovery of ore has been made in an open cut which revealed the vein for a distance of about 12 ft. The vein is quartz, carrying some free gold. A shaft has been started and at last accounts was down 16 ft.

Trade Dollar.—This company is now employing 80 men in the mine and at the mill. At latest accounts about 22 tons a day were being run through the mill.

Shoshone County.

Trouble is again reported with the miners' union in the Coeur d'Alene region. At a meeting recently held at Gem a number of miners were ordered to leave town at once, and it was resolved that no member of the union should work with any of the parties blacklisted. No reason was given for this arbitrary action, and it is said that more of the same business is to be expected.

ILLINOIS.

Macoupin County.

Mines Nos. 9 and 7 at Staunton have been compelled to close down on account of the railroad strike.

INDIAN TERRITORY.

Choctaw Coal and Railway Company.—Mr. George H. Earle, Jr., of Philadelphia, Pa., chairman of the Reorganization Committee of this company, gives notice that, by the terms of the plan for reorganization, security holders are required to accept its provisions on or before July 21st, 1894, in order to entitle them to participation in the benefits thereof. The agreement is now lodged for signature with the Finance Committee of Pennsylvania.

IOWA.

Des Moines County.

North American Lead and Zinc Company.—This company has been organized at Burlington to work lead and zinc mines in Iowa and also in other States. The immediate object is understood to be to work the deposits recently discovered at Starr's Cave near Burlington. The authorized capital stock is \$500,000, and the incorporators are Robert Allen, George S. Tracy and E. Hedburg.

MARYLAND.

Allegany County.

The strike is practically over in the George's Creek region, and nearly all the coal mines are at work with full forces.

MICHIGAN.

Copper.

Atlantic Mining Company.—The foundations for the mill at Salmon Trout River are about completed, and the branch track from the main line is finished. The work of filling the cribs to the dam is under way, and this will be all finished shortly. During this summer the railroad from the mine to the present mill will be made into a standard gauge road. There is no change to note in the appearance of the mine. No. 3 shaft is sinking to the 23 level, which is the deepest point in the mine.

Calumet & Hecla Mining Company.—Solid foundations are being put up for the last of the stamp heads in the mill. With the new foundation the efficiency of the steam stamp is increased by about 20 tons per day.

Minnesota Mine.—During the winter a party of men have been driving a drift or crosscut into the hillside from the south, at about the adit level, says the Norway "Current." The object was to reach a point a level above and a little east of the "big side" where the big mass was found and taken out more than 25 years ago. It was thought that in the somewhat careless mining methods of that period, some bunches of good copper ground had been left, which would pay for crosscutting the conglomerate and putting in a limited amount of new timber. In the result, the prospectors were disappointed, as the whole amount of available copper did not reach 100 lbs. This evidence does not, however, argue against the opening of the old mine to a greater depth than has ever been reached, by the sinking of new vertical shafts to intersect the several veins or fissures, and as a result its return to its old prosperity. It may be said that no one will be willing to spend money to open up the mine now, under present conditions and with a more or less limited knowledge of the conditions existing at the time of abandonment. This may be in the main true, but a careful study of the history of the mine is all that is needed to convince the fair minded that there is much method in the madness of those who declare that the Minnesota will again be profitably wrought. Mr. Joseph Biscombe, one of the tributors, and his partner are now doing some work in an old Indian digging north of No. 5

shaft, where a small vein was opened on in days long since gone by.

Iron—Gogebic Range.

The strike of the miners about Ironwood still continues. On July 3d a number of the men commenced riotous proceedings and endeavored to stop the working of steam shovels on the Norrie property. A fight ensued in which six of the strikers were shot and two of them seriously hurt. A detachment of the State militia was ordered to Ironwood by the Governor.

Iron—Marquette Range.

In one day recently the Duluth, South Shore & Atlantic Railroad handled 1,850 cars of ore from the mines to the docks at Marquette, making an extraordinary day's work.

Iron—Menominee Range.

The Escanaba "Iron Post" gives the following late notes:

It is reported that the Commonwealth has made another large sale of ore, and that 60 more men will be put to work. This will make a force of 200.

Ishpeming miners paid no attention to the mischief makers who attempted to get up a strike there.

Work progresses nicely at the Dunn and Columbia mines, Crystal Falls field, and each will soon be shipping ore.

The Millie has shipped its stock, but will probably not mine this season.

The Loretto will ship 50,000 tons of ore over our docks this season.

The Commonwealth is shipping 50 carloads per day to this place.

The Excelsior furnace at Ishpeming will be blown in next week.

The Volunteer is shipping 15,000 tons from its stock pile.

The Commonwealth has over 100,000 tons in stock. The Winton gets rid of 600 tons a day.

MINNESOTA.

Iron—Vermilion Range.

Chicago Iron Company.—John M. Williams has sued the Chicago Iron Company to have a mining lease to land in 58-16 annulled. He alleges that the iron company has defaulted in their payments and that the lease works a cloud on his title.

Duluth & Mesabi Iron Company.—A bed of carbon or graphite has been discovered near Iron Junction, and a company to be known as the Duluth & Mesabi Iron company has been formed to operate it, says the Tower "Iron Journal."

MONTANA.

Fergus County.

Northern Pacific Mine.—At this mine, near Maiden, in the Judith district, a vein was recently struck showing well in copper, carrying some silver and considerable gold. This mine has been shipping ore for two years past, but the new find is said to show better than anything yet shown in the claim.

Granite County.

Sunrise.—This company's new 10-stamp mill is now nearly completed, and will soon be in operation. The company has, as it is understood, made its last shipments of ore.

Jefferson County.

Bunch Grass.—Ore taken from the new shaft on this mine, near Basin, makes good returns, the assays showing a considerable amount of gold as well as silver. The deepest shaft as yet is only down 30 ft., but is going down as fast as possible.

Butte & Basin Mining Company.—On this company's Dimon claim the shaft is now down 61 ft. and is in ore, the vein carrying lead. There has been some trouble with water and new pumps are to be put in.

Mattie.—This mine, owned by William McDermott, of Butte, has considerable work done, and has shipped some ore to many smelters. It shows well in copper and carries both gold and silver. This mine and the Comstock, which lies about 1,500 ft. to the west, have had more work done on them than any of the leads in this vicinity, and both have shipped ore. These claims lie about two miles east of Basin, on the divide between High Ore and Cataract creeks, and are in the heart of the copper belt. The leads are large and have walls of granite, dipping to the south at an angle of about 45°, running east and west.

Mayflower.—At this mine, situated about a mile east of Basin, the tunnel is in 180 ft., and it will have to be run 100 ft. farther before the lead can be cut. There are three men working, and they make on an average 1½ ft. every 24 hours. The backs for stopping will be about 120 ft. by the time the tunnel cuts the lead. This property is under lease and bond to D. P. Wortman, who states that henceforth this property will be known as the June Rose.

Union.—On this property, near Basin, the shaft is now down 40 ft., and the vein shows some good copper ore, carrying both gold and silver.

Lewis & Clarke County.

Notices of location have been filed with the county clerk as follows: Mary Bell lode, East Fork Skelly gulch, by T. E. Crutcher and others; Creek Bed placer, 160 acres, by Frank Johnson and others; 40 acres placer and water right on Trout Creek, by H. L. Butler and M. A. Butler.

Fred Snyder and George McLane have located 20 acres of placer ground on Canyon Creek at Nugget gulch. This is a new discovery.

Mamie D.—Wm. Sampson and son James, John R. Davis, Henry R. Davis and James Jose are the owners of this mine, situated in Dry Gulch, three miles south of Helena. Considerable work has been done on the property, an incline shaft having been sunk 50 ft. and a tunnel run for a distance of 150 ft. A body of free milling ore that assays well has been struck. The ore is in slate formation and is easily mined. These gentlemen are also the owners of the Florence lode and mill site and 20 acres of placer ground adjoining the Mamie D. They have a steam arastra on the property which they propose to put in operation in a few days.

Marysville Mining Company.—This company has a force of men at work sinking a shaft upon its properties, the Jeanette and Redemption lodes on Cruise Hill. The company recently struck a 16-ft. vein on the Jeanette claim. This is believed to be a continuation of the Nine Hour vein.

Park County.

Crevice Mountain Mining and Milling Company.—This company, which owns a 20-stamp mill in Crevice gulch, has recently purchased from Joseph Brown and others a group of claims, including the Graham, the Tip Top, the Mountain Chief and the Legal Tender. All of these claims so far as explored have yielded free milling gold ore, and the company which has purchased them proposes to put up 20 additional stamps. The price paid is said to have been \$28,000.

NEVADA.

Storey County—Comstock Lode.

Following are extracts from the latest official letters of the superintendents of Comstock mining companies:

Consolidated California & Virginia.—In the 1,650 level, at the south end of south drift 2 and mouth of south drift 3, 28 ft. below south drift 1, we are stopping out ore east and west. The west crosscut from the end of south drift 4 on the 1,700 level has been extended to a total length of 26 ft. The first 4 ft. is in ore, making a total width of 6 ft. of ore assaying \$30 per ton; then through 4 ft. of low grade ore assaying from \$5 to \$10 per ton. At the point where the 6 ft. in width in ore was cut through square sets of timbers have been put in, and we are now upraising to crosscut with south drift 2, 22 ft above this level. On the sill floor we have open north and south 10 ft. long and 5 ft. wide, and have upraised 12 ft., all in ore giving an average assay value of \$32.50 per ton. The top of this opening assays a little better than the sill floor. From the openings above described we have extracted during the week about 268 tons of ore, the average assay value of which per car samples was \$71.60 per ton. Have shipped during the week to the Morgan mill 276 tons 20 lbs. of ore, the average assay of which per car samples was \$86.10. The average assay value per battery samples of all the ore worked at that mill during the week (345 tons) was \$74.95 per ton. In the 1,000 level the west crosscut from the upraise, 585 ft. south from the shaft station at a point 37 ft. above the sill floor, has been advanced to a total length of 78 ft.; in vein porphyry showing streaks of clay and fine lines of quartz. The east crosscut from the main drift, at a point 310 ft. south from the shaft station, has been extended to a total length of 65 ft.; face in porphyry and quartz formation which carries a low assay value. In this crosscut, at a point 35 ft. from the mouth, a north-west drift has been advanced 38 ft. in porphyry, clay and fine lines of quartz of nominal value.

Kentuck Consolidated.—We are cutting out a station and preparing to sink a winze on the ore found in the east crosscut on the 1,100 level. The south drift from Jacket incline, 1200 level, is in a total distance of 1,200 ft.; face in gold ore of milling value.

Ophir.—On the 1465 level the recently started west crosscut is in 27 ft. and continues in porphyry and clay. In the old Central tunnel workings the west crosscut from the drift north from the old Mexican shaft on the tunnel level at a point 26 ft. north from shaft has been extended 50 ft., total length 142 ft., passing through bunches and streaks of ore assaying from \$10 to \$20 per ton. The north drift from the end of the west crosscut, 56 ft. above the tunnel has been extended to a total length of 39 ft., continuing along in quartz and old fillings assaying from \$10 to \$15 per ton.

OREGON.

Baker County.

Gray Eagle Mining Company.—This company has been putting up a Crawford mill which is now ready for operation and was to be started up about July 1st. Work has been somewhat delayed by bad conditions of the roads.

PENNSYLVANIA.

Anthracite Coal.

Thomas M. Righter & Co., at their Mount Carmel colliery, have recently cut with a diamond drill a good vein of coal overlying their mammoth vein, which is 10 to 12 ft. thick.

The Audenried No. 4 colliery, which has been idle for the past few months, started up last week.

Bear Valley Colliery resumed operations on July 5th after an idleness of six months, caused by the building a new breaker. This plant employs 400

men and boys, and is operated by the Reading Coal and Iron Company.

The committee of the Schuylkill Coal Exchange have drawn 5 collieries, and fixed the rate of wages for mine employes in that region at 9% below the \$2.50 basis. This is the same rate as last month.

Lehigh Valley Railroad Company.—This company's tonnage from the Mahanoy and Pottsville regions has been reduced the last few months, says the Mount Carmel "Ledger." They lost the tonnage of the Park Colliery No. 2 owing to the destruction of that breaker by fire; this colliery's daily output ran up close to 1,501 tons. The Giendon Colliery, owned by the Lehigh Valley Coal Company, has been gradually decreasing its output, the mines, it is said, being about worked out. The lower levels are flooded with water. The Primrose Colliery, which they recently purchased at public sale, is not in a position to do much, until extensive improvements are made inside and out. Park Colliery No. 5, one of the largest shippers, has been idle for some time on account of fire in the No. 1 Packer mine workings, which is part of this colliery. The other Packer collieries of the company and the York Farm Colliery have all been very much affected by the recent floods and their outputs materially decreased.

Bituminous Coal.

About 1,000 coal miners in the Saw Mill Run District, which is within the Pittsburg City limits, are reported on strike, owing to local troubles.

Osborne & Saeger have signed the Columbus scale for the Whitsett, Darr, Eclipse and West Newton mines. Morgan Moore and Blaine signed for their Banning mine. This makes the Pittsburg mining district union with few exceptions.

At the miners' convention held in Philipsburg on July 3d, a resolution was adopted indorsing the action of the Altoona compromise scale, though opposed by many who were against a partial resumption. The result will be that after the Fourth of July there will be no opposition to any mine being started, the operator of which will agree to pay 45c. a gross ton. One mine, Coaldale No. 4, started on July 3d at 40c. A mass meeting, to be attended by all the miners in this section, will be held at that mine with a view of getting the men to come out. The convention voted that settlements with the operators on the basis of 45c. should be left in the hands of the local officials.

W. L. Scott Coal Company.—A cave in and an explosion occurred on July 2d at the Buena Vista mine, this company. Two miners were fatally injured.

SOUTH DAKOTA.

Lawrence County.

Deadwood Terra Mining Company.—A two-thirds interest in the Willie lode has been transferred to this company by John Hodgkin and Abe Thebert, the consideration being \$200. The claim is situated upon the divide between Bobtail and Deadwood gulches, and adjoins the Deadwood Terra property on the north. It is said that the company has purchased the remaining one-third from other parties. The Deadwood "Times" says that the company intends to resume operations, else it would not be buying more ground.

Golden Reward Mining Company.—At the recent meeting of the directors and principal stockholders of this company it was decided to double the capacity of the works by the erection of a cyanide plant capable of treating 100 tons per day, plans and specifications for which are now nearly completed. The crushing capacity of the present chlorination works, says the Deadwood "Times," will be increased by the addition of a new building now under construction, to accommodate new sets of rolls and screens. It is not yet known whether the McArthur-Forrest process will be adopted in the new works or not. Experiments were made last fall by the Golden Reward Company relative to the precipitation of mineral from the cyanide solution to or on copper plates by means of electricity. The test was on a small scale but proved satisfactory. The Golden Reward Company has a large reserve supply of ore in its various mines, carrying gold and silver in almost equal proportions, none of which the company has attempted to treat in its chlorination plant.

TENNESSEE.

Blount County.

Chilhowee Slate Quarries.—These quarries are to be worked on an extensive scale by the owners, Hamilton & Walsh. About 100 men will be employed and the slate taken out will be shipped by boat to the railroad at Lenoir.

TEXAS.

Fayette County.

Muldoon Quarries.—These quarries, owned by A. B. Kerr & Sons, have been started up again and are shipping from 25 to 30 cars a day to Galveston. The owners have secured a large contract for stone at that point.

Maverick County.

Fuente Coal Mines.—These mines, near Eagle Pass, which have been shut down for nearly a year, have been started up again with a full force of men, and it is said that they will be worked to their full capacity on contracts with the railroad.

UTAH.

Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending June 23d were: Bullion, 766,836 lbs.; silver and lead ores, 515,150 lbs. The receipts of ore and bullion in Salt Lake City for the week ending June 29th were to the aggregate value of \$118,942, of which \$70,942 was in bullion and \$48,000 was in ore. The receipts of Pennsylvania bullion amounted to \$30,942; Hanauer bullion, \$12,900; base bullion, \$12,300; Ontario bullion, \$15,000.

VIRGINIA.

Allegheny County.

Lowmoor Company.—This company is about to add another ore washer to its property. It will bring the plant up to 500 tons daily capacity.

Louisa County.

Mineral City Mining Company.—This company has organized at Mineral City with \$500,000 capital stock. Its purpose is to work and develop coal and iron mines.

Rockbridge County.

Longdale Furnace Company.—This company has begun work on some extensive improvements in its furnaces at Longdale.

Spotsylvania County.

Whitehall Mine.—This gold mining property, including a large tract of land, was sold at public sale in Fredericksburg, recently, and was bought for \$8,500 by Gilbert R. Fox. It is not said whether the purchaser intends to work the property or not.

WEST VIRGINIA.

Kanawha County.

Southern Mining and Metallurgical Company.—This company has been incorporated with offices in Charleston to do a general mining business. The capital stock authorized is \$500,000.

McDowell County.

Crozer Coal and Coke Company.—This company is preparing to add a coke crusher to its plant at Elkhorn.

WYOMING.

Albany County.

Keystone.—This property has been leased to Mr. Osborne, of Park City, Utah. He proposes to start up the mill as soon as possible, putting in a number of improvements.

Morning Star.—At this claim on Deadman's Hill, between Three Mile and One Mile, a new tunnel has been started to reach the vein. A number of specimens from this claim have been sent to the State University at Laramie for assay.

Fremont County.

Miners' Delight.—The pumps at this mine have been started up. So far the machinery, which has not been in use for several years, has been found in good order. A force of men will be set at work in the mine as soon as it is unwatered.

FOREIGN MINING NEWS.

BOLIVIA.

Huanchaca Silver Mining Company.—At the annual meeting recently, Mr. Charles Vattier, engineer of the company, was chosen a director in place of Mr. Beebe, resigned. The other retiring directors were re-elected.

BRAZIL.

St. John Del Rey Gold Mining Company.—In the report for the year ended May 31st last the directors state that the hindrance and delay in the landing and transport of the machinery and plant during and since the revolt have compelled them to ask for further borrowing powers to the amount of £15,000, in order to put them in a position to pay off the un-renewed portion of the Cuiabá bonds, and to insure the due payment of the half-yearly mortgage bond interest on September 1st next.

BRITISH COLUMBIA.

Parties from Seattle, Wash., have purchased a gold claim at Texas bar, nine miles from Yale, on the Frazer River, from Kai Kee, a Chinaman, who has mined it successfully in a small way for years. The price paid was \$4,000. The purchasers will spend \$10,000 in putting in a hydraulic plant at once.

Bear Lake Consolidated Mining Company.—This company has been organized at Victoria. Capital stock, \$500,000 with shares at \$5 each. Incorporators, G. Riley, G. Leiser, M. Gutmann, G. Hunter, G. Nowell.

Styne Creek Gold Mining Company.—This company has been incorporated at Vancouver. Capital stock \$200,000. R. C. Campbell-Johnson, of Vancouver; J. H. Anthony, of Lytton; N. P. Snoden, of Victoria, are directors.

Nelson District.

(From our Special Correspondent.)

Hamber & Kirk Placers.—Prospecting is being carried on this property on Bird Creek. This property is about three-quarters of a mile west of Forty-nine Creek and on a slope of the same ridge. A large amount of gold was taken out in the Kootenay excitement in 1864, but it has since been lying idle. Operations will be started on a large scale as soon as the water subsides to permit it,

Slocan District.

(From our Special Correspondent.)

Dardanelles Mining Company.—This mine has been shut down for the present, the pumps being unable to control the water, but work will be resumed as soon as possible. Some 2,000 tons of ore are now ready for sorting and shipment to the smelters.

Wakefield.—This property and the Silverton, owned by J. A. Finch, of Wallace, Idaho, are preparing to ship ore.

Trail Creek District.

(From our Special Correspondent.)

Kootenay Hydraulic Company.—This company recently completed a run on its property at Waneta, on the Pend d'Oreille River. They obtained \$525 gold from 2,200 cu. yds. of gravel. The gold included some nuggets of fair size.

Le Roi Mining Company.—The shaft on this company's mine at West Kootenay is now down 200 ft., and the ore body has widened out to 7 ft. It continues to assay well.

Trout Lake District.

(From our Special Correspondent.)

Black Prince Mining Company.—This company, of Seattle, Wash., has completed arrangements to start work for the season on its mine at Trout Lake, and Mr. Greenlee has gone up to the mine to take charge as superintendent.

Cariboo & Kootenay Mining and Prospecting Company.—Work has been started on this company's placer property on the Sardeau Creek.

CHILE.

Lagunas Nitrate Company.—This company has been formed in London, with a capital of £900,000 in £5 shares, of which 60,000 shares are reserved for the vendors, and 120,000 are offered for subscription. The prospectus states that the company has been formed to acquire a portion (being about 200 estacas of 40,000 square varas [Spanish yards] each in extent) of the well-known nitrate grounds of the Lagunas Syrdicate (Limited), and which are believed to contain the richest deposits of caliche in the Province of Tarapaca, Republic of Chile, together with the oficina recently erected thereon. The directors state that, owing to the valuable nature of the caliche deposit, and the facilities for manufacture which will be possessed by the company, the profits from the production of nitrate will be very large, and that the manufacture of iodine will also prove a source of profit, and they have reason to believe that the dividends which this company will be able to pay will be very large. In their opinion the company is acquiring the property at a favorable price, and on conditions satisfactory to the new company.

London advices, however, say that the shares of the new company are not meeting with a very good reception, and that some doubts are expressed as to the success of the issue.

GREAT BRITAIN.

England.

The coal miners in Northumberland and Durham, in England, appear to have profited by their disastrous experience in the strike of 1892. The latter brought about a meeting between representatives of the mineowners and the workmen, and the principle of conciliation was accepted. While negotiations were in progress the coal-owners of Northumberland gave a signal proof of their loyalty to the scheme. The state of trade compelled them to ask their men to acquiesce in a slight reduction of wages, and they convinced the leaders of the miners that a reduction was justified by the lowered market prices. Nevertheless, the workmen, by a majority of votes, declined to accept the proposed reduction. In ordinary circumstances the owners would then have proceeded to issue their notices. In the interest of the board of conciliation then being formed they, however, magnanimously forbore. They said they would delay their demand until the board was formed, and if the state of trade then seemed to call for a reduction they would submit their claim to the new body or court representing both employers and employed. Since then the Northumberland miners have officially intimated their acceptance of the constitution of the board framed by the representatives of both bodies, and the court of conciliation is now practically, though not yet formally, established. The rules provide that the board is to consist of 15 representatives from each side, with an independent chairman. This chairman is to be elected annually by the members, and if they fail to agree the chairman, for the time being, of the Northumberland County Council, is to have the power, after conferring with the board, to nominate a man for the office. The board is to have power to determine from time to time the county rate of wages. The chairman is to preside at all the ordinary meetings, and, in default of agreement on any question by the representatives of the owners and the workmen, he is to give the deciding vote, which is to be final and binding. The board is to continue until either party gives a month's notice of withdrawal, but neither side can withdraw before December 31st, 1895.

JAPAN.

Details of the earthquake in Tokio and Yokohama, Japan, on June 20th were brought to Vancouver, B. C., July 4th, by the steamship "Empress of China." Twenty persons were killed and 277

injured, 39 houses demolished and several thousand houses damaged. A fire in Yokohama on June 17th burned more than 1,000 houses.

ONTARIO.

Sudbury District.

(From an Occasional Correspondent.)

Some anxiety was felt in the Nickel smelters over the strike in the Connellsville coke region, but the strike fortunately closed before the coke reserves were exhausted.

The new rockhouse of the Stobie is about completed, and it is reported that the mine will shortly be pumped out and work resumed.

The Copper Cliff and Evans are in active operation, and the Canadian company has one Herreshoff stack in blast—the second one being at present cold. Both mining and smelting are being carried on at the Murray, and the smelter at the Blezard is expected soon to blow in—although at present no mining is being done.

Much promising ground remains to be opened up in Drury, Denison and several neighboring townships, and confident expectations are felt regarding the new district near Wahnapiitae Lake. The openings (except the Worthington mine of Drury township) are as yet but prospects, and capital is needed to make them mines. Much interest is felt in the development of the Emmens process, works for which, it is reported, will be established in Toronto.

SOUTH AFRICA.

Matabeleland.

(From an Occasional Correspondent.)

Bulawayo.—The place from which I write is making rapid strides. It is the center of this new gold mining region, and there are already a number of people here. We have started a paper already. A number of prospectors are at work in this neighborhood and some good-looking specimens of quartz have been sent in. It is believed there is a good field for development here. It may be said that prospecting has just been begun fairly, for up to this time the affairs of the community have been directed to taking off farms and mining claims.

Our paper, the "Matabeleland News and Mining Record," somewhat resembles the "Umtali Advertiser," published in Mashonaland, since we have no printing press and it is gotten out on a duplicating apparatus. It gives already a number of mining notes and has quite a show of advertising. Bulawayo has a sanitary board and several other modern improvements, and looks forward to becoming a flourishing town.

SOUTH AUSTRALIA.

Adelaide, May 16.

(From our Special Correspondent.)

A few days ago an expedition, fitted out by Mr. W. A. Horn, a wealthy colonist, started from Adelaide for the purpose of making a scientific exploration of the MacDonnell Ranges, lying near the center of this great island-continent and about 1,100 miles north of this city. Scientists from the neighboring colonies as well as from Adelaide accompanied the party, traveling 688 miles by rail, and then proceeding on camels to the ranges. The country in question is interesting from a geological and mineralogical point of view, good gold having been found there and mica in large sheets. Two or three practical prospectors have gone with the party, which is under the guidance of Mr. Winnecke, an experienced surveyor and explorer, who is acquainted with the country. They expect to be absent about three months, when we may expect our knowledge of the flora, fauna and mineral products of that part of the country to be enlarged.

The work of prospecting for gold in various directions is still progressing and the results on the whole are very satisfactory. We have succeeded in proving what a number of pessimists have persistently denied, that we have paying gold reefs in South Australia, and that with the help of the cyanide, or some other modern process of extraction a yield of 10 dwt. of gold per ton of vein-stone will pay better here than 2½ oz. in West Australia. The localities formerly mentioned, Mount Pleasant, Blumberg, Wodnaminga, Waukaranga, Nillinghoo, etc., are being developed very satisfactorily, though the only actual returns at present were about 15 dwt. of gold per ton from 175 tons from a reef near Blumberg.

Reliable and practical men who have spent some few months on the West Australian gold-fields, especially Coolgardie, have lately returned and given us their opinions, which is that though there are several rich deposits of gold they are patchy and the country, geologically speaking, is unsettled. The want of water too is a great drawback, adding immensely to the cost and difficulty of working the mines. In fact most of them are stopped for want of water. A few weeks ago some heavy rain fell, but the water disappeared in about three weeks. The country appears to be very sandy and rocky and not calculated to hold water. Then the number of prizes in the mines are very small compared with the blanks. Alluvial deposits are terribly disappointing, as even if they find water to wash the gold out, the gold itself is soon exhausted. It is said there are 7,000 or 8,000 persons about Coolgardie on the verge of starvation, and these men most probably had from £50 to £100 each when they landed there. In many cases the storekeepers are said to have promoted "rushes" where there has been nothing to warrant them, and altogether, not

withstanding a few very rich mines, the place has been much overrated. Flour sells at 6d. per pound and other provisions in proportion, and the fare for traveling 60 miles is £5, though passengers often have to walk for miles.

LATE NEWS.

The Franklin Mining Company, of Michigan, reports its output for June at 181½ tons of copper, against 174½ tons in June of last year.

(Special Telegram to "Engineering and Mining Journal.")

The Poorman Consolidated mill, Idaho, was destroyed by fire on the night of July 4th. The mill is a total loss, nothing having been saved.

A dispatch of July 5th says that all of the La Belle iron mills at Wheeling, W. Va., resumed work on the morning of July 5th in all departments after a shut-down of nearly a year. Over 600 men are employed in these mills. The Riverside Iron Works at Wheeling, which employ 500 men, also started up on the same day.

Ward's Natural Science Establishment, Rochester, N. Y., has issued a number of convenient catalogues, or rather new editions of catalogues, giving lists of a great number of specimens collected and prepared for sale. The catalogues include minerals, minerals for college collections and geological and petrological specimens.

It is well known to all foundrymen that for making fine castings a very essential point is good facing. The quality of this will determine often the appearance and finish of the castings in a marked degree. Especial attention to facings is given by the S. Obermayer Company, of Cincinnati and Chicago, who are importers and manufacturers of pure East India plumbago, graphite or silver-lead facings. The company imports the material for itself and does all the refining, reduction and preparation.

The small village of Edwards, 14 miles from Gouverneur in St. Lawrence County, N. Y., was destroyed by fire on the afternoon of July 5th, all the business portion of the town being wiped out. It is a mining town, being entirely supported by the talc mines in the vicinity. The mines, however, did not suffer directly. It is stated that nearly all the talc interests in this part of New York, which have been for some time united under one management, have been sold to New York capitalists, including Chauncey M. Depew, H. Walter Webb and others.

President John R. Bartlett, of the Nicaragua Canal Company, has received from Nicaragua a cablegram from the canal representative at Managua, the capital, saying that the government had withdrawn all opposition to the canal. It will be remembered that some time after the old company passed into the hands of a receiver the Nicaraguan government, on several slight pretexts, claimed that the company had forfeited its concessions. While it has not been believed that the government would proceed to extremities, this attitude caused some anxiety, and the withdrawal of opposition is a relief to the company.

A cablegram from Paris, France, says that the liquidator of the old Panama Canal Company has undertaken to deliver to the new company formed to complete the canal all the belongings of the bankrupt company on the Isthmus of Panama, besides the documents, plans, and shares in the railway, on condition that the canal be completed within the stipulated time. The liquidator reserves the right to send a commission to inspect the works and books. The Societe Generale, the Credit Lyonnais, and the Credit Industriel have undertaken to subscribe 10,000,000 francs and to furnish three directors, and agree to purchase the unissued lottery bonds of the old company up to 545,000 francs. The total capital is 60,000,000 francs.

The famous tunnel of the Polaris Mining and Milling Company in Beaverhead County, Mont., which has been regarded as a piece of skillful engineering work and on which it has been at work for so long, last month encountered a considerable quantity of water from the upper mine at a distance of over 1,800 ft. from the mouth and just as it was approaching the vein. At the same time the whole formation of the hanging wall settled, breaking the front sets of timbers. It was feared that the tunnel would be lost, but a disastrous cave-in was prevented by very heavy timbering, the sets being on the ground ready for just such an emergency. The tunnel was settled and side-spragged until the action of the ground subsided in a measure. As soon as the water broke through it seemed to relieve the strain. The slume in the tunnel carried off the water very well. A telegram just received from the superintendent at the New York office of the company announces that the vein has been struck.

Mr. Charles M. Jacobs, chief engineer in charge of the work of driving the tunnel under the East River, New York, for the East River Gas Company,

reports the following extraordinary progress made during last week: Day shift, 48'6 ft.; night shift, 52'6 ft.; total progress for week, 101 ft. This is remarkable work under the circumstances, and considering the great difficulties encountered under the East River, this may be put down as some of the quickest tunnel driving on record. The general foreman directly responsible for this driving is Mr. G. B. Fry, rock superintendent of the work. The heading is 10 ft. 6 in. by 8 ft. 6 in., and is advanced full section. The rock encountered was hornblende gneiss, very hard. Four 3½ in. Ingersoll-Sergeant drills are used in the heading, mounted on tunnel columns with arms; two drills on each column. About 15 holes, 9 to 10 ft. deep, are drilled by each shift, consisting of five machine runners and their helpers. Compressed air for running the drills and pumps and also for ventilation is supplied by an Ingersoll-Sergeant air compressor, of the latest improved piston-inlet type, straight-line pattern, having cylinders 20 in. diameter by 24 in. stroke, furnishing about 1,050 cu. ft. of free air per minute.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 6.

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending June 30th and year from January 1st:

	1894.		1893.
	Week.	Year.	Year.
Shipped East and North:			
Phila. & Erie R. R.	2,394	29,845	46,905
Cumberland, Md.	45,909	1,368,950	2,009,523
Barclay, Pa.	115	9,941	31,155
Broad Top, Pa.	3,043	125,834	355,593
Clearfield, Pa.	2,894	1,125,811	2,111,213
Allegheny, Pa.	1,567	477,264	656,698
Beech Creek, Pa.	1,117	838,310	816,822
Pocahontas Flat Top	72,012	1,483,328	1,465,987
Kanawha, W. Va.	32,428	1,119,667	1,583,520
Totals	161,509	6,578,980	9,107,216

* Week ending June 23.

	1894.		1893.
	Week.	Year.	Year.
Shipped West:			
Pittsburg, Pa.	31,733	628,124	660,190
Westmoreland, Pa.	17,371	582,086	1,031,938
Monongahela, Pa.	32,091	269,671	392,875
Totals	81,198	1,417,881	2,085,003
Grand totals	242,707	7,996,861	11,192,219

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending June 30th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 35,961 tons; year 1,263,401 tons; to corresponding date in 1893, 2,722,198 tons.

Anthracite.

The anthracite coal trade is just now experiencing a period of exceeding dullness. The market is as quiet as it has been at any time during the present year. There is little or no demand for anthracite, the only new sales reported being so small as to be of no importance.

No other condition was to be expected, as the action of the sales agents last week in advancing prices was only calculated to make many consumers persist in their determination to hold off as long as possible. No business is doing, and consequently prices are neither firm nor weak.

The operators claim that their action was justifiable. They admit that they do not expect to get July prices for six weeks to come. But late in August when the demand shall be good they will get higher prices than now prevail without the necessity of a new advance. So far, it is well enough, but it is virtually an admission that prices cannot be maintained by the operators, despite their oft-repeated assertions to the contrary.

The policy of restriction which characterized the producing interests during the first four months of the current year is again being strictly pursued. The production for July is not expected to exceed 3,500,000 tons. To do this few of the collieries will work on full time, and those whose coal is the least salable or the most expensive to mine will close down entirely. If producers wish to avoid demoralization they will certainly have to restrict as much as possible.

The official circular of prices of the Philadelphia & Reading Coal and Iron Company is as follows for coal delivered on board of vessels at Port Richmond, Philadelphia, Pa.:

	Broken.	Egg.	Stove.	Chest.
Hard white ash	\$3.60	\$4.75	\$5.90	\$3.90
Free white ash	3.50	3.65	3.90	3.90
Shamokin	3.85	4.15	4.40	4.15
Schuylkill red ash	4.00	4.40	4.40	4.15
Lorberry	4.00	4.40	4.40	4.15
Lykens Valley	4.65	5.15	5.40	4.75

New York prices are 25c. higher.

The Reading Railroad reports that its coal shipment (estimated) for last week, ending June 30th, was 333,000 tons, of which 85,000 tons were sent to Port Richmond and 30,000 tons were sent to New York waters.

Bituminous.

The increase in the quantity of soft coal being shipped to tide is just beginning to be felt on the market. The filed orders for precedence are now being forwarded to shippers in their respective order.

Coal is still from 25 to 50c. above the figures quoted before the strike, and as the market is relieved by the coal coming forward, this advance will be reduced. It is thought, however, that the present shortness of supplies is such that the demand will

keep up all summer until the usual fall call for coal comes.

Most of the regions are working full but in a few districts the men are still out. This cannot last long and it is anticipated that all the mines will be working full within a week or ten days.

The output at first is much reduced because the men, by reason of the long spell of idleness, are not in a condition to do as much work as before. In some instances this has reduced the output very nearly one-half. A week's work, however, will make this right and the usual output will be then forthcoming.

Outside of the usual orders for coal and the shortage incurred by the strike there is a very small demand. This is accounted for by the small stocks of anthracite and outside fuels which have been put in and which are not yet used up.

The supply of cars is good, and all asked for are given by the various roads. Transportation is very good, and very good time was made to tide by first shipments. The all-rail demand if anything seems to be greater than tide shipments. There have been, so far, very few outside sales on spot orders, all coal going to the customers of the various companies in the order of precedence.

The vessel market is in an extraordinary condition. On account of the very large amount of tonnage chartered waiting at Norfolk the rates there are 30 to 40c. higher than at other ports. This is occasioned by the Pocahontas mines having been the only ones working during the strike and therefore the only ones able to charter. This enabled this company to charter vessels for about 175,000 tons ahead, and the delay caused in loading of vessels has naturally advanced the rates at this port. We quote the following rates of freight from Philadelphia: To Boston, Salem, Portland, Providence, New Bedford, New Haven, Gardiner and Bath, 50c.; Portsmouth, 55c.

Buffalo.

July 5.

(From our Special Correspondent.)

The following are the circular prices at this port for anthracite coal for the month of July, on cars, per ton of 2,240 lbs.: Grate, \$4.40; on wagons at trestles per ton of 2,240 lbs., \$4.50; egg, stove and nut on cars, \$4.65; on wagons and trestles, \$4.75. Retail prices per ton of 2,000 lbs. delivered within city limits are \$5 for grate, \$5.25 for egg, stove and chestnut. Bituminous quotations at present continue nominal.

There is a good demand for anthracite and bituminous coal; the latter coming in now quite freely, so that vessel men, manufacturers and others have no trouble. News from upper lake ports indicate that there are no stocks of bituminous there to draw from, the railroad strike affecting the movement from the mines.

The shipments of coal by lake from Buffalo westward from June 24th to 30th, both days inclusive, aggregated 114,525 net tons, distributed as follows: 45,300 tons to Chicago; 24,700 to Milwaukee; 7,100 to Duluth; 1,925 to Toledo; 300 to Saginaw; 1,350 to Hancock; 400 to St. Ignace; 14,100 to Superior; 465 to Sheboygan; 1,500 to Racine; 450 to Bay City; 1,000 to Gladstone; 4,435 to Green Bay; 500 to Cheboygan; and 1,000 to Port Huron. The rates of freight were as follows: 45c. to Chicago and Racine, 40c. to Milwaukee, Hancock, Sault Ste. Marie, Green Bay, Cheboygan and Sheboygan; 35c. to Saginaw, St. Ignace, Portage and Bay City, and 25c. to Duluth, Toledo, Superior and Gladstone.

When the tables are complete the shipments of coal westward by lake for the month of June will aggregate about 385,000 net tons, and for the season to July 1st about 726,000 net tons.

No coal shipped by canal eastward during June; but the receipts by that route for June aggregated 1,785 net tons.

Chicago.

July 3.

(From our Special Correspondent.)

No sooner had the great coal miners' strike been declared off and once again Chicago was enjoying a sufficiency of coal, up springs the strike of railroad employees, and we are again compelled to whistle for fuel. There is any amount of coal on the way to Chicago, but it is mostly stalled in some out-of-the-way place, and may stop there for some time to come. Some say that no time during the late miners' strike has coal been such a rarity here, but that is placing the situation too broadly. There is one means of getting coal into Chicago and that is via the lake. Coal shipments from Ohio ports have been very heavy during the week; in fact, the shipments of coal from the mentioned ports constituted at least two-thirds of the business, while grain and iron ore shipments have been virtually at a standstill. Hard coal is being bought extensively, being used as a substitute for soft, for the supply of anthracite is yet of goodly proportions, though with little coming in, this condition may not prevail a week hence. Some of the city institutions are already pinched for coal, and numerous factories will soon have to close. Prices have again jumped back to where they were a couple of weeks ago, soft coal selling from \$3 up, and anthracite bringing for grate \$5.40, egg, stove and chestnut, \$5.65.

The Public Service committee of the County Board decided yesterday to recommend that the contract for Indiana or Brazil block coal for the county institutions be awarded for the coming year to Baker Brothers for \$2.75 a ton delivered, except at Dunning, and there at \$2.70. The same firm was awarded the contract for screenings for the County Hospital on a bid of \$1.63 a ton. E. F. Daniels & Co. secured

the contracts for hard coal for all institutions except the normal school at the following prices: Range, \$5.14 and \$5.23 a ton; large egg, \$4.89 and \$4.98 a ton; nut, \$5.14 and \$5.23 a ton. H. S. Van Ingen was awarded the contract for the normal school at the following prices: Range, \$5.25; large egg, \$5.25; nut, \$5.25. For furnishing coal to the poor of the county on orders from the County Agent's office the contract was awarded to Baker Brothers at \$2.75 per ton. These awards will be recommended to the County Board, Monday, and the contracts ordered.

Coke.—Supply is again extremely short, and numerous concerns that expected opening again will be compelled to stay closed. Coke sells for \$4.50 @ \$5.

Pittsburg. July 5.

(From our Special Correspondent.)

Coal.—While some of the coal men have agreed on a basis of prices in the pools, there are others who refuse to negotiate or make any arrangement with the miners; the low stage of water in the Ohio makes coal men indifferent, as there is no certainty of being boating water before fall, and when coal is loaded in boats and barges it is a daily expense. Coal operators present figures and arguments to freight agents. A committee of coal operators of the Pittsburg district, representing all the owners, held a meeting on Tuesday with the general freight agents of the different railroads, to consult on the rates to the lakes. There is a strong rivalry between the thin and thick vein operators in rates from points on the extreme limit of the 40-mile radius from Pittsburg and points just beyond. The new rates will be announced in a few days.

A new coal company has been organized at Bellaire, O., the Mutual Consumers' Coal Company; the capital stock is \$300,000. It will run its own tow-boats and barges.

Connellsville Coke.—The strike is still on on a small scale; new plants are being fired up rapidly, and new men are arriving in large numbers. The operators in the region are becoming more aggressive every day. They say they have waited long enough on the old men and will now import by the wholesale. Five carloads of men arrived on Saturday, and it is stated that arrangements have been made for 20 carloads the present week. Yesterday's shipment of coke exceeded 600 cars. Manager Lynch, of the Frick Coke Company, said to Secretary McBride that so far as that company was concerned, there would be no arrangement made with the strikers. He said the strikers had repudiated an agreement which they had accepted and promised to maintain. In the future the miners' organization would receive no recognition from the company, either local or national. It seems cruel not to call the strike off and give the old men a chance to work before the places are all filled, when there is no chance to win.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 6, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From		From	
	June 30, 1893.	June 29, 1894.	Jan., '93.	Jan., '94.	Jan., '93.	Jan., '94.
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
Anthracite.	71	33,699	30	12,350	900,662	415,589
Coke.....	138	133,624	41	47,690	3,650,117	2,241,666
Charcoal....	34	8,394	20	3,930	284,215	107,818
Totals....	243	175,717	91	63,970	4,834,994	2,765,073

Pig Iron.—There is a diversity of opinion in the trade concerning the pig iron market, some dealers stating that desirable grades of iron are scarce and show a tendency to advance, while others say that prices will remain stationary for some time to come. On one point all agree, and it is the market is exceedingly dull.

Briefly stated, the position to-day is practically unchanged from a month ago. The furnaces which are not out of blast have small stocks on hand and therefore are holding prices firmly. On the other hand, consumers are buying for immediate requirements only, and do not find any difficulty in getting old prices. So long as the demand continues as light as it is at present there is no chance for an advance in values.

The usual July dullness characterizes this market. Consumers report that there is little or no demand for their finished articles, and therefore they are not buying raw materials. They realize that prices are not likely to be any lower this year, but they will not buy ahead because they have not the money, and besides the furnaces as a rule refuse to sell at present figures for delivery later than August. Quotations at tidewater are as follows: Northern brands, No. 1, \$12.50@13; No. 2, \$11.50@12.50; gray forge, \$10.50@11. Southern irons, No. 1, \$12@13; No. 2, \$11@11.50; No. 1 soft soft F., \$11@11.50; No. 2 soft F., \$10.50@12.25. Scotch irons are quoted: Coltness, \$21.50@22; Eglinton, \$19.50@20; Summerlee, \$20.50@21.50.

Billets and Rods.—Sellers' prices are higher than consumers are willing to pay, and the result is a dull market for billets and rods. No sales of consequence are reported this week. Quotations are nominally: Domestic billets, \$18@19; wire rods, domestic, \$27@27.50; foreign rods, \$30@34.

Manufactured Iron and Steel.—The market for structural material continues quiet. We do not

hear of any business doing. Prices are without much change from last week, and we quote: Angles, 1'30@1'40c.; axles, scrap, 1'40@1'60c. delivered; steel, 1'40@1'55c.; bars, common, 1'15@1'30c.; refined, 1'25@1'40c. on dock; beams, up to 15 in., 1'40@1'50c.; channels, 1'40@1'50c. on dock; steel hoops, 1'45@1'75c., delivered; links and pins, 1'40@1'65c.; plates, flange, 1'60c.@1'80c.; fire-box, 1'80@2'10c.; marine, 2'45@2'70c.; sheared, 1'80c.; shell, 1'40@1'60c.; tank, 1'30@1'40c.; universal mill, 1'25@1'50c.; tees, 1'50@1'60c., all on dock.

Merchant Steel.—This market continues without change either as to prices or as to volume of business. Quotations this week are: Tool steel, 5'75@6'25c.; tire steel, 1'60@1'75c.; toe calk, 1'70@1'90c.; Bessemer machinery, 1'25@1'50c.; open-hearth machinery, 1'90@2c.; open-hearth carriage spring, 1'90@2c.; crucible spring, 3'50@3'75c.

Old Material.—The market for old material is very quiet. Quotations are nominally as follows: Old steel rails, \$9.50@9.75; old iron tees, \$10.50@11.50 per ton; New York railroad scrap, \$11.50@12 per ton delivered at mill, and yard scrap at \$10; wrought turnings, delivered at mill, \$8.50@9; No. 1 wrought scrap at \$9.50@10.50 from yard, and machinery cast scrap \$9@10; old wrought tubes and pipe, \$6.50@7; old car wheel, \$9.50@10.50 New York; cast borings, \$6@6.50 delivered at mill.

Rail Fastenings.—This market continues exceedingly dull. No business is reported and quotations remain as follows: Fish and angle plates, 1'20@1'40c. at mill; spikes, 1'50@1'75c.; bolts and square nuts, 2@2.25c.; hexagonal nuts, 2'10@2'30c., delivered.

Spiegeleisen and Ferromanganese.—There is nothing of importance doing in this market. Quotations remain nominally: Spiegeleisen, 10@12%, \$21@22; 20%, \$25@26. Ferromanganese, \$51.50@53.

Steel Rails.—No sales of standard sections are reported this week, and the market is as dull as ever. Prices continue \$24 at mill and \$24.80 at tidewater.

Tubes and Pipe.—Some of the mills which had shut down owing to the coal and coke strike are starting up again. Business, however, continues very quiet. Prices are fairly firm, owing to the fact that the recent shutdown reduced stocks in producers' hands considerably, and some sizes, especially the smaller ones, have been quite scarce. Had the demand been greater prices would have advanced considerably. Ruling discounts are: On 1½ in. and smaller, 60, 10 and 5 for plain black pipe, and 50, 10 and 5 for galvanized; for 1½ in. and larger, 70, 10 and 5 for black, and 60, 10 and 5 for galvanized.

NOTES OF THE WEEK.

Late advices from Pittsburg, Pa., are to the effect that there is a prospect of a speedy settlement of many labor troubles there.

William M. Whitaker, a well-known iron merchant of Philadelphia, Pa., died suddenly at Media, Pa., on July 5th, aged 65 years.

Owing to the railroad strike and the consequent inability to get any supplies, the Illinois Steel Company's mills at South Chicago are expected to close down at once, throwing about 3,000 men out of employment.

The Cumberland Tin Plate Company, the Mitchell Transfer Company, the Licking Rolling Mill Company and the Muncie Iron and Steel Company have signed the steel scale, and the scale which governs tin plate mills will likely be signed also.

The Carnegie Steel Company, Limited, has received from Washington reports of a second test made of the armor plates on which the fine was assessed because they were not as good as could be made. The plates tested this time were the upper halves of the ones on which the report of the Ordnance Board was based, and on which the fine was imposed. They show that, in two cases, they were equal to the other plates, and in the third, stood a ballistic test that would entitle the company to a premium. The result is a practical vindication for the company.

A press dispatch from Media, Pa., says that on July 5th Receiver W. B. Bromall asked the court for an order to sell the Wellman Steel Works in Thurlow, Pa. Notice of the application has been given in the newspapers the past two weeks. The proposed sale was objected to by the Wellmans just at this time. It was stated that in the depressed condition of the iron and steel market the plant would not bring anything like its value. Judge Clayton thought it best to "go slow" in the matter. He did not think anything would be lost by waiting. He continued the order for the present and it will not come up again until the September term.

Buffalo. July 5.

(Special Report of Rogers, Brown & Co.)

During the week just passed little or no business has been transacted so far as buying is concerned. There are some few inquiries being received for

round lots, but most buyers are waiting for something to turn up. We quote on the cash basis, f. o. b. cars Buffalo: No. 1 foundry, strong coke iron, Lake Superior ore, \$11.50; No. 2 foundry, strong coke iron, Lake Superior ore, \$11; Ohio strong softener No. 1, \$11.50; Ohio strong softener No. 2, \$11; Jackson County silvery No. 1, \$15.75@16.75; Lake Superior charcoal, \$14.25; Tennessee charcoal, \$15.50; Southern soft No. 1, \$11.25; Southern soft No. 2, \$10.75; Hanging Rock charcoal, \$18.50.

Chicago. July 3.

(From our Special Correspondent.)

The iron market for Chicago and vicinity for the past week has not been nearly so good as the previous week. In all branches consumers appear to be holding off for more settled conditions before placing contracts and there is nearly a hand to mouth system prevailing at present. The strike of the railroad hands has done considerable to disable business, for it is now quite impossible to obtain fuel in any sufficient quantity. This naturally delays the reopening of furnaces to that contemplated starting up with the close of the coal miner's strike.

Pig Iron.—The total sales of pig iron for the week will drop much below those of previous week. The strike has effected conditions much, but consumers who were expected to place large contracts, have failed to do so, preferring to await until the labor difficulties ceased, or else they anticipate another dearth of fuel which might become a fact, for there are now numerous complaints on the shortness of the coal supply. Sales of pig iron for the week have run from 50 up to one of 3,000 tons northern iron, the largest sale of the week. Freight charges on lake iron ore traffic dropped to low water mark during the week, 40c. per ton from Escanaba. At this rate vessel owners assert that they cannot continue in commission without losing money. In Southern iron the conditions reported last week still prevail. Sales have dropped more than 50% since early in June, and inquiries have been materially reduced. There are no single sales of southern iron reported beyond 200 tons. Prices are, per gross ton f. o. b. Chicago: Lake Superior charcoal, \$14.50@15; Lake Superior coke No. 1, \$11.50@11.75; No. 2, \$10.50@11; No. 3, \$10.25@10.50; Jackson County silveries, \$14.50@15; Southern coke, foundry No. 1, \$10.75@11; No. 2, \$10.25@10.50; No. 3, \$9.75@10; Southern coke, soft, No. 1, \$10.50@10.75; No. 2, \$10.25@10.50; Southern car-wheel iron, \$17.50@18; Southern silveries No. 1, \$11.75@12; No. 2, \$11.25@11.50; Tennessee charcoal No. 1, \$14@14.50; Bessemer, \$11.50@11.75; Ohio strong softeners, \$12.75@13.25.

Structural Material.—Business remains slow there being nothing of note to report for the week. Sales are small and continue mostly for stock. Quotations are f. o. b. Chicago: Angles, 1'50@1'55c.; tees, 1'70@1'80c.; universal plates, 1'50@1'55c.; beams and channels, 1'50@1'60c.

Plates.—Business for warehouse remains quite good, while inquiries are developing into sales to a fair degree. Prices are unchanged. Flange steel is quoted at 1'70@1'80c.; firebox steel, 2'75@3'00c.; tank steel, 1'40@1'50c.; boiler tubes, 75% discount.

Merchant Steel.—Sales have been reduced much with the week, presumably brought about by the labor troubles. Inquiries are in good number and will undoubtedly lead to much business when strikes cease. Orders at present are mainly supplied from stock. Quotations are, carload lots: Smooth finished machinery, 1'80@1'90c.; tire steel, 1'70@1'80c.; Bessemer bars, 1'45@1'55c.; toe calks, 2'05@2'15c.; crucible spring, 3'40@3'65c.; tool steel 6¼c. and upward; specials, 12@20c.

Galvanized Sheets.—Orders are few and for small quantities and mostly supplied from store. Quotations on mill lots are 75 and 10% off.

Black Sheet Iron.—Conditions are not as favorable as heretofore, consumers appearing to be laying low and waiting for better business outlook. Prices are 2'35@2'40c. for No. 27 f. o. b. Chicago.

Bar Iron.—Inquiries, which have been quite plentiful, have not brought in the business expected of them, and, like black sheet consumers, prefer to await developments before contracting for any large supply. Complaints of cutting are numerous and houses that uphold prices are therefore losing business that ought naturally go to them. Quotations are 1'05@1'15c. f. o. b. Chicago.

Billets.—The Illinois Steel Company are having trouble in getting material to their mills, likewise in shipping away, the strike interfering. Orders for billets are decreasing, but a sufficient amount have been booked to keep the mills working through July. Prices remain \$18.25@18.50.

Steel Rails.—Demand for standard sections holds well. Though orders are all for small quantities, aggregate tonnage for the week is very good. Prices \$25@27.

Nails.—Wire nails are in fair demand, while there is not much call for steel cut. Prices on wire nails are \$1.15@1.25.

Old Rails and Wheels.—Sales are very few and mighty small quantities. Old iron rails sell \$9.50@10.60. Old wheels \$10.

Scrap.—Market continues dull with no encouraging signs. Prices are: Forge, \$8.50@9. Cast borings, \$3.50@4; wrought turnings, \$1.50@1.75; axle turnings, \$6@6.50; mixed steel, \$5@5.50; tires, \$12.50@13; iron axles, \$14@14.50.

Pittsburg. July 4.

(From Our Special Correspondent.)

Raw Iron and Steel.—The first week in July, which includes "Spread Eagle" day, is never noted for business activity, the present one will be no exception to the general rule. Great preparations are being made for an active trade during the next six months, so that the last half of '94 will undoubtedly exceed the first half. Of course, there is a reason for this prediction and a substantial one. Production of raw material so far is only about one-third of what it usually is, hence there are no stocks on hand at furnaces or in yards; all have been disposed of, and many of the furnaces have sold largely ahead, deliverable the next four months; the iron and steel to supply these contracts will make an active business and give employment to many thousand workmen who have been idle for some time. The Pittsburg market is entirely bare of Bessemer pig and soft steel billets; the oldest iron man never knew of a similar occurrence. As a matter of course, our wide-awake manufacturers will start their mills on these products, and there will soon be a stock on hand sufficient to meet all requirements. The demand for steel billets has been unprecedented; manufacturers have been aware of this fact for some time, and have made extensive improvements by the introduction of new machinery that in some instances will increase their capacity fully one-third. At the beginning of the year the situation gave little promise of improvement, and each succeeding month exhibited a narrowing of the demand and a downward trend of prices; the latter declining in April to a point never before known. To add to this depression, the strike among the Monongahela miners and coke-burners during May and June compelled the shutting down of many of the largest furnaces and mills. The pig iron market, however, presents a firmer undertone, with prices tending upward, although the sales made have been of moderate proportions.

COKE SMELTED LAKE AND NATIVE ORE.		SKELP IRON.	
Tons.	Cash.	500 Nar. gr'ved.	1.30 4 m.
2,400	Bessemer, July.	450 Sheared.	1.45 4 m.
	August.	320 Wide gr'ved.	1.30 4 m.
1,500	Bessemer, July.	SKELP STEEL.	
	August.	700 Nar'w gr'v'd.	1.20 4 m.
1,200	Gray Forge, at Storage Yard.	620 Sheared.	1.30 4 m.
		500 Wide gr'ved.	1.20 4 m.
1,000	Gray Forge.	MUCK BAR.	
	Bessemer, July.	500 Neutral, July.	20.00
1,000	August.	STEEL WIRE RODS.	
	Bessemer, July.	500 Five gauge American, at mill.	25.50
1,000	August.	CHARCOAL IRON.	
	Bessemer, July.	50 Cold Blast.	23.50
500	Gray Forge.	25 No. 2 Foundry.	16.25
		25 Cold Blast.	23.50
350	Bessemer, July.	25 Warm Blast.	16.25
100	No. 1 Foundry, all ore.	25 Cold Blast.	23.75
		SCRAP IRON.	
100	No. 1 Foundry, all ore.	500 No. 2 Wrought net.	7.00
100	Gray Forge, all ore.	300 Wrought turnings, gross.	6.00
50	Gray Forge.	200 Cast scrap, gross.	9.00
50	No. 1 Silvery.	200 Cast borings, gross.	5.00
BLOOMS, BILLETS AND SLABS.		200 Cut plates, net.	13.50
1,000	Billets, July, Aug., Sept., at mill.	200 Coil springs, gross.	12.50
		50 Soft steel scrap, net.	9.50
1,000	Billets, July, Aug., Sept., at mill.	OLD RAILS.	
		500 Steel rails, mixed prices.	9.50
1,000	Billets, July, Aug., Sept., at mill.	400 Long steel rails.	12.00
		200 Iron rails.	11.75
500	Billets, July, Aug., Sept., at mill.	100 Steel rails, short.	10.00
		100 Iron rails.	11.75
300	Billets, at mill.	50 Steel rails, mixed.	9.75

Philadelphia. July 6.

(From our Special Correspondent.)

Pig Iron.—Brokers who have iron to sell are refusing further concessions to foundrymen who want better prices on spot cash lots. Agents who keep close watch of the market report from all quarters an utter indifference on the part of buyers to market possibilities. Every one recognizes the bare possibility of a reaction that might temporarily put prices up a trifle on account of low stocks and small production. The market is being very closely watched. Quotations are: No. 1, \$12.50; No. 2, \$11.50; Forge \$10.50@11.

Steel Billets.—Agents representing producers are now working the Eastern trade for big fall orders. None have been placed yet. Buyers do not say, at least not to outsiders, what they think of doing. There is evidently no reason for being in a hurry to buy. Eastern parties have no notion of paying over \$17.75 or \$18 when they buy—so say parties who, though not buyers, stand close to them.

Merchant Iron.—None of the bar iron brokers or sellers have any news to give beyond the statement that all manufacturers will have some business to do before the end of the month. The prospects of more business does not affect prices. A good many mills are idle this week. Most makers will want bona fide orders before starting.

Nails.—Makers think there will be, as usual, a freer movement of nails in a week or two.

Skelp.—Mill men report negotiations started a short time ago at a standstill.

Sheet Iron.—A few more small orders from old customers were sent to the mills this week from customers who bought largely last month.

Merchant Steel.—Very little business is noted at present.

Plate and Tank.—The resumption of three or four western mills that have given our eastern mills a good deal of trouble has again resulted in some shading on inquiries for small lots.

Structural Material.—Brokers have no knowledge of inquiry for material outside of trifling lots. Some business that had been bid on, escaped to Western competitors.

Steel Rails.—No change; quoted at \$24.

Cartagena, Spain.

(Special Report of Barrington & Holt.)

The opening quotations for July are as follows, all the prices given being per ton f. o. b. at port of shipment: Ordinary 50% Portman ore, 5s. 2d. @ 5s. 8d. per ton; special low phosphorus ore 5s. 8d. @ 6s. 2d.; extra quality low phosphorus ore, 6s. 6d. per ton. No 1 manganiferous ore is quoted at 12s. 3d.; B ore, 25% iron and 17% manganese, 9s. 3d. per ton; Nos. 2 and 3 manganiferous ore, 5s. 3d. per ton; low grade manganiferous, 45% iron and 6% manganese, 5s. 9d. Manganese ore, 40% metal, is quoted at 10d. per unit; iron pyrites, 40% iron and 45% sulphur, 11s. per ton. Since our last report there has been no favorable change in the local market. In view of the large stocks of ore on hand and the poor prospects of prompt shipment, all the Portman miners and exporters have closed down their mines for the present, and will not recommence work until things look more promising. The chief prospect of better times is in the hope that a market may be found in the United States for Spanish ores once more.

METAL MARKET.

NEW YORK, Friday Evening, July 6, 1894.

Gold and Silver.

Prices of Silver per Ounce Troy.

June.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.	July.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.
30	4.88	28 3/4	62 3/4	.485	4	4.88	28 3/4	62 3/4	.484
32	4.88	28 3/4	62 3/4	.484	5	4.88	28 3/4	62 3/4	.484
33	4.88	28 3/4	62 3/4	.484	6	4.88	28 3/4	62 3/4	.484

Supplies continue to be limited owing to the many discouragements to production and shipment. It is also true that as this is the dull season in the East, the demand for silver is light, and is not sufficient to advance prices above the rates that have been so steady for some time. Some exchange has been going on in the East, such as selling gold and replacing it with silver, as we have already noted.

The United States Assay Office at New York reports the total receipts of silver for the week to be 34,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending June 30th, 1894, and for Years from January 1st, 1894, 1893, 1892.

	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
Week	\$2,915,069	\$184,912	\$516,203	\$7,794	\$3,268,566
1894...	65,739,013	9,673,695	18,651,815	783,681	\$73,932,452
1893...	62,872,845	6,558,774	15,854,225	1,294,338	\$70,873,958
1892...	43,408,993	6,279,115	11,695,481	828,577	\$47,996,782

Of the gold exported for the week \$1,500,000 went to Germany, \$1,250,000 to France and the rest to Havana; the silver nearly all went to London. The gold imported was from England and France; the silver from the West Indies.

During the five days ending July 5th the exports and imports of gold and silver at New York were as follows: Exports, gold, \$959,800; silver, \$232,800. Imports, gold, \$1,117,186; silver, \$486. Of the gold exported, \$579,000 was in French coin and went to the West Indies. The remaining \$380,800 was in American coin, \$25,800 of which went to South America, \$350,000 to Germany, and \$5,000 to the West Indies. Of the silver exported, \$16,000 was in Mexican coin, and went to the West Indies. The remainder, \$216,800, was in American coin and bullion, all of which went to London.

Gold and Silver Exports and Imports of the United States, at all Ports, for May, 1894, and for Five Months to May 31st, 1894, 1893.

	Gold.		Silver.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
May	\$27,406,801	\$4,282,743	\$3,769,379	\$781,752	\$26,111,685
1894.	47,639,955	1,552,425	20,332,271	3,152,262	\$33,614,539
1893.	71,008,712	13,749,361	15,535,377	7,068,461	\$68,706,267

The statement includes all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

NOTES OF THE WEEK.

The business situation this week has been disturbed by the interruption to traffic and the threatening condition of railroad affairs caused by the strike in the West. The absence of cause for this strike is referred to in another column. The result has been depressing, although perhaps not quite to the extent which might have been anticipated, since many are inclined to look upon it as a fermentation which marks the closing of the panic period. We have before referred in this column to the saying of an eminent French economist that "the strike is the last development of the panic," and every new period of depression seems to show the truth of this. The present strike has its center in Chicago, and so far its effects have not been felt to any considerable extent by the roads east of that city, although some apprehension is felt that it will extend in that direction.

The other cause which has been for so long disturbing business—the tariff discussion—seems at last to be in a fair way of settlement, and we hope to be able in a few weeks at furthest to note its final removal as an obstruction to our return to a normal prosperous condition.

The Senate passed the Tariff Bill at 10:45 p. m. on Tuesday, July 3d, by a vote of 39 to 34. There were 10 senators paired, who were absent or did not vote; had they been recorded the vote would have stood 44 to 39. The bill went at once to the House, where it is expected that action on the Senate amendments will not be delayed. In anticipation of a disagreement, the Senate has already appointed a conference committee. The present outlook is that the bill will be finally disposed of by the end of July.

That the seriousness of the existing depression in manufacturing, and the doubt as to its future prosperity, have been exaggerated by partisan organs is demonstrated by the record of new enterprises during the current year which has been compiled by the "American Wool and Cotton Reporter." In the six months ending with June the construction of 116 new textile mills was undertaken, or almost as many as the 127 in the first six months of 1893, before the hard times really began. If the country were actually going to ruin, and there were no future for manufacturing, we should not find new enterprises starting in practically as large numbers now as before the panic. Evidently, men with money to invest have confidence both in the country and in the capacity of manufacturing enterprises to flourish.

The fall in exchange, the increased supply of money at the European centers and the good business of special demand have combined to check the exports of gold. The only shipment reported this week was \$350,000 from New York on Tuesday, and so far \$750,000 is reported taken for Saturday's steamers, so that the sum of \$1,100,000 will make the exports for the week. On the other hand, somewhat over \$1,000,000 in French coin was received on the same day. Very little of this, however, was destined for New York, most of it being in transit for Cuba.

The statement of the New York banks for the week ending June 30th shows increases of \$1,760,700 in loans, and of \$4,349,800 in legal tenders; decreases of \$1,552,025 in reserve, \$5,976,500 in specie, \$298,700 in deposits and \$51,600 in circulation. The total reserve reported was \$218,127,800, being \$74,794,325 in excess of legal requirements. The statement seems to show a check in the accumulation of funds in New York, and in addition to ordinary payments, the usual demand for money in the crop season will soon begin. The increase of loans and discounts is not exceptional and may be expected to continue for some time yet.

The statement of the United States Treasury on Thursday, July 5th, shows balances in excess of outstanding liabilities amounting to \$117,161,062, made up as follows: Gold, \$64,742,735; silver, \$16,014,875; legal tenders, \$18,396,397; treasury notes, etc., \$17,161,062. Changes during the week were a decrease of \$835,701 in the total balance, and of \$2,155,749 in the gold balance. The Government deposits with National banks amounted to \$13,577,354, an increase of \$1,233,203 during the week.

The statement of the United States Treasury for June for the first time in many months showed substantially no deficit in receipts as compared with expenditures. The general Treasury balance was \$117,584,436, against a balance on May 31st of \$117,854,335. The comparative figures of a month ago showed a net loss of \$7,243,450 during May. The explanation of this favorable condition of affairs is found in the internal revenue receipts, which amounted to \$15,178,898 during June, against \$12,041,950 during May and \$14,003,127 during June, 1893. The customs receipts showed further losses, and were only \$8,858,876, against \$9,798,067 in May and \$14,964,290 in June, 1893. The total receipts shown on the books of the warrant division were \$26,485,925, and the expenditures were \$25,557,021, an actual gain of nearly \$1,000,000. The figures for the fiscal year, which

ended June 30th, show an aggregate deficit of less than \$70,000,000, the total receipt being \$296,960,226 and the expenditures \$366,933,359. The only unfavorable feature of the statement was the proportion of gold in the general balance, which was reduced from \$78,693,267 a month ago to \$64,873,024. Receipts of gold in exchange for currency are increasing, however. The receipts of gold at the New York Custom House during June were less than 2%, while silver certificates constituted 83% of the gross receipts.

The monthly circulation statement issued by the United States Treasury Department on July 1st shows a net decrease in the circulation last month amounting in the aggregate to more than \$14,000,000, and a loss in Treasury gold coin and bullion holdings of nearly \$17,000,000. There were decreases in the circulation of all kinds of money except National bank note and subsidiary silver circulation, the conspicuous changes being decreases of \$3,000,000 in gold certificates, nearly \$2,000,000 in gold coin, \$8,250,000 in silver Treasury notes and silver certificates, and nearly \$2,000,000 in greenback circulation. The total circulation of the country on July 1st is placed at \$1,664,061,232, a per capita of \$34.33, against \$1,593,726,411 on July 1st a year ago, or an increase during the year of \$70,334,821. Last month gold coin circulation decreased \$1,758,495, gold certificates \$3,630,140, standard silver dollars \$761,314, silver certificates \$2,865,578, silver Treasury notes \$5,212,681, greenbacks \$1,817,718, and currency certificates \$315,000, while national bank note circulation increased \$1,030,330 and subsidiary silver \$147,427. The net decrease for the month amounted to \$14,583,169.

The changes in the circulation of the various kinds of money coined and issued during the fiscal year just closed, together with the amounts of each kind in circulation at the beginning of the current and last fiscal year, are shown by the following table, which gives the estimated amounts of each class on July 1st:

	July 1, 1893.	July 1, 1894.
Gold coin.....	\$403,633,700	\$497,873,990
Standard silver dollars ..	57,029,743	51,191,377
Subsidiary silver.....	65,400,268	58,233,344
Gold certificates.....	92,970,019	66,344,409
Silver certificates.....	326,489,165	327,094,381
Silver Treasury notes.....	140,661,694	134,62,009
United States notes.....	320,875,683	268,772,371
Currency certificates.....	11,935,000	58,985,000
National bank notes.....	174,791,139	200,754,351
Totals.....	\$1,593,726,411	\$1,664,061,232

The changes in detail in the Treasury money and bullion fund during the last fiscal year, together with the amounts held in the Treasury at the beginning of the current and the last fiscal year, are shown in the following table:

	July 1, 1893.	July 1, 1894.
Gold coin.....	\$110,109,923	\$86,605,121
Gold bullion.....	78,345,510	44,612,311
Standard silver dollars.....	362,302,707	368,141,831
Subsidiary silver.....	11,855,944	17,889,531
Silver Treasury notes.....	6,528,533	17,722,468
Silver bullion.....	118,173,820	127,267,347
United States notes.....	25,805,333	77,908,645
National bank notes.....	3,982,733	6,598,893
Totals.....	\$717,104,563	\$746,746,089

There was last month a net decrease of \$9,733,658 in the Treasury money and bullion fund. Gold coin holdings decreased \$13,394,987; gold bullion, \$3,455,395; and National banknote holdings, \$922,105. On the other hand, the Treasury store of standard silver dollars increased \$761,493; subsidiary silver, \$306,558; silver Treasury notes, \$5,117,356; silver bullion, \$35,714; and United States notes, \$1,817,718.

During the last fiscal year there was a net increase of \$29,641,586 in the Treasury money and bullion fund. Gold coin and bullion holdings decreased, while, on the other hand, Treasury holdings of all other kinds of money—silver coin and bullion, silver Treasury notes, greenbacks and National bank notes—increased. The gold and bullion fund decreased fully \$57,000,000 during the year—gold coin \$23,000,000 and gold bullion \$34,000,000. Silver coin and bullion and silver Treasury note holdings increased in the aggregate \$22,000,000—silver bullion \$9,000,000, standard silver dollars \$6,000,000, subsidiary silver \$6,000,000, and silver Treasury notes \$1,000,000. Greenbacks and National banknote holdings increased about \$55,000,000—greenbacks \$52,000,000 and National banknotes about \$3,000,000.

The coinage executed at the mints of the United States during the month of June was as follows:

Denomination:	Pieces.	Value.
Double eagles.....	68,257	\$1,365,140.00
Eagles.....	323,239	3,232,390.00
Half eagles.....	193,672	968,360.00
Quarter eagles.....	35	87.50
Total gold.....	585,203	\$5,565,977.50
Standard dollars.....	179	\$179.00
Half dollars.....	466,179	233,089.50
Quarter dollars.....	1,325,000	331,250.00
Dimes.....	350,203	35,020.30
Total silver.....	2,141,561	\$599,538.80
Five cents.....	379	\$18.95
One cent.....	379	3.79
Total minor.....	758	\$22.74
Total coinage.....	2,727,522	\$6,165,539.04

The coinage executed at the United States Mint in Philadelphia during the fiscal year ending June 30th was as follows:

Denomination:	Pieces.	Value.
Double eagles.....	1,713,257	\$34,265,140.00
Eagles.....	3,327,024	33,270,340.00
Half eagles.....	1,721,836	8,609,180.00
Quarter eagles.....	30,101	75,252.50
Total gold.....	6,792,228	\$76,219,912.50
Dollars.....	758	\$758.00
Half dollars.....	1,416,758	708,379.00
Quarter dollars.....	2,812,758	703,189.50
Dimes.....	2,050,758	205,075.80
Total silver.....	6,281,032	\$1,617,402.30
Five cents.....	9,226,071	\$461,303.55
Cents.....	25,561,571	255,615.71
Total base.....	34,787,642	\$716,919.26
Totals.....	47,860,902	\$78,551,231.06

The Bank of England on Thursday, July 5th, reported its total gold holdings at £39,726,235, an increase of £9,980,858 as compared with the corresponding date last year. The reserve has decreased somewhat, owing to the July interest payments and other demands usual at this season.

The Bank of France on Thursday, July 5th, reported its specie holdings at 1,812,128,000 fr. gold and 1,276,644,600 fr. silver; an increase of 93,449,500 fr. gold and a decrease of 689,400 fr. silver, as compared with the corresponding date in 1893. Changes during the week were increases of 25,050,000 fr. gold and 1,275,000 fr. silver.

The work of collecting the Italian small silver coin in France to return it to Italy is proceeding so slowly, that the French Government has thought it necessary to issue a fresh notice that the limit of the 24th July, after which the coin will cease to be received at the public offices will be rigorously observed. The withdrawal of the coin has led to an examination of the pieces, which has given rise to other difficulties. The convention of the Latin Union admitted to circulation in France only silver small coin of a date anterior to 1863. In practice the French public paid no attention to the date, and all coin passed from hand to hand indiscriminately. Complaints are now made that since the silver has been called in, pieces of a date earlier than 1863, when presented at the Bank of France, have been cut and returned to the persons offering them. They consequently lose more than 50% of the nominal value, and cannot sell it to the money changers to be returned to Italy in parcels. The Italian Government, on its side, has refused to accept coins of the dates of 1886 and 1888, as being counterfeit, no coin having been struck in Italy in those years. There appears to have been a large manufacture of spurious Italian coin at Marseilles, and the French Government has not been able to discover the guilty parties, although a number of persons have been arrested for passing it.

The following was the value of the foreign trade of France in the month of May of the last two years:

	1894.	1893.
IMPORTS:		
Food.....	Fr. 91,417,000	Fr. 82,273,000
Raw materials.....	185,798,000	174,029,000
Manufactures.....	45,440,000	49,088,000
Total.....	Fr. 322,655,000	Fr. 305,390,000
EXPORTS:		
Food.....	Fr. 64,156,000	Fr. 63,039,000
Raw materials.....	72,463,000	64,358,000
Manufactures.....	122,459,000	149,025,000
Post parcels.....	51,575,000	6,467,000
Total.....	Fr. 264,633,000	Fr. 282,889,000

If the comparison is carried back to 1892, the results of the export trade are still more unfavorable as the total then amounted to 334,404,000 fr., of which 184,632,000 fr. was in manufactures. The imports also fell from 429,370,000 fr. to 323,655,000 fr., but the difference was due to a decrease of over 190,000,000 in food, principally in wheat and wine. The imports in the first five months of the year amounted to 1,915,000,000 fr. against 1,564,000,000 fr. last year, there being an increase of 351,000,000 fr. in food, 150,000,000 fr. in raw materials and 17,000,000 in manufactures. The exports were 1,328,000,000 fr., against 1,389,000,000 fr. in 1893. There was a decrease of 16,000,000 fr. in raw materials and of 45,000,000 fr. in manufactures. The above is an abstract published in advance of the detailed returns.

French imports and exports of gold for the month of May and the five months ending May 31st were as follows:

	May.	Five months.
Imports.....	Francs. 14,244,950	80,640,770
Exports.....	24,235,153	49,956,506
Excess.....	Exp. 9,990,203	Imp. 30,684,264

The gain in gold for the five months was thus about \$6,137,000.

The London "Stactist" of late date says: Lancashire is looking forward to the immediate future very gloomily. After the closing of the Indian mints orders came pouring in so that in many cases manufacturers were fully booked six months ahead, so fully that they refused to take further orders. Since however, the India Council gave up the attempt to keep up a minimum, orders have ceased. It is said

that some of the great manufacturers who then had orders enough to keep them fully employed six months ahead, have hardly received orders since from India to keep them going for a week. Consequently the prospect is that in the course of this month business will become exceedingly slack unless activity arises elsewhere. The danger is that labor disputes may spring up. These, of course, may be avoided by judicious concessions on both sides. As a matter of course the orders for the other countries of the far East are likewise bad. It is true that Japan has been ordering large quantities of machinery. But that does not help Lancashire very much; on the contrary, it equips a new and formidable competitor of Lancashire. And as the orders from the far East are very few, and are likely to continue on while exchange remains as it is, the depression in the cotton trade is sure to react upon the iron and the coal trades, and therefore we may have a recurrence of disputes in these industries likewise. Unfortunately, the outlook is not any brighter in Australia.

At the half-yearly meeting of the Peninsular & Oriental Steam Navigation Company, the most important company engaged in the Eastern carrying trade, the chairman gave an interesting address on the condition of trade in the East, from which we take following selections:

The closing of the Indian mints has been, so far as the trade of India is concerned, a distinct and absolute failure, and while we unfortunately have to receive a large portion of our revenue in this depreciated currency, we have, as you are aware, to meet nearly the whole of our expenditure in gold. Now, gentlemen, with regard to this exchange question, I feel bound to add one or two more words, in this sense, that it weighs very heavily at the present moment upon the whole of the export trade to the far East—to India, China and Japan—for we find, as we state in our report, that our mail steamers, sailing weekly from this country to India and China, are unable at the present moment to obtain more than half or two-thirds of the small cargoes they are able to carry, and we have, as you are aware, the additional disadvantage in connection with the trade of India at the present moment; namely, that owing to their financial conditions India has been compelled to impose import duties upon all goods imported into that country, with the exception of those from Manchester. That is the case with regard to the whole of the export trade to India.

To China, at the present moment, in the face of this terribly miserable exchange, the exports are—and as far as I see, must continue to be—extremely low. Well, gentlemen, what operates disadvantageously in one direction might naturally be supposed to operate advantageously in another direction, and we should have expected to find that the exports from China, India and Japan would have largely increased in consequence of this very low exchange, which comes, as you are aware, as a stimulus and bounty to the trade of these countries. In the case of India the exports have not increased, I am sorry to say, for the exports have been counteracted altogether by the extremely low and unremunerative price of wheat. In this country wheat formed one of the largest, if not the largest staple of export, but the fact is, so backward was the export trade at the close of last year in Calcutta that steamers were actually searching for iron as ballast to enable them to go home on account of not being able to get either wheat or rice or any other heavy cargo for deadweight. I stated at the last meeting in December that within a comparatively short space of time the export of wheat from India had diminished by something like 500,000 tons, and I am sorry to say that the decrease is still greater up to the present moment than that amount; and, in fact, if it had not been for this—that there happened to be a very large crop of linseed in India, and that linseed was in great demand owing to the shortness of food for cattle in this country—and that if it had not been for this, our export trade in the far East would have resulted in an enormous loss. On the other hand, I am glad to say that the exports from China have increased, owing to the benefit of the low exchange. I am unable to state to what extent that increase has taken place, but it has been certainly considerable; and we find that products are being brought from China now which were never heard of in connection with the trade of that country a few years ago.

I can only sum up what I have said by this: that the outward and homeward trade to India is in an unfavorable condition as I have ever known it to be. The outward trade to China is equally alike unfavorable, but the homeward trade appears to be a growing if not an abundant one.

A dispatch from Santiago, Chile, says that President Montt has declared the absolute necessity of the proposed conversion of the currency in 1896 at the rate of 24%, in order to protect the credit of the Republic. He regards the conversion as certain. There is now in the Treasury a reserve of \$7,500,000, and it is expected that the nitrate field sales in October will realize nearly \$10,000,000 more.

The new government of Salvador has revoked the decree of the late President establishing a gold standard and prohibiting the importation of silver, thus returning to the silver standard which prevails generally in all the Central American countries.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$1.11 1/2	\$1.12
Peruvian soles and Chilean pesos.....	4.31 1/2	4.32 1/2
Victoria sovereigns.....	4.31	4.32
Twenty francs.....	3.90	3.93
Spanish 25 pesetas.....	4.80	4.85

Other Metals.

Copper.—The market pursues the even tenor of its way, as the demand remains limited and the offerings about the same as for some weeks past, although it is reported from some quarters that exceptionally low figures have been named without stimulating business, however, as that only can improve as the world-wide stagnation disappears. Lake we have to quote at 9 1/2 c.; Electrolytic at 8 1/2 c., and Casting at 8 1/2 c.

Rumors have been in circulation that the Anaconda Company is storing a large amount of its product either at Anaconda or Baltimore, or both. We are able to state from most reliable information that such is not the case; that no copper is being held at either point excepting what is in process of refining, and the Anaconda Company has sold its entire product for some little time ahead.

Abroad, the speculative market has more than recovered from the relapse reported a week ago, and prices have been advanced a little almost daily, closing at £39 5s. @ 7s. 6d. for spot and £39 12s. 6d. @ 15s. for three months prompt. This might have had an appreciable effect on the markets for the finer grades, makers of which have now disposed of most of what they had accumulated during the time they refrained from selling, had it not been that American refiners, or rather some American refiners, have all along been selling freely at ruling prices and even below. However, if the thing is not overdone, it may be beneficial in its effects, especially as more hope is felt all around of a new tariff being a certainty ere so very long. Refined and manufactured sorts are quoted as follows: English Tough, £41 @ £41 10s.; Best Selected, £41 15s. @ £42; Strong Sheets, £50 @ £50 10s.; India Sheets, £47 @ £47 10s.; Yellow Metal, 4 1/2 d. Statistics show an increase of 700 tons in visible supplies during the closing half of June.

Copper Exports.—The exports of copper from the port of New York during the week ending July 6th, as reported by the New York Metal Exchange, were as follows:

Glasgow—Norwegian.....	Ingots	10 tons
Rotterdam—Rotterdam.....	Ingots	285 "
Swansea—Manhasset.....	Bars	260 "
Antwerp—Friesland.....	Bars	50 "
".....	Ingots	30 "
".....	Plates	25 "
".....	Cakes	10 "
Liverpool—Tauric.....	Pigs	283 "
Rotterdam—Obdam.....	Plates	50 "

Matte:
Hamburg—Bohemian..... 81 tons

Exports of copper from Baltimore for the week ending July 5th are reported by our special correspondent as follows:

June 30, Hamburg—Hungaria.....	488 bars,	67,441 lbs.
".....	263 cakes,	67,684 "

Other metals exported during the week were 59 bbls. zinc skimmings, 28,700 lbs., to London.

Baltimore Exports.—Exports of metals from the port of Baltimore in June are reported as follows by our special correspondent:

Rotterdam—Urbino.....	14,783 ingots copper,	221,000 lbs	
".....	95 cakes "	22,322 "	
".....	251 ingots "	11,336 "	
".....	1,785 bars "	221,046 "	
".....	320 cakes "	67,994 "	
Hamburg—California.....	(in transit from Mexico)	1,434 pigs lead,	111,950 "
London—Maryland.....	1,124 plates spelter,	56,148 "	
Rotterdam—Ohio.....	75 boxes sulphate copper,	45,000 "	
".....	128 bars "	22,434 "	
".....	1,505 ingots "	22,400 "	
".....	583 b'ld's tin scrap	133,643 "	
Liverpool—Queensmore.....	999 bars copper,	112,066 "	
".....	19 bbls. scrap copper,	9,378 "	
Hamburg—Romulus.....	745 bars "	112,349 "	
".....	633 cakes "	112,183 "	
".....	1,463 ingots "	21,400 "	
".....	75 bbls. sulphate copper,	45,000 "	
".....	330 bars "	44,927 "	
London—Minnesota.....	87 bbls. zinc dross,	126,500 "	
Bremen—Dresden.....	128 bars copper,	22,577 "	
Hamburg—Barmen.....	125 cakes "	22,400 "	
".....	263 bars "	22,439 "	
Old Province—Kemp.....	8 kegs zinc,	200 "	
".....	13 kegs nails,	1,300 "	
Rotterdam—Chicago.....	520 bbls. tin scrap	88,640 "	
".....	219 cakes copper,	44,972 "	
".....	38 bbls. sulphate copper,	22,800 "	
Havre—Khio.....	1,357 bars copper,	112,561 "	
".....	164 cakes "	33,991 "	

The totals are: 1,277,938 lbs. copper; 111,950 lbs. lead; 112,800 lbs. sulphate of copper; 56,348 lbs. zinc, 126,500 lbs. zinc dross; 222,283 lbs. tin scrap.

Tin has ruled about steady throughout the week, continuing to closely follow the London market. The close is at 19 50 for spot and July, 19 55 for August and 19 55 for September, the demand still being limited to what is needed for actual requirements.

Abroad the net result of the week is a slight gain over the close of the preceding week, as far as

futures are concerned, while the price of spot is a little off, the quotations being £68 1/2s. 6d. @ 17s. 6d. for spot and £69 2s. 6d. @ 5s. for three months prompt.

The position of tin supplies on June 30th as compared with May 31st, was as follows, the amounts given being in tons of 2,240 lbs.:

	June.	May.
Shipments from Straits.....	4,105	3,450
"..... Australia.....	370	350
Total.....	4,475	3,800
Consumption for the month.....	4,190	3,315
Increase in stocks.....	285	485
Stocks in hand.....	11,994	12,848
"..... afloat.....	7,410	6,135

Total stocks at close of month..... 19,404 18,983

The shipments to the United States in June were: Straits, 430; Australia, 100; London, 500; Holland, 210; total 1,300 tons. The United States deliveries for consumption were 1,200 tons. United States stocks, July 1st, were: In ports, 1,160; afloat, 1,970; total, 3,130 tons.

Lead.—It is surprising, but nevertheless a fact, that the market for this article has stiffened during the week—a week in which we have seen passed by the Senate a bill reducing the duty on the pig metal to one cent a pound. If this duty was now in force it would be possible to import the foreign product at almost a quarter of a cent a pound under the price for the domestic article for prompt delivery, so that it does not seem as if it would be possible for the market to long retain its present level, which is 3 1/4 for spot and 3 3/5 for futures.

Abroad, also, there has been an enhancement of values, as we have now to record £9 10s. 1d. for Spanish and £9 10s. for English lead, as the current quotations.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead stagnant and no business. The labor troubles have made it impossible for railroads to bring in lead or to ship it out. Nominal price for both spot and future is 3 10c.

Spanish Lead Market.—Our special correspondents write from Cartagena as follows: There is but little change in the market value of lead and silver. Owing to the rather higher rate of exchange on London, lead has been liquidated at 45 1/2 reales per quintal in this Sierra against 45 reales last month. The writers this month shipped the first cargo from Cartagena of lead ore (some 816 tons) to Glasgow to be used in the manufacture of white lead direct from the ore. This ore comes from the mines in the Linares district and is of high quality, assaying over 80% of lead.

Spelter is not in quite so good demand as it has been, which ought to foreshadow a further decline. So far, however, the figures are nominally the same as last week, viz.: 3 1/4 New York and 3 1/5 St. Louis.

The quotations abroad are £15 17s. 6d. for good ordinaries and £16 for specials.

Antimony continues to ease off gradually, and to-day we quote Hallett's at 8 1/2 c.; L. X. at 8 1/2 c.; Cookson's at 10c.; and U. S. French Star at 10c.

Aluminum.—Current quotations are as follows, No. 1 being over 98% pure metal, and No. 2 over 94% pure: No. 1, in rolling ingots, 75c. per lb. for small lots at factory, 73c. in 100 lb. lots; 70c. in ton lots. No. 1 in ingots for remelting, 65c. for small lots, 60c. for 100 lb. lots, and 55c. in ton lots. No. 2 in ingots for remelting, 60c., 55c. and 50c. per lb., according to size of order. Sheets, 80c. @ \$4.40 per lb., according to size and thickness. Wire, \$1 @ \$2.40 per lb., according to gauge. Castings, 90c. per lb. up, according to number, weight, patterns, etc.

Abroad quotations for 99% pure metal in Paris are 6 75 @ 7 50 fr. per kilo, for ingots; 8 @ 10 50 fr. for sheets; 11 @ 17 50 fr. for wire, and 19 @ 22 fr. for tubes. The Neuhausen Company quotes No. 1 (guaranteed 98% pure, and in fact 99 7/8%) at 5 francs per kilo, for ingots in small lots; for large lots a considerable discount is allowed.

Bismuth.—Recent quotations on the New York Metal Exchange are \$2 per lb. for lots of 500 lbs or over; \$2.25 @ \$2.50 per lb. for smaller lots.

Magnesium.—No quotations are to be found for this metal in New York. Prices in Germany are, for lots of over 10 kilos: Ingots, \$6.75 per kilo; bars, \$6.50; powder, \$9; ribbon and wire, \$9.50. For orders of less than 10 kilos, 25 cents per kilo, must be added for ingots or bars, and 50 cents for ribbon, wire or powder. These prices are delivered at works; the Aluminum and Magnesium Fabrik, Hemelingen, Germany, is the only maker of the metal for sale.

Nickel.—Quotations are still 44 @ 50c. per lb., according to grade. Business is dull, and a few sales have been made below these figures, say 42 @ 48c. Abroad the demand has also been light, and prices have a downward tendency.

Phosphorus.—Quotations continue steady at 50 @ 52 1/2 c. per lb., f. o. b., New York or Philadelphia.

Platinum.—Abroad the prices are somewhat unsettled, with an upward tendency, owing to light supply.

For chemical ware, hammered metal. Messrs. Eimer & Amend, New York, quote crucibles and dishes 4c. per gram for orders of over 250 grams; 43c. for orders of 100 grams or over, and 45c. for small lots. Wire and foil are 40c., 41c. and 42c. per gram, respectively, for orders of the quantities named. Current retail prices for crucibles are 50c. per gram.

Sodium.—Abroad the price continues steady at 90c. @ \$1 per lb. Sales in this market are too small to furnish quotations.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, July 6.

Heavy Chemicals.—No change has occurred in the heavy chemical market since our last report. Generally speaking it continues dull and uninteresting. Caustic soda has been in fair request and some small spot sales are reported in addition to the usual contract business. Alkali and carbonated soda ash have been a shade firmer and in somewhat better inquiry. Bleaching powder continues very quiet. Prices generally are without change from last week. We quote: Caustic soda, 60%, 2 82 1/2 @ 2 97 1/2 c.; 70%, 2 60 @ 2 70 c.; 74%, 2 62 1/2 @ 2 72 1/2 c.; 76%, 2 70 @ 2 80 c. Carbonated soda ash, 48%, 1 05 @ 1 25 c.; 58%, 1 05 @ 1 15 c. Alkali, 48%, 1 05 @ 1 15 c.; 58%, 1 @ 1 10 c.; according package. Sal soda, 80 @ 90 c. Bleaching powder, 2 @ 2 25 c.

Acids.—In no respect has the acid market changed either for the better or for the worse since our last report. It continues dull and devoid of features. A fair jobbing trade is reported this week. Prices are unchanged and we quote: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.62 1/2 @ \$1.75; muriatic, 18", 80c. @ \$1; 20", 90c. @ \$1.10; 22", \$1 @ \$1.25; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 75c. @ \$1; chamber acid, \$7.50 @ \$8 per ton. Mixed acids according to mixture, oxalic, \$6.40 @ \$7.25 per 100 lbs. Blue vitriol is quoted at \$3.75; glycerine for nitro-glycerine, 11 1/2 @ 12 1/2 c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone continues very quiet. Quotations are: Best un-mixed seconds on the spot and to arrive, \$17; best thirds, 75c. @ \$1 less.

Fertilizing Chemicals.—The fertilizer market, as usual at this time of the year, is exceedingly quiet. Prices are unchanged and fairly steady. We quote this week: Sulphate of ammonia gas liquor \$3.85, and \$3.25 for bone. Dried blood, \$2.05 @ \$2.10 per unit for high grade and \$2 @ \$2.05 for low grade. Azotine, \$2.15. Concentrated phosphate 30% available phosphoric acid, 75c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18% P₂O₅, 95c. per unit. Acidulated fish scrap, \$15 @ \$16, and dried scrap nominally \$25 f. o. b. fish factory; wet scrap \$15 f. o. b. fish factory. Tankage, high grade, \$22.50 @ \$23; low grade, \$21 @ \$21.50. Bone tankage, \$23 @ \$24; bone meal, \$24 @ \$25.50.

In lots of 50 tons on contracts we quote: Double manure salts, 48 53% (basis of 48%); New York and Boston, \$1.12; Philadelphia, \$1.14 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.17. High grade manure salts, 90-95% and 96-99% (basis 90%), respectively: New York and Boston, \$2.07 @ \$2.11; Philadelphia, \$2.09 1/2 @ \$2.13 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.12 @ \$2.16.

Phosphate Rock.—Charleston, S. C., quotations are as follows: Acid phosphate, \$6.25 @ \$6.50 cash f. o. b. in bulk; phosphate rock, standard land, kiln dried, \$4.50 @ \$4.75 f. o. b. mines; ground rock, \$6 f. o. b.

Muriate of Potash.—Arrivals this week were about 20 tons. In lots of 50 tons, quotations are as follows: 80-85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.78 @ \$1.91; Philadelphia, \$1.80 1/2 @ \$1.83 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.83 1/2 @ \$1.86.

Messrs. Mortimer & Wisner, the well-known brokers of this city, send us the following interesting nitrate statistics issued under date of July 2d:

	1894.	1893.	1892.
	Bags.	Bags.	Bags.
Imported into A ports from West Coast S. A., from Jan. 1, 1894, to date	240,301	380,192	406,219
Impt. from Jan. 1 into Atlantic ports from Europe	.....	16,712	.....
	240,301	396,904	406,219
Stock in store and afloat June 1, 1894, New York:	22,626	75,049	77,457
Boston.....	.....	500	1,000
Philadelphia.....	.....	.....	.....
Baltimore.....	1,150	4,500	6,500
To arrive, actually sailed	208,100	211,500	136,000
Vis. supply to Oct. 15, 1894.	231,876	291,049	220,957
Stock on hand, Jan. 1, 1894.	44,938	15,454	53,585
Deliveries past month. ...	29,572	55,980	84,785
Deliveries since Jan. 1st to date.....	261,463	332,309	374,847
Total yearly deliveries..	.....	754,560	685,158
Prices current, July 1, '94.	2'20c.	1'65c.	1'70c.

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

Kainit.—Prices for kainit (minimum 23%) in cargo lots for 1894 delivery are as follows for invoice and actual weights respectively: New York, Boston and Philadelphia, \$9 @ \$9.25; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.75 @ \$10. For sylvinit, 27-35%, prices are as follows per cent. per gross ton, invoice weight: New York, Boston

and Philadelphia, 37½c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 41c. Actual weight, 1c. more per cent.

Nitrate of Soda.—The market is firm. Quotations are: Spot, \$2.22½@ \$2.25; near-by, \$2.15; summer shipments, \$1.95@ \$2.

Liverpool. June 27.

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

It seems scarcely worth while reporting on the chemical trade at present, seeing that it is simply the same monotonous tale week after week, of dull business. Soda Ash is difficult to sell, and for Le-blanc makes the range is quite nominal, at about as follows: Caustic Ash, 48%, £3 15s. @ £4 per ton; 57-58%, £4 10s. @ £4 15s. per ton. Carbonate ash, 48%, £3 5s. @ £3 15s. per ton; 58%, £3 15s. @ £4 per ton, net cash. Ammonia ash, 58%, is dull at £3 10s. @ £3 15s. per ton net cash for tierces, 5s. less for bags. Soda Crystals are without improvement at £2 12s. 6d. @ £2 15s. per ton, less 5%. Caustic Soda very flat and quotations quite nominal, varying according to export market. We quote: 60%, £7 10s. @ £8 5s. per ton; 70%, £8 10s. @ £9 5s. per ton; 74%, £9 10s. @ £10 5s. per ton; 76%, £10 10s. @ £11 5s. per ton, net cash. For parcels under 10 tons 5s. per ton extra is charged.

Bleaching powder is not meeting with much inquiry at the moment, but manufacturers are trying to talk it a little firmer for the home trade. For export the position is unaltered, quotations ranging from £7 10s. to £8 5s. per ton net cash for hardwood packages, according to market, but orders are not plentiful. Chlorate of potash is quite idle, in spite of the reduction in output, and for prompt delivery 6% @ 6½d. is about the nominal figure. Bicarb. soda is without special feature, and still quoted at £6 15s. per ton, less 2½% for one cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia: There is a fair business going on in a quiet way at about £14 5s. @ £14 7s. 6d. per ton, less 2½% for good gray 24 and 25% in double bags f. o. b. here. Nitrate of soda quiet, at £9 15s. per ton, less 2½% for double bags f. o. b. here. Carb. ammonia: Lump, 3½d. per lb.; powdered, 4d. per lb., less 2½%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburgh, St. Louis, London and Paris, see pages 22 and 24.]

NEW YORK, Friday Evening, July 6.

The anniversary of the Declaration of Independence of the United States of America is in a great degree responsible for the small volume of business done in the mining stock market during the past week. Holidays are always more or less demoralizing. Moreover, the San Francisco board was closed two days this week and that helped to intensify the dullness here. Only 1,710 shares were sold, of which 1,110 were dividend shares and 600 non-dividend shares.

The Comstocks were in but little demand. Consolidated California & Virginia declined from \$3.20 to \$2.90, with sales of 310 shares. Yellow Jacket shows sales of 200 shares at 40@45c. There was a solitary transaction of 100 shares of Best & Belcher at \$1.10. Of Mexican 400 shares were traded in at 60@70c.

No California stocks were traded in during the week, although there was some inquiry for some of the Bodies. Standard Consolidated reports that during the month of June its earnings amounted to \$14,000 and its expenses to \$12,000. The expenses were heavy, owing to the fact that extraordinary supplies were purchased during the month.

Of the Colorado stocks Leadville Consolidated shows sales of 400 shares at 9c. @ 10c. There was a sale of 200 shares of Little Chief at 15c.

El Cristo, Mr. Harpending's pet stock, returns to the exchange this week after an absence of many months; 100 shares were sold to-day at 5c.

Boston. July 5.

(From our Special Correspondent.)

Another week of extreme dullness and inactivity in the market for copper stocks has passed. The occurrence of a holiday generally is marked by a dull market, but the dullness the past week is without precedent. Prices are gradually fading out and there is no disposition to sustain the market, or to operate on either side, and we look for no improvement in the near future.

Boston & Montana sold in a small way early in the week at \$23½, declined to \$22½, and recovered to \$23. Butte & Boston declined from \$9 to \$8½ on sales of about 350 shares. Calumet & Hecla sold at \$270 for 20 shares, and an order for a single share was filled at \$272. Tamarack sold at \$156 for 5 shares only, and Quincy dropped to \$80 for 28 shares. Scrip sold at \$28. Osceola declined to \$18½, with a lot of 6 shares at \$18½. Franklin sold at \$18½ for 2 shares and \$8½ for 5 shares. Atlantic declined to \$8 for a small lot. The balance of the list was entirely neglected. In other stocks Napa Quick-silver sold at \$5 for 100 shares.

Closing Prices.—Calumet & Hecla, \$270 bid; Boston & Montana, \$23 bid; Butte & Boston, \$8½ bid; Quincy, \$80 bid; Tamarack, \$156 bid; Osceola, \$18½ bid.

San Francisco.
BY TELEGRAPH.

SAN FRANCISCO, July 6.—The opening quotations to-day are as follows: Best & Belcher, 90c.; Bodie,

30c.; Belle Isle, 10c.; Bulwer, 21c.; Chollar, 24c.; Consolidated California & Virginia, \$2.70; Gould & Curry, 45c.; Hale & Norcross, 55c.; Mexican, 55c.; Mono, 30c.; Ophir, \$1.55; Savage, 31c.; Sierra Nevada, 55c.; Union Consolidated, 30c.; Yellow Jacket, 37c.

London. June 21, 1894.

(From our Special Correspondent.)

During the last week American mining stocks have been more in evidence than has been the case for some time, owing to the publication of very favorable yearly reports. The New Guston Company and the American Belle Company, which belong to the Gresham House group, of which the Montana company is also a member, have published their reports for the year 1893, and, though both show a loss in the year's working, the prospects appear to be much more promising, consequently many investors who are fairly well acquainted with this group of stocks, have come forward again and signified a desire to buy. Of the two New Guston has the most promise on account of the improvement in the ore bodies. Both companies expect to be able to reduce their expenditure considerably when the new pyritic smelter is at work, as the smelting charges will be lower and the cost of transport reduced. Since the publication of the reports the shares of American Belle have gone up a shilling, and now stand at 3s. 6d.; while Guston's have advanced to 13s. 6d. Montanas have continued the rise that was reported last week and now stand at 11s., a higher figure than they have ever before known.

The De Lamar Mining Company's report for the year ending March 31st has just been published, but it contains no information explaining the slump of two months ago. The fact that no prospecting has been done since the collapse of silver last July, and that consequently no new ore bodies have been discovered or opened up, might under certain circumstances cause a gradual retrogression in the stock, but it would not cause a sudden slump which was almost as quickly recovered. The explanation given in these columns before is the only tenable one. The ore reserves at the mine are very large and the gold contents are measuring in comparison with the silver contents, so that holders of the stock here are very firm and there are more buyers than sellers. Harqua Hala shares continue to lose favor and now stand at 7s. 6d. The outlook of the company does not improve, and holders of the shares are all feeling rather uncertain about continuing in the company.

Western Australia is still to the fore in London, and two new gold mining companies have been floated during the past week. The export of gold from the colony during the first three months of the year amounted to 35,367 oz., valued at £134,398, as compared with 16,176 oz., valued at £61,470, during the corresponding period of 1893. Almost the whole of this gold went to Melbourne.

A short time ago it was announced that a rich deposit of auriferous quartz had been discovered at Mount Huxley in the Mount Lyell district on the west coast of Tasmania. A government inspector was sent to examine the spot, and he has since reported that the alleged discovery was a fraud. The culprit has been arrested on the charge of salting the alleged mine with intent to defraud the public.

The Australian Gold Recovery Company, working the MacArthur-Forrest cyanide process, have entered into contracts to treat the ores of the Golden Mountain Gold Mining Company, of Victoria, to treat the tailings of the Croydin Quartz Crushing and Gold Mining Company, and of the Pioneer Gold Mining Company. The government of South Australia has acquired a license from the company to use the process, and has already erected a plant.

June 23.

(From our Special Correspondent.)

During the past week the onslaught on the Harqua Hala and De Lamar stocks has been continued. It may be here remarked that the Mining and Financial Trust, who are responsible for these two companies and the Elkhorn, never support the market in their own shares. They never show themselves as buyers when adverse rumors are floated about by unfriendly people, and they never offer to buy the shares from a weak holder, but let them go on the market. There is at present a party of capitalists and investors in London who owe a grudge to the trust on account of a series of attacks on them emanating from the trust's officials and friends; and it only natural to find the party retaliating by picking out all the weak points in the reports and news from the Harqua Hala and De Lamar mines. Harqua Hala has had a pretty good dose already, and the shares have been knocked down from 18s. to 8s.; and now De Lamar is having its turn. The recently published report of the company is discussed in the financial papers and at every place where mining investors and speculators congregate. It is being pointed out that during the year no new veins have been discovered and no new ore obtained; that the production has all come from ore reserves; and that gold contents of the ore reserves at present available work out less than was estimated a year ago. Consequently the price of the stock, which became firm when the 25% dividend was declared, is now wavering, and in all probability will fall further before long.

The silver companies of Gresham House are still being worked strongly. Montanas continue firm, at 10s., and New Gustons have risen slightly and

now stand at 16s. 3d. The attempt to galvanize American Belle has been a failure, as almost everybody can see plainly that the mine is played out. At the New Guston meeting, held yesterday, some remarkably promising information was given by Mr. Crowther in addition to that in the report, which was commented on in these columns last week. During the last year a considerable number of paying ore bodies containing copper as well as silver have been discovered in the lower level, and the reserves of ore are now very great. In addition, it is expected that the New Silverton smelter, which started work this month, will smelt their ores at a cost of \$6, which with freight will bring the cost up to \$7.75, as compared with \$14, at present paid to the Durango smelters.

There has been a sudden convulsion in the directorate of the Thistle Reef Gold Mining Company. It will be remembered that this company was once called the Eberhardt, but its name was altered on the abandonment of the Eberhardt and Monitor mines in Utah for the Thistle Reef in the Transvaal. Towards the end of last year it was decided to shut down the Eberhardt but to continue to work the Monitor and at the same time to acquire with the remaining capital a gold property in South Africa. It appears, however, that in spite of this decision of the shareholders, the chairman and directors have gone on spending money on the Eberhardt. The shareholders' opinion of this policy was so pointed that the chairman and directors resigned remarkably quickly and new officers have been appointed, who are interested only in the South African property. The mines, stores and property in America are now being sold off and the company will shortly cease to have any connection with America.

The Emma Company has received the following proposals from Mr. Woodrow: 1. To lease the Grizzle mine for 14 months at 20% royalty, with the option to purchase for \$30,000. 2. To lease for three years, 20% royalty, and no option, and to drive 100 ft. per annum on the lower tunnel; or 3, to work the mine at his own expense, assuming any and all losses, for one-half of the net profits for three years. A meeting has been convened to consider these proposals.

Paris. June 23.

(From our Special Correspondent.)

It must be admitted that letters from this market are somewhat monotonous. I cannot report yet any revival of speculation, nor can I say that I look for such an event soon. Confidence grows slowly and any attempt to hurry matters generally results in a step backward.

The reconstruction of the Panama Canal Company, or rather the formation of a new company to build the canal, is now an accomplished fact. The capital stock is 60,000,000 francs. It has all been subscribed, a fact which might appear surprising to outsiders. In view of the decision of the Oberndorfer case, however, it is well understood here that certain parties could not withhold their subscriptions without incurring results which they did not care to face; in fact they could not afford to disobey the mandate of the official liquidators. That the new company will succeed in its object, no well informed persons really believe, and the general public is doubtful, and, to speak truly, not very much interested. Even those who have lost in Panama stock have generally abandoned hope, and do not look for anything in the future.

The committee of the Paris Bourse has admitted to official quotation Rio Tinto shares and first and second series of mortgage bonds, shares of the company for working the Oriental railways of Turkey in Europe, and shares of the English Lautaro Nitrate Company. It is reported that De Beers and other mining and nitrate companies will shortly obtain a right to quotations in the official price current. The coulissiers, had, however, preceded the agents de change in opening their market to English mining companies, and the Randfontein and Langlaagte have been recently added to the list of those dealt in. All the shares named have been largely speculated in here, though not on the official list of the Paris Bourse.

The metallurgical stocks show but little change and are fairly steady. They are not strong, however, and any attempt to sell heavily would be followed by a break.

The coal stocks are the strongest of all and hold their prices fairly well on light sales.

In the lead and zinc stocks there is nothing new.

It is now reported that the new zinc syndicate will not be formed, owing to the fact that one, at least, of the great companies withholds its allegiance. Laurium shows some improvement. In silver Huanchaca has been doing well on news received from the mine.

The Transvaal gold stocks are steadily growing in favor here. De Beers has not been materially affected by the reported discovery of new diamond mines in the Orange Free State.

Finally, copper prices continue low, and the copper stocks are dull and heavy. Nickel is erratic and continues to fluctuate, the general tendency being downward. Some event, I hope, may soon occur to stir up the market and induce some activity.

Azote.

DIVIDENDS.

Central Railroad Company of New Jersey, 1¼% quarterly, payable August 1st. Transfer books will close July 16 and reopen August 1st.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for Name and Location of Company, Dividend-Paying Mines, and Non-Dividend-Paying Mines. Includes sub-headers for June 30, July 2, July 3, July 4, July 5, July 6, and SALES.

*E-dividend. + dealt in at New York stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 1,110. Non-dividend shares sold, 600. Total shares sold, 1,710.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, June 29, June 30, July 2, July 3, July 4, July 5, and SALES. Divided into Dividend-paying and Non-dividend-paying sections.

Dividend shares sold, 1,297. Non-dividend shares sold, 405. Total shares sold, 1,702.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Names of Stocks, June 30, July 2, July 3, July 4, July 5, July 6, and Sales. Includes sub-headers for H. and L. prices.

Total shares sold, 18,013.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Name of Stock, June 30, July 2, July 3, July 4, July 5, July 6, and SALES. Includes sub-headers for H. and L. prices.

Total shares sold, 166,727.

PENNSYLVANIA.

Table with columns for Philadelphia, July 5, Bid, and Asked. Lists various mining stocks and their prices.

UTAH.

Table with columns for Salt Lake City, June 30, Bid, and Asked. Lists various mining stocks and their prices.

FOREIGN.

Table with columns for London Quotations, June 28, 1894, Buyer, and Seller. Lists various international mining stocks.

CALIFORNIA. San Francisco.

Table with columns for Names of Stocks, June 29, June 30, July 2, July 3, July 4, July 5. Lists various mining stocks and their prices.

COLORADO.

Table with columns for Denver, June 30, High, Low, and Sales. Lists various mining stocks and their prices.

MARYLAND.

Table with columns for Baltimore, July 5, Bid, and Asked. Lists various mining stocks and their prices.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table containing two columns: 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each column lists company names, capital stock, shares, par value, and assessment details (total levied, date, amount of last, etc.).

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † 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 Coma. Virginia \$12,300,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,250,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid \$2,400,000 in dividends against \$425,000 in assessments.

COLORADO.

Aspen, June 30.

Argentum-Junata	Price	\$0.52
Aspen Contact		38
Aspen Deep Mining		08 1/4
Best Friend		06
Bi-Metallic		05
Hashwacker		11
Della S.		85
Gold Valley Placer		04 1/2
Little Annie		1 27 1/2
Mollie Gibson		04
P. antic		04
Smuggler		04 1/2
St. Joe & Mineral Farm		04 1/2
U. S. Paymaster		04 1/2

Colorado Springs, June 29.

Cripple Crk (gold): High.	Low.	Sales.
Anaconda Gold	.28	13,606
Aola	.02	58,000
Argentum Junata	.62 1/4	3,600
Bankers	.03 1/4	05
Blue Bell	.02 1/4	3,250
B. B. Lee	8.50	8.01
Calumet	.02 1/4	24,500
Cripple Creek Con.	.02 1/4	30,000
Creede & Cripple C.	.01 1/2	2,650
Golden Dale	3.50	3.00
Golden Eagle	16.00	15.00
Goldstone	7.00	6.50
Gould	0.6 1/4	3,000
Granite Hill	8.50	8.01
J. Eck Pot.	.02 1/4	156,650
S. Cerro Monto	.63 1/4	2,500
Specimen	.02 1/4	42,000
Summit	.14 1/2	6,000
Union	.23 1/4	25,500
Virginia M.	.03	11,500
World	.0 1/4	7,500

Total shares sold..... 513,166

PENNSYLVANIA.

Pittsburg, July 5.

Allegheny County Light	Bid.	Asked.
Bridgewater Gas	80	...
Chartiers Block Coal	48	...
Chartiers Valley Gas	36	...
Fisher Oil	13	50 1/2
Harcwood Oil Co	15	...
Luster Mining Co	12	13
Manufacturers' Gas	33	...

CURRENT PRICES.

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

Acid—Acetic, chem. pure..... 17@19
Commercial, in bbls. and cys...... 01 1/4@.02
Carbonic, liquefied, # b...... 18@.25
Chromic, chem pure, # b...... 1.00
for batteries..... .40
Hydrobromic, dilute, U. S. P...... .45@.60
Hydrocyanic, U. S. P...... .20@.30
Hydrochloric..... .22.50@.32.40
Acehal—35%, # gal...... .33.80
Absolute..... .32.80
Ammoniated..... .32.80
Alum—Lump, # cwt...... \$1.75@1.85
Ground, # cwt...... \$1.85@1.90
Powdered, # b...... .04 1/4@.05
Lump # ton, Liverpool..... .25
Aluminum Chloride—Pure, # b...... \$1.25
Amalgamating solution, # b...... .80
Sulphate, # cwt...... \$1.90@2.50
Ammonia—Sal., in bbl. lots,..... .07 1/2@.08
b...... .07 1/4@.08
Carbonate, # b., English and German,..... .07 1/4@.08
Muriate, white, in bbls., # b...... .08 1/4
Aqua Ammonia—in cys., 38% # b...... .03@.04
20% # b...... .04@.05
32% # b...... .04 1/4@.05
Antimony—Oxymur, # b...... .04@.06
Regulus, # b...... .10@.11 1/2
Argois—Red, powdered, # lb...... .15
Arsenic—White, powdered # b...... .03@.03 1/2
Red # b...... .065@.07
Yellow..... .08@.09
White at Plymouth, # ton..... \$12 2 1/2
Asbestos—Canadian, # ton..... \$50@\$90
Italian, ton, c. i. f. L'pool..... \$18@\$80
Askes—Pot, 1st sort, # b...... 4.75@5
Pearl..... .05 1/4@.06 1/4
Asphaltum—
Prime Cuban, # b...... .04@.05
Hard Cuban, # ton..... \$23.00@30.00
Trinidad, re fined, # ton..... \$30.00@35.00
Egyptian and Syrian, # b...... .05@.07 1/4
Canaanian, at mine, # ton..... \$12.00@22.00
at San F. Ranisco, # ton..... \$15.00@29.00
Barium—C carbonate, pure, # b...... .45
Carbonate, commercial, # b...... .05@.10
Chlorate, crystal, # b...... .75
Chloride, commercial, # b...... .05@.10
pure, # b...... .16
Iodide, # oz...... .40
Nitrate, # b...... .06 1/4@.07
Sulph. Am. prime white, # ton..... \$17.50@19
Sulph., foreign, floated, # ton..... \$21@24
Sulph., off color, # ton..... \$11.50@15.00
Carb., lump, f. o. b. L'pool, # ton..... .26
No. 1, Canks, Runcoma, #..... 43 1/2@ 0
No. 2, base, Runcoma, #..... 43 1/2@ 0
Bauxite—# ton..... .95 @ 30
Bichromate of Potash—Scotlan,.....
b...... .11@.12
American, # b...... .11@.12
Bichromate of Soda—# b...... .09 1/4@.10
Borax—Refin ed, # b., in car lots..... .08@.09
San Francisco c...... .08@.08 1/2
Con centrated d., in car lots..... .07 1/4@.08
Refined, Liverpool, # ton..... .28
Stromalite—# lb...... .25@.35
admiium Minion—# lb...... \$2.00

Monongahela Nav. Co...... 69
Monongahela Water..... 32 32 1/2
Nat. Gas Co. of W. Va...... 25
N. Y. & Cleve. Gas Coal...... 48
Olive Valley Gas..... 23 21
People's Nat. Gas..... 25
People's Pipeage Co...... 14 14 1/4
Pennsylvania Gas..... 10 10 1/4
Philadelphia Co...... 19 1/4 19 1/4
Pittsburg Gas Co...... 75
Pittsb. Plate Glass Co...... 140
Stand. Undergr. Cable Co...... 90
Tuna Oil..... 11
U. S. Glass Co. pr..... 8
" common..... 24 1/4
Westinghouse Air Brake..... 12 1/2
Westing'ise Elect., 1st prf..... 51
" 2d..... 35
" com..... 24 1/2
Whelring Gas..... 17 1/4 18 1/4

MISSOURI.

St. Louis, July 3.

Closing quotations: Bid. Asked.

Adams	\$0.40	...
American & Nettie, Colo.	2.50	\$0.30
Bi-Metallic, Mont.	2.60	3.00
Elizabeth, Mont.	1.15	20
Granite Mountain, Mont.	1.25	1.75
Hope	2.50	...
Leo	.61 1/2	.02
Small Hopes	.50	...

MONTANA.

Helena, June 28.

(Specially Reported by S. K. Davis.)

Bald Butte (Mont.)	Bid. Asked.	...
Benton Group (Nelhart), Mont.	\$4.25	\$5.00
Combination (Phillips'g), Mont.	.30	.50
Helena & Frisco	1.50	...
Helena & Victor, Mont.	.25	...
Iron Mountain (Missoula), Mont.	.40	.50
Piegan (Marysville), Mont.	.35	.50
Poorman (Coeur d'Alene), Idaho	.25	.50
Whitlach Union & Macintyre	.25	.25

MINNESOTA.

Duluth, July 3.

LISTED STOCKS. Par. Bid. Asked.

Biwabik M. Iron Co.	100	\$20.00	\$21.00
Cincinnati Iron Co.	25	.25	.30
Clark Iron Co	100	...	...

Great Northern Min. Co...... 100 2.75 3.50
Kanawha Iron Co..... 100 .10 .20
Keystone Iron Co..... 40 .40 .40
Lake Superior Iron Co..... 25 2.50 2.50
Lincoln Iron Co..... 100 .50 .50
Mesaba Moun. Iron Co...... 100 14.00 17 0
Minneapolis Iron Co..... 100 .02 .15
Mountain Iron Co..... 100 50.00 65.00
Shaw Iron Co...... 100 2.50 3.00
Security Land & Exp. Co...... 10 10.00 15.00

UNLISTED STOCKS.

Adams Iron Co.	10	\$7.00	\$9.00
Ashland Iron Co.	25	40.00	40.00
Buckeye Iron Co	100	2.50	2.50
Charler Iron Co	1	1	20.00
Chandler Land & Exp. Co.	25	20.00	26.00
Charleston Iron Co	100	15	30
Cleveland Iron Co.	100	20.00	40.00
Cleveland Cliffs Iron Co.	100	20	30
Chicago Iron Co	25	.01	.02
Detroit Iron Co	100	.05	.25
Elmira Land & Iron Co.	100	1.90	2.25
Great Western Mining Co.	100	.25	.00 1/2
Homestead Iron Co.	10	22.50	25.00
Int'l Development	25	20.00	27.00
Jackson Iron Co.	25	60.00	60.00
Lake Supr. (Marquette)	25	20.00	27.00
McCaskill Mining Co.	10	.01	.03
Mesaba C. L. & Ex. Co.	10	6.00	6.00
Mesaba Chief Iron Co.	100	1.75	2.00
Mesaba Iron Co.	30	30	20
Metropolitan L. & L. Co.	25	50.00	70.00
Northern Light Iron Co	100	5.00	5.00
Ohio Mining Co.	10	1.00	1.00
Ophir, gold	100	.04	.10
Penn. Iron & Steel Co.	100	1.00	1.00
Pioneer Iron Co.	25	100.00	125.00
Pittsburg & Lake A. Co.	100	110.00	125.00
Putnam Iron Co.	100	...	...

FOREIGN.

Shanghai, China, June 4.

(Special Report by J. H. Bisset & Co.)

Sheridan Con., Colo	2.50	...
Punjom Mining, Ltd.	4.75	...
" Pref.	1.46	...
Jelebu Mg. & Trading, Ltd.	4.20	...
Raub A'han G. Mg. Ltd.	2.92	...
Shanghai Gas Co.	215.00	...
Hong Kong Electric Co.	3.54	...

Paris, France, June 25.

Acieries de Creusot..... Francs. 2,160.00
 " de irminy..... 1,793.00

Acierles Fives-Lille..... 665 00
 " de France..... 895.00
 " de la Marine..... 260.50
 " de St. Etienne..... 1,255.00
 Aguas Fenidas..... 495.00
 Anzin (coal)..... 1,461.00
 Heimez, Spain..... 665.90
 Callao..... 21.50
 Callao Bis..... 35.00
 Cape Copper..... 1,220.00
 Champ d'Or..... 41.00
 De Beers Consolidated..... 625.90
 Gold River, Cal.....
 " parts.....
 Huanchaca..... 12.25
 Huta Bankowa..... 1,500.00
 Jerez-Lantewa..... 15.00
 " parts..... 3.00
 Kebao..... 510.00
 Laurium, Greece..... 581.00
 Lexington, Mont..... 40.00
 " parts..... 0.75
 Mafidano..... 1,630.00
 Mokta-el-Hadid..... 795.50
 Nickel New Caledonia..... 401.00
 Phosphates de France..... 412.50
 Placers Haute Italie..... 71.25
 Pontgibaud..... 200.01
 Rio d'into, Spain..... 327.50
 Robinson (Transvaal)..... 162.50
 Soufres Romaines..... 200.00
 Tharsis, Spain..... 108.75
 Transvaal Coal..... 17.50
 Uruguay..... 25.00
 Vieille-Montagne, Belgium..... 478.50

ASSESSMENTS.

COMPANY.	No.	Dingt. in office.	Day of sale.	Amt. per sh're
Alta, Nev.	46	June 19	July 10	.10
Buchan'n, Mex	2	July 2	July 21	.12 1/2
Bulwer, Cal.	9	June 29	July 20	.10
Conlon, Cal.	13	June 30	July 20	.05
Con N. Y., Nev	15	June 19	July 12	.05
Mexican, Nev.	56	July 17	Aug. 7	.25
Occidal, Nev.	16	July 15	July 31	.10
San Marina, Mont.	3	June 13	...	.004
Segr. Belch. & Mides, Nev.	14	July 16	Aug. 6	.10
Silv. K'g, Ariz.	10	June 11	July 9	.20

Mineral Wool—Ordinary slag..... .01 1/4
Ordinary rock..... .02 1/4
Ground, # ton..... .04@.06
Naphtha—Black.....
Nitre Cake—# ton..... \$10.00
Ochre—Rochelle, # b...... .01 1/4@.01 3/4
Washed Nat Oxid. Lump, # b...... .06 1/2@.06 3/4
Washed Nat Oxid. Powder, # b...... .07@.07 1/2
Golden, # b...... .03@.05
Domestic, # ton..... \$12@20
Oils, Mineral—
Cylinder, light filtered, # gal...... 14@16
Dark filtered, # gal...... 10@13
Extra cold test, # gal...... 30@34
Dark steam refined, # gal...... 17 1/2@19
Phosphorus # b...... .80@.85
Precip., red, # b...... .80@.85
white, # b...... .85@.90
Platinic Chloride—Dry, # oz..... \$7
Fluabago—Ceylon, # b...... .04@.05
American, # b...... .06@.07
Potassium—Cyanide, # lb., C. P...... .52
7 1/2% # lb...... .30
mining, # lb...... .28@.31
Bromide, domestic, # lb...... .28@.32
Chlorate, English, # lb...... 18@18 1/4
Chlorate, powdered, English, # b...... 18 1/4@.19
Carbonate, # lb., by casks, 82%..... 04 1/2@.05
Caustic, # lb., pure slock..... .05 1/2@.06
Iodide, # b...... \$2.58@2.80
Nitrate, refined, # lb...... .06@.08
Bichromate, # lb...... 10@11 1/4
Yellow Prussiate, # b...... 21 1/4@22 1/4
Red Prussiate, # b...... 39@40
Pumice Stone—Select lumps, # b...... \$10 1/4@15
Original cks., # b...... .01 1/2@.02
Powdered, pure, # b...... .01 1/4@.01 1/2
Pyrites—Non-cupreous, p units,..... 10@.11
Quartz—Ground, # ton..... \$6.00@10.00
Rotten Stone, Powdered, # b...... \$0.34@.03 1/4
Lump, # b...... .06@.07
Original cks., # b...... .04 1/2@.05 1/4
Rubbing stone, # b...... .03 1/4@.04
Sol Ammoniac—lump, in bbls., # b...... \$0.34
Salt—Liverpool, ground, # sack..... .700
Domestic, fine, # ton..... \$7@7.5
Common, fine, # ton..... \$4.50@5
Turk's Island, # bush..... 25@.28
Salt Cake—# ton..... \$10.00@15.00
Saltpeter—Crude, # b...... .03 1/4@.04
Soapstone—Ground, # ton..... \$5@5.25
Block and slab according to size......
Sodium—Prussiate, # b...... 22@.24
Phosphate, # b...... .04@.05
Stannate, # b...... .06@.12
Tungstate, # b...... .30@.35
Hypophosphite, # cwt., in casks..... \$1.70@1.80
Strontium—Nitrate, # b...... .48@.06
Sulphur—Roll, # b...... .01 1/2@.02 1/4
Flour, # b...... .01 1/4@.02
Sylvinit, 27@35%, S.O.P., per unit,..... 3.75
Talc—Ground French, # b...... .01 1/4@.01 1/2
American No. 1, # b...... .01 1/4@.01 1/2
American No. 2,..... .06
Terra Alba—French, # b...... 65@.80
English, # b...... 65@.80
American No. 1, # b...... 60@.80
American No. 2, # b...... 44@.50

Tin—Crystals, in kegs or bbls...... 14@15
feathered or flossed..... .90
Muriate, single..... .07@.12
Double or strong, 54° B...... .10@.15
Oxymur, or nitro..... .19
Vermillion—Imp. English, # b...... .80
Am. quicksilver, bulk..... .57 @.60
Am. quicksilver, bags..... .58 @.60
Chinese..... .85@1.00
Trieste..... .90 @.96
American..... 11 1/4@.13
Zinc White—Am., Dry, # b...... 04 1/2@.06
Antwerp, Red Seal, # b...... .06 1/2@.07
Paris, Red Seal, # b...... .07 1/2@.08
Muriate solution..... .06
Sulphate crystals, in bbls., # b...... .03@.03 1/4

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated:

Arsenic (metallic), per kilo..... \$0.25
Barium (ex amalgam)..... 2.12
" (per electrol.)..... 7.75
Bismuth (metallic), per kilo..... 6.25
Cadmium (metallic),..... 2.75
Calcium (per electrol.)..... 5.25
Cerium (pulv.)..... 2.25
(fusum in globulis)..... 5.50
Chromium (fus.)..... .40
(cryst.)..... .75
Cobalt (metallic), per kilo..... 10.00
(pure), per kilo..... 40.00
Didymium (pulv.)..... 5.51
Erbium-Yttrium (oxydat.)..... 10.00
Gallium (cryst.)..... 100.00
Germanium (fus.)..... 37.50
(pulv.)..... 35.00
Glucinum (pulv.)..... 7.00
(cryst.)..... 10.75
Indium (fusum)..... 5.00
Lanthanum (pulv.)..... 6.00
" (per electrol.)..... 11.00
Lithium (in glob.)..... 5.00
(wire)..... 6.25
Manganese (fusum)..... .25
Molybdenum (pulv.)..... 12 1/2
Niobium (pulv.)..... 4.25
Osmium..... 1.00
Palladium (wire)..... .06
(pulv.)..... 1.00
Potassium (metal), per kilo..... 27.50
Rhodium..... 1.63
Ruthenium..... 2.50
Rubidium..... 6.25
Selenium (cryst.)..... .51
" (precipitated)..... .62 1/2
Strontium (per electrol.)..... 7.25
(ex amalgam)..... 3.75
Tantalum..... 4.75
Tellurium (fusum)..... 4.50
(precipitated)..... 22 1/2
Thallium..... .02 1/2
Titanium..... 1.13
Tungsten (pure)..... .05
Uranium..... 1.00
Vanadium..... 4.00

RAILROAD MATTERS.

The Austrian consul at Beyrout has recently reported to his government on the railway development of Syria. He says that the line from Damascus to Mescrib, 70 miles—the construction of which was undertaken by a Belgian company—has been completed. Mescrib is situated in the center of the Hauran, and, when the connection of this railway with that from Damascus to Beyrout has been effected, will enable products of this region to find a ready way to European entrepôts. The line from Beyrout to Damascus will hardly be opened for traffic before the end of 1895, in consequence of difficulties of a technical character as well as obstacles in the way of obtaining possession of the necessary lands. On the other hand, owing to negotiations between the contractors and an Anglo-American syndicate, the construction of a railway from Acre to Caiffa and Damascus is completely at a standstill, and only the first eight miles have been completed. The concession for the construction of a line from Beyrout to Biredjik, on the Euphrates, by way of Aleppo, which has been obtained by the Compagnie du Chemin de Fer de Beyreuth-Damas, must be considered as of great importance. The line, which will be about 360 miles long, passes through the most productive regions of Syria. Surveys are already being undertaken for this line, which is guaranteed by the government, but the construction will take 8 or 10 years.

The Sixth Statistical Report of the Interstate Commerce Commission, prepared by its Statistician, being the complete report for the year ending June 30th, 1893, for which a preliminary income account was issued in December, 1893, has just been submitted. The following is an abstract: The total mileage of railways in the United States on June 30th, 1893, was 176,461, being an increase during the year of 4,897 miles. The corresponding increase during the previous year was 3,160.

The total number of locomotives on June 30, 1893, was 34,788, being an increase of 1,652 during the year. Of these 8,957 were passenger locomotives, 18,599 freight locomotives, and 4,802 switching locomotives, the remainder being unclassified. The total number of cars owned by the carriers making report was 1,119,878, to which should be added 154,068 leased cars, making a total of 1,273,946 cars. This shows an increase in the number of cars directly controlled of 58,854 during the year. Of the total number of cars 31,384 were in the passenger service and 1,047,577 in the freight service. The number of passengers carried per passenger locomotive was 66,263 and the number of passenger-miles per passenger locomotive was 1,588,601. The number of tons of freight carried per freight locomotive was 40,062, and the number of ton-miles per freight locomotive was 5,031,839. The number of passenger cars per 1,000,000 passengers carried was 53, and the number of freight cars per 1,000,000 tons of freight carried was 1,613. The increase in equipment fitted with train brakes or automatic couplers, as compared with the increase in equipment itself, is not as marked as in the previous year. Thus, from a total increase in equipment during the year ending June 30, 1893, of 60,506, the increase in equipment fitted with train brake was 42,158, and the increase in equipment fitted with automatic coupler was 77,904.

The aggregate of property properly classified as railway capital was, on June 30, 1893, \$10,506,235,410, which shows railway capital equal to \$13,421 per mile of line. The amount of stock outstanding was \$4,668,935,418, of which \$3,982,009,602 was common stock, the remainder, \$686,925,816, being preferred stock. The funded debt outstanding was \$5,225,689,821, classified as follows: Mortgage bonds, \$4,504,333,162; miscellaneous obligations, \$410,474,647; income bonds, \$248,133,730, and equipment trust obligations, \$82,699,282. The amount of investment in railway securities has increased during the year from \$1,391,457,053 to \$1,563,022,233, being an increase of \$171,565,180.

The amount of stock paying no dividends during the year was \$2,859,334,572, being 61.24% of the total stock outstanding. Of stocks paying dividends 5.25% of the aggregate paid from 4 to 5%, 11.62% paid from 5 to 6%, 5.24% paid from 6 to 7% and 5.3% paid from 7 to 8%. The total dividends paid amounted to \$100,929,885. The amount of mortgage bonds paying no interest was \$492,276,999, or 10.93% of the total of mortgage bonds, and the amount of income bonds paying no interest was \$204,364,269, or 82.56% of the total of income bonds.

The total number of passengers carried during the year was 593,560,612. Passenger-mileage during the same year was 14,229,101,084. The average

journey per passenger was 23.97 miles. The total number of tons of freight reported by the railways for the year was 745,119,482. Ton-mileage was 93,588,111,833. The average number of tons in a train was 183.97, and the average haul per ton for the entire country was 125.60. Passenger train-mileage was 336,618,770, and freight train-mileage 508,719,506.

The gross earnings from operations on the railways of the United States for the year ending June 30th, 1893, was \$1,220,751,874, being an increase of \$49,344,531 over gross earnings reported in the previous year. Operating expenses during the year were \$827,921,299, being an increase of \$46,923,303 over the previous year. The income from investments reported by the railways was \$149,649,615, while deductions on account of fixed charges and other analogous items were \$431,422,156. The final net income available for dividends was \$111,058,034, being a sum less than the corresponding amount for the previous year of \$4,907,157. After deducting from this amount the dividends paid the income accounts of railways in the United States for the year 1893 shows a surplus of \$8,116,745, which is less than the surplus of the previous year by \$5,919,311. The complete report shows a full income account for each of the 10 territorial groups into which the country is divided. The gross amount received from carrying passengers was \$301,491,816; from carrying the mail, \$28,445,053, and from carrying express matter, \$23,631,394. The gross amount received for carrying freight was \$829,053,861. The passenger service accounts for 29.49% of the earnings from operation, and the freight service for 68.23% of such earnings.

The number of railway employees killed during the year was 2,727, being greater by 173 than those killed during the previous year. The number of employees injured was 31,729, being greater by 3,462 than the number injured the previous year. The number of passengers killed during the year was 299, being less by 77 than the number killed the previous year, and the number injured was 3,329, being 2 in excess of the number injured the previous year. Of the total number of deaths to employees on account of railway accidents, 433 were due to coupling and uncoupling cars, 644 to falling from trains and engines, 73 to overhead obstructions, 247 to collisions, and 153 to derailments, the remainder being due to causes not so clearly defined. An assignment of casualties to the opportunity offered for accidents shows 1 employee to have been killed for every 320 men employed, and 1 to have been injured for every 28 men employed. The most dangerous service is that of trainmen, and for these the statistics show 1 employee to have been killed for every 115 trainmen, and 1 employee to have been injured for every 10 engaged in this service. A similar comparison shows 1 passenger to have been killed for each 1,985,153 passengers carried, or for each 47,588,965 passenger-miles accomplished, and 1 passenger injured for each 183,822 passengers carried, or for each 4,406,659 passenger-miles accomplished. An assignment of accident statistics to the territorial groups show great diversity in the relative safety of travel and railway employment in the various sections of the country.

Mention is made in the report of an important step toward the realization of uniformity in railway accounts in that the Commission has, with the assistance of the Association of American Railway Accounting Officers, revised the classification for operating expenses. It is safe to say that within a few years there will be practical uniformity in the bookkeeping of railways so far as operating expenses are concerned.

Another subject of interest touched upon in the report is the necessity of compiling freight statistics more fully than at present is the case. It is probable that something akin to a clearing house of freight statistics will become a necessity in the near future.

BRATTICE CLOTH, Imported.

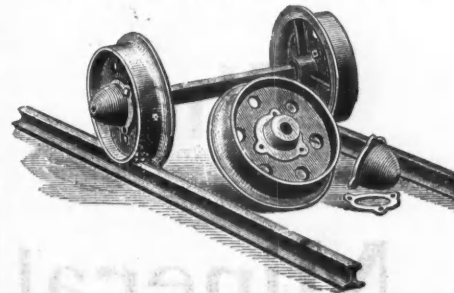
From 12c. Yard upwards.
Rubber Belting, Hose, Packing, and all articles in Mechanical Rubber. Fluted Rubber Belting, on Fluted Tires, cannot slip.
Mineralized Rubber is better than Vulcanized.
MINERALIZED RUBBER CO., 18 Cliff Street, New York.

Situations Wanted Only 10 Cents a Line.

PENNSYLVANIA DIAMOND DRILL & MAN'F'G CO.

ESTABLISHED 1866. **BIRDSBORO, BERKS CO., PA.**
Has a larger experience than any other Company in the Boring of Prospecting Holes with the Diamond Drill. We make a Specialty of Prospecting Mineral Lands by taking out Cores, and of Boring Artesian Wells, Round and Straight.
W. F. Parrish Machinery Company, Western Sales Agents, Home Ins. Building, Chicago, Ill.

THE F. M. DAVIS IRON WORKS CO.,
DENVER, COLO.



MINE SUPPLIES.

Mining and Milling Machinery, Hoisting Machinery, Quarry Machinery, Smelting Furnaces, Engines, Pumps, Boilers, etc.
No. 3. **SEND FOR CATALOGUES.**

AMERICAN DEVELOPING

—AND—
MINING COMPANY,
BUTTE, MONTANA.

This company is engaged in the business of buying and selling, developing and operating mines. It is at the present time occupied in developing and equipping for production at an early date several groups of gold mines, situated in Idaho and Montana, of which it is the owner.

Thus prominently established in the mining regions, it has occasional opportunities for securing valuable mines at prices much lower than are possible under the usual methods of bringing such property to the attention of investors.

It has in its employ mining engineers whose reports it will guarantee, and desires to act as the Western agent of individuals or syndicates in the selection and purchase of mining property, doing the work on a commission. It will also advise on the operation of such or other property of this class.

The company is in a position to properly guarantee any statement or report made by it, and solicits work of the character described, confident that with its exceptional facilities it can render valuable service to non-resident mine owners and investors.

It will furnish, upon proper application, evidences of its local reputation and of the character of its business transactions.

Correspondence Solicited. Moreing and Neal Code used. Cable address: "Adamco, Butte."



SELDENS' PATENT PACKINGS,

with Either Rubber or Canvas Core, For Piston Rods, Plungers, Valve Stems, etc.

Sold by the supply houses in Denver, Butte, Helena, Chicago, St. Louis, Kansas City, Omaha, and on the Pacific Coast.

SOLE MANUFACTURER, RANDOLPH BRANDT, 38 Cortlandt St., N. Y.

The
Mineral
Industry:

Its Statistics,
Technology
and Trade

IN THE UNITED STATES
 AND OTHER COUNTRIES

From the Earliest Times to the Close of 1893.

VOL. II. ANNUAL.

This great volume of more than 1,000 octavo pages is the most important contribution to the statistics of the mineral industry of the world that has ever been published. This is the only work published in any language that gives the Statistics of the Mineral Industry of the World, and the only work that gives the Statistics of the United States for 1893.

It treats of abrasive materials; alum; aluminum; antimony; arsenic; asbestos; asphaltum; barytes; bauxite; bismuth; borax; bromine; cadmium; cements; the chemical industry, with the latest electrolytic and other processes applied in America and Europe; chrome iron ore and its products; clay and the clay industry; coal, with graphical tables of production, consumption per capita, production per man employed, costs, markets, coal mining machines and their work; copper production, consumption, markets, improvements in copper metallurgy, all the electrolytic refining processes, present practice in copper concentration and extraction throughout the world; copperas; cryolite; feldspar; fluorspar; gold and silver; graphite; gypsum; iron and steel; advances made in iron and steel metallurgy; open-hearth work at Steelton, Pa.; lead, distribution and production of lead in all countries; recent improvements in the treatment of argentiferous lead ores; limestones, marble and lime; lithographic limestone; magnesite; magnesium; manganese; marls; mica; nickel; onyx; ozokerite; peat; petroleum, its production, refining, markets, etc.; phosphate rock; phosphorus; precious stones; pyrites; quicksilver; the rare elements, their occurrence and production barium, boron, calcium, cesium, cerium, chromium, columbium, didymium, erbium, gallium, germanium, glucinum, indium, lanthanum, lithium, manganese, molybdenum, osmium, palladium, potassium, rhodium, rubidium, ruthenium, scandium, selenium, silicon, strontium, tantalum, tellurium, thallium, thorium, titanium, uranium, vanadium, ytterbium, yttrium, zirconium; salt, slate; sodium; sulphur; talc and soapstone; tin; tungsten; whetstones; scythe stones and grindstones; zinc.

Statistics of countries: Australasia, Austro-Hungary, Belgium, Canada, other British Colonies, Chili, France, Germany, Greece, Italy, Japan, Norway, Portugal, Russia, Spain, Sweden, Denmark, Egypt, Holland, Roumania, China, Switzerland, United Kingdom, United States.

Assessments by mining companies; dividends paid from 1884 to 1893; markets; mining schools in the United States and Canada; present practice in ore dressing; theories of the origin of ores; stone quarrying, etc.

Price \$5.00.

THE SCIENTIFIC

PUBLISHING CO.

Publishers,

Postal Telegraph Building, Main Office Room 817.

253 Broadway, New York.

ALPHABETICAL INDEX TO ADVERTISERS.

- Indicates every other week or monthly advertisements. -

Table with 3 columns: Advertiser Name, Page Number, and Advertiser Name. Columns are headed by letters A through Y. Includes entries like 'Abbott, Wheelock & Co.', 'Corcoran Scientific School', 'Jennings, E. P.', 'Penrose & Barringer', etc.

WIRE ROPE MANUFACTURERS.

BRODERICK & BASCOM ROPE CO.

SOLE MANUFACTURERS OF

Established
1875.



St. Louis,
Mo.

THE MOST POWERFUL ROPE MADE.

SEND FOR ILLUSTRATED CATALOGUE.

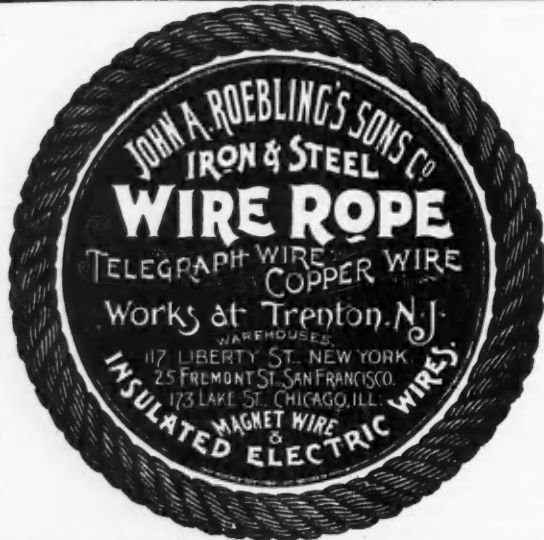
A. LESCHEN & SONS ROPE CO., ST. LOUIS, MO.

Sole
Manufacturers
of



**BEST
ON EARTH.**

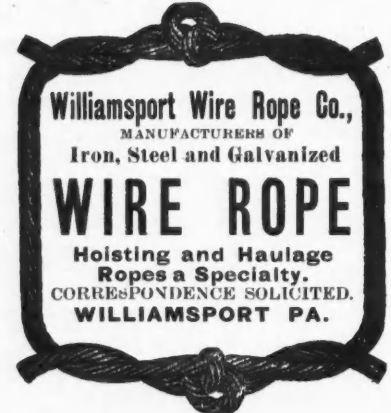
[TRADE MARK REGISTERED.]



W. S. TYLER Pres: PROCTOR PATTERSON, Sec. & Tre



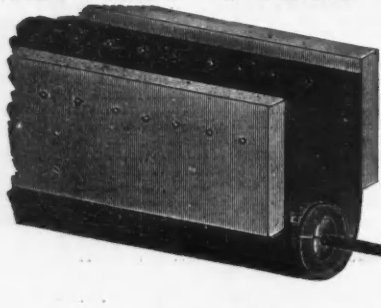
MANUFACTURERS
EXTRA HEAVY
Double Crimped
STEEL, IRON,
COPPER
AND BRASS
BATTERY
Mining Cloths.
Cleveland, O.
FRASER & CHALMERS
AGENTS,
CHICAGO, ILL.



Perforated Metals

FOR ALL USES IN
Mining and Ore Dressing.

JEFFREY STEEL CABLE CONVEYORS



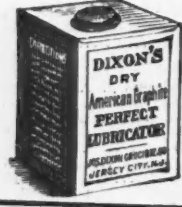
For Handling Coal, Ores,
Chemicals, Refuse, Etc.,
Etc.

Simple in Construction.

SEND FOR CATALOGUE.

THE JEFFREY MFG. CO., COLUMBUS, O.
Also, 163 WASHINGTON STREET, NEW YORK.

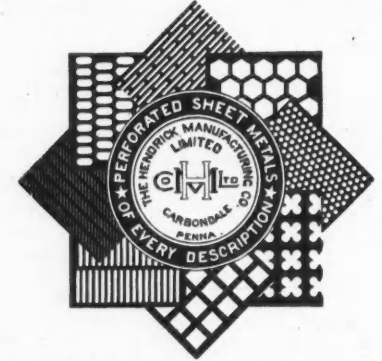
**DIXON'S PURE, FOLIATED, DRY AMERICAN GRAPHITE
PERFECT LUBRICATOR.**



Its enduring qualities are several times greater than those of any oil. Unlike either oil or grease, it is not affected by heat, cold, steam, acids, etc., and acts equally well under the most varying conditions of temperature and moisture. Its natural impurities contain substances fatal to anti-friction purposes, namely, quartz or grit. Its proper selection, sizing and perfecting for lubricating purposes is a matter requiring large skill, much machinery and great experience. We have made this a special study, and, by methods of sizing and dressing, peculiar to ourselves, have produced a graphite unequalled for purity, for correct size of flake and unrivaled for lubricating qualities.

Manufactured and Warranted Only by the
JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

**PERFORATED SHEET METALS
OF EVERY DESCRIPTION
FOR MINING PURPOSES.**



**THE HENDRICK MFG. CO., LTD.,
CARBONDALE, PA.**

WELL DRILLING MACHINERY,
MANUFACTURED BY
**WILLIAMS BROTHERS,
ITHACA, N. Y.,**
Mounted and on Sills, for
deep or shallow wells,
with steam or horse
power.
Send for
Catalogue.
ADDRESS
Williams Brothers
ITHACA, N. Y.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
 Bostelmann, Louis F.
 Bullock, M. C., Mfg. Co.
 Burlingame Rock Drill Co.
 Clayton Air Compressor Works.
 Fraser & Chalmers.
 Hasenzahl, W.
 (See Diamond Drills.)

Amalgamators
 Bucyrus Steam Shovel & Dredge Co.
Anti-Friction Metals
 Hertz, T. & Son.
Architects and Builders
 Berlin Iron Bridge Co.
 Pencoyd Bridge & Construct. Co.
Assayers' and Chemists' Supplies
 Alinsworth, Wm.
 Baker & Adamson.
 Baker & Co.
 Berg, J. & H.
 Bullock-Crenshaw.
 Denver Fire Clay Co.
 Eimer & Amend.
 Goldsmith Bros.
 Henry Hell Chem. Co.
 Hoskins, Wm.
 Miners' Assay Office.
 Attorney, Corporation
 McIndoe, H.
Babbit's Metal
 Eppinger, Carpenter & Co.
Band Wheels
 Poole, R., & Son Co.
Bankers and Brokers
 Amer. Devel. & Mfg. Co.
 Bandell, E.
 Bieber & Sohne.
 Billings, Robt. & Co.
 Grant, E. E.
 Handy & Harman.
 Hicks & Sprague.
Belting
 Carp'ter, Geo. B. & Co.
 Groetzinger & Sons.
 Hendrie & Bolthoff Mfg. Co.
Blasting Caps and Fuses
 Lau, J. H., & Co.
 Macbeth, James, & Co.
Blowers
 Garden City Sand Co.
Boilers
 Fraser & Chalmers.
 Pollock, Wm. B. & Co.
 Scaife, Wm. B. & Sons.
 (See Machinery.)
Brass Castings
 Eppinger, Carpenter & Co.
Brass Rolling Machinery
 Poole, R., & Son Co.
Brattice Cloth
 Mineralized Rubber Co.
Brick Machinery
 Fletcher, S. K.
Bridges
 Berlin Iron Bridge Co.
 Pencoyd Br. & Co.
 Pittsburgh Bridge Co.
Buckets
 Scaife, Wm. B. & Sons.
Cable Railways
 Fraser & Chalmers.
Carbons
 Bishop, Victor, & Co.
 Bostelmann, Louis F.
 Car Wheel
 Whitney & Co.
Cement
 Atlas Cement Co.
Chain and Link Belting (See Belting.)
Chemicals
 Baker & Adamson.
 Bullock & Crenshaw.
 Eimer & Amend.
 Henry Hell Chem. Co.
 Chlorine Liquid
 Fickhardt, Wm. & Kuttroff.
 Glutchea, Friction
 Poole, R., & Son Co.
Coal
 Maryland Coal Co.
 Newell Coal Co.
 Potts, F. A., & Co.
 Stockney, Conyngham & Co.
 Ward & Olyphant.
Coal Cuts
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
 Youngstown Bridge Co.
Coal Tips
 Youngstown Bridge Co.
Coke Ovens
 Sheffield Car Co.
Concentrators, Crushers, Pulverizers, Separators, Etc.
 Ails, Ed. F. & Co.
 American Mining & Milling Machinery Co.
 Beckett Foundry & Machine Co.
 Blake, Theo. A.
 Boston Ore Machinery Co.
 Colorado Iron Works
 Fraser & Chalmers.
 Frue Vanner Concentrator.
 Gates Iron Works.
 Hendrie & Bolthoff Mfg. Co.
 Krom, S. B.
 Krupp, F.
 Mechanical Gold Extractor Co.
 Raymond Bros. Imp. Pulv. Co.
 Stedman Foundry & Mach. Co.
 Totten & Hogg.
 Walburn-Swenson Mfg. Co. (See Machinery.)
Conduits, Fibre
 Fibre Conduit Co.
Contractors and Miners' Supplies
 Bucyrus Steam Shovel and Dredge Co.
 Fraser & Chalmers.
 Pollock, Wm. B. & Co.
 Pratt & Whitney Co. (See Machinery.)
Copper Dealers and Producers
 Abbott, Wheelock & Co.
 American Metal Co.
 Atlantic Mining Co.
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Boston & Mont. Mfg. Co.
 Butte & Boston M. Co.
 Canadian Copper Co.
 Central Mining Co.
 Copper Queen Mfg. Co.
 Detroit Cop'g Mfg. Co.
Copper Rolling Machinery
 Poole, R., & Son Co.
Corrugated Iron
 Berlin Iron Bridge Co.
 Scaife, W. B. & Sons.
 Crucibles, Graphite, Etc.
 Denver Fire Clay Co.
 Garden City Sand Co.
 Obermayer Co.
Crucible Steel Castings
 King & Andrews Co.

Crushed Quartz
 Garden City Sand Co.
Cupola
 Garden City Sand Co. | Obermayer Co.
Dermatolite
 Groetzinger & Sons.
Diamond
 Bishop, Victor, & Co.
 Lexow, Theodore.
Diamond Drills
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Bullock Mfg. Co., M.C.
 Hasenzahl, W.
 Lexow, Theodore.
 (See Air Compressors and Rock Drills.)
Drawing Materials
 Alteneder, Theo. & Son.
 Queen & Co.
Dredges
 Bucyrus Steam Shovel & Dredge Co.
Dredging Machines
 Poole, R., & Son Co.
Dump Cars
 Hunt Co., C. W.
 Fraser & Chalmers.
 Wright & Adams Co.
Educational Institutions
 Columbian University.
 Correspondence School of Mines.
 Harvard University.
 Mass. Inst. of Technology.
 Michigan Mining School.
 Missouri School of Mines.
 Pennsylvania Military College.
 R. se Polytechnic Institute.
 School of Mining.
 State School of Mines.
 Vanderbilt University.
Electrical Machinery and Supplies
 General Electric Co.
 Jeffrey Mfg. Co.
 King & Andrews Co.
 Nassau Electrical Co.
 Okonite Co., Limited.
 Thomson-Houston International Co.
Elevators, Conveyors and Hoisting Machines
 Brown Hoisting and Convey. Mach. Co.
 California Wire Works.
 Cooper, Hewitt & Co.
 Fraser & Chalmers.
 Hunt, C. W., Co.
 Jeffrey Manufacturing Co.
 Scaife, Wm. B. & Sons.
 Union Wire Rope Tramway Co.
 Vulcan Iron Wks.
 (See Wire Rope Tramway and Machinery.)
Elevator, Grain, Machinery
 Poole, R., & Son Co.
Emery Wheels
 New York Belting & Packing Co., Ltd.
Employment Bureaus
 Engineering Employment Bureau.
Engineers, Chemists, Metallurgists
 Kent, William.
 Kerr, Mark B.
 Keyes, W. S.
 Kirby, E. B.
 Blamire, T. L.
 Lavagnino, G.
 Ledoux, C.
 Leggett, Thomas H.
 Loring, Frank C.
 Merwin, J. A.
 Mariner & Hoskins.
 Martinez, Dion.
 Maynard, George W.
 McDermott & Duffield.
 Rogers, Edward D.
 Nicks, J. Richardson.
 Minger, W. C.
 Mixer & DuBois.
 Moore, Gideon E.
 Newberry, W. E.
 Nicholson, Frank.
 O'Brien, Frank.
 Olcott, Eben E.
 Page, Wm. Byrd.
 Pearce, A. L.
 Penrose & Barringer.
 Davis, Lewis K.
 Phillips, W. B.
 Poole, Robt., & Son Co.
 Porter, J. A.
 Potter, William B.
 Pushe, J. A.
 Randolph, John, C. F.
 Raymond, Rosster W.
 Raymond, R. M.
 Rickard, T. A.
 Ricketts & Banks.
 Robinson, G. H.
 Rothwell, John E.
 Rothwell, Richard P.
 Schwab, Theodore E.
 Shields & Middleton.
 Skewes, Edward.
 Squire, Jos.
 Stein, Wm. M.
 Stoiber, E. G.
 Taylor & Brunton.
 Terhune, Richard H.
 Thies, A.
 Trent, L. C.
 Unzicker, H.
 Vansick, Wm.
 Walter Bros.
 Wannemaker, J. F.
 Wilson, J. Howard.
 Wyatt & Saabach.
 Young & Park.
 Heller, Chas. F.
 Stieren, Wm. E.
 Queen & Co.
 Union Iron Works
 Weber Gas & Gasoline Engine Co.
 Engine Co.
 Webster, Camp & Lane
 Mach. Co.
 Wright & Adams Co.
 (See Machinery.)
Excavators
 Bucyrus Steam Shovel & Dredge Co.
Fans, Steam
 Cole, Wm. E.
Fertilizer Machinery
 Poole, R., & Son Co.
Fibre Conduit
 Fibre Conduit Co.
Fire Brick and Clay
 Garden City Sand Co.
Flour Mill Machinery
 Poole, R., & Son Co.
Flourishers
 Obermayer Co.
 Poole, R., & Son Co.
Fly Wheels
 Obermayer Co.
Foundries
 Fraser & Chalmers.
 Poole, R., & Son Co.
Foundry Cranes
 Obermayer Co.
Foundry Supplies
 Obermayer Co.
Friction Clutches
 Poole, R., & Son Co.
Fuel Oil
 Star Burner Co.
 Poole, W. B. & Co.
 Sheffield Car Co.
 Moore, S. L. & Son Co. (See Machinery.)
 Climax Fuse Co.

Gas Engines.
 Weber Gas & Gasoline Engine Co.
Gas Works
 Pollock, Wm. B. & Co. | Wood, R. D. & Co.
 Gauges, Recording, Etc.
 Allen, Chas. A. | Bristol Mfg. Co.
Gearing
 Fraser & Chalmers. | Poole, R., & Son Co.
Grain Elevators
 Poole, R., & Son Co.
Grease, Graphite, Etc.
 Dixon, Jos., Crucible Co.
Hangers
 Poole, R., & Son Co.
Heavy Machinery
 Fraser & Chalmers. | Poole, R., & Son Co.
 Mueller Mfg. Co.
Hose, Rubber, Etc.
 Allen, Chas. A.
 Mineralized Rubber Co.
 New York Belting & Packing Co., Ltd.
Injectors
 Young Lock Nut Co.
Inspection and Tests
 Hunt, The Robert W. Co.
Insulated Wires and Cables
 Okonite Co., Ltd.
Insurance Companies
 Hartford Steam Boiler Inspect'ns and Ins. Co.
 Mutual Life Insurance Co.
Iron Castings
 Poole, R., & Son Co.
Ladders
 Obermayer Co.
Lamps, Miners'
 Stieren, Wm. E.
Lead, White, Machinery
 Poole, R., & Son Co.
Locomotives
 General Electric Co. | Porter, H. K., & Co.
 Hunt, C. W. Co. | Thomson - Houston International Co.
Machine Molded Gearing
 Poole, R., & Son Co.
Machinists
 Fraser & Chalmers. | Poole, R., & Son Co.
Marine Railways
 Poole, R., & Son Co.
Machinery
 Aetna Fdy. & Mach. Co.
 Allis, Edw. F., & Co.
 Amer. Mining & Milling Machinery Co.
 Armstrong Brothers.
 Beckett Foundry & Mach. Co.
 Bostelmann, L. F.
 Boston Ore Mach'y Co.
 Buckeye Engine Co.
 Bullock, M. C., Mfg. Co.
 Carp'ter, Geo. B. & Co.
 Colorado Iron Works.
 Exeter Mach. Wks. Co.
 Fraser & Chalmers.
 Griffith & Wedge Co.
 Hendrie & Bolthoff Mfg. Co.
 Jeffrey Mfg. Co.
 Krupp, F.
 McKelgan, S. G. & Co.
 Mech'l Gold Extr. Co.
 Mecklenburg Br. Wks.
 Moore, Sam. L., & Son.
 Johnson, Matthey & Co.
 Leach, Wm. B. & Co.
 Mathison Sm'ling Co.
 Orford Copper Co.
 Phelps, Dodge & Co.
 Picher Lead Co.
 State Ore Sampling Co.
 Victor Chemical Co.
Metal Dealers
 Abbott, Wheelock & Co.
 American Metal Co.
 Am. Zinc-Lead Co.
 Baker & Co.
 Bath, Henry & Son.
 Baura Co.
 Goldsmith Bros.
 James & Shakspeare.
Metallurgical Works and Ore Processors
 American Zinc Lead Co.
 Baker & Co.
 Balbach Smelting & Refining Co.
 Baltimore Copper Works.
 Canadian Copper Co.
 Fraser & Chalmers.
 Goldsmith Bros.
 Kansas City S. & Ref. Co.
 Ledoux & Co.
 Mechanical Gold Extractor Co.
 Orford Copper Co.
 Pennsylvania Salt Mfg. Co.
 Ricketts & Banks.
 Russell Process Co.
 St. Louis Sampling & Testing Works
 State Ore Sampling Co.
 Walburn-Swenson Mfg. Co.
Min. Cars
 Sheffield Car Co.
Mining and Land Compauces
 Amer. Devel. & Mfg. Co.
 Atlantic Mfg. Co.
 Boston & Mont. Mfg. Co.
 Butte & Boston Mfg. Co.
 Central Mfg. Co.
 Copper Queen Mfg. Co.
 Detroit Copper Mfg. Co.
 Eureka Co.
Moulding Sand
 Garden City Sand Co.
Nickel
 Canadian Copper Co.
Nuts, Lock
 Young Lock Nut Co.
Oil, Fuel
 Star Burner Co.
Ore Cars
 Fraser & Chalmers. | Truax Mfg. Co.
Ore Testing Works
 Hunt & Robertson. | Ricketts & Bank.
 Ledoux & Co. | State Ore Sampling Co.
Packing and Pipe Coverings
 Brandt, Randolph. | New York Belting & Packing Co., Ltd.
 Jenkins Bros. | Wycokoff & Son, A.
 Keasby, Robt.
 Mineralized Rubber Co.
Perforated Metals
 Aitchison, R., Perf. Metal Co.
 Fraser & Chalmers.
 Harrington & King Perforating Co.
 Hendrick Mfg. Co.
Periodicals
 Arms and Explosives. | Iron & Coal Trades Review.
 Australian Mng. Stand'd. | Indian Engineering.
 El Minerio Mexicano. | Jour. of Assoc. of Engineering Societies.
 Electrical Plant & Electrical Industry. | Mining Journal.
 Financial Times.
 Phonograph.
 Trenholm, Paul C.
Phosphor-Bronze
 Phosphor-Bronze Smelting Co.
File Drivers
 Bucyrus Steam Shovel and Dredge Co.
Pipe
 Pollock, Wm. B. & Co. | Wycokoff & Sons, A.
 Poole, R., & Son Co.
Planed Gearing
 Poole, R., & Son Co.
Platinum
 Johnson Matthey & Co.
Plumbago-East India
 Obermayer Co.

Portland Cement
 Atlas Cement Co.
Powder
 Etna Powder Co.
 Laffin & Rand Powder Co.
 Lau, J. H., & Co.
Publications
 Allison Coupon Co. | Financial Times.
 Arms & Explosives. | Iron & Coal Trades Rev.
 Australian Mining Standard. | Jour. of Assoc. of Engineering Societies.
 Electrical Plant & Electrical Industry. | Mining Journal.
Pulleys
 Poole, R., & Son Co.
Pumps
 Etna Fdy. & Mach. Co. | Knowles Steam Pump Works.
 Allen, Chas. A. | McGowan, John H. & Co.
 Blake, Geo. F., Mfg. Co. | Pulsometer Steam Pump Works.
 Cameron, A. S., Steam Pump Works. | Scoville Iron Works & Frasier & Chalmers.
 Epping, Carp'ter & Co. | Goulds Mfg. Co. | Stillwell-Bierce & Smith-Valle Co.
 Groetzinger & Sons. | Jeannville Iron Wks. | Worthington, Henry
Quarrying Machines
 Bostelmann, L. F.
 Ingersoll-Sergeant Rock Drill Co.
 Rand Drill Co.
 Sullivan Machinery Co.
 Union Wire Rope Tramway Co.
Quicksilver
 Eureka Co.
Railroads
 Midland R. of Kentucky.
Railroad Supplies and Equipment
 Carp'ter, Geo. B. & Co. | Porter, H. K., & Co.
 Garden City Sand Co. | Robinson & Orr.
 Hunt, C. W., Co. | Young Lock Nut Co.
 (See Machinery.)
Regulators, Dampers, Heat, Etc.
 Eddy Valve Co. | Mason Regulator Co.
 Lunkenheimer Co.
Rock Drills (See Air Compressor.)
Rolling Mill Machinery
 Poole, R., & Son Co.
Roofing
 Berlin Iron Bridge Co.
 Holton Iron & Steel Roofing Co.
 Holton Bridge and Const. Co.
 Phelps, Dodge & Co.
 Pittsburgh Bridge Co.
 Scaife, Wm. B. & Sons.
 Youngstown Bridge Co.
Rope Wheels
 Poole, R., & Son Co.
Rubber Goods
 New York Belting & Packing Co., Ltd.
Safety Lamps
 Wm. E. Stieren.
Screens
 Aitchison, R., Perf. metal Co.
 Exeter Machine Works Co.
 Fraser & Chalmers.
 Harrington & King Perforating Co.
 Tyler W. S., Wire Works Co. (See Machinery.)
Screen Plates
 Harrington & King Perforating Co.
Separators
 Harrison Safety Boiler Works.
Shafting
 Poole, R., & Son Co.
Shoes and Dies
 Chronos Steel Works. | Chalmers & Fraser.
 Crescent Steel Co.
Shovels (Steam)
 Bucyrus Steam Shovel & Dredge Co.
 Souther & Co.
Smelting and Refining Works
 Balbach S. & Ref. Co. | Penna. Salt Mfg. Co.
 Baltimore Cop'g Wks. | Penna. Smelting and Refining Works.
 Kansas City S. & Ref. Co. | Phelps, Dodge & Co.
 Mathison Smelting Co. | P h o s p h o r - B r o n z e Smelt. Co.
 Orford Copper Co.
Steam Fans
 Cole, Wm. E.
Steel Rails, Castings, Rolls, Drill Steel
 Abbott, Wheelock & Co. | King & Andrews Co.
 Bethlehem Iron Co. | Moore, S. L., & Son Co.
 Chester Steel Cast. Co. | Roberts, A. F., & Co.
 Chroms Steel Works. | Robinson & Orr.
 Crescent Steel Co. | Whitney, A., & Sons.
 Exeter Machine Wks. Co. | (See Metal Dealers.)
 Harrison, A., Fdry. Co. | Pollock, Wm. B. & Co.
 Scaife, Wm. B. & Sons.
 Williams Mfg. Co.
Tapping Machine, Gas Main, Etc.
 Mueller Mfg. Co.
Telegraph Wires and Cables
 Okonite Co., Ltd., The.
Tin Plate Rolling Machinery
 Poole, R., & Son Co.
 Pratt & Whitney Co.
Tubes
 Pollock, Wm. B. & Co. | Williams Bros.
Tube-Rubber
 New York Belting and Packing Co., Ltd.
Turbines
 James Leffel & Co., The.
 Poole, Robt. & Son Co.
 Stillwell-Bierce & Smith-Valle Co.
Turbine Water-Wheels
 Poole, R., & Son Co.
Valves
 Eddy Valve Co. | Lunkenheimer Co.
 Jenkins Bros. | Mason regulator
Ventilators
 Bullock, M. C., Mfg. Co. | Fraser & Chalmers.
 Bostelmann, L. F. | Valenite Emery Wheels
 New York Belting and Packing Co., Ltd.
Washers
 Milton Mfg. Co.
Water Pressure Reducers
 Mueller Mfg. Co.
Water Pressure Regulators
 Mueller, H., Mfg. Co.
Water-Wheels
 Poole, R., & Son Co.
Well Drilling Machinery
 Bostelmann, L. F.
 Penna. Diamond Drill & Mfg. Co.
 Sullivan Machinery Co.
 Williams Bros. | Sheffield Car Co.
White Lead Machinery
 Poole, R., & Son Co.
Wire Cloth
 Aitchison, R., Perf. Metal Co.
 Harrington & King Perforating Co.
 Tyler W. S., Wire Works.
Wire Rope & Wire
 Abbott, Wheelock & Co. | Leachen, A., & Sons
 Co. | Rope Co.
 Broderick & Bascom. | Phelps, Dodge & Co.
 Rope Co. | R'bling, J. A. Sons & Co.
 California Wire Wks. | Ropeways Synd. Ltd.
 Carp'ter, Geo. B. & Co. | Trenton Iron Co.
 Cooper, Hewitt & Co. | Williamsport Wire Rope Co.
 Hunt, C. W., Co.
Wire Rope Tramway
 Brown Hoist. & Convey. Machine Co.
 California Wire Works.
 Colorado Iron Works.
 Cooper, Hewitt & Co.
 Fraser & Chalmers.
 Hunt, C. W., Co.
 Roehling, J. A., Sons & Co.
 Trenton Iron Co.
 Vulcan Iron Works.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

Positions Vacant.

1332 WANTED—A MANAGER THOROUGHLY familiar with the manufacture of alum. Address ALUM, ENGINEERING AND MINING JOURNAL.

1334 WANTED—MINING ENGINEER and assayer, speaking and writing Spanish, for silver mines; salary \$75. Address, with full particulars as to experience and references, ZACATEC, ENGINEERING AND MINING JOURNAL.

1335 WANTED—FIRST-CLASS ENGINEER for large steam plant. One familiar with both theory and practice. Answer with references and salary required, to PROCTOR, ENGINEERING AND MINING JOURNAL.

1336 THERE IS AN OPENING ON THE editorial staff of the ENGINEERING AND MINING JOURNAL. Preferably a mining engineer and metallurgist familiar with our Western mining districts, and who has had experience in reading exchanges and newspaper work. Address, stating experience and salary expected, STAFF, ENGINEERING AND MINING JOURNAL.

1337 WANTED—A COMPETENT FOREMAN for converting department of copper plant. Must have experience in blowing copper. Give full particulars and references. Address "DURANGO," ENGINEERING AND MINING JOURNAL.

1338 WANTED—ASSISTANT IN ANALYTICAL laboratory; one experienced in analysis of ores, coals, limestones, phosphates, etc., and assaying of gold and silver ores. Address, with references, stating age, experience and salary expected ANALYTICAL, ENGINEERING AND MINING JOURNAL.

1339 WANTED—CHEMIST AND ASSISTANT to superintendent of copper smelter. Young active man, competent and reliable in analytical laboratory work, willing to work at all hours when needed, with several years' practical experience in smelting copper ores in blast furnaces and in roasting said ores. Location of works in the Southern States. State experience, age, and salary wanted. Address SMELTER, ENGINEERING AND MINING JOURNAL.

1340 WANTED—TWO EXPERIENCED furnacemen as foremen for large water jacket blast furnace smelting roasted copper ores into matte. State experience, also age, and salary wanted. Address COPPER, ENGINEERING AND MINING JOURNAL.

1341 WANTED—CHEMIST TO GO TO Florida. Address, stating references, salary expected, etc., GLOBE, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

Advertisements for SITUATIONS WANTED will be Charged only 10 cents a line.

AN ALL-ROUND CIVIL ENGINEER (thoroughly American) familiar with Spanish language and customs, capable of taking full charge, willing to be an assistant. If with general contracting firm prefer an interest to salary; at present second chief engineer; employers as reference. Experienced in handling, reconnaissance, preliminary, location, construction and men, both as engineer and superintendent. Parties needing the same (especially those interested in South American enterprises) address CHARACTER, ENGINEERING AND MINING JOURNAL. No. 16,527, Aug. 4.

MECHANICAL ENGINEER, WITH VALUABLE experience in arranging, designing and operating mining machinery with compressed air and coal as a specialty, is open for engagement. Technical graduate, Jun., A. S. M. E., member Franklin Institute and other societies. Address MECHANICAL, ENGINEERING AND MINING JOURNAL. No. 16,651, July 14.

POSITION WANTED BY A YOUNG GRADUATED Technical Chemist, two years and a half experience in sulphuric acid and roasting of ores. Excellent certificates and references. Address H. H., ENGINEERING AND MINING JOURNAL. No. 16,718, July 14.

POSITION WANTED AS ASSISTANT TO mine manager or mining engineer, by a recent graduate of the Columbia College School of Mines. Address METAL MINING, ENGINEERING AND MINING JOURNAL. No. 16,509 1/2.

OPEN FOR ENGAGEMENT. HAVE HAD charge of the mining engineering department of the Michigan Mining School for the past four and one-half years. Practically experienced in all kinds of mine surveying, in railroad and in general engineering work. Well acquainted with mining on Lake Superior. F. W. DENTON, Houghton, Mich. No. 16,602, July 21.

SITUATION AS MINING ENGINEER, ASSISTANT superintendent, or with manufacturer of mining machinery; technically educated; experienced; familiar with the mining of large bodies of ore; large mining acquaintance; references furnished. Address L. S., ENGINEERING AND MINING JOURNAL. No. 16,648, July 21.

ASSAYER AND CHEMIST DESIRES POSITION; is a graduate with many years' experience in Colorado and Mexico; speaks Spanish fluently and can give first-class references as to character and capacity. Address T. X. W., ENGINEERING AND MINING JOURNAL. No. 16,646, July 21.

METALLURGIST AND CHEMIST OF eight years' experience as assistant superintendent, superintendent and consulting metallurgist of lead refining, lead concentrating, pyritic smelting, copper smelting and copper refining works, will be at liberty shortly to take new position. Familiar with the latest metallurgical processes and improvements in the winning of metals from their ores, and the treatment of furnace and mill products. Terms reasonable. Address SMELTING AND REFINING, ENGINEERING AND MINING JOURNAL. No. 16,650, July 28.

AN ALL ROUND MAN OPEN FOR EN- gagement, will go anywhere as a machinist or mine foreman. Practically experienced in both branches. Address TEMPERENCE, ENGINEERING AND MINING JOURNAL. No. 16,647, July 14.

A GRADUATE CIVIL ENGINEER AND student of mining and geology wants position specially fitted for prospecting and exploring. A 1 reference. Address PROSPECTOR, ENGINEERING AND MINING JOURNAL. No. 16,648, July 28.

METALLURGIST OF WIDE EXPERIENCE in the building and operation of concentrating works, lead and copper smelting works, copper converting works, silver refineries, etc., will be at liberty in a few months to make new engagement. Should like to correspond with any company requiring a superintendent either for the construction of new works or the operation of existing works. Terms very moderate. Address CONSTRUCTION, ENGINEERING AND MINING JOURNAL. No. 16,649, July 28.

AN AMERICAN OF MIDDLE AGE, WITH scientific education and long experience in purchasing and smelting argentiferous lead ores, desired position as agent or superintendent of works. Speaks and writes Spanish; satisfactory references. R. M. T., ENGINEERING AND MINING JOURNAL. No. 16,645, July 21.

**Contracts Open.**

ARC LIGHTS.—Rome, N. Y.—C. A. Fowler invites bids until Aug. 6 for furnishing 150 arc lights for one, three or six years.

U. S. ENGINEER OFFICE, NEWPORT, R. I.—Sealed proposals, in triplicate, for stonework at Stonington breakwater, Conn., will be received here until July 17th, 1894. Attention of bidders is invited to Act of Congress approved August 1st, 1892, Sections 1 and 2 (Public No. 193). Full information furnished on application. W. H. BIXBY, Captain Corps of Engineers, U. S. A.

STAND PIPE.—Proposals for furnishing and erecting upon its foundations a stand-pipe for the village of Glendale, O., will be received by the trustees of the water works of said village at the office of the secretary, United Bank Building, Cincinnati, O., until July 18th, 1894. Specifications and blank forms for proposals will be furnished upon application to CHAS. B. GOING, Secretary, United Bank Building, Cincinnati, O.

ORDNANCE SUPPLIES.—Springfield Armory, Springfield, Mass.—Sealed proposals, in triplicate, will be received until August 3, 1894, for furnishing forage, steel, iron castings, charcoal, lumber, hardware supplies, stationery, paints, oils, chemicals, soft soap, gasoline, black walnut gun stocks, etc., during the fiscal year ending June 30, 1895. All information furnished on application to COLONEL A. MORECAL, Ord. Dept.

The Most Successful Process for the Extraction of Gold. IMPROVED BARREL CHLORINATION.

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

JOHN E. ROTHWELL,
ENGINEERING AND MINING JOURNAL, New York.

WATER-WORKS.—Sealed proposals will be received by the Village of Coxsackie, N. Y., until July 20, 1894, for furnishing the materials and constructing a system of water works for said village. There will be required about 852 tons of cast-iron pipe, 6 tons of special castings, 45 fire hydrants, 32 gate valves, 30 valve boxes, a concrete reservoir dam, etc. Bids will be received for furnishing materials above or for constructing the works complete. Proposals must be addressed to the President of the Board of Trustees, and must contain a certified check or its equivalent, made payable to the President of the Board of Trustees of Coxsackie, N. Y., in an amount equal to two (2) per cent. of the amount of the bid. Plans may be seen and specifications and blank forms of proposal procured at the office of the village clerk, Coxsackie, N. Y., or at the office of the engineers, Voorhees & Witmer, Rooms 65 and 66 Chapin Block, Buffalo, N. Y. The right is reserved to reject any and all bids. THOS. B. ALCOTT, President Board of Trustees; WILLIAM K. REED, Village Clerk.

ELECTRIC LIGHTING.—Rome, N. Y.—Bids for lighting the streets of the city with electric lights will be received until August 6th. Proposals must be for one, three and six years, for 150 arc lights, more or less, of 2,000 candle power, to be lighted every night from sunset to sunrise. Also for same lighted from one-half hour after sunset till one-half hour before sunrise and from one hour after sunset till one hour before sunrise. A preliminary bond of \$2,000 must accompany each proposal. For further particulars address ALD. CHARLES A. FOWLER, Chairman of Lamp Committee. K. S. Putnam, Chamberlain.

BRIDGE.—New Westminster, B. C.—Separate sealed tenders, properly indorsed, will be received by D. Robson, City Clerk, City Hall, until July 31st, for the construction of a combined railway and traffic iron bridge over Fraser River at New Westminster. Plans, specifications and forms of tender may be seen at the City Hall. A set of printed specifications and forms of tender and blueprints of plans will be furnished to any person applying on payment of \$20. Persons tendering may furnish alternate plans with tenders based thereon for the several parts of the work, but such plans must provide for a first-class combined railway and traffic bridge with steel and iron superstructure. A. M. HERRING, Chairman Bridge Committee.

POWER HOUSE.—Detroit, Mich.—Sealed proposals for power house and office building for the 8'0-ft. lock, St. Mary's Falls canal, will be received until July 28. Information furnished on application to O. M. POE, Colonel Corps of Engineers.

WATER-WORKS.—Grafton, W. Va.—Bids will be received until July 16, for furnishing all material and performing all labor necessary for the construction of a water-works plant for the above corporation. The work to be done embraces the following: Part 1.—Furnishing cast-iron pipe about 430 tons. Part 2.—Furnishing valve and fire hydrants. Part 3.—Hauling and laying pipes and valves. Part 4.—Constructing steel tank. Part 5.—Furnishing two 1,000,000-gallon pumping engines. Part 6.—Furnishing boiler plant, 200 horse power. Part 7.—Constructing boiler and engine house. B. F. BAILEY, Secretary.

WATER WORKS.—Napoleon, O.—Bids will be opened July 24th for one brick building for the entire plant; one brick stack 75 ft. high; water-works machinery; two 1,000,000-gallon pumps; about 8 miles of pipe, 14 to 4; 72 hydrants, etc., and two boilers. JOSIAH KALLER, Secretary.

WATER-WORKS.—On the 17th day of July, 1894, the city of Kaukauna, Outagamie County, Wisconsin, will let a franchise to the lowest and best bidder for the construction of a water-works system. The city will contract for 90 hydrants, Population, 6,000. For further particulars address City Clerk, Kaukauna, Wis. H. B. TANNER, Mayor.

ROCK REMOVAL.—U. S. Engineer Office, Newport, R. I.—Sealed proposals, in triplicate, for removing ledge rock in Pawtucket River, R. I., will be received here until July 31st, 1894, and then opened. Attention of bidders is invited to Act of Congress approved August 1st, 1892, Sections 1 and 2 (Public No. 193). Full information furnished on application. W. H. BIXBY, Captain Corps of Engineers, U. S. Army.

DREDGING STEAMER.—U. S. Engineer Office, Wilmington, N. C.—Sealed proposals for building a dredging steamer will be received here until August 2d, 1894, and then publicly opened. All information furnished on application. W. S. STANTON, Major Corps of Engineers, U. S. Army.

Continued on page 19.

CHLORINE LIQUID

For Extraction of Gold.

FOR SALE BY

WM. PICKHARDT & KUTTROFF.

98 LIBERTY STREET, NEW YORK.

MACHINERY AND SUPPLIES FOR SALE.

**STEEL RAILS,
NEW OR SECOND-HAND.**

We can furnish any weight of New Rails. We also have for immediate delivery 400 tons of Second-Hand 60 lb. Steel T Rails, 100 tons 35 lb. Girder and 300 tons 45 lb flat steel; all well fit to relay, and cheap.

ROBINSON & ORR,
No. 419 Wood Street, Pittsburg, Pa.

FOR SALE.

1 Ryan-McDonald Saddle Tank Locomotive, weight 7 tons.
30 Ryan-McDonald 2 cubic yard side Dump Cars.
1/2 mile 30-lb. steel T Rails. All new.
Complete outfit will be sold cheap for cash.
Address **J. E. THURSBY,**
45 Broadway, N. Y.

**FOR SALE OR TO LEASE
ON GOOD TERMS,**

A Manufacturing Water Power Plant,
stone buildings, 1,300 horse-power, fully equipped with turbines; suitable for a wood pulp mill, electrolytic refining works, or metal rolling mill; advanced and suitably situated. Address **MANUFACTURING, ENGINEERING AND MINING JOURNAL.** No. 16,587, 17.

FOR SALE.

One 12-in. Second Hand Sturtevant Mill
for crushing and grinding ores. In good condition.
Address **Room 21, 5 Wabash Ave., Chicago, Ill.**

FOR SALE.—A VALUABLE GOLD MINING
Property; title, United States patents, extensive tunnel development and rich, free milling ore; full-est possible investigation solicited; only responsible parties willing to pay fair price for a satisfactory property need apply; bank references exchanged. Address P. O. BOX 918, Philadelphia, Pa.

FOR SALE.

The Star and Crescent Furnace, capacity 50 tons per day, with all the Buildings, Ore Lands, Tramways and Equipments. The whole of it new and in good running order. Plenty of ore, cheap charcoal, plenty of labor and plenty of water. Pig iron can be made cheaper than in any other part of the Union. This furnace is located on a railroad line, and is situated in Cherokee County, Texas, near New Birmingham.

LEON F. HAUBTMAN,
Room 9, Godchaux Building, New Orleans, La.

FOR SALE.

A New Steam Dredge,

Built by Marion Steam Shovel Company; capacity of dipper, one cubic yard; daily capacity of dredge, 600 to 900 cubic yards per 10 hours. Also 5 1/2 ton Locomotive and 15 side-dump cars of two cubic yards capacity, 36-in. gauge; together with about 5,000 ft. 16-lb. iron rail.

The above machinery is new (locomotive and cars built by Ryan, McDonald & Co., of Baltimore, Md.), and is now in Florida, where it will be sold cheap for cash or approved paper.

Address **L., P. O. Box 542,**
Syracuse, N. Y.

BARGAINS IN FURNITURE.

Several flat-top black walnut and mahogany desks, black walnut, cane-seated arm chairs, for sale. Address

SCIENTIFIC PUBLISHING CO.,
253 Broadway, New York.

DIVIDENDS.

HOMESTAKE MINING COMPANY,

MILLS BUILDING, 15 Broad St.,

NEW YORK, July 13, 1894.

DIVIDEND 192.

The regular monthly dividend, FIFTEEN (15) CENTS PER SHARE, has been declared for June, payable at the office of the company, San Francisco, or at the transfer agency in New York on the 20th inst.

Transfer books close on the 20th inst.
LOUNSBERY & CO., Transfer Agents.

STANDARD CONSOLIDATED MINING COMPANY, OF BODIE, CAL.

SAN FRANCISCO, Cal., June 18, 1894.
DIVIDEND NO. 85.

Of TEN (10) CENTS a share, is payable here and at Farmers' Loan & Trust Company, New York, July 25th. Transfer books close July 14th.

J. W. PEW, Secretary.

MISCELLANEOUS WANTS.

WANTED.

EXPERIENCED CONTRACTORS

to join in sinking a deep shaft through wet ground. Must be able to command \$100,000; very large profits can be made on the job.

SHAFT,
ENGINEERING AND MINING JOURNAL.

THE SO-CALLED SQUIRTING OFF (PARTIAL CRACKING OFF) OF (IN) ENAMEL can be remedied even in the most obstinate cases, against a small payment, by a safe and efficient process. Acknowledgments can be furnished. Address **I. A., 9693 Rudol Mosse, Berlin, S. W. (Germany).**

**THE GOLD AND SILVER
EXTRACTION COMPANY**



**OF AMERICA,
LIMITED.**

MacARTHUR-FORREST

Process.

**CAPITAL,
£110,000 Sterling.**

TO MINEOWNERS and others having Refractory Gold and Silver ores hitherto untreatable at a profit, the **MacArthur-Forrest (Patent) Process** of gold and silver extraction offers a solution of the difficulty.

Advisory Board in the United States: **THOMAS W. GOAD, Mgr.** **HUGH BUTLER, Atty.** **JOHN F. BELL,** **P. GEORGE GOW.** **DENVER, COLO.**

OFFICE:

McPhee Building, - Denver, Colo.

Contracts Open.

Continued from page 18.

POWER-HOUSE, ETC—Detroit, Mich., for power-house and office building for the 800-ft. lock, St. Mary's Falls Canal, until July 28. **O. M. POE, Col.** Corps of Engineers.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., July 11, 1894.—Sealed proposals will be received at this office until 2 o'clock P. M. on the 14th day of August, 1894, and opened immediately thereafter, for all the labor and materials required for the erection and completion of the U. S. Post Office building at Meridian, Miss., in accordance with the drawings and specifications, copies of which may be had at this office or the office of the Superintendent at Meridian, Miss. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for the Erection and Completion of the U. S. Post Office Building at Meridian, Miss.," and addressed to **JEREMIAH O'ROURKE, Supervising Architect.**

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C., July 11, 1894.—Sealed proposals will be received at this office until 2 o'clock P. M. on the 14th day of August, 1894, and opened immediately thereafter for all the labor and materials required for the erection and completion of the U. S. Post Office building at Meridian, Miss., in accordance with the drawings and specifications, copies of which may be had at this office or the office of the superintendent at Meridian, Miss. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposals for the Erection and Completion of the U. S. Post Office Building at Meridian, Miss.," and addressed to **JEREMIAH O'ROURKE, Supervising Architect.**

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., July 7, 1894.—Sealed proposals will be received at this office until 2 o'clock P. M. on the 31st day of August, 1894, and opened immediately thereafter, for all the labor and materials required for the surgeon's house (except heating apparatus), and isolated ward for the U. S. Marine Hospital, Detroit, Mich., in accordance with drawings and specifications, copies of which may be had at this office or the office of the superintendent at Detroit, Mich. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid should it be deemed in the interest of the government to do so. All proposals received after the time stated for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for Surgeon's House and Isolated Ward Building for the U. S. Marine Hospital, Detroit, Mich.," and addressed to **JEREMIAH O'ROURKE, Supervising Architect.**

The Only
Treatise on

**MINING
METALLURGY**

Markets and Uses of the
Commercial Minerals and
Metals that is

**ABSOLUTELY
UP TO DATE**

**The
Mineral
Industry,**

Its Statistics, Technology and
Trade, from the Earliest
Times to the close of 1893.

OUT. OUT. OUT.

This great volume of more than one thousand pages treats of minerals and metals and their products, and contains numerous technical monographs of the greatest value.

Every one interested in knowing the very latest and best methods in use for producing, extracting, and refining the useful minerals and metals, and the amounts and values of each produced and consumed in every part of the world, can find the information in this great work, and in no other book published in any language.

**2d ANNUAL VOLUME.
PRICE \$5.00.**

Order before
the supply is
Exhausted.

**THE
SCIENTIFIC PUBLISHING CO.,**
Publishers,
253 BROADWAY NEW YORK

THE HASENZAHL DIAMOND BIT ROCK DRILL

FOR HAND AND OTHER POWER.
Brings out a Core. Write for Particulars.
WM. HASENZAHL, Mfr.,
49 East Second Street, Cincinnati, Ohio.

HUNT & ROBERTSON,
77 PINE ST., NEW YORK,
ANALYSTS & ASSAYERS,
MINING ENGINEERS.
Specialty Made of Copper Metallurgy.

THE CANADIAN COPPER CO.

HEAD OFFICE:
Room 201 Perry-Payne Bldg., Cleveland, O.
Miners and Smelters of Copper-Nickel
Ores at Sudbury, Ontario, Can.

COPPER AND NICKEL.

BALTIMORE
Copper Smelting and Rolling Company
(THE BALTIMORE COPPER WORKS),
Office: KEYSER BUILDING,
BALTIMORE, MD.

INGOT COPPER. SHEET COPPER.

J. STOCKLY CARY, Chemist and Assayer Dep't of Mines and Mining; Chemist of National Bureau of Awards, World's Columbian Exposition.
JOHN E. MOORE, formerly with Rattle, Nye & Hollis, Rookery Building.

CARY & MOORE,
Analytical and Consulting Chemists, Samplers and Assayers,
1760 Monadnock Bldg., CHICAGO, ILL.
Specialty: Coal and Coke Analyses.

THE AMERICAN METAL CO. LIMITED.

80 Wall Street (P. O. Box 957), NEW YORK.
114 Laeclde Building, ST. LOUIS, MO.
COPPER, COPPER ORES AND MATTES, TIN, LEAD,
SPELTER, ANTIMONY, NICKEL, ALUMINUM.
ADVANCES MADE ON CONSIGNMENTS.
Agents for Henry R. Merton & Co., London; Metallgesellschaft, Frankfurt-on-Main; Williams, Foster & Co., Limited, Swansea, Eng.; Pascoe Grenfell & Sons, Limited, Swansea-Eng.; Balbach Smelting & Refining Co., Newark, N. J.

ORFORD COPPER CO., COPPER SMELTERS

Works at Constable's Hook, N. J., opposite New Brighton, Staten Island. Copper Ore, Mattes, or Bullion purchased. Advances made on consignments for refining and sale. Specialty made of Silver-Bearing Ores and Mattes.

SELL
INGOT AND CAKE COPPER.
President, **ROBERT M. THOMPSON,**
Office, 37 to 39 Wall Street, New York.

JAMES & SHAKSPEARE, ENGLAND.

1 Metal Exchange Buildings, London, E. C.,
AND
17 Irwell Chambers West, Liverpool.

METALS, MATTES AND MINERALS.

Cable Address, **METALLURGY, LONDON.**
Use A B C Code, 4th Edition.

Established 1846.
W. & L. E. GURLEY, TROY, N. Y.
Largest Manufacturers of Civil Engineers' and Surveyors' Instruments. Send for Illustrated Circular Price List showing latest improvements.



THE HARRINGTON & KING PERFORATING CO.
CHICAGO.

**METALS PERFORATED AS REQUIRED
FOR MINING SCREENS OF ALL KINDS.**

FOR USE IN

MILLING AND MINING MACHINERY, REDUCTION AND CONCENTRATING WORKS, WOOLLEN, COTTON, PAPER AND PULP MILLS, RICE, FLOUR AND COTTONSEED OIL MILLS, SUGAR AND MALT HOUSES, DISTILLERIES, FILTER PRESSES,	STONE, COAL AND ORE SCREENS, STAMP BATTERY SCREENS, BRICK AND TILE WORKS, FILTERS, SPARK ARRESTERS, GAS AND WATER WORKS, OIL, GAS AND VAPOR STOVES, COFFEE MACHINERY, ETC., ETC.
---	---

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.
Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A.
Eastern Office, No. 284 Pearl St., New York.

LEWISOHN BROTHERS,

P. O. Box 1247. 81 and 83 FULTON STREET, NEW YORK.
Advances made on Copper, Matte and Ores.
Agents for the following Mining Companies: Boston & Montana C. C. & S. Mining Co. Tamarack Mining Co.; Butte & Boston Mining Co.; Osceola Consolidated Mining Co. Arizona Copper Co., Ltd.; Kearsarge Mining Co.

HIGH GRADE HOISTING ENGINES AND DRUMS.

We have some of the heaviest plants in the world in Iron, Copper and Silver Districts of United States.
OUR CORLISS ENGINES ARE DESIGNED EXPRESSLY FOR HOISTS
SEND FOR CATALOGUE.

OTHER SPECIALTIES.
Diamond Core Drills.
Rock Drills and Air Compressors.

Cable Address:
"BULLOCK."

M. C. BULLOCK MFG. CO.,
37 Canal Street, Chicago, Ill.

LEDOUX & CO., 9 Cliff Street, New York.

Assayers and Engineers.

ORES, BARS, BULLION AND ALL FURNACE PRODUCTS SAMPLED AND ASSAYED.
Public Ore Yards and Sampling Works.
ADVANCES OBTAINED ON CONSIGNMENTS. PRINCIPAL BANKS AND METAL BUYERS ACCEPT OUR CERTIFICATES AS FINAL.
ASSAYERS BY APPOINTMENT TO NEW YORK METAL EXCHANGE.

RIGGETTS & BANKS, 104 John St., New York.

ORES TESTED!

Complete Ore Milling and Testing Works for making practical working tests of ores to determine the Best Method of Treatment. Milling, Metallurgical and Chemical Processes Investigated.

Assays and Analyses!

CIRCULARS AND TERMS ON APPLICATION.

DR. HENRY FROEHLING,

Chemical and Metallurgical Laboratory.
7 South 12th Street, Richmond, Va.

Assays and analyses of ores, furnace products, clays, limestones, phosphates, waters, coals, oils, gases, etc. Price lists of analyses on application. Mines and mineral properties in the South examined.

HASTINGS, JOHN B.,

Consulting Mining Engineer.
Office: Broad St. House, Old Broad St., London, E. O., England.
Present Address: Boise City, Idaho, U. S. A.

INDUSTRIAL CHEMISTRY.

Improvement and Invention of Processes and Products. Utilization of Wastes and Unapplied Substances. Experimental Investigation of Technical Problems. Expert Examinations and Tests. Formulas, Counsel and Opinions.

PETER J. AUSTEN, PH. D.,
99 Livingston St., BROOKLYN N. Y.

HENRY BATH & SON,

London, Liverpool and Swansea,
BROKERS.

All Description of
Metals, Mattes, Etc.

Warehouses, Liverpool and Swansea.
Warrants Issued under their Special Act of Parliament.

NITRATE OF SODA.
Cable Address: - BATHOTA, LONDON.

FRANCIS M. SIMONDS, E.M., Ph. D.,

Experimental, Analytical and Assay Laboratories.
20 Platt St. cor. of Gold, NEW YORK.
SPECIALTIES: Special Laboratory for Students and Business Men. Experimental Work on Chemical and Metallurgical Processes.