

ENGINEERING and MINING JOURNAL.

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MR. RICHARD P. ROTHWELL, Managing Editor of the JOURNAL, will leave to-day on the steamer Hadji, for St. John's, Porto Rico, at which place telegrams will reach him until the 11th of June.

THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The meeting of the Institute of Mining Engineers which began at Staunton on Tuesday was a pronounced success from the outset. The attendance of members was very large, and the number of ladies who escorted their husbands and brothers to the meeting was surprising. In fact, the interest taken by Woman in mine engineering and metallurgy is one of the phenomena of the age, which philosophers should study. And our boys are the philosophers to do it! The citizens of Staunton displayed a graceful and overflowing hospitality; the weather was delightful up to our latest advices; the papers read were interesting and important; and at the date our informant sent his hasty note, a large and merry party was starting for the Shenandoah Valley, to dine at the Luray Cave.

THE RENSSELAER POLYTECHNIC INSTITUTE.

It is with pleasure that we call attention to the announcement just made of the annual commencement exercises of this time-honored institution. The items of particular interest to the alumni are those noticed for the 14th and 15th of June. It is gratifying to see that those in authority are beginning to learn the value of the social element even in a college given to teaching in great measure the inexorable logic of mathematics and the immutable facts of science. This is shown by the new feature in the programme, inviting all the alumni and friends to a reception, to be given by the Institute on the evening of June 14th. We consider this an important step in advance, and would urge those interested to show their appreciation of it by a large attendance.

The Rensselaer Polytechnic Institute has turned out some of the best men in the profession of engineering to be found in our country, and is deserving of a still higher position than it now occupies. This it can not reach without an endowment sufficient to pay for first-class men in all its professorships; and the time has come when, even to hold its own, an endowment is a necessity.

No man can do his best work as a professor unless paid enough to free him from all anxiety as to an adequate support, and the Polytechnic can not keep its best men unless it pays them as much as other institutions offer.

We trust that the meeting of the alumni socially with the citizens of Troy will enable them to so present this matter as to awaken an interest

which shall result in a proper response, and remove the one hinderance to the onward progress of the first purely scientific school established in America.

The business meeting on the following day will afford an opportunity for the alumni to discuss their own duty in the same connection. Let each man come prepared to offer practical suggestions, so that the meeting shall be of real value.

It is gratifying to see that the Hon. CLARKSON N. POTTER has enough interest in his Alma Mater to turn aside from the cares of business and deliver the address to the graduates on the evening of the 15th of June.

NEW PUBLICATIONS.

GESTEINSDREHBOHRMASCHINE mit Differential-Schraubenvortrieb des Bohrers (Rotating Rock-Drilling Machine, with Differential Screw-Feed). By EGD JAROLIMEK, Royal Imperial Chief Mining Councilor, etc. Vienna: Manz's Publishing House. 1881. 8vo, 40 pages.

This pamphlet is a republication from the Austrian Zeitschrift of the present year. It discusses the latest developments of machine-drilling in Germany, and describes a peculiar rock-drill invented by the author.

Dr. STAFFF, in his classic work on rock-drilling, published in German and Swedish a little over ten years ago, calculates the loss of power in hand-boring with a hammer and drill, in the usual way, to be 95.6 per cent, leaving only 4.4 per cent of actual effect. This loss he divides as follows: In lifting the hammer, 50 per cent; by average inertia and imperfect elasticity of the tool, 21.8 per cent; in battering the tool, 5.1 per cent; in unnecessary pulverization of the chippings, 1.7 per cent; in ineffectual blows or misses, 17 per cent. Some of these figures seem too high; but there is no doubt that the waste of power is great.

The use of the best percussion-boring machines removes many of these sources of loss. But Councilor JAROLIMEK asserts that there are objections, economical and otherwise, inseparable from any system of boring by percussion. Among them he names the intermittent nature of the effect, and the strong reactionary vibration of the machine. Such apparatus, operated by hand, has never been introduced in mines, probably because the loss of power in the friction of the gearing, and the inconvenience of setting up and taking away the machine in confined stopes, etc., counterbalance the greater effectiveness of the drill itself. Power-drills on the percussive principle are, however, employed; but the loss of power is still great, particularly when compressed air is employed. Under unfavorable conditions, it has been calculated that the actual effect upon the rock may fall to 1 per cent of the crude power applied, 90 per cent being lost in transmission to the boring-machine, and 9 per cent in the boring itself. Though this is an extreme instance, Councilor JAROLIMEK claims that the best instances are so far unfavorable as to make the use of percussion-drills driven by compressed air not much less costly on the whole than hand-drilling, although when to gain time is specially an object, or when water or steam-power is comparatively cheap and labor dear, they are used with advantage. We need hardly point out that the higher wages paid in this country make the comparison more favorable to machinery.

The rotary drilling-machines are divided by Dr. STAFFF into abrading (schleifend) and cutting (keilend, schneidend, brechend) machines. The first class is represented by the diamond drill, which, although a great invention, and undoubtedly successful in deep borings, and to some extent in drifts and tunnels, does not thus far, for ordinary mining work, compete with hand-labor. In the sinking of the St. Clair shafts near Pottsville, we think it was found that time was saved, at an increased cost in money.

The cutting or wedging drills have teeth of steel, and are either pressed by direct hydraulic pressure against the rock, while they are rotated, or are advanced by strong screw-gearing, which effects both the pressure and the rotation. To the former class belong the drills of HAND and BRANDT (for the latter of which Dr. STAFFF claims priority of invention). The BRANDT hydraulic rotary drill has been found very effective in tunnels and drifts. But Councilor JAROLIMEK says that it has proved cheaper than hand-labor in ordinary mining, so far as he knows, in one mine only, where in favorable rock (Carboniferous slates and sandstones) it enabled the men employed to do four times the work per man, but at an actual cost per unit of work of only 18 per cent less than hand-labor—a difference scarcely sufficient to cover interest and repairs.

Dr. STAFFF has suggested that drills of this class might be rotated by hand-power, the pressure being directly given, as we have said, by an hydraulic column. This has not been practically tested; but Councilor JAROLIMEK expresses a doubt of its economy.

After discussing at some length the other classes of drills, our author proceeds to describe one invented by himself, in which the pressure, advance, and rotation are effected by a powerful hydraulic or steam motor and a differential screw. The steel chisel teeth cut out a core. Actual trial of the machine in the solid dolomite of Raibl in Carinthia (analogous to the lead-bearing dolomites of our Western territories) gave satisfactory results. Several hundred holes were bored, of one meter average depth and 67 millimeters diameter (the diameter of the bit being 65 millimeters).

The average advance, including the slower work in starting the holes, was 40 millimeters per minute. The drill revolved 11 to 13.5 times per minute. The (usually 5-toothed) bit has to be sharpened, on the average, after boring 2 meters, but may last to even 3 or 4 meters. The water-pressure employed was 18 atmospheres. The cost, as compared with hand-labor, was as follows:

	Hand.	Machine.
Labor.....	15.00	6.00
Explosives and fuses.....	9.75	22.82
Other supplies and blacksmithing.....	1.40	1.80
Interest and repairs on machine.....	2.00
Special labor in cleaning up the working-face, etc.....	2.00
	26.15	34.62

These sums are expressed in Austrian florins (of about 50 cents). It will be seen that the machine-boring required a much larger expenditure in explosives. This is due to the fact that the holes are drilled but 0.4 to 0.5 meter deep by hand—a depth which, for the given dimensions of gallery, and for the charges of dynamite and nitro-glycerine employed, was better suited to the maximum effectiveness. Our author regards the above results as encouraging, and suggests several ways of reducing the consumption of explosives. The main point is, that the drilling itself was so cheaply done.

AMERICAN SOCIETY OF CIVIL ENGINEERS—THIRTEENTH ANNUAL CONVENTION.

The Thirteenth Annual Convention of the Society will be held at Montreal, Canada, beginning Wednesday, June 15th, 1881, at half-past ten A.M.

Sessions for professional discussion and one for the transaction of business will be held.

The general arrangements for the Convention and for travel to and from Montreal, are in charge of a special committee.

Details of the programme are in charge of the local committee at Montreal, of which Mr. Thomas Keefer, M.A.S.C.E., is Chairman, and Mr. John Kennedy, M.A.S.C.E., is Secretary.

The titles of papers published in Transactions during the past year, or in preparation for publication, and upon which discussion is invited, are given below. Members are particularly desired to take part in discussion upon any of the subjects presented, either by these papers of the past year or by new papers. Members are also requested to present papers upon other subjects.

Arrangements are made to have such of the members as desire to do so meet at Niagara Falls on Saturday, June 11th, and examine the new suspended structure of the railroad suspension bridge, and the re-enforcement of its anchorage. A paper on this subject will be presented at the Convention by L. L. Buck, Member A.S.C.E., the engineer in charge of the work.

After spending Sunday at Niagara, the party will proceed to Toronto, and after a short stay at that city, will go to Montreal by a steamer, on Lake Ontario, passing on Tuesday the Thousand Islands and the Rapids of the St. Lawrence, and arriving at Montreal the evening before the day of the opening of the Convention.

Members who can not make the trip by way of Niagara and Toronto can go directly to Montreal, and should arrive there by June 15th. The families of members are invited to accompany them.

The arrangements at Montreal are in charge of a committee, and will be duly announced.

The general arrangements for the Convention, and for travel to and from Montreal, are in charge of the following Committee: T. C. Clarke, W. Katté, W. G. Hamilton, J. G. Van Horne, New York; John Newell, Chicago; Charles Paine, Cleveland; F. De Fumiak, Louisville; D. J. Whittemore, Milwaukee; G. Bouscaren, Cincinnati; Joseph M. Wilson, Philadelphia; Thomas J. Whitman, St. Louis; Henry B. Richardson, New Orleans; L. L. Buck, Niagara; Frederick Brooks, Boston.

Headquarters at Niagara will be the Cataract House, where favorable arrangements will be made.

Headquarters at Montreal will be the Windsor Hotel. Rates, \$2.50 and \$3 per day.

Arrangements in regard to transportation will be made on as favorable terms as possible by the Committee. Low excursion rates will generally be provided. Members intending to attend the Convention are requested to write to the addresses given below, stating the fact that they are members, and that they desire transportation over the routes named, except where the special arrangements are stated.

Boston to Montreal direct: Frederick Brooks, Esq., 130 Boylston street, Boston, Mass.

New York to Montreal direct; also New York to Niagara; Niagara to Montreal; also on return, Montreal to New York or to Buffalo: John Bogart, 127 East Twenty-third street, New York.

Pittsburg to Erie: F. Slataper, Chief-Engineer Pennsylvania Company, Pittsburg, Pa.

Chicago, Cleveland, or Erie to Niagara: the ticket agents at these points will sell round trip tickets to Buffalo and return, for one fare, to those presenting evidence of membership.

St. Paul or Milwaukee to Chicago: pay full fare in going—will be returned for one fifth fare on presentation of certificate of attendance, signed by the Secretary.

St. Louis to Niagara: T. J. Whitman, Water Commissioner, Eighth and Pine streets, St. Louis, Mo.

Cincinnati to Niagara: G. Bouscaren, Cons. and Prin. Eng. C. S. Railroad, 134 Vine street, Cincinnati, O.

Louisville to Niagara: D. W. C. Rowland, Gen. Supt. Trans. L. & N. Railroad, Louisville, Ky.

New Orleans to Niagara: Henry B. Richardson, Chief State Engineer, New Orleans, La.

Philadelphia and Baltimore and Washington to Niagara: Joseph M. Wilson, 435 Chestnut street, Philadelphia, Pa.

Papers published during the past year:

Progress of Work at the East River Bridge: F. Collingwood. The Variation Due to Orthogonal Strains in the Elastic Limit in Metals: R. H. Thurston. Appliances for Testing Cement: Alfred Noble. Design and Construction Table for Egg-shaped Sewers: G. G. Force, Jr. The Preservation of Timber: J. W. Putnam. Annual Address, Engineering Progress in the United States: O. Chanute. The Hudson River Tunnel: Arthur Spielmann and Charles B. Brush. American Natural Cement: F. O. Norton. South-Pass Jetties: Max E. Schmidt. Ship-Canal Locks Calculated for Operation by Steam: Ashbel Welch. The Causes of Fall of the Western Arched Approach to the South Street Bridge, Philadelphia: J. G. Barnard. Kutter's Diagram: C. H. Swan. Tensile Tests of Cement: D. J. Whittemore. Waterproof Coverings: F. Collingwood. The Location of the Chimboe Tunnels: O. F. Nichols. Practical Consequences of Variation of the Wet Sections of Rivers: R. E. McMath. Wind Pressure against Bridges: Ash-

bel Welch. Cheap Transportation versus Rapid Transit and Delivery: M. Corvelli. The Crippling Strength of Wrought-Iron Columns: C. L. Gates. Web Strains in Simple Trusses, with Parallel or Inclined Booms: E. Sweet, Jr. Inter-Oceanic Canal Projects; also, additional information obtained by Recent Surveys in Nicaragua: A. G. Menocal. The Strength of Wrought-Iron Columns: G. Bouscaren. The Improvement of the Harbor of Quebec: J. Vincent Browne. The Strongest of the Bronzes; a newly-discovered Alloy of Maximum Strength: R. H. Thurston. Renewal of Foundation and Transfer of a Lighthouse in Pascagoula Harbor: J. W. Putnam. The Sewerage of Memphis: F. S. Odell. The Ventilation of Halls of Audience: Robert Briggs. The Construction of the Second Avenue Line of the Metropolitan Elevated Railroad of New York: G. Thomas Hall. Exponent of the Principle of Moments: W. S. Auchincloss. Wind Pressure upon Bridges: C. Shaler Smith. The Methods of Determining Wind Pressures: F. Collingwood. The Removal of the Egyptian Obelisk to its site in the Central Park, New York City: Henry H. Gorringe. Quicksand in Excavation: Charles L. McAlpine. (Advance slips printed.)

The following papers are announced for presentation during the Convention: Re-enforcement of the Anchorage and Renewal of the Suspended Structure of the Niagara Railroad Suspension Bridge: L. L. Buck. The Stability of Tunnels in River Silt: Ashbel Welch. Repairs of Masonry: O. Chanute. Strength of Wrought-Iron Columns: T. C. Clarke. Weights and Measures: Charles Latimer. Comparative Economy of Light and Heavy Rails: Ashbel Welch.

JOHN BOGART, Secretary.
NO. 127 EAST TWENTY-THIRD STREET, NEW YORK, May 24, 1881.

THE STAUNTON MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The American Institute of Mining Engineers met at Staunton, May 30th. Among the distinguished members are President William Metcalf, of Pittsburg, Pa.; Dr. R. W. Raymond, of the ENGINEERING AND MINING JOURNAL, New York; Dr. Thomas Egleston, of the School of Mines, New York; Dr. Dudley, chemist of the Pennsylvania Railroad Company; Professor Persifer Frazer, of Philadelphia; Dr. T. Sterry Hunt, of Montreal; J. A. and J. T. Burton, of Troy, N. Y.; W. P. Ward, of Savannah, Ga.; F. S. Witherbee, of New York, and others.

The institute was first welcomed in the Opera-House by Mayor Balthir, and then by Hon. A. H. H. Stuart, Secretary of State under President Fillmore, who, on behalf of the citizens, delivered an address well suited to the occasion. He spoke of the remarkable accomplishments of the geologists and mineralogists of the day, and in alluding to the wonderful strides of science, said that he well remembered when, only as far back as 1834, the distinguished Dr. Lardner delivered a lecture in England to prove that it was absolutely impracticable to apply steam to ocean navigation. Unfortunately for the doctor's reputation as a scientist and prophet, a steamship was the first conveyance to bring his lecture to this country. In acknowledgment of the welcome, President Metcalf, on behalf of the Institute, responded in a happy vein. After tendering thanks for the cordial manner in which he and his associates had been received, he referred to the mineral wealth with which this section abounds.

At the opening of the Mining Institute on the morning of the 31st, Professor Egleston read a paper on the Ore Knob Copper Process. The mines of the Ore Knob Company are in North Carolina. The ore consists of pyrrhotine, mixed with chalcopyrite and quartz in variable proportions. An interesting account of the process of reducing the ore was given. The pig-copper is arrived at in four operations. The process consists, first, in roasting the picked ore and the dressed "fines" in kilns; secondly, fusion in the shaft-furnace for mattes, generally called single mattes; thirdly, roasting the mattes in kilns; fourthly, fusion in the shaft-furnace for block or pig-copper and concentrated or double mattes; fifthly, treatment of the salamanders; sixthly, fining and refining.

In connection with this subject, the Professor delivered an entertaining lecture on the properties and uses of copper and the approved methods of its production. He believed that a great wealth in copper lay dormant in the South, which, if properly worked, would be as profitable as the lake copper. Major Hotchkiss, of Virginia, thanked Professor Egleston for drawing attention to the copper deposits of the South. Very few persons are aware of the great wealth in this mineral with which this State abounds. Forty years ago, Richard Taylor made explorations and reported on this class of ore. The only difficulty in its development then was the lack of transportation facilities. That objection does not now exist, and this industry may be expected to be seen coming prominently to the front.

A paper prepared by F. H. Williams, of St. Louis, Mo., on a Volumetric Method of Estimating Manganese in Pig-Iron and Steel was read by the secretary. It was an adaptation of the known processes. In connection with it was presented a paper on Manganese Determinations in Steel, prepared by William Kent, of Pittsburg, Pa. These papers were discussed by Drs. Brown, Sharples, and Dudley. In reference to the subject of steel rails, etters were read from Richard Akerman, of Stockholm, Sweden, and C. P. Sandberg, of London, England. The latter showed a preference for the mechanical over the chemical tests of steel rails, though he recognized the full importance of both. Considerable discussion ensued on this subject, the principal participants being doctors Raymond and Dudley.

At the afternoon session, Dr. Sharples, of Boston, made a statement with reference to the Black Band Iron Ores of West Virginia. F. P. Dewey, of Tennessee, read a paper on Rich Hill Iron Ores. O. J. Heinrich, of Drifton, Pa., explained the practical working of the Ammonia-Soda Process, and Stuart M. Buck, of Virginia, read a paper on the Hard Splint Coal of the Kanawha. After an explanation of the geology of the valley by Major Hotchkiss, the Institute adjourned until night. In the mean time, the visitors were invited to visit the various points of interest about the city, carriages having been provided by the citizens.

At the night session, Professor Frazer, of Philadelphia, read a paper on Observations on some of the Ores of the Upper James River.

This was followed by Major Hotchkiss in a description of the topography and geology of the Virginia Valley, together with a graphic account of Jackson's campaign in that section.

The session closed at nine o'clock, after which the members of the Institute attended a musical reception and banquet given by the citizens, which was quite an elegant affair.

To-morrow, an excursion over the Shenandoah Valley road to Luray Caverns is on the programme. In addition to the subterranean wonders, the engineers will have an opportunity of examining some of the finest mineral deposits of the valley.

SOUTHERN ARIZONA—THE TOMBSTONE MINES, AND THE CONTENTION AND THE GRAND CENTRAL.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Tombstone has been eminently fortunate in the good judgment and economical management that have attended the exploitation and development of the principal mines. Still it must be admitted that nature has greatly aided in this result, by an equable climate, tractable formation and ore, the latter on or near the surface; while water and timbering have offered no great obstacles. This prosperity has given Tombstone an enviable reputation as a bullion-producer, and also has helped to remove biased opinions against Arizona that have long existed.

With the exception of a party of adventurers and mining men under Bronco, who, years before, located and worked the mine bearing the name of the leader, but who abandoned it on account of treachery and murder, the Schieffelin Brothers and R. Gird were the first to prospect in this district. These men discovered the properties owned by the Tombstone Mining and Milling Company, embracing 169 acres and including the following well-known claims: Tough Nut, Survey, Good Enough, Lucky Cuss, Tribute, West Side, East Side, East Side No. 2, Owl's Nest, Owl's Last Hoot, and Defense, situated near and southeast of the town. The locators, in conjunction with the Corbin Brothers, of Connecticut, and ex-Governor Safford, incorporated first under the laws of Arizona, afterward under those of Connecticut. The capitalization was \$12,500,000, in 500,000 shares, of the par value of \$25 per share. The dividends to date have been \$450,000 for the ten months of the Arizona corporation, and \$700,000 for the fourteen months of the present organization, although the shares are quoted now at \$5, a handsome price for the properties.

The formation, briefly stated, is an admixture of dolomite, quartzite, and dolerite, the former of changeable thickness. The ore is interstratified in an unconformable manner, and composed chiefly of carbonates and chlorides, with now and then native silver and polybasite. The carbonates contain from 10 to 15 per cent of lead—no great impediment to pan amalgamation; for I understand that Prof. John A. Church, who has lately assumed the management of this company's affairs, has with some alterations been able to discard chemicals of any kind, quicksilver only being employed as the amalgamating agent. It is to be hoped that this new departure from the time-honored custom of using salt, sulphates, and cyanide will be permanent. The addition of five stamps caused a delay of about twenty days last month; yet the returns show a bullion-product of \$97,000, which represents the work of one mill of 15 stamps for ten days, and the other, of 15 stamps, for thirty days. If no delay occurs, this month's yield must be greatly augmented, as the ore obtained is greater in quantity and better in quality.

The Western Mining Company's claim, the Contention, lies southeast of the Tombstone Company's mines, higher up the small mountain named Contention Hill. It was discovered in the fall of 1877, and located on the same day as the Grand Central. A dispute arose regarding the boundary. The contending parties decided upon a line, the Contention securing a full claim, 600×1500 feet, south of this line. It was soon afterward secured by a California company, through Superintendent J. H. White, by a bond of \$10,000, but purchased before expiration for \$9000. It is incorporated in California, and stocked for \$10,000,000, divided into 100,000 shares, now selling at about \$60 per share. A depth of 500 feet is obtained with a linear direction of over 800 feet. The first level is reached at 112 feet, when a west cross-cut of 15 feet opens a strong ledge, with well-defined walls, accompanied by clay casing, and having a dip of about 85 degrees. Drifts both north and south show a vein averaging 6 feet in width. The second level is 162 feet deep, the vein cut at 32 feet by cross-cutting west. The third level, 212 feet deep, intersects, by west cross-cutting at 93 feet, the main vein, which, while having a westerly dip, has a pitch to the north. The linear drifts, both north and south, expose a strong vein of high-grade ore. The fourth level is 262 feet down. The first 65 feet strike the main ledge, and 90 feet farther west, cut another ledge, known as west ledge. The theory is, that the two veins are converging, and that the confluence will occur at no great depth, forming a large high-grade vein. If such should prove true, together with the present nine to twelve million dollars in sight, this would be the best mining property extant. The vein-matter on this level is very wide. The fifth level is 312 feet deep; cross-cutting taps the east ledge at 95 feet, and the west ledge at 55 or 60 feet farther west, with ledge formation still continuing west. These ledges are opened by drifts nearly 800 feet. The general character of the upper levels is here maintained. The sixth level is 400 feet deep. The linear drifts and the winzes uncover large and valuable ore-bodies, sinking still continuing. All future levels to be opened are to be 100 feet apart, and to make connection with the main working-shaft. The mine is opened by two shafts, both supplied with hoisters; the main one has a compound engine with two reels, capable of sinking 1500 feet. The company has a 25-stamp steam-mill, with a reducing capacity of from 65 to 75 tons per day, from which there was an output in April of \$144,000 from 1800 tons of ore, yielding 80 per cent of assay value. The stockholders have received dividends amounting to \$900,000 to date.

The Grand Central is a southern neighbor of the Contention, the two mines having only an imaginary line and separate organizations to distinguish them, as they are the same vein. The Grand Central is incorporated under the laws of the State of Ohio, with a capital of \$10,000,000, and sells, I think, at over half that rate. It is owned chiefly in Ohio and Chicago. Hardly a year and a half have elapsed since active operations began, yet it is only surpassed by its neighbor, the Contention. One shaft has been employed in the development. At present, a 7×19 three-compartment shaft is rapidly sinking, which will be advantageous in working this mine. It is hard to estimate the value of the ore in sight; but there is no doubt that when it has reached the same stage of exploitation, it will equal in value that of the Contention. As before said, it has the same dual veins, with the same character and grade of ore. The first, second, and third levels represent 300 vertical feet. The vein is strong, with clay gouge inclosed in porphyritic formation, with ore fairly averaging \$90 per ton, responding readily to the stamp and tractable in the pans. On the third

level, a cross-cut of 310 feet strikes the main west ledge with southwest strike. Drifting confirms previous accounts of this ore-body, which is easily mined. A tendency of the vein to pitch east is taken as a basis to predicate the theory that, at sufficient depth, the dip will be east. Sinking and drifting are prosecuted with flattering results. Apr.'s mill return was \$116,000.

A trio of able experts, Messrs. Price, Bowie, and Parrish, examined this property, it is reported, for an Eastern syndicate, that is ready to pay a handsome sum for the control, if the report be favorable. To show the prosperity of the bullion and ore-producing mines, I need only state that a low estimate places the month's production at a half-million dollars.

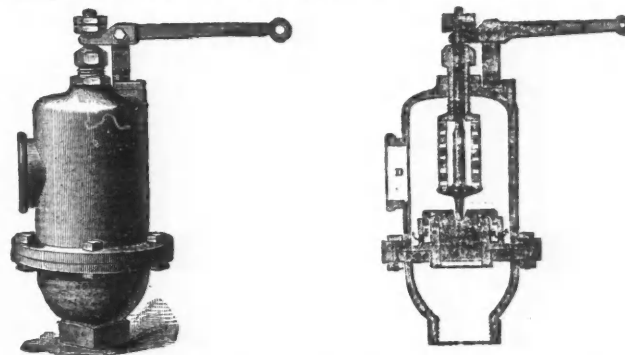
TOMBSTONE, ARIZ., May 19.

J. M. G.

ASHCROFT'S NICKEL-SEATED "POP" SAFETY-VALVE.

The great peculiarity of this valve, a sectional view of which is shown in the right-hand illustration, is that, by the use of a stricture, the recoil action of the steam is made available to overcome the increased pressure of the spring on the valve-head as it rises. The valve is made with a nickel seat, and consequently will not corrode or rust. All sticking is thus avoided, and action takes place at the critical moment. The valve opens at whatever pressure it is adjusted to, and entirely prevents any greater accumulation of pressure. Although especially adapted to use on portable engines, equal efficiency is obtained on stationary, locomotive, and marine engines. The following extracts from a report of official experiments, conducted by Edwin Fithian, Chief-Engineer of the United States Navy, will afford the best evidence of the working of this valve:

"The boiler used for the test was of the cylindrical horizontal tubular type, 6 feet diameter, 20 feet long, grate surface 22 square feet, heating surface, 928 square feet, and of about 30 nominal horse-power; pressure of steam used in the test from 65 to 80 pounds per square inch. The ex-



periments were comparative, and were made with seven of the common kind, of the following diameters, namely, 4-inch, 3-inch, 2 $\frac{1}{2}$ -inch, 2-inch, 1 $\frac{1}{2}$ -inch, 1 $\frac{1}{4}$ -inch and 1-inch, and seven of the nickel-seated valves, of diameters 4-inch, 3-inch, 2 $\frac{1}{2}$ -inch, 2-inch, 1 $\frac{1}{2}$ -inch, 1 $\frac{1}{4}$ -inch, and 1-inch. The object was to ascertain the lift and area of opening given for the escape of steam when the valve was acting freely and blowing off at full pressure of steam, and to ascertain how much the pressure could be increased after the valve was in full operation. The lift was ascertained by securing scratchers against the valve-seat. In these respects, the nickel-seated valve possesses an advantage which places it beyond comparison. The 4-inch common valve, when blowing off at the limit of pressure, had a lift of $\frac{1}{2}$ th of an inch, giving an area for the escape of steam of only $\frac{1}{10}$ ths of a square inch. The nickel-seated valve of the same diameter, operating with the same pressure, had a lift of one quarter of an inch, giving an area for the escape of steam of 3.14 square inches. The 3-inch common valve had a lift of $\frac{1}{4}$ th of an inch, giving an area of opening of $\frac{5}{16}$ ths of a square inch, while the 3-inch nickel-seated valve had a lift of $\frac{3}{8}$ ths of an inch, giving an area of opening of 1.76 square inches. In the experiment to ascertain how much the pressure could be increased while the valve was blowing off at the limit of pressure with the 4-inch common valve, which is about the diameter used on boilers of this size, the pressure was increased 5 pounds in 4 minutes, without any apparent increase in the lift, and the experiment was stopped. With the 3-inch valve it was increased 9 pounds in 6 minutes. The 4-inch nickel-seated valve operating under the same circumstances, opened to its full lift as soon as the limit of pressure was reached, and the pressure could not be increased, but it steadily decreased to a point a little below the original pressure, when the valves suddenly closed. With the 3-inch valve, the pressure was held at its limit. In both cases, the fires were in active condition and the furnace-doors closed. This experiment proved that the lift of the common valve is not sufficient, and will not increase sufficiently with the pressure by its own action to relieve the boiler under all circumstances, and that the pressure can be increased until an explosion takes place, while the valve is in operation; and therefore it is not in reality a safety-valve. The nickel-seated valve, under the same conditions, obtained its full lift instantaneously by its own action, giving an opening of sufficient area to relieve the boiler at once. The common safety-valve needs no description.

"The nickel-seated valve is automatic, and can be used either as a lock-up or an open valve. It is actuated in its resistance to the steam pressure by a spiral spring of the most accurate workmanship, and plated with nickel. The face of the valve coming in contact with the seat is a solid ring of a composition the principal constituent of which is nickel. The valve-seat is also of the same metal. Its great hardness insures its resistance to wear. It is not affected by the action of steam and the saline matter in water, and, being non-corrosive, it is free from the possibility of sticking, as is often found to be the case with the common valve, and which may be attended with the most fearful consequences."

This, with a variety of other valves, embodying the same peculiarities, is manufactured by the Consolidated Safety-Valve Company, of Boston.

THE MANUFACTURE OF BESSEMER STEEL AND STEEL RAILS IN THE UNITED STATES.*

By Capt. W. E. Jones, General Superintendent of the Edgar Thomson Steel-Works.

In reading the proceedings of the Iron and Steel Institute, I have noticed frequent allusions to the output of American Bessemer works, as compared with that of foreign works. Believing that a history of the operations of the Edgar Thomson Steel-Works for the year 1880 would be a matter of interest to the members of the Institute, I have been induced to present this paper to the Institute. The average time worked per week was 141 hours. This, I believe, is a greater number of hours worked per week than is customary in foreign works, and will be one factor in explaining the large output. The average time worked at the rail-mill was 136 hours per week. Owing to delay in erecting a new roof over the converting-works, and other causes, the works did not start until January 20th, 1880. Moreover, several accidents occurred during the year, such as the breaking on two occasions of cross-heads of blowing-engines and the bursting of ladle-crane cylinders (all of which were owing to original weakness of parts), which caused a loss of over 5000 tons in the product. The works were stopped for annual repairs at noon on December 24th, having been in operation nine months and twenty-nine days, and having produced in that time 123,303 tons of ingots, 100,094 tons of rails and 4262 tons of merchant steel, making a total finished product of 104,357 tons. In our converting-works we have four iron-melting cupolas and four spiegel-melting cupolas. Three of the iron-melting cupolas are of the following dimensions: Inside diameter of shell, 85 inches; distance from hearth to charging-door, 14 feet; inside diameter of lining, 59 inches, reduced at the boshes to 48 inches. These cupolas are provided with six tuyeres, the area of which is 34 6-10th square inches. The fourth iron cupola has a diameter inside of shell of 96 inches; inside diameter of lining, 66 inches, reduced at the bosh to 48 inches. This last cupola we have been able to keep in operation 141 hours. The whole of the iron cupolas are to be made of the same dimensions as the large one, it being a great advantage to run the cupolas 141 hours or longer before dropping the bottom. We use four spiegel cupolas, the inside diameter of the shell of which is 55 inches, the inside diameter of the lining being 28 inches, which is reduced at the boshes to 21 inches. The blast for all the cupolas is furnished by three No. 7 Baker blowers, with an average blast pressure of eight ounces. These blowers I have found to be best adapted for cupola practice, furnishing a steady, positive blast, and requiring the minimum of power to drive them, besides being durable and reliable. The converting vessels are the same in size as those generally used by American Bessemer works. The number of pounds of metal charged is regulated by the weight of rails to be made, the heats varying from 71-4 to 73-4 tons. Two vertical blowing-engines (built by Mackintosh, Hemphill & Co.), with steam cylinder 42 inches in diameter, and blowing-cylinders 56 inches in diameter and 48-inch stroke, supply blast for the converters, with an average pressure of 23 pounds. Barring the breaking of weak and defective cross-heads, the engines worked well during the year. In order to keep the works and machinery in proper order, great care and watchfulness must be exercised, the time for repairs being extremely limited.

We will start from the cupolas and converters lined and in fair condition. For the first month, we find the men are out of practice. It is not a little singular that a few weeks' stoppage will make the men rusty and almost awkward; and my experience has been that, after a stoppage for repairs, it generally requires from four to six weeks before the workmen again regain the skill and energy displayed before the works were stopped. In addition to this, if any changes or improvements have been made, the workmen are generally slow to admit the usefulness of the improvements, and are apt to follow their own judgments, which are generally founded on prejudice; and instead of making an earnest effort to test the true merits of the improvement, they are apt to throw obstacles in its way. This state of affairs requires an almost constant personal supervision of the testing of any new invention or improvement; but to do the workmen justice, after plainly demonstrating that the improvement is really a good thing and that it lightens their labor, they turn in with a rush to make amends for the obstinacy and prejudice that they first exhibited. I can here say that generally all the improvements introduced at these works have been condemned and opposed by the workmen. When, at the outset, I stated to one of our most intelligent workmen that I ultimately expected that the rail-mill would turn out 300 tons of rails in twenty-four hours, he was so amazed with the statement that he was unable to speak for a few moments, and, on recovering from his surprise, he declared that it never could be accomplished; yet this same workman has assisted in rolling 520 tons of 60-pound rails in twenty-four hours, and now believes, with myself, that with a few more improvements 600 tons in twenty-four hours can be rolled.

In about four to six weeks, the workmen have regained their accustomed skill, and then begins the real difficulty of keeping the works up to the high mark required to produce a large output. In producing from 3000 to 3300 tons of ingots weekly, we find the service very severe on the vessels. The linings being kept almost constantly at a high temperature, they fuse easily and wear away fast, and toward the latter part of the week they require great watchfulness to prevent burning through. They often need patching, which is generally done, and yet the high rate of production is maintained. At the close of the week, the lining having been worn thin at the nose and base, a strong gang of men is set on to repairs as soon as operations cease at four o'clock on Saturday evening, and the vessels are then patched or relined, as the case may be. The lades are also then skulled and re-lined, so as to have all the reserve force of the works, such as ladles, etc., in good condition to stand the severe work of the next week. The maintenance of the vessel linings during the period of the large output is one of the most important questions to be kept in view; and when the basic process is forced on us, which it will be, I think we shall be more ready to meet it on account of our experience in keeping the acid vessels in running order while maintaining a great yield. All repairs must be made on Saturday night and during daylight on Sunday. As an illus-

* A paper communicated to the British Iron and Steel Institute, and read at the Meeting on Thursday, May 5th, 1881.

tration of the energy and mechanical skill shown in carrying out repairs at these works, I will cite one instance: A few weeks ago, the crank-pin on our 36-inch by 48-inch blowing-engine was found to be loose. The chief-engineer reported the fact, and it was at once decided to put in a new pin, the mill being then required to finish the week's work. Shutting down at four o'clock on Saturday evening, the old pin was taken out, the hole was rebored, the new pin fitted, the crank heated and shrunk on the pin, the pin riveted, making a first-class job, and the engine running at twenty minutes before six o'clock on Sunday evening.

Now as to the true cause of the great output of American steel-works. On the introduction of the Bessemer process in America, quite a number of young men, who believed that the process would revolutionize the metallurgical world, became anxious to identify themselves with its development. At the Troy Works, which may be considered the pioneer Bessemer works of the country, Mr. A. L. Holley was applying his brilliant talents to the perfecting of American plant. Forsythe, of the North Chicago Works, was also assiduously studying the process. A few years later, the Pennsylvania Steel-Works, the model of nearly all the subsequent American works, were constructed by Mr. Holley. Some years later still, the Cambria Works were built. At all these works, there were ambitious young men closely studying and carefully watching all possible points of development. From the Cambria graduated Mr. R. W. Hunt, general superintendent of the Albany & Rensselaer Works; Jones and Fry, at present connected with the Cambria; Rinard, of the Edgar Thomson; Stanton, of the Vulcan; Williams, of the new Pittsburgh Bessemer Works, and myself. Mr. Holley, as editor of Van Nostrand's *Eclectic Magazine*, a few years ago, records as follows: "We have information from the Pennsylvania Steel-Works that on Tuesday, of last week, they had succeeded in making eight blows or conversions in ten hours." I quote from memory. Soon the Cambria Works commenced to creep up to thirty-six heats, or about 160 tons in twenty-four hours. After the disruption at the Cambria Works, attendant on the death of Mr. George Fritz, one of the ablest of American metallurgists, Mr. Hunt assumed control of the Bessemer department of the Troy Works, being succeeded by Mr. John E. Fry, the present superintendent of the Bessemer department of the Cambria Works. A strong rivalry immediately commenced between these two gentlemen; and great was my astonishment at this time on receiving from Mr. Hunt a telegram stating that "in the last twenty-four hours we have made fifty heats," or about 250 tons. This achievement caused great surprise in the Bessemer world. In the mean time, Forsythe, having concluded his studies at Troy, had assumed the reins at North Chicago, and reports soon circulated about what he was doing there. This only stirred up Messrs. Fry and Hunt and Liebert, of Bethlehem, to greater achievements, and so the production kept on increasing, while we of the Edgar Thomson were compelled (being engaged in erecting the works) to listen to their wonderful stories. In 1875, the Edgar Thomson Works began operations, followed soon afterward by the Scranton and the Vulcan Works, while the Joliet Works, under an efficient organization, had again entered the field. In the latter year, the output of the American works began to assume those proportions which have caused so much surprise in Europe. The output soon reached 1500 tons of ingots per week, then 1800 tons, then 2000 tons, and ultimately increasing to 3000, 3100, 3200, and 3300 tons. I am frequently asked by people, "Where will you Bessemer men stop, and what is the limit of your production?" I can only reply, "Ask some one who knows more about it than I do." But I really believe we are on the verge of the elastic limit of the production, although it may yet reach a product of 14,500 to 15,000 tons for what I term a "long month" of 31 days per pair of converters. The output of the American works is governed by the facilities for getting the ingots out of the road. This is the sticking-point just now. Therefore the works that cast their tonnage in the least number of molds have a decided advantage in reaching the ultimate production of the present American or Holley plant. The race, so far as the Edgar Thomson Works is concerned, will soon cease. A few months more, and the Edgar Thomson will change from a two 7-ton converter plant to a three 10-ton plant, and then our efforts will be concentrated upon keeping pace with the Bethlehem four-vessel plant, and with the North Chicago and Pennsylvania steel companies' three-vessel plants.

Next to the strong yet pleasant rivalry of the young men who have assumed control of the works, and who have worked hard and faithfully to excel, the development of American practice is due to the *esprit de corps* of the workmen after they get fairly warmed to the work. As long as the record made by the works stands the first, so long are they content to labor at a moderate rate; but let it be known that some rival establishment has beaten that record, and then there is no content until the rival's record is eclipsed. Another marked advantage which the American works have is the diversity of nationality of the workmen. We have representatives from England, Ireland, Scotland, Wales, and all parts of Germany, Swedes, Hungarians, and a few French and Italians, with a small percentage of colored workmen. This mixture of races and languages seems to give the best results, and is, I think, far better than a preponderance of one nationality.

In the converting department, each heat will make five ingots, which are termed 14-inch ingots, each ingot making either four 67-pound rails, or five 60-pound rails, or six 52-pound rails, according to the order being executed. A small locomotive delivers the ingots in front of the Siemens heating furnaces. Four men and one boy charge the ingots, while the same number of workmen are engaged in drawing for the mill. We use five furnaces for heating the ingots; and when the converting-works are running steadily, it keeps the two gangs fully employed in charging and drawing. After the ingots are rolled, they are cut into single lengths by a powerful shears, and, if the bloom is free from defects, it is taken directly to the rail-mill heating furnaces. If the blooms require chipping, they are swung to a steam-hammer, carefully chipped, and then again subjected to inspection before being charged in the rail-mill furnaces. The rail train contains three stands of rolls, 23-inch pitch-line, three-high. The number of passes used last year was thirteen, but this year it is eleven. The train is driven by a 46-inch x 48-inch engine with balance-slide valves, built by Messrs. Mackintosh, Hemphill & Co. I prefer using three stands or sets of rolls for the following reasons: It enables the roller to better control the amount of

metal going into the leading and finishing grooves, and gives him a chance to overcome any defect or miscalculation on the part of the roll-turner, particularly in rolling thin wide-flange rails. The slabbing pass being in the No. 2 stand, the roller can thin or thicken the flange at will; while, on general principles, the three stands produce a far truer rail on the surface of the head, the rails being more free from the wave-line that railroad engineers have so much complained of. The last stand of rolls contains two leading and two finishing passes, enabling us to roll all the week without producing a rail that is rough on the surface. The rails are hot-straightened on a bed specially designed for the purpose, patented and owned by this company. Four straightening-presses are employed to cold-straighten, a fifth one being outside the mill to re-straighten any rails that do not pass the inspection. The present plan of straightening by presses is certainly a barbarous one, and will sooner or later be superseded by passing the rails through a series of rolls. The balance of the finishing department consists of four rail drills, one punch and slotting machine, and two cold saws, all short lengths being cut at the cold saw.

The best weekly output of the rail-mill has been 2753 tons of 60-pound rails, and 2765 tons of 67-pound rails. I have not the least doubt that the mill can roll 3000 tons of 60-pound rails per week, and I think we can maintain an average output of 2800 tons per week. While the production of rails reached 100,094 tons in 1880, the amount of second-class rails produced was a fraction over 1 per cent.

The system of rolling directly or even double lengths, while generally conceded to be the best abroad, does not find many advocates here, the principal objection to it being the liability to largely increase the percentage of second-class rails and the probability of inferior hot and cold straightening in the finishing department. I certainly think that, if rolling directly or in double lengths should be adopted, more room should be required to hot-straighten the rails. The great advantage in rolling single lengths is the better opportunity to thoroughly hot-chip any mechanical defects in the rails. I have been unable to get any figures as to the percentage of second-class rails in a mill rolling directly or in double lengths. It would be an interesting matter to me if any of the members of the Institute could give correct figures on this subject. I admit that rolling directly or in two or more lengths is a great saving in crop ends and waste; but taking into consideration the great difference in amount of second-class rails produced, as compared with rolling single lengths, is it not as economical, after all, as rolling directly or in two or more lengths? I infer that to roll directly requires the use of an excess of manganese in the steel.

When I state that our percentage of second-class rails during 1880 was over 1 per cent, it means of all rails rolled, but does not include cobbles, which are of such rare occurrence that we do not keep account of them.

In increasing the output of these works, I soon discovered that it was entirely out of the question to expect human flesh and blood to labor incessantly for twelve hours, and therefore it was decided to put on three turns, reducing the hours of labor to eight. This has proved to be of immense advantage to both the company and the workmen, the latter now earning more in eight hours than they formerly could in twelve hours, while the men can work harder constantly for eight hours, having sixteen hours for rest.

(TO BE CONTINUED.)

THE STEAM VACUUM DREDGE.

The pressure of the atmosphere is the principle on which this machine is based. This pressure being about fifteen pounds to the square inch, the force with which a column of water and gravel is driven up the draught-pipe can be readily computed. An 8-inch pipe has an end area of about 50 square inches; in such a pipe, therefore, the pressure up the tube is 750 pounds; for a 12-inch pipe, the force would be 1700 pounds; for an 18-inch pipe, 3800 pounds; and for a 24-inch pipe, 6700 pounds. The principal parts of the machine are a vacuum-chamber, which rests on hollow trunnions, upon which it oscillates, and through which steam and water connections with the top and the upper part of the vacuum-chamber are made; a draught-pipe, which rests on the bottom, and through which the solid material is brought up into the vacuum-chamber; an air-valve opening from the vacuum-chamber; and a water-gate below the water-line in the draught-pipe, through which water is admitted when desired.

Upon the dredge-boat there is also a boiler-house containing a boiler and a steam-pump, each connected with the vacuum-chamber. A winch or hoisting-engine for raising and lowering the draught-pipe, and a sluice or other receptacle to receive the contents of the vacuum-chamber, complete the equipment. When used for gold-mining, the dredge-boat may be furnished, besides, with the necessary sluices and an additional pump to supply water for washing out the gold.

To operate the machine, the draught-pipe is lowered until its open end rests upon the bottom. Steam is then let into the vacuum-chamber, expelling the air through the air-valve. The air-valve is then closed, and a jet of water is forced upon a perforated disk in the upper part of the vacuum-chamber, condensing the steam and forming a vacuum, into which the water at the bottom of the draught-pipe instantly rushes, carrying with it gravel, sand, stones, or whatever else may be at the end of the pipe; and as these pass up and into the vacuum-chamber, the pipe burrows into the bottom, the vacuum-chamber swinging slightly forward on its trunnions as the pipe goes down.

A delivery door at the bottom of the chamber is then instantly opened by means of a cam-lever, and the contents fall into the sluice or other receptacle beneath.

The delivery-door is then closed, the chamber filled with steam as before, the steam condensed, and another load of solid material brought up; and this operation is repeated as often as may be desired, from one to five tons of gravel, etc., being raised every five minutes, varying with the size of the vacuum-chamber and draught-pipe.

This great power renders this machine surprisingly effective. One of the smaller dredges which the company has on exhibition readily brings up, through an 8-inch draught-pipe, not only gravel, but also gold coins, pieces of iron, several pounds in weight, and even stones, as large as the pipe will admit, weighing twenty pounds.

That nothing may become lodged in the pipe, it is made smaller at the

lower end, and whatever enters there readily passes up into the chamber. Another excellent feature is the method of introducing the steam and water. The pipes by which these enter the vacuum-chamber proceed from the upper side of the hollow trunnions. The steam-pipe from the boiler enters the end of one of the trunnions by a packed, steam-tight joint, and the cold-water pipe enters the other trunnion in the same manner, thus allowing the chamber to swing freely on the trunnions, and at the same time doing away with flexible pipes. The extreme simplicity of this dredge also commends it. There are no complicated or delicate parts to get out of order, it is easily operated, requiring only four or five men upon the dredge-boat, and the entire working expense will not exceed \$20 or \$25 per day.

The original object for which this dredge was invented was to obtain the rich deposits of gold from the beds of the gold-bearing rivers of the Pacific coast, and the first large machine (which has a 24-inch draught-pipe) is now in successful operation on the Fraser River, in British Columbia.

For this river mining, the vacuum dredge is admirably adapted, as it does away with the expensive and uncertain system of damming and fluming, and its general adoption would completely change the present method of mining in river-beds.

Moreover, the vacuum dredge will not only take up sand and gravel, when lying in beds, but will thoroughly "clean up" bare rock, even if its uneven surface should prevent the end of the pipe from coming within a foot of some portions of the rock.

Other uses of this dredge are for the deepening or widening of channels in rivers or harbors, or the removal of bars obstructing navigation. It can be operated at a small expense, and is effective in clayey as well as gravelly soils. Diamond dredging, the digging and deepening of canals, the building of levees on river-banks, the dredging of mussel-beds, and the raising of fossil bones from beneath the waters of rivers in the Southern States, for their fertilizing elements, are uses which will readily suggest themselves to persons interested in these operations. Indeed, it is believed that there is no kind of dredging for which the vacuum dredge can not be profitably employed.

This dredge is owned and controlled by the International Vacuum Mining and Dredging Company.

THE IRON MINES OF THE MEMONINEE DISTRICT, MICHIGAN.

The *Marquette Mining Journal* of May 28th concludes its review of the history and products of the mines of the Menominee Mining Company, from which we abstract the following. The Vulcan, the Norway, and the Cyclops were presented last week. The record closes with the Quinnesec, the Chapin, and the Florence, the last being in Wisconsin:

The Quinnesec mine is located on the southeast quarter of Section 34, Town 40, Range 30. The first explorations on the property were made in 1873, by Mr. John L. Buell, who put down several test-pits and sunk a shaft which proved the existence of ore on the property in paying quantities. During the following winter, the good quality of the ore was demonstrated by a practical test in the Menominee furnace. Like the other properties in this district, the development of the Quinnesec was delayed for want of transportation to the lake-side, which was not secured until several years after the value of the property had been practically demonstrated. In the mean time, the Menominee Mining Company secured a lease, and began stripping the vein preparatory to the opening of the mine. The railroad was completed to the mine in the winter of 1877-8, and the first shipment made early in the spring of the latter year. Since then, the product has been as follows:

Year.	Gross tons.
1878.....	25,925
1879.....	41,954
1880.....	52,436
Total.....	120,315

Work was commenced by carrying an open cut into the east side of the hill, which gave a slope of about 40 feet, the whole width of the vein, the outcrop being at least 200 feet above water-level. The bottom of this open cut constitutes what is now called the first or upper level of the mine, the ore from which is taken out on a double-track incline tram-road, 700 feet in length, to the docks, whence it is dumped directly into the stock-pile or into the railroad cars underneath a trestle-work some fifty feet in height. This tram-road is so arranged that the loaded cars going down draw the empty ones up. In the beginning, a large amount of stripping was done which might better have been omitted, considering that it was subsequently found necessary to adopt the underground system of mining. The formation is a peculiar one. The ore dips about 70 degrees to the north, the overlying rock being a sandstone, immediately under which there is a thin stratum of ore of no market value. The deposit is of variable width, the average being probably 20 feet. The walls, particularly the hanging, are of such a character as to require a large amount of timbering; but so far, they have been most skillfully and amply secured, the record of the mine showing little, if any, loss of life or limb to employes since the beginning.

The Chapin mine is about four miles north of west of the Quinnesec mine and village, and embraces the south half of the southwest quarter, and the southwest quarter of the southeast quarter of Section 30, Town 40, Range 30, the fee of which is owned by Mr. H. A. Chapin, of Niles, Mich.—the Menominee Mining Company's proprietary interest being that of a lease for a term of years. Explorations were begun in July, 1879, and the first shipment was made in June, 1880, in which year the total shipments amounted to 34,556 gross tons. The mine workings, all of which are underground, lie in the north face of a hill which gradually slopes away to the north and west from an elevation at least two hundred feet above the railroad level. The original discovery was made immediately on the line between sections 30 and 31, at a point about 400 feet west of the east line of the company's tract. At this point, an exploration-pit was begun on the foot-wall, the top of which is on Section 31, and was carried down through 50 feet of surface and 32 feet of ore, the vein being apparently only about 4 feet in width. From here, the explorations and workings have been extended down the northwest slope of the hill, to the length of 1452 feet. The workings at present con-

sist of eight shafts, numbered respectively from 1 to 8, from east to west. No. 1 is an enlargement of the exploration-pit already referred to, is in mixed ore, and not now working. In No. 6 shaft, there is a wide drift which extends 60 feet west of No. 8, and which was still continuing in good ore at a point immediately under the stock dock. A close examination showed nothing but clean ore throughout the whole length of this drift, and the miners asserted that, though working along the foot-wall, they had not encountered half a ton of rock in the last 300 feet. This drift is intended to cover the whole length of the vein, and is wide enough for a double tram-way; from it the ore is mined out in chambers 20 feet wide, leaving alternate pillars of ore 18 feet thick the whole width of the vein or deposit. The Nevada system of timbering is used, the ore being mined out from the bottom of each lift in benches 8 feet high, the timber-men keeping close at the heels of the miners. From the fault east of No. 2 to No. 3, the chambers and cross-cuts on the 2d and 3d levels show an average width of not less than 30 feet of clean ore; from No. 3, the vein gradually widens out until it attains a width of 50 feet at No. 5. From No. 5 west, there is a stretch of ground 1000 feet in length, which is shown by the chambers and cross-cuts to carry a width varying all the way from 55 to 70 feet—the last-named figures appearing by actual measurement in a cross-cut on the 2d level at No. 7. In all the work thus far done west of No. 7, ten tons will cover all the rock taken out, the deposit in its entire extent being the most uniformly clean of any the writer has ever examined. Some idea of the character of the vein, in that regard, may be gathered from the fact that with a product of over 2500 tons mined during the week ending May 21st, only five tons of rock were raised, and that did not occur in the vein, but fell away from one of the walls. Though very little other than preparatory work was done during the winter, there were raised from the close of navigation to May 21st a little over 45,000 gross tons, 27,000 tons of which remain in stock at this writing. When the drifts are completed on the 3d level, making no allowance for a farther extension of the workings to the westward than has already been reached, active mining can be prosecuted in no less than 38 chambers, 20 feet wide and from 30 to 70 feet long on the 3d level, while large bodies of ore yet remain to be broken on the levels above. It is estimated that from these 38 chambers an average of 6000 tons each can be mined, and the writer thinks the estimate a low one. This would give a product of 228,000 tons from this one level, notwithstanding very nearly one half the vein is left standing in the shape of pillars. When the fact is taken into consideration that, while the ore is mined out above one level, another is preparing by dropping the shafts and driving the necessary working-drift along the foot-wall, and that there is a strong probability that the vein extends far beyond the most westerly point yet reached in the underground workings, the writer feels assured that he will not be thought guilty of exaggeration when he says that he believes the Chapin capable of a larger product than has ever yet been achieved in a single year by any mine in either district. Its walls are regular and well-defined, and it is doubtful if a larger continuous body of pure ore has ever been opened anywhere. It is certainly the largest and most promising mine on the Menominee range; and had the present system of timbering been adopted in the beginning, a product of 200,000 tons the present year might easily have been reached.

This concludes the list of the Menominee Company's developed mines on the Michigan side of the river; but there still remains to be described the Florence mine, which is in Wisconsin, some eighteen miles northwest of the village of Quinnesec, and four miles south of the confluence of the Michigamme and Brule rivers. The Florence is located on the north half of the southeast quarter, and the northeast quarter of Section 20, Town 40, N., Range 18, E., the present workings being on the first-named description. It is the property of the Menominee Mining Company, which owns three fourths of the fee, and holds the remaining one-fourth under a lease from H. D. Fisher, who receives a royalty of ten cents a ton on all the ore mined. The company owns, in the same relative connection with Mr. Fisher, other valuable adjoining lands, including the south half of the southeast quarter of Section 21, on which, within the past year, has sprung up the very pretty and flourishing little village of Florence. Ore was originally discovered on the tract, and near the place where the mine is now located, by Mr. Fisher, in October, 1874. Sufficient work was done under his direction to prove almost conclusively the existence of a workable and, perhaps, extensive deposit in the near vicinity, though subsequent developments showed that his original explorations were too far south to reveal the real extent or character of the ore formation. Such was the opinion of Mr. Wright when he visited and examined the property in the fall of 1877, and the work subsequently done proved his opinion to be well taken; a shaft afterward put down by Mr. Fisher, some distance north of his first exploration-pit, struck the ore at a point subsequently found to be about midway between the foot and hanging-walls. The work of stripping the deposit was actively begun in the winter of 1879-80; but the railroad was not completed to the mine till some time in October of the latter year, in the second week of which month the first shipments were made—the output during the remainder of the year footing up to 14,143 tons. The trend of the ore-belt at the Florence is from southeast to northwest, and the dip slightly to the north. The workings are in the north side of a hill, the highest point at which the ore was uncovered being at an elevation of at least 100 feet above drainage, the face of the ore-bed apparently conforming to the topography of the ground, the pitch being to the northwest. Work was begun by uncovering the deposit at its highest elevation, and taking up a slope from the hanging-wall side, the hanging-wall at that point being depressed to such an extent as to render the approach to the upper part of the ore-bed a comparatively easy task. The ore having been mined out, at this point, down to the level of the cut through which access was had to it, work has since been carried on by sinking in the ore and taking up stopes in opposite directions. At the time of the writer's recent visit to the mine, work was in progress on four such stopes, covering a length of 406 feet on the vein, the average width of which is about 55 feet. Farther to the northwest, a shaft is down in ore, showing an apparently unbroken continuation of the vein in that direction. The foot-wall is a hard slate and the hanging a graphite, lying next to the quartzite. While the vein in which the workings are located appears to have narrowed down to a little more than half the width it was be-

lieved to carry a year ago, it must be said that scarcely enough work has been done to determine its extent. There are peculiarities about the formation calculated to puzzle persons much better posted in such matters than the writer hereof, and which can only be definitely solved by time and further work. About 30,000 tons were mined during the winter, two thirds of which is first-class ore; the remainder, which is stocked separately, not having been very carefully assorted, a fault which was found with the whole of the product shipped last year. These 10,000 tons have, however, or will be, sold as second-class ore, the management preferring that course to the "picking-over" process. The ore, it is well known, is too high in phosphorus for Bessemer purposes; in all other respects, it ranks among the best in the district.

In addition to its six valuable mines, from which it will raise the present year nearly, if not quite, half a million tons of first-class ore, the Menominee Mining Company is making explorations in other quarters. Perhaps the most promising of these explorations are those in progress on what is known as the Walpole Tract, just east of the Chapin mine, and on the same section. The explorations are making with a diamond drill, and thus far have been of a most satisfactory character. Two drill-holes, 1000 feet east of No. 1 Chapin shaft, passed through from 30 to 40 feet of ore apparently of the same quality as the Chapin. The company is also exploring the north half of Section 32, but thus far without favorable result. The tract is, however, in direct line with the ore-belt, and it is scarcely possible that further boring can fail to reveal something of value. On the Felch Mountain range, explorations in progress promise good results, as may also be said of the work doing by the company at Keyes Lake, south west of Florence, where ore of apparently good quality has lately been uncovered.

With its six great mines, and more in embryo, the Menominee Mining Company may well be considered the richest mine corporation on Lake Superior, and probably the largest ore-producer in the world.

The following is a statement of shipments made from the Menominee Mining Company's mines by lake, from the opening of navigation to Wednesday, May 25th, inclusive:

Name of mine.	Gross tons.	Name of mine.	Gross tons.
Chapin.....	12,564	Vulcan.....	11,360
Florence.....	5,721		
Norway.....	11,449	Total.....	46,232
Quinnesec.....	5,138		

The following is a statement of lake shipments of iron ore for the season of 1881, up to and including May 25th, 1881:

ESCANABA—MARQUETTE DISTRICT.		MARQUETTE—MARQUETTE DISTRICT.	
Barnum.....	2,757	Perkins.....	4,370
Boston.....	161	Quinnesec.....	5,138
Cleveland.....	10,654	Stephenson.....	2,031
Cleveland Hematite.....	510	Vulcan.....	11,360
Champion.....	388	Cornell.....	1,241
Goodrich.....	354		
Republic.....	276	Total.....	63,868
Jackson.....	4,259	Grand Total.....	109,998
Jackson, South.....	1,321		
McComber.....	1,348		
Michigamme.....	3,515		
Sterling.....	400	Cleveland.....	6,325
National.....	1,062	Lake Superior.....	8,582
New York.....	4,975	Winthrop.....	561
W. Jackson.....	208	Republic.....	11,363
Palmer.....	729	Champion.....	4,548
Saginaw.....	1,776	Lowthian.....	1,024
Salisbury.....	349	Milwaukee.....	698
Section 12.....	1,920	Total.....	26,901
Superior.....	7,961		
Superior Hematite.....	467		
Wheat.....	741	L'ANSE.....	
Total.....	46,130	Michigamme.....	733
		Total.....	733
MENOMINEE DISTRICT.		PIG-IRON.	
Chapin.....	12,564	Carp River Iron Co.'s furnaces.....	302
Commonwealth.....	6,982	Total pig-iron.....	302
Curry.....	1,569	Ore to local points.....	3,471
Florence.....	5,721	Total ore, pig-iron, and quartz.....	31,407
Keel Ridge.....	1,311		
Ludington.....	732		
Norway.....	11,449		

MAINE MINING NEWS.

Special Correspondence of the Engineering and Mining Journal.

The Blue Hill copper mines are taking the lead now as our representative mines.

The Douglass has two reverberatory and two cupola furnaces in good running order. The mine continues to produce large quantities of fine ore. The buildings of this company cover a large area of ground, are well arranged, and supplied with running water.

Work has been resumed upon the Stewart, which is next to the Douglass.

The Blue Hill mine is producing the same rich ore. The smelters will soon be completed.

The Twin Lead is pushing work in both the drifts and shaft, taking out good ore. The smelter works well.

Work has just been begun in good earnest on the two other copper mines, situated but a few miles from the Sullivan mines. One of these, the Copperopolis, has Mr. J. Shombar, of the Milton mine, for its superintendent, and we may expect to see the property developed in a systematic manner. The ore shown on the surface is very rich copper, and contains some silver. The vein is a wide one, and promises to yield a large quantity of ore. The vein-matter is soft and very easily worked. There is a fine chance for dumpage, and the facilities for shipping the ore are excellent.

The Milton continues its underground work on its two drifts. The southerly one is in 381 feet; the northerly one, 212 feet. There seems to be a more favorable class of rocks met with now. This company intends to open and develop its property in a thorough and business-like manner, and is sparing neither time nor labor to do every thing systematically.

The managers of the Sullivan-Waukeag succeeded in their plan of re-organizing the mine on an assessable basis. It is now called the Sullivan Mining Company. In consequence of the change, this valuable mine is now lying idle. How long this state of affairs will last is uncertain; but

in all probability until the directors have a chance to exchange the stock and levy an assessment.

The Golden Circle stamp-mill has made the first run on thirty tons of ore. The result was a brick worth \$294, over and above the loss which follows the first run of a stamp-mill. The ore was averaged and assayed before work, and gave \$50 to the ton. The run will probably yield a much higher result.

The Gouldsboro' mill is running regularly, and will soon begin shipping its concentrations.

The Cherryfield continues to improve. A number of new veins have been found recently, and we may look for more new companies in a few weeks.

ELLSWORTH, ME., May 31.

DOUGLASS.

PROGRESS IN SCIENCE AND THE ARTS.

Measuring the Densities of Gases and Liquids.—At a recent meeting of the Physical Society in London, a paper by Dr. J. E. Mills was read on the ascent of hollow glass bulbs through liquids. A glass ball of a pear shape rises through a liquid with a sensibly uniform velocity, which varies with the liquid. The time of ascent is proportioned to the square of the diameter of the vessel, and depends, of course, on the specific gravity of the contents of the bulb. Professor Perry, commenting on the paper, thought that the bulb should have no re-entrant angles.

Treatment of Burns Caused by Sulphuric Acid.—The *Journal de Pharmacie et de Chimie* says that two pupils of the Communal School of Clermont-Ferrand, were severely burnt in the face with boiling sulphuric acid, owing to the rupture of a retort. The author covered their faces with a soft paste made of calcined magnesia and water, and applied it in layers of 2 mm. in thickness. As portions of the coating split off, the paste was reapplied. All pain ceased in about a quarter of an hour, and after some time—five hours in the slighter of the cases, and twenty-four in the more severe—no further treatment was needful. Their faces show no trace of injury.

Coke with a Very Small Percentage of Sulphur.—W. W. Staveley recently had occasion to test a sample of coke, made from coal-tar pitch, which he found to contain very little sulphur. Since it is not generally known, he says in the *Chemical News*, that coke of such purity is obtainable in large quantities, it may be well to record the analysis:

Sulphur.....	0.12	0.11
Ash.....	2.43	2.50
Carbon.....	97.45	97.39 by difference.

The sulphur was estimated by the prolonged boiling of the powdered coke, 5 to 6 grams, with nitric acid and a little chlorate of potash. The ash was estimated by heating for several hours in a Fletcher's muffle-furnace, at a white heat. The sample of coke was taken from the ovens and powdered white hot, thus insuring the absence of moisture. Several determinations of sulphur and ash were made with similar results. A noticeable feature of this coke is that, on exposure to the weather, even for months, it does not "slack" or disintegrate. This is no doubt due to the small percentage of sulphur present, the cause of the slacking of most coke—gas-coke especially—being attributable to the oxidation of the sulphides of iron contained in the coke. The heating and burden-carrying power of this coke in the furnace far exceeds that of the best Durham coke. From its hardness and close texture, it is especially calculated to resist the action of the hot gases on the upper portion of the furnace, thus diminishing the loss.

An Ancient Bronze Casting.—A remarkable specimen of ancient Babylonian workmanship has been received as a portion of the proceeds of Mr. Rassam's expedition, which is of interest to metallurgists as well as to antiquaries. It is the largest single specimen of bronze casting which has been found in Mesopotamia, and is a very weighty plate of metal, 5 feet 4 inches long, with a breadth of 21 inches and a thickness of 2 inches. The form of the plate leaves experts in doubt as to its original purpose, but it may possibly be one of a pair of folding-doors.

Richards's Plastic Metal.—London *Engineering* describes the "J. Richards's Plastic Metal" as resembling in general outward appearance some of the other varieties of white metal so largely used for lining bearings, but having a remarkably close, hard texture, and taking a good polish. It has a great affinity for other metals, which enables it to be readily "pasted on" with a plumber's soldering-iron, it being impossible, when thus attached, to remove it by abrasive force. As it fuses at about 450° Fahr., it can be readily melted in an iron ladle over an ordinary fire, while it is stated that it contains neither lead nor spelter, and that it is not deteriorated by re-melting. *Engineering* has examined bearings, glands, etc., lined with the material, and says that the adhesion seems to be perfect; while, judging from its performance on railroad axle-bearings, it is remarkably durable. The ease with which it can be applied renders this metal peculiarly applicable for effecting repairs in places where casting-furnaces are not available.

German Scientists for the Arctic.—The San Francisco *Post* of May 23d says that Drs. Aurelius and Arthur Krause, Berlin scientists, have arrived in San Francisco en route to Eastern Siberia. The success of Nordenskjöld induced the German Geographical Society of Bremen to send the Drs. Krause on a voyage of similar exploration in some respects. When the doctors left Berlin, it was believed that they would have no difficulty in accompanying one of the Arctic expeditions from San Francisco; but, unfortunately, the Corwin has already left, and there is no room on the Rodgers except for those actually necessary for the trip. The doctors are contemplating the engaging of a vessel of their own to proceed to the point where Nordenskjöld wintered. They expect to remain four or five months in Siberia, and will then proceed to Alaska and there devote the winter to scientific work. Both the doctors are young men. On account of the delay from the freight blockad of the Union Pacific Railroad at the Missouri River crossing and the consequent detention of supplies, the Rodgers will not sail for the Arctic before the middle of June. This will still be time to reach Behring's Straits to take advantage of the first opportunity of entering the Arctic as the ice breaks north.

STRIKE AT OXFORD.—The puddlers employed at the iron-works at Ox-

ford furnace struck a few days ago, and the mills have all shut down and are undergoing general repairs. The new blast-furnace is still running on stock.

THE MONTLAND COAL AND IRON COMPANY.—This Glasgow corporation, on May 31st, passed a resolution in favor of winding up its affairs.

ZINC-WORKS BURNED.—Matthieson & Hegeler's zinc-works, at La Salle, Ill., were burned Saturday evening, May 28th. The loss is about \$12,000.

THE DENVER, WESTERN & PACIFIC RAILROAD.—DENVER, COLO., May 31.—The grading on the Denver, Western & Pacific Railroad is about completed between this city and Longmont, and track-laying has been begun. Graders are now at work on the line west of Longmont. It is not yet decided whether the line through the mountain shall be a broad or narrow-gauge road. The road will probably be in operation between this city and Longmont by September 1st.

A MINING STRIKE ENDED.—COLUMBUS, O., May 29.—The miners at some points in the Hocking Valley region have decided, at their meetings, to accept the reduction to 70 cents per ton for mining, and will return to work on June 1st. The Nelsonville miners, at their meeting yesterday, decided to hold out for 80 cents. The backbone of the strike is broken, and it will probably be a question of only a few days when all the miners will again be at work at the reduced rate.

OHIO MINING TROUBLES.—COLUMBUS, May 31.—From advices received from Straitsville to-night it is learned that the striking miners have held a meeting and resolved not to go to work to-morrow, as they agreed to do some days ago. A few of the miners are working, and threats have been made against these by the strikers. It is feared that there will be trouble at Straitsville to-morrow.

LESSEPS'S NEW CANAL.—From London, May 31st, we learn that a dispatch from Athens says that M. Rinieri, Governor of the National Bank of Greece, is negotiating with the government, in the name of M. de Lesseps, with the view of constructing a ship-canal through the Isthmus of Corinth to connect the waters of the Gulf of Corinth with those of the Aegean Sea. It is believed that a convention on the subject will shortly be signed. A later dispatch from Athens announces that a decree has been signed granting M. de Lesseps a concession to cut a canal through the Isthmus of Corinth. The work will probably be commenced in 1882, and be completed in five years.

STRIKE OF IRON-WORKERS IN CINCINNATI.—CINCINNATI, May 30.—Quite an excitement was occasioned in manufacturing circles here to-day by an announcement that the employes in all the rolling-mills here are to go on strike to-morrow night. All the mills in the Ohio Valley are operated by members of the Amalgamated Union of Iron-Workers. They have demanded an advance of 30 per cent in wages. They fix on April 1st of each year a scale of prices which employers must pay, giving them till June 1st to accept. The prices this year are 30 per cent above those of last year, and this the manufacturers refuse to pay, saying that they will close their mills first. They say that they are now paying 5 per cent more than Pittsburgh prices, and that this advance would throw them out of the competing market. The workmen, they say, are making from \$4 to \$13 [?] per day. The union, however, has ordered the strike, and about 2000 men are to quit work to-morrow.

GENERAL MINING NEWS.

ARIZONA.

Late Arizona exchanges have the following:
EMPIRE.—The shaft has obtained a depth of 450 feet, and has four levels, in each of which a large amount of exploratory work has been done in drifts, cross-cuttings, and other openings. From the winze on 200-foot level west of the shaft, is now extracted a fine quality of chloride ore, which apparently extends to the 300-foot level.

CALIFORNIA.

THE BODIE DISTRICT.

The *Free Press* of the 24th ult. says:
The Goodshaw, Glynn-Dale, South Bodie, and perhaps others, now idle, will shortly resume work; the greatest activity prevails in all the working mines, and the outlook was never better. On the 1000-foot level of the Standard, the east cross-cut is in 277 feet, the west cross-cut, 219 feet; the 1000-foot tank station is nearly completed; the shaft is down 1015 feet in good working ground, and all the stopes and ore-breasts are looking well. The Bodie mill shut down on Sunday, to put in some new pans and mortars and to overhaul the driving-engine, and will probably remain idle for ten days. Work is actively prosecuted in the mine, however, and all the stopes and ore-breasts are looking well, particularly in the lower levels. The Lent shaft is down 620 feet, the bottom being in very hard rock. Bodie Tunnel is breasting ore from No. 7 and No. 20 veins, and keeping the Miners' Mill supplied. Boston Consolidated shaft is down 390 feet, in favorable formation and without water. The east cross-cut, 520-foot level, of the Oro, has reached the hanging-wall, showing the fissure to be 85 feet wide. The large east vein of Concordia is improving rapidly in the north drift. In Consolidated Pacific, the west cross-cut, 600-foot level, has passed through a vein rich in stephanite and decomposed sulphuret of silver, and into a heavy wall of clay. South Bulwer is drifting north and south from the winze, 70 feet below the 550-foot level, in a vein of clean ore four and a half feet wide and of good milling quality. Syndicate is still stoping and milling ore from the upper levels of the Osceola vein, and shipping about \$12,000 per month in bullion. The Noonday and North Noonday are both looking well, the stopes yielding the usual quantity and quality of ore, and the drifts showing some improvement. South Noonday struck quartz and a heavy flow of water at a depth of 185 feet, at which point a station is being cut out and a cross-cut will be run for the ledge, which is believed to be close by, if not already in the bottom of the shaft, where the heavy flow of water was struck. The Stonewall ledge of the Bulwer Consolidated is increasing in width in the 70-foot uprise from the 400-foot level. Tioga has encountered a horse in the vein followed by the north lateral drift from the east cross-cut, 982-foot level; but the west cross-cut, same level, is coming into much more favorable ground than heretofore reported, with some increase of water. Black Hawk is getting considerable quartz (and water) in the east cross-cut, 800-foot level, and the bottom of the cross-cut is showing marked improvement.

COLORADO.

CLEAR CREEK COUNTY.

We are indebted to the Georgetown *Courier* of the 26th ult. for the following notes regarding some of the principal mines of that section:

HERCULES AND SEVEN-THIRTY.—This mine employs 65 men, nearly all of whom are taking out ore. The developments going forward at present are on five levels that are driven west, two that are driven east, and the sinking of the main

shaft. The shaft continues in good ore, and a winze 75 feet west of the shaft, which is sinking for the purpose of ventilation, is producing ore.

HUKILL.—Stephens's concentrating mill, at Lawson, is now running exclusively on Hukill ore, about thirty tons of crude ore per day being treated, which produces from six to eight tons of concentrates. The ore is concentrated in jigs which are slightly modified from the Hartz pattern, from which the tailings pass to a fifteen-stamp battery where they are crushed fine and concentrated on buddles.

UNADILLA.—The Eagle lode is owned by the Unadilla Mining Company, and is situated on Hiawatha Mountain near Dumont. Work is going forward at sinking the shaft and driving one level west. The shaft has reached a depth of 100 feet, and the level, at a depth of 75 feet, has been driven 40 feet. Both the level and the shaft show a vein of solid gray copper ore ranging from a small vein to one ten inches thick, and also from a foot to eighteen inches of concentrating ore, the solid vein in the neighborhood of and below the 75-foot level being from eight to ten inches thick. Solid ore was first found 40 feet from the surface, in a level that has been driven west 50 feet; and as the vein is quite regular along the bottom of the upper level, and has improved regularly with depth, it gives good grounds for the supposition that the ground below it contains pay-ore, and that development and better hoisting facilities are all that are needed to make the mine a heavy ore-producer.

GILPIN COUNTY.

RARA AVIS.—The *Register Call* says that this company is working three 8-hour shifts of miners in sinking the main or No. 1 shaft, on the Whitney lode. This is down 285 feet. The reporter of the *Register-Call* inspected the workings in the bottom of the shaft, where he found four feet of crevice-matter. Above the present depth of the shaft, the crevice was pinched up somewhat, but a soft gouge of four inches of black sulphurets is now coming in and the crevice-matter is becoming more solid, and contains large quantities of mineral. No stopping is being done or levels driven at present, the manager of the mine being desirous to hasten the attainment of a depth of 305 feet, when levels east and west will be started. No. 2 shaft, distant 450 feet from No. 1 shaft, is down 110 feet. Drifts east and west will be driven to open up ore-bodies for back-stopping. A California whim is partially erected; and when in working order, this shaft will be sunk to intersect the 300-foot level west from No. 1 shaft. The pay-matter in the face of the west drift from this shaft is $2\frac{1}{2}$ feet wide, yielding under stamps $2\frac{1}{2}$ ounces per cord. The outlook in the bottom is better.

LAKE COUNTY.

The Leadville mines are steadily increasing their shipments, their present daily output being estimated by the *Leadville Circular* at 909 tons. In addition to this, the grade of the ore in many of the mines is improving; and in nearly all, exploration-work is energetically pushed with good results. An attempt was to have been made by the Little Pittsburg people, on the 1st inst., to open the New Discovery shaft, which, if successful, will greatly facilitate the operations of this company, as there is known to be a considerable body of good ore in the claim, from which shipments were making when stopped by the gas from the fire. At present, no shipments are made. According to latest advices, the Chrysolite shipments continue to be about 40 tons daily. The Catalpa is mining and shipping nearly 15 tons per day of high-grade ore. As was expected, the recent verdict in the suit of the Iron Silver *versus* the Smuggler was adverse to the former. In the case it appears that the location of the two claims are parallel. The plaintiffs had made the first location, but not on a defined lien or lode. They obtained a patent for their claim in 1876, and in 1878 the owners of the Smuggler sank a shaft beyond the side-lines, and discovered a body of mineral on which they made their location. The Iron Silver Mining Company went about its so-called discovery-shaft, and ran an incline into the mountain, reaching to the bottom of the Smuggler shaft, and brought suit, claiming that the top or apex of the vein was found inside the patented location. The owners of the Smuggler claimed that there was no vein in the rock in the place within the side-lines of the Iron Mining Company's location, but that the top of the vein was within the Smuggler's location. The territory in dispute, however, was but comparatively small, and but little developed. As compared with the previous month, the shipments from Highland Chief for May show considerable decrease in tonnage; but the grade of the ore is stated to be improving. The Silver Cord Combination is putting out about 65 tons of ore daily, and the mines are reported as looking finely. The Evening Star sends out about 50 tons of ore per diem, which nets the company \$70 to the ton. The daily shipments from the Morning Star amount to about 30 tons. The machinery in the new shaft is reported as working well and keeping the mine drained. The ore taken from the Miner Boy at present is running very high, although the shipments amount to but 12 tons per day.

MONTANA.

From our Montana exchanges we condense the following:
ALTA-MONTANA.—This company will rebuild as soon as the insurance is adjusted, and the plant then will consist of a 15-stamp mill, 6 cylinders, 4 amalgamating-pans (16 tons capacity), a 35-ton water concentrator, a 30-ton smelter, 7 reverberatories capable of roasting 35 tons of ore per diem, and a cupel furnace, together with all necessary appliances to render the works complete in every department. When the order is given, work in each department will begin, under competent supervision, and will progress as rapidly as supplies from all sources obtainable will allow, and a large force of artisans will be employed to insure the early completion of the works.

HECLA.—A correspondent, writing to the *Butte Miner*, says: The cluster of mines on Lion Mountain known as the True Fissure, Sheep, and Silver Quartz, are all in excellent condition. Important ore-developments have been recently made that will be of great advantage, and will yield a large quantity of first-class ore. The Cleopatra, highest up the mountain, is showing up well. At a depth of 230 feet, a vein of first-grade ore has been opened. The ore is soft carbonate and easily mined. The Atlanta mine has been worked to a depth of 1400 feet. The Cleve mine, east of the Atlanta, has been opened to a depth of 450 feet by a main shaft with levels run. The Franklin mine has just been started up again. Work was begun at a depth of 140 feet. These are some of the principal mines of the company. The operations are said to be conducted on a very extensive scale, both as regards the extraction of the ore and the handling.

NEVADA.

THE COMSTOCK LODE.

The *Gold Hill News* of the 25th ult. says: There is not much encouragement to be derived by stockholders from the information given this week of the middle mines or the Gold Hill group. At the Sierra Nevada, it is expected to commence cross-cutting some time next week; probably about the 1st of June. The Union shaft will be sunk but 22 feet deeper for some time. It is the intention of the management to run a drift from the 2700 level of that mine to connect with the Sierra Nevada and Union Consolidated winze, thereby exploring the ground between, as well as making an air connection. The Gould & Curry and Best & Belcher pump-rods will be in place and every thing ready for pumping Tuesday. The Savage started its pump yesterday, and the Hale & Norcross is running it to its utmost capacity, in consequence of the pump at the C. N. S. shaft losing a clack in the sump night before last, which stopped operations there until this morning. The Imperial 600 pump-bob was caved on and not broken. The effect is the same, and no pumping will be done there for a week. In what degree the accident will affect the Yellow Jacket, remains to be seen. Crown Point, Belcher,

and Sierra Nevada are the only mines on the Comstock listed on the Stock Boards now known to be extracting ore.

COLUMBUS DISTRICT.

NORTHERN BELLE.—The *True Fissure* of the 21st says: The general appearance of the mine is much the same as last week. The shaft levels are looking well throughout and yielding as usual. The eleventh or adit level still continues to make a very fine showing. In the section of mine above the adit, a large amount of work is doing, most of it productive of good results. In the fifth and ninth levels especially, the outlook for the future is very encouraging. All work in and about the mine is progressing as usual; 88 tons of ore are extracted and sent to mill daily. The mills are doing the usual amount of work. The bullion shipments for the week ending May 18th, \$33,249.31; shipments on May account to May 18th were \$71,233.52.

UTAH.

Our Utah exchanges have the following:
EMPIRE.—Grading for the new hoisting-works is pushed forward as rapidly as possible. It is the intention of the company to put new works up in the best style, and the building will be one of the largest in the camp when completed. The hoisting-works will be 230 feet long by 40 wide, and, besides being used as hoisting-works, will have a machine-shop in connection. The gallow-frame is to be 60 feet high, in order to be able to tank the water out, instead of pumping, for the present. In this way it is hoped to have complete mastery over the water. When it is once tanked out, pumps will be put in. The engine from the mill will probably be remodeled for a hoisting-engine and taken to the mine. The company has enough lumber at the mill to build the hoisting-works, and it will probably be used for that purpose.

HORN-SILVER.—The working-shaft has reached a depth of 400 feet. The work of cutting out the fourth station has begun. Cross-cutting to the vein from this point will begin immediately, and will be prosecuted with great speed.

SOUTH HORN-SILVER.—The sinking of the shaft 200 feet farther, to make a total depth of 325 feet, has begun; the shaft will be straightened and timbered from the top down.

PROPOSALS AND SALES.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, the full name and address of parties soliciting, and the latest date at which they will be received:

Supplying the Schools under the Charge of the Board of Education of the City of Brooklyn with Coal until May 1st, 1882; E. N. Fisher, Office Board of Education, Red Hook Lane, Brooklyn, N. Y.	June 7, 1881.
Dredging in Rancocas River, N. J., and Chester Creek, Pa.; J. N. Macomb, Colonel of Engineers, U. S. A., U. S. Engineer's Office, 1125 Gerard street, Philadelphia, Pa.	" 9, "
Improving Milwaukee Harbor, Racine Harbor, and Kenosha Harbor; D. C. Houston, Major of Engineers, U. S. A., U. S. Engineer's Office, Milwaukee, Wis.	" 9, "
Building a Floating Engine and Fire-Pumps for the same; office of the Fire Department, 155 and 157 Mercer street, New York City.	" 9, "
Furnishing Wood and Coal for the Public Buildings of the City of Brooklyn for the year 1881; Department of City Works, Municipal Department Building, Brooklyn, N. Y.	" 10, "
Furnishing Material and Building a Crib Dike in the Ohio River, at Twelve Pole Bar, near Burlington, a Crib Dam in the Ohio River at Brown's Island, a Dike in the Ohio River, at Puppy Creek Bar; William E. Merrill, Major of Engineers, U. S. Engineer's Office, 82 West Third street, Cincinnati, O.	" 11, "
Dredging on the Bar at the Mouth of Sabine River, Texas; Improving Trinity River, Texas, by Dredging and Removing Snags between Liberty and the Mouth of the River; Improving Neches River, Texas, from Yellow Bluff up to the River toward Bevilport; S. M. Mansfield, Major of Engineers, U. S. A., U. S. Engineer's Office, Hendley Building, Galveston, Texas.	" 13, "
Dredging in Broad Creek, Del., Elk River, Md., Chester River, Md., and in Lower Thoroughfare, Deal's Island, Md.; William P. Craighill, Lieut.-Col. of Engineers, U. S. Engineer's Office, 70 Saratoga street, Baltimore, Md.	" 15, "
Dredging in Elizabeth River and Woodbridge Creek, N. J.; W. Michler, Lieut.-Col. of Engineers, U. S. Engineer's Office, Army Building, New York.	" 16, "
Dredging in Mattawan Creek and Raritan Bay, N. J.; W. Michler, Lieut.-Col. of Engineers, U. S. Engineer's Office, Army Building, New York.	" 17, "
Building a Bridge across the Wissahickon Creek at or near the Site of the Old Red Bridge; Russell Thayer, Superintendent Fairmount Park, Philadelphia, Pa.	" 18, "
Construction of an Ice Pier in the Harbor of New Castle, Del.; J. N. Macomb, Colonel of Engineers, U. S. Army, U. S. Engineer's Office, 1125 Girard street, Philadelphia, Pa.	" 18, "
Supplying Wood and Coal to the United States Marines at one or more of the following stations: Portsmouth, N. H.; Charlestown, Mass.; Brooklyn, N. Y.; Philadelphia, Pa.; League Island, Pa.; Washington, D. C.; Annapolis, Md.; Gosport, near Norfolk, Va.; Mare Island, Cal., and Pensacola, Fla. (with the privilege of increasing the quantities one third); W. B. Slack, Major and Quartermaster, U. S. Marine Corps, Washington, D. C.	" 23, "
Removing the Reefs off Van Wie's Point, Hudson River, near Albany; (Removing Part of Sheepshead Reef, Echo Harbor, New Rochelle; John Newton, Colonel of Engineers, Room 31, Army Building, Houston and Green streets, New York.)	" 23, "
Construction of the Railroads from Bage to Cacequy, and from Cacequy to Uruguayana, in the Province of S. Pedro do Rio Grande do Sul. Particulars can be had by application to the Brazilian Consulate-General, No. 71 Broadway, Room No. 62, New York City.	July 4, "
Construction of the Iron Superstructure of a Railroad Bridge over the Savannah River, on the Charleston & Savannah Railroad, near Savannah, Ga.; also, for Completing the Foundations (now in an unfinished condition) of the same Bridge. The Bridge will be about 1000 feet in length, including a Draw-Span. For further information apply at the Office of the Company, at Charleston, S. C.	" 4, "

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for gold.....\$3.50	Assay for copper.....\$3.00	Assay for iron.....\$4.00
" silver.....3.00	" lead (wet)... 3.00	" nickel and
" gold and silver 5.00	" zinc..... 5.00	" cobalt.....10.00

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to
ENGINEERING AND MINING JOURNAL, 27 Park Place, New York
(P.O. Box 4404).

B. L. W.—The sample sent appears to be a piece of conglomerate, with no commercial value visible to the naked eye.

DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, Feet on Vein, Capital Stock, SHARES (No., Par Val), ASSESSMENTS (Total levied to date, Date and amount per share of last), DIVIDENDS (Total paid to date, Last Dividend), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (May 28, May 30, May 31, June 1, June 2, June 3), and SALES.

g, Gold. s, Silver. L, Lead. c, Copper. * Non-assessable. † The Deadwood mine paid in dividends, previous to the consolidation, \$275,000 and the Golden Terra paid \$75,000. Total shares of Dividend Paying stocks sold during the week, 375,735.

FINANCIAL.

Gold and Silver Stocks.

New York, Friday Evening, June 3.

The week under review has been a quiet one, the sales amounting to but 825,619 shares, while considerable weakness was shown in some stocks. The market closes as strictly a speculative one.

The feature of the market has been the unprecedented activity in the Comstock shares, accompanied by an advance in sympathy with the San Francisco market. California advanced from \$1.20@ \$1.80, with sales of 12,775 shares. Consolidated Virginia records the remarkable business of 45,325 shares, advancing from \$2.40@ \$3.95.

The Tuscarora stocks have been quiet and weak. The Bodies have had but a moderate business. Bulwer advanced from \$2 1/2 @ \$3.10, and Standard from \$23 1/4 @ \$24 1/2.

Amie has had a moderate business at nearly steady prices. Bassick has had a small business at \$11 1/2 @ \$12. Cedar Tree declined from \$2.75 @ \$2.10, and recovered to \$2.40 on moderate transactions. Chrysolite has been very quiet and weak, declining to \$5 yesterday, but recovering to \$5 1/4 to-day. Glass-Pendery, under a moderate business, has been a little weak. Green Mountain has been strong. Hibernia has been very active and quite weak; the sales aggregate 119,700 shares at \$1.30 @ 90c. Horn-Silver has been quiet, and declined from \$16.25 @ \$15. Iron Silver has been moderately active, but weak. The sales amount to 28,600 shares between \$2.35 @ \$2.05. Robinson Consolidated has had a moderate business, and was by no means strong. Stormont has

continued to be very quiet and weak. Bull-Domingo has been declining under a moderate business. The Roberts stocks have had a good business, but the wrong way for a confiding public, which is supposed to bite on such bait as the following, from the Tribune of this morning:

An official letter, May 24th, from the assayer of the State Line mines says that the lower level and drifts never looked better. The ore in the face of both drifts is wonderfully rich. A telegram received at the company's office yesterday says: 'selover starts for home to-morrow well pleased. Every thing is running first-class, and the mines could not look any better. Joint shaft between 1 and 2 improves very remarkably as depth is attained.'

The above is a sample of the generalities that have been used to bull these stocks. It gives the public no hold on any one, and throws out the impression that the greatest bonanza of the century has been discovered. What the public wants is a full, clear statement from some responsible authority, who will put his name to his statement. Oriental and Miller declined from \$2.60 @ \$1.70, on a business of 40,950 shares; State Line No. 1 declined from \$2.90 @ \$1.80; No. 4 advanced from \$1.65 @ \$3.25. Nos. 1 and 4 declined from \$2.60 @ \$1.75, and advanced to \$2.70; Nos. 2 and 3 declined from \$8.50 @ \$6.50, and afterward advanced to \$8.73. The public is certainly showing a lack of faith in these properties at prevailing prices. Sutro Tunnel has been quite active, advancing from \$2.13 @ \$2.65. The other stocks do not show features worthy of notice.

It is stated that 10,000 shares of the Silver Cliff Company's stock has been divided into 10-share lots and sent to the London market.

The downward tendency of the price of the stock of the Calaveras Company appears to have stopped. It is claimed that provisions have been made for the sale of the new debenture bonds, and that the company will be enabled to make the necessary improvements, thereby greatly increasing the producing capacity, and in time be able to give satisfactory returns to the stockholders.

UNLISTED QUOTATIONS.

Mr. L. V. Deforest, No. 70 Broadway, under date of June 3d, 3 P.M., reports the current quotations of unlisted stocks as follows:

Table with columns: Bid, Offer'd, Bid, Offer'd. Lists various stocks and their prices.

OFFICIAL LETTERS.

Allied.—An official statement has been issued by the officers of this company, from which we learn that the 85-ton concentrator, including engine to be used in case of failure of the water-power, has been shipped to the mines, and that vigorous preparations are making to have it up and running in July. They also state that five lines of wire tramway are being constructed, one each from the Crusader, Gertrude, and Hidden Treasure, to the Norma, and one from there to the rock-house, and another from there to the mill. These lines together will be about four miles long, and will be completed this summer. Upon the completion of the tramways and the mill, the company claims that it will be better equipped for the handling and reduction of ore than any other company in Colorado. The mill will begin reducing ore before the tramways are completed. It is estimated that this system of tramways (which run by gravitation) will save the company over \$5000 per month. The mill, engine, and tramways, ready to run, will cost about \$90,000. The whole expenditure for the development of the mines, buildings, tramways, mills, etc. (not including first cost of the mines), by August 1st next, will be about \$160,000.

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, FEET ON VEIN, CAPITAL STOCK, NUMBER OF SHARES, ASSESSMENTS (Total levied to date, Date and amount of last), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (May 28, May 30, May 31, June 1, June 2, June 3), SALES.

g. Gold. s. Silver. l. Lead. c. Copper. * Non-assessable. Total shares of Non-Dividend Paying Stocks sold during the week, 449,984. Total shares sold at all the Exchanges during the week, 825,610.

Hibernia.—The superintendent telegraphs, under date of May 30th :

The strike in Forest City improves with each day's development, and I think adds immensely to value of Hibernia property. Ore assays very high.

Hite.—The superintendent, under date of May 19th, writes as follows :

Have bought air-compressor, drills, pipe, and hoisting-machinery capable of carrying our work rapidly and economically to a depth of 100 feet below the level of the river. The compressor has a capacity for running two hoisters. The new level (900) will soon be ready for stoping. We are now working three shifts in old workings, where we have abundant ore. Mill running smoothly. Will ship bullion regularly in June.

Robinson Consolidated.—The superintendent telegraphs, June 21: Ore in smelters and at Argo and en route amounts to \$100,000. This sum increases surplus on hand to \$139,950.54.

Bassick.—The superintendent telegraphs : Began shipping two car-loads concentrates to-day. Four hundred level shows magnificently both ways. Shaft water much increased. Supposition find bonanza next level. The shaft is now down to the fifth level below the tunnel, or about 700 feet from the surface, and a station is opening for a cross-cut to the vein.

DIVIDENDS.

The Robinson Consolidated Mining Company has declared a monthly dividend (No. 3) of \$50,000, paya-

ble June 15th. Transfer-books will be closed from the 10th to the 15th inclusive.

The Charleston (South Carolina) Mining and Manufacturing Company announces a quarterly dividend of one dollar per share, payable on demand.

The Cedar Tree Mining Company has declared dividend No. 3, of 5 cents per share, payable June 9th to stockholders of record June 6th.

The Tombstone Mill and Mining Company has declared its regular monthly dividend (No. 15) of \$50,000, or 10 cents per share, payable June 15th. Transfer-books closed from June 10th to June 15th inclusive.

The board of directors of the Alice Gold Mining Company have declared monthly dividend No. 4 of \$40,000, payable June 15th, to stockholders of record June 10th.

The Standard Consolidated Mining Company has declared its regular monthly dividend of 75 cents per share, payable June 13th, to stockholders of record June 4th.

The Indian Queen Mining Company has declared its regular monthly dividend of 2 1/2 per cent from the May earnings.

The Barclay Coal Company, of Philadelphia, an-

nounces a quarterly dividend of two per cent, payable June 15th.

REVIEW OF THE SAN FRANCISCO MARKET.

The San Francisco list shows a decided improvement on the quotations recorded a week ago. Sierra Nevada has been the prominent feature of the week, this stock advancing at one time to \$21, but closing yesterday at \$18 1/4. Recent advices from this mine are to the effect that every thing is in readiness to begin cross-cutting, but it is the general belief that the cross-cuts will not be started until Senator Fair arrives there to watch them, and that he will not go up to the mines until Mackey, who has just returned from Europe, accompanies him. There is now scarcely any doubt but that a "boom" in the Comstocks is projected. The making ready to start the combination pumps, the movements of Fair, Mackey, etc., the frequently advertised readiness to start the cross-cuts, and the favorable condition of the Sutro Tunnel, which is now ready to receive any amount of water which may possibly be tapped by these cross-cuts, and last, but not least, the abundance of idle money there, coupled with the general prosperous condition of trade and the magnificent promise of the crops, all lead to the opinion expressed,

Yellow Jacket sold yesterday at \$4 1/4.

It is stated that prospecting can now be comfortably and economically carried on in the Bonanza mines, and that work has been resumed in the joint California and Consolidated Virginia east cross-cut on the 2300-foot level, and also in the joint Ophir and California winze.

The following dispatch, dated Washington, June 2d, is of interest:

The Commissioner of the General Land-Office has decided not to permit the entry of so much of a mineral claim as lies between the limits of the Suro Tunnel grant, west of the Comstock lode. He also decides that parties who had located claims within the limits of the Suro grant, prior to the date of the grant, are only required to comply with the mining regulations prescribed by the laws of Nevada, and not with United States laws respecting possessory rights.

It is stated that there was a large buying of this stock on this market yesterday for foreign account.

SAN FRANCISCO MINING STOCK QUOTATIONS. Daily Range of Prices for the Week.

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (May 27, 28, 30, 31, June 1, 2, 3), Opening June 3.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

Boston, June 2. The market for copper stocks opened very dull and heavy, with a declining tendency, and the whole list felt the depressing influence. Within the last twenty-four hours, however, there has been a much better feeling, and a decided improvement is noticed, especially in the producing mines, which have undoubtedly been selling much below their real value, and we look for higher prices for this class of stocks. The speculative list, or non-producing mines, is entirely neglected.

Silver stocks have also been dull and show a falling off from prices of last week.

In copper stocks, Calumet & Hecla declined to \$37, with, however, but little stock offered for sale at these figures. Copper Falls declined to \$7 3/4, but rallied again to \$8; sales of 200 shares only.

Franklin has been weak, and declined from \$12@11, with sales of about 1000 shares at that. It is better to-day, and recovered to \$12.

Pewabic declined from \$16@14, on very small sales. The stock is in good demand, and no large lots can be bought without advancing prices; \$15 was bid for it to-day without bringing any out.

Quincy has been the strongest stock on the list, and only declined from \$34@33 3/4, quickly recovering and advanced to \$35, which was the bidding price at the close.

Oscuela records a single sale of 100 shares at \$33.

Copper Falls declined from \$14@13, sales, 200 shares.

Huron sold \$11 1/4@11 3/4, and declined to \$11 1/4 (assessment unpaid). The stock is now quoted at \$4 1/4, assessment (\$3) paid.

National sold at 7-16, and now offered at \$2 1/4, assessment (\$2) paid.

Douglas steady at \$3.

Allouez declined from \$2 1/2@2, and rallied again to-day to \$2 1/4.

Star sold at \$1.

Ridge at \$3 1/2.

Blue Hill at \$2 3/4.

In silver stocks, Catalpa declined from \$23 1/2@22 1/4. Crescent from \$1 7-16@1 1/4, Bonanza Development from \$5 1/2@5 1/4.

Duncan sold at \$2 1/4.

Harshaw declined from \$8 3/4@8 1/4.

Silver Islet dull and heavy, at a decline of \$3 from last week's price; sales at \$42.

San Pedro also declined from \$4 3/4@4 1/4.

Sullivan & Waukeag from \$3 1/4@3 1/2.

3 P.M.—The market for copper stocks this afternoon was dull but prices firm. \$35 was bid for Quincy, \$15 1/2 for

COAL STOCKS.

Table with columns: NAME OF COMPANY, Capital Stock, Shares (No., Par Val.), Last Dividend, Rate per Ann., Quotations of New York stocks (May 28, 30, 31, June 1, 2, 3), SALES.

*Of the sales of this stock, 23,036 shares were sold at the Philadelphia Stock Exchange, and 20,750 shares at the New York Stock Exchange. †111 1/2% ‡127 3/4% Total Sales..... 363,810.

Pewabic, \$11 1/4 for Franklin, and none offered of either of them. Calumet, \$23 1/2 bid, \$23 3/4 asked. Silver stocks dull and lower. Harshaw \$7 bid and \$7 1/4 asked. Bonanza sold at \$4 3/4@4 1/2 bid. Silver Islet, \$42.

At the Boston Mining Exchange, a fair amount of business has been done, and prices show but little change. Empire has been active as usual at 93c. @ \$1.05; sales this afternoon at 97c. and bid. Copperopolis has advanced from \$1 27@1.45, and sales have been quite large. Simpson Gold active at 16@19c. Dunkin has been quite largely dealt in from \$1.50@1.55.

Mendocino steady at \$4.25@4.50. Arizona & Massachusetts Gold and Silver has been regularly listed and has advanced from 65@75c. This stock is considered cheap at these prices; there are but 60,000 shares, and the mine is showing well, and will no doubt advance to a much higher price.

Other specialties have been more or less active, and the Board is having a fair share of the mining business of the city.

The following is a synopsis of the transactions in mining stocks at the Boston Stock Exchange, and at the Boston Mining Stock Exchange, for the week ending June 1st.

Table with columns: NAME OF COMPANY, Opening May 29, Highest during the week, Lowest during the week, Closing June 1, Total shares sold.

c. Copper. s. Silver.

Philadelphia.

PHILADELPHIA MINING STOCK EXCHANGE.

The market shows a favorable reaction in the quotations for the past week, especially in Colorado stocks; and while the advances in the majority of cases are limited, they indicate a healthier tone. Governor Group has advanced to 70c.; Iowa Gulch to 43c.; Argent to 38c., and 55 buyer's option; Permanent to 37c., Penn. Breckinridge to 11c., and Buena to 23 @26c., buyer's option. At a meeting of the stockholders of the Silver Glance Consolidated, on Monday last, the entire treasury stock of the company was subscribed for, and arrangements perfected for the immediate

erection of the smelter. The parties interested in the Montana Gold and Silver Mining Company held a meeting at the West Jersey Hotel, Camden, on Thursday afternoon, by virtue of a dividend declared by the Orion, the week previous, of one share of the Montana for every two shares of the Orion, registered on the books of the company by June 1st, 1881. The officers and seven directors were chosen, and books were opened for subscriptions to 100,000 shares of the working capital stock. The following dispatch was received by the Rara Avis Mining Company from Superintendent H. H. Boucher, dated Central City, Colo., May 27th, 1881: Crevice five feet, showing great ore-body; pushing for 300-foot level to begin producing.

The following is a synopsis of the transactions in mining stocks at the Boston Stock Exchange, and at the Boston Mining Stock Exchange, for the week ending June 1st.

Table with columns: NAME OF COMPANY, Opening May 29, Highest during the week, Lowest during the week, Closing June 1, Total shares sold.

Coal Stocks.

NEW YORK, Friday Evening, June 3.

A good business has been done in these stocks during the week past at gradually stiffening prices. Delaware, Lackawanna & Western has had sales of 183,382 shares at \$126@128 1/4; there is reported to be a heavy short interest in this stock. Delaware & Hudson records sales of but 11,825 shares at \$110@112 1/2. New Jersey Central, on sales of 49,705 shares, has been a little stronger, closing at \$103 3/4 as against \$101 on Saturday last. Reading has been quiet and steady, the combined sales in this market and in Philadelphia amounting to 33,451 shares at \$58 1/2@61 1/4.

The sales of Cameron Coal have amounted to 14,200 shares at \$42 1/2@45 1/2. This stock has developed considerable strength within the past few weeks, and it is

confidently predicted by insiders that it will see \$50 within a short time.

The Supreme Court of Pennsylvania has refused to grant the application of Franklin B. Gowen et al. for a reargument of the Reading Railroad case. No reasons are assigned.

BULLION MARKET.

NEW YORK, Friday Evening, June 3.

The market has been stagnant the past week, both abroad and here, and is without any indication of change either way.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

Table with columns: DATE, London (Pence, Cents), N. Y. (Pence, Cents). Rows for May 28, May 30, May 31.

* 51 1/2 @ 51 1-16.

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported.

The shipments of silver bullion are valued at \$1,292,290 per ounce. Troy; gold at the standard \$20.67 per ounce. Troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. The price of silver being now about \$1.12 per ounce, the following figures, where they relate to silver bullion, should be diminished by about 13 1/2 per cent to arrive at actual value:

Large table with columns: MINES, States, For the week, Month of May, Year from Jan. 1st, 1881. Lists various mines like Alice, Barbee & Walker, Belle Isle, etc.

G. Gold. S. Silver. L. Lead. * Official.

COLORADO.

Big Pittsburg.—The superintendent reports, under date of May 30th: shipped during week 40 tons of third-class ore averaging 107 ounces to the ton.

Boston Gold and Silver Mining Company.—The superintendent reports that he has sent a number of sacks of ore from Dolly Varden dumps which assayed sixty-one ounces. Was concentrated to 435 ounces, leaving only fifteen ounces in tailings. The Dolly Varden dumps contain about 15,000 or 20,000 tons of low-grade ore, which have been carefully sampled with the results as stated in the above report.

Evening Star.—The ore product for May is estimated at 1300 tons. This ore nets about \$70 per ton.

Highland Chief.—The ore from this mine is said to be improving in quality. Up to May 27th, the shipment amounted to 281 tons.

Miner Boy.—The fifteen-stamp mill is running to the full capacity. Ore-shippments are made daily to Eddy & James.

Silver Cliff.—The superintendent telegraphs May 30th: Shipped 3968 ounces of bullion.

Taylor & Branton.—Two silver bars, Nos. 203 and 204, were shipped May 27th from this smelter. The first weighed 897 ounces, was 994 fine, and had a value of \$1000.80. The second weighed 805 ounces, was 992 3/4 fine, and had a value of \$896. Total value of shipment, \$1896.80.

Butte Creek.—The returns from the hydraulic mines are just beginning to be made. The first clean-up after only about ten days' run was over \$12,000. This will be largely increased at the next clean-up, as there was much dead-work to be done at the beginning of the run.

Caledonia.—The superintendent reports that during the week ending May 21st there were 1260 tons of ore delivered at the mill, which produced \$8493 in bullion.

Father de Smet.—The superintendent's report of this mine from May 15th to May 22d shows: Ore extracted from first level, 1200 tons; ore extracted from second level, 600 tons; ore extracted from third level, 55 tons; total, 1855 tons. Ore milled, 1855 tons.

Bonanza Chief.—On May 22d, the gold received from an eleven days' run of this mine amounted to \$1675.

Manhattan Mill.—For the week ending May 20th this mill crushed 148 tons of ore, assaying \$41,468.

Sherbrooke.—This district, during the month of April, yielded 146 oz. 2 dwt. gold; 309 tons of quartz were raised, and 2340 days' work done.

Park City Smelter.—The bullion shipment from this smelter for the week ending May 21st was 220 bars, weighing 22,196 pounds.

Manhattan Mill.—The shipments of bullion for the week ending May 27th aggregated \$71,877.63.

Bullion Receipts from the Mines to New York.—The bullion received from the mines at the various offices in this city during the week ending with yesterday, as compiled from various sources, amounts to \$245,181.57, as against \$331,791.39, reported in our last.

United States Mint Coinages for May, 1881.

WASHINGTON, June 1.—The following statement shows the coinage executed at the United States mints during May:

Table with columns: Denomination, No. Pieces, Value. Rows for Double-eagles, Eagles, Half-eagles, Total gold, Silver dollars, Three cents, Cents.

WASHINGTON, June 2.—The Treasury Department to-day purchased 400,000 ounces of fine silver for delivery at the San Francisco, Carson, and Philadelphia mints.

Operations of the New York Assay Office for the month of May.

Table with columns: Deposits of gold, Foreign coin, United States bullion, United States bullion (redeposits), Jewelers' bars.

Table with columns: Deposits of silver, Miscellaneous, Arizona, Colorado, Lake Superior, Montana, Nevada, New Mexico, Utah, Refined bars.

Total gold... \$421,000; Total deposits... \$3,030,700.

May Coinage at the Philadelphia Mint.

PHILADELPHIA, May 31.—The following is the official report of the coinage executed at the United States Mint, Philadelphia, during the month of May:

Table with columns: Denomination, Number of pieces, Value. Rows for Double-eagles, Eagles, Half-eagles, Total gold, SILVER, Dollars, Total silver.

MINOR COINAGE.

Table with columns: Three cents, Cents, Total minor coinage.

Coin Assets of the U. S. Treasury, June 1, 1881.

Table with columns: Gold coin, Gold bullion, Standard silver dollars, Fractional silver coin, Silver bullion, Gold certificates, Silver certificates, Nickels and minor coins.

The Specie Imports.—The Commercial Bulletin publishes the following:

The importations of specie and bullion at this port during the week ending May 27th were \$26,807, consisting of \$5312 in gold and \$21,495 in silver, as against a total of \$33,462 for the week ending May 29th last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

Table with columns: -Since January 1, 1881, -Since August 1, 1880. Rows for Gold, Silver.

Total \$29,394,363 \$3,600,851 \$100,144,682 \$81,006,337

The Gold Circulation of the United States.—WASHINGTON, D. C.—The Director of the Mint estimates that the total gold circulation of the United States, including bullion in the treasury, amounted at the commencement of the current month to \$520,000,000, of which about \$344,000,000 was held as treasury and national bank reserves and \$256,000,000 was in actual circulation. There has been a total gain of gold coin and bullion to the country since July 1st, 1879, of \$234,000,000, of which \$35,000,000 was added to the Treasury, \$59,000,000 to the banks, and \$140,000,000 to the active circulation. The total amount of gold in the country makes a fair showing compared with the principal countries of Europe, being exceeded by only two. The amount estimated to be in England in 1880 was \$396,000,000, of which \$428,000,000 was in actual circulation; and France, with \$927,000,000 of gold, had a circulation of about \$816,000,000. The larger proportion of gold in active circulation in the latter two countries the director attributes in part to the fact that their coinage consists almost exclusively of denominations of less value than five dollars. The largest English gold coin is the sovereign, equivalent to \$4.86 1/2 of our money, while in France, out of a total coinage during the last seventy-seven years of \$1,743,288,000 of gold, nearly ninety-nine per cent was in pieces of less than five dollars.

In the United States, the bulk of the gold coinage has heretofore been double-eagles. From 1850 to 1880, nearly \$920,000,000 was struck in that coin, \$44,000,000 in eagles, \$40,000,000 in half-eagles, and \$42,000,000 in pieces of smaller denominations. The absorption of \$140,000,000 of gold coin in the active circulation of the country since July 1st, 1879, he believes is owing, to a considerable extent, to an increased coinage since that time of denominations less than the double eagle. The coinage of the latter during the fiscal year 1880 and up to April 30th last, amounted to \$32,000,000, while \$47,000,000 was struck in eagles and \$40,000,000 in half-eagles, and during the same time \$55,000,000 of these coins has been paid out by the Treasury and been retained in active circulation.

METALS.

NEW YORK, Friday Evening, June 3.

After a long protracted period of dullness and inactivity in the metal trade, it looks at last as if a cloud with a silver lining was about to appear above the horizon. We wish to make no prediction, but evidences are not wanting that the long-continued featureless condition of this important trade may give way to a greater activity in its various branches, in the near future.

Copper.—The market has remained dull during the whole week, the first 200 casks have just arrived from the lakes, and large new supplies may now be looked for, which makes buyers shy. Small jobbing lots of Lake are offered at 18 1/2 c. and large lines are attainable at 18c. Baltimore is quite nominal.

Our London mail advices include May 24th.

May 16th. Sales the 14th and 16th amounted to about 400 tons at £57 1/2 @ £57 1/4 cash to £57, 4th June, fixed; £57 1/2 @ £58 for July delivery.

May 17th. Business very small at £57 1/4 cash to £57 1/2 three months, closing strong.

May 18th. Sales of about 200 tons of bars at £57 1/2 cash and £58 for forward delivery.

May 19th. Sales of about 150 tons were reported at £57 1/4 cash, £58 to arrive, and £58 1/2 three months prompts.

May 20th. Small business at £57 1/4 sharp cash, and £57 1/2 usual 14 days; sellers asking £57 1/4.

May 23d. Sales of 300 tons at £57 1/2 @ £57 1/4 cash and short prompt, and £58 1/2 for delivery three months hence.

May 24th. Sales of 250 tons at £57 1/4 cash, with a steady market.

Wallaroo, £70; Burra, £65, nothing doing. English Tough is quoted £63 @ £65; Select Ingot, £64 @ £65 1/2; India Sheets, £69; Yellow Metal Sheets, 5 1/4 @ 6 1/2 d. per lb.

Tin.—There has been a fair consuming trade during the week at from 19 1/2 @ 19 3/4 c. for Straits and Ma-

Belvidere-Delaware Railroad Report for the week ending May 28th :

	Week.	Year. 1881.	Year. 1880.
Coal for shipment at Coal Port (Trenton).....	1,491	14,375	9,664
Coal for shipment at South Amboy.....	10,840	259,890	156,322
Coal for distribution.....	9,016	288,134	188,993
Coal for company's use.....	1,910	41,848	41,139

The shipments of coal over the George's Creek & Cumberland RR. by the Maryland and the American Coal companies for the week ending May 28th amounted to 2865 tons, making a total of 3004 tons since the beginning of transportation.

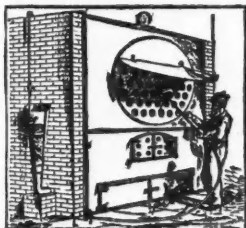
The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 96,737 tons, as compared with the corresponding period in 1880.

The Production of Bituminous Coal for the week ending May 21st was as follows :

	Week. Tons.	Year. Tons.
Cumberland Region, Md.....	44,490	728,947
Barclay Region, Pa.....	9,672	174,782
Broad Top Region, Pa.....	3,089	95,163
Huntingdon & Broad Top RR.....	1,071	25,826
East Broad Top.....	2,748	34,346
Clearfield Region, Pa.....	45,481	837,910
Alleghany Region, Pa.....	4,805	103,403
Pennsylvania RR.....	5,199	121,100
Pittsburg Region Pa.....	432	12,055
West Penn RR.....	10,526	309,935
Southwest Penn. RR.....	2,071	77,153
Fenn & Westmoreland gas-coal, Pa. RR.....	13,902	233,567
Pennsylvania RR.....	121	2,806
For the week ending May 28th.....	47,078	938,531

HORSFORD'S ACID PHOSPHATE IN DEBILITY FROM DRINKING.—I used Horsford's Acid Phosphate in two cases of nervous debility, from excessive drinking. E. B. DAVIS, M. D., Dayton, O.

Parson's Steam Blower,



For improving Bad Draught in Boilers, Burning Waste Materials of all kinds, Screenings, or Slack Coal. It requires no gearing, belting, or machinery. It is a power within itself, capable of accomplishing a wonderful range of work.

Parson's Air-Jet Tube Cleaner.



This Apparatus Cleans Ten Tubes per Minute, while the Boiler is Running. Will not get out of order, and will last as long as the Boiler. They are guaranteed First-Class and are sold on their merits only. Sent for trial to responsible parties. Manufactured by WATERTOWN STEAM BLOWER CO.

H. E. PARSON,
42 Pine Street, New York.



THE NEW PULSOMETER,

CHEAP, ECONOMICAL, EFFICIENT.

McHENRY COAL COMPANY, McHENRY, OHIO CO., KY., Feb. 23, 1880.

PULSOMETER STEAM PUMP CO.: We have been using one of your No. 7 New Pulsometer Pumps in our mines for about three years. It throws more water than any pump I ever saw, and I heartily recommend it to any one who wants a good pump, with no machinery to get out of repair.

Yours truly, W. G. DUNCAN, Supt.

PULSOMETER STEAM PUMP CO.,
83 JOHN STREET, NEW YORK.
BRANCH OFFICES: Chicago, 193 Lake Street, H. F. CASWELL.
Boston, 73 Kilby Street, S. B. EVERETT.

VERMONT & COLORADO Mining Co.

Organized Under Laws of Colorado.
Head Office, Denver, Colorado.
CAPITAL STOCK - - \$2,000,000.
200,000 Shares of \$10 Each.
Full-Paid and Forever Non-assessable.

DIRECTORS:

EDWARD H. GOFF (of Goff, Hastings & Co.), Boston.
HON. H. A. W. TABOR (Lt.-Gov. of Colorado), Denver, Colo.
HON. ALEX. McDONALD (Pres. Wabash Mining Co.), New York.
CHAS. E. FOLSOM (Chas. E. Folsom & Co.), Boston.
J. B. RHODES, Banker and Broker, Boston.
SILAS GURNEY (Silas Gurney & Co., Tremont House), Boston.
COL. A. J. WARE (Supt. B. & B. Smelting Co.), Breckenridge, Colo.
B. F. STICKLEY (Pres. Mount Royal Mining Co.), Leadville, Colo.
COL. H. M. FRENCH, Breckenridge, Colo.
EDWARD H. GOFF, President.
H. E. IRVINE, Sec. and Treas.
HON. H. A. W. TABOR, Vice-President.
THOS. GOWANLOCK, Supt. of Mine.

GOFF, HASTINGS & CO., Financial Agents.

The property owned and controlled by this Company comprises 160 acres of rich mineral lands, from which large amounts of free gold have been taken in the old style of washing with rockers, besides four lode claims which have been considerably developed during the past year, and show good indications of rich silver veins.

The location of this property is unsurpassed, being near the celebrated "Robinson Consolidated," "White Quail," "Aftermath," and "Wheel of Fortune" mines, in the Ten-Mile Consolidated Mining District, and as prospect property is as valuable as any in Colorado.

Development-work is to be actively and vigorously pushed, under the experienced management of Thomas Gowanlock, one of the most intelligent and experienced mining superintendents in Colorado.

A limited amount of Treasury Stock for promoting above works and purchasing machinery will be sold for a few days at 50 cents per share.

Remember, full-paid \$10 shares at 50 cents, which are likely to be worth from \$2 to \$5 per share within six months. Send all orders to

GOFF, HASTINGS & CO.,

BANKERS & BROKERS,

292 Washington Street, Boston.

BEAR CREEK MINING COMPANY,

SAN JUAN DISTRICT, COLORADO.

Incorporated under the Laws of the State of New York.
CAPITAL STOCK.....\$300,000
Stock full-paid and non-assessable.

OFFICERS.

President.....HON. ABRAM WAKEMAN.
Vice-President.....HON. JOHN CUMMINS.
Treasurer.....R. V. D. WOOD.
Secretary.....CHARLES S. BAUER.
Office of Company,
145 Broadway, Room 11, New York.

MAPS.

ARIZONA AND NEW MEXICO.—This Map shows all the Township Surveys, Private Land Claims, Post-Offices, and Settlements. It also exhibits the Explorations of other Government and Private Expeditions, including the facts developed by the Surveys for the Routes of Projected Railroads, etc. 1881. Scale, one inch to thirty-three miles. Colored, 24x17 inches. Pocket form, \$1.
COLORADO.—Topographical and Township Map of the State. Compiled from U. S. Government Surveys and other authentic sources, by Louis Nell, Civil Engineer. By means of symbols, the following mass of facts is graphically shown: Railroads in operation; Railroads chartered or in progress; Wagon-roads; Wagon-roads proposed; Trails; Drainage dry during the greater part of the season; County-seats; Post-offices (July 1st, 1880); Villages; Townships subdivided; Townships surveyed in outlines; Contour-lines, with vertical intervals of 1000 feet; Altitudes in feet above sea-level, by barometer observations, and by spirit-levels; Private grants; Military reservations; Indian reservations ceded to the U. S. Government; Arable land, with irrigation. Scale, 1 inch: 10.5 miles. Size, 31 x 40 inches. Pocket form. \$1.50, on thick paper, varnished, on rollers, \$1.75.

COLORADO.—Topographical and Township Map of Part of the State, exhibiting the San Juan, Gunnison, and California Mining Regions. By Louis Nell. Substantially same as above. Post-offices, March 21st, 1880. Scale, 1 inch: 9 miles, 1-570,240. Pocket form, \$1. Plain sheets for wall, 90 cents.

COLORADO.—Thayer's New Map of the State. Compiled from Official Surveys and Explorations. 1880. Scale, 14 inches to one mile. 25 x 32 inches. Pocket form, \$1.

SAN JUAN MINING REGION (COLO.).—Stockder's Map of San Juan Mining Region, compiled from U. S. Surveys and other Authentic Sources. 1881. Shows county boundaries, district boundaries wagon-roads, trails over mountain passes from river basin to river basin, continental divide, timber-line (11,000 to 11,500 feet above sea-level), etc. Scale, 1 inch to the mile, or 1=63360. 28x38 inches. Pocket form, stiff paper cover, \$1.50; or as a wall-map, \$1.50.

LEADVILLE MINES.—Thayer's Map of the Leadville Mines. Compiled from the United States Surveys and County Records. 1880. Scale, 800 feet to one inch. 27 x 18 inches. Pocket form, \$1.50; mounted on muslin, with rollers, \$2.50.

WHITE RIVER INDIAN RESERVATION, COLORADO.—Published as a Supplement to Nell's Map of Central and Southwestern Colorado, to represent the whole area of the Ute Indian Reservations. Sheet, 25 cents.

MAP OF MINING CLAIMS ADJOINING LEADVILLE, California, Mining District, Lake County, Colo. By Edward Rollandet. 1879. Mounted on muslin, \$2.50. In cloth-bound covers, \$2.

MEXICO.—Map of Mexico. Showing Railroads, Broad Gauge and Narrow-Gauge, Constructed; and Railroads, Broad-Gauge and Narrow-Gauge, Proposed. This very large and finely-engraved Map, constructed originally by the government for official purposes, contains all the information obtainable by it, and shows minutely the towns and villages of the entire country. Scale: 266 Mexican Leagues to the degree, and 69.16 English Miles to the degree; also, Kilometrical Scale. 1881. Size, 53x41 inches. Printed in colors. Pocket form, \$5.

MINING MAP OF UTAH.—Showing the location of the Mining Districts, over an extent of territory 150 miles from North to South. Compiled from U. S. Government Surveys and other authentic sources. Scale, one inch to four miles. Colored. 1879. Pocket form, \$1.50.

NEW SECTIONAL AND MINERAL MAP OF UTAH.—Pocket form. Compiled from the latest U. S. Government Surveys and other authentic sources, exhibiting the Sections, Fractional Sections, Counties, Cities, Towns, Settlements, MINING DISTRICTS, Railroads, and other internal improvements. Scale, one inch to eight miles. Colored, 1878. \$3.50.

POCKET MINING ATLAS OF THE MINES OF THE UNITED STATES.—Showing the Mines of NEVADA: the Comstock Lode, the Eureka, Treasure Hill, and Tuscarora Districts; CALIFORNIA, including Map of the Bodie District; COLORADO, including the Leadville, Silver Cliff, San Juan, Caribou, and Central City Districts; DAKOTA, including Map of Deadwood; MONTANA, IDAHO, UTAH, ARIZONA, NEW MEXICO, LAKE SUPERIOR REGION, the SOUTHERN STATES. Printed in colors, and bound in flexible leather covers. Price, \$1.

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Delaware and Maryland.....	50	*Ontario, Province of Canada.....75
Florida.....	50	ada.....75
Georgia.....	50	ada.....50
Idaho Territory.....	50	Oregon.....50
*Illinois.....	50	*Oregon.....50
*Indiana.....	50	*Pennsylvania.....50
*Indian Territory and Texas.....	75	ada.....50
*Iowa.....	50	Rhode Island.....25
Kansas.....	50	South Carolina and North Carolina.....50
Kentucky and Tennessee.....	50	Carolina.....50
Louisiana.....	50	Tennessee and Kentucky.....50
Maine.....	50	*Texas and Indian Territory.....75
Maryland and Delaware.....	50	tory.....50
*Massachusetts.....	50	Utah Territory.....50
Michigan.....	50	Vermont and New Hampshire.....50
Minnesota.....	50	shire.....50
Mississippi.....	50	Virginia and West Virginia.....50
Missouri.....	50	Washington Territory.....50
Montana Territory.....	50	West Virginia and Virginia.....50
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Maps marked thus * are also put up in flexible covers, without index; price, 25 cents each.

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DIVIDENDS.

OFFICE OF THE STARR-GROVE SILVER MINING COMPANY, No. 2 Nassau st., cor. Wall st. New York, May 18, 1881.
DIVIDEND NO. 7.

The Board of Trustees have this day declared the regular monthly dividend of \$20,000, being one per cent on the capital stock of the company, or ten cents per share, payable on the 31st inst., at this office.

The transfer-books will be closed from the 21st to the 31st inclusive. WM. S. CLARK, President.
JOHN R. BOTHWELL, Secretary.

DIVIDEND NO. 3. THE CATALPA MINING COMPANY.

A dividend of Twenty Cents per Share (\$60,000) will be payable June 15th, 1881, to stockholders of record at close of business June 1st. The transfer-books will be closed from June 1st to June 6th.

New England stockholders will be paid their dividends at the Globe National Bank, Boston.

By order of the Trustees.
H. W. WESSON, Treasurer.
46 BROAD STREET, NEW YORK, MAY 14, 1881.

OFFICE OF THE TOMBSTONE MILL AND MINING COMPANY, 432 Walnut Street. FIFTEENTH DIVIDEND.

PHILADELPHIA, May 31, 1881.
The Executive Committee of the Board of Directors of this company have this day declared the regular monthly dividend of \$50,000; being ten cents on each share of the capital stock of the company; payable on and after June 15th, at this office. Transfer-books closed from 10th to 15th, inclusive. GEORGE BURNHAM, President.
W. J. CHEYNEY, Secretary.

THE ROBINSON CONSOLIDATED MINING CO. NEW YORK, June 1, 1881.

DIVIDEND NO. 3.—The Board of Directors have this day declared a monthly dividend of \$50,000, payable on and after June 15th, at the office of the Company, 15 Wall street. The transfer-books will be closed from the 10th to the 15th inst., inclusive.

FINANCIAL STATEMENT FOR MAY, 1881.

Amount in bank and deposited during the month.....	\$128,736.54
Bullion at Newark Smelting and Refining-Works and in transit to said works, less advances and freights.....	55,000.00
	\$183,736.54

May 9. Purchase of smelters at mines.....	\$87,500.00
Thomas Ewing's drafts and bills paid during the month.....	10,286.00
Dividends for June 15th.....	50,000.00
Surplus on hand.....	35,950.54

Attest:
JAMES K. SELLECK, Secretary. BRAYTON IVES, President.

DIVIDEND NO. 3. NEW YORK, May 25.

At a meeting of the Directors of the Cedar Tree Mining and Milling Company, held May 25th, 1881, a dividend of five (5) cents per share was declared on the capital stock of the company, payable at the office of the company, Room 25, No. 58 Broadway, New York, on and after June 9th, 1881.

Transfer-books close at 3 P.M. June 6th, and reopen 10 A.M., June 13th, 1881. L. F. SEAMAN, Secretary.

DIVIDEND NOTICE. INDIAN QUEEN MINING AND MILLING COMPANY.

The regular monthly dividend from the net earnings of the mine for May, of two and a half per cent on the par value of the stock, will be paid June 20th, 1881, at the office of the Company, 7 Exchange Place, Boston. Transfer-books will close the 15th inst. C. C. LANE, Secretary.

MICAH DYER, JR., Treasurer.

THE STANDARD CONSOLIDATED MINING COMPANY to-day declared its regular monthly dividend of

SEVENTY-FIVE CENTS PER SHARE, payable on 13th inst., at the Farmers' Loan and Trust Co., 26 Exchange Place, New York.

Transfer-books close June 4th, and open on 14th inst. M. R. COOK, Vice-President.

The New York office of this company is now with the Farmers' Loan and Trust Co., where the superintendent's reports and the monthly financial statements are on file, open to the stockholders.

THE Phosphor-Bronze Smelting Co. LIMITED.



Phosphor-Bronze Wire, Rods, Sheets, Bolts, etc. Particulars and pamphlets on application. Owners of the U. S. Phosphor-Bronze Patents. Sole manufacturers of Phosphor-Bronze in the U. S.

SPECIAL NOTICES.

W. H. ADAMS,
Chemist and Metallurgist,

is at present engaged in Mexico. Parties contemplating opening up mining properties or erection of metallurgical works in that country can secure the services of competent men with knowledge of the language, etc., by addressing him, Central Mines, Villa de Musquiz, Coahuila, Mexico, via Eagle Pass, Texas.

THE CALAVERAS WATER AND MINING CO.—Notice is hereby given that the transfer-books of this company will close at 3 o'clock P.M. on Saturday, May 28th, 1881, for the purpose of permitting stockholders of record to subscribe for an issue of Debenture Bonds.

Purpose of issue, to develop property and retire present bonds.

Amount of issue, \$300,000.
Price of issue, 40 per cent on par value.
Payments, 15 per cent on application.
25 per cent when bonds are ready for delivery.

Each 1000 shares of stock is entitled to subscribe for \$1000 of bonds. Bonds are in denominations of \$1000, but certificates will be issued for any lesser amounts in case of holdings too small to be entitled to a whole bond.

There is no surrender of stock.
The bonds run thirty years at 6 per cent, with annual drawings of \$10,000 at par.

Subscriptions must be filed with the Treasurer of the Company before 3 o'clock P.M., Tuesday, May 31st, 1881, at his office, No. 25 Broad street, New York.

Blank forms can be had on application at company's office.
By order of the Board of Trustees.
R. K. SOUTHWICK, Secretary.

The time for closing the books, above mentioned, has been extended until Wednesday, June 8th, 1881, at 3 P.M.

Subscriptions for bonds will be received until Thursday, June 9th, at 3 P.M.

NEW YORK AND CALAVERAS COUNTY GOLD MINING COMPANY.—The attention of stockholders in this company is respectfully called to the above advertisement of the Calaveras Water and Mining Company. You have the right to change your present stock for that of that company; but unless you exercise that right before the books close on Wednesday, June 8th, 1881, you will not be entitled to the very valuable privilege of subscribing for the bonds. By order of the President.
R. K. SOUTHWICK, Secretary.

FOR SALE.—A NEW AND COMPLETE "BRADFORD JIG CONCENTRATOR," suitable for Silver, Lead or Copper Ore, and especially Gold Sulphurets, capacity one ton per hour, 30 to 80 mesh, with four (4) H.P. steam; having been taken to close an account, will be sold for half-price. Address J. M. DALTON, 2547 N. 7th street, Philadelphia, Pa.

DEPARTMENT

FOR SUPPLYING THE CITY WITH WATER.

WM. H. McFADDEN,

CHIEF ENGINEER.

OFFICE, N. W. CORNER THIRTEENTH AND SPRING GARDEN STREETS.

PHILADELPHIA, May 25, 1881.

SEALED PROPOSALS will be received at this office until Tuesday, June 7th, 1881, at 3 o'clock P.M., to be opened in the presence of the Water Committee of Councils, and awarded to the lowest bidder.

TO BE INDORSED,
For the removal, transfer and erection of the West Philadelphia Stand-Pipe, together with alternate bids for the erection of a new Stand-Pipe near the Schuylkill Water-Works, with the use of such parts of the West Philadelphia Stand-Pipe as may be directed by the Chief Engineer.

Plans and specifications can be seen at the office of the Chief Engineer.

No proposal will be entertained unless each and every one of the items in the specifications are bid upon, which specifications must be taken as entirety.

Nor will any proposal be entertained except from a competent engineer or contractor, who must give evidence of having had experience in similar work.

The successful bidder will be required to enter bond in amount of Fifteen Thousand (\$15,000) Dollars for the faithful performance of his contract, and to secure the city against any loss by accident or otherwise as may be sustained during the progress of the work.

Each bid must be made upon blanks furnished at this office and accompanied by a certificate that a bond of Five Hundred (\$500) Dollars has been deposited with the City Solicitor as per ordinance of May 25th, 1860.

If the proper security is not offered to the City Solicitor within ten days after the award by, in the presence of the Water Committee, the Chief Engineer may, without further notice, readvertise the work.

The Committee reserve the right to reject any or all bids.
W. H. McFADDEN,
Chief Engineer Water Department.

COLORADO: ITS GOLD AND SILVER Mines, Farms, and Stock Ranges, and Health and Pleasure Resorts in and near the Rocky Mountains By Frank Fossett. Second Edition, 1880, \$2. First Edition, 1879, \$1.50. Address THE SCIENTIFIC PUBLISHING COMPANY, 27 Park Place, P.O. Box 4404, New York.

Miner Boy Mining Company

OF COLORADO.

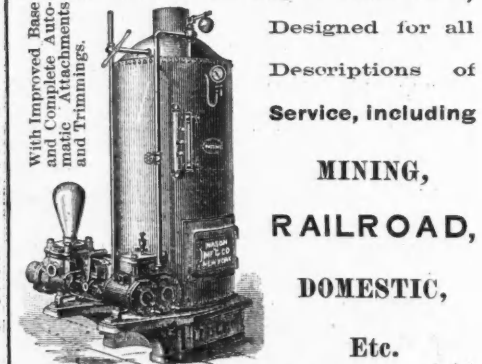
OFFICE, 63 BROADWAY, NEW YORK.

Registrar of Transfers:
MINING TRUST COMPANY, NEW YORK.



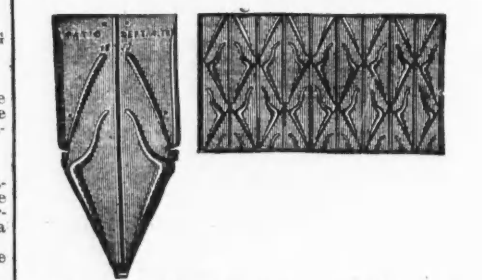
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THE NASON MANUFACTURING CO. Nos. 71 Beekman and Fulton Sts., New York.

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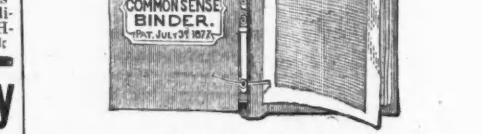
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