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ONE instance in which white miners do not object to Chinese labor underground is reported from British Columbia by Consul Stevens. It appears that at some of the mines the white miners, who are paid by the ton of coal they mine, employ Chinese at \$1 to \$1.25 per day to do the shoveling and other hard work, and sometimes even as tamperers. The white miners, performing little hard labor themselves, are said to make from \$4 to \$5 per day in some cases.

SUPERINTENDENT JOHN U. COURNOUR, of the Penn Iron Co., writes from Vulcan, Mich., that during the month ending May 17th, 1888, or 27 working days, he sank the East Vulcan new shaft 107 feet 10 inches, making the depth at that date 205 feet 10 inches. The rock was solid blasting ground and wet. The shaft is 20 feet by 10 feet in three compartments. It is timbered in sets 4 feet apart. The cage guides were put in and the pump sent down during the same period.

We would like to hear from any mine that has beaten this record.

THE Mexican Financier says that the newly discovered gold mines near Ensenada, Lower California, are creating great excitement. One will not be surprised at this on learning that the veins are from three to thirty feet wide, "largely composed of free gold in white quartz," and

that they run from \$300 to \$2200 per ton. Here is an inviting field for the British investor; in fact, the reports read like those in an English prospectus, which every one knows are generally works of the imagination.

MINERS' RELIEF AND INSURANCE.

There are several systems under which the miner, whose hazardous occupation makes him a "bad risk" for the regular insurance companies, may at a comparatively small cost have the prospect or certainty of assistance in case of accident or sickness, and know that in case of his death his family may have at least temporary relief.

The state may incorporate in its mining laws regulations prescribing compulsory insurance, and holding the mining companies responsible for the fulfillment of such rules. This plan is applicable only in countries in which the mines are mainly of the same character, and where a rigid system of mine inspection is in force, and especially where the mines are controlled by government. It would be difficult to draft a uniform and equable set of regulations of this kind for most of our mining states; and the mining laws here are already sufficiently complicated.

The mining companies themselves may adopt a compulsory relief scheme, deducting from the wages of employes such a proportion as is found by experience to cover the average risks, and may also resort to assessment in cases of emergency. Under this system it seems fair that the mine owners should share in these regular payments, and to do so would be a more certain and satisfactory method than to depend upon a vote of the directors, perhaps just at the moment when, from some unforeseen catastrophe, the company might be embarrassed. Such a system of compulsory insurance, with or without assistance from the shareholders, has been adopted at many of the larger mines of this country. At the Lake Superior mines it is found to work excellently, the medical and hospital service being most efficient. But it applies only to mines employing a very large number of men; and in the United States such mines are uncommon. A company working a force of fifty to one hundred men could not establish a relief service comparable with that of the few great mines. Where, however, the plan can be carried out, it is highly to be commended.

The miners' unions and similar organizations usually have some provision for the relief of members; but as the money is mostly wasted in strikes or is turned over to other trade unions, while the receipts are uncertain, the crippled miner or the family of the dead miner come in for but a small share of the funds.

Independently of the companies or the unions the miners may themselves organize mutual relief associations. Such societies could well be established in districts where there are a number of comparatively small mines. The membership would be voluntary, and might include men having other pursuits than actual mining.

In whatever way it is attempted to act, the primary objects are to secure relief in case of accident and insurance to the miner's family in the event of his death. Besides there are sometimes added relief in case of sickness or accident not incurred in mine work, free medical attendance and medicines to the miners' families, funeral expenses, etc. In Europe there is sometimes, under government regulations, provision for a retiring pension at a certain age or length of service; but the conditions at our mines are too changeable for this. Only a small surplus need be carried over from year to year. The scale of dues will, of course, vary with the character of the mine. They may be levied *pro rata* on the wages in case of large mines paying fixed rates; but often, as in mutual insurance organizations, the simpler method is a uniform *per capita* tax. Regular installments are to be preferred to emergency assessments.

We commend this subject of relief and insurance to the earnest consideration of miners and mine owners in all cases where some system is not already in operation.

CANALS VERSUS RAILROADS.

The conviction has been gaining ground that canals are maintaining the competition with railroads in the carriage of heavy materials, such as coal and ore, with much better results than it was formerly expected they would be able to do. This is of course a broad statement, subject to many exceptions under locally varying conditions; but if it holds good for a majority of cases, the outlook for the continuance of existing canals and for new ones in the future is promising.

The huge projects for cutting isthmuses and for connecting inland cities with tide-water for ship navigation have naturally attracted public attention to the neglect of what is being done by the smaller canals. Indeed, the actual construction of the latter has not been large, comparatively, during recent years; but the development of their traffic—again broadly speaking—has been surprising. In this country one meets with so many instances where a canal has been entirely supplanted by a railroad, the latter sometimes utilizing the tow-path as a road-bed, that the first impression might be that it is simply a question of time when nearly

all of the existing canals are doomed to extinction by their more active competitors. But on closer observation it will generally be found that the dead canals were planned and dug before the railroad era, that they were badly located for competition, that the centers of trade have shifted, that they were designed for a general or light goods traffic to which they are not adapted, that the railroad bought the canal as a cheap location for the road and closed it to prevent competition, or that there has been some such specific reason to account for their decay which is not applicable in many cases.

Considering only the common canals and neglecting the large ship canals and irrigation or water-power conduits, it will be seen that, as contrasted with railroads, they are built and operated under certain disadvantages, such as the following: They are restricted as to locality by topographical features to a greater degree than railroads; they require a constant and large water supply; sometimes the character of the ground is an economically insuperable obstacle; it is difficult to carry them across rivers or through tunnels; they seldom have branch navigable water connections; they require peculiar trade conditions and permanent terminal connections; they are not so well adapted to other than through traffic; they only carry heavy and cheap freight; they are slow; and their first cost, if well constructed, is necessarily high. These and similar considerations which will suggest themselves, seem sufficient to effectually decide the question against canals for the future, and they do to a certain extent. But there are qualifying conditions which apply to a large number of cases. The canals now in operation have, with not many exceptions, long since been built and paid for, so that they have only the cost of maintenance and repair to carry, as against the bonded debts of the railroads. Some are owned by the States, and are therefore removed from stock-jobbing drawbacks, except so far as the latter affect competition.

In the case of the Sault Ste. Marie locks the National Government, too, has its interest; while abroad government ownership and control are the rule. This control secures a comparatively uniform tariff, though we notice that in France the remarkable growth in traffic of certain canals, in comparison with the carrying business of competing railroads, has caused the latter to petition the Chamber of Deputies to restore the reduced canal rates. Such a movement is to be looked for under almost any condition of the carrying trade, as we see in the frequent canal wars at home; but in the case of the French railroad companies the figures for 1887 show that they had abundant cause for alarm. While the canals are only serviceable for a limited class of freight, the heavy, low-priced materials, such as ore, coal and grain, they can afford to carry such freight at extremely low rates. They are slow conveyers, but this is not of very great importance with most of their freights.

It must be remembered that while engineering progress in regard to the movement of freight by canals has been slow in comparison with the strides in the direction of canal construction, and still more so in comparison with the railroad practice, there is a wide field open. Steam haulage by cable or rail, and the innumerable designs for self-moving vessels, with increased speed and tonnage, offer interesting problems, as do also improved devices for unloading, for grade planes and locks, for the protection of the banks from wash, and in other details.

To sum up, at the lowest we can predict a long life to suitably located canals, with a possibly improved future, even if they never outvie railroads in gross importance as carriers.

THE DYNAMITE GUN VESSEL.

The performance of the dynamite cruiser "Vesuvius" will be watched with great attention. Without discussing the merits of Capt. ZALINSKI'S ingenious pneumatic gun and its possible evolution into an arm of greater range and accuracy, we may briefly consider the vessel herself. She is 252 feet 4 inches over all, by 26 feet 5 inches beam, by 9 feet mean draft, measures 725 tons, will be driven by triple expansion engines of 3200 indicated horse-power, and is expected to make 20 knots. She has twin screws and steam steering-gear, and it is claimed will prove handy. There are to be three 15 inch guns or pneumatic tubes placed near the bow abreast and parallel, giving direct fire ahead. Their muzzles will project slightly above the deck, the remainder being under cover (though not really protected). The guns will have a fixed elevation of about 16 degrees, and the range, which it is said will be over one mile extreme, will be controlled by an arrangement of valves. There is, of course, no lateral training, except by changing the course of the vessel. The 15-inch dynamite projectile carries 600 pounds of explosive gelatine, estimated to be equal to 852 pounds of dynamite No. 1, or 943 pounds of gun-cotton. By the introduction of sub-caliber tubes it would be possible to use smaller shells. The vessel will carry thirty of the 15-inch size. There will be a secondary battery of two 3-pound and one 1-pound rifles, two 37 mm. Hotchkiss guns, and two Gatlings for defense against boats. As against heavier foes she will have to rely on those twin screws and the 3,200 I. H. P. in case the dynamite shells miss.

Now, assuming the potency of the dynamite shell, can the vessel hit

her antagonist before being herself destroyed? The guns can be loaded twice per minute, Capt. ZALINSKI stated in his interesting paper read before the Naval Institute. This we understand to mean less than six shots per minute without altering the range or allowing for any lateral training by steering. The vessel, approaching a stationary enemy, would take about three minutes in traversing its run of one mile of range before reaching its mark, or close quarters. Theoretically, during these three minutes she would have nearly eighteen shots, out of which something ought to come. While approaching the enemy in daylight she would be under fire about ten minutes, and during the last five or six minutes under a painfully accurate fire as compared with her own. The number of shots to be faced would depend upon the armament of the enemy; but it is a question whether the dynamite vessel could ever reach her own range before being disabled or sunk, notwithstanding the small mark she would present bows on, this mark of 26 feet beam by a considerable freeboard being, however, immensely greater than that offered by a torpedo boat. Supposing her to arrive at her firing point unharmed, she would have to do a great deal better practice than was attained with the dynamite gun on shore under every possible advantage.

When in commission her offensive strength will of course be tested. This should be done in a sea-way as well as in smooth water, and with moving objects, the vessel herself being under way. A few shots with dummy projectiles will show what can be expected in actual combat on open water and in a rough sea. The range of the gun afloat will depend upon the uniform action of the valves, the pitch of the vessel, and the personal equation of the marksman in timing the moment of firing to the motion of the vessel. But the very high trajectory of the projectile renders a small error of much more importance than with common ordnance.

The lateral training can not be so rapid as from the shorter torpedo boats, which with a few exceptions are less than half the length of the dynamite vessel, and swifter. The error in lateral pointing will be less from yawing.

It is a misnomer to call this new addition to our navy a cruiser. She is a large torpedo boat, whose projectile traverses the air instead of the water. She will have greater offensive power, perhaps, than the ordinary torpedo boat, and will be more liable to disablement or destruction. She will be more seaworthy, but slower and less handy. It is impossible to compare the untried effect of an air torpedo striking the armored portions or light upper works of an ironclad with that of a torpedo striking below the armor belt on a double-bottom, small compartment or jacketed hull. Experience in real service can alone determine this. As to the probability of being destroyed, there is little to choose between the torpedo boat and the new type. A single hit from a small gun would be apt to put out of action or sink either. The additional seaworthiness will enable the new vessel to move from point to point along the coast in weather too heavy for the smaller craft, and, without knowing her coal capacity, we suppose she could make longer runs—at reduced speed, of course.

Her best fighting policy would be at very short range, where the inferior accuracy of her fire would not tell so much against her. The most favorable opportunity would be the chance for a short dash at night upon an anchored enemy, a surprise, and the luck of putting in one of the big dynamite shells before going down herself. This is just what the cheaper torpedo boat is designed for. The electric search light and boat patrol tell against both alike, while nettings would be less effective against the air-torpedo. Neither can attend to more than one enemy at a time, and both would probably be subject to fire from a consort of the attacked vessel. Failure on the part of either torpedo boat or dynamite ship would almost certainly mean annihilation.

It may seem unfair and unsafe to criticize in advance of actual experiment, and without full particulars as to construction. We do not pre-judge. That the efficiency of torpedo boats was overrated three or four years ago, has been shown by recent trials; and if the new system is found to be all that is claimed for it, the country will save the expenses of building on obsolete types. At all events the experiment is not a very costly one. It is well that it is to be made. It is in fair competition with the torpedo boat, the Ericsson "Destroyer," the heavy single-rifle gunboat, and the Nordenfeldt submarine torpedo boat, as well as the numerous modifications of these types.

Electrical Railroad Statistics.—An examination of electrical railroad statistics shows that there are 130 miles of road in operation on this continent. Of this number of miles 21 are in operation in the State of Pennsylvania, 16 miles in the State of New York, 10 in Ohio and 83 miles in other States. Almost all of this building has been done in the past year. On these various roads, constructed and constructing, in 62 different towns and cities, the Van Depoele system is used or to be used in 17 cases, the Daft system in 15 cases, the Sprague system in 7 cases, and the Bentley-Knight, the Heart, the Henry, the Julien and other systems in the remaining cases. The last-named system is to be used on the projected New York & Harlem Fourth Avenue Electrical Railroad

CORRESPONDENCE.

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

The Cost of Making Iron in Alabama.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Referring to your statement on page 357 of the cost of Alabama pig-iron based on the paper of Mr. Wm. M. Bowron, "Manager of the South Pittsburg Division of the Tennessee Coal, Iron and Railroad Company," we beg to state that he is an independent engineer and metallurgist, and is not in the employment of this company. We merely desire to make the correction because it is not the practice of this company to participate in public discussion on the vexed question of the cost of Southern products.

Yours truly,
TENNESSEE COAL, IRON AND RAILROAD COMPANY.

J. BOWRON,

Secretary and Treasurer.

NASHVILLE, TENN., May 22.

LOVE'S IRONY.

By a Blast-Furnace Manager.

[Verses read at the Banquet of the American Institute of Mining Engineers, Birmingham, Ala., by R. W. Raymond.]

I frankly own 'tis not my part
To sing as poets can;
In strains of ordinary art
I praise my Mary Ann.

When first by love's reducing flame
I found myself surprised,
And in her coal-black eyes became
Completely carbon-ized,

All former dreams up chimney-flue;
I dream of her instead.
No other train of thought goes through
The tunnel of my head.

At merest touch of her fair hand
I feel love's potent spell;
The in-walls of my heart expand,
As they would burst the shell.

Her hair is dark as magnetite
(In not too lean a piece);
Her face is like a limestone white,
Just flushed with manganese.

With Clinton red her lips are lined;
And for the rest, I'll say
She seems to be of most refined,
Yet not refractory, clay.

And when she waltzes, who is he
Would have the heart to stop her?
'Tis such a witching sight to see
That lovely belle and hopper!

I gaze upon her, ore and ore,
Her slender bosh and throat,
Her mantle, lifted from the floor,
Her red short petticoat.

I wish I were the brodered rag
That wipes away her tears;
I wish I were two drops of slag,
To hang at her tuyeres!

Would she life's burden take with me
From barrows, cars or trucks—
Good luck indeed! Why, that would be
The very best of flux!

No silly Kate should spoil our loves!
With acid atoms plus,
The hottest blast of Gordon's stoves
Should make no fuss-for-us!

Like fluid cinder from the spout
Our life should flow rejoiced.
Together, at the last blow-out,
We'd mount the heavenly hoist!

One fateful day, I broke the bound
That erst had held me fast,
And poured my glowing passion round
In one tumultuous cast.

Alas! her answer made me sick!
In tones too much like fun,
She said, "my friend, you melt too quick;
You can't be No. 1."

This cruel sentence in my brain
Wrought transformation strange;
I felt myself in every grain
Molecularly change.

I grew first mottled and then white
By chemical gradation,
Obeying in my chilly plight
The law of graphitization.

But as she turned, I heard her say
(And hope again grew big),
"He might be useful, in his way,
To mix with other pig!"

"Not so," I cried; "for you and me
Love's open hearth has room;
And I the only pig will be,
While you supply the bloom!"

Said she, "These impudent affronts
Can never stand excused."
"Madam," I said, "I've melted once
And will not be re-fused."

Thus finished I my first campaign,
Retiring from the field,
Yet trusting, when I charge again,
She will begin to yield.

For love dares all in fiery war;
And love's career will end
Either upon a scaffold, or
Upon a dividend.

O Mary Ann! if fuel smile
My care will turn to cash.
The fact that you're so volatile,
Does not make me more rash.

Faith, it would be a splendid joke
(And I will do it, yet!)
To try, instead of Warrior coke
A well-prepared coquette.

What metallurgic triumph can
Be more complete than that—
To substitute my Mary Ann
In place of Mary Pratt!

THE ALABAMA MEETING OF THE INSTITUTE OF MINING ENGINEERS.—II.

In our last issue we gave a brief account of the opening sessions of the fifty-first annual meeting of the American Institute of Mining Engineers at Birmingham, Ala., May 15th. Nearly one hundred visiting members were present. Of the seventy-four new members and associates elected during the meeting, a large number were residents of Birmingham and vicinity. The list of papers read by title was an unusually long one. The topics covered a wide range, but as might be expected in view of the locality of the meeting, iron predominated.

Wednesday, May 16th, was spent in an excursion over the Birmingham Mineral Railroad to the North Birmingham furnaces of the Sloss Company, the furnace of the Pioneer Iron Company, the furnaces, coal mines, and coke-ovens of the Tennessee Coal, Iron and Railroad Company, the furnaces of the De Bardeleben Coal and Iron Company, the Bessemer rolling mills, etc., including a lunch at Ensley, by invitation of the Ensley Land Company. At the Pioneer Company's red hematite mines the ore is in three distinct seams running 51, 41, and 39 per cent in order downward, with a leaner ore, which is, however, in demand. The ore is delivered at the furnace 11 miles distant, at a total cost of 75 cents per ton; of which the railroad freight charge is 25 cents. Negro miners are employed at \$1 to \$1.25 per day, and are said to make efficient miners.

At Ensley the four-furnace plant of the Tennessee Coal, Iron and Railroad Company was inspected. Each stack is 80 feet x 20 feet, the largest in the South. The one in blast is turning out an average of 160 tons of iron daily. The second stack was to be blown in this week and the other two will be completed shortly.

The Pratt mines, a short distance from the works of the Tennessee Coal, Iron and Railroad Company, were visited, and many members went underground. The main seam is 4 feet 9 inches, with a good roof, requiring little timbering. These mines are now producing about 3000 tons per day, and could be brought up to an output of 4000 tons. The coal is a fine coking coal, but rather high in ash, the coke carrying from 13 per cent to 16 per cent. Harrison and Legg coal cutting machines are both in use.

The town of Bessemer excited much comment on the part of visitors who had not before seen it. The town is just thirteen months old, and has 4000 inhabitants. The leading works are the two-furnace plant of the De Bardeleben Company, the furnaces being 75 feet by 17 feet, with Whitwell stoves, Dixon blowing engines, etc., and almost ready to be blown in. In the rolling mill are 24 single puddling furnaces, and sufficient heating furnaces and rolls will be put in to give a capacity of 120 tons daily of sheet, plate and bar iron. The mill is well designed for convenience in handling material and product.

On Thursday morning was held the third session. A paper on Large Furnaces on Alabama Material, by Mr. Fred W. Gordon, of Philadelphia, was read by the secretary in the absence of the author. This paper was chiefly a description of the Ensley furnaces, their history, so far as they have been completed, with a brief account of the ores used in the first runs made. The author pointed out the economy of large furnaces as compared with small ones, and predicted that before long the South would be full of such furnaces, and that the small furnaces would be no more. In the discussion which followed, superior quality was claimed for the coke made in the Birmingham district over that of Chattanooga. The question of washing coal before coking came up in the discussion and was treated at length. There can be no doubt it would be highly

advantageous. Then followed the election of new members and associates, and the reading of papers by title. They were as follows:

The Bleichert Cable Tramway System, by E. G. Spilsbury; Locked Wire Cables, by E. G. Spilsbury; Calculations on the Heat Generated and the Areas of Chambers and Passages Required in the Use of Blast-Furnace Gases for Heating Boilers, by F. C. Roberts; The Taylor Gas-Producer in Practice, by W. J. Taylor; Note on Arsenic Determinations, by R. C. Canby; The Determination of Phosphorus in Iron and Steel, by Porter W. Shimer; The Development and Statistics of the Alabama Coal-Field for 1887, by Charles A. Ashburner; Prominent Sources of Iron-Ore Supply, by John Birkinbine; The Efficiency of a Steam-Boiler Using Blast-Furnace Gases as Fuel, by J. E. Denton; The Petit Anse Salt Mine, by Richard A. Pomeroy; The Feasibility of Using Cheaper Fuels in the Blast-Furnace, by Jacob T. Wainwright; Henderson Steel, by Alfred F. Brainerd; Notes on Certain Iron Ores and Coals of Alabama, and on the Improvement of Blast-Furnace Practice in the Birmingham District, by Alfred F. Brainerd; An Experiment to Determine the Cause of Freezing of Compressed-Air Engines in Mines and Tunnels, by J. E. Denton; A Bessemer Steel Plant of 1888, by John F. Wilcox; The Handling of Natural Gas, by John F. Wilcox; The Grading of Birmingham Pig-Iron, by Kenneth Robertson; Experiments to Test Hofer's Theory of Blasting, by Frank Firmstone; Mining in Soft Ore-Bodies at Low Moor, by W. S. Hungerford; The Segregation of Copper-Silver Alloys, by F. F. Claussen; The Losses in Roasting Gold Ores, and the Volatility of Gold, by S. B. Christy; Notes on the Geology and on Some of the Mines of Aspen Mountain, Pitkin Co., Colo., by Carl Henrich.

A resolution was then passed instructing the secretary to express the thanks of the Institute to the local committee and the various corporations and citizens, for the hospitable reception of visitors and guests. After the adjournment of the morning session a visit was made to the Henderson Steel Works. In the afternoon an excursion was made over the Alabama Great Southern Railroad, to the Gate City Rolling Mill, ore bank and limestone quarry, and the Trussville furnace. In the evening a subscription dinner was given at the Alabama Club.

Friday, May 18, an excursion over the Mineral Railroad, visited the Blue Creek coal basin, the limonite deposit at Woodstock, and the Lower Cahaba coal-field at Blocton, the party being entertained at Blocton by the Cahaba Coal Mining Company.

On Saturday a trip was made to Anniston, where the works of the Woodstock Iron Company and other establishments, including the large pipe-works in progress, were visited. An informal session was held in the evening.

On Monday, by special train on the Anniston & Atlantic narrow gauge, a visit was made to the ore-banks at and beyond the Clifton furnace. Returning from this excursion about noon, many of the visitors departed on trains North and East. Those who remained were entertained in the evening and a ball given in their honor.

Altogether the meeting was a most successful one, and gave the members an opportunity to visit many works and mines of interest. Those who had not previously visited the district were impressed with its remarkable advantages for the production of cheap iron. The ore, coking coal and excellent limestone are in contiguity, and it is figured that the total cost of material at furnace in the Birmingham district will average about \$1.12½ per ton of iron produced, as against \$4 and \$5 in the Lehigh and Schuylkill valleys. The future utilization of phosphatic slag and the outlook for the basic process were also studied. Prof. W. P. Phillips stated at the meeting that the South is now paying about \$10,000,000 annually for phosphoric acid in one form or another for fertilizers, and pointed out the immense field possibly to be opened for the by-product from the phosphatic ores of the region. Perhaps, however, the feature which most impressed the visitors was the wonderful development and rapid growth of the district.

THE DEVELOPMENT OF THE AMERICAN CHEMICAL INDUSTRY.*

By Dr. Francis Wyatt.

(Continued from Page 325.)

THE LEBLANC PROCESS (HYDROCHLORIC ACID).

The best and least complicated method known to us of conveying the gases to the towers is outlined in our illustration No. 17, and consists of cast-iron pipes for those proceeding from the Leblanc roasters or from Hargreaves cylinders, and earthen-ware pipes for those that are given off in the decomposing pans. The tapering earthenware pipes are made in 3 foot lengths, are 15 inches in diameter, are thoroughly boiled in tar, and are provided with spigot and faucet joints. The regulation of their elevation and declination, and the distance they are to traverse are points of vital importance. If the distance be too short the gases will have no chance of becoming sufficiently cool; while if it, on the contrary, be too long, they will condense ere they reach the end, and thus very soon cause an intolerable nuisance and loss from leakage. All their joints must be made with a paste compounded from a judicious mixture of ground fire-clay and warm tar, and the whole range, from pan to condenser, should be well supported by a strong timber platform, and so arranged as to be always readily accessible for repairs. The gases which emanate from the bi-sulphate roasters have, of course, nothing to do with these pipes, but pass up a chimney and are carried by a brick stack into a flue of the same material some 25 or 30 feet high, whence they enter the long range (say 100 feet) of cast-iron pipes which conduct them to the towers. These pipes, cast in 9 feet lengths, have a diameter of 3 feet, and the majority of their ends are provided with flanges and bolts.

In putting them together it has been found to answer well in practice to occasionally alternate the flanged joints by plain ends secured with an overlapping collar. This effectually provides against the danger of expansion and contraction, and is therefore worthy of being borne well in mind. The whole of the joints are to be well luted with the same mixture of tar and fire-clay already referred to. The destruction of the pipes by condensing acid is greatly lessened, if not entirely obviated, by building at the tower end of the range a short length of fire-brick flue

in which the arch is formed from segments of brickwork held together by an iron band, and of which the sole is made of cast-irons plates resting upon flat-bottomed rails. The upright metal columns shown in Figs. 18 and 19 are the most convenient form of support, and can be made to hold their burden with a very close grip. They should be bolted upon solid stone flags or blocks of granite well fixed in immovable ground at equal distances of about 18 feet.

Our plans for conveying the gases from our pans, cylinders or furnaces being completed, we may turn our attention to the construction of the condensers, where we shall find a great demand upon our caution and forethought, and ample scope for the development of ingenuity. In the first place, as those who pause to think must readily realize, every thing will depend upon the nature, solidity, and durability of our foundations. To lose sight of this elementary fact would be, and undoubtedly often has been, fatal. How many manufacturers or managers who have sought to make some petty economy at the expense of this solidity might not come forward and add eloquent, if sorrowful, emphasis to this warning?

No more important service than that rendered by an efficient condenser, is required of any piece of plant in a Leblanc alkali works. In cost of construction it rarely averages less than \$5000, while the gross weight of the materials composing it may be safely reckoned, when in place, at from 500 to 600 tons. Since it must be so erected as to occupy a maximum space of about 10 feet of ground, it is evident that only the very best building material should be employed. If we seek to cheapen it by the use of inferior substances, the least unusual strain will throw it out of plumb, and directly that catastrophe (it can not be called any thing less) occurs, there will commence a series of unlooked-for and deplorable leakages and irregularities, which, in our efforts to repair or remedy them, will soon cost us far more time and money than would suffice to build up an entirely new structure.

In our own opinion, based upon considerable observation, the best and most lasting foundations we have ever seen were built up of solid, large size granite flag-stones, cemented together with hydraulic mortar of known quality, embedded to a depth of fifteen feet, and covered over at the surface with a thick, even bed of asphalt. These have so thoroughly answered their purpose that we have no hesitation in recommending them, or in stating that, under certain favorable circumstances, we shall certainly again adopt them ourselves. At the same time, we have no inclination to disregard the advice or opinions of other experienced writers—such, for instance, as Mr. Lomas—whose views do not exactly coincide with our own, and whose recommendations are, nevertheless, well worth the consideration of our readers. This author, commenting upon this subject, says that he has become convinced, after a very long experience, that the only really lasting and reliable foundation for a condensing tower *must be made of wood piles not less than 12 inches square at the thick end, standing not more than 9 inches apart, and driven into the ground at least 25 feet!* Upon the heads of these, he places spiked balks of timber laid longitudinally, filling up the spaces between them with a cement made from fire-brick and pitch, and the whole is made completely level with the ground by a flooring of three-inch deals. According to Mr. Lomas, a foundation thus prepared is practically indestructible, affords complete protection against treacherous ground, and is indifferent to all the attacks of leaking acid; its strength depending, not so much upon the stability of the bottom upon which the piles repose, as upon the friction and pressure of the material they have been driven through.

Which ever of these two plans may be preferred, we shall presume that a faultless foundation has been secured, and may now proceed with the erection of the tower itself. Strictly speaking, we recommend that it be invariably composed throughout of granite, or of the hardest possible sandstone; selecting for the gas chamber, or that point where the gases enter the base of the structure, the largest, soundest and most uniformly excellent flags the neighborhood can afford. These flags must be very carefully dried at a high temperature and, their well trimmed edges having been accurately joined together, are thoroughly cemented with boiling sulphur, poured lavishly into all the crevices. We give preference to sulphur for this cementation because, providing the temperature to which it is exposed does not exceed 212 degrees Fah., it has no equal in its acid-resisting qualities. If, however, it can not be conveniently procured, asphalt must be chosen as the best substitute. The joints of the stones are equalized when the cement has quite cooled by means of a very hot iron. The floor and sides of the chamber should consist of large, single flags, its roof, constituting the first arch of the tower, being built of square blocks of granite, properly interspaced so as to leave sufficiently large apertures for the free upward passage of the gas and the egress of the descending water. There is no objection to resting this construction upon granite pillars rising from the chamber bottom. While we have said and must maintain that the entire tower should be built of closely joined and well cemented siliceous stone, we can not ignore that there are some regions in which it would be next to impossible to obtain stones in sufficient quantity and of the proper quality for such a purpose. In these, happily rare, cases we must rest content with building the chamber only as we have described, and construct the rest of the tower with well burned fire-bricks, made acid resisting by coating them with tar. The tar is well boiled to deprive it of moisture, and the bricks, previously made very hot, are allowed to soak in the liquid for an hour. At the end of that time they are withdrawn, drained and immediately used. Being warm, all asperities or lumps will disappear when they are pressed together. The tar constitutes an excellent cement, and the walls will hence settle down into a compact, impenetrable mass.

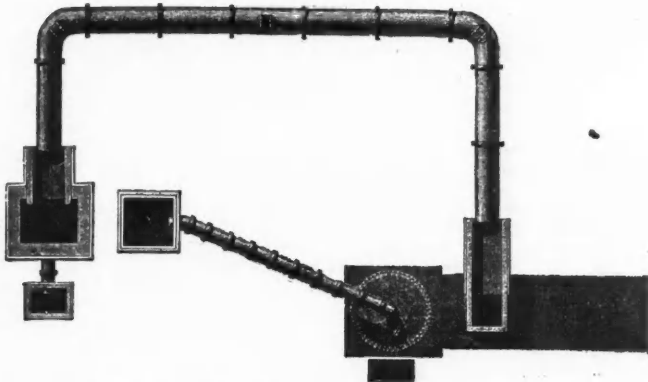
When the coating of tar has been given to the bricks previous to their arrival at the place where they are to be used, they must all be warmed, and before being placed in position, should be sprinkled with a very thin coating or dust of fine, burnt, and washed sand. This may seem at first sight an excessive or unnecessary precaution, but we have only to reflect upon the corrosive nature of the gas HCl, and the readiness with which, under even a short period of faulty condensation and consequent increase of temperature, they would slip from their position, to appreciate its necessity. As the tower progresses upwards it will be found highly convenient—whatever

* Copyright by the Scientific Publishing Company, 1888.

material be employed—to insert at definite intervals a regular layer of large and very perfectly dressed granitic or other siliceous stones, arranging them in such a manner that they project evenly all the way round from the interior wall. These projections will serve as supports for either the arches or the perforated roofs that bear the packing, and the strain upon the coke being thereby relieved, the otherwise inevitable crushing is obviated. The best covering for the top of the tower is made by one large, level, perfectly dressed and cemented siliceous flag; but if this can not be obtained a roof must be built of several smaller stones. The material most in favor for packing, especially in England, is hard, porous foundry coke, but upon this point, as in the case of sulphuric acid denitrators, we have no wish to be absolute, for there is any thing but unanimous opinion. Fire-bricks (arranged so as to leave the necessary openings), hard burnt refractory tiles, broken bottle ends, china, or pottery, siliceous pebbles, and many other substances which will resist the action of the acid and offer a large condensing surface to the gas are freely advocated, and are indeed said to be used in several large establishments with very satisfactory results. And here, before proceeding with our description, we may pause to

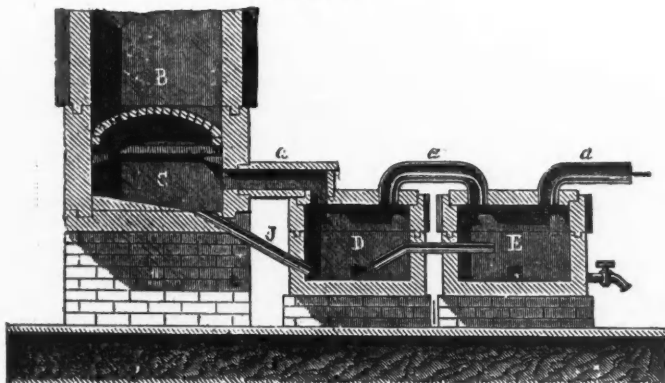
As we have already hinted, the less we submit our coke to pressure, or strain, the less risk do we run of being frequently compelled to stop working and remove obstructions by flushing with large bodies of water, and it will therefore be found a good plan in practice, instead of being satisfied with two or three, to arrange several, of these arches at short intervals from each other. It will be observed that in this pan tower the gas exit pipe passes out at its side and rises some 3 or 4 feet above it. This allows any uncondensed gases that have resisted the action of the water, either to be transferred to the tall main chimney of the works or to be discharged directly into the air. In all well conducted establishments, where good management and technical ability prevail, the condensation is so completely effected that no inconvenience is incurred from adopting the latter course. The towers marked *B* and *C*, while differing but very little, either in fashion or material of construction from *A*, are nevertheless specially destined and adapted to receive the gases from the cylinders or the roasters. The packing on the top of the gas chamber of *B* is therefore made of open fire-bricks instead of flints, and is carried very much higher than in *A* to prevent any possible firing of the coke by the superheated gases. *C* is what is

Fig. 17.



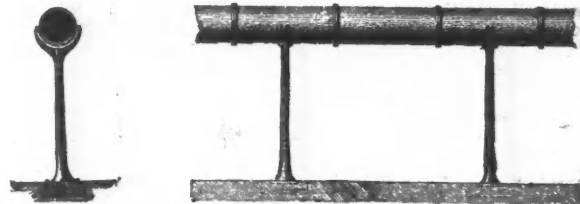
Arrangement of Pipes for Conveying HCl to the Condensers.

Fig. 20.



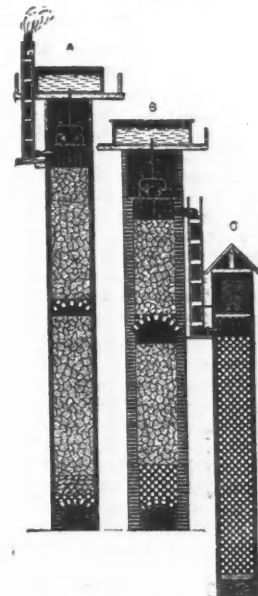
Lower Extremity of a HCl Condensing Tower.

Figs. 18 and 19.



Supports for "Furnace" or "Cylinder" Gas Pipes.

Fig. 21.



Upper Structure of HCl Condensers, with "Flush" Tower.

glance at the figures 20 and 21, in order that what is to follow may become entirely intelligible.

The first of these two drawings illustrates the lower extremity of a modern condensing tower, *A* being its foundation, *B* the section immediately above the first roof or arch where the coke packing commences, *C* the gas chamber, which receives both the HCl from the pans, cylinders, or furnaces, and the condensed or absorbed gas which trickles down from the coke. The pipe *J* carries the condensed acid into the vessel *D*; hence it is conveyed by another pipe into *E*, whence it is drawn off into the storage tanks by means of an earthenware stopcock. The gases, leaving the points where they are generated, finally reach the pipes *a*, *a'*, *a''*, pass from them into *E*, then into *D*, and at last reach the condenser. The tanks *E* and *D* are supplemented in some important continental works by adding to them, in order to still further facilitate the absorption process, a series of enormous stoneware pitchers or carboys furnished with siphons. Wherever we have seen it at work, however, this system has appeared to entail great annoyance and loss from the inevitable breakage, and we have been unable to discover that this was counterbalanced by any very tangible advantages.

The second drawing represents what, in our opinion, is the most practical and convenient arrangement of the entire condensing plant that has hitherto been adopted. The tower marked *A* is destined to receive the gases from a decomposing pan of 8 to 10 cwt. of salt per hour capacity. It has an interior measurement of from 6 to 7 feet square and a total height of 70 to 80 feet from the ground. A layer of about 3 feet of carefully washed flints, immediately on top of the gas chamber roof, commences the packing and prevents any choking from crumbled coke, and following this, for say 30 feet, comes the carefully selected coke itself. Next comes the second arch, built of hard fire-bricks, resting on our arrangement of outcropping stones, and this is followed by coke again, and so we go on until the summit is attained.

technically known as a "flushing tower," and is generally built only about half the size of the other two. As its most essential quality is the possession of a free and rapid draught, the packing of coke may, in its case, be entirely replaced by fire-bricks. It receives the gases that have passed through *B* by an earthenware pipe in its side at the top, and it is supplied with a good flow of water from some neighboring cistern. The water reservoir shown as capping the towers *A* and *B* should have a capacity of 1000 gallons, and be constantly supplied with the purest available water by means of a forcing pump.

There is still a custom prevalent with some old-time manufacturers, of directing all the gases proceeding from several furnaces and pans into one condenser. In defense of it they argue that the great height of their chimneys supplies so powerful a draft, that they are thus furnished with a constant and regular affluence of HCl gas which, providing their work be properly managed and regulated, is extremely profitable, and unattended by any inconvenient results. By "proper regulation of the work," they mean that the furnaces and pans must always come into full blast one after the other, in regular succession; as one finishes, or diminishes in force, another must commence, and so on. This position, although sustained by apparently good authority, is nevertheless gravely contested, and we may say at once that a most unfortunate practical experiment has convinced us that it has no tenability outside of theory. The tax upon the intelligence and vigilance, not only of the overseers, but even of the common furnace men, imposed by the absolute precision that it is necessary to maintain in the water supply, the draughts, and the adjustment of the various dampers, is much beyond what we have any right to expect of them, and the result is that directly one man commits a fault the whole plant gets out of gear, and a serious and even dangerous loss of gas is entailed. For our own part, therefore, we pronounce emphatically in favor of separate condensers, and recommend that in all cases, with the exception of the flushing tower, the gas be

Group). This fibrolite area lies in between the two great areas of porphyritic gneiss, very well developed between Rumney and Hebron.

Of the influence of the walling on the quantity and quality of the mica but little is known. My own investigations on this subject have not as yet led to any definite conclusions. Some of the more experienced miners in Mitchell County say that both the quantity and the quality of the mica depend upon the character of the walling and of the vein, but the lack of careful and long-continued observations, conducted in a methodical and scientific manner, preclude the formation of definite and reliable opinions. There are so many accessory circumstances that influence the quality of the mica—such, for instance, as the width of the vein, the presence of flat and curved mica, of crystallized feldspar, etc., that the time has not yet come for expressing an opinion. These circumstances may depend more or less upon the character of the walling; but if so, it is not known just what the connection is. The same may be said as to the influence of width, depth, dip, strike, and accompanying minerals.

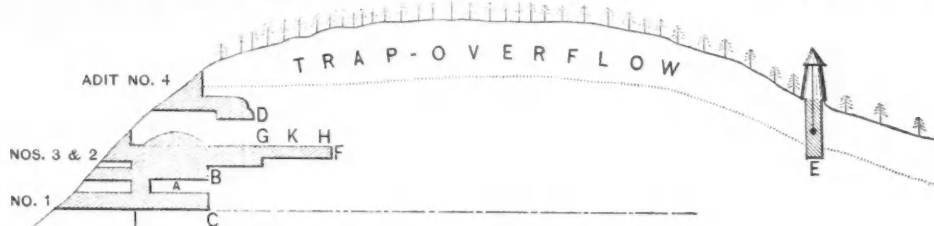
Below the zone of atmospheric influences, rarely extending below 20 feet, and sometimes not below 10 feet, the vein becomes more solid, and the quality of the mica improves. The width of the veins varies widely, from 3 feet to 40 feet, sometimes in the same mine varying from 3 feet to 20 feet, as at the Presnel mine, Yancey County. Nipping of the vein is a common occurrence, occasionally to almost entire obliteration. It has frequently happened that one set of miners have quit work on account of a "nip," and another set at a subsequent date have prosecuted the "driving," and found good mica within a few feet. The "stringers" that make off from the main vein penetrate into the wall-rock at various angles, and though narrow sometimes yield fine mica.

The occurrence of well crystallized feldspar is held to be a sure indication of fine mica, though flesh-colored feldspar is regarded as exerting an injurious influence, as also the preponderance of quartz, and the presence of uranium minerals. These assertions must, however, be accepted with caution, or, as a Teutonic friend once remarked, "with a big dose of salts."

The next article will deal with the minerals found in mica veins.
(TO BE CONTINUED.)

THE PORCUPINE SILVER MINE, ONTARIO.

This mine is situated on location "96 T," in the Rabbit Mountain District, about 26 miles from Port Arthur, and about 13 miles from Murillo,



PORCUPINE MINE,

NEAR

PORT ARTHUR, ONTARIO.

MAGNETIC COURSE OF VEIN

S.W. ←

→ N.E.

SCALE, 200 FT. TO THE INCH.

WALFOLE ROLAND, C. E.

on the Canadian Pacific Railway, and is near the Beaver mine, recently illustrated in the ENGINEERING AND MINING JOURNAL.

The Porcupine mine was discovered in 1883 by Messrs. Daunais & McPhee, associated with Thos. A. Keifer, of Port Arthur.

The accompanying illustration shows the amount of underground developments, which are extensive for this district, so extensive in fact that they have delayed the erection of a mill, which is now the great want of the property.

The ore is similar to that of the Beaver and Badger mines, and is frequently of very high grade, native silver and argentite. Five hundred dollar to \$1000 assays are common, and occasional samples run much higher.

The veins occur in fissures in the metamorphic slates of the Animikie series near their contact with the syenitic granite. Mr. S. Brady, superintendent of the Beaver mine, who examined this property, thinks the proximity of the granite has retarded rather than assisted the deposition of the ore. The vein runs north 63 degrees east, and dips 78 degrees to the east; it is a well-defined fissure, crossing the slates in places, and it varies in width from 18 inches to 3 feet.

The most extensive developments have been made on the west face of the hill, at which place the vein has been opened by a series of adits, four in number, which were driven unnecessarily close to each other. An excellent quality and a large quantity of ore is exposed by these developments, more especially is there a fine body of high grade ore showing in adit No. 2, and at and between points marked B. C. At points H, and at breast of adit F good ore is also showing, but not in such quantity as from B. C.

Samples of the ore taken by Mr. Brady ran from 10 to 600 ounces to the ton.

Mr. Brady says: "On sinking through the trap-overflow, the line of junction of it with the slate is met with on the foot-wall at the depth of 33 feet. The same does not show on the hanging-wall until a depth of 54 feet is reached. A sample of 47 tons taken from the bottom of this shaft gave 134 ounces. The lode at this point is strong and well defined, with strike and dip, the same as on the western slope of the hill. It shows silver glance and a little native silver, with the same accompanying vein matrix as at other points."

Dr. Selwyn, Director of the Canadian Geological Survey, referring to this district, says:

"I have no hesitation in expressing my conviction that the region is

traversed by a great series of true fissure-veins of most promising appearance and many of which will almost certainly prove of immense and permanent value. The features of the veins are especially well illustrated in the workings of the Beaver and Porcupine mines; but there seems no reason whatever why the numerous parallel veins, which occur under precisely similar conditions, but on which at present only small openings have been made, should not develop into mines of as great value as those above named, and now being successfully worked." After referring in most favorable terms to mines visited in this vicinity, the report concludes as follows: "In any case, sufficient is now known to warrant the assertion that this region presents all the natural conditions for the development of an immensely valuable and extensive mining industry, awaiting only the application of well-directed energy and enterprise in order to secure results exceeding, perhaps, the most sanguine anticipations."

BOOKS RECEIVED.

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

Annual Report of the Geologist of Wyoming. By Louis D. Ricketts, Territorial Geologist and Mining Engineer. Published by the State, Cheyenne, Wyoming. January, 1888. Pages 87.

Silver in Volcanic Ash.—The Panama Star and Herald says: A specimen of volcanic ash collected recently on the coast in Ecuador, 120 miles west of Cotopaxi, has been analyzed by Prof. Mallet. The ash fell in July, 1885, and formed a deposit to the depth of several inches. The interesting feature in the composition of the material was the presence of a small amount of silver, probably as silver chloride; the result of several experiments showed that silver was present to the extent of one part in eighty-three thousand of ash. This is believed to be the first instance that silver has been identified in material ejected from a volcano.

Preventing Noise on Railway Bridges and Elevated Roads.—Berlin engineers have adopted two different systems for diminishing the noise of trains on their viaducts. One is to bolt to the bridge structure long troughs of sheet-iron, about 16 inches wide, so arranged that a rail will come in the center of each. The troughs are then filled with gravel, in the middle of which is buried the longitudinal timber carrying the rail, and the space between the troughs is covered with iron plates, on which is spread a thin layer of gravel. The second method, which is

found to be more efficient than the other, consists in placing a continuous series of shallow iron troughs, about 5 feet square, along the line of the tracks. These are filled with gravel, on which the ties and rails are laid.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

PATENTS GRANTED MAY 22d. 1888.

- 383,101. Water and Fire-Proof Composite Roofing. William Chadd, Wilkes-Barre, Pa.
- 383,104. Friction-Clutch. Hilar C. Crowell, Cuyahoga Falls, Ohio.
- 383,109. Injector. Walter E. Dodge, Everett, Assignor to the National Tube Works Company, Boston, Mass.
- 383,111. Tube-Expander. James Duffy, Buffalo, N. Y.
- 383,116. Machine for Tinning Copper Sheets. David Evans, Ansonia, Conn.
- 383,123. Oil-Furnace. Alphonzo A. Harwood, McKeesport, Pa.
- 383,154. Gas-Burning Torch. James R. Smith, Chicago, Ill., Assignor to the Standard Natural Gas-Burner Company, same place.
- 383,168. Rail or Bar Bender. Morris H. Brown, Yonkers, N. Y.
- 383,179. Traction Engine. David B. James, Visalia, Cal.
- 383,192. Ingot or Bar for Tools. Frederick Wm. Seaman, Sheffield, County of Kent, Eng., Assignor to the Electrical Accumulator Company, of New York.
- 383,201. Process of Reducing Iron Ores. Gustaf M. Westman, Stockholm, Sweden.
- 383,202. Process of Reducing Zinc Ores. Gustaf M. Westman, New York, N. Y.
- 383,203. Molder's Draw-Iron. George A. White, Sharon, Assignor of one half to William Henry Bense, Canton, Mass.
- 383,233. Piston-Packing. Michael J. Russell, Jersey City, N. J.
- 383,267. Governor for Steam-Engines. James B. Allfree, Indianapolis, Ind., Assignor of one half to Robert Shriver and Harrison Swartzwelder, Cumberland, Md.
- 383,284. Concentrator. John J. Droughton, East Newark, N. J.
- 383,287. Valve for Steam-Engines. John D. Fiske, Baltimore, Md.
- 383,302. Machine for Making Sheet-Metal Blanks. Charles W. Judson, Terryville, Conn., Assignor to the Eagle Lock Company, same place.
- 383,322. Steam-Engine. Francis M. Bites, Pittsburg, Pa., Assignor to the Westinghouse Machine Company, same place.
- 383,385. Testing-Machine. Arthur V. Abbott, Brooklyn, N. Y., Assignor to E. & T. Fairbanks & Co., St. Johnsbury, Vt.
- 383,395. Gas-Generator for Locomotives. Arthur C. Huidekoper, Meadville, Pa.
- 383,405. Steam or other Motor. Hermann Moehring and Albert Pflüger, Frankfurt-on-the-Main, Prussia, Germany.
- 383,406. Valve for Steam or Other Engines. Hermann Moehring and Albert Pflüger, Frankfurt-on-the-Main, Prussia, Germany.
- 383,407. Mechanical Movement. Hermann Moehring and Albert Pflüger, Frankfurt-on-the-Main, Prussia, Germany.
- 383,408. Valve-Gear. Hermann Moehring and Albert Pflüger, Frankfurt-on-the-Main, Prussia, Germany.
- 383,420. Explosive Compound. Carl W. Volney, Tom's River, N. J.
- 383,426. Fluid-Pressure Regulator. William B. Mason, Boston, Mass., Assignor to the Mason Regulator Company, same place.
- 383,427. Governor Valve. William B. Mason, Boston, Mass., Assignor to the Mason Regulator Company, same place.
- 383,428. Combined Pipe-Coupling and Check Valve or Chamber. William T. Messenger, Cambridge, Mass., Assignor to George T. Power, Chicago, Ill.

PERSONAL.

Mr. Charles M. Rolker, mining engineer, New York, has gone to Idaho on professional business.

Mr. Clarence King, mining engineer, has recently examined mines in Nevada, and is about to sail for Europe.

The New England Water-Works Association will hold its seventh annual convention at Providence, R. I., June 13 to 15.

Mr. Graff, general superintendent of the rolling mill at Scottsdale, Pa., has resigned, and Mr. Robert Kemp has been appointed his successor.

Mr. Archie Farrington has been appointed manager of the Reno Reduction Works, Reno, Nev., to fill a vacancy caused by the resignation of Mr. John Howell.

Mr. Andrew Carnegie and Mr. Henry Phipps, Jr., of the firm of Carnegie, Phipps & Co., Limited, of Pittsburg, Pa., sailed for Europe on the 22d inst. on a three months' trip.

Advices from London, England, state that a serious accident happened to Mr. C. H. Disseldorf, a well-known mining man of Salt Lake City, Utah. It will necessitate the amputation of his right leg.

Capt. John Eddy, of the Cleveland mine, Mich., met a horrible death on the 17th inst., by the fall of a heavy mass of rock from the roof of the mine, which knocked him down a shaft, the mass of rock falling on him and killing him instantly.

We have received so many inquiries for copies of Mr. Childs' paper on "Cost Accounts," referred to in these pages May 5th, that we beg to inform those wishing to learn more concerning the subject that the Secretary of the Institute of Accountants, 241 Broadway, New York, will send it, gratuitously, to those who may apply to him for it.

FURNACE, MILL, AND FACTORY.

The Clapp-Griffiths department of the plant of the Spang Steel and Iron Company, Limited, at Etna, Pa., has closed down for an indefinite period on account of a lack of orders.

D. W. Carroll, a prominent boiler manufacturer, of Pittsburg, Pa., made an assignment on the 22d inst. for the benefit of his creditors. The liabilities are about \$75,000, and the assets estimated at \$160,000.

The Weymouth Iron Company's plant at Weymouth, Mass., was recently sold at auction for \$14,300 to Job M. Leonard, of Mt. Hope Iron Company; Cyrus Washburn, W. G. Comey and John F. Rogers.

The capital stock of the Oil City Tube Company, of Oil City, Pa., has been increased from \$200,000 to \$300,000. Among contracts now being filled by the firm is the manufacture of the pipe for a gas company, to supply the town of Wapakoneta, Ohio.

The Fowler Car Company, of Illinois, filed a bill in equity in the U. S. Court at Pittsburg, Pa., on the 22d inst., against the Pittsburg Steel Casting Company. They claim the company has an infringement on a patent of theirs, and lay their damages at \$100,000.

No. 2 furnace of the Nashville Iron, Steel, and Charcoal Company, at West Nashville, Tenn., has been blown in on charcoal. No. 2 foundry iron being made, with the furnace working nicely. The company is making 175 gallons of wood alcohol a day as a by-product.

The Gere Iron Works, of Port Leyden, N. Y., were sold by the sheriff of Lewis County, on the 22d inst., to Martin A. Knapp, of Syracuse, for \$12,000. The works are valued at \$250,000. A new company will be organized, including Hon. J. J. Belden, W. H. Gere, Jacob Crouse and R. A. Bonta.

The North Chicago Rolling Mill Company has begun rolling steel beams at its North Chicago mill, Chicago, Ill. It started on 6-inch, and made a very creditable output for a new undertaking. This week it will work on 8-inch and perhaps 10-inch, and so on, until it has a full assortment of sizes.

The employes of the Twenty-ninth street mill of Carnegie, Phipps & Co., Limited, of Pittsburg, Pa., have organized a benefit society. The employes are all invited to join, independent of the work they do. The firm donated \$500 to the society, and when Andrew Carnegie learned of it he donated another \$500.

The National Pulverizing Company, of which Stephen P. M. Tasker is President, and Antonio C. Albrecht Secretary, filed a petition in Court of Common Pleas, No. 1, at Philadelphia, Pa., on the 23d inst., for permission to change its name to that of the Planet Mill Company, as being more suitable and descriptive.

The Jeffrey Manufacturing Company, of Columbus, Ohio, has just issued a new and attractive, descriptive and illustrated catalogue of chain belting, elevating and conveying machinery. The company is now the exclusive manufacturer of the Mey-Oborn improved detachable chain belting, which it is able to furnish in all sizes to suit standard sprocket wheels.

Hooven & Sons' rolling-mill and pipe-mill, at Norristown, Pa., closed down on the 23d inst. for an indefinite period. It is understood that their only reason was

a lack of orders. The pipe mill has been in almost continuous operation for two years. The three rolling mills are now idle, the only iron establishments in operation being two blast-furnaces, both with an abundance of stock piled up in their yards.

At the Phoenix Roll Works, Pittsburg, Pa., four large rolls are now being turned out for the South Chicago Rolling Mill Company. Each will weigh 32 tons between 13 feet long and 51½ inches in diameter. They are known as channel rolls, and are used for heavy structural shapes. It will require twelve cars to ship these rolls. Each car will have three sets of trucks, and only one roll will be shipped on a car.

The mill of the Standard Mineral Company, of New York, at Port Morris, N. J., was burned to the ground on the 20th inst. The origin of the fire is unknown, but it is believed to be purely accidental. The loss is \$31,000, partly covered by insurance. The building and machinery were totally ruined. The company will rebuild, and in the meantime arrangements have been made with other factories to supply all orders, which, however, will be necessarily delayed.

The large iron and machine works of the Belmont Iron Company (formerly the Cooper & Manly Manufacturing Company), at Philadelphia, Pa., were completely destroyed by fire on the 22d inst., causing a loss of \$60,000 on the building and machinery and \$10,000 on the stock. The building destroyed was a brick structure erected for a hotel at the opening of the Centennial Exhibition in 1876, and was known as Congress Hall. At the close of the Centennial its usefulness as a hotel was at an end. It remained vacant for about five years, since which time it has been used as a machine shop.

The iron and steel manufacturers of the Mahoning Valley, Ohio, have organized an association under the name of the Iron Manufacturers' Association, and have elected the following officers: President, H. O. Bonnell; Vice-President, Myron L. Arms; Secretary and Treasurer, G. H. Sheadle; Executive Committee, H. O. Bonnell, Henry Wick, J. G. Butler, Jr., Robert Bently, Henry B. Shields and Myron C. Wick. The association is the largest and strongest organization of the kind ever formed in Eastern Ohio. The object of the association is mutual protection, especially in the matter of freight rates.

The Miners' Safety Explosives Company, Limited, has been organized in London, England, with a capital stock of £200,000, shares £10 each. The object is to prevent or diminish the loss of life and accidents caused by explosions in mines from the use of dangerous explosives, and to acquire and deal in any inventions which may bring about such result; to acquire all or some of the British, colonial, and other patents for, or licenses to use, the inventions of Arthur Favier, of Paris, for improvements in the manufacture of explosives and in cartridges containing such improved explosives, and any other patents; to purchase and carry the manufacture of explosives.

The American Electric Manufacturing Company, New York City, had 10 judgments aggregating \$19,419 entered against it on the 24th inst. in favor of the American Electrical Works of Providence, and one for \$543, and the Sheriff took possession. The company has been hard-pressed financially for some time, as its cash capital had become exhausted, and the stockholders, it is said, would not put in any more money. It was incorporated in 1885, with an authorized capital stock of \$3,000,000, of which \$1,000,000 stock was paid to the American Electric and Illuminating Company, of Boston. Only a small part of the capital was paid in cash. In October, 1885, the company bought the assets of the Fuller-Wood Electric Light Company, of New York, for \$125,000.

The proposition made by Carnegie, Phipps & Co., Ltd., of Pittsburg, Pa., to which we referred in our issue of the 12th inst., to their employes, and in which the firm agree to pay six per cent for all money deposited with them by the men, has already been taken advantage of by quite a number. It went into effect on the 15th inst., and since that date the firm have daily been receiving applications for loans from their men who wish to build houses for themselves. As soon as the application is received it is sent to the attorney of the firm for examination, and if the applicant is liable he receives the money. It does not make any difference how much the borrower wants or in what small sums he intends to pay it back again. There are a large number of the men who leave some of their money with the firm every pay day who do not contemplate building yet.

At an adjourned meeting of the Henderson Steel and Manufacturing Company held at Birmingham, Ala., recently, it was decided to erect a 100-ton steel furnace at once, also to construct rolling-mills and a foundry with two three to five ton hammers. A new company was organized, known as the Henderson Steel Company, with a capital of \$1,000,000. There will be \$560,000 in common stock and \$340,000 in preferred 8 per cent. The old Henderson Steel Manufacturing Company will take \$600,000 worth of the common stock and pool it with its old stock, agreeing that it shall not be placed on the market until the preferred stock pays 8 per cent dividend and the common stock 4 per cent dividend. The money realized from the sale of the preferred stock will be used in the erection of steel plants in North Birmingham, in the immediate vicinity of the present plant. It is reported that before the meeting adjourned \$40,000 worth of the preferred stock was taken. The remaining \$300,000 worth was bid for by a West

Virginian syndicate, which agreed to take it on certain conditions, which are now under consideration.

The Ingersoll Rock Drill Company, New York, has recently made foreign shipments of air compressors, drills, etc., comprising a plant to China, one to Liverpool, two to Mexico, and one to South America; and have now under way a complete plant for the Pacific Coast of Mexico to be transported on muleback, compressors, receiver, and all the heavy machinery being cut up into sections. For railroad work they have recently taken orders from the Norfolk & Western, New York Central, and Philadelphia & Reading, and they have shipped an air compressor plant to contractors on the Cumberland Gap Tunnel in Southern Tennessee. In mining they have orders for air compressors, drills, etc., from Cooper, Hewitt & Company, the King Iron Ore Company and the Bessemer Iron Company, New Jersey, New Jersey Iron Mining Company and have just sold six "Sergeant" drills (making 12 in all recently sold) to the Minnesota Iron Mines in Minnesota. They have recently shipped stone channeing machines to the Warsaw Bluestone Company, Warsaw, N. Y., Brainerd Quarry Company, Connecticut, and to Robinson & Cary, St. Paul, Minn. Orders are on hand for channelers, gadders, portable boiler, etc., for the Orville and the Esperanza marble companies of West Rutland, Vt. The company's business has been increasing greatly since the beginning of spring.

CONTRACTING NOTES.

Machinery and supplies wanted. See page xiv. Contracts open will be found on page xix. New contracts this week: No. 902, Pipe; No. 903, Building Water-Works Dam; No. 904, Dredging.

The Aqueduct Commissioners, New York, have received the following bids for deepening and finishing shaft No. 24 and building a new head house: O'Brien & Clark, \$98,575; Charles Peterson, \$100,345. The award will be made on the 28th inst.

GENERAL MINING NEWS.

The Natural Gas Trust announces the regular annual meeting of the holders of certificates, to be held in New York on the 31st inst. The secretary, Mr. John Bushnell, was seen by a representative of the ENGINEERING AND MINING JOURNAL. Mr. Bushnell refused to divulge the names of the natural gas companies included in the trust, which, he says, does not in any way influence the price or production of natural gas. It was learned that this trust is simply one of the numerous satellites of the gigantic Standard Oil Trust.

ALASKA.

One of our well-informed and reliable Alaskan correspondents sends us the following items:

Returning parties claim that gold does not exist in paying quantities at Yakutat. They also state that the parties who brought rich sand from there last fall acknowledged that the sample brought had been "panned down." Another party of miners (29) left some time ago for Yakutat. A schooner returning from Yakutat with miners had to seek shelter from a storm in Lituya Bay, and was somewhat damaged. While the vessel was being repaired the prospectors utilized their time around the bay. They found gold in the sand, located some claims, and three of them remained to develop the claims located.

At Berners Bay some work is already going on this spring. Good ore was brought in from a claim adjoining Salt Water, on which the owners did assessment work. Good claims are known to exist there, but most of them are high up, and can only be prospected during the summer. I expect good results from this summer's work. The ore bodies in this district are not as large as on Douglas Island, but of a higher grade, in fact some exceedingly rich pockets have been found. One Huntington mill is in the district, and will be working on a fine class of ore this summer. The Alaska Union M. & M. Co. started the rock breakers a few days ago, and it is reported the mill will start shortly. Neither the President, the General Manager, nor Superintendent have been here all winter. From the local papers I see that only a few stringers of quartz have been encountered in the 900-foot tunnel, but that the vein will surely be struck in 75 or 100 feet more. Reports of rich strikes by this company appear frequently on the street, and every one here hopes that there may be some truth in them, for the interest of those that invested their hard cash. No one seems to have a good word for the promoters. The enclosed slip, cut from a local paper here, seems to contain a new advertising dodge:

"Three assays made on samples of ore now being run through the Treadwell mill gave returns of \$12, \$83 and \$113 to the ton respectively, and picked samples run much higher. That the mill is now running on at least \$50 ore is an established fact, and the amount of gold turned out per month is far in excess of \$100,000 a month, as reported. But let us see what a little figuring will say about the monthly output: The stamps crush from 275 to 350 tons of ore every 24 hours, say the average for that time will be 300 tons. The very lowest value that can be placed on the ore now being run through is \$25 per ton. A month's run, counting thirty days, would consume 9000 tons of ore, which at \$25 per ton would give \$225,000, the monthly output in gold. This is probably the reason why no stock of this company can be bought, even at fabulous prices."

The same paper has frequently reported millions in

sight in the Alaska Union M. & M. Co., and I hear that the calculation and assays referred to are furnished by some one connected with that company. "If such wonderful rich ore is found in the Treadwell group, why can it not be found in the Alaska Union group only about three miles distant? Some stock is, perhaps, yet unsold" is the way such statements are used. You have already correctly stated in the *ENGINEERING AND MINING JOURNAL* that Treadwell ore runs \$6 to \$8 per ton, not \$50.

At the Alaska M. & M. Company (Treadwell) every thing runs as usual. Active work is going on preparing the ground for the additional 120 stamps. Two hundred and forty stamps will be working instead of 120 in, say, three months more. A good deal of work will be done this season in Silver Bow Basin by placer miners as well as by quartz miners. I hear that Nowell has bought some claim there, and will put up a mill on it this summer.

The Mexican Mining Company, which owns four claims adjoining the Alaska M. & M. Company's group on the southeast, is now driving a tunnel 9 feet by 9 feet in the clear. This tunnel will strike the ore body at a depth of 200 feet. It will drain the mine to that depth and will also be used for hauling ore out of it. Previous work, open cuts and shaft, prove the ore body to be identical, where the tunnel will tap the vein, with that worked at the Treadwell. It is over 200 feet wide on the surface, and shafts and cross-cuts prove it to be of a better grade than that worked by the Alaska M. & M. Company. The company is a private one. The entire stock, I believe, is held by the owners of the Alaska M. & M. Company. It is not offered on the market. This property will without doubt equal the famous Treadwell in a short time. Adjoining the Treadwell group on the northwest is the Bear's Nest group. No work is being done at present on these claims. It is said a sale is pending.

About one-half mile further west-northwest from the Treadwell group is another group called the Great Eastern. Some good looking ore has been found in a tunnel, in somewhat over 100 feet. As to quality and quantity, I can say nothing from personal knowledge. (The same local paper which reported the millions in the Alaska Union has also seen enormous sums in this group.)

Alaska offers good inducements to parties willing to develop prospects in good localities and on promising indications. I know of no stock of any value that is offered on the market from Alaska mining companies at present. Parties that intend investing money in Alaska should investigate the properties offered, but if they fail to do so and put money into the hands of promoters and lose it, they have in reality only themselves to blame; but the fact is that the "black eye" is given to the whole district where such careless parties have sunk their money.

Alaska needs no stockjobbing, neither an artificial boom. It offers to the legitimate mining operator and miner a good field, and to them it gives a cordial invitation. Your editorial remarks, "Some Alaskan Bubbles," created quite a stir. "I guess every word of it is true," "Just what I thought of it," and "The article will not do the country any good," are a few of the opinions passed. My opinion is that you stated nothing but facts. If your warning is heeded by some would-be investors in that scheme, and if it also lets other operators, *a la* Nowell, know that their movements are closely looked into, it has accomplished its mission. Legitimate mining will be benefited. Stockjobbery will be crushed. Your journal deserves the thanks of very one connected with the mining industry, and in this case, especially from those living in Alaska, who know its resources are such that, if taken in hand in the legitimate way, will shortly show that Uncle Sam's ice-box is not as worthless as usually imagined.

ARIZONA.

Our correspondent, Mr. John F. Blandy, writes us from Prescott as follows: The shipping of ore from this region so far has been very favorable, and shows an increased activity amongst the mines which surprises even the most sanguine. I am sorry I cannot give you the total to date for the year, but hope to do so in my next; suffice it to say that it is now exceeding two car-loads per day. This ore is coming from all the districts—Big Bug, Walker, Groom Creek, Hassayampa, Turkey Creek, Bradshaw, and some from the Congress mine of the Centennial district, about 60 miles to the southwest. There are also some ores which reach the railroad between Prescott and the A. & F. Junction. The Senator mine, which has been idle for the past ten years, has lately passed into the hands of a Chicago company, and is to be put in thorough order. It is a large vein, and is said to have averaged about \$80 per ton in gold and silver. It was worked for some time for the free gold (\$25@30 per ton), but the attempt to work the ore by the barrel process without roasting involved the owners to such an extent that the mine was closed down. There is no reason to doubt but that now with increased facilities for transportation and more modern appliances it will become a remunerative property. In the same district (Hassayampa) and near the Senator active work is going on in the Storm Cloud, which is in the hands of Colorado parties. Between the latter and Mt. Union lie the gold quartz veins of Jersey Gulch. They are well opened by shafts and tunnels, and are said to carry from \$10 to \$30, or an average of at least \$20 per ton. About one mile below the Senator and immediately on the creek is the Howard mine, the discovery of which was heralded all over the country in December last. This wonder-

fully rich "find" has not yet been worked out, but from last accounts is about as good as ever. The owners were soon able to lay aside the pestle and mortar for an arrastra, and have now abandoned the arrastra for a stamp-mill driven by a turbine. I hear of some other discoveries of gold quartz in the same neighborhood, but have no definite information in reference to them. In March a rich discovery of silver ore was found on Little Copper Creek, in the same district, though on the west slope of the Sierra Prieta range. The ore (black silver with some lead) is in a white porphyry dike, and although the dike has been traced for a distance of four claims, or 6000 feet, yet no ore has been found, except within a length of about 800 feet on the original claim. Several tons of ore have already been taken out and are now being packed to Prescott, and is expected to go \$150 per ton. The assays have run from \$50 to \$1600 per ton. Just south of the Hassayampa on the head of Slate Creek are the well-known Dosoris, Mark Twain, Blue Dick and Buzzard mines, all of which have produced many tons of high-grade ores. Nearer to Prescott, and lying from five to eight miles south of that town, is Groom Creek District. It is more favored with water facilities than the others, being drained by Banning, Groom and Wolf creeks, each of which has running water in places the year through. On Groom Creek is situated the "Standard mill," which has been in active operation since February. The company is working the Adell and Benjamin mines principally, but have several other claims which they are prospecting. About a mile above the Standard mill is a steam arrastra which has run very successfully for the last two years on gold ore mined by the owners. There are a large number of claims in the district, the best known of which are the above-named and what are known as the Lone Star Group (Nevada, Surprise, Gazelle, Lone Star, What Cheer and Providence). They all contain gold and silver—much of the latter as chloride. This district is well wooded throughout, and as the veins are numerous and well defined it is second to none in the region. Three new ten-stamp mills have lately arrived and are being hauled into the mountains, and the prospects are that more will be brought in later in the season. Active work is going on in Copper Basin, and the talk is of a narrow-gauge railroad from that place to Prescott.

GRAHAM COUNTY.

One of our Arizona correspondents sends us the following items under date Clifton, May 18th: Mining matters in this vicinity are flourishing, and may be expected to remain so while copper maintains its present price. Gold strikes have been made in three widely separated districts tributary to Clifton, and silver in two others. Some of the quartz is of wonderful richness, a gold specimen having received Assayer Stegman's certificate that it contained \$192,000 per ton in gold, and Baxter obtained \$142 per ton from El Paso for 17 tons of silver ore. These are recent—last Autumn the ledges were discovered—but they have already attracted attention, and St. Louis parties have been making quite extended investigations.

A twelve-foot steam arrastra here has been running ten days on quartz from the Coon mine, Chase Creek, three miles above town, grinding about 2½ tons per 24 hours. No clean up has been made, so results can not be given. As the "mine" is the one furnishing the high gold assay mentioned above, frequent horn spoon tests of the ore have given upwards of \$1 per pound of rock in gold dust, and gold can be seen plentifully sprinkled throughout the rock. No doubt is entertained that, if the work is well done, the results will be good. (A Mexican "burro" arrastra running on picked ore from the crest of the hill above the "Coon" gave 3 ounces gold (value \$16 per ounce) for three days run. It is impossible to give tons.) Several copper strikes have been made also, but have not received the attention that has been accorded to gold and silver, because of their frequency and the fact that copper properties are of little value to any one outside the two companies who virtually control matters in that respect. As, however, prospectors seem, in former years, to have searched solely for copper, the depression in copper, by turning attention to other kinds of ore, may yet prove a substantial benefit to the community. There is an immense mineral belt here, an exceedingly rough and difficult country to prospect, and the fact that a prominent ledge of quartz containing masses of free gold has been passed over for years, that too within three miles of town, crossed by a trail, induces the hope that Clifton's metallurgical processes may soon be varied by a goldmill or two.

CALIFORNIA.

AMADOR COUNTY.

Our special correspondent sends us the following from Amador City: The New London at Plymouth is being prospected thoroughly, and from what I can learn, a 40-stamp mill will be built upon the property in the near future.

Coming this way are a number of small mines being worked in a small way. The Gover, a half mile north of the Bunker Hill, is doing very well. They have a 20-stamp mill, and their sulphurets alone are paying running expenses.

The company has been recently reorganized with a new board of directors, and in all probability a new 40-stamp mill will soon be built and the mine take its former place as one of the best paying mines of Amador County. Bunker Hill, the largest claim on the lode, being 2600 x 500, keeps its 40 stamps pounding away six days in the week the year round. (It is the only mill that does not run on Sunday.) Its own chlorination works is kept busy all the time working its own sulphurets. The chlorination process used in these works

is quite different from any thing on this coast. After the sulphurets are roasted in the usual way, they are put into a lead lined barrel with chloride of lime, sulphuric acid and water. The barrel is then made to revolve for about six hours, when the mass is run into a tank with a rock and sand filter. Through this filter the chloride of gold passes to precipitating tanks below, and the gold is collected in the usual way. The results are much more satisfactory by this process than by the Plattner, which has been tried in these works.

This property is for sale, and I know of no mine in this section that holds out better inducements to a company with a large capital than this.

The Keystone, with its 40 stamps, and the South Spring Hill, right in Amador City, are running along very regularly, paying dividends every month.

The old Wildman mine in Sutter Creek has recently passed into the hands of a new company, who have erected a ten-stamp mill and new hoisting works the past winter, and are so well pleased with their prospects underground that ten more stamps are likely to be added to their mill this season.

The Kennedy, within a mile of Jackson, the county seat, is another old mine that has been resurrected by a new company. About two years ago the new company started in, and the outlook was so flattering that a forty-stamp mill with Frue concentrators was built within the first year.

The ore did not prove as high grade in the mill as was expected, and consequently dividends have not gladdened the hearts of the new owners; but still they are not discouraged. Sinking the shaft below the 900 is now going on, and it is confidently expected that better ore will be found below.

The Zeelie mine, in Jackson, continues to pay a little more than expenses by milling a large quantity of ore a day (135 tons) in their 40-stamp mill. They work their own sulphurets by the Plattner process, and I presume the results are satisfactory, as they are not disposed to change.

About 1½ miles beyond Jackson is the noted Amador mine, that has been boomed in the New York market for some time past. This certainly is one of the mines with "vast possibilities." We hear that the contract has been let for the building of a 60-stamp mill on this property this season.

We certainly are as much in favor of capital coming into the county as any one, but I think it would be well for the company to know what they have in the way of pay rock before putting up a 60-stamp mill.

No one who has not had the actual experience can realize the amount of ore such a mill as that requires every day, and as it takes a large force of miners to keep up this supply, the ore must be pretty good even to pay expenses.

At the present writing we can not say how much ore they have in sight, nor its value; we only advise the company to make haste slowly.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—The superintendent's weekly report shows that the company has had some trouble with the Standard Company in stopping them from taking out ore from the ground now in dispute between the two companies. It has again been agreed to leave the ore undisturbed until the courts shall decide or the directors of the Standard and Bulwer shall agree to whom it belongs.

NEVADA COUNTY.

ORIGINAL PITTSBURG (GRASS VALLEY) GOLD MINES, LIMITED.—This company has been organized in London with a capital stock of £100,000, shares £1 each, for the purpose of acquiring and extending the working of the Pittsburg gold mine, situated in the Grass Valley District. The Pittsburg mine is easy of access by rail from San Francisco, the branch road from Colfax on the Central Pacific road to Nevada City, passing through the company's property, and affording facilities for the transportation of machinery and supplies, as there is a siding at which trains can load and discharge within 350 yards of the main shaft. The South Yuba Canal passes near the works and furnishes the greater portion of the motive power for the mine and mill. The property to be acquired by the company, is held under United States patents, and consists of the Original Pittsburg Claim and its Northern Extension, it comprises about 40 acres of freehold land, a considerable portion of which is covered with timber. There is a 10-stamp mill on the property which it is proposed to enlarge to 20 stamps, as its present capacity is insufficient for the available output. The hoisting and pumping machinery is in perfect order. The mill and pumping machinery are driven by water, but steam power can at any time be used, the timber on the property being abundant for all fuel purposes. There are also on the property all necessary buildings, including a superintendent's house and convenient offices. The mine has been reported on by Prof. Constantin Heusch, of San Francisco, and Mr. Gilbert Pitcairn Simpson, Mining Engineer, of London. The price to be paid for the property is \$90,000, payable entirely in fully paid-up shares, or, at the company's option, partly in cash and partly in fully paid-up shares, the minimum of shares to be taken by the vendor being £33,333, leaving a balance of £10,000 available for working capital. The contract for purchase, dated 15th March, 1888, is made between Henry Jarvis Alfred, of the one part, and James Nicoll, as trustee for the company, of the other part, and recites an agreement, dated 9th February, 1888, made between the Pittsburg Gold Mining Company, of the one part, and the said Henry Jarvis Alfred of the other part.

SAN BERNARDINO COUNTY.

Judge Sawyer at San Francisco on the 17th inst. allowed an appeal to the United States Supreme Court from the decree of the Circuit Court in the case

of Abbie L. Waterman against R. W. Waterman and J. L. Porter. The bond in the action against R. W. Waterman was fixed at \$70,000 and against J. L. Porter at \$12,000. The suits are to compel Waterman and Porter to convey 24-100 and 8-100 interests respectively in the Alpha, Omega, Silver Glen, and Front mines in San Bernardino County. Under contract made with J. S. Waterman May 14, 1881, he advanced the respondents \$38,070.64 for the development of the mines, in which he was to be given the interest mentioned. The conveyances were never made, and the complainant, to whom the contracts had been assigned, sought relief in the United States Circuit Court, which decreed a specific performance of the contracts.

SAN DIEGO COUNTY.

SAN DIEGO REDUCTION WORKS COMPANY.—This company has been organized with a capital stock of \$50,000. The officers are: President, W. G. Rifenberg; Vice-President, T. J. Daly; Secretary, Richard Garvey; and Treasurer, J. D. Hanbury. Work has already commenced, and the machinery for the new smelting and reduction works and a five-stamp sampling mill has been purchased. The smelting furnaces are intended, so it is said, to work copper ore from the mountains back of San Diego.

CANADA.

PROVINCE OF ONTARIO.

MINERAL DEVELOPMENT COMPANY OF ONTARIO, LIMITED.—This company, chartered by the Ontario legislature, has been organized. The object of the company is to examine and report upon mining properties that are offered for sale, to develop properties to such a point that capitalists may be induced to take hold of them, and finally to find a market for them. All very laudable objects, but practically such enterprises have not found support.

CENTRAL AMERICA.

SALVADOR.

SAN SEBASTIAN GOLD MINING COMPANY.—We are officially advised by the company that it has recently sent a new five-foot Huntington mill, and a new boiler and concentrators, and greatly improved the plant.

The company has secured the services of Mr. F. R. McCaffrey as superintendent of the mine, and Mr. J. T. Canfield as superintendent of mill. The receipts of bullion in New York from the mine from January to May, 1888, were nearly double the corresponding period in 1887. Mr. Wm. D. Rennie, General Manager of the company in Salvador, writes that work has been limited during the last two months, on account of the dry season, and now advises by cable that the rainy season has commenced, that the mills are running, and 500 tons of ore ready at the mill assaying \$70 per ton.

COLORADO.

COLORADO GOLD AND SILVER EXTRACTION COMPANY.—This company has been formed to acquire and work in the State of Colorado an exclusive license for the working of the Newbery-Vautin patents. The capital is £100,000, in £1 shares, of which 25,000 are now offered. No cash consideration will be paid, but the Newbery-Vautin (Patents) Gold Extraction Company, Limited, will receive for the license granted by them £50,000 in fully paid-up shares; £25,000 in fully paid-up shares will be issued to Mr. A'Court William Granville Birkin, who will bear and pay all preliminary expenses of the formation and bringing out of the company.

We have already fully exposed in previous issues of the ENGINEERING AND MINING JOURNAL the worthlessness of the Newbery-Vautin claims and patents, and we have no idea that any mine owner in this country will pay them royalty. All that is of value in the process has long been in use here, and is not covered by any patent.

EAGLE COUNTY.

IRON MASK MINING AND SMELTING COMPANY.—The treasury stock of this company is now offered for sale in New York at \$5 per share, for the purpose of raising capital to erect a smelter and needed working capital with which to pay for outside ores. Further particulars will be found in our advertising columns. The Iron Mask mine is situated near Red Cliff, within four hundred yards of the Denver & Rio Grande Railroad. The mine and the district in which it is situated were fully described and illustrated in the ENGINEERING AND MINING JOURNAL of June 11th and 18th, 1887.

GARFIELD COUNTY.

Secretary Vilas on appeal has affirmed the action of the Commissioner of the General Land Office in the matter of the application of E. Harris Jewett and others, of Glenwood Springs District, to coal entries numbers 8 to 12 inclusive. The Commissioner first approved these entries for patent, but subsequently reversed his action on the ground that they did not appear to be free from the suspicion that they were made in bad faith, and in the interest of parties other than the claimants of record, and suspended them until they were investigated by an agent. The Commissioner declined to relieve this suspension, and his action is sustained by the Secretary. The patents will remain suspended until it is definitely ascertained that the entries are not tainted with fraud or collusion.

LAKE COUNTY.

LEADVILLE CONSOLIDATED MINING COMPANY.—At the annual meeting of the stockholders of this company, held in New York City on the 12th inst., the old Board of Trustees were unanimously re-elected. The cash balance is \$14,199.59. The total value of the ore mined on this company's property since its incorporation is \$835,797.89.

CONNECTICUT.

HARTFORD COUNTY.

The old copper mine at Bristol, which has been closed for thirty-one years, has been purchased by B. S. Cowles and E. J. Hubbell, of Pittsfield, Mass. The purchase includes the mine and the tract of 120 acres of land on which it is situated, the whole property being valued at \$10,000. Operations will be resumed at once.

DAKOTA.

ESTRELLA DEL NORTE MINING COMPANY.—A meeting of the stockholders of this company was held in New York on the 22d inst. The president, Mr. R. W. Prestedge, states that the company owns no property, and declines to give to the public any information whatever in regard to its organization or condition.

LAWRENCE COUNTY.

BUXTON MINING COMPANY.—The company has made its first shipment of ore of the season to Omaha.

MINNEHAHA COUNTY.

The Drake Company, owners of the Monarch Jasper granite quarries in Sioux Falls, has contracted to furnish 1300 car loads of granite paving blocks—700 to Kansas City and 500 to Nebraska City. A force of over one hundred pave cutters will be added to the old force in the quarries at once. We described these quarries in our issue of March 24th.

HELENA.

LEWIS & CLARKE COUNTY.

The Helena *Herald* states that it has good authority for saying that all the capital necessary to carry out the great smelter enterprise has been secured by ex-Governor Hauser and that a company has been organized with a capital of \$5,000,000, \$1,000,000 preferred and \$4,000,000 stock. The plant will be located near Helena. Superintendent Raht, in charge of the smelting-works at Wickes and Toston, is now investigating the Omaha reduction-works for the instruction of himself and the Helena projectors in building the new plant. It is also reported that the company will transfer a portion of the common stock in payment for the Gregory and the Helena Mining and Reduction Company's plant.

IDAHO.

LEMHI COUNTY.

MICHIGAN GOLD MINING COMPANY.—This company, in which Detroit parties are interested, proposes to run a large ditch, forty miles long, to cover Kirtley, Willow Creek and Geertson bars, each being about 2000 acres in extent, making in all six thousand acres placer ground. It is said that the company has spent about fifty thousand dollars toward the purchase of these three claims, making surveys, etc. The three claims cost \$150,000 and hence are only paid for in part, but the company propose to pay all and expend a large sum in the ditch and equipments for mining.

PINE CREEK MINING COMPANY.—The property of this company is now being opened up, a 10-stamp mill is being erected to be arranged for saving the sulphurets in concentrates ready for shipping. There is a cañon cutting across the ledges, exposing them on one side to a height of 1000 feet, with well defined walls all the way up. Part of the eight claims lie on the opposite side of the creek from the exposed ledges, and a tunnel has been run in to where there is 4 feet ore at the face. Philadelphia parties are interested in the company.

SHOSHONE COUNTY.

POORMAN EXTENSION MINING COMPANY.—This company has been organized at Butte, with a capital of \$5,000,000, shares \$10 each. The properties owned by the company are said to be on the same belt as the Poorman mine, and are recorded, thus far, as follows: The Manhattan, Green Mountain, Fuller, Abbott and Burke mining claims. The officers are: B. C. Kingsbury, President; H. L. Frank, Vice-President; Charles S. Warren, Secretary; Walter Mackay, Treasurer; Patrick Clark, General Manager. Work has been in progress for some time.

ILLINOIS.

PERRY COUNTY.

MOON COAL MINING COMPANY.—This company has purchased the Frizzelle coal lands at Duquoin for \$17,000. The Rogers mine, or Frizzelle Coal Company mines, are swallowed up in this transaction. The works of the Moon mine will now be prosecuted vigorously.

IOWA.

WHITEBREAST FUEL COMPANY.—The company's mines at Cleveland, Iowa, have been abandoned, and all the available machinery formerly at old No. 1 mine at Cleveland will be shipped to other mines operated by this company in Illinois. Mr. T. J. Phillips, the superintendent, expects to get there himself and take charge of the enterprise. The new mines that the company are to open in Illinois are located near Abington.

MEXICO.

At the Santa Barbara property, Chihuahua, experiments are being carried on with cadmium, and a small quantity, about 400 pounds, has been treated with crude appliances.

The Department of Public Works has granted a concession to Mr. Mariano Amezcua and associates for the exploration of mineral lands in the District of Badriguato, State of Sinaloa, within a tract 25 by 15 kilometers, the center of the parallelogram being the hill known as "Guajolotes." The terms of the concession are similar to those recently granted.

The Mexican *Financier* reports the following:

A concession for exploring and working mines of all kinds in the mineral district of Zacualpan has been granted to Mr. J. Gladwyn Jebb representing the London, Mexican Prospecting and Finance Company, Limited.

The Department of Public Works has authorized Mr. Benjamin Pedrosa, either by himself or by the company he may organize, to proceed, at his own cost, to the exploration of mines of all kinds which may be found in the old Mineral of the Sierra la Amargosa, situated in the jurisdiction of Julimes, Canton Mecqui, State of Chihuahua, within a parallelogram 25 by 15 kilometers.

DURANGO TIN MINING COMPANY.—This company, of St. Louis, has leased its property to Dr. J. W. Ottinger for ten years, with the privilege of ten more, the lessee to pay the company 15 per cent of the net profit and securing an option of buying the property within two years. The property is an exclusive grant, given by the Federal Government of Mexico to the Durango Tin Company, of 500 square miles, 320,000 acres, upon which all other parties are prohibited from prospecting for minerals of any kind. There are five tin mines. In the first, El Diablo, the shaft is sunk 200 feet, with five levels, the vein of ore being 25 inches pay streak, and running from 15 to 40 per cent tin. The second, the Providencia, has a shaft of 40 feet, and a vein of 9 inches pay streak, running from 20 to 50 per cent. Both are true fissure veins. The three others are developed all the way from 10 to 50 feet, and all show ore running from 8 to 20 per cent tin. The mines are located in the Cacaria Mountains, about forty miles northwest from the city of Durango, and the Huntington road when completed from Eagle Pass to Mazatlan will pass within thirty miles of the properties.

SANTA EULALIA SILVER MINING COMPANY.—Justice Lawrence, in the Supreme Court, Chambers, New York City, on the 24th, reserved his decision on an application made by stockholders of the Santa Eulalia Silver Mining Company to have the corporation dissolved and a receiver of its assets appointed. They say it has a debt of \$330,000 and no prospect of paying it. The counsel for the trustees, in opposing it, produced a letter from the superintendent of the mine, which is in Mexico, stating that silver was being taken out in such quantities that it was necessary to hire men to guard it.

MICHIGAN.

Our correspondent sends us the following: The Sudbery gold fields are now attracting most attention among mining men here. They are situated 120 miles east of the Canadian, Sault Ste. Marie. Sudbery is the junction of the Canadian Pacific and a branch road which runs to the "Soo." Quite a number of astounding discoveries have been made in this field which assay up into the hundreds. The gold and silver is free milling, and is found in quartz veins of different widths.

The Michigan Gold Company started this week to unwater the shaft, which had been idle all winter. A mill test of the rock is to be made immediately at the Ropes stamp mill.

As is well known the Michigan is on contested ground. Several claimants have arisen since its value became more fully known, and June 8th is the day set by the Circuit Court to test the Grummett claim to this land. Great interest is taken in the result.

Iron options are in demand at the several real estate offices in Marquette, notwithstanding the state of the iron market. Lake Superior ores are sure to be called for before the season ends. The struggle now going on between the bulls and bears already shows signs of weakness, and the bulls are plai ly ahead. The bear talk of there being 800,000 tons of unsold ore on the Cleveland docks is known to be untrue. In March last there was less than 800,000 tons, while three months have passed since then. By July all expect a great rush to get ore to market before winter sets in again.

Town 47, N. R. 45 E., in Michigan, is having quite an excitement over gold discoveries found under similar geological conditions to the Ropes. A party of explorers have gone to the Huron Mountains from here, where the late Dr. Houghton found gold years ago, but his death by drowning and the loss of his papers at the same time obliterated all trace of the exact spot.

Section 16 and 21, near Ishpeming, under the Lake Superior Iron Company, are developing finely, the one in Bessemer soft hematite and the other in red specular hard ore. At 16, a plant has been set up, tracks graded in and pockets built. Shipments are now going forward from this point from a stock pile raised during the winter of 15,000 tons. At 21, ninety feet of drifting has been done on the body of ore, and cross-cuts have been driven from two levels twenty feet in the same. Twelve months from now we can look for a good mine here. The Saginaw, which has been idle for several years, is preparing to explore for a new body of ore by diamond drills. Men are now on the ground and preliminary work going on. The Lake Superior are preparing papers for explorers' options. They hold many acres on the range, but until now have never offered any inducements to explorers. There are rumors of a reduction in forces at the older mines if the ore market remains much longer as it is, but these best posted say that such extreme conservatism means nothing.

JASPER COUNTY.

THE VIROQUA LEAD AND ZINC COMPANY.—This company reports a strike of lead on its property near Joplin, on which zinc only has heretofore been found.

COPPER MINES.

CALUMET & HECLA MINING COMPANY.—The management is making energetic efforts speedily to unwater the mine, and in addition to the steam pumps will use large iron skip tanks, holding five tons of water, and especially constructed for this purpose by the company.

MINNESOTA.

Manager Stone, of the Minnesota Iron Company, places the output of the Vermilion Range for the current year at 550,000 gross tons. Of this amount, he estimates the production of the mines at Tower at 450,000 tons, of the Chandler mine at Ely at 50,000, leaving the other 50,000 to be made up of shipments from smaller new mines which were not producers last year. The Minnesota company has not sold any ore as yet.

WEST SUPERIOR IRON AND STEEL COMPANY.—This company has been incorporated at St. Paul, Minn., where the principal office will be, with a capital stock of \$2,000,000, shares \$100 each, for the purpose of mining and working ores and other minerals, the manufacturing of iron, steel, and other metals, etc. The first board of directors are as follows: James Roosevelt, Hyde Park, N. Y.; Robert Leoux Belknap, New York City, N. Y.; William F. Mattes, Scranton, Pa.; Rowland J. Wemyss, and John H. Ames, St. Paul, Minn.

MISSOURI.

The report that the Pilot Knob mine has "pinched out" has been revived. The St. Louis *Age of Steel* of April 28th says that the best that is said of the prospects for the property is that a fine body of iron ore, "10 feet thick," has been discovered at a depth of 700 or 800 feet. It has been a matter of general remark for several months that the Pilot Knob was not getting out its usual amount of ore, but it was not known positively that the mine was failing, although it was feared that such might be the case.

BATES COUNTY.

KEITH AND PERRY COAL COMPANY.—Work has been resumed at the Keith & Perry's No. 6 shaft at Rich Hill, where the explosion occurred in March, and to which we referred in our issue of March 31st. The company operate two mines, Nos. 5 and 6. The former is loading about forty cars per day, and both are running full-time. Twelve suits have been begun in the United States Court at Kansas City against this company, the total damage claimed being \$202,000. The plaintiffs are the widows and other relatives of the victims of the explosion which occurred in this company's mines in March.

SAINT FRANCIS COUNTY.

ST. JOSEPH LEAD COMPANY.—At the regular annual meeting held in the city of New York on the 17th inst. the old board of trustees were unanimously re-elected.

MONTANA.

NORTHERN PACIFIC & MONTANA RAILROAD COMPANY.—This company has been organized with a capital stock of \$10,000,000. It proposes to build lines, taking in all the mines and towns contiguous to Helena. The incorporators are: Thomas F. Oakes, St. Paul; Charles B. Wright, Philadelphia; Frederick Billings, Woodstock, Vt.; Brayton Ives and John N. Brockman, New York.

Among the lines to be built is: First—A railroad, the termini of which are to be located in Lewis & Clarke County. The road shall pass partly through this county, and the general route shall be from a point on the main line of the Northern Pacific at or near Birdseye station, thence extending in a north-westerly direction to Marysville, and thence via the Gloster mine to Empire.

Second—Another, the termini of which are to be located in the counties of Jefferson and Silver Bow. The general route of this road shall be from a point at or near Jefferson City, thence up Boulder Valley and across the divide to Butte City.

Third—A road from a point on the road from Jefferson to Butte at or near Boulder City, thence to a point on the main line of the Northern Pacific near Gallatin City.

Fourth—Another from a point at or near Jefferson City, thence down the Boulder River to a point near the mouth of Elkhorn canyon, and thence to Elkhorn City.

Fifth—Another from or near the city of Missoula across the Hell Gate River to the Bitter Root River, and southwardly up the Bitter Root Valley via Stevensville, Corvallis and Skalkaho to a point near the mouth of the west fork of the Bitter Root River, and thence in a general southeasterly direction to Ross' Hole.

Sixth—A road of which the starting place will be at or near the City of Drummond; thence across the Hell Gate River, and in a general direction west of southwardly up the valley of Flint Creek to a camp near the mouth of Flint Creek; thence to a point at or near Phillipsburg, and thence to a point at or near the granite mines.

Seventh—From a point on the main line of the Northern Pacific, near Livingston, in a general northerly direction to the mines in the vicinity of Castle, in Meagher County.

Eighth—A railroad in the counties of Yellowstone and Choteau, the general direction of which shall be from a point on the main line of the Northern Pacific at or near Billings, thence in a northwesterly direction via Fort Benton and the valley of the Marias River to the northern boundary line of the territory. Also such branch roads to such points in the territory as the company shall from time to time determine.

CASCADE COUNTY.

MONTANA SMELTING COMPANY.—Work is being pushed vigorously at the works now being erected by this company at Great Falls. Five water-jacket shaft furnaces will be built at once, also twenty reverberatory furnaces for the roasting and calcination of refractory sulphurous ores. Mr. Anton Eilers states that the plant is to be increased next year to ten water-jackets and the necessary equipment for an establishment handling 300 to 500 tons of silver-lead ore a day.

DEER LODGE COUNTY.

HOPE MINING COMPANY.—Official advices to us show that the production for April amounted to \$16,954.47, making a total for the first four months of 1888 of \$81,449.31.

LEWIS & CLARKE COUNTY.

CAPITAL GOLD MINING COMPANY.—This company has been organized for the working and development of the Capital Quartz Lode Mining claim, located near Helena. The ore of the "Capital" lode is free milling gold rock. One hundred thousand shares of the Treasury stock will be put on the market at 25 cents per share. The officers are: President, H. L. Frank; Vice-President, Geo. W. Irvin; Secretary, J. L. Gessler; Treasurer, Lee Mantle; General Manager, James Moffet.

MONTANA COMPANY, LIMITED.—Official advices to us show that the production for April amounted to \$95,700, and the working expenses \$52,000. In answer to many inquiries, the directors have issued a circular from which we take the following: "The diminished return for April month is consequent on the prevalence of low-grade ore in the various workings. Although recent developments below the 400-foot level indicated the presence of ore of a high grade class, yet the quantity which has been rendered available is at present insufficient to increase the monthly returns. The prospects of the mine are in many ways satisfactory. A change from low to high grade ore will probably occur in depth. Arrangements are being made for developing the deeper ground as vigorously as possible. The new and powerful hoisting machinery will be erected forthwith, but until it is complete the supplies of ore will be drawn from ground above the 400-foot level.

"In the meantime, and until rich high-grade ore is met with in somewhat considerable quantities, the 50-stamp mill will be employed in treating the ore for gold and concentrates, which will reduce the working expenses. The production of the mills now consists mostly of gold, being about two thirds gold to one third silver. The importance of this will be appreciated by the shareholders when they are informed that gold is realized at a cost of only 2 1/2 per cent discount against 29 per cent discount on silver. The shareholders may be assured that the directors will continue to give their best and closest attention to the economic, judicious, and rapid development of the property."

NEVADA.

ELKO COUNTY.

COMMONWEALTH CONSOLIDATED MINING COMPANY.—At the annual meeting the following officers were elected: George C. Hickox, President; S. Hart, Vice-President. Henry Deas was re-elected Secretary; F. F. Coffin, Superintendent, and Bank of California Treasurer. The Secretary's financial report showed receipts during the year of \$52,309.72, and disbursements of \$59,335.69, leaving a present indebtedness of \$7026.97. The Superintendent's report mentions a number of very rich and extensive ore veins which have been struck and developed in the mine during the year, and concludes with the following statement: "There are about 35 tons of first-class ore stored in the shaft-house which will average \$800 per ton. On the dump there are about 220 tons, from which car samples show over \$200 per ton. No stoping has been done, all the ore now out having been extracted in developing the mine. The mine is being put in shape as fast as practicable. The expense henceforth will mainly be to develop the mine and furnish supplies, all the buildings and machinery now being in good order."

STOREY COUNTY—COMSTOCK LODGE.

SCORPION MINING COMPANY.—At the annual meeting of this company the old directors and officers were re-elected. No developments of any importance were made in the mine during the past year. An assessment of 10 cents per share has been levied.

NEW MEXICO.

SANTA RITA.—New York parties are negotiating for the purchase of this copper property—owned by the Bonanza Development Company, which is to be examined for them by a well-known expert. The purchasers put up the money to pump out the mine.

NEW YORK.

TOMPKINS COUNTY.

Negotiations are pending at Ithaca looking to the formation of a large salt plant there. The Test Well Company will take \$5000 in stock for the well, and Ithaca business men to subscribe \$25,000 in cash. The remainder of the \$75,000 with which to start the plant is to come, it is said, from Buffalo and New York capitalists.

OHIO.

The Supreme Court of Ohio has reversed the decision of the Circuit Court in the Hocking Valley Railroad suit, and ordered the case back to the Circuit Court for a further hearing. The latter Court, when the case was brought before it on appeal from the Court of Common Pleas by Stevenson, Burke and others,

held that it had no jurisdiction, and from this decision Judge Burke appealed. The Common Pleas Court heard the case and found for John W. Shaw and the railway company, the amount involved being about \$8,000,000.

OREGON.

OREGON RAILWAY AND NAVIGATION COMPANY.—The company next month will begin the construction of a branch from Farmington to Spokane Falls, Oregon, about forty-three miles. It is stated that the line can be built cheaply, and that it can be depended upon for a valuable traffic when completed. It is said that to some extent it will come into competition with the Spokane & Palouse road.

PENNSYLVANIA.

The American Brownstone Company has commenced operations in its quarries at Hummelstown and the Pennsylvania Brownstone Company started up its new mill for sawing fine sandstone blocks.

OR.

Exports of refined, crude, and naphtha from the following ports, from January 1st to May 19th.

	1888. Gallons.	1887. G. Hons.
From Boston.....	882,466	1,816,780
Philadelphia.....	41,077,772	52,601,218
Baltimore.....	1,323,053	3,006,106
Perth Amboy.....	8,164,555	5,878,999
New York.....	128,360,247	195,910,706
Total exports ..	180,008,093	199,213,809

TENNESSEE.

PIONEER COAL AND COKE COMPANY.—This company has made the first coke. It is said to resemble Connellsville coke very much. The company has 300 ovens near Knoxville, and is working a 14-foot vein of coal.

UTAH.

DICKERT & MYERS' SULPHUR COMPANY.—The company is considering the erection of a refinery to be built probably at Salt Lake City. Twenty-five tons are now shipped weekly from the mines at Cove Creek.

WASHINGTON TERRITORY.

A correspondent writes us as follows: I notice in your issue of April 21st an article on the "West Coast Coal-Field of America," in which a correspondent writes as follows:

"Of the wealth of this and neighboring territories in timber and mineral, there is no question of doubt; but in pastoral and agricultural lands there is not much to be said in their favor, either as to extent or quality of soil. The climate is excellent, and poor soil will give fairly good crops, but fail to yield anything in the drier seasons. Ham, bacon, cheese, butter, eggs, fresh and canned meats, oatmeal and other produce has to be imported from Chicago, St. Paul and Minneapolis into the towns above named (i. e., Spokane Falls, Tacoma and Seattle). The sandy plains of Eastern Washington or the gravel valleys on the N. P. R. R., derived from basaltic and other rocks, are more or less unproductive, partly from want of rain or dew, and partly from the poverty of the sandy or loamy soil," etc.

This [entire statement] is a tissue of nonsense, and the writer must have drawn entirely upon his imagination for his facts. The yield of wheat in Eastern Washington last year was in the neighborhood of four hundred thousand tons; there are three hundred miles of branch railroads traversing the wheat fields of Eastern Washington. In Spokane Falls we manufacture five hundred barrels of flour per diem; and seventy-five barrels of oatmeal. We are large growers of beef stock; have immense flocks of sheep and hogs—and (this your correspondent could have ascertained from any reliable market report) are large shippers to the eastern market. Last year the wheat crop of the Palouse averaged thirty bushels to the acre; barley fifty bushels. Our barley is considered by eastern buyers equal to the best Canadian variety. We raise as high as one hundred bushels of oats to the acre. Our present output of small grains is 500,000 tons, with barely one-tenth of our farming lands under cultivation. Fruits of all kinds grow on our nutritious soil, and every thing is raised without any attempt at irrigation.

Reports from Ellensburg state that arrangements have finally been made between the Northern Pacific Railroad and the Moss Bay Steel Company, of England, for establishing extensive steel works in this country. The iron company agree to furnish traffic for a branch line to extensive iron mines on the Upper Cle-Elum River. It will take a year to construct the works. The work of developing the mines has been carried on all winter.

The miners of the Black Diamond coal mines in the vicinity of Seattle have been ordered to strike by the Knights of Labor because one man was paid laborer's instead of miner's wages. The mines are shut down in consequence.

SALMON RIVER MILL AND MINING COMPANY.—This company's concentrator is expected to be in operation in about sixty days.

WYOMING.

NORTH STAR PIPE-LINE AND OIL COMPANY.—This company has been organized with a capital stock of \$2,000,000. The company is to lay a 6-inch pipe-line at once. This line runs from Cheyenne to a point twelve miles west of Ford Casper, and from Cheyenne east and west. It will start a tank-line in connection with its pipe-line. The company also intends to carry oil as common carriers, the same as the pipe-lines do in the Eastern fields, also to buy and sell oil at a

stipulated market price, whatever the same may be. The headquarters will be at Cheyenne. L. I. Gillispie is President and A. Y. Young, of St. Paul, is Secretary and Treasurer.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 27.

Statistics.

Production Anthracite Coal for week ended May 19th, and year from January 1st:

Table with 3 columns: Tons of 2240 lbs., Week, Year. Rows include P. & Read RR. Co., Cent. R. R. of N. J., L. V. R.R. Co., D. & H. Canal Co., Penna. RR., Penna. Canal Co., and Total.

Decrease 629,682; Increase 11,096. The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period: 1883: 10,895,891; 1884: 10,542,038. 1885: 9,407,390; 1886: 11,244,464.

Production Bituminous Coal for week ended May 19th, and year from January 1st: Tons of 2000 pounds, unless otherwise designated.

Table with 3 columns: Tons of 2000 lbs., Week, Year. Rows include Phila. & Erie RR., Cumberland, Md., Broad Top, Pa., Clearfield Region, Pa., Snow Shoe, Karthaus (Keating), Tyrone & Clearfield, Tipton, Alleghany Region, Pa., Gallitzin & Mountain, Pocahontas Flat Top Coal, Norfolk & West, Kanawha Region, Ches. & Ohio RR., and Total. Also includes Western Shipments for Pittsburg Region, Pa., Southwest Penn. RR., Pennsylvania RR., Westmoreland Region, Pa., Monongahela Region, Pa., and Grand total.

Production of Coke on line of Pennsylvania RR. for week ending May 19th, and year from January 1st, in tons of 2000 pounds: Week, 80,538 tons; year, 1,492,152 tons; to corresponding date in 1887, 1,523,831 tons.

Anthracite.

The anthracite trade appears to improve somewhat with the companies as the individual operators increase their prices nearer and nearer to companies' circulars. In general, there is but little cutting now, the outsiders getting very nearly net circular rates; but since they have advanced their prices they are doing less business and the companies are doing more.

The remarks that we made last week upon the overplus of production appear to be bearing fruit, and we have to note that cars are less abundant for individual operators, and that the production during this month is likely to be more nearly what the quota calls for than it has been during the past four months.

It is in the highest degree essential that the facts should confirm the statements of the companies, that their arrangement, though not one of a legal and binding character, is an agreement among gentlemen who, of course, will do what they say. The facts thus far have been against these claims, and it is high time that there was a "revival," in a moral sense.

There can now be no question as to any increase in price being made by the companies before the first of July; in fact, we know that contracts have been made at present prices running up to July. Any increase would, of course, only open the market again to the individual operators and close it to the companies, until the natural condition of the trade would justify the increase. There is not the least probability of any advance being made before the first of July.

The output for June, it is supposed, will not exceed that for the present month, or let us say 2 1/2 million tons, which is the same as last year in the corresponding month.

The Western trade is taking coal very freely, and affords a safety valve for the pressure of stocks, which is increasing in the East.

Freights to the East are down to 80 and 85 cents to Boston, and discharge, with a somewhat drooping tendency to-day.

Bituminous.

There is nothing new to report in bituminous coal beyond the fact that most of the steamship orders have now been closed, and for the most part at a cut from circular rates. The companies having made these

heavy contracts on terms which, in a measure, guarantee that the prices will not be reduced, are anxious to convince every one that they are being maintained. The steamship contracts of this harbor must amount about a million tons, and perhaps from one half to two thirds of this has been booked, while of the remainder a considerable portion has not yet come into the market, the old contracts not having expired.

In our report of the coal trade last week we made reference to "rumors which are circulated" that some recent fires in coal piles have been caused by spontaneous combustion of Pocahontas coal. It is, we believe, unnecessary to say that rumors of such a serious character would not have been allowed place in the ENGINEERING AND MINING JOURNAL unless we had received the information from what we considered well informed and reliable sources. The agents of the Pocahontas coals have strenuously denied that their coal has ever ignited spontaneously, and have furnished us the following letter from Mr. A. Perkins, fuel agent of the Boston & Maine Railroad.

BOSTON, May 23, 1888.

Messrs. Curran & Burton, Agts.: GENTS: In reply to your inquiry of above date, will say that we have used your coal since February, 1885, to date, and as yet have not had any of it on fire. The report that you have from outside parties of fire in your coal on our line is news to us, and we take this occasion to emphatically deny the same.

Yours, A. PERKINS, Fuel Agent B. & M. R. R.

Messrs. Avilés Brothers, who manage the Cuban sales of Pocahontas coal, write that they have heard nothing of it, and "if there was the slightest foundation to base such a report upon, it would certainly be reported to us by some of our correspondents." We have ourselves further investigated the rumors, and thus far the results are: That, concerning the Boston-Maine fire, "parties are extremely reticent, each agent naturally putting the blame on the other's coal." While as to the Havana fire, which we are informed occurred in a pile of about 3000 tons of coal, partly Cumberland and partly Pocahontas, its origin has not been and probably can not be determined. Having thus found that the "rumors" circulated, and which were communicated to and used by us in perfect good faith, have not been confirmed by any sufficient knowledge, we desire, in justice to the interests affected, to state these disclaimers and results of our closer investigations.

It is always a difficult matter to ascertain the cause of fires in coal piles. Even hard anthracite culm banks not unfrequently ignite, though if it were desired to burn them it would be difficult to do so. A piece of oiled cotton waste, which so easily gets into the coal handled by machinery, may well account for such a fire.

Our American bituminous coals are very generally free from liability to spontaneous combustion, and so far as chemical composition is an indication of freedom from this dangerous quality, no coal sent to the Eastern market would be counted safer than Pocahontas, of which the average composition is given by McCreath as follows:

Table with 3 columns: Moisture, Volatile matter, Fixed carbon. Values: 10.11, 18.812, 74.256. Ash, Sulphur, 5.191, .730.

This is extremely low in sulphur and in ash, and even its rivals admit this to be an excellent and popular steam fuel. We have reason, therefore, from the evidence, to hope that the fires referred to had their cause in something else, and that Pocahontas coal should not be charged with them.

Boston, May 24.

[From our Special Correspondent.]

There has been a very fair movement in anthracite coal this week. Orders are being forwarded about as usual at this time, and it can not be alleged that the Eastern market is not doing all that could naturally be expected of it. Some apprehension is caused over the unsatisfactory state of the iron market, which might possibly lead to lower prices on the large sizes. The tone of agents continues to reflect great confidence in the situation. Some strength is imparted from the fact that there is less and less individual coal, so called, crowding for shipment. Broken coal remains in short supply, the smaller sizes all being offered in greater stock, except Lykens Valley coal, which is so scarce that it is difficult to get any size.

Outside of three local railroads, the Old Colony, New York & New England, and the Boston & Albany (if the latter has not bought within a day or two), no large contracts are left for the soft coal trade to fight over in this market. Every thing, therefore, moves along without friction. Those who have the reputation for cutting the most are the strongest adherents of the pool now, and every body is just a trifle anxious lest something or other shall happen to break the market and cause great losses on contracts now booked, subject to revision if a decline occurs. The f.o.b. price of \$2.60 has been pretty well adhered to all along; the favorite method of cutting has been to give a lower rate of freight than could ordinarily be had.

There has been a little easier feeling in freights, but quotations are substantially unchanged.

We quote, exclusive of discharging: New York, 80 @85c.; Philadelphia, \$1@81.10; Baltimore, \$1.10@ \$1.15; Newport News and Norfolk, \$1.05@81.10; Richmond, \$1.15@81.25.

There is a moderate retail trade at former prices, which have held up very well. We quote prices as follows, 2000 pounds to the ton delivered: Stove, \$6; Egg, \$5.75; Broken, \$5.50; Nut, \$6; Frankan, \$7.25; Lehigh, Egg, \$6; Broken, \$5.75; Bituminous (on the wharf), \$4.25.

Buffalo, May 24.

[From our Special Correspondent.]

Your readers will have to be satisfied with the following items in the absence of any incidents in the coal and coke trade worth noting:

The shipments of coal by lake from May 17th to 23d, both days inclusive, 90,842 net tons, namely, 26,900 to Chicago; 25,100 to Milwaukee; 8000 to Duluth; 1360 to Racine; 250 to Bay City; 3380 to Green Bay; 1020 to Kenosha; 1850 to Ashland; 910 to Detroit; 600 to Alpena; 8250 to Superior; 550 to Saginaw, and 400 to Kincardine. Total shipments thus far this season, 291,071 net tons. The rates of freight were: 85c. to Chicago, Milwaukee, Green Bay and Manitowoc; to Racine and Sheboygan, 90c.; to Duluth, Superior, and Ashland, 60c.; to Saginaw, 50c.; to Detroit, 35c.; to Kincardine, —, and to Alpena, —.

The shipments by canal thus far this season only 235 net tons.

Canal freights as follows: One load coal dust to Syracuse, 50c. gross ton; one load to Oriskany, 55c. net ton, both free on and off. Nominally asking 100c. to New York and 85c. to Albany or West Troy, gross ton, free on and off.

Our harbor has been enlivened by the advent of seven new propellers during the past week. The descriptions given of some of these craft would make the hearts of lovers of marine architecture rejoice exceedingly, and our dockmen are wild with enthusiasm.

As a specimen of quick handling at our port, note the following: A propeller and consort arrived May 19th, at 9:15 A.M., and at 4 P.M. same day had left port laden with 3100 tons of coal.

The new Lehigh coal trestles are now in operation, and considerable animation is observable in consequence in this portion of our harbor system.

The long expected fleet from Duluth commenced arriving here Saturday, May 19. These vessels will carry coal back.

The ice still holds the fleet outside of Port Arthur. A dozen crafts have been there over a week.

The Buffalo Harbor bill has been increased \$25,000 by the Senate Committee. If the bill is passed and approved as amended, the Buffalo appropriation will be \$250,000.

The Toronto Globe is curious to know why coal that sells in Buffalo at \$4.75 per ton should cost \$6 at that port. A New York State newspaper says "the Toronto contemporary does not know the methods of the coal ring," because, if it did, "it would know that distance has nothing to do with price."

The Buffalo Fire Commissioners have advised the Common Council to immediately shut off the natural gas from our city. It is said that the Natural Gas Company is rapidly perfecting permanent safeguards, which it is believed will make accidents in the future impossible. Of course the company for the sake of its money interests will do all in its power to restore fully the confidence formerly felt.

Pittsburg, May 24.

[From our Special Correspondent.]

Coal.—Since our last report the shipments by the Ohio River have exceeded 10,000,000 bushels, destined for Western and Southern markets. The principal shipments were made on Sunday and Monday. During that time 66 towboats left this port. Prices show no change.

Table with 3 columns: Pool, Price per 100 bushels, Price per ton. Rows: First pool (\$4.75), Second pool (4.25), Third pool (3.75). Railroad coal (5.00).

Connellsville Coke.—The dealers so far have not come to any understanding in regard to prices, and coke has undergone no change. Of course the demand was active at Blast-Furnace, \$1 per ton f.o.b. cars at works; foundries, \$1.15.

Freights.—New rates to Pittsburg, 80 cents per ton; Chicago, \$3; Springfield and Urbana, Ohio, \$2.75; Toledo, \$2.90; Cincinnati, \$2; Indianapolis, \$2; all valley points, \$1.50; East St. Louis, \$3.50; St. Louis, \$3.65. Other points same proportion.

FREIGHTS.

The latest actual charters to May 24th, per ton of 2240 pounds:

Table with 3 columns: From, To, Rate. Rows include Baltimore to Bangor, Me., Bath, Boston, Bridgeport, Conn., Charleston, Fall River, Galveston, Gardner, Me., New Bedford, Newburyport, New Haven, New London, Portland, Providence, Richmond, Savannah, Somerset, Williamsburgh, Wilmington, N.C., Philadelphia to Alexandria, Charleston, Fall River, Gloucester, Lynn, Marblehead, Milton, New York, Norfolk, New Bedford, Newburyport, Norfolk, Portland, Portsmouth, Richmond, Salem, Savannah, Washington, Wilmington, N.C.

* And discharging. 3c. per bridge extra. † Alongside.

MARKETS.

NEW YORK, Friday Evening, May 25. Prices of Silver per ounce troy.

Table with 4 columns: May, Sterling exchange, Lond'n Pence, N. Y. Cts. Rows for May 19, 21, 22 and May 23, 24, 25.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 3 per cent. During the week the bank gained £148,000, and the proportion of its reserve to its liabilities was raised from 38 to 38.76 per cent, against an advance from 47.16 to 47.57 per cent in the same week of last year, when its rate for discount was 2 per cent. The weekly statement of the Bank of France shows gains of 6,900,000 francs gold and 6,050,000 francs silver.

Copper.—No change worth reporting has taken place in this market since our last issue. Now that the controlling parties have succeeded in entering into contracts with consumers for their supplies up to the end of July, the condition of the market may be regarded as settled for some time to come. Although we are without authentic information as to the exact quantity embraced in the contracts above alluded to, we have good grounds for believing that we are not far from the mark in placing this quantity at about 10,000,000 pounds. This may be regarded as a comparatively small total, which may be accounted for by the fact that some of the larger manufacturers have not as yet taken advantage of the Lake companies' offer, whilst others have only partially covered their requirements; these latter no doubt relying on being able to secure further quantities as they may require them over the period covered by the contracts on the same terms. Purchasing on behalf of the syndicate still continues in the open market at 16.60, but very little has been tendered to them at that figure. We find the general feeling on the question of the steadiness and stability of the market becomes rather more assured, and we are ourselves inclined to think that for some time to come the variations in price will be very inconsiderable, always of course assuming that nothing unforeseen should arise to disturb existing conditions. During the week the transactions on the Metal Exchange have been very limited, owing to the scarcity of copper now floating about, and speculative business is altogether at a standstill, the operators on both sides waiting for further developments. Closing quotations to-day are: Spot, 16.60@16.65c.; June, 16.60@16.65c.; July, 16.60@16.65c.; August, 16.50@16.60c.

In London the price of Chili Bars has shown very little variation during the week, and our cable advices are to the effect that the felling on that market is pretty much the same as with us. The last quotations for Chili Bars are: Spot, £81 15s.; three months' prompt, £75 10s.

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

Table with 4 columns: Destination, Commodity, Quantity, and Value. Rows include Liverpool (Copper matte), S. S. City of Rome (Sacks), Italy (Lbs), and Antwerp (Copper).

Tin.—This market continues in a despirited condition. The demand, both for consumption and speculation, has been almost nil, and every body interested in the article is now waiting to see how the market will turn when the May deliveries have been completed. Consumers, having apparently covered their immediate needs, are now buying hardly any spot tin, as they are not at all disposed to pay the existing premium for spot delivery as compared with futures. It seems very probable, therefore, that the premium referred to will soon almost, if not entirely, disappear. During the week quotations have marked a slight advance, but practically no business has resulted. We quote to-day: Spot 21.25; May, 20.70; June, 19.50; July, 19.50.

Lead.—The downward movement which has now continued for some weeks in this market does not appear to have come to an end yet, and we have to report a further decline to 4c. At this point, however, more business has been done during the week than for a long time past. Some of the larger consumers are evidently more disposed to take advantage of present quotations to secure some stock. Although the current price may be deemed low when compared with the figure touched during the last advance, yet judged on its merits the future of lead does not command much confidence, not because lower prices are expected, but the general public can not see any grounds for an advance with stocks in New York still very large and consumption not very satisfactory, while production not only continues undiminished, but shows signs of a large increase before long. Smelters are selling pretty freely at current rates. Our closing quotations to-day are: Spot, 4; June, 4.02½; July, 4.07½.

In London, after having declined to £12, the market has experienced a slight rally, and the price of Spanish lead is now £12 5s., with a very firm tendency.

Messrs. Evertt and Post, of Chicago, telegraph to-day as follows: The market remains about the same; if anything, a shade firmer. There is a somewhat better feeling, owing to growing inquiry. Current quotations are at 4.00, with 3.80@3.85 freely bid. We think that bottom has been reached.

Messrs. John Wahl & Co., of St. Louis, telegraph to-day as follows: It appears to be generally conceded that bottom has been reached. Stocks in the hands of holders are limited. 3.85@3.90 were the asking prices at the close, 3.90 for retail lots.

Spelter continues weak, with moderate demand. Domestic is quoted 4.50@4.60; foreign, 5.40@5.50.

Antimony.—About the same as last week. The demand for this article continues fair. Present quotations are: Cookson's, 13; Hallett's, 10½.

Chemicals.—The market during the past week has been rather dull, though prices in most cases are well maintained. Holders are not willing to grant any

concessions, and in most cases their views are above what consumers are willing to pay.

Carbonated soda ash, 48 per cent, continues dull, with small stock on the spot. Sales are making in a jobbing way from store at 1.30@1.35, according to quantity. Larger quantities may be had for immediate delivery at 1.27½, while lots to arrive are quoted at 1.25. High test is entirely without animation and the quotations, 1.15@1.17, are nominal.

Caustic soda ash, 48 per cent, is quite active compared with the other heavy chemicals. The light stock maintains spot prices well, and nothing is offering below 1.27½. Goods to arrive may be had for 1.25 and for shipment at 1.22½.

Refined alkali, 36 per cent, is not wanted to any extent. The quotation of 1.15 is more or less nominal. Higher tests are sold in a jobbing way, nothing of importance being noted; 48 per cent is quoted at 1.22½, and 58 per cent at 1.22½.

Caustic soda continues dull and we note no sales of consequence since our last. All business transacted is of a jobbing character. The quotations of last week remain unchanged: 60 per cent, 2.40@2.50; 70 per cent, 2.30, and 74@76 per cent, 2.20@2.22½.

Bleaching powder continues dull, only small retail sales being made during the week. It is impossible for New York holders to compete with Boston at present prices. However, holders are not pressed to sell and nothing is offering here below 1.85, ranging to 1.92½, as to brand, quantity, etc.

The acid market is without any important changes since our last. Sales are making in a jobbing way, but large orders are scarce.

Acetic acid is fairly active outside of contract orders, though most of the business is in a retail way. There is no change in quotations, which continue steady at 2½@2½c.

Sulphuric acid, 66 degrees, is steady, with a moderately good demand, though there are no very large sales. We continue to quote 90c. to \$1 for large lots, and \$1.05@\$1.15 for smaller quantities. Chamber acid is moving fairly to meet current wants. There is no change in quotations.

Muriatic and nitric acids are moving steadily into consumption, and the prices are well maintained.

Oxalic acid is dull and the market favors the buyers. There is little demand outside the orders to fill immediate wants. We continue to quote 6½c. for large lots and 7c. for small lots.

In the fertilizing chemical market a fair volume of business has been done, all things taken into consideration. The light stocks in most of the lines maintain prices well and the outlook is good for fall business.

We quote dried blood, low grade, \$2.15; high grade, \$2.20@2.25; azotin, \$2.15@2.20; tankage, high grade, \$21.50@22.50; low grade, \$19@20; refuse bone black, \$16.50@17 per ton; ground steam bone, \$25@27 per ton; fish scrap, f.o.b. factory, \$25 per ton; sulphate of ammonia, \$3.20@3.25 per cwt.

Kainit is in very light stock on the spot and \$11 per ton is demanded for goods ex store on vessel. The demand for shipment is good and quotations firm at \$8.50 per ton.

High grade sulphate of potash is selling well and quotations are very firm at 2.25c. on basis of 90 per cent sulphate.

Muriate of potash is in good demand and the market very firm. Prices have not advanced, however, and we continue to quote 1.75c. for sail shipments, 1.77½ for steamer shipments and 1.80 on the spot.

Double manure salt continues dull but firm, the quotations ranging from 1.10@1.15c.

All the potashes are very firm on account of the high freight rates from Hamburg, two of the steamship lines having consolidated.

Nitrate of soda continues firm, but business is not very active. Goods are offering ex store in large quantities at 2.02½@2.05c., and in smaller lots at 2.10c. Nothing of consequence is done in futures, which remain at our last quotation, 2c.

Brimstone continues firm, and the spot market has advanced in sympathy with advices from Sicily. Holders are not pressing sales at all, and consumers seem unwilling to pay present prices on the spot, so the market has a rather dull appearance. Future sailings are now quoted at \$20.50@21.50 for seconds and 75 cents per ton less for thirds. Nothing is at present offering on the spot for less than \$22.

Arsenic is quiet but firm, with quotations from 3½@3½ in 100-keg lots. Receipts during the week have been about 500 kegs per "Jersey City," from Bristol. The English quotations are firm, with an advancing tendency.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 25.

As yet there has been no appreciable increase in the demand for pig-iron at the prevailing lower prices. In fact it is held that the recent announcements of reduction of prices are simply making public what has been going on for several months. Buyers are still holding off, but there is little doubt that they will come into the market as soon as they are satisfied that the bottom has been reached. The general dullness of trade continues and is likely to continue until there shall be sufficient demand to make the scarcity of good No. 1 brands apparent.

The Thomas Iron Company's reduction of prices applies, as we have pointed out, only to their regular customers, whom they determined to satisfy as to price, in order to meet squarely the prices offered by Western and Southern makers, and in some cases do even more than that.

The Southern makers profess to be entirely willing to let prices rule as at present in this market. Having sold well ahead they can wait until the restricted output of Northern furnaces begins to be felt.

Scotch iron remains very quiet, with quotations unchanged.

There have been no recent sales of any quantity of steel rails, and the inquiry from responsible buyers is rather less. Structural iron continues in good demand and the business being done by the bridge makers is fully up to what could be expected at this season, with a good amount of work ahead. There have been considerable sales of old rails lately, some holders having decided to accept the low offerings of \$20@20.50 for Tees. The stronger holders, however, will not sell at those prices.

In other departments of the iron trade, business has been marked by dullness, amounting almost to apathy. Still there is a decidedly hopeful undertone, and a prevailing feeling that, with the tariff matters settled and the presidential election decided, the iron business of the country will certainly enter again on a period of prosperity.

Louisville. May 22.

[Reported by HALL BROTHERS & Co.]

There have not been as many large orders placed during the last week, but the general tone and condition of the market have been well sustained. We know of no sales having been made below last week's transactions. There is still a fair inquiry. Furnaces are kept busy filling old contracts, and, in some cases, are behind on shipments. Some buyers are still experiencing difficulty in getting early deliveries to meet their requirements, but this will in a measure soon be relieved by the blowing in of some new furnaces. Quotations for cash f.o.b. at Louisville will be found in our weekly register of prices.

Pittsburg. May 24.

[From our Special Correspondent.]

The iron trade during the week has been exceedingly dull in all departments. Notwithstanding the extreme low price, dealers manifest but little disposition to purchase beyond immediate wants. The stock in first hands, although not large, is fully sufficient to meet current demands. All parties agree, that unless there is a better demand very soon, there can be nothing to induce the owners, whose furnaces are now out of blast to start up; the furnace men with whom we have conversed, say that there must be a reduction in the price of labor, ore and freights before the market can exhibit much signs of life or activity.

The following table gives the cash price of iron at Pittsburg, May 24th, for the past two years.

Table with 4 columns: Product, Price 1887, Price 1888. Rows include Gray Forge, Bessemer, No. 1 Foundry, No. 2 Foundry, Muck Bar, and Gray Forge (Storage).

The decline in leading descriptions for year ending May 24th, was as follows: Gray Forge, \$4.25 per ton; Bessemer, \$5; No. 1 Foundry, \$4.70; No. 2 Foundry, \$5; Muck Bar, \$5.90; (Storage) Gray Forge \$3.50; Steel Crop Ends, \$4.50; Steel Billets, \$2.25.

The labor troubles will adjust themselves in time, as noted in our last. The Edgar Thomson works are all in successful operation. Solar works of Clark & Co. have all the men they want, and are running double turn, and manage to control their own business. The Black Diamond strike has been officially declared off. The strike cost the Knights of Labor \$168,000, leaving out the wages of ten thousand men. The Park Bros. & Co. have always paid union prices, and from the day it was built, nearly 30 years, would never allow outside parties to manage their business, and never will. The coke question remains without change. Prices are remarkably low, and will so remain until the parties interested have a better understanding.

The following sales will furnish a better description of the market than any thing we can say:

Coke and Coal Smelted Lake Ore.

Table with 2 columns: Product, Price. Rows include 500 Tons Bessemer No. 3, 500 Tons Bessemer No. 2, 500 Tons Bessemer No. 1, 500 Tons Bessemer No. 3, 500 Tons Gray Forge, 100 Tons No. 2 Foundry, 350 Tons Gray Mill, 50 Tons No. 2 Foundry, all ore, and 50 Tons No. 1 Foundry, all ore.

Coke, Native Ore.

Table with 2 columns: Product, Price. Rows include 500 Tons Gray Forge, extra, 30 Tons No. 1 Foundry, 25 Tons No. 2 Foundry, 50 Tons Silvery, and 25 Tons No. 1 Foundry.

Muck Bar.

Table with 2 columns: Product, Price. Rows include 500 Tons Neutral and 500 Tons Neutral.

Steel Slabs and Billets.

Table with 2 columns: Product, Price. Rows include 1000 Tons Billets delivered, 1000 Tons Billets delivered, 500 Tons Nail Slabs, and 500 Tons Sheet Blooms.

Old Iron Rails.

Table with 2 columns: Product, Price. Row includes 300 Tons American T's.

Steel Crop Ends.

Table with 2 columns: Product, Price. Row includes 400 Tons Crop Ends.

Steel Wire Rods.

Table with 2 columns: Product, Price. Row includes 500 Tons June.

Philadelphia. May 25.

[From our Special Correspondent.]

Every thing is unsettled in the iron trade. Prices are not quotably lower, but buyers claim there is such

a strong downward tendency as justifies them in continuing their course of buying only for the most urgent wants. The result of this is showing itself almost daily in some further restriction of output. Large pig-iron sales are unknown, and consumers are not willing to enter into contracts for the summer or fall at any price. The reductions made by the railroad companies are insufficient to protect the iron industry, and the furnace companies find it impossible to obtain satisfaction as to the course the companies intend to or probably will pursue. A further decline of about 10 per cent is looked for; but even this would not place the trade on a solid footing. Seven furnaces will blow out soon. Others will follow as soon as they work up some stock and fill contracts. Prices remain nominally unchanged.

Virginia iron is selling. More offerings of Alabama iron have been made.

Founders are about the only people who are buying. Three rolling mills at Norristown are idle, the pipe mill closing Wednesday. Reading industries are suffering. Three mills will, it is said, shut down next week if there are no orders in the meantime to justify running. Quotations unchanged. Nail makers have nothing to add.

Dealers in foreign material are doing no more than answering an occasional inquiry. The new business in sheet iron plate and tank is not sufficient to replace orders executed since the first of the month, and yet manufacturers have hopes of a busy summer. Prices can not be shaded. Buyers explain the situation by saying that until all doubts as to what bottom prices are to be removed, it is useless to talk of large transactions. The only genuine activity is in the structural iron works, and they would feel the depression, but for the large building requirements. The steel rail situation is unchanged, and manufacturers have no further information as to what builders propose to do in the matter of supplies, which will be wanted this fall. Grading has been almost completed on considerable mileage and ties are on hand. Old rails are very slow at unchanged quotations. The scrap yards are pretty well filled, and apart from a few sales of choice and No. 1 scrap but little is selling.

FINANCIAL.

NEW YORK, Friday Evening, May 25.

There is little interest shown at present in mining shares, and in consequence the business is small and prices show but little change.

Hollywood is meeting with little favor at the Exchange, and in consequence the price does not advance. The stock was dealt in this week at 29@30c. Amador shows sales of 5700 shares at prices ranging from \$2.00 to \$2.15. Middle Bar at 44@45c.

The Bodies continue to be neglected. Only one sale of Bodie is reported at \$2.50, one of Bulwer at 95c. and of Mono at \$1.55.

Taylor Plumas continues to sell at 1@2c.

We are advised by the officers of the company in New York that there is nothing new in regard to the fire in the Plymouth mine. The mine will remain closed until it is absolutely certain that the fire is extinct. The stock has been quiet. A few sales have been recorded at from \$9.50 to \$10.

A correspondent from Amador sends us the following information relating to the fire in the mines of the Plymouth Consolidated Mining Company, which gives the current local opinions in the matter. Regarding the Plymouth Consolidated, I wish I could give you the true inside information which you desire. I will give you all the information obtainable about here, and allow you to judge for yourself.

When the first news came that the mine was on fire, of course there was quite an excitement. We soon learned that only a select few were allowed in the mine, and, consequently, the impression soon got out that there was not as much fire in the mine as at first reported. From time to time we have heard reports that the fire was out, and work would be resumed, and as often we would hear that as soon as the shafts were opened and men went down into the mine, fire would be discovered and all work stopped. I have never seen but one man in or out of Plymouth who claimed there was any fire in the mine.

All of the principal men connected with the management at Plymouth have left town and gone to a mine at Angel's Camp, owned and operated by Mr. Hayward.

The report is now that the mine will be started up on June 1st, but few about here believe it.

Another report (which is believed by many) is that Hayward sold out a large amount of his stock when it was \$20 and over, and has really lost control of the mine, and if it does start up, it will be under a different management.

You know how hard it is to prove such things, therefore great allowance must be made.

I think the mine just as good as it ever was, and that it will be worked again some time. Without doubt it will be as well for Plymouth and the company if it should be worked under another management.

If I had means, I would willingly invest in the stock at its present value.

What seems strange to me is the fire not going out, smothered by the foul air in the mine.

I understand the water is being hoisted from one shaft all the time, thus keeping the mine in good condition. I know the above information does not amount to much, but the fact is no reliable information can be had. The people in general think it is a put-up job

and nothing will make them think differently but the resumption of work in the mine. The other mines of the company are doing fairly well.

Of the Dakota stocks, only Homestake appeared on the list, and a few sales were made at \$11 and \$11.63. Cleveland Tin, Deadwood-Terra, Caledonia, Father de Smet and Iron Hill show no sales.

Our remarks concerning the La Noria Mining Company have, very naturally, created a good deal of excitement, and the stock has gone down heavily at Pittsburg in consequence.

We have to-day received the following telegram from Mr. J. L. Carnaghan who, we believe, is president of the company:

"PITTSBURG, Pa., May 25, 1888.

"ENGINEERING AND MINING JOURNAL, 27 Park Place, New York:

"Your publication of the 19th inst., respecting the property of La Noria Mining Company and management is not true. You will be held responsible for further similar statements. J. L. CARNAGHAN."

In answer to this we can only say that the ENGINEERING AND MINING JOURNAL never makes such

statements as it has in this case without what it considers entirely trustworthy information. We still believe our statements, which, we need scarcely say, are absolutely disinterested, to be justified by the facts, and we think the stockholders can ascertain these by having the property and management investigated by competent and disinterested experts. If Mr. Carnaghan will favor us with some specific information we will gladly publish it, and if it disproves the information in our possession we will promptly make such fact known.

Security shows a further decline and went from 12 to 9c. It is thought that the company will be reorganized, as but few of the holders will feel inclined to pay the voluntary assessment of 25c. Monitor showed a small business the beginning of the week, at from 12 to 15c. Lacroix at 10 and 11c. Denver City at 20c. Cashier at 10 and 13c. Robinson Consolidated one sale at 68c. Leadville a few at from 81 to 28c. Dunkin one at 85c, and Adams one to-day at \$3.60.

Ontario shows one sale at \$30. The company has just declared its usual monthly dividend of \$75,000, making a total amount of dividends to date of \$9,200,

IMPORTATIONS AT NEW YORK DURING 9 DAYS ENDING MAY 23, AND FROM JAN 1 TO SAME DATE.

Table with multiple columns: Spelter, S. & I. Rods (Con.), Old Rails, Tin, Pig Lead, Tin Plates, Steel Sheets, Billets, Forgings, etc., Iron Ore, Copper, Bar Iron, Pig Iron, Steel & Iron Rods. Columns include Week, Year, Tons, and Corres. date 1887.

EXPORTS.

Table with columns: Copper, Bar Iron, Pig Iron, Steel & Iron Rods. Columns include Week, Year, Pounds, and Corres. date 1887.

WEEKLY REGISTER OF CURRENT QUOTATIONS.

Table of current quotations for various commodities including acids, chemicals, sulphur, and iron products.

Table listing prices for Sulphur, Vermilion, Vitriol, Zinc Oxide, and other minerals.

Table listing prices for Building Materials such as Bricks, Haverstraw, and Building Stone.

Table listing prices for The Rarer Metals including Aluminum, Barium, Bismuth, Cadmium, Calcium, Cesium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Glucium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Niobium, Osmium, Palladium, Potassium, Rhodium, Ruthenium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Titanium, Thorium, Tungsten, Vanadium, Yttrium, and Zirconium.

Table listing prices for Metals including Aluminum, Copper, Lead, Tin, and Zinc.

Table listing prices for Iron and Steel products such as American Pig-Iron, Scotch Pig, and Bessemer Pig.

Table listing prices for Steel Blooms, Steel Billets, Steel Nail Slabs, Steel Wire Rods, Steel Rails, and other iron products.

Table listing prices for Louisville Prices including Hot Blast Irons, Cast Scrap, Old Car Wheels, Old Rails, and Nails.

Table listing prices for Pittsburgh Prices including Coke or Bituminous Pig, Charcoal Pig, and various iron products.

Table listing prices for Philadelphia Prices including Foundry No. 1, Foundry No. 2, Gray Forge, Bessemer Pig, and other iron products.

STOCK MARKET QUOTATIONS

Table of stock market quotations for Baltimore, Md., listing companies like Atlantic Coal, Balt. & N. C., and Big Vein Coal.

Table of stock market quotations for Birmingham, Ala., listing companies like Ala. Cons. Co., Bir. Min. & Mfg., and Broken Arrow.

Table of stock market quotations for Pittsburgh, Pa., listing companies like Allegheny Gas, Bridgewater Gas, and Charlotte Mfg. Co.

Highest and lowest prices bid and asked during the week ending May 24th.

Table of Foreign Quotations for London, listing companies like Alturas Gold, Arizona Copper, and Birdseye Creek.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G. Gold, S. Silver, L. Lead, C. Copper, N. Non-assessable. This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. Non-assessable for three years. The Deadwood previously paid \$775,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation in Aug., 1884, the California had paid \$31,330,000 in dividends, and the Con. Virginia, \$42,900,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1875, the Copper Queen had paid \$1,360,000 in dividends.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, divided into Dividend-paying and Non-dividend-paying mines. Columns include Name and Location of Company, dates from May 19 to May 25, and Sales.

*Dealt in at the New York Stock Ex. Unlisted Securities Dividend shares sold, 17,824. Non-dividend shares sold, 60,550. Total New York, 78,404.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations. Columns include Name of Company, dates from May 18 to May 24, and Sales.

Boston: Dividend shares sold, 8,116. Non-dividend shares sold, 19,000. Total Boston, 27,166.

COAL STOCKS.

Table of Coal Stocks. Columns include Name of Company, Par value of shares, and dates from May 19 to May 25.

*Bid. †Asked. **Of the sales of this stock, 84,472 were in Philadelphia, and 353,120 in New York. Total sales, 510,138.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations. Columns include Company, and dates from May 18 to May 24.

000. Horn-Silver does not attract much attention. A few sales were made at from 78 to 90c.

Consolidated California & Virginia declined to \$10.88 yesterday, the lowest point it has reached for many months. Sales were made to-day at from \$11.98 to \$11.75. The dividend recently paid by the Hale & Norcross Mining Company has not affected the price of the stock, which remains steady at from \$7.88 to \$8.13. Ophir declined from \$8.13 to \$7.75. Sierra Nevada shows one sale at \$4.25. Yellow Jacket a few at from \$5.63 to \$5.88. Mexican went from \$4.40 to \$4.25. Julia was firm at from \$5 to \$6.00. Exchequer shows one sale at \$1.70. Bullion a few at prices which went from \$2.20 to \$2.05. Best & Belcher from \$4.50 to \$4.20. Sutro Tunnel was entirely neglected, only 3100 shares changing hands, at from \$2 to \$1.4c.

Of the Tuscarora stocks Belle Isle was the most active, advancing from \$3 to 75c., closing to-day at 65c. Navajo went from \$1.85 to \$2.10. North Belle Isle declined from \$3.80 to \$3.50. Tornado shows one sale at 45c.

Barcelona again showed considerable activity, with a declining tendency, the prices going from 92 to 70c. Rappahannock was only dealt in on Tuesday, when it sold at \$2 to \$1.3c.

Proustite was one of the most active stocks on the list. The price opened at \$1.20, reaching \$1.25 during the week and closing at \$1.15. Castle Creek was neglected at 8c. and Holyoke at 5c. Shoshone displayed considerable activity at 13 and 14c.

El Cristo, which had been firm all week at from \$2 to \$2.20, dropped to-day to \$1.75.

One hundred shares of Kingston & Pembroke sold at \$2.75 per share.

Some attention has been directed to San Sebastian, which was quite active, at from \$1 to \$6c.

Silver King continues to hold its own at \$5.

Meetings.

Marshall Consolidated Coal Co., Denver, Colo., June 16th, at twelve o'clock noon. Special meeting to vote upon a proposition to change the number of directors from five to seven.

Natural Gas Trust, Room 89, No. 26 Broadway, New York City, May 31st, at twelve o'clock noon.

Union Mining Company, of Alleghany County Md., Room 46, No. 115 Broadway, New York City, June 4th, at twelve o'clock noon.

Warrior Coal and Coke Co., Coaldale, Ala., May 31st. Special meeting for the purpose of authorizing a mortgage not exceeding five hundred thousand dollars.

Dividends.

Eureka Consolidated Mining Company, of Nevada, has declared a dividend, No. 85, of twenty-five cents per share, or \$12,500, payable June 7th, at Laidlaw & Co.'s, No. 14 Wall street, New York City.

Lehigh Coal and Navigation Company, of Pennsylvania, has declared a dividend of two per cent., payable June 9th, in Philadelphia.

Mt. Diablo Mill and Mining Company, of Nevada, has declared a dividend, No. 8, of twenty cents per share, or \$10,000, payable May 24th, at No. 318 Pine street, Rooms 16-17, San Francisco, Cal.

Ontario Silver Mining Company, of Utah, has declared a dividend, No. 144, of fifty cents per share, or \$75,000, payable May 31st, at Messrs. Lounsbury & Co.'s, No. 15 Broad street, New York City.

Standard Cons. Gold Mining Company, of California, has declared a dividend, No. 74, of five cents per share, or \$5000, payable June 12th at the Farmers' Loan and Trust Co., No. 22 William street, New York City.

Assessments.

COMPANY.	No.	When levied.	Day of sale.	Am't per share.
Alta, Nev.	37	May 12	June 12	.50
Anna, Dak.	1	Apr. 10	May 10	.001
Arnold, Ariz.	4	May 1	June 4	.75
Baltimore, Nev.	1	Apr. 16	May 21	.25
Big Hole Pl., Utah.	3	May 7	June 12	.01
Bulwer Cons., Cal.	4	May 3	June 7	.20
Crown Point, Nev.	49	Apr. 13	May 16	.50
Eclipse, Dak.	2	Apr. 13	May 30	.004
Florence, Dak.	2	May 10	June 17	.004
Golden Reward, Dak.	2	.....	June 8	.014
Homeward B'd, Dak.	5	Mar. 24	May 26	.001
Himalaya, Utah.	3	Apr. 26	May 26	.005
Justice, Nev.	46	May 7	June 11	.25
K. of the West, Ida.	10	May 7	May 8	.15
Last Chance, Nev.	41	Apr. 9	May 10	.25
Mayflower, Cal.	19	Apr. 12	May 17	.30
Navajo, Nev.	2	May 7	June 7	.001
New La Plata, Dak.	2	Apr. 9	May 9	.005
Oxford, Dak.	2	Apr. 9	May 9	.005
Paradise Valley, Nev.	5	Apr. 21	May 29	.15
Peerless, Ariz.	11	Apr. 4	May 7	.25
Quincy, Dak.	3	Mar. 3	May 22	.024
Rattler-Gilroy, Dak.	11	Apr. 7	May 7	.02
Rochester, Utah.	.....	May 15	June 16	.05
Scorpion, Nev.	23	May 25	June 22	.10
Sierra Nevada, Nev.	91	Apr. 3	May 8	.25
Silver Bar, Dak.	.....	Apr. 16	May 14	.005
Spanish, Cal.	2	Jan. 4	Mar. 10	.04
Trojan, Nev.	17	Mar. 27	May 4	.10
Utah, Nev.	4	May 4	June 8	.25
Wilkinson, Dak.	.....	.....	May 25	.01

* One half cent a share is delinquent if unpaid June 12th, and the other if unpaid July 12th.
 † Delinquent day and day of sale postponed to these dates.

Pipe Line Certificates.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

May 19	Opening	Highest	Lowest	Closing	Sales.
19	89c.	89 3/4c.	88 3/4c.	89 1/4c.	247,000
21	89 1/4c.	89 1/2c.	88 3/4c.	88 3/4c.	437,000
22	88 3/4c.	88 3/4c.	86 3/4c.	86 3/4c.	1,482,000
23	86 3/4c.	86 3/4c.	84 3/4c.	85 1/4c.	1,244,000
24	85 3/4c.	86 3/4c.	85 1/4c.	86 3/4c.	982,000
25	86 3/4c.	86 3/4c.	85 1/4c.	86 3/4c.	549,000

Total sales in barrels..... 4,941,000

NEW YORK STOCK EXCHANGE.

May 19	Opening	Highest	Lowest	Closing	Sales.
19	89c.	89 3/4c.	88 3/4c.	89 1/4c.	159,000
21	89 1/4c.	89 1/2c.	88 3/4c.	88 3/4c.	167,000
22	88 3/4c.	88 3/4c.	87	87	445,000
23	86 3/4c.	86 3/4c.	85 1/4c.	85 1/4c.	599,000
24	85 3/4c.	86 3/4c.	85 1/4c.	86 3/4c.	391,000
25	86 3/4c.	86 3/4c.	85 1/4c.	86 3/4c.	241,000

Total sales in barrels..... 2,002,000

St. Louis Mining Stocks. May 23.

[From our Special Correspondent.]

Our market has been rather an active one during the past week, and the leading stocks have had considerable fluctuations, which necessarily makes business good. San Francisco Consolidated, of course, is the leading stock on our market at the present time, and is subject to the most violent fluctuations. The original owners of this property have every confidence in its being another Granite Mountain, and although it was placed here at a very nominal price, still the similarity of the ores and its contiguity to Granite Mountain make outside investors very firm on it, and the principal stock that is being transferred at present is going into the hands of investors, who are holding it as an investment. West Granite, the next leading stock, while having been traded in to a very considerable extent has not had very much fluctuation. It also lies adjoining the Granite Mountain and Bi-Metallic, and the holders of said stock are great believers in it. It seems that any little decline brings out large orders and the market reacts very quickly. Adams and Small Hopes have remained steady with but very little trading in them. Golden Era is slightly lower. Work is being pushed vigorously on the Rena mine, which is the extension of the Golden Era. Peacock has obtained possession of the old Sheridan mill, and expects in the course of a very short time to operate both mine and mill extensively.

Name of company.	Opening.	H.	L.	Closing.
Adams, Colo.	4.50	4.50	3.50	4.00
Anderson, Mont.	1.15	1.15	1.00	1.00
Black Oak, Cal.	75	75	55	55
Bi-Metallic, Mont.	38.50	38.50	37.50	38.00
Caribou, Idaho.	.53	.53 1/2	.50	.50
Central Silver, Ariz.	.72	.72 1/2	.50	.53
Cleveland, Colo.	.15	.15	.11	.12
Concepcion, Mex.	.26	.27 1/2	.25	.26
Dinero, Mex.	.18 1/2	.21 1/4	.17 1/2	.18 1/2
Golden Era, Mont.	1.05	1.05	.95	.95
Gordon	.12 1/2	.12 1/2	.12 1/2	.12 1/2
Granite Mt., Mont.	59.50	59.50	59.00	59.00
Hope, Mont.	6.70	6.90	6.50	6.65
I X L, Colo.	.50	.50	.42 1/2	.47 1/2
Jumbo, Colo.	.23 1/2	.25	.22 1/2	.22 1/2
Juniper, Idaho.	.43 1/2	.42 1/2	.45	.45
Mexican Imp., Mex.	.17 1/2	.17 1/2	.17 1/2	.17 1/2
Neata, Colo.	1.20	1.25	1.10	1.20
Pat Murphy, Colo.	.81 1/4	.81 1/4	.75	.75
Peacock, N. Mex.	.17 1/2	.18 1/4	.17 1/2	.17 1/2
Phillips	.31	.31 1/4	.26 1/2	.29
Pilot	.08	.10	.07 1/2	.08 1/2
Queen of the West, Cal.	.42 1/2	.45	.40	.42 1/2
Redro, Colo.	.46	.55	.45	.52 1/2
Rena, Mont.	.23	.25	.22 1/2	.24
San Francisco, Mont.	1.71	1.65	1.55	1.65
Small Hopes, Colo.	1.20	1.50	1.10	1.40
Silver Age	.38	.55	.37 1/2	.53
West Granite, Mont.	.61	.61 1/4	.57 1/4	.54

Bid and asked prices during the week ending May 23d.

Boston Mining Stocks. May 24.

[From our Special Correspondent.]

The market is about as dull and inactive as it can well be, and orders to buy or sell are few and far between. An order early in the week to buy 300 shares Calumet & Hecla was filled by advancing the price from \$245 to \$247, after which it subsided to \$245 1/2, where it still remains. The balance of the list, with the exception of Boston & Montana, continues to decline on every attempt to make sales. Boston & Montana declined from \$44 1/2 to \$43, when orders were in the market to buy a few hundred shares, which advanced the price to \$44 1/2. Quincy declined on very small sales from \$72 1/2 to \$70 1/2, but later rallied to \$72.

Franklin holds fairly steady at \$15, although it is freely offered at this price; \$14 1/2 bid.

Osceola sold at \$22 1/2 to \$22 in the early dealings, but reports of a fire at the mine had the effect of causing a decline to \$21, at which it sold quite freely to-day.

Kearsarge declined from \$6 1/2 to \$6. Atlantic steady at \$17 1/2. Tamarack sold at \$165 to \$163, but only a few shares; \$160 was the best bid for it to-day. Allouez declined to \$1 1/2 and National sold at \$2 1/2. The minor copper stocks are entirely neglected, although at the Mining Exchange there is something doing in them occasionally; but their time has not yet come. Bonanza has been very quiet this week. The boom is evidently over for the present, awaiting further developments regarding the sale, of which so much has been said. Sales at \$1 1/2, the best bid being \$1 1/2.

Dunkin continues to droop in consequence of a lack of cash remittances from the mine. It is stated that the low-grade ore barely pays expenses, but work is continued with the hope that another rich pocket may be uncovered, which will fill up the treasury again and yield rich dividends.

The dealings in "Security" at the mining board

have been quite large the past week, the price declining to 7c. per share with a 25c. assessment to be added to those who hold their stock for permanent investment. Cusi sold at 7@8c., and Catalpa at 20c.

Deadwood Mining Stocks.

Company.	O.	H.	L.	C.
Double Stand	.03 1/2	.03 1/2	.03 1/2	.03 1/2
Florence	.02	.02 1/2	.02	.02 1/2
Greenwood	.01	.01	.01	.01
Golden Reward	.30	.30	.30	.30
Horse Shoe C.	.07	.10	.07	.10
Iron Hill	.25	.25	.25	.25
Isadorah	.08	.08	.08	.08
New Era	.05 1/2	.05 1/2	.05 1/2	.05 1/2
Oxford	.03	.03	.03	.03
Rattler Gilroy	.05 1/2	.05 1/2	.05 1/2	.05 1/2
Retriever	.08 1/2	.08 1/2	.08 1/2	.08 1/2
Ruby Bell	.11	.11	.11	.11
Spanish It.	.05 1/2	.05 1/2	.05 1/2	.05 1/2
Tornado	.40	.40	.40	.40

Highest and lowest prices during the week ending May 19th.

USEFUL BOOKS.

- Engineering and Mechanics. Practical Workshop Companion for Tin, Sheet-Iron and Copperplate Workers, Blinn. 2.5
- Principles of Economy in the Design of Metallic Bridges, Charles B. Bender. 2.50
- Principles of Design, E. L. Garlett, 1886. 1.00
- Railroad Engineers' Practice, F. M. Cleemann. 1.50
- Railroad Spiral, W. H. Searles. N. Y., 1886. 1.50
- Relative Proportions of the Steam Engine, W. D. Marks, C.E. 1887. 3.00
- Retaining Walls for Earth, M. A. Howe. 1.00
- Silversmith's Hand-Book, Geo. E. Gee. 1.7c
- Steam Engine, G. Holmes. London, 1887. 2.25
- Statics and Dynamics for Engineering Students, Irving P. Church, C. E. 1886. 2.00
- Teeth of Gears, G. B. Grant. Boston, 1887. 1.00
- The Windmill as a Prime Mover, A. R. Wolf. 3.00
- Young Engineer's Own Book, S. Roper. Philadelphia, 1884. 3.00

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9	1/2	2.25	5.84	15.84	27.65	37.71	47.17
12	1	3.00	7.46	20.04	34.70	47.03	60.90
15	1	3.60	9.23	24.10	42.42	57.41	73.83
18	1 1/2	4.33	10.73	28.95	49.14	67.06	86.70
21	1 1/2	5.00	12.41	33.11	57.90	78.42	100.05
24	2	5.67	14.10	37.87	65.59	88.89	113.40
27	2	6.34	15.88	41.85	72.48	98.93	125.82
30	2 1/2	6.99	17.07	45.83	79.38	107.58	137.25
33	3	7.45	18.55	49.81	85.23	116.83	148.17
36	3	8.06	20.04	53.80	91.16	123.88	161.10
39	3	8.58	21.37	57.38	93.38	124.68	171.82
42	3 1/2	9.12	22.70	60.97	105.58	143.09	182.55
45	3 1/2	9.60	24.03	64.55	111.78	151.49	192.27
48	4	10.21	25.37	68.14	117.99	159.90	204.00
54	4 1/2	11.17	27.79	74.64	129.27	175.19	222.60
60	5	12.15	30.22	81.15	140.56	190.48	243.00
66	5 1/2	13.05	32.46	87.16	151.16	204.56	261.00
72	6	13.95	34.70	93.18	161.97	218.09	279.00
78	6 1/2	14.81	36.81	99.84	171.17	231.97	295.95
84	7	15.74	38.92	104.50	180.07	245.20	312.90
90	7 1/2	16.61	40.96	109.99	193.49	258.43	329.85
96	8	17.48	42.99	115.43	199.87	270.81	345.61
102	8 1/2	18.39	45.01	120.85	205.28	283.55	361.75
108	9	18.99	47.03	126.28	210.60	294.20	374.90
114	9 1/2	19.72	49.07	131.77	223.19	309.19	394.45
120	10	20.55	51.12	137.29	237.70	322.15	411.90
126	10 1/2	21.41	53.21	143.02	247.69	335.97	429.95
132	11 1/2	22.35	55.40	148.76	257.63	349.20	445.60
138	12	23.25	57.50	154.50	267.57	361.90	461.25
144	12 1/2	24.25	59.50	160.25	277.51	374.10	476.50
150	13	25.25	61.50	166.00	287.45	386.10	491.25
156	13 1/2	26.25	63.50	171.75	297.39	397.95	505.50
162	14	27.25	65.50	177.50	307.33	409.70	519.25
168	14 1/2	28.25	67.50				