

ENGINEERING and MINING JOURNAL.

VOL. XXV., No. 24.

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THE SCIENTIFIC PUBLISHING CO., PUBLISHERS,
 27 Park Place, New York.

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NOTICE.

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WHO would not own a mine in Leadville, the home of the great Colorado Bonanza?

OUR San Juan (Colo.) correspondent points out that there is an opening in that country, not only for mining engineers and miners, but also for farmers and graziers, and he gives some valuable hints to intending emigrants.

OUR Managing Editor, Mr. R. P. ROTHWELL, who recently returned from Colorado, sails to-day, the 15th inst., from Boston, per steamer Parthia, for Europe. Mr. ROTHWELL expects to visit the salt mines, and to examine the Chaudron method of shaft-sinking in various parts of Europe. His European address will be care of Messrs. HENRY F. GILLIG & Co., 449 Strand, London, W. C., till the end of July, when he expects to return.

In another column we publish a letter from Leadville, Colo., written by our special correspondent, who is thoroughly reliable, conservative, and well-informed. His letter indicates that the discoveries at that place may prove of as much, if not of greater, importance than that of the bonanza of the Comstock, and decidedly more profitable than the average of that famous lode. In fact, it would appear that the same amount of capital employed at Leadville as has been spent in mining and reducing ores on the Comstock would give infinitely better results financially, and would produce an amount of pig-lead that would necessitate the closing of many galena mines, not only in this country, but also in other parts of the world. Such discoveries as these tend to turn the heads of sober, prudent men, and give rise to those periodic revivals of the mining speculation fever; and no doubt will also be laid under contribution to float many worthless properties in this and other markets.

THE "MCGARRAHAN CLAIM" TO THE NEW IDRIA MINES.

The long-continued litigation concerning the ownership of the New Idria quicksilver mines seems at last to have received a final decision. Probably no other case that ever came before Congress and the courts has been credited, in general belief, with so great an amount of bribery and corruption as this famous, or infamous, "McGarrahan Claim." It has been, and always will remain, a standing disgrace to our Congressional and legal records, and it is a matter for sincere congratulation if the present decision of the Supreme Court has withdrawn it forever from public view. The decision of the Supreme Court will be found on another page.

HONESTY IS THE BEST POLICY IN MINING AS IN OTHER MATTERS.

Our enlightened and well-informed San Juan correspondent conveys to us the pleasing indorsement, by "some of the best citizens" of the district, of the course of the JOURNAL in denouncing unsound or dishonest mining enterprises. Our correspondent says:

"My first duty in commencing this letter is to thank you, at the request of some of our best citizens, and on my own behalf, for your efforts toward reducing mining and the investment of capital in our mines to a legitimate business, and, at the same time, reducing to a minimum the chances of there being floated any fraudulent schemes connected with this extraordinarily rich region. We are in our extreme infancy, and as yet innocent of guile in the above connection, and being fully aware that our growth will be not only retarded, but effectually dwarfed, by the perpetration of even one of the magnificent swindles of which other mining camps have been the scene, you may imagine how those of us who have come here to live and work in the accumulation of an honest fortune appreciate your good offices."

That the course we have followed is that which best advances the interests of mining is recognized by the ablest and best papers published in the mining regions. We are constantly gratified by expressions of approval, and, though not given to sounding our own praises, we can not refrain from quoting the following flattering indorsement from so well-informed and respectable a paper as the *Colorado Bulletin*, of Denver:

"The Denver *Mirror* takes occasion to lecture that most excellent paper, the ENGINEERING AND MINING JOURNAL, for the course it has seen fit to pursue. The *Mirror* remarks:

"Hardly an enterprise in silver mining is brought to the attention of Eastern capitalists that is not cried down by that paper. These blows are all the more serious because they come from a journal which is professedly the friend of mining enterprises, and which is looking and working for a goodly portion of its support from the silver districts."

"This criticism is entirely unfair. There is, perhaps, no publication that has done more for the real interests of mining in Colorado than the ENGINEERING AND MINING JOURNAL. Its columns can not be controlled to bolster up and endeavor to float every worthless mining scheme sought to be placed on the Eastern markets. Too much 'Wildcat' has already received respectable indorsement for the good of Colorado or the benefit of her mining interests. We read the ENGINEERING AND MINING JOURNAL regularly, and feel deep interest in its articles on our mining enterprises, and feel impelled to say that they are not only ably written, but eminently fair, and we believe the course of the MINING JOURNAL is very generally approved."

THE CHATTANOOGA EXCURSIONS.—II.

Well, Reader, so you are there yet, are you? Still sitting up, and bound to hear all about it. We meekly submit, and patiently continue our narrative.

If we are not mistaken, we left ourselves, so to speak, just in the middle of the excursion down the Tennessee, en route for South Pittsburg, after the elegant cold collation at Cole City, near the Dade coal mines. (The materials for a pun are here liberally provided. Every gent is requested to mix his own.) At three in the afternoon, we arrived at South Pittsburg, too late to include in our trip, as had been intended, a visit to the coal mines, coke-ovens, and fire-brick manufactories belonging to the same proprietors, but situated at Victoria, some distance up the Sequatchee valley.

South Pittsburg is especially interesting as the headquarters of the Southern States Coal, Iron, and Land Company, an English enterprise, backed by large capital and planned upon a large scale. The usual history of great manufacturing undertakings in this country is, that they begin in a rude and humble way, and gradually grow to large dimensions. This course has both its advantages and its disadvantages, though it is usually adopted, without weighing the one against the other, as the result of necessity rather than choice. One of its unfavorable consequences is, that most of our large establishments lack room and convenient arrangement. Nothing is more common than to hear managers say, "If we had known from the beginning that our operations would be so much extended, we would have arranged our buildings differently. But adding one thing after another, as we needed and could afford it, we have accumulated a mass of shops, furnaces, tracks, and machines, more complicated and more expensive in operation than the best economy would require or permit." It is true, on the other hand, that to take a clean sheet of paper and draw the plan of large works upon it without mistakes in judgment is not easy. Creative genius, as well as practical judgment, is required. Moreover, "building for the future" is always risky. The future may not always be as near at hand as it is supposed to be; and there is danger that capitalists, disappointed by delay, may be daunted just at the time when success impends. English capital, however, has a remarkable "staying" quality; and, sooner or later, it carries through what it undertakes.

A great deal of money has evidently been spent by the Southern States Coal, Iron, and Land Company. It owns many thousand acres of land—more than it needs at present. It has laid out a beautiful town, with park, hotel, and neat cottages. Its shops are large and handsome; its blast furnaces (not yet completed) are of the largest and most expensive character, with costly Whitwell stoves, etc., etc. All these things will pay in the long run. Many of them will pay as soon as the manufacture of iron commences, by effecting numerous economies in the cost of production, without which, we venture to say, nobody can face the sharp competition of the future. We base no definite prophecies upon the impressions derived from a hasty visit. But we must confess that the natural resources and facilities of the locality, and

the nature and arrangement of the company's plant, struck us very favorably. Mr. THOMAS WEBSTER, the company's master mechanic, feels just pride in his well-ordered shops, and the excellent work which they turn out. The supply of ores will come from the "dye-stone," or fossiliferous red hematite belt, and from the brown hematite of the limestone valley. The former is phosphoric. Some deposits of the latter are relatively free from phosphorus. Both classes of ore in this favored region are closely sandwiched with the coal, limestone, and refractory sandstone; the whole Devonian formation, which elsewhere separates the ancient sandstones and limestones from the carboniferous rocks, having been benevolently omitted or rubbed out by Nature. These remarks apply to the whole East Tennessee iron region, and not merely to the locality of South Pittsburg.

Dinner was served in one of the large new shops—swept and garnished for the occasion. Our hospitable entertainers displayed the American flag wherever it had room to dangle or to wave; and patriotism flowed like milk and honey. President HUNT, neatly proposing the health and prosperity of the Southern etc. Company, called upon the manager, Mr. JAMES BOWRON, to respond, which Mr. BOWRON did, in an exceedingly happy manner, stating with compendious clearness the nature of the enterprise in which his company is engaged, and expressing gracefully the pleasure with which, as its representative, he received the visit of so many professionally and socially welcome guests. Mr. BOWRON, as an Englishman, must pardon us for complimenting Mr. BOWRON as an individual at the expense of his countrymen, when we frankly say that most Englishmen can not make as good a speech as he does. As a class, it seems to us, they do more, and poorer, after-dinner oratory than any other class. But when one of them, without hemming or hawing or stammering or tetering his chair, starts off to make a simple, straightforward speech, it is likely to be, on the whole, a little better than the average American speech, because it lacks the airs and attitudes of the stump.

Mr. E. C. PECHIN (formerly of Dunbar, but now the Assistant Manager of the Southern etc. Co.—what do they call it for short?) was urgently called on for a speech; but, for the first time in his life, PECHIN excused himself; and the Institute, absolutely stunned by the unexpected audacity of the thing, had not the presence of mind to denounce vociferously the paltry subterfuge, and insist upon the speech which it had a right to expect. "Unprepared," forsooth! Of course he was prepared—thoroughly prepared! Hadn't we all seen him eat? And what does a fellow need, as preparation for an after-dinner speech, except the preceding dinner, which is of course essential?

Well, after that, we packed ourselves comfortably in the train once more, and journeyed uneventfully back to Chattanooga, where we arrived long after dark. As the cars had not been provided with lamps against the contingency of belatement, the gentlemen had the perplexing pleasure of murmuring compliments and ejaculating witticisms in the dark to ladies whose "identity" was but vaguely recognized. It was as good as a masked ball.

That same evening, the indomitable—I had almost said intolerable—energy of the Council effected a business meeting in the parlor of the Stanton House. Certainly business was never before rushed through at such a rate. New members were elected; the result of the Scrutineers' count of the annual election was announced; amendments to the Rules, previously noticed, were ruthlessly laid on the table for a year—with a single exception, of which next week; a resolution of thanks, as long as the Tennessee itself, naming nearly every body in three States, was passed (after the ladies of Chattanooga had been added, with some indignant eloquence at their omission); an Envoy Extraordinary, bearing an invitation from the authorities of Mobile, was briefly heard, and summarily thanked; the annual report of Council was presented and received; a long list of papers was read by title; the session was adjourned; and away went the peripatetic philosophers to catch the special night train for another excursion.

This time it was a railway raid into Alabama and Georgia, under command of Mayor CARLILE, of Chattanooga, who proved himself a skillful manager and a royal good fellow. It's not easy to be both, with a roaring excursion party, changing its mind and voting to and fro in spite of the programme. However, the worst that happened on this occasion from such vacillation was the eating of two breakfasts and two dinners, because the party would get hungry and eat when they were not expected to, and then politeness required them to eat also where they were expected to—and their Awful Appetites consented. The jolly Mayor, meanwhile, "made his time," and more too; for he brought them back sooner than had been thought possible. He also kept his temper, and more too; for he shed positive good nature on every side. The following is the outline of this excursion, which we must forbear to describe at length:

TRIP IN ALABAMA AND GEORGIA.

Leaving Chattanooga Thursday evening, by special train on the Alabama and Chattanooga R. R., the party arrived at Birmingham, Ala., at 6 A. M., on Friday. The Mayor of Birmingham, popularly called the Duke, was gobbled and carried off as a traveling companion. Whether

he ever got back to his dukedom we don't know. The last we saw of him he was having a high old ducal time of it, away up toward Knoxville, and was engaged in periodical discussions with Mayor CARLILE (popularly called the Burgomeister) as to whether Birmingham was a suburb of Chattanooga or *vice versa*. From this pretty and thriving suburb or metropolis, whichever it is, the Institute proceeded *via* the South and North Alabama R. R., to the furnace of the Eureka Company at Oxmoor, where the regular breakfast (an irregular one having been taken at Birmingham) was provided by Mr. JAMES THOMAS, Superintendent of the works. A narrow-gauge road of $2\frac{1}{2}$ miles conveyed the party to the company's mines at Red Mountain, where extensive workings on the fossil ore or "dye-stone" were inspected. Opportunity was also given to examine the inclined plane by which limestone is brought over Red Mountain to the company's railroad.

Returning to Oxmoor, the party inspected the furnaces and coke-ovens, and then, resuming the South and North Alabama Railroad, was conveyed to the coal mines of the same company at Helena, in the Cahawba coal field. Here the Steitz coal-washer, as well as the coke-ovens, received attention.

The Selma, Rome, and Dalton Railroad next delivered the Institute safely at Shelby Iron Works, where the charcoal blast-furnaces, extensive brown hematite deposits, and beautiful general arrangements for works and workmen were examined, and Col. BLACK, the Superintendent, entertained the party at dinner. After dinner, the trip was continued by the same road to the Woodstock furnaces and mines, where Mr. ALFRED L. TYLER, the President of the company, received, guided, and enlightened the excursionists, and dined or supped them some more. After all these performances, nothing was possible but sleep; so they all slept, as they were marching through Georgia, and were finally delivered in Chattanooga, by way of Dalton, at some unheard-of hour next morning—a seedy but satisfied lot, ready for another start.

ANOTHER COMBINATION GONE.

We have another evidence of the instability of combinations, in the abandonment of the compact among the Western railroads to regulate east-bound freights. Mr. GUILFORD, the Commissioner, appears to have made the discovery of an obstacle that has been insurmountable in all combinations of this kind. He stated at the meeting on Wednesday that it is impossible to enforce a compact where there is an absence of power to punish men who will openly and defiantly violate it. In other words, he would have the public make it a criminal offense for an officer of a railroad, combining to extort unreasonable rates of freight, to fail in securing the attainment of this oppressive object. We see little prospect of the public appreciating the subject to this extent. As in nearly all other combinations of this kind, the interests were unequal, and human nature, seeking primarily selfish ends, was, and always will be, brought into active operation for the destruction of compacts which violate the fundamental laws of political economy.

LAWLESSNESS CONDEMNED BY A WORKMAN'S JOURNAL.

We are pleased to see so influential a paper as the *Labor Tribune* taking the position it has. It says:

"Considerable interest has centered in the trials now going on at Greensburg against a number of miners who are charged with arson, attempted murder, and conspiracy in Westmoreland County. William Lewis, an Englishman, was arrested some time since in Somerset County and brought to Greensburg on a charge of arson and attempted murder. Robert Whitelaw, a Scotch-Irishman, was arrested on the same charge at Smithton, Pa., while Fred. Proctor was charged with conspiracy. They have all been found guilty, and will undoubtedly serve the State for some years to come in the penitentiary. There are others implicated in the dark doings, and it is but a matter of time until they are brought in and punished. No apology can be offered for men who violate the law and bring themselves under its ban, and none should be attempted."

CORRESPONDENCE.

RIOTING MUST BE STOPPED.

EDITOR ENGINEERING AND MINING JOURNAL:

DEAR SIR: Under the above caption, in your issue of June 8th, there is a very imperfect account of a labor trouble in Kanawha, West Virginia. The facts are as follows:

About the middle of May the operators at the Blacksburg mine discharged their blacksmith. The men claimed that there was no just cause for the action, and demanded his reinstatement. This was refused, and the men struck, refusing to go to work till their demands were complied with. To hold to their decision, and yet have the mines in operation, the work was leased to two of the miners, who were to employ what men they chose, and deliver the coal on the railroad cars at a fixed price, the operators furnishing cars, mules, bank-timber, etc. But, to this lease there was the one stipulation (private), that the blacksmith should not be employed by the new management. The lessees went to work with sixteen miners. When this became known, the "Union" decided that they were playing false to their comrades, or, in their language, were "black-legs," and it was determined to stop work. On Friday afternoon, a delegation of about 150 men from the Campbell's Creek district, boarded the Modoc on her up trip, and went to Blacksburg, refusing to pay fare. That night, between 600 and 650 men from the upper region of the Kanawha, marched down to the same point, so that by daylight there were

about 800 men assembled. When the Blacksburg men came to work in the morning, a circle was at once formed around them, and some very plain talk indulged in, which, in few words, amounted to an order not only to stop work at once, but to leave the region, as they would not be allowed to work any where in it. The loaded bank-wagons, that had come out the night before, and were awaiting dumping into the railroad cars, were then "up-ended," the coal thrown out, and the men separated to the various quarters whence they came, the Campbell's Creek delegation waiting for the morning down train, so as to have a free ride home.

Like every other coal region, the cry here is, "Short work and hard times;" and if looking only to the miner himself, it is to be greatly deplored that such demonstrations should take place, and that these men won't see that they are placing barriers against capital being converted into labor, and that, instead of capital being the enemy of labor, they are making labor antagonistic to capital.

Yours truly,

M. F. MAURY.

CHARLESTON, W. VA. June 12, 1878.

PHILADELPHIA WATER SUPPLY

At the last meeting of the Engineers' Club of Philadelphia, Mr. HENRY G. MORRIS made some very interesting remarks in regard to the proposition which Messrs. WILLIAM CRAMP & SONS have made to the Philadelphia Water Department. They propose to furnish steam-pumping machinery and foundations, boilers and air-vessel complete, with all valves and attachments inside the house, to the pumping mains proposed to connect with the distributing pipes of the Belmont Water Works, on the east side of the Schuylkill River, and operate the same.

They also propose to furnish all coal, stores, and supplies, provide attendants and maintain repairs free of all charges to the city in the first cost and operating expenses, for the same sum per million of gallons pumped as it now costs at the Belmont Works, that being the lowest cost in the list for steam pumpage.

At the expiration of five years from the time the machinery is started, it shall become the property of the city of Philadelphia without further cost or expense, grounds and houses to be furnished by the city, and located at the Schuylkill Works; the Department to so arrange its pipes that any excess of pumpage not required on the east side can flow into the Belmont Basin, in order that continuous pumpage may be maintained. The machinery to be capable of pumping fourteen millions of gallons per twenty-four hours, the quantity of water pumped to be determined by the method now used by the Department, and payments to be made quarterly on quantities certified by the Chief of the Department.

The cost at the Belmont Works, the cheapest of any of the works in the city, for pumping 1,000,000 gallons 200 feet high, was in 1877 \$14.12. The Messrs. CRAMP have stated that they are satisfied that, by using their own engines, they can supply the 14,000,000 gallons every 24 hours at the same rate as now done at the Belmont Works, \$14.12, and still make a good profit.

Mr. Morris gave an estimate of the cost at which the work could be done, and, by comparison with the duty of the Lowell engines, showed approximately what profits might be expected. At Lowell, Mass., the cost was in 1877 \$10.71 per million gallons, for raising water into reservoirs a height of 166 feet, with the Morris engine.

THE CARBONATES OF LEADVILLE, COLO.

Special Correspondence of the Engineering and Mining Journal.

A FLOURISHING MINING CAMP—LARGE PRODUCTS AND PROFITS.

Leadville is the metropolis of the liveliest mining camp of the State. The carbonates of the district have created such a stampede as has not been known in recent times in Colorado. This magic city, which was unheard of one year ago, now boasts of over 2000 people, a school and newspaper, two churches, a theater, several concert-halls, any number of stores and saloons, and smelting and sampling works, and more in course of construction. Scores of frame and log structures are going up on the leading streets, and the miners and prospectors are settling at intervals along the hill-sides for miles around. Its rapid growth, free circulation of money, and general characteristics, remind one strongly of a placer mining camp in the heyday of prosperity. Nor is this appearance of good times deceptive. Many properties are paying enormously. Most of these carbonate ledges are of great size, and are usually so soft that the pick and shovel do the work without the necessity of blasting. But little powder is used, and a few men are able to get out quantities of ore or dirt that return profits of hundreds and sometimes thousands of dollars monthly. Long trains of wagons leave Leadville daily, loaded with ore and bullion, bound for the railway at Colorado Springs or Cañon City, and return laden with coke or merchandise. One store received over 50 tons of goods last week, and several others have received an equal amount during the past month. The ore shipped away carries a value, in silver and lead, of not less than seventy-five or one hundred dollars, but much of it is worth from two to five times those figures.

The lower grades of ore are treated to the amount of 15 tons daily at the Harrison Smelting Works, at Leadville. These carry an average value of \$50 per ton, and sometimes less. Three tons of ore usually make one ton of lead bullion, worth about \$150 per ton. These works are to be enlarged by the addition of another smelter and a Flincher furnace, and the managers expect to be able to treat 60 tons of ore daily by September next.

There are two ore-buying and sampling works in operation—those of the St. Louis Smelting Company, superintended by A. MEYER, and those of BERDELL & WITHERILL—the last shipping to Omaha. Each of these can crush and sample 30 tons daily, and the former are being enlarged.

BERDELL & WITHERILL are putting up some small reverberatory furnaces near their sampling works. D. G. GRANT is beginning the erection of smelting works of 30 tons daily capacity, which will be in operation in September. PATRICK BROS. and STARR are purchasing ores for their sampling works just completed. This can handle about 30 tons daily. Next week EDDY & JAMES will have their ore-buying and sampling mill ready for business.

Before this is published, Leadville will have ore-buying and sampling facilities for handling and shipping East 100 tons of high-grade ores daily. This month her smelting facilities will be doubled, and before October will be capable of treating over 100 tons daily. There are low-grade ores enough already on hand to supply all the smelters that are likely to be put up this year. There is no doubt but that the mines already producing will be able to export all the ore during the remainder of the year that the ore-buyers can handle. It is claimed that the Iron mine alone can turn out 100 tons daily, the Dana and Camp Bird or Argentine an equal amount, and the Carbonate cluster of mines as much more. The Rock, Dome, and Stone have vast quarries of carbonates rich in lead, but too poor in silver to pay for smelting or shipment at present.

An immense amount of prospecting is being done, and new discoveries are made almost daily. Some of these are of great value. These carbonate ledges are generally nearly flat in direction, with a downward tendency into the mountain, overlaid by porphyry and underlaid by limestone. The ore extends in waves, rising and falling, occasionally giving out in one place and beginning at another; breaking off abruptly, to start anew at a higher or lower elevation. The ledges are almost universally reached by sinking shafts, reminding one of boring for oil.

Sometimes carbonates are found at from 10 to 50 feet below the surface, but a distance of 150 feet or more has been made in some cases before the search is rewarded or abandoned. On reaching the carbonates, usually in the form of red or yellow sand or dirt, or of decomposed quartz, drifting commences in one or more directions. The hill-sides are dotted with shafts and dump-piles in the vicinity of the richest strikes, and for long distances along what is considered the valuable belt. Two weeks ago, a Leadville grocer made an arrangement with two prospectors, furnishing them a "grub stake," with an interest in the prospective "find" or loss. A very rich carbonate ledge was found at a depth of 26 feet, and a ton of dirt sold for nearly \$200, and as much more of far greater value has been taken out as the result of two weeks' work for two men. The owners assert, with no little show of reason, that their sales will hereafter reach \$1000 weekly.

A few months' work of seven men at the "Carbonate" mine returned \$45,000 to the owners for ore sales, at an outlay of only \$7000. The Iron gave proportionate profits on a yield over three times as large in the past seven months. The sales of ore from the Camp Bird mine up to April exceeded \$80,000. This and four adjoining claims, making a plat of ground 1500 feet by 1500, were recently purchased for \$225,000 by members of the St. Louis Smelting Company and others now known as the Argentine S. M. Company. Some delay ensued in getting the mine properly opened for more extensive operations, it having been left in bad shape as regards drifting and timbering by the former owners, although the quantity of ore in sight was and is very large. The present output of ore worth over \$100 per ton is from 20 to 30 tons daily, the result of 38 men's labor, and but little stoping is done. The future yield and profits of the company will soon be very large. The ore body varies in width from one to twelve feet in thickness and appears to extend around into the mountain without end. A shaft was sunk 50 feet on the Wolfe Tone, and since ore was struck two weeks ago, the ore sales have exceeded 20 tons, yielding altogether over \$2000. But three men were at work.

Among some of the best-paying mines at present are the Crescent, the Adelaide (recently sold for a large sum), the Catalpa, Dyer, Dana, and others. The Dana, sometimes called after its owners, Long & Derry, had yielded over \$75,000 in two months up to this spring, and is beginning to ship its ore on hand now that the snows have disappeared. The quantity of ore on hand between the various drifts is believed to be worth over \$200,000, and the vein seems to improve as opened, and is usually 7 feet thick. The upper portion carries largely in what may be termed chloride of silver ore, the middle is mainly carbonates, and the lower portion is mainly galena ores. The average sales have been \$100 to the ton, but ore worth hundreds of dollars is now being mined. But few men have been at work underground—as many more in sorting ore and several in timbering, etc.—not a dozen in all.

PROBABLE OUTPUT THIS YEAR.

The Leadville carbonate district is likely to smelt or export over \$1,000,000 worth of ore during the present year. Possibly the 100,000 tons of ore likely to be handled in the next six months may yield a still larger sum. Wages are usually \$3 per day, and payments are usually made semi-monthly. People are flocking into camp from all quarters, and every body who has money or supplies, or who can get backing, starts off prospecting. While the A., T., and S. F. and D. and R. G. railways are fighting over the Arkansas cañon and valley, the Denver and South Park line is steadily pushing on toward this mountain metropolis. Forty miles more of this road will be in operation before July. Leadville is 9800 feet above sea level, and many of the miners are 1000 feet higher or near the verge of timber line. Consequently the climate is a cold one.

LEADVILLE, June 5, 1878.

COIN.

THE SEABOARD PIPE LINE.

At the last meeting of the Engineers' Club of Philadelphia, General HERMAN HAUPT made very interesting remarks in regard to the Seaboard Pipe Line. About two years ago, the Pennsylvania Transportation Company called upon General HAUPT for estimates in regard to cost of transporting oil to the seaboard by means of pipes. The first pipes in the oil regions for the transportation of oil were laid 14 or 15 years ago. At present there are some 2000 miles of pipe in operation between the wells and the railroads.

At first the pipe-line company met with a very determined opposition from the teamsters and boatmen; but after waging a bitter war against the new system, they had to succumb, and pipe-lines became the only mode for conveying oil from place to place. The Legislature passed an act allowing pipe-lines in four or five of the western counties. The Conduit line was started to operate between the oil regions and Pittsburg. After a sharp contest with the Pennsylvania Railroad, it succeeded in getting across the line of the railroad by using a public road. The oil was received in tanks which were mounted on wheels, hauled across the railroad, poured into receivers, and went on its way to Pittsburg. Even with this extra expense of handling, the line paid well.

Upon visiting the oil regions, it was found impossible to get satisfac-

tory data for formulating the hydraulic pressure and making necessary calculations for an estimate of cost for a long line. The Seaboard line proposes to use a 6-inch pipe which will give a capacity of 6000 barrels' discharge per day; the line will be tested to 1800 lbs. pressure per square inch, and worked at 400 lbs. per square inch. Preliminary surveys have already been made. The first station will be located at Parker City, from which the oil will be forced a distance of 35 miles; the second pump will force it 26 miles further; the third pump, 70 miles further; and the last pump, which will be located on the west side of Tuscarora Mountain, will send it to Baltimore, a distance of 102 miles. The pressure at each station will be 400 lbs., equal to a head of 1200 feet of oil. Distances between stations varying with the profile of the ground crossed.

The estimated cost of transportation is 1 cent per barrel at each pump, the distance between pumps being immaterial. Five cents per barrel is a full estimate of cost for transportation from the oil regions to the seaboard. A 6-inch line of pipe can be made at a cost of \$8000 per mile, making the total cost of the projected line \$1,750,000. Construction of the seaboard line will be commenced in two or three weeks.

One of the most important points in the construction of pipe-lines is to allow for contraction and expansion due to changes of temperature.

A pipe-line is certainly the most economical and natural method for transporting fluids, and there is no more reason why oil transported in pipes should be exported than when transported in cars.

OLD GRANBY MINES, NEWTON COUNTY, MISSOURI.

Special Correspondence of the Engineering and Mining Journal.

Something must be done to revive the Granby mines. They contain large deposits of galena, and the biggest calamine deposits yet developed in this country. Their silicate of zinc is mined as cheaply as the Picher blende of Joplin—say from \$3 to \$5 per ton—and there is no reason why all parties concerned should not be able to do well. The situation is this:

The main diggings are on Section Six, the property of the St. Louis and San Francisco Railroad Company, and held under lease by the Granby M. & S. Co., which is operating also on adjoining sections, on fee-simple lands, and at Oronogo and Joplin, to which latter places they have of late transferred their main operations, and erected dressing, ore-separating, and smelting works. Formerly Granby was the chief point, and the company used to incur many idle expenditures by hauling the mineral by wagons and rail to Granby for smelting, while the railroad company secured thereby the freight on the mineral from all the mines of the Granby Company in the counties of Newton and Jasper.

Pig-lead, then, averaged from 6½ to 7 cents per pound in St. Louis, and silicate of zinc—the weekly production of which varied from 200 to 350 tons—brought double the price of the present market.

To that period of prosperous years the Granby Company, at that time under the management of the late Hon. HENRY T. BLOW, owed its success. The good fortune of the company was the envy of all, and stimulated in no small degree the enterprise of Joplin mining companies, who, by the discovery of immense deposits of galena and the introduction into the market of their not less important deposits of zinc-blende (the latter first done by the writer), succeeded in placing Joplin at the head of this region. Although then in possession of a valuable part of the celebrated Lone Elm mineral range, the Granby Company, acting in the interests of the Atlantic and Pacific Railroad Company (now the St. Louis and San Francisco, which discouraged the growth of Joplin mines on account of the opportunity of Joplin shippers to evade the A. & P. route by using the Missouri River, Fort Scott, and Gulf road), neglected its Jasper County mines, and drew all it could toward Granby. Some 30,000 to 50,000 lbs. of mineral were hauled every week from Joplin to Granby by axle—a distance of 20 miles, resulting in the loss on the road of hundreds of thousands of pounds of its own mineral.

During the management of the late Hon. HENRY T. BLOW, under which the Granby mines prospered by the stability of the lead and zinc market without requiring great expenditures in improvements by introduction of pumps of all kinds, and erection of dressing and improved smelting works (since then become necessary), the situation remained virtually the same, the crisis of 1873 being successfully weathered by the company.

Since the death of HENRY T. BLOW, times have changed. The stability of the lead and zinc market is a thing of the past, absent in the present, and a matter of great uncertainty and doubt in the future. The seven fat years are gone by, and the seven thin ones are in full blast. This is a period of permanency of depression and decline, causing great loss to the Granby Company; in lead, actual loss; in zinc, loss of profits, necessitated by the decreased demand for silicate, the St. Louis and Illinois smelters preferring to purchase Joplin blende, on account of the larger percentage of metal contained therein, and forming an important item in matters of freight. Last year, the Railroad Company reduced the freight, but although it was and is a relief for shippers from the few independent diggings of Newton County, as yet insignificant, the Granby Company claims that it realized no benefit therefrom; the reduction in freight being balanced by the imposition of a royalty on zinc ores, which had hitherto been free, with compulsory shipment over that railroad at a fixed rate. To the Granby Company the reduction was a mere change of account—the same horse putting another foot forward. At present the Granby Company pays on lead a royalty of one seventh of the pig—one car-load of pig-lead out of seven shipped; on zinc ore, a royalty of \$1.25 per ton. The Granby Company states that with a constantly falling lead market, and the growing difficulty of disposing of its zinc ore, accumulating on its hands, and, when sold, realizing only 50 per cent of former prices, it can not pay the royalties and freight rates, and at the same time prosper or invest any more capital in enterprises which are otherwise needed for the success of that section.

The relations between the Railway Company and the Granby Company became more and more disturbed. The one, being poor, desires to make all it can; the other, being rich, is naturally conservative.

No amicable understanding resulting from consultations on the matter, the Granby M. & S. Company changed its tactics, dropped the unnatural concentration at Granby of the affairs of its various mines; built dressing and smelting works at Joplin; reduced its large staff of officers; reduced salaries throughout; sent the Oronogo mineral to Joplin, and smelted in Granby no other lead but that raised there. Much of the machinery and furnace apparatus, no longer needed in Granby, was sent to Joplin.

Corporations are generally of an absolute mood, and the two companies form no exception. The St. Louis and San Francisco Railway Company did not yield an inch, and claims that, if it reduced the royalties, the miners could derive no benefit therefrom. On the other hand, the Granby Company claims that it loses money on lead, and that the zinc is a burden on its hands; that the improvements made by them in the building of dressing and smelting works preparatory to competition with the far West mines, require an outlay of funds far out of proportion to late earnings, and with no warranty whatever of being refunded; that the Railway Company, by moderating its royalties to ten per cent, would secure full compensation by increase of shipments.

The distemper thus illustrated threatens to become chronic. The matters between Granby and the Railroad Company may be compared to the differences

between the King and the late Queen of Holland—mighty little respect and less love between them. Why not adopt their mode of accommodation?—see each other only on affairs of ceremony, with champagne, etc., and let a third party, representing Minerva, attorney-in-equity, be the medium of their intercourse.

The Railroad Company should propose a plan of coöperation and select an efficient business man to act as assistant bookkeeper in Granby. All the affairs of that mine should be open to his inspection, and his salary be paid by the Railroad Company. The latter to reduce its freights to Joplin rates, and the royalties on lead and zinc ores to 10 per cent thereof. An assessment of the actual value of smelting works, pumps, engines, etc., to be made every six months, together with actual capital used in transacting the business of the Granby mine. A reasonable interest thereon to be allowed to the Granby Company, to be first deducted from net profits after payment of the 10 per cent royalties, salaries, etc. All these matters to be considered and determined upon prior to the commencement of such an arrangement. The Granby Company to manage entirely and solely the affairs of the mine; but all transactions of the Granby department to be open to the eye of the commissioner to be appointed by the Railroad Company.

At the close of every six or twelve months make the following settlement: Total amount of ore produced, both zinc and lead, — tons. Average value at the mine, \$— Royalty, 10 per cent thereof, due to the railroad company, which shall be at liberty to draw monthly on shipments. The interest on capital and inventory, further salaries and expenses, to be next deducted from general earnings. The balance to be divided into two equal shares; the railroad company to receive one half, less the amount of 10 per cent royalty account.

This understanding once effected, the mutual interests of the railroad and the Granby Company should lead them to establish early railroad connection with good and cheap coal, the proper agitation for the building of zinc works at the nearest suitable coal mine, as the shipping of two thirds of waste in the silicate ore, several hundreds of miles, is a dead loss, weighing terribly on the miners, who could be paid several dollars more if there were a home market. That is one way to settle the unfortunate divorce case of the St. Louis and San Francisco versus the Granby Company, with the poor miners as involuntary co-respondents.

B.

DADE COUNTY (GA.) COAL MINES.

The Dade coal mines are located in Sand Mountain, Georgia, just south of the State line of Tennessee. The company was chartered in 1873, and consists of JOSEPH E. BROWN, Ex-Gov. of Georgia, President; JULIUS L. BROWN, Vice-President; C. T. WATSON, Secretary and Treasurer; the Directors are JOSEPH E. BROWN, JOHN T. GRANT, and W. C. MORRILL, and the headquarters of the company are at Atlanta. Col. WELLS is Superintendent, and lives at the mines. Two adits are now excavated about three quarters of a mile into the mountain, and about 850 cars, each containing 20 bushels of coal, are mined daily. Convict labor is employed almost entirely, and the company has 283 convicts at work, of whom 173 were employed at the top of the mountain, 74 at the furnaces at the bottom and on the road, and 36 at Castle Rock, another station. The company pays to the State of Georgia ten dollars per annum for each convict, besides clothing, feeding, and guarding them. The State does not keep up a penitentiary, but leases out every convict to some kind of labor. They are almost all negroes, and are sentenced to hard labor from one to four years for the most petty crimes. Stealing is a weak point in negro character, and the larceny of a neighbor's hen-coop furnishes the State with a profitable source of revenue and brings into action a class of labor with which there can be no competition. Last year the State made a profit on its convicts of \$98,000, and it wasn't a good year for convicts, either. It is safe to presume that the average number of criminals in Georgia will not decrease very rapidly as long as the system pays such good dividends for the encouragement of crime, and all the leading employers of labor are pledged to its support by self-interest.

At the Dade coal mine the convicts are kept inside high stockades, some small dwellings being provided for sleeping and eating purposes; they go to work at sunrise and work till dark. Every man is dressed in coarse, striped woolen clothes, and has a chain wound about one leg; sometimes both legs are chained; sometimes the chain is fastened about the waist or neck; a few of them were free from chains and assisted on the coal trains; while one, a white man, kept the daily account of work and was allowed to talk to visitors. He was in for murder, but his time was nearly expired, and he had a tolerably comfortable situation. From him we collected some of our statistics. The mining gangs are always chained together one behind another, and in the stockade they are again fastened to other chains; the area surrounding the entrance to the mine is guarded by seven sentries, each armed with a loaded shot-gun, and a convict is not allowed to approach a sentry, nor can he move about the open area without gaining permission; now and then a negro is released from his chains by a well-directed charge of buck-shot, and a salutary lesson is imparted to his surviving fellow-convicts; but we suppose the Georgia convicts are about as well treated as the inmates of many of our Northern penitentiaries and county poor-houses are, if we are to judge from some recent revelations.

The method of keeping the account of work done at the Dade coal mine is as follows: Each convict is numbered and has a hook in the office; he takes with him in the morning a number of leather checks with his own number on, and on each car of coal sent out by him he hangs one of these checks, which is taken from the car at the mouth of the mine and hung on its hook in the office; at night a record of checks is made in the proper book, and thus the value of each man determined. From 8 to 8 cars per day is the work done by the negroes, but a little tobacco will induce a negro to send out as high as 12 cars in a day. The total number of cars sent out for the week ending May 18th was 2259, of 20 bushels each; average number of miners employed each day, 79; average number of cars by each man, 4½. The men are employed as miners, mule-drivers, switchers, water-bailers, blasting slate, repairing, coupling cars, carrying picks, scavenger, sawing timber, assistants.—*Eng. News, June 6th.*

GAS MOTORS FOR TRAMWAYS.—The Lenoir gas engine has been improved by Otto, with a view to its employment on street railways. It is stated, as the result of several comparative trials, that the Harding steam-engine effects a saving of from 10 to 25 per cent over horse power; Mevarky's compressed-air engine, a saving of from 23 to 37 per cent; and the Otto gas-engine, a saving of from 61 to 67 per cent.—*La Gaceta Industrial.*

THE SULPHUR FUMES OF LONDON.—The atmosphere of London is vitiated by the fumes arising from its innumerable coal fires. In a paper read before the Society of Arts it was estimated that the coal annually consumed in London is over 8,000,000 tons, equal at 1 per cent of sulphur to 80,000 tons, or as oil of vitriol to 245,000 tons. This is more than five times the amount given off from all the sulphuric acid works in the country.

TUNNEL TIMBERING AND ARCHING.*

MODIFICATIONS OF THE ENGLISH SYSTEM IN AMERICA.

(Continued from page 392.)

Now, the foregoing description of bar-timbering at the Hauenstein Tunnel is an illustration of the English system in full, as applied in loose rock; in the author's article above referred to, on the Musconetcong Tunnel, we have the system used in soft ground.

We will now turn to certain modifications of the system that have been put in practice in the United States.

BAR-TIMBERING AT THE HOOSAC TUNNEL.

Figs. 2, 3, 4, and 5 show the English system as used at the Hoosac Tunnel by Mr. B. N. FARREN, contractor for the soft-ground work at the west end. There is no necessity for a detailed description of this work, as the figures show the system to be generally similar to that already described under the Musconetcong Tunnel, except that an invert was needed, and that the bars were not drawn but bricked in. It may be well also to say that the material met was of the worst character, and was exceedingly difficult to drive through. The work, however, was carefully done, and has stood well since. The many stretchers between sills, shown by 1, 1, 1, 1, 1, 1, 1, 1, and 2, 2, 2, 2, 2, 2, show the very heavy nature of the ground met.

COST OF EXCAVATING AND ARCHING BY THE ENGLISH SYSTEM AT MUSCONETCONG AND HOOSAC.

As to the cost of section mining and arching by the English system, it will, of course, depend largely upon local circumstances. In the descrip-

land. Payments were to be made to the contractor monthly, at the rate of 80 per cent of the finished work.

The State furnished the bricks (made on the spot) at \$9 per M, and the timber at \$16 per M for hemlock, and \$18 for spruce and hard wood. The State also furnished the cement, costing in Troy, N. Y., from \$1.65 to \$1.70 per barrel, to which must be added freight at 30 cents per barrel. One barrel of cement was, on an average, used to a perch of masonry.

Mr. FARREN began work June 7th, 1866, and early in December the brickwork of the top of the arch had entered the mountain. The masonry in open cut was commenced about 25 feet west of the point first selected, so that it extended some 200 feet in all. At the beginning, the invert and sides to the spring of the arch were laid with five courses of brick, and the arch with six, the thickness of the arch being increased as it advanced east, until in the soft-ground excavation eight bricks thick all around (or 32 inches) was found necessary. Both a top and bottom heading were driven, the top one being for the bars and the bottom one for drainage. Side-drains were also driven in the very soft ground, 6 feet high and 4 feet wide. These were driven in advance of the main headings, and the water from them was let into the tunnel from the sides; holes were left in the invert at proper intervals to facilitate this drainage. These side-passages were afterward filled with stone, making permanent blind drains, and they acted as outside buttresses to the mason-work.

The first contract for arching was completed* August 31st, 1867. Another contract was then made with him for 500 feet more of brick arch. The prices under the new FARREN contract were:

For excavation.....	\$6.00 per cubic yard.
Brick masonry.....	12.00 per perch (25 cubic feet).
Stone masonry.....	6.00 per perch.
Stone culvert.....	6.50 per perch.

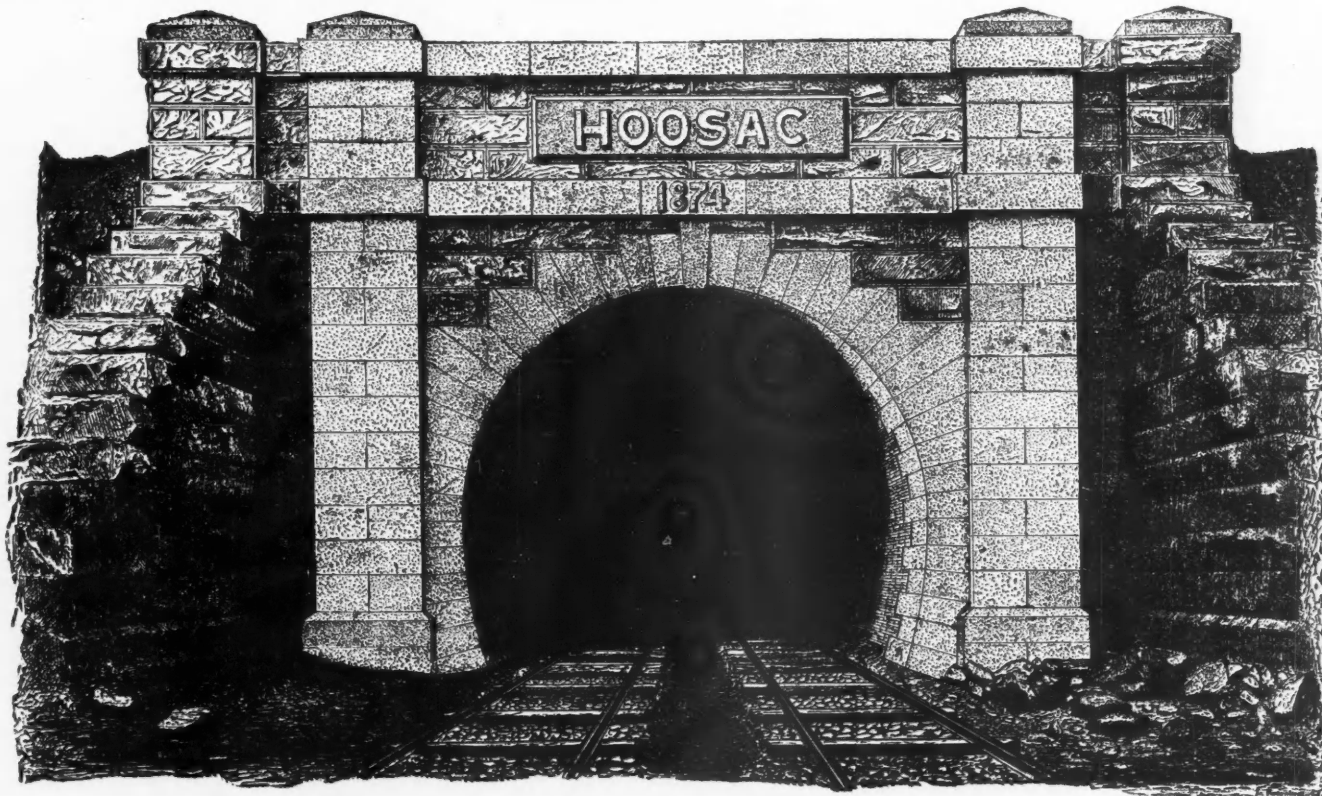


FIG. 1.—WESTERN PORTAL, HOOSAC TUNNEL, TROY AND GREENFIELD R.R. (For other Illustrations see pages 408 and 409.)

tion of the Musconetcong Tunnel, the number of miners, laborers, and masons required is given, also the rate of advance attained. These figures applied in similar ground will be of use in approximate estimates. At Musconetcong, the contract price for all excavation, whether rock or earth, was \$6 per cubic yard. This rate, however, owing to the many obstacles met with by the contractor during the prosecution of the work, was increased by subsequent advances. The price for mason-work was \$12 per cubic yard; backing, \$2.50 per cubic yard.

At Hoosac the record of the soft-ground work was as follows:

The first contract for excavating and arching at the west end was made with Mr. B. N. FARREN, May 1st, 1866.† Fig. 5 shows the normal cross-section. This form of cross-section has been highly commended. It was devised and adopted by Mr. THOMAS DOANE, Chief Engineer, after careful consideration, and, as will be seen, it gives a very strong cross-section.

The FARREN contract was as follows: For arching 174 feet of open cut: earth excavation, \$3.50 per cubic yard; brick masonry, \$12 per perch (25 cubic feet); stone masonry, \$6 per perch. Contractor to plank the bottom and sides when necessary, at \$15 per linear foot.

The contractor further agreed to construct 200 feet of underground tunnel, and as much more as he could accomplish before August 1st, 1867, at the following prices:

Earth excavation, \$6.50 per cubic yard; brick masonry, \$13 per perch (25 cubic feet); stone masonry at \$6.50 per perch; the timbering from \$40 to \$50 per foot lineal, depending upon the thickness of the wall. The contractor was allowed to take stone and sand free of cost from State

* Condensed from advance proofs of *A Treatise on Tunneling, Explosive Compounds, and Rock Drills*. By Henry S. Drinker, Mining and Civil Engineer. Published by John Wiley & Sons, New York. (Copy-righted.)

† Massachusetts Legislative Report, Senate, No. 59, Feb., 1867, p. 25.

For timbering, \$40 to \$50 per lineal foot.

Mr. FARREN to pay \$9 per M for brick made by the State, and to furnish his own lumber. This contract was at the rate of \$57.88 per linear foot less for arching than the former one, and was completed by Mr. FARREN in February, 1869, with also some 41 feet additional of arching carried west into the open cut. After this date, the work was prosecuted by SHANLY Brothers.

(TO BE CONTINUED.)

COÖPERATIVE IRON MANUFACTURE.—Coöperation in the iron manufacture has been tried with success among the workmen at Pittsburg. A number of iron mills have been erected west of Pittsburg by skilled workmen out of their own funds. Every such mill has been successful, with the exception of one, which did not have a proper head in the management of its finances. These coöperative laborers understand every detail of their business better than their former employers, who are feeling their competition seriously. The workmen have another advantage in their lighter living expenses, which enables them to sell on closer margins than the regular manufacturers.

CEMENTATION OF NICKEL.—Boussingault has experimented to find whether the carburization of nickel would affect it like iron, and, if so, whether its combination with steel would render it less oxidizable. Although he was able to carbonize the nickel as highly as steel, he did not find any increase of elasticity, hardness, or resistance to tension; he was unable to temper it; and the alloy with iron easily rusted, unless the nickel was in very large proportion. Damour found, in the meteoric iron of Santa Caterina, 34 per cent of nickel. Boussingault exposed a piece of it under water, for more than a month, without finding the least rust. He then made a very homogeneous alloy, by melting 63 parts of steel with 37 parts of nickel, which was malleable and resisted the action of the water as well as the Santa Caterina iron.—*Comptes Rendus*.

† Massachusetts Legislative Documents, Senate, No. 102 (1868), p. 8.

COAL MINING AT THE PARIS EXHIBITION.

The matériel and processes of working mines and metallurgical products included in Class 50 at the Paris Exhibition, are very largely represented both by France and foreign countries. In reviewing this class we shall find it convenient to take the larger groups of exhibits first before proceeding to notice the smaller and more miscellaneous ones. We may commence by the collective exhibit of the Committee of Coal Mines of the Departments du Nord and the Pas de Calais. The President of the Committee is M. Vuillemin, of Douai (Nord). The exhibit includes a plan in relief to a scale of $\frac{1}{1000}$, showing the concessions belonging to each company, the shafts, workshops, laborers' cottages, coal basin for an area 50 miles in length and from $2\frac{1}{2}$ miles to 10 miles broad. On this plan are indicated the mines of the following companies: Auchy aux Bois, Béthune, Douchy, Ferfay, Vicogne, Aniche, Anneullin, Azincourt, Carvin, Douges, Escarpelle, Fléchinelle, Liévin, Marles, Meurchin, Ostricourt, Bruay, Courrières, Sens. Of these the following companies make exhibits of considerable interest:

1. *The Coal Mines of Aniche, Aniche (Nord).*—This company shows (a) a mode of traction (tail rope system); (b) relief plan of coal seams; (c) miscellaneous plans and sections of mines and surface works. The first-named exhibit comprises models to a scale of $\frac{1}{10}$ of the hauling engine placed on the surface, the arrangement of pulleys on the surface and at the bottom of the mine for the transmission of motion, and the permanent way employed. This method of traction is employed at the Sainte Marie and Dechy pits of the Aniche Company. Limited by smallness of space, only a portion of the arrangement is shown, including a part of the permanent way at the bottom of the pit, with a 100-foot curve connecting two galleries, but the capacity of the system is very clearly defined. The principal object of this exhibit is to prove the efficiency of this system of haulage in any mine gallery, no matter how irregular it may be, without the necessity of increasing its dimensions, and that the transmission of power from the surface to the bottom of the mine can be effected without great difficulty. At the surface, two pulleys placed over the center of the shaft are sufficient to guide the ropes to the bottom, where two other pulleys lead them to the working, one for the lateral tail rope, and the other for the head rope, on the level of the gallery floor. A series of vertical pulleys, spaced about 30 feet apart, support the tail rope as far as the return pulley. Horizontal and vertical rollers, and horizontal pulleys laid on the curves, guide the ropes attached to the head and tail of the train in the curves of the gallery, and prevent them from dragging on the ground. The permanent way, $23\frac{5}{8}$ in. gauge, is composed of Vignoles' rails weighing 20 lbs. per yard, fastened by spikes to oak sleepers. The rolling stock is that generally employed in coal mines, and does not require to be altered in any way. The rope is of steel, weighing 2.8 lbs. per yard, and consisting of six strands, each made with a hemp center. The hauling engine has two cylinders, which drive two drums by means of gearing. Each of these drums is alternately set in motion by the engine, the one held by a brake, so that the cables may be properly extended in the shaft and galleries. The cost of haulage by this system, including the sinking-fund on the capital, amounts, according to carefully ascertained deductions, to 4d. per ton of coal hauled per mile, on an extraction of 300 tons per day; and to 3d. per ton on 400 tons per day. In France there are few coal mines where the application of mechanical means to haulage is properly carried out. Traction is usually performed by horses, and on a single line of way the amount transported is very limited. At Aniche, on account of the insecure character of the rock, the galleries are made narrow, and only a single track can be laid

with passing places at intervals for the full and empty trains. The coal seams are thin and widely separated, and require to be connected with the shaft by means of tunnels, which are very costly; for this reason means had to be devised for transporting the largest possible amount of coal upon a single track, which must follow all the windings of the galleries. Under these conditions the mode of hauling so largely practiced in this country has been successfully introduced. The hauling engine could not be placed within the mine on account of the nature of the ground, which prevented the formation of large excavations for the engines, drums, etc., and, moreover, the engineers at Aniche do not approve of the system of leading steam down the shaft from boilers on the surface. The installation of boilers at the bottom of the mine was impracticable on account of the special conditions of working, there being only one shaft divided off for the up-cast. If a steam pipe were brought down the pit, it was feared that the water by condensation would be greater than that arising from the method adopted. The various reasons which, combined, decided M. Vuillemin to adopt the system of transmission by engines on the surface were then as follows: 1. The rapidity with which the various levels are worked out, due to the seams at Aniche being so thin, and which would involve the shifting of the complete installation every six or seven years. 2. The engineers at Aniche had become familiar with the system of traction by engines on the surface, this system having been employed for many years in sinking the shafts and running the galleries. 3. The inconvenience arising from the heat from the descending steam-pipe, and the difficulty of providing for the exhaust, when, as in the Sainte Marie mine, there is only one shaft. It was feared, also, that the maintenance of a steam pipe about 1000 feet long would be excessive. 4. The difficulty and expense of forming chambers in the mine large enough for the engines, drums, etc., and the inconvenience of maintaining the same. The loss of power in raising the cables in the shaft is, it was considered, far more than balanced by the advantages gained in the system adopted. In November, 1876, the length of line laid at Aniche was about 1000 yards.

2. *The Relief Plan of the Marie Vein.*—This plan shows with great accuracy the exact features of this vein at a depth of 2130 feet, and to a scale of $\frac{1}{1000}$. The vein Marie is one of the best known seams of the deposit in this district. It was opened by the Renaissance workings in 1841, at a depth of 482 feet, then successively by the workings of St. Louis, Archevêque, 754 feet, Sainte Marie, 1148 feet, and Fénélon, 1357 feet; in these seams for a distance of about three miles, the coal has been entirely extracted. The plans and sections of these workings have been prepared with an unusual amount of accuracy and minuteness, and it is from a portion of these that the relief of the Sainte Marie seam has been made. In preparing the plan the various galleries were laid out carefully on pieces of wood of a thickness equal, on the scale, to the distances separating the different levels; these pieces were then cut down to the contour of the lines traced, and placed together so as to form a mold in which plaster was poured, so that an exact reproduction of the seams

was obtained. The strata passed in sinking the shafts are represented at the sides of the plan. The seam dips from the Renaissance workings to Sainte Marie (east to west). It has been recut at 450 feet at La Renaissance, at 403 feet at Traisnel, and at 761 feet at Sainte Marie. The seam then runs eastward. Its inclination varies from 15 deg. (at Archevêque) to 90 deg., and even more (west of Sainte Marie). These variations in direction are not abrupt, except west of St. Louis, where a fault running from north to south has thrown off the vein for a distance of about 65 feet, and again to the west of Archevêque.

3. *Vertical Sections of Strata passed.*—The same company also exhibits two vertical sections to a scale of $\frac{1}{100}$, the one showing the position of the various seams at Aniche, and the other the veins of rich bitumi-

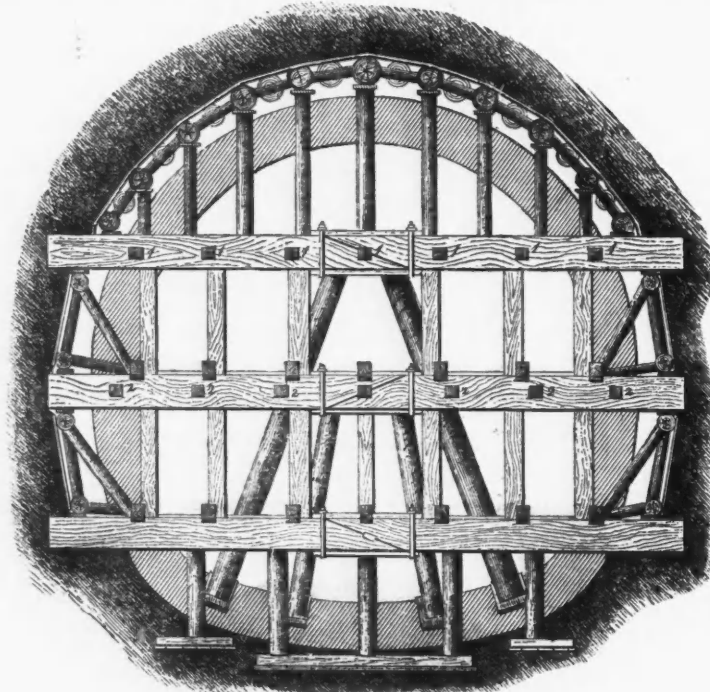


FIG. 2.—HOOSAC TUNNEL.

(Section of Fig. 4, through A B, looking west.) Timbering and arching through soft ground at the West End. Scale, 10' = 1".

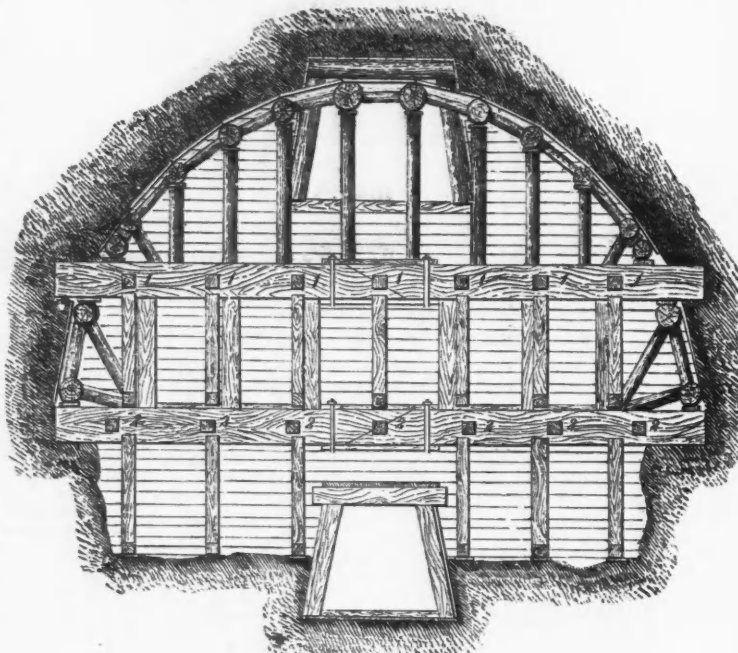


FIG. 3.—HOOSAC TUNNEL.

(Section of Fig. 4 through A B, looking east.) West End. Scale, 10' = 1".

nous coal of Douai. These sections are made in various planes, so as to show clearly the whole of the seams. The position of each shaft is indicated with the strata through which it has passed, and dotted lines in red show the extent to which the seams have been worked out.

4. *Plans at various Levels.*—Two plans on different levels, drawn to a scale of $\frac{1}{1000}$, complete the data afforded by the sections just alluded to. In these plans are shown the various shafts, and the extent of workings to which each refer.

5. *Diagram of Coal Production.*—The production of the company from 1840 to 1878 is indicated by a curve, which shows a gradual and regular progress since the first-named date.

6. *Sinking of the Roucourt Shafts.*—This work is represented by plans and sections, and gives a complete idea of the means adopted by the Aniche Company to increase their production. Both shafts will be employed for raising the coal, but one of these will be also employed for other purposes—pumping, ventilation, raising and lowering men and matériel. They are 115 feet apart, this distance having been fixed upon in order to place between them the engine-houses, boilers, etc. The shafts are lined with wood for a depth of about 157 feet and afterward in cast-iron to a depth of 240 feet. The clear diameter of the lined shaft is 13 feet 1 inch. The Aniche Company being desirous of employing economical working engines, well adapted for raising coal from varying depths at certain fixed speeds, and easily controlled, has adopted a winding engine on the Sulzer-Martin system, manufactured by the Quillacq Company. This engine has two cylinders $29\frac{1}{2}$ inches in diameter and 63 inch stroke. The distribution of steam is a modification by M. Martin of the system of M. Sulzer; it is effected by the Sulzer balanced valves, and the variable expansion is regulated by a governor; but the mechanism controlling the valves, in place of consisting of a shaft, eccentrics, and cams, is composed of an expansion link, and a system of levers connected to the center of the link. This mechanism acts on a compound lever by means of which the steam and exhaust valves are operated. In 1875 the Northern Railway Company transported 5,225,206 tons of coal, of which 2,801,028 tons came from the Nord and Pas de Calais basin, 2,039,723 tons were Belgian coal, 312,025 tons English, and 72,430 tons German. The average transport mileage per ton of coal was 31.6, and the mean cost per mile was .57d. The mean distance that each ton of coal was

carried on the canals in 1875 was 87 miles, and the cost of transport was .32 per ton per mile. During the same year, the products of the basin were forwarded in the following proportions: 28.9 per cent by water, 42.3 per cent by railway, and the remaining 28.8 per cent was used for local consumption by carts. In the Pas de Calais, where the native population was somewhat scarce, the companies were obliged to expend considerable sums in building in order to provide accommodation for the necessary number of workmen. They have erected altogether about 12,000 houses, each of which contains two or more distinct sets of apartments. Each apartment is occupied by a family, which includes about one and a half workmen; about half of the laborers employed by the companies are lodged in these houses; the Bully-Grenay provides them for 70 per cent of its staff, Marles 50 per cent, and Aniche 28 per cent. The rents collected vary from 36 to 72

francs per month, which represents, with maintenance expenses and losses, scarcely 1.5 per cent of the capital employed in the construction. In several of the mines the workman is enabled to become proprietor of his house by making gradual payments equivalent to double or threefold the amount of his rent, according to circumstances. The various schools, orphanages, and places of worship are also indicated upon the plan; many of the companies give gratuitous instruction to the children of their workmen, and will not take into their employment any who do not know how to read or to write. In 1875 the various companies employed 39,766 men of all ages, of whom 31,285 were occupied in the mines, and 8481 on the surface, representing a population of more than 100,000 inhabitants supported entirely by this mining industry.

Besides the coke ovens, the factories for the production of compressed fuel and other accessories to the mines, the various manufactories in the locality—sugar works, refineries, breweries, distilleries, glass works, etc.—are shown upon the plan, as well as the hamlets, villages, woods, streams, ponds, etc., which are located within the limits it deals with.

The actual outlay necessary to establish a mine capable of yielding 100,000 tons per year in this district has been estimated at £120,000, but the commercial public has given to this industry a much higher value, and from the prices at which the mining stocks are quoted on the Bourse at Lille, the works in the basin of the Nord and the Pas de Calais represent a value of about £24,000,000.—*Engineering.*

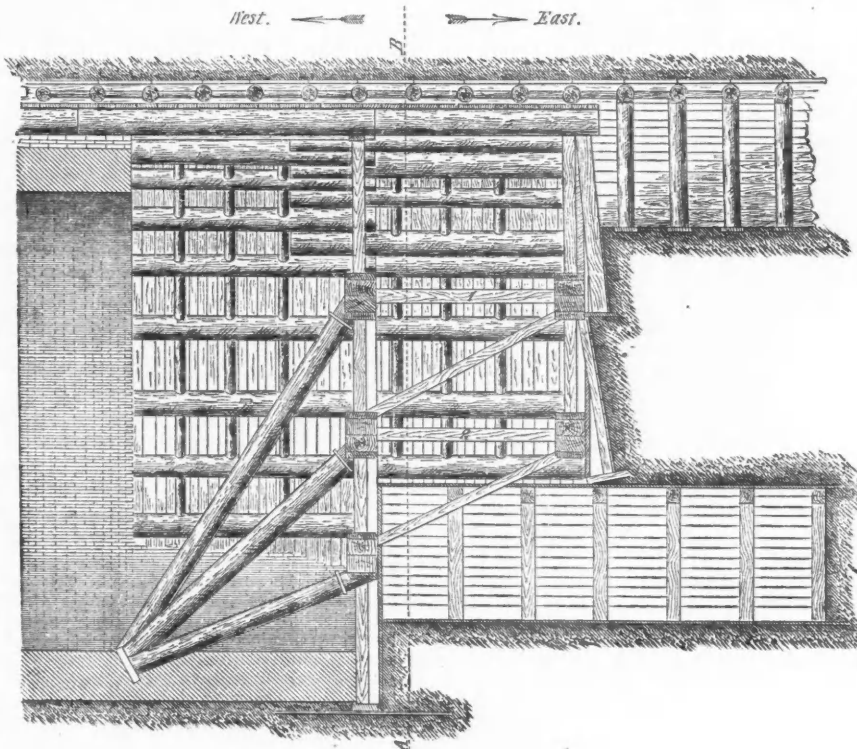


FIG. 4.—HOOSAC TUNNEL. West End. Scale, 10' = 1".

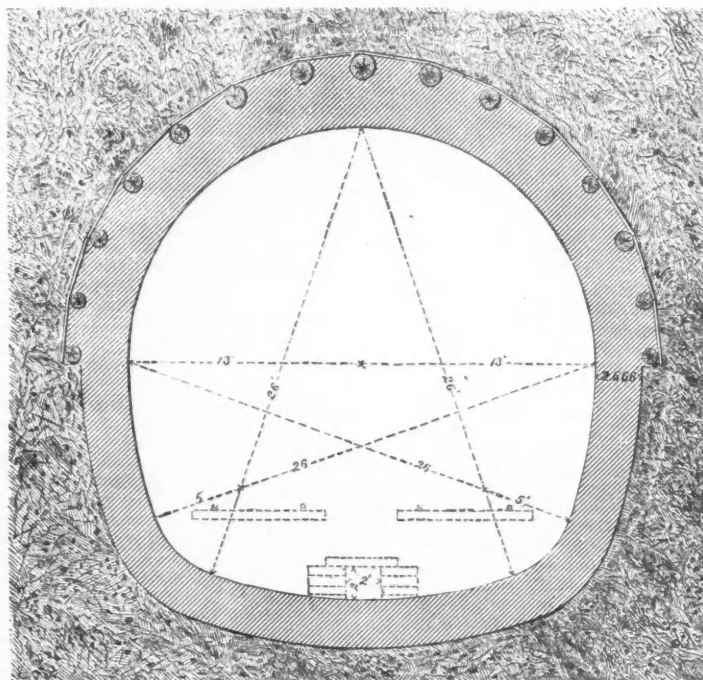


FIG. 5.—HOOSAC TUNNEL.

Finished masonry through soft ground with bars walled in. Scale, 10' = 1".

and although embracing in part the balloon principle, the evolutions were accomplished without waste of gas in descending or any use of ballast whatever. The aeronaut worked the central propeller of the machine with effect, and rose over every obstacle to the height of 100 feet. The breeze was blowing to the eastward, and the exhibitor allowed his machine to be carried with it for an eighth of a mile, and amused himself by showing his ability to ascend or descend at will. Then the propeller at the pointed end of the frame work was set in motion and the machine shifted its course, twisting and turning in small circles. Still its general drift was to the eastward, with the wind, and the spectators freely expressed the opinion that its powers were at an end; but at a signal from Professor Richtels the machine was pointed back toward the exhibition grounds. The propelling wheel was started at top speed, and the air-ship sailed along back, at an altitude of 100 feet, until it hovered over the exhibition grounds; then the central propeller was set in motion, and the ship sank to the earth, within half a dozen rods from the original starting-point.

A DEEP WELL.—The artesian well in Pesh is one of the deepest borings of modern times. It has reached a depth of 951 meters, while the Parisian well at Passy is only 547 meters deep. The water is pure as crystal, rich in calcium and baryta, having a temperature of 37° C., and flowing 6940 hectoliters per day. It is intended to sink the well until the water reaches a temperature of 65°, and flows in sufficient quantity to supply the baths and the city offices with hot water.—*Bergu. Hütt. Zeit.*

AN AIR-SHIP.—HARTFORD, CONN., June 12, 1878.—Three postponements, necessitated by heavy rains, had induced the Hartford people to believe that fate was making a dead set against Professor Richtels' determination to show that his new flying machine was really capable of aerial navigation. To-day was far from favorable for an outdoor exhibition, yet it was given, and with gratifying success. The large assemblage that came to witness what they fully believed would be only another unsuccessful attempt to solve the problem of navigating the air were pleasantly disappointed. The machine not only rose in the air, but moved backward and forward, up and down, at the option of the aeronaut,

THE MCGARRAHAN CLAIM.

Decision of the Supreme Court.

WASHINGTON, May 27.—The following is among the recent decisions by the United States Supreme Court:

William McGarrahan vs. The New Idria Mining Company—In error to the Supreme Court of the State of California.—The federal question in this case is whether the record in the volume kept at the General Land Office at Washington for the recording of patents of the United States issued upon California confirmed Mexican grants, relied upon by MCGARRAHAN as evidence of his title, proves a conveyance to him by the United States of the land in controversy. In his behalf it is contended that the record is itself the grant, or, if not, that it proves the issue to him of a patent which does grant the legal title to the property described. That the record is not itself a grant of title is evident. The act "to ascertain and settle the private land claims in the State of California" (9 Stat., 621) provides (sec. 13) that "for all claims finally confirmed * * * a patent shall issue to the claimant, upon his presenting to the General Land Office an authentic copy of such confirmation and a plat of the survey," etc. By section 8 of the "act for the establishment of a General Land Office in the Department of the Treasury" (2 Stat., 717), it is enacted that "all patents issuing from the said office shall be issued in the name of the United States, and under the seal of said office, and be signed by the President of the United States, and countersigned by the Commissioner of said office; and shall be recorded in said office in books to be kept for the purpose." Thus, the patent executed in the prescribed form, which issues from the General Land Office, is made the instrument for passing title out of the United States. The record of this patent is evidence of the grant, but not the grant itself. It is evidence of equal dignity with the patent, because, like the patent, it shows that a patent containing the grant has been issued. The record called for by the act of Congress is made by copying the patent to be issued into the book kept for that purpose. The effect of the record, therefore, is to show that an instrument, such as is there copied, has actually been prepared for issue from the General Land Office. If the instrument recorded is sufficient on its face to pass the title, it is to be presumed that the grant has actually been made, but if it is not sufficient, no such presumption arises. In short, the record for the purposes of evidence stands in the same position and has the same effect as the instrument of which it purports to be a copy. The same defense can be made against the record as could be made against the instrument recorded. The public records of the executive departments of the Government are not, like those kept pursuant to ordinary registration laws, intended for notice, but for preservation of the evidence of the transactions of the department.

This brings us to inquire whether this record shows upon its face the execution of a patent sufficient in law to transfer the title of the premises in question from the United States to MCGARRAHAN. And here it may not be improper to note that although the case shows that in July, 1870, before this suit was commenced, the Commissioner of the Land Office and the Recorder caused to be entered upon the face of that record over their official signatures a statement to the effect that no patent was ever, in fact, executed or delivered to MCGARRAHAN, he rests his whole case upon the record and the evidence it furnishes. This he has the undoubted right to do; but if he does, he must stand or fall by what it proves. It is his own fault, if, having a valid patent in his possession, he fails to produce it.

By the "act to reorganize the General Land Office" (5 Stat., 107), it was provided (sec. 1) that the executive duties relating "to private claims of lands, and the issuing of patents for all grants of land under the authority of the Government of the United States, shall be subject to the supervision and control of the Commissioner of the General Land Office, under the direction of the President of the United States," and (sec. 4) "that there shall be appointed by the President, by and with the consent of the Senate, a Recorder of the General Land Office, whose duty it shall be in pursuance of instructions from the Commissioners to certify and affix the seal of the General Land Office to all patents for public lands, and he shall attend to the correct engrossing and recording and transmission of such patents. He shall prepare alphabetical indexes of the names of patentees and persons entitled to patents." * * * By section 6 it was further provided that "it shall be lawful for the President of the United States, by and with the advice and consent of the Senate, to appoint a Secretary, * * * whose duty it shall be, under the direction of the President, to sign in his name, and for him, all patents for land sold or granted under the authority of the United States." By the act of March 3d, 1841 (5 Stat., 416, sec. 2), the duty of countersigning patents was transferred from the Commissioner of the General Land Office to the Recorder. Thus it appears, that a patent for lands must be signed in the name of the President, either by himself or by his duly appointed Secretary, sealed with the seal of the General Land Office, and countersigned by the Recorder. Until all these things have been done, the United States have not executed a patent for a grant of lands. Each and every one of the integral parts of the execution is essential to the perfection of the patent. They are of equal importance under the law, and one can not be dispensed with more than another. Neither is directory, but all are mandatory. The question is not what, in the absence of statutory regulations, would constitute a valid grant, but what the statute requires. Not what other statutes may prescribe, but what this does. Neither the signing, nor the sealing, nor the countersigning can be omitted, any more than the signing, or the sealing, or the acknowledgment by a grantor, or the attestation of witnesses, when by statute such forms are prescribed for the due execution of deeds by private parties for the conveyance of lands. It has never been doubted that in such cases the omission of any of the statutory requirements invalidates the deed. The legal title to lands can not be conveyed except in the form provided by law. But if either of the requisites to the due execution of a patent may be considered as directory, the countersigning by the Recorder should not be permitted to occupy that position. The President may sign by his Secretary, but the Recorder must sign himself. He countersigns, that is to say, signs opposite to and after the President, by way of authentication. Being specially charged with the duty of attending to the issue of patents, it is peculiarly appro-

priate that his attestation should be the last act to be performed in the perfection of the instrument, and that he should do it personally.

The record shows an instrument in the form of a patent signed in the name of the President, and sealed. The place for the signature of the acting Secretary is left blank. The name of the President is signed by his Secretary. The claim which is made that STODDARD, the Secretary, also countersigned as acting recorder, is not sustained by the evidence. His signature appears only as Secretary, and there is nothing whatever to indicate that he attempted to act as Recorder. Besides, the law provides (5 Statutes, 111, sec. 8) "that whenever the office of Recorder shall become vacant, or in case of the sickness or the absence of the Recorder, the duties of his office shall be performed *ad interim* by the principal clerk on private land claims." It is certainly not to be presumed that the same person will hold at the same time the offices of Secretary to the President for signing patents and of principal clerk on private land claims. And if it were, his signature as Secretary will not be treated as his signature as Recorder *ad interim*, or acting Recorder. He must sign both as Secretary and as Recorder.

The case is, therefore, one in which the record shows upon its face an instrument prepared for a patent, but not countersigned by the Recorder. If a patent thus defectively executed had itself been introduced in evidence, it would not have shown a grant absolutely perfected. But it is said that the record of the paper is evidence of the fact that the Recorder recognized its completeness, and is equivalent to his counter-signature. The law is not satisfied with the simple recognition of the validity of a patent by an officer of the Government. To be valid a patent must be actually executed. Before it can operate as a grant, the last formalities of the law prescribed for its execution must be complied with. No provision is made for an equivalent of these formalities. Even an actual delivery of the patent by the Recorder in person would not supply the place of his counter-signature, any more than the delivery of a paper by a private person without being signed would make it his deed. But the record of a patent would not necessarily be as much a recognition of its validity as a personal delivery by the Recorder, because he only attends to the recording, and is not required to do it in person. The only way in which he can lawfully and effectually recognize the validity of a patent is by personally countersigning it.

Again, it is said that the act of March 3d, 1843 (5 Statutes, 627), remedies the defect, because it provides that "literal exemplifications of any such records which may have been or may be granted in virtue of the provisions of the seventh section of the act, * * * entitled 'An Act to Reorganize the General Land Office,' shall be deemed and held to be of the same validity in all proceedings, whether at law or in equity, wherein such exemplifications are adduced in evidence, as if the names of the officers signing and countersigning the same had been fully inserted therein." This act does not, however, dispense with the signing and countersigning. The record, to prove a valid patent, must still show that these provisions of the law were complied with. The names need not be fully inserted in the record, but it must appear in some form that the names were actually signed to the patent when issued. If they are partially inserted in the record, it will be presumed that they fully appeared in the patent, but no such presumption will be raised if no signature is shown by the record. Here no signature does appear, and consequently none will be presumed.

The failure to record the patent does not defeat the grant. It only takes from the party one of the means of making his proof. If he can produce the patent itself, and that is executed with all the formalities required by the law, he can still maintain his rights under it. He is not, therefore, necessarily deprived of his title because of a defective record. He is in no worse condition with the signatures omitted than he would have been if the description of his land had been erroneously copied or other mistakes had been made which rendered the record useless for the purpose of evidence. A perfect record of a perfect patent proves the grant, but a perfect record of an imperfect patent or an imperfect record of a perfect patent has no such effect. In such a case, if a perfect patent has in fact issued, it must be proved in some other way than by the record. It is undoubtedly true that when a right to a patent is complete, and the last formalities of the law in respect to its execution and issue have been complied with by the officers of the Government charged with that duty, the record will be treated as presumptive evidence of its delivery to and acceptance by the grantee. But until the patent is complete it can not properly be recorded, and consequently an incomplete record raises no such presumption.

Again, it is said that the record of an instrument which the law requires to be recorded is *prima-facie* evidence of the validity of the instrument. That is undoubtedly true if the instrument recorded is apparently valid. The presumption arising from the record is, that whatever appears to have been done actually was done. If the record shows a perfect instrument, the presumption is in favor of its validity; but if it shows an imperfect instrument, a corresponding presumption follows. Here the instrument recorded appears to have been incomplete, and consequently it must be presumed to be invalid. This presumption will continue until overcome by proof that the instrument as executed and delivered was valid. We are of the opinion that because this record does not show a patent countersigned by the Recorder, it is not sufficient to prove title in McGarrahan. This makes it unnecessary to consider any of the other questions which have been argued, and the judgment is affirmed.

The Chief-Justice delivered the opinion. Mr. Justice Field took no part in the decision of this cause.

THE DOM PEDRO II. RAILWAY.—The Emperor and Empress of Brazil recently made an excursion into Minas Gerdes to open a forum at Luiz da Fora, as well as a section of 25 miles of the Dom Pedro II. Railway, which traverses the Joam Ayres gorge of the Serra da Mantiqueira, the highest, with one exception, of the mountain buttresses of Brazil, and the point of maximum elevation of the railway. The height of the line in the gorge is 3462 feet above the sea, the line rising thereto 220 miles. The total length of the Dom Pedro II. Railway open for traffic is now 227 miles. Some heavy works had to be constructed to enable the line to reach the summit of the gap, the line passing in the preceding six miles through two tunnels of 450 feet and 420 feet respectively (for illustrated description of these tunnels, see H. S. Drinker's book on *Tunneling*), and a cutting of 108 feet in depth. In the gap there is a great masonry revetment of 960 feet in length on each side and 80 feet in height, which contains about 14,000 cubic yards of stone. It was built by an American engineer in less than four months.

SAN JUAN (COLO.) SILVER MINES.

Special Correspondence of the Engineering and Mining Journal.

My first duty in commencing this letter is to thank you, at the request of some of our best citizens, and on my own behalf, for your efforts toward reducing mining and the investment of capital in our mines to a legitimate business, and, at the same time, reducing to a minimum the chances of there being floated any fraudulent schemes connected with this extraordinarily rich region. We are in our extreme infancy, and as yet innocent of guile in the above connection, and being fully aware that our growth will be not only retarded, but effectually dwarfed, by the perpetration of even one of the magnificent swindles of which other mining camps have been the scene, you may imagine how those of us who have come here to live and work in the accumulation of an honest fortune appreciate your good offices.

The best point you make, in noticing the recently-issued circulars of some proposed companies, is, in my humble opinion, the distinction between mines and prospects; and if intending investors will remember that the great proportion of our mining properties are as yet but simple prospects (magnificent ones, I grant you), and bear in mind the full significance of the term, they will not so likely be "taken in and done for."

In my short experience here, I have, of course, noticed great difference in the value of prospects even. Many of our veins are large, well-defined, and traceable on the surface for from one to three miles, having numerous claims on them, in nearly all of which the work done shows up a good ore body and good average assay. In such, the chances of making a good investment are, I take it, less prospective than in a vein not so traceable, and on which there are only one or two openings showing fair indications. But the idea of floating a company with capital stock up in the millions, upon property which consists of three or four prospects, having, perhaps, assessment work only done on them, and telling the public in their prospectus how many tons of ore there are between the surface and sea-level, is rather too much of a joke. Why don't they go on down and estimate the ore to the antipodes (if veins run that way)? But here I am getting as far beyond my depth as the wily promoters.

A GOOD FIELD FOR CONCENTRATION WORKS.

Through the efforts of one or two individuals, aided by the very able articles of the worthy editor of the *San Juan Sentinel*, Dr. McKinney, who is a pioneer mining camp editor, the attention of our miners is being now drawn to the all-important subject of concentration works. We are now in the days of trails, and though concentrators will pay equally well when we have roads, now is the especial time when they are needed, as the cost of transporting our ores to the few and far-between reduction works is such that high-grade ores pay very small profits, and low-grade veins (50-ounce ore rated "low grade") are not worked at all.

Now here is the golden opportunity for investment of individual capital. We have abundant and never-failing water-power in all our districts, and endless timber. Hundreds, I may say thousands, of good claims are now held by men who have braved heat and cold, hunger and thirst, and privations of all sorts in prospecting for and holding on to them from year to year, and who, not possessing the capital to develop them or the ore not paying to transport to distant reduction works, would gladly give an interest in their property to him who would put up small works to concentrate their ores, and thus turn their produce into ready dollars. Not being "up" myself in this kind of machinery, perhaps you, Mr. Editor, or some of your readers who are, will kindly give us some hints as to the best kind to employ for cheapness and portability, bearing in mind the fact that it would have to be transported to its site from two to ten miles by pack animals, the maximum weight carried by each burro being 150 pounds. Is there any crushing machinery capable of being carried in portions of not over that weight?

Again, many such claim-owners as depicted above who are not possessed of the ready cash to lay in a winter's supply of grub, tools, powder, and fuse (and remember, our winter is of eight months' duration), and whose claims have rich pay-ore in sight, will often deed a certain interest in the mine for a certain amount of development to be done. Yes, and a large proportion of them where the drifts are, on the vein and the very dead-work pays handsomely.

Or, they will give short leases on the property, the lessee getting all the ore he takes out by running levels, royalty being asked only in case of stopping being done—thus getting their property developed free of cost to themselves.

Hundreds of our best prospects are owned by men here engaged in business, merchants and others, who, having bought them for small sums, just for a "flyer" or a "nest-egg," and not caring to invest the money, nor having the time to attend to the working of them, will also give an interest in the same to the man who will develop them.

A GOOD FIELD FOR EMIGRATION AND A BONANZA FOR CAPITALISTS.

So you see we offer such advantages for investment of individual limited capital at "bed-rock figures" as no other and older mining country can offer. There is one desideratum, however, absolutely necessary to success. The individual must be a miner, or have some one with him who is, and on whose knowledge and honesty he can "bet his bottom dollar." I don't think a lawyer, for instance, can come here and make money in mining any more than I could go into court and prove a man innocent who was clearly and beyond all doubt guilty, and it is not only for our actual mines we need capital. We in San Juan are consumers and non-producers. Imagine us here with beautiful agricultural and pastoral valleys at our feet stretching far away to the blue foot-hills of the Wahsatch Range, and potatoes now six cents a pound, and for over a month this spring not a pound of meat of any kind to be had in Ouray. There are fortunes here as well for the farmer and grazier as the miner, and, perhaps, surer ones. We want toll-roads, too; the county commissioners will give the road-builder as high tolls as he likes, and the people as gladly pay them. But it is the old story—the man who comes here to take up a ranch or build a road is dazzled by the glitter of our gold and silver, and, throwing overboard the enterprise he understands, plunges headlong into mining—to him a sheer gamble, and one in which he is bound to lose, unless, by mere luck, he happens to "sit behind four aces."

There is yet another class to whom the San Juan silver region offers an

opening unequalled by any mining district on this continent, and I am surprised that I do not see many of them here. I refer to young miners, men of education and culture, who have studied mining engineering in the East, and, knowing the theoretical branches of the profession, have the "sand" and energy to strike out for a new and rich field like this to learn the practical part, and, while doing so, acquire a property that will enable them to live in affluence while yet in the prime of life. Surely there must be many such in the United States: out of the twenty odd who were studying in the metallurgical laboratory of the Royal School of Mines of England at the same time as myself in the fall of '76, I know at least six who would have made their mark and a fortune here. Since that, they have doubtless obtained their degree of A.R.S.M., and are hanging around overcrowded England, harassing their friends and worrying themselves in order to obtain some "appointment," the pay of which might amount to £200 per annum—just enough to keep them in debt.

Taking it for granted that your paper is devoted as much to the interests of the young miner as the older capitalist, I propose in my next to give you a short sketch of our winter's work in Imogene Basin, 10,800 feet above tide-water, and the *modus operandi* and results of six months' underground work; not that my partner or I desire to parade our labors, but on the principle that what we can do others can do as well, and, I dare say, a great deal better.

The editors of the *San Juan Sentinel* and *Ouray Times* have been kind enough to republish such of my correspondence as has already appeared in your paper, and, while a few have complained that I "tell too much truth," the larger proportion of our *habitants* express themselves as much gratified at your giving so much space in your valuable columns to the interests of the San Juan silver mines. W.

OURAY, May 25, 1878.

COLORADO'S BULLION PRODUCT.

By F. Fossett.

Colorado has produced up to January, 1878, the handsome sum total of \$72,000,000 in gold and silver (coin value), representing a much larger value in greenbacks or currency. All figures given here represent gold values. The yield of the State for the past six years was as follows:

1872	\$3,785,000	1875	\$5,434,387.02
1873	4,070,000	1876	6,191,907.82
1874	5,362,000	1877	7,365,283.83

The mines of Colorado are being rapidly developed and are steadily increasing their production. New mines and districts are being discovered every season, and more distinct mineral-bearing veins have already been recorded than in the entire West besides. There is every reason to believe that the yield of the gold and silver mines of the State in 1878 will exceed \$10,000,000, and that there will be a proportionate increase in production for each succeeding year.

The following table shows the yield of each county or section of Colorado for the year 1877 in each of the valuable metals, and the total of each metal and county:

COLORADO MINING PRODUCT FOR 1877.

(Value in Gold).

COUNTIES.	Pop.	Tons of ore treated or exp't'd	Gold.	Silver.	Lead.	Copper.	Total.
Gilpin..	6,500	149,000	\$1,963,485.07	\$161,255.38	\$1,000.00	\$82,296.64	\$2,208,037.09
Clear Creek.	7,500	19,503	96,500.00	1,984,077.91	123,000.00	3,000.00	2,206,577.91
Park ..	2,200	4,040	108,000.00	606,959.32	10,000.00	8,500.00	733,459.32
Boulder	10,000	10,815	366,722.48	224,602.86	2,000.00	.....	593,325.35
Lake ..	2,200	2,700	55,000.00	423,930.00	76,400.00	.....	555,330.00
Custer.	2,000	3,000	33,000.00	269,081.34	3,000.00	.....	301,081.34
Summit	500	200	150,000.00	40,000.00	.....	.....	190,000.00
The San Juan Region	8,500	11,000	105,000.00	237,472.52	35,000.00	.....	377,472.52
All other sources and localities ..	.....	.....	200,000.00	.....	.....	.....	200,000.00
Total.	.....	200,258	\$3,076,707.55	\$3,947,379.33	\$250,400.00	\$93,796.64	\$7,365,283.83

The currency value of Colorado's total product for 1877, was \$7,675,871.60. The product of the coal mines, nearly 200,000 tons, brought about \$800,000, making a total mineral product of \$8,165,283.83 gold, or \$8,511,871.60 greenback value.

WIRE TRAMWAY BETWEEN OUCHY AND LAUSANNE.*

By G. Meissner.

The tramway connecting the town of Lausanne with its harbor Ouchy on the lake of Geneva, consists of two lines of rail, and two trains which are connected by a wire rope. At the top of the tramway the rope passes over a winding drum, through which the trains are put in motion. The two trains keep each other in equilibrium, the one ascending upon one line while the other descends on the other line, and *vice versa*.

The tramway is 1650 yards long, and leads in a straight line from Ouchy up to Lausanne, passing on the way a tunnel several hundred yards in length. The steepest gradient is 1 in 9.

The winding drum is driven by two Girard turbines, which work under a head of 393 feet; they are made of brass on account of the high velocity of the water, due to the great head; they have a diameter of 7 feet 4 inches, and run at a speed of 170 revolutions per minute. The water can easily be turned on and off the turbines by means of circular slides worked by hydraulic gear.

The two turbines are fixed upon a horizontal shaft, which carries also a

* Abstract of a paper in the *Organ für die Fortschritte des Eisenbahnwesens*, vol. xiv., p. 41. From the Proceedings of the Institution of Civil Engineers, of London, edited by James Forrest, Secretary.

brake-wheel, the hand of which is worked by gear similar to the slides, and spur-gear for transmitting the motion to the winding drum.

The winding drum is 19 feet 8 inches in diameter and 13 feet long, and is covered with wood lagging. As it has to transmit by mere friction a force of 180 H. P., making at the same time only a few revolutions per minute, the following arrangement to produce the necessary friction has been contrived by M. CALLON, the designer of the tramway. The winding drum is placed in a position parallel to the direction of the tramway and considerably lower than the level of the rails; the rope is wound on the drum in two coils, and above the drum; the two ends of the rope are made to pass over two guide-pulleys, which stand at right angles to the drum, and are carried in sliding bearings. By means of bevel gear and screw spindles, these pulleys are made to move to and fro along the winding drum, thus forcing the rope to travel continually from one end of the drum to the other, and preventing the surface of the latter from being worn smooth, as it would be if the coil were always on the same spot.

W. R. B.

MINING NEWS.

MISSOURI.

Special Correspondence of the Engineering and Mining Journal.

The Fredericktown *Platendealer* reports the discovery of a lode of soft galena in Perry County, said to be 12 feet wide and 18 to 24 feet thick. Next in order will be a narrow gauge from Leadville, Colorado, to Perry County, Ill. I have not seen the lode (?) but presume it is a deposit of galena in soft ground, the latter measuring, when reported on, 12 feet by 18, and yielding 5000 lbs. a day, which is good enough.

The St. Joe Lead Company is putting up a new cupola furnace.

Cotton compressors and ice machines form an important branch of some of our foundries.

The manufacture of sewer pipe has become a prosperous business of the Cheltenham Fire-Clay Works.

The Lone Elm Mining and Smelting Company, of Joplin, smelted in the last week of May 420,000 lbs. of galena on 5 eyes. It yielded at the same time 63,000 lbs. of blue paint, mixture of sulphate, sulphide, and oxide of lead. The above 420,000 formed about two thirds of all the lead raised during the week, including turn-ins of other companies and of the neutral mines.

Some Joplinites labor under the impression that the Lone Elm Mining and Smelting Company and the White Lead Company are in favor of a further depression of the pig-lead market in order to force others to give way to the propositions of the White Lead Company. As the latter, however, makes far more pig-lead than paint, it is difficult to decide where the profits on paint come in and the loss on pig ceases.

The Missouri Iron Furnace is still in blast. Nothing doing at the others in Carondelet.

The Carondelet Zinc Works are all running. The Martindale Zinc Works run Jasper blende and Valle carbonate; the Carondelet on Granby silicate one fourth, and Valle carbonate three fourths. Mr. Chr. Luther, foreman at the Carondelet, reports that a charge of 3800 lbs. Valle and 900 lbs. Granby ore will yield 2100 lbs. of metal; charging the total of 4700 lbs. of either the Granby or Valle by itself alone, produces only 1900 lbs. It is explained by the presence of oxide as a fine powder in and with the carbonate, which is saved by adding in smelting the above proportion of silicate. The Missouri Zinc Works run on Granby silicate and Southeast Missouri carbonates. The Martindale Zinc Company made 1300 tons of spelter the last six months. The same company saved this year by their dressing works 5 car-loads of lead, the galena separated from the Jasper blende.

The following is the number of zinc ovens now running: Martindale, 6; Carondelet, 4; Missouri, 5.

Robertson & Joachum, of Ozark, Christian County, have smelted 912,240 lbs. of mineral since the opening of their clay mines in 1875. But little work done at present. These mines are in and on the breaks of the Encinal limestone, near its junction with the second magnesian.

40 tons of lead were sold last Saturday, the 8th, at St. Louis for 2.87½.

The market shows somewhat firmer. The temporary closing of the works of the St. Louis Silver Smelting Company, and the statement of the company that it can not bring lead to market at present prices, had their effect.

The sale of pig-lead at 2.75 on the 6th inst. covered only one car-load. The affair was in small hands throughout.

On the 8th, a prominent broker received an offer of 2.75 for 10 car-loads, but it was not accepted.

Silicate of zinc is at a discount. Purchasers will require a premium, by and by.

The present opportunity, for capitalists, of securing long and favorable contracts for zinc ore, and the realization of great profits by reducing said ore at the proper places, may never offer again.

ILLINOIS.

The Madison and St. Clair coal mines are again in operation, with the exception of two on the Cairo Short Line, one on the Ohio and Mississippi, and one on the St. Louis and Southeastern. On the Vandalia line all resumed. The compromise was effected on the following basis: 2½ cts. a bushel loaded in the box-cars in the working rooms; term of contract, 12 months; all miners of non-operating companies to be employed by the others.

The total number of miners in these counties is about 1800.

Illinois ships at present 90,000 bushels of coal daily to St. Louis. Retail price, 9½ cts.; wholesale, 8 to 9 cts. per bushel.

COLORADO.

MALACHITE COMPANY OF COLORADO.

We are officially informed that since issuing their pamphlets for the information of stockholders, the company have completed the 500-foot adit to connect with the 165-foot shaft. Drifts have been run from the shaft to intersect the main vein, and ore is now being taken out. A telegram received this morning (11th) says: "We have got a vein with pay ore 5 feet wide, carrying 12 per cent copper."

Prof. W. J. Sapp has gone to Golden to take charge of the works, which will shortly be started with a good supply of ore.

NEVADA.

From the mining summary in the *Gold Hill News* of the 5th inst. we extract the following: "Ophir is evidently developing a bonanza, and Savage gives better promise of ore than heretofore. Julia will show something very shortly."

"Imperial is cross-cutting away toward the east at the lower level after the same sort of an arrangement, and Crown Point and Belcher are preparing to follow suit shortly. In fact, both of these last-mentioned mines have been showing a degree of improvement in their general ledge formation for the last three or four hundred feet that warrants the belief that a new bonanza is 'making,' and perhaps about to be developed, in their depths. We are also privately informed that there is a very good prospect that the trouble between Justice and Alta will soon be compromised to the mutual benefit of both. This will raise the embargo off the fine body of ore developed in Alta, and start a couple of hundred men, at least, working to extract it for milling."

"The annual meeting of the Crown Point Mining Company was held at its office in San Francisco on the 3d inst.; 78,709 shares were represented. The usual reports from the officers were filed without reading. That of the Secretary shows re-

ceipts during the past year of \$575,391.35, of which \$369,101.53 came from assessments and \$132,500.76 from bullion. The present liabilities are \$49,445.02, of which \$42,461.95 is overdrawn at the Bank of California. During the past year the expenses of the mine were reduced \$372,863. The Superintendent's report is an exhaustive review of work accomplished, and holds forth the hope that at greater depths a body of pay ore will be developed."

SUTRO TUNNEL.

Face of header in this work is in soft vein matter, composed of quartz, porphyry, and clay, requiring close and careful timbering. Some very fair assays are given, and the tunnel is probably running into the outskirts of the east ore formation of the Comstock.

A dispatch dated San Francisco, June 8th, says: "So far as the true animus of the recent action of the Comstock Mining Companies in connection with the Sutro Tunnel Company can be arrived at, it is about as follows: The Chollar, Hale & Norcross, and Savage Companies concede the right of the tunnel company to collect a royalty of \$2 a ton on all ore raised after the completion of the tunnel, in accordance with the terms of the original agreement of April 13th, 1866. This breaks up the combination of mining companies, formed in January, 1874, to resist the collection of the royalty. None of the mines, however, except the three above mentioned, concede the Sutro's right to collect the royalty, and in the case of those three it is the admission of a barren right, as neither of these companies has any ore to hoist, and as the tunnel would be useful to them without expense on their part. The Bonanza mines, and probably others, will not concede the right to a royalty. A Virginia City dispatch to-day gives an interview with Sutro, who says no compromise has been arrived at. The Savage Company has notified the tunnel company of its readiness to withdraw from the suits and recognize the royalty. If all the companies should take the same action in good faith, every thing will go along smoothly; but if only the Savage, Hale & Norcross, and Chollar, which have no ore, and, consequently, nothing to pay, propose to avail themselves of the tunnel, leaving the latter to protracted litigation to compel payment by the companies having ore, the Sutro Company will probably not permit the use of the tunnel at all until an understanding is reached with all the companies."

EUREKA CONSOLIDATED.

The Superintendent's letter of the 1st inst., from this mine, says: "There is no apparent change in any of the ore bodies. The fifth level northeast drift has been run 22 feet. The ground is getting a little softer, with indications of ore."

"The raise from the ninth level is now up 68 feet. The west drift from the main cross-cut on the seventh level has been run 8 feet; total length from turn-table, 244 feet. There is no change in appearance of the ground since last report. The west drift from cross-cut No. 2 on the ninth level has been run 8 feet in favorable ground for ore. The east drift has been run 12 feet, with good indications for ore. The incline has been sunk 15 feet this week, and is now down 359 feet below the ninth level and 85 feet below the eleventh level."

"The new furnace has started up, and is running well."

"Have produced 372 tons of bullion for the week, being an average of 53 tons per day. We expect to do better."

RICHMOND CONSOLIDATED.

The aggregate of dividends declared by this company amounts to \$1,285,250. Of this amount \$202,500 have been paid to shareholders since last September. The developments in the lower levels of this property are said to be equal to any deposits ever found in the property.

The ore body at the Connolly mine is looking splendidly, and developing in proportions as work continues. Considerable amounts are shipped to the Richmond works for reduction.

VIRGINIA.

The Wytheville (Va.) *Enterprise* of June 1st says: "A company of New York capitalists have recently purchased of Messrs. Calfee, Forney & Barrett a tract of land on Reed Island, in this county, containing what is supposed to be an inexhaustible mine of zinc ore, paying \$25,000 for the same. The company is known as the Bertlia Zinc Mine Company. They have rented of Mr. J. Williamson McGavock the furnace property, including the storehouse, known as Graham's New Furnace, for the purpose of conducting the business of the works until buildings and fixtures of their own can be constructed, or perhaps with a view of leasing permanently. The ore, as it is raised and washed, will be transported on flat-boats from the ferry at the New Furnace to New River Bridge, and thence sent on by the A., M., and O. Railroad. Operations were commenced by the company last Monday, since which time they have been getting out from 12 to 15 tons of ore per day. The force of hands now employed will, we are informed, be considerably increased, and the number of tons of ore raised per day brought up to from 20 to 25."

The Manganese works near Waynesboro, Augusta County, Va., have within a short time past shipped 2000 tons of manganese to Eureka.

NOTES.

LARGE FOREIGN ORDER FOR INGERSOLL ROCK DRILLS.—We are informed that the Ingersoll Rock Drill Company has recently received an extensive order for its drills from the contractors, Messrs. P. & T. Collins, of the Madeira & Marmore Railway Company, of South America.

APRIL BULLION YIELD.—The bullion product of the leading mines of California, Nevada, Arizona, and Utah for April was as follows:

Black Bear Quartz	\$13,000	Leeds	\$16,000
California	1,507,000	Manhattan	143,900
Comanche	13,000	McCrackin Consolidated	82,600
Consolidated Virginia	1,162,300	Northern Belle	36,300
Christy (Utah)	27,300	Ontario	168,700
Empire (Nevada County)	12,600	Raymond and Ely	10,700
Eureka Consolidated	352,900	Rye Patch Consolidated	15,300
Excelsior Water and Gravel	90,000	Silver King	54,300
Grand Prize	92,100	Standard	78,200
Hussey	22,200	Star (Cherry Creek)	34,400
Idaho	58,000	Tiptop	26,600
Justice	64,600	Tybo Consolidated	35,400
K. K. Consolidated	44,000		
Total			\$4,162,400

Of this, \$1,721,000 was gold, \$2,350,000 silver, and \$90,400 lead.

FOSSIL COAL FLORA.—The *Annales des Mines* contains a summary covering fifty pages of Grand'Eury's works upon the determination of the age of coal beds by the aid of fossil flora. His first memoir was presented to the Academy of Sciences, and submitted to the examination of a commission composed of MM. Daubrée, Tulasne, and Brongniart. M. Brongniart's report, which was inserted in the *Comptes Rendus*, recommended the insertion of the memoir in full, in the *Mémoires des Savants Etrangers*, which recommendation was adopted by the Academy; but M. Grand'Eury continued and enlarged his work by new discoveries, so that it did not appear until 1877. Soon after it was published, it received one of the gold medals from the general union of learned societies. While adopting most of the conclusions of Ginetz, Brongniart, and Gruner, his systematic botanical and geological classifications of divisions have greatly enlarged our knowledge of the French carboniferous flora, and his work is one of the most valuable contributions to vegetable paleontology which has appeared for many years.—*Journal of the Franklin Institute.*

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending June 8, and years from January 1:

Tons of 2240 lbs.	1878.		1877.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	35,807	825,464	50,911	946,257
D. L. & W. RR. Co.	44,899	752,638	56,116	946,222
Penn. Coal Co.	24,431	288,090	33,801	449,394
L. V. RR. Co.	23,645	309,700	18,935	425,766
P. & N. Y. RR. Co.	1,373	10,966	1,218	22,088
C. RR. of N. J.	27,558	358,982	33,902	650,372
Penn. Canal Co.	8,447	72,567	14,947	118,166
	166,160	2,618,407	209,830	3,558,235
Lehigh Region.				
L. V. RR. Co.	78,858	904,032	56,800	1,253,881
C. RR. of N. J.	28,063	456,719	33,286	636,859
D. H. & W. B. RR.	337	9,302		6,297
	107,258	1,370,053	90,086	1,897,037
Schuylkill Region.				
P. & R. RR. Co.	174,768	1,547,303	154,953	2,454,040
Shamokin & Lykens Val.	28,023	264,265	8,623	240,120
	202,791	1,811,568	163,576	2,694,160
Sullivan Region.				
Sul. & Erie RR. Co.	730	13,525		4,858
Total	476,939	5,813,553	463,492	8,159,432
Increase	13,447			
Decrease		2,345,879		

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

Receipts and shipments of coal at Chicago Ill., for the week ending June 8, and year from January 1.

	Week.	Year.
Receipts	31,145	578,962
Shipments	3,700	78,239
Perth Amboy Business:		
Received for the week		27,076
Shipped for the week		22,769
On hand June 8		38,501

Coals Cleared on the Canals of the State of New York for the week ending June 7, and years from the opening of navigation:

Tons of 2000 lbs.	1878.		1877.	
	Week.	Year.	Week.	Year.
Anthracite	27,452	95,172	32,016	199,856
Bituminous	6,862	25,339	13,414	51,100
Total amount cleared	34,314	120,511	45,430	250,956

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 38,734 tons as compared with the corresponding period in 1877.

The Production of Bituminous Coal for the week ending June 8, was as follows:

Tons of 2000 lbs., unless otherwise designated.	Week.	Year.
	Tons.	Tons.
Cumberland Region, Md.	40,203	537,812
Barclay Region, Pa.	5,829	130,262
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.	2,897	60,070
*East Broad Top	1,113	28,872
Clearfield Region, Pa.		
*Snow Shoe	557	12,551
*Tyron and Clearfield	24,976	501,641
Allegheny Region, Pa.		
*Pennsylvania R. R.	4,543	85,777
Pittsburgh Region, Pa.		
*West Penn R. R.	2,936	88,593
*Southwest Penn. R. R.	561	12,295
*Penn & Westmoreland gas coal, Pa.		
R. R.	11,835	310,581
*Pennsylvania R. R.	12,413	182,902
*For the week ending June 7.		

The Production of Coke for the week ending June 7:

Tons of 2000 lbs.	Week.	Year.
	Tons.	Tons.
West Penn R. R.	1,888	35,229
Southwest Penn. R. R.	12,811	334,439
Penn. & Westmoreland Region, Pa. R. R.	1,664	28,740
Pittsburg, Penn. R. R.	2,033	39,982
Total	18,396	438,390

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 14, 1878.

Anthracite.

The business at the present time is very dull, although most of the companies speak quite confidently of their ability to move all of their June allotment. Lehigh coals are well sold ahead, and prices for this coal are very firm. The prices of free burning coals are not so regular, but are firmer than at any time this year. We learn of Scranton stove coal sold on the basis of from 3@5c. per ton advance on the last auction sale, and yet there are those who say that from some cause this size of coal was not permitted to

bring at the auction sale as much as it would have done.

By some a very active business is expected during the last half of the year. In corroboration of views previously expressed by us, we quote from a letter written by a representative of the anthracite trade traveling in the Eastern States, one who is a close observer, and whose judgment is well worthy of attention. He says: "The bituminous companies are putting coal in all around at an average price of \$3.90, delivered at Providence; Cumberland not over \$4. A large company in Rhode Island (which used anthracite coal last year) has bought about 18,000 tons of Clearfield coal for summer delivery at \$3.80 delivered at Providence, 4 months time, flat. At these figures, you see that anthracite has but little chance. I can readily see that the consumption is much less than last season. Where the Board of Control thinks the demand for coal will come from during the summer months I can not imagine, and as for the fall trade I think it will only amount to a spurt from the retail trade."

The Philadelphia Ledger is authority for the statement that the Philadelphia and Reading Coal & Iron Co. in addition to moving its large allotment, will have to purchase 75,000 tons of coal this month to fill its orders.

The production of anthracite coal last week was 476,939 tons, as against 204,255 tons the previous week, and 463,492 tons the corresponding week of 1877. The total production from January 1st to June 8th was 5,813,553 tons, as compared with 8,159,432 tons for the like period of last year, showing a falling off this year of 2,345,879.

Bituminous.

A contract with an Eastern railroad for supplying about 29,000 tons is reported to have been closed during the past week. Shipments are fairly maintained, although the producers are complaining of a lack of orders. Hope, however, is entertained that a better business will be done later in the season.

New York.

Wholesale Prices of Anthracite Coal for June Delivery f. o. b. at Tide Water Shipping Ports, per ton of 2,240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.						
Lackawanna, at Weehawken	3 60	3 60	3 60	3 75	4 10	3 50
*Pittston, at Newburg	3 45	3 45	3 45	3 60	3 95	3 40
L. Val. Coal Co., at Amboy	3 75	3 50	3 50	3 60	3 90	3 25
Kingston at Hoboken	3 50	3 50	3 60	3 75	4 10	3 50
LEHIGH COAL.						
L. V. Coal Co., at P. Amboy			3 75	3 75	3 90	3 25
Mount Pleasant, at Hoboken			3 75	3 75	3 90	3 25
Hazleton, at Hoboken			3 75	3 75	3 90	3 25
Cross Creek, at Port John	4 00		3 75	3 75	3 90	3 25
SCHUYLKILL COAL at Pt. Richmond, Phila.						
Hard White Ash	3 30	3 30	3 30	3 45	3 75	3 25
Free-burning W. Ash			3 25	3 40	3 75	3 15
Schuylkill Red Ash			3 60	3 75	3 15	
Lorberry			3 70	3 75	3 75	
Lykens Valley Vein			3 70	3 85	3 85	

* Fifty cents per ton additional for delivery in New York.

Wholesale Prices of Bituminous Coal.

Per ton of 2240 lb.	At the Shipping Ports.		Along-side New York.
	Philadelphia	New York.	
Westmoreland and Penn.	\$4 25	\$5 50	
At S. Amboy		5 00	5 50
Kanawha at Richmond		4 10	5 40
Red Bank Cannel, Pa., at Philadelphia		8 00	8 50
Youghiogheny, Waverly Co., at Balt		4 00	5 65
Despard, West Va.		4 50	6 00
Murphy Run, West Va., at Baltimore		3 75	5 85
Fairmount, West Va.		3 75	5 70
Newburg Orrel, Md.		3 75	6 00
Cannelton Cannel, West Va.			10 00
" Splint " at Richmond		6 00	7 00
" Gas Coal at Richmond		4 00	5 65
Peytona Cannel, W. Va., at Richmond			10 00

MANUFACTURING AND STEAM COALS.			
Cumberland at Georgetown and Alexandria	2 75@2 90	4 35@4 50	
Cumberland, at Baltimore	2 90@3 00	4 35@4 50	
Cl'rd "Eureka" and "Franklin"			
At mines	0 75		
At Baltimore	3 25	4 50	
At Philadelphia	3 25	4 50	

FOREIGN GAS COALS.			
	Sterling.	Am. cur'ney	
Newcastle, at Newcastle-on-Tyne	7s.6d.	\$2 50@	\$3 50
Liv. House Orrel, at Liv.	25s.		13 00
Ince Hall Cannel	35s.6d.		18 00
" Gas Cannel	25s.6d.	10 00@	10 50
Scotch Gas Cannel, at Glasgow, nominal	25s.		7 50
	Gold.		
Bl'k House, at Cow Bay, N.S.	\$1 75	\$4 50	
Caledonia, at Pt. Caledonia.	1 50	4 25	

Glance Bay at Glance Bay	1 50	4 00
Lingan, at Lingan Bay	1 50	
Intern'l Mines, at Sydney	1 75	4 50
Pictou, Vale Mines, at Pictou	2 00	4 70

Retail Prices.

Per ton of 2000 lbs.			
Anthracite.			
	G. & Egg.	Stove	Chest.
Pittston coal delivered	\$5 00	\$5 00	\$5 00
Lack. coal, delivered below 59th St.	4 50	4 50	4 50
Wilkes-Barre, delivered	4 50	4 50	4 50
Lehigh and Locust Mount, del'd	5 00	5 00	4 75

Bituminous.

Liv. House Orrel	\$18 00	American Orrel	\$11 00
Liv. House Cannel	18 00	Red Bank Cannel	7 00
Am.	11 00	Cumberland	9 00
Ca'n't'n Bl'k, or splint.	10 00		

Baltimore.

June 13, 1878.

[Specially reported.]

Wholesale Prices per ton of 2240 lb.

In cars at Depot N. C. R. R.

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.			
Lump and Steamboat	\$3.95	Stove	\$4.25
Broken	3.95	Chestnut	3.70
Egg	4.05		

LYKENS VALLEY RED ASH.

Broken	\$4.15	Stove	\$4.45
Egg	4.25	Chestnut	3.90

From wharf or yard to the trade, 50c. per ton additional. Afloat by cargo per canal barge, 15c. per ton less than in cars.

Boston.

June 12, 1878.

We quote Boston wholesale prices as follows:			
Anthracite, broken	\$4.45	Caledonia	\$4.00
" egg	4.50	Newcastle	4.00
" stove	4.80	Cannel, English	18.00
Franklin	5.75	Library	15.00
Cumberland	4.50	Buckeye	11.00
Clearfield	4.50	Penn.	6.25
Westmoreland	6.25	Youghiogheny	5.62

Commercial Bulletin.

Buffalo.

June 12, 1878.

Specially reported by E. L. HEDSTROM.

Until further notice, the following will be the prices for Scranton, Wyoming, Lehigh and Blossburg coals, per ton of 2000 pounds, delivered free on board vessels at Buffalo, N. Y.:

	Lump.	Grate.	Egg.	Stove.	Nut.
Scranton	\$4.05	\$4.15	\$4.40	\$3.90	
Wyoming					
Lehigh (Sugar Loaf)	\$5.00				
Blossburg	\$4.15	F. O. B.			

Cincinnati, O.

June 13, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

The market for Youghiogheny coal here is now regulated by the Pittsburg Coal Exchange, which is a combination of about all the producers on the river at Pittsburg. The barge price in the river is 7 3/4c. per bushel, cash, with discounts on large quantities. A short time since, one shipper withdrew from the pool and sold 15 barges at a reduction from pool price, whereupon the pool, or exchange, placed 50 or 100 barges on the market at 6c. per bushel, which has tended to break down prices in the retail market, and Youghiogheny has been selling at retail, delivered to consumers, at 9@10c. per bushel of 72 lbs. Campbell's brick coal has been sold at about 1/2c. per bushel below Youghiogheny. Camden and other Ohio River coal has been sold at 5c. per bushel, in barges, and delivered at 8c. Anthracite prices have also been cut very low. The Panhandle and other lines have cut the freight rates to about 3/4 of a cent per ton per mile, and this has made lower prices here than last year, though the price at the mines has been higher. Nominal quotations are \$5.75 for Wilkes-Barre and \$6.75 for Lehigh per ton of 2000 lbs., but large commissions have evidently been allowed from these prices. Cannel coal unchanged.

Per bushel of 72 lbs.

	Retail delivered.	Wholesale afloat.
Youghiogheny	11c.	7 1/2c.
Camden	8c.	5 3/4c.
Cannel	17@18c.	13c.

Anthracite, delivered, \$7@8 per ton of 2,000 lbs.

Chicago, Ill.

June 11, 1878.

[Specially reported by Messrs. RENO & LITTLE.]

Retail prices of coal delivered per ton of 2,000 lb.			
Lackawanna Stove	\$5.75	Erie and Brier Hill	\$5.00
" Chestnut	5.25	Wilmington & Ill.	\$3.00@3.50
" Grate	5.50	Blossburg	5.50
Egg	5.25	Piedmont	6.50

Cleveland, O.

June 11, 1878.

Markets in a very unsatisfactory condition. Dealers in the West, having a portion of the last year's stocks on hand, are buying very sparingly, and shippers, steadily pressing the market to sell, have so reduced margins that much of the coal is going out with no profit to the mines or shippers. A little reflection on the part of shippers would show the folly of pressing an already stocked market.

Per ton of 2000 lbs. f. o. b. vessels.

WHOLESALE.			
Brier Hill (Church Hill)			\$3.25
" No. 2 Grades			3 00@3.15
Monday Creek			2.60
Straitsville Lower Vein			2.60
Hocking Valley			2.60
Massillon (No. 2 grades 15 cents less)			2.60
Tuscarawas Valley			2.25
Columbiana			2.25
Nut coal, various grades			1.70@2.

indications of immediate improvement, and think it more likely that it may fall off a little, but not materially. We quote the London market at 53½@53¾d.; New York, 116½, and San Francisco, 8 per cent discount.

DATE.	LONDON.		N. Y.		DATE.	LONDON.		N. Y.	
	Pence.	Cents.	Pence.	Cents.		Pence.	Cents.	Pence.	Cents.
June 8.	53 2-16	116¾	June 12	53 2-16	116¾				
June 10.	53 2-16	116¾	June 13	53 2-16	116¾				
June 11.	53 2-16	116¾	June 14	53¾	116¾				

BULLION SHIPMENTS.

May 30. Raymond and Ely.	Nevada.	\$5,035.87
" 31. Tybo cons.,	"	16,231.64
" 31. Manhattan,	"	14,307.26
June 1. California,	"	234,495.55
" 1. Con. Virginia,	"	99,596.06
" 2. Modoc,	"	35,145.81
" 1. Justice,	"	5,618.98
" 1. Northern Belle,	"	12,208.82
" 3. Hussey,	"	6,230.00
" 3. Independence,	"	19,500.00
" 4. Star,	"	4,274.00
" 2. Standard,	California.	21,516.51
" 2. Gila,	Arizona.	9,500.16
May 27. Christie,	Utah.	6,588.00
" 25. Butte,	Montana.	13,150.00

The International Monetary Conference proposed by the United States to consider the double standard of silver and gold, promises to be quite a respectable gathering. The United States, France, Russia, Italy, the Netherlands, Hungary and Switzerland insure the meeting of the Conference, and doubtless Great Britain, Germany, Austria and Belgium will now see the desirability of being represented. The Conference is to adopt a current ratio between gold and silver for the purpose of establishing, internationally, the use of bi-metallic money and securing fixity of relative value between these metals.

Governmental Encouragement to the Mexican Mining Industry.—The onerous duties, charges, and taxes that have always made Mexican mining operations burdensome have recently been removed by the amendment of the mining laws and the hearty encouragement given by the Mexican Government to proposed enterprises in the mining field. Ore is now exported free, and bullion and coin which formerly paid 25 and 30 per cent now pay but 4-40 and 4-60 per cent. The burden of providing escort to and from distant mints is also lifted.

San Francisco Mint Coinage for May.—The coinage of the United States Mint at San Francisco, for the month ending May 31st, 1878, is shown in the following statement:

	Value.	No. of Pieces.
Gold—Double Eagles.	\$2,740,000	137,000
Silver—Standard Dollars.	\$1,500,000	1,500,000
Total.	\$4,240,000	1,637,000

During the month of May 3,500,000 silver dollars were coined at the various U. S. Mints.

The steamer China sailed for China and Japan on the 4th inst., from San Francisco, carrying treasure to the amount of \$1,049,759.

A sale of 200,000 ounces of fine silver by the Anglo-California Bank to the Government is reported, but the price is not stated.

Specie Imports and Exports of New York.—The Custom House returns show the following comparative results of the imports and exports in specie of the port of New York during the period indicated:

IMPORTS.			
	1876.	1877.	1878.
Specie (May).	\$175,953	\$549,114	\$1,371,147
Specie (11 months).	7,649,985	30,812,813	19,541,180
EXPORTS.			
	1876.	1877.	1878.
Specie (May).	\$8,519,671	\$10,743,150	\$821,105
Specie (11 months).	40,988,440	30,796,930	14,463,876

Day Mine.—The total production of this mine since its opening is \$210,060.

The Defiance Mine, in Inyo county, is again attracting attention. It has turned out \$200,000 in bullion since last March.

From present indications the Independence will be a formidable rival to the Prize as a bullion producer. Already, with only ten stamps, the Independence has been extracting bullion to the value of about \$20,000 per week. The company expects a weekly yield to reach from \$35,000 to \$40,000.

Copper.—The sales have been only in a small way, and quite unimportant in the aggregate. The prices realized have been 16¼@16½c. At the close it is very difficult to name a price, but 16½c. may be given as nominal. A liberal quantity either sought for or offered would materially change the situation. The latest cable information quotes Chili bars at £64@£64 10s., and best selected £69 10s. On Tuesday 880 tons of Wallaroo and Burra Burra copper will be sold at auction in England.

Tin.—The business in pig-tin is very quiet, and prices are by no means strong. We quote Straits at 14½c. and L. & F. at 14½@14¾c. The London price of Straits is £61@£61 10s.

Tin Plates.—The business in these is quieter and prices are lower. It is intimated that there is trouble in the combination lately established in England. Messrs. Robt. Crooks & Co., of Liverpool, under date of May 30, say: "Since our last market has been in a decidedly 'mixed' condition, some makers holding firmly for advances of 1s. to 1s. 6d., while others are anxious to sell at the lowest prices they have touched, and within a shade of the bottom figures touched. Charcoal ternes are in best, and coke tins in lightest demand." We quote in gold, per box, as

follows: Charcoal tins, \$5.75@£6, and ternes, \$5.37½@£5.50; coke tins, \$4.87½@£5.12½, and ternes, \$4.87½@£5.12½.

Lead.—There is a report that 200 tons of lead have been sold for export at \$3.05. In addition to this there has been some further business at \$3.12½@£3.20. The market at the close can not be quoted at over \$3.12½. In another column we publish a letter from Leadville, which shows the very important part that camp will take in the country's lead production. We also publish elsewhere the statistics of the Utah production which show but an insignificant falling off, while it is a well-known fact that the Eureka District is producing very much more than last year, and will probably continue to do so during all of this year. Missouri shows some falling off, but not so much as was predicted would be the case under low prices. Taking all the reports, it is very evident that our supplies are, and will be, greatly in excess of our requirements, and the only chance of improving the domestic market will be in exporting large quantities. The export movement from San Francisco has assumed quite respectable proportions.

In another column we publish a letter from Leadville, Col., by our special correspondent. Several months ago we ventured to publish what we considered a modest estimate of the probable future product of that district. Our correspondent's estimate of the present capacity equals that made by us, while if his estimate of the future product should be realized or only partially so, this district would revolutionize the lead business of the world. It is almost beyond question that the actual production that will take place during this year must have a very important effect upon the price of lead. In anticipation of it our own markets have declined, while the European market, in expectation that lead would be exported from this country, has been steadily lowering.

The Commercial Bulletin of June 6th says: "The China, for Hong Kong, carried 410,068 lbs of pig-lead.

Spelter and Zinc.—Spelter continues very quiet, and is quoted at 4½c. Sheet zinc is unchanged at 6c.

Antimony.—Cookson's is quoted 12¼@13c. and Hallet's 11¼@12c.

Quicksilver.—The San Francisco Commercial Herald of June 6th says: "The steamship China, hence on the 5th instant for Hong Kong, carried 899 flasks, a much smaller quantity than was expected. The spot supply at the moment is light, enabling some holders to obtain 42c., while others have sold small lots at 41½c. The steamer Georgia, for Panama and way ports, carried 1320 flasks to Mexico, etc."

The exports from January 1st to May 31st, show a falling off of 9312 flasks, and in value of \$325,170.

SALT LAKE ORE AND METAL MARKET.

SALT LAKE CITY, Utah, June 14, 1878.
Argentiferous Lead (Base Bullion), \$28 to \$30 per ton for lead; \$1.15 per ounce for silver; \$20 per ounce for gold. The quotations for silver are based upon the silver in the lead of 80 to 120 ounces per ton of 2000 lb.

Mr. J. B. Meader, under date of the 8th inst., reports the following shipments:

Shipments of base bullion for May, 1878.	3,764,659 lbs.
Shipments of base bullion for four months.	14,410,132 lbs.
Total for five months.	18,174,791 lbs.
Shipments of lead (Germania refined), in May.	715,251
Shipments of lead (Germania refined), previous.	188,503
Total shipments of refined lead.	903,754 lbs.
Ore shipments for May reduced to lead.	37,100
Ore shipments for four months.	723,222
Total shipments of lead for five months.	19,838,867 lbs.
Same time for 1877.	23,829,059 lbs.
Decrease in 1878.	3,990,192 lbs.

The lead and silver smelting works at Wyandotte, Mich., have started on another run, having received, during the week ending the 8th inst., 25 tons of silver ore, 10 car-loads of coal, and the same amount of coke.

FINANCIAL

New York Stocks.

NEW YORK, Friday Evening, June 14, 1878.
About 120,000 shares of the stocks of the Coal Carrying Roads comprise the business of the week. The dealings during the latter part of the week were made at generally lower prices, the quotations yesterday marking the lowest of the week, and the final prices to-day showing a slight recovery from these. In Delaware & Hudson the sales amounted to 13,375 shares at from 55½ to 58½, closing at 56½. We note the statement that \$1,500,000 of this company's 7 per cent bonds, which matured November 1, 1877, were extended, by agreement with the holders, until November 1, 1891, the extension not to

in anywise impair the security afforded by the mortgage dated January 2d, 1871. The company asked the Stock Exchange to have these bonds restored to the list. The committee having the matter in charge have recommended that they be placed on the regular list next after 1891s, and called "Delaware and Hudson Canal First Mortgage Extended."

Delaware, Lackawanna, and Western stock to the extent of 100,910 shares has changed hands at from 59¾ to 56¾, closing at 58¾. New Jersey Central stock has been comparatively steady, and closes at about the highest point of the week; 6393 shares were sold. The Board of Directors of this company met on the 12th inst. and approved the plan of reconstruction. They then examined the proofs of the new mortgage bonds of the company, and the forms of mortgage. It was announced that the amount of bonds and stock represented in the agreements to the plan of reconstruction is about 85 per cent of the entire amount. During the past 15 days 2½ per cent of this amount has been procured, the holders of the securities being principally residents of England and the West Indies. The new bonds of the company will be issued in 30 days.

Baltimore and Ohio R. R.—This company announces a dividend of 25 per cent on the Washington Branch stock, payable July 24th. This dividend embraces five semi-annual dividends on the Washington Branch, which had been withheld up to October, 1877, aggregating 25 per cent. These dividends were passed by the company in view of a pending suit against it by the State of Maryland to recover the one-fifth capitation tax on passengers carried. A recent act of the Legislature provided for an adjustment or compromise of the claim, which has been accepted.

The Cumberland News says that "a rumor is current in that city to the effect that the Baltimore and Ohio Railroad Company are contemplating the re-opening of their rolling mills at that point, so as to make the vast buildings and machinery remunerative in some degree."

Chesapeake & Delaware Canal Co.—The annual meeting of the stockholders of this company was held on the 10th inst. The fifty-ninth annual report of the Board of Managers was read, showing that the revenue from tolls for the year ending May 31, 1878, was \$169,650.45; revenue from other sources, \$7,039.50; balance on hand May 31, 1877, \$61,350.05; total receipts, \$230,340. The expenses during the past year were \$9894.21.

Rochester and State Line R. R.—This road runs from Rochester, N. Y., passing through thirty towns, to Salamanca, a distance of about 109 miles, and by it the New York Central secures New England business from the Atlantic and Great Western, it making a short direct route from the Southwestern States. The Standard Oil Company transports over 100 cars of petroleum per day over the road, and the city of Rochester alone will need over 100,000 tons of coal per annum. The company is offering, through Messrs. Walston H. Brown & Bro., a limited amount of its first mortgage 7 per cent bonds, at 90 and accrued interest. The bonds are a first mortgage upon the road and its equipment, and are issued at the rate of \$20,000 per mile of road.

Cumberland Valley R. R.—The annual report of this Company shows that the gross earnings were \$519,851; expenses, \$239,174; net earnings, \$66,693. As compared with the same period of the last fiscal year, the statement shows a decrease of \$28,142 in gross and \$10,718 in net earnings.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, June 14, 1878.

The coal shares on this market close lower. The sales amount to about 77,000 shares. Pennsylvania R. R. stock has ranged from 30½ to 28¾, and closed at 29¾, the sales amounting to 56,000 shares. Reading has been fairly steady, closing at 15½, with sales aggregating 16,422 shares. Lehigh Valley stock closed at 37¾, the transactions only reaching 1403 shares. In Lehigh Coal and Navigation stock a business of 3335 shares has been done from 17¼ to 16, closing at 17.

The Lehigh Valley Railroad Co. announces a quarterly dividend of 1 per cent, payable July 15.

AUCTION SALES.—Schuykill Navigation Co.—900 shares preferred at \$6.25 per share.

Lehigh Coal & Navigation Co.—\$2500 of the 6 per cent convertible gold loan bonds registered at 94 per cent.

Westmoreland Coal Co.—50 shares at \$63 per share.

Bethlehem Iron Co.—275 shares par, \$50@£20 per share.

Copper Stocks.

Reported by WILSON W. FAY & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street

BOSTON, Wednesday Evening, June 12, 1878.

The market has been a little more brilliant during the past week, it being evident that the active market on other things has had the effect of stirring up the "coppers" somewhat, and giving a better tone to the active stocks. The majority of the stocks are more firm and are more in demand than they have been of late, and the prospects of an active market on them are better than they have been for the past three months. The silver stocks are very active and look strong, having spurred within the past few days, large lots of stock changing hands.

Calumet & Hecla sold down to 176, and looked rather weak, but has strengthened again and sold up to 179, and closes firm at 178½@179.

Central is weaker, being offered at 29, and no bidders. Copper Falls is also weak, and has sold down to 55c., and closes ¾@¾. The probabilities are that there will be another assessment on it before long.

Franklin is quiet and weak at 4@4½.

Oscuela has stiffened up somewhat, and closes firm at 9 bid, and 10 asked.

Pewabic is unchanged.

Quincy is rather weak at 14@14½, and sales at 14.

Ridge is also weak at ¾@¾.

Duncan has jumped about pretty lively and has sold

from 2 1/2 up to 4 1/2 within two days, there being reports of very favorable news from the mine. It has reacted a little, however, and sold at 4 @ 4 1/4 @ 4 1/2, and closes at 4 1/4 @ 4 1/2.

International has advanced somewhat, and sold at 50c., and closes firm, at 50 @ 55c.

Copper Products.—Below will be found products of reporting mines for May:
Calumet and Hecla..... Tons. Pounds. 1395 175
Franklin..... 130 1088
Quincy..... 120 255
Allouez Tribute Company..... 83 985
Pewabic..... 30 75

Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 14th inst are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

Table with columns: STOCKS, Par Value, High'st, Lowest, Closing, Sales: Shares. Includes American Coal Co., St. L. M. & S. R. Co., Spring Mt. Coal Co., Cambria Iron Co., Penn. Salt Mfg Co., Westm'land C. Co., Buck Mt. Coal Co., Schuyl. Nav. Co., B. & O. R.R. Co. 1st pf, B. & O. R.R. Co. 2d pf, George's Ck C. Co., Clara Mfg Co., Atlantic Coal Co.

Table with columns: BONDS, Price, When Due, Int. When Due, High'st, Lowest, Amount. Includes D. L. & W., N. J. C., Lehigh & W. B., Am. Dock & Imp., Ches. & O., D. & H. C. Co., L. V. R., P. & R. R., P. & E. R., P. & R. R., L. Nav. Co., RR., Gold R. C., P. & N. Y. C., Pa Canal, Schuyl. Nav., Sus. Canal, Balt. & O. R.R.

Total transactions for the week.....\$221,960

* \$3,000 of the whole were assented, selling at from 67 1/4 to 71.

Gas Stocks.

New York, Friday Evening, June 14, 1878.

We are reported no business in these securities, and the declining tendency in prices continues. We note declines in the following stocks: The Metropolitan Gas Co.'s and the Harlem Gas Co.'s, of New York, \$2 each, and the People's, of Brooklyn, and the Williamsburgh Co.'s, from \$25 @ \$20 bid for the former, and from \$90 @ \$80 being bid for the latter; otherwise there are no changes.

Paterson (N. J.) Gas Co.—The annual meeting of this company will be held on the 19th inst.

The Gas Stock Question in Halifax, N. S.—The Public Accounts Committee of the Halifax City Council recently recommended that notice should be given the Gas Company that if the price per lamp for lighting that city were not reduced from \$23.75 (the present figure) to \$20, their gas would be dispensed with and oil lamps substituted. However, it was resolved to confer with the Gas Company, and ascertain what reduction they would make, and also to learn what would be the cost of lighting the city with oil.

The Electric Light in Atlantic City, N. J.—A proposition has been made to the Common Council, of this city, to light up the city and beach with the electric light. The cost of introducing it would be a little over \$5000.

The Gas Question in Peoria, Ill.—The Transcript of the 12th inst. says: "The Peoria Gaslight and Coke Company won their point before the city council last evening. They get the contract for lighting at \$25 per street lamp per year, and \$2.25 per thousand feet to our citizens. The contract is to run for six years. The Transcript early put the prediction on record that the gas company would succeed by a method they knew how to make use of. The final vote on the matter will be rather surprising to many of our citizens."

The Gas Question in Cumberland, Md.—The News of the 12th inst. has the following communication from the President of the Cumberland Gas Co. to the Common Council: "In reply to your letter of the 7th inst., I am instructed to state that the gas company will furnish gas for the 117 posts for the ensuing year at \$2 per post per month for a five-foot burner, or at \$1.60 per post for a four-foot burner, lighting the same number of hours each month as per existing contract."

At a vote of the members of the Council the proposition was adopted. Boston Gas-Light Co.—We note the recent sale of 2 shares of this stock at \$80 1/4 per share.

The Jackson (Mich.) Gas Co. was organized in 1857; \$3.00 per thousand feet is charged for gas. It is understood that the dividends are entirely satisfactory to the stockholders.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

Table with columns: COMPANIES IN NEW YORK AND VICINITY, Capital Stock, Par, Rate per ann., Am. of last, Date of last, Dividends, Quotations (Bid, As'd). Includes Mutual N. Y., N. York, Metrop., Harlem, Manhat., Brooklyn, Nassau, People's, Metrop., Wms'g, Citizens, J. C., N. J., Cen. Watch N.Y., Subur'n, Municipal, N. Y.

Gold and Silver Stocks.

New York, Friday Evening, June 14, 1878.

Although the week under review shows a larger amount of sales than the previous one, yet it is pronounced a quieter week than the Exchange has experienced for a long time. The dealings have been much more largely among brokers than for many weeks past. Dealings direct with San Francisco continue to be quite important. The interest in mining investments has in no way abated, there being considerable capital going into mines and a large number of important negotiations going on. The cause of a lack of business at the Mining Exchange is that the public has but little confidence in nearly all of the stocks listed there. During the week there have been sales of 30 shares of American at \$7. In small lots there have been sales of 100 shares of Consolidated Virginia and California. Hale & Norcross records 50 shares at \$6 1/2; Northern Belle, 10 shares at \$8 1/2; Raymond & Ely, 200 shares at \$4 @ \$4.15. The sales of Hukill amount to 1000 shares at \$4.85 @ \$4.60. There is being loaned on this stock \$3.50 per share. Moose has sold to the extent of 1204 shares at \$2.60 @ \$3; New York & Colorado, 400 shares at \$1.70 @ \$1.75. Plumas continues to report large transactions, those for the week amounting to 2200 shares at \$4.10 @ \$4. Buckeye shows sales of 2100 shares at 38 @ 34c. Cashier records but 100 shares at \$1.50; King's Mountain, 300 shares at \$1.65, and Mt. Bross 200 shares at \$1.15. American Flag has been attracting more attention, it being reported that their mine, which has been "jumped" and is being worked by another, has been leased to a party of Welsh miners. The sales aggregate 13,900 shares at 10 @ 19c. The sales of Bertha and Edith amount to 26,600 shares at 5 @ 7c.; Dahlonega, with a business of 69,600 shares, declined from 20 to 14c.; Gold Placer, after reaching 70c. on Tuesday, declined to 40c. yesterday, recovering to 58c. to-day. The sales of this stock for the week amount to 22,450 shares. Lacrosse has ranged between 33 @ 28c., with an inclination to weakness. An unfavorable report as to the developments on the Burroughs lode, has received credence. The total sales have been 64,700 shares. The stock of the Granville mine did not make its appearance at the Exchange this week, as was expected. We have been shown bars, dust, and nuggets represented as coming from this mine. The following is from a letter written from the mines, by R. M. Eames, Superintendent, and bearing date of June 8th:

"I forward you this day by express a box containing gold bar, gold dust from washings from Gold Branch, also a few quartz specimens. Gold bar weighing 100 pennyweights 13 grains, the yield of 6 1/2 tons of ore (second class ore). Gold dust from washings, 12 pennyweights 16 grains, two men's work one week prospecting our Placer property. The large piece was found under a rock on the Branch. Will forward you bullion—result from 16 to 18 tons of ore that will be milled next week. Am driving along as fast as possible."

The dealings in Ontario have amounted to 835 shares at \$37 @ \$36. We are in receipt of the annual report of this company. It is a very satisfactory one, and the Superintendent's report indicates that for the year ending January 31st, 1879, it will be even better.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (June 7, 8, 10, 11, 12, 13, 14), Opening June 14. Includes Alpha, Belcher, Best & Bel., Bullion, Caledonia, California, Chollar-Fot, Con. Imp., Con. Va., Confidence, Crown P'int, Eureka Con., Exchequer, Gould & Cur, Grand Prize, Hale & Nor., Julia, Justice, Kentucky, Mexican, North Belle, Ophir, Overman, Ray & Ely, Silver Hill, Savage, Seg. Belcher, Sierra Nev., Union Con., Yel. Jacket.

The San Francisco stock market, as indicated from the quotations above, showing the course of prices for the past week, is more satisfactory than we have noticed for a long time past, while the opening quotations to-day are not at the highest of the week. Yet, an improvement, which is shown by the majority of the quotations, is fairly sustained, and many of the prices are at their highest at the opening of the Board to-day. Consolidated Virginia is producing at the rate of 350 tons of ore per day, and the prices throughout the week do not exhibit a difference exceeding 25c. per share. The stock of the California Mining Company exhibits the same comparative steadiness. Ophir is a little lower and shows the greatest variation in prices of any stock on the list, the extreme range in prices being \$50 @ \$45, and the opening to-day \$48 1/2. Eureka Consolidated is fairly maintained, the opening price to-day of \$59 1/2 being 50c. below the best quotation of the week. This mine is developing large reserves on the seventh level. Other portions of the property are looking well, and there is no diminution or signs of exhaustion in any of the important ore bodies. The Eureka District has yielded, since the first day of January, precious metals and lead of a value probably exceeding \$6,000,000.

Grand Prize shows a decline from the highest point of the week, but no change from the closing in our last.

The Times-Review says: "At the Grand Prize, work upon the large new shaft is being vigorously prosecuted night and day. As to the value of the mine, nobody doubts it, but all confidently expect the lode to be infinitely more valuable when it shall be tapped from the new shaft."

The Excelsior Water & Mining Co. has declared a dividend for May of 50c. per share, amounting to \$20,000.

Table with columns: Company Name, Dividend Amount. Includes Black Bear Quartz Mining Co., California Mining Co., Cons. Virginia Mining Co., Eureka Cons. Mining Co., Idaho Mining Co., Ontario Mining Co., Ontario Mining Co. (extra), Silver King Mining Co., California Stock Exchange, Standard Mining Co., Cons. Amador Mining Co., Excelsior W. & M. Co.

Total.....\$2,036,250
Assessments with dates when delinquent: Justice, \$1, July 16; Succor, \$1, July 1; Morgan, 50c, July 8; El Tesoro, 5c., July 13; Comanche, 50c., July 9; Emigrant, 50c., July 1; Leviathan, 15c., July 2; Silver Prize, 15c., July 5; Crown Point, \$1, July 10; Phoenix, 25c.; Mountain City, 5c.; Black Hawk (Bodie), 25c.; Trojan, 25c.

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

COAL STOCKS.

Table with columns: NAME AND LOCATION OF COMPANY, Feet on Vein, Capital Stock, SHARES (No., Par Val., Total lev'd to date), ASSESSMENTS (Date and amount per share of last), DIVIDENDS (Total paid to date, Last Dividend, Rate per Ann.), HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE (June 8, June 10, June 11, June 12, June 13, June 14), and SALES.

GENERAL MINING STOCKS.

Dividend Paying Mines.

Table listing Dividend Paying Mines with columns: Company Name, Location, Shares, Assessments, Dividends, and Prices per share for various dates (June 8, 10, 11, 12, 13, 14).

Non-Dividend Mines.

Table listing Non-Dividend Mines with columns: Company Name, Location, Shares, Assessments, Dividends, and Prices per share for various dates (June 8, 10, 11, 12, 13, 14).

G. Gold, S. Silver, L. Lead, C. Copper, * Non-Assessable.

Total Assessment levied to date 52,057,802 Total Sales of Coal Stocks for the week 197,921 shares
Total Mining Dividends to date 220,595,832 Total Sales of Mining Shares for the week 208,780
* A dividend of 3/4 per cent was declared on the preferred stock of this Co. in July, 1878.