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RICHARD P. ROTHWELL, C.E., M.E., } Editors.  
ROSSITER W. RAYMOND, Ph.D., }

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Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus " " ; and only for articles so signed is he responsible.

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A MANUFACTURING, Mechanical, and Mining Exhibition for the State of Virginia is now opened at Richmond, to continue until November 11th.

WE call the attention of our readers to the change in our post-office address. All communications to the ENGINEERING AND MINING JOURNAL should be addressed to P.O. Box 1833.

Mr. GEORGE W. MAYNARD has left for Butte, Montana, Salt Lake City, and Grass Valley, Cal. His address may be obtained at 24 Cliff street, New York City, during the time of his absence.

AMONG the passengers who sailed on the City of Berlin for England this morning were Mr. FRANKLIN B. GOWEN and Mr. RICHARD P. ROTHWELL. Mr ROTHWELL'S address in London will be care of American Exchange, 449 Strand.

WE would call attention to the sale by auction, on the 25th inst., in this city, of an iron mining property situated in Rockaway township, Morris County, N. J. For further particulars we would refer to our advertising columns.

WE are in receipt of the first number of the Mining Index, published by Mr. A. F. WUENSCH, of Leadville, formerly mining editor of the Lead-

ville Democrat. This paper is very neatly got up, contains 16 pages 8 X 11 inches, and is to appear weekly. The number before us, and the previous work in the same direction by Mr. WUENSCH, lead us to expect that this journal will be very valuable to those interested in Colorado mines, and especially those located at Leadville.

WE have been asked to state whether parties taking out leases on supposed mineral land must pay annually a fixed sum, whether mineral is mined or not, in the case that those having obtained the lease did not bind themselves to mine a certain amount per annum. As the subject is one of general interest, we may say that in Pennsylvania it has been held by the courts that a lease without a fixed rental is "without consideration," and therefore invalid. The consideration is usually a minimum royalty, to be paid whether ore is taken out or not.

WE print elsewhere a paper by Mr. FRANCIS A. LOWE, formerly of Silver Islet, and now of Batopilas, Mexico. In it he gives some data which show how erroneous is the creed so long taught by European metallurgists, and here and there lingering with us, that it is pernicious if not actually had practice to concentrate the ores of the precious metals. It is true that, being largely in the form of metallic particles, the contents of the ores of which he speaks are not powdered into the finest dust by crushing, as other ores would be. We hope, however, to be able to show at an early date that good results in concentration are by no means restricted to mineral of the character referred to.

THE Supreme Court of California has decided recently that the "Drainage Act," of April 23d, 1880, is unconstitutional, reversing the judgment of the Superior Court of Sacramento County. The act referred to provided for the carrying out the following objects: "The control of debris from mining and other operations, the improvement and rectification of river channels, and the erection of embankments or dikes necessary for the protection of lands, towns, or cities from inundation." The judges of the Supreme Court, with the exception of one dissenting voice, declared the act to be unconstitutional, on the ground that it contravenes Section 24 of Article IV. of the Constitution, which requires that every act shall embrace but one subject, which shall be expressed in its title.

A SILENCE that is suggestive is maintained as to the present working of the basic process in Europe. We know that there is the greatest activity on the continent and in England in developing it; but it appears to have passed the stage where it had to struggle for recognition. Many zealous and able metallurgists are now working out details; but instead of seeking publicity, as they did not long ago, the results of their labors are carefully guarded, and those not directly interested find it difficult to obtain data from which a statement of the present status could be given. It would be very wrong, however, to infer from the cessation of all sensational or technical reports that the process has been nothing more than a brilliant meteor, now extinguished. For the manufacture of many and notably the milder classes of merchant steel its future is a very promising one, and the quiet way in which its possibilities are now being developed will make its assumption of a leading position all the more surprising.

THE programme of the Harrisburg meeting of the American Institute of Mining Engineers has been issued. The opening session, at which the Governor of Pennsylvania and the Mayor of Harrisburg will, it is expected, deliver addresses of welcome, will be held on Tuesday, the 25th inst., and the reading and discussion of papers will occupy one session on Wednesday and two on Friday. The excursions include a visit to the works of the Pennsylvania Steel-Works at Steelton, on Wednesday; the hematite ore-banks of the Philadelphia & Reading Coal and Iron Company and the Pine Grove Furnace on Thursday; and the famous Cornwall ore-banks, near Lebanon, on Friday. The social features will include a reception tendered by the citizens of Harrisburg and their wives on Wednesday. The local committee of arrangements, of which Mr. HENRY MCCORMICK is Chairman, consists of Messrs. H. H. CAMPBELL, S. H. CHAUVENET, G. S. COMSTOCK, E. C. FELTON, HARVEY FISHER, A. S. MCCREATH, C. E. STAFFORD, JONES WISTER, F. W. WOOD, and D. WATTS, Secretary, an array that will insure for the visiting members an excellent reception and sustained enjoyment.

IN our issue of September 17th, we gave an outline of the Hamilton process for treating gold and silver ores with lead, for which an elaborate plant has been erected in this city. The company which proposes to work the process has been organized with a capital of \$1,000,000, divided into 100,000 shares of the par value of \$10 each; and though it is stated that all of the stock has been taken at par, and is now selling at a premium, the promoters are pushing the company vigorously in the daily press, a proceeding which is not calculated to inspire confidence. If those who are connected with it themselves believe the statements which they

call upon the public to accept as facts, they are recklessly giving away a very good thing. Mr. HAMILTON asserts that he can treat ore for less than \$1 per ton. Any one at all familiar with mining will concede that, if he can do this, his process is worth much more than \$1,000,000. Still we find him and his associates endeavoring to place the stock upon the market, which is a justifiable inference of their present proceedings. While we do not wish to discourage an effort to improve our present methods of working, and look with much interest to a practical demonstration on a large scale, for which the plant is well planned, we think that the wonderful claims need practical results now altogether wanting before they can be accepted by prudent men. Until such results are forthcoming, it should be distinctly understood that there are doubts of a technical character which nothing but such experiments can clear away.

#### THE OUTLOOK

In spite of many predictions of those who saw danger and disaster ahead, our prosperity still continues. The demand for manufactures as well as raw materials is almost unprecedented as far as the iron, steel, metal, and machinery branches are concerned, and the fact that in some trades producers are engaged for the whole of the coming year gives much stability to the markets and inspires confidence, when otherwise under similar general conditions, there would be more distrust as to the future. Some believe that many circumstances are well calculated to make the most sanguine pause, and fears are expressed in many quarters that we are going ahead at a rate that is not warranted by the present aspect of affairs. Our crops, it is urged, are not by any means equal in abundance to those of former years, and though to some extent our agricultural population is compensated by high prices for low yields, the laboring and trading classes will feel severely during the coming winter the increase in the cost of living which higher values for the necessities will entail. We may look forward to discontent and some suffering, and it would be idle to deny that manufacturers will be forced, in many cases, to yield to demands for advances in wages. With full and remunerative employment of their manufacturing facilities, they will probably be able to do this. But the question naturally arises, whether the prospects for such employment for producers are really as good as the present active demand would seem to indicate. The following reasons are given to support the belief that they are really not so bright as a hasty survey might indicate, always excepting some trades which special circumstances render less sensitive directly to general trade movements. A very considerable portion of the heavy orders in many branches is due to the investment by our agricultural population of surplus earnings in permanent improvements in house and farm. These expenditures are not likely to be as heavy in the coming season as they have been this year. Another important factor was the revival of railroad building and the demand for repairs of roadway, rolling stock, and structures of our lines of transportation. The process of renewal and improvement has now been going on for years, and a slackening may be looked for at an early date. As for the construction of new lines, it goes on unabated; but the reduction of the volume of business by the curtailment of the crops to be carried must affect the receipts, and will lead to the abandonment of some plans of aggrandisement on the part of roads who look for revenue chiefly to the carriage of agricultural produce. This may be conceded; but on the other hand, those lines over whose tracks any considerable coal traffic goes will be fully compensated by the enormous expansion of that trade and the freight it gives directly and indirectly. We shall have occasion to speak more fully, at an early date, of the influence of this business, which is too much and too generally underrated by the public at large, and even by railroad men.

Our experience in past years in "booms" has been so disastrous that many business men are, fortunately, inclined to take a conservative view of affairs; and while we do not share their opinions, as briefly outlined in the above, they are well worthy of consideration. The influence of such an element counteracts the sanguine tendencies which are characteristic of our mercantile communities in times of prosperity, and it secures us to some extent against the dangers of overproduction and overtrading. That it should exist is, we believe, an encouraging sign for the future.

#### OUR TARIFF ON ORES.

That wonderful jumble of legislative enactments, decisions, opinions, and instructions which we call our tariff, has some features which would puzzle the wisest. Its provisions for the "protection" of the mining interests of the country are curious and in this instance have done little more than to kill already established industries and effectually to prevent the development of others. With all our unbounded wealth of raw materials in the shape of ores, it was believed necessary by our legislators to establish, and to maintain during nearly twenty years, a duty on lead ores of  $1\frac{1}{2}$  cents, and on copper ores of 3 cents per pound of the pure metal it contains. Iron ore pays 20 per cent *ad valorem*, and manganese ores the same

while curiously manganese ores are free. The ores of the precious metals pay no duty; but as soon as they contain, besides gold and silver, any base metal, they fall under the ban of our tariff. The principle by which our custom-house officers are guided in determining when an ore ought to be classified as "precious" or as an ore of lead, for instance, is well illustrated by the rulings of the department. It appears that in 1879 certain quantities of argentiferous galena were imported from Mexico, and, as represented by those shipping it, it contained lead valued at 5 per cent of the assay value of the silver, which was \$70 per ton. By assay of the department chemist, it was found that the ore held from 41 to 61 per cent of lead, which, even taking lead at a low figure and estimating the cost of reduction at \$15 per ton, including allowance for waste, would indicate that the importers undervalued the contents of the base metal. Still, this did not affect their claim that the silver being the constituent of chief value, the ore ought to be classified as an ore of the precious metals. The question was a delicate one, but, by an ingenious interpretation of an existing decision of the department, it was solved, although some doubts as to its applicability were expressed. On the 16th of November, 1875, the department rescinded instructions issued December 19th, 1874, on the duty to be paid on base bullion, an alloy of silver and lead. In this it was held that "mixed metals, the product of ores smelted and refined, should be classified according to the preponderance of weight and quantity." This, by a somewhat violent stretch, was made to apply to ores, and naturally put a stop to any attempts to bring into this country for reduction argentiferous galena, and laid an impost on any but "dry" silver ores. Under the decision, one per cent of lead, for instance, would make \$300 ore a lead ore, so that granting the wisdom of taxing mineral that holds lead enough to be of value, it is obviously absurd to lay a duty on a constituent that is a positive drawback rather than a valuable portion of its contents in other cases. For instance, 10 per cent mineral would have to pay \$3 duty per ton, while the presence of that base metal would force the adoption of special methods more expensive than the treatment of ore free from it. It will be seen, therefore, that the present tariff not alone keeps out effectually a class of mineral that might profitably be smelted in works on our seaboard, but that the interpretation of its provisions actually hinders importation of ores that are declared to be free.

We have cited the above as an instance of one of the perversities of our present tariff; but we may well and profitably inquire whether there is any real necessity for the existence of its provisions as they now stand. Aside from the question whether rates on the metal are excessive or not, it will be found on examination that those charged for ore, with a due regard to average percentage and cost of working, are still higher, so that they effectually prohibit smelting foreign materials in this country, while a fair adjustment ought at least to give us the option of bringing in the raw material or the product of the furnace. In fact, the principle of encouragement to American industries, which is supposed to be the foundation of our tariff, would call for discrimination in favor of ore, and the fact that the call for foreign material is subject to variations and long cessation at times, ought to cause that discrimination to be more pronounced still. The present system is, therefore, wrong and vicious in principle and in execution. It has, however, done more; it has, as we said at the outset, killed an established industry, prevented its revival, and has checked any attempts to build up on our seaboard a large smelting business. The history of our copper works, which at one time were rivals of those at Swansea, furnishes emphatic proofs for this statement.

It may be urged that the granting of drawbacks removes all causes of complaint, as it enables smelters to recover on crude or manufactured metal exported, the amount of duty paid for the raw material imported. The system, which we may call it in the absence of any better term, is, however, a very curious and ineffective one. On some articles it takes the form of a specific drawback of so many cents; on others, allowance is made for waste in manufacture; and in some, it is computed simply on the basis of the actual weight of the exportation, without any reference to what quantities of metal were really required in producing the finished article. The principal cause, however, why the drawback system is not effectually operative in the case of smelting ores, is the requirement that the metal exported must be the identical metal that was imported in the shape of ore. Any smelter will readily understand how this hampers his operations, and may in many cases so obstruct them that they are rendered unprofitable. The French have an admirable way of encouraging manufacture from foreign raw materials which is known as the *acquit à caution* system. Under it, an importer in the north of France, for instance, may bring in a quantity of English pig-iron, for which he pays duty. A rolling-mill in the south of France or any other part of the country exports say a given quantity of bridge iron. By doing so, it can claim a drawback on an amount of pig equal to that employed in making the rolled material exported, and in order to obtain it need only purchase the certificate of importation of the person in the north who brought foreign pig-iron into the country. The advantages of this system are apparent. A



smelter at Philadelphia, under such circumstances, might bring in Mexican ores, for example, while a pipe, sheet and shot mill could send out to China, or any part of the Pacific, an equivalent amount of metal, allowance being made for loss in smelting and waste in manufacture. In a country as large as our own, where the cost of overland transportation prevents any attempts on the part of Eastern manufacturers to seek such markets as the Pacific, the *acquiescence* system would be an aid to the miners and manufacturers of that coast, while at the same time it would aid in building up a smelting industry of foreign ores in cities on the Atlantic seaboard.

We believe that we have said enough to prove how unsatisfactory the present state of affairs is, and to show that something must be done to improve it. The question whether or not duties should at all be levied on ores is one that deserves serious discussion. If a thorough investigation of all contending interests decides in favor of the necessity of the continuance of the present course, simple justice demands such an adjustment between the rates on ore and on metal that the former carries relatively less. The present drawback system ought to be so regulated as to be based upon some intelligent principles. The identity clause should be dropped, and the adoption of some method similar to the French should be taken into consideration.

#### WHAT CONSTITUTES FULL-PAID STOCK?

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As there seems to be a difference of opinion as to what constitutes "full-paid stock" of the various mining companies, as organized under the laws of this State, I should be pleased to have your views on the law on this subject.

Can a mining company, with a capital of, say, \$100,000, after having purchased valuable property for nine tenths of its capital stock, which makes this nine tenths (from the very plain wording of the statutes) full-paid stock, issue the remaining one tenth of its capital stock in payment of the salaries of its officers, and thereby declare, by filing the required certificate, that the whole amount of capital stock is "full paid"?

INVESTOR.

The law of New York provides that no stock of an incorporated company can be issued except for cash or for property purchased.

#### TREATMENT OF THE LOW-GRADE SILVER ORES AT THE SILVER ISLET MILL.

Written for the Engineering and Mining Journal by Francis A. Lowe, E.M.

The Silver Islet mill of 50 stamps, 24 Frue vanners, and two Blake crushers, and all the necessary machinery in the way of an upright double fly-wheeled 300 horse-power engine, frictional hoisting machinery, pumps, water-tanks, and four large boilers (for wood), was begun and completed at a cost of nearly \$100,000 during the severe winter of 1873-1874, the thermometer registering for many days 30° below zero. The mill was built to treat only the low-grade ores carrying native silver and other rich silver ores, of which many thousand tons had accumulated in the mine, on the islet, and on the mainland. The late W. B. Frue, at the time of the construction of the mill, was general manager of the property. It was during his management that he made experimental tests as to the best method of treating this class of ores, which had never been worked by any of the ordinary methods of concentration, either in this country or abroad. The natural fear of losing the little particles of native silver disseminated throughout the rock checked the adoption of methods which would have been readily applied to other ores of greater value per ton, and led to the invention of the Frue vanner, an improvement upon Brunton's revolving belt. Though since greatly improved, it still necessitates, in the case of rock carrying native silver, a "clean-up" or "lower" table, to save the loss from the upper one. Probably with some ores, however, the clean-up table could be dispensed with. Frue made a series of tests, the outcome of which was the concentrator which bears his name—perhaps the best now in use. The present table is very much superior to the early ones in its simplicity of construction and mechanical arrangement, and is better as regards the delivery of battery slimes, the steady and invariable movement of the belt, and the absence of any lost motion of any kind in the lateral movement. The first twenty-four tables made under Frue's patent were placed in the Silver Islet mill. Though they are at present, from wear, like so many cripples propped up by diagonal braces to recover lost motion, and though subjected to a swaying movement, they have given such satisfaction that the statement is warranted that the mill, with all the drawbacks noticed, is probably the most successful one of its kind in the country, and its production has paid over four times the cost of its construction. The present article has been written with the object of dissipating any hesitation on the part of those who have to deal with ores carrying native and other rich silver ores, and to correct the prevailing error that the concentration of rich silver ores can only be effected at a loss varying from 20 to 70 per cent.

The location of the mill is on the mainland, and on a narrow slip of ground separating Surprise Lake from Lake Superior—the level of the latter being 22 feet below the level of the former. Surprise Lake furnishes an abundant supply of water throughout the year, and its average depth is about 50 feet. It is fed by streams flowing from Grass Lake at a higher elevation, and were the volume of water sufficient, it would furnish a power to take the place of the expensive use of steam-engines. Except in times of extreme drought, which seldom occur, the present supply or overflow is sufficient for a 100-stamp mill.

The stamp rock from the Silver Islet mine is a fine-grained calc-spar with a pinkish hue, due to the presence of oxide of manganese, with an intermixture of quartz carrying traces of native silver, macfarlanite, huntillite, a nimikite, silver-glance, proustite, nickel and cobalt bloom, blende, galena

iron, copper and arsenical pyrites, and plumbago. Macfarlanite, huntillite, and animikite are three rich silver ores, unknown until their recent discovery in this mine, where they occur in abundance in and around the later deposits of silver. They are now the principal producing silver ores of the mine. Macfarlanite is a compound of nickel, cobalt, and arsenic, with 78 per cent of silver. Huntillite, of which there are two varieties, the amorphous and the crystalline, is a very black mineral, which—especially the amorphous variety—crumbles and breaks between the fingers, and under the stamps is easily reduced to a fine powder. The amorphous variety has a density of 7.47, while the crystalline has a density of 6.27, and a fracture showing crystals of calcite throughout the ore. Animikite is a massive mineral with a conchoidal fracture. It has a specific gravity of 9.45.

The blende, galena, and pyrites are generally very poor in silver, seldom exceeding 2 ounces per ton when taken from barren parts of the vein, but in and about rich silver deposits they become highly enriched, both chemically and mechanically. This chemical enrichment has not been noticed by the writer in the case of the same minerals in and about the rich deposits of silver found in the rich native silver veins of Batopilas, Mexico. Mechanically, however, they are enriched by particles and streaks of native silver. In that district, as at Silver Islet, the base minerals, galena, blende, and pyrites, are generally poor.

The stamp rock of Silver Islet is brought over to the mainland on large scows, each carrying ten car-loads. They are towed over by tugs to a slip. The cars are hoisted by frictional gearing up an incline to the mill, where the ore is divided and dropped in front of the two Blake crushers, from which it falls into large bins on a level with the stamp-feeders. The introduction of ten of Hendy's Challenge ore-feeders, there being ample space behind the batteries, would require only one man to attend to the 50 stamps. These feeders are portable, easily moved about, and readily put in communication with the stamps from which they are driven. The batteries are fed slowly and regularly with about 3½ gallons of water to each battery, each stamp being supplied by an independent stream. They have a fall of about 6 inches, and between 80 and 90 drops per minute, and weigh about 600 pounds apiece. The battery slimes pass through sheet-iron slotted screens, and are conducted on to the vanners through launders with one foot pitch to the 12 feet. With 3½ gallons of water per minute and slow and regular feeding, the tables never become loaded or clogged with the slimes, in the prevention of which lies the true success of the Silver Islet treatment of such ores. The maintenance of this condition, and the slow and regular forward movement of the belt, assist the small particles of ore in sinking and attaching themselves to the belt.

The slime dispersers deliver the slimes on the table in a direction opposite to the movement of the belt, and they are fixed to the vanner frames. On the new and improved table, the slimes are delivered in the same direction with the movement of the belt, much lower down from the head, and the disperser is attached to and partakes of the same lateral motion of the belt. The inclination can be varied and the speed of the belt be changed from three to twelve feet, to suit different ores and different degrees of fineness of slimes, a principle the importance of which is well established practically and theoretically in the concentration of ores. Besides, the belt passes over galvanized sheet-iron drums of the same diameter, a great improvement upon the old wooden ones.

The Silver Islet mill has twenty tables, ten upper or "head" tables and ten lower or "clean-up" tables, the latter being about two feet below the former, which treat directly the slimes from the battery. The inclination of these tables is fixed, and they are almost level. The slimes, as they strike the upper machines, are concentrated to as high a degree as possible, ostensibly in order to get the first headings as clean as possible. As they accumulate in the boxes below the machines, they are raked out and placed in barrels. A sample from every shovelful is taken for assay. The ore or metal passing the upper tables, varying in quantity with the richness of the ore treated, along with the slimes passes down on to the lower tables, where a product is obtained containing considerable sand or gangue, but thoroughly freed from all slime. The discharging slimes from these tables pass off into the lake through the main waste launder, with about two ounces in silver per ton—the average of over 200 assays made by the writer. The headings from the lower tables are raked from the boxes beneath, and equally divided and placed in convenient boxes to the right and left of the "dressing" tables to the right and left of the mill. Upon these dressers the clean-up headings are reconcentrated to as high a degree as possible, repeating the method of treating the battery slimes. The headings from the clean-up dressers are mixed with the headings from the clean-up tables. These poor headings are fed upon the upper dresser through a box in which there is a stirrer—the periods of feeding being shown by a revolving dial upon a face placed over the table and directly in front of the boy whose duty it is to attend to the proper amount of feeding at every revolution of the dial. The loss, as will be readily understood, is greater in the discharge from the clean-up dresser, but seldom exceeds 2½ ounces per ton.

The method at the Islet mill of treating such low-grade native silver ores is simple. No accumulations overcrowd the mill or stop the batteries, as the slimes are treated as fast as they issue from the stamps, and the mill is kept clean. Sixty tons of rock are treated daily, producing from one to two tons of wet concentrations, at an average cost of \$1.70 per ton. The average amount of moisture is about 14 per cent. These concentrations, with a small percentage of gangue, are barreled and shipped to the smelters in New York. At convenient places below the upper tables, catch-pits or boxes are placed to catch the fine stuff in the overflow from the large boxes under the head of the tables. These accumulations are barreled and shipped likewise.

The numerous assays made of the tailings from poor and rich ores showed that the loss in ounces increased with the value of the rock, but that the percentage of loss decreased with the increase of the value of the rock; in other words, a 6¼-ounce rock, the poorest ever treated in the mill, which yielded concentrates holding 270 ounces per ton, or 1 to 42 tons of rock, gave a loss of ¾ ounce, equal to a loss of 12 per cent, while the treatment of a 37-ounce rock, the richest treated during the writer's connection with the company, resulted in a loss of 2½ ounces per ton of tailings, equal to a loss of about 7 per cent. The mean of the two is about 9½ per cent, showing a concentrating power of the Islet method of treating low-grade native silver ores of 90½ per cent, probably not excelled by any other concentrating or amalgamating mill in the country. These facts prove

that it is erroneous to suppose that rich silver ores can only be concentrated at a loss of 20 to 70 per cent. It will be seen that the battery slimes pass through five stages of concentration before they are ready for shipment. Were the mill supplied daily with a 37-ounce rock, its capacity would be equal to a silver production daily of 2250 ounces, or over 700,000 ounces yearly, with a weekly product of eight tons of concentrations, and assay value of 1700 ounces per ton.

The 37-ounce rock produced concentrations of nearly 1700 ounces per ton, 46 tons of rock being concentrated into one. The writer, while connected with the company, and before him Mr. Curtis, who then was in charge of the Duncan mine in Thunder Bay, near Silver Islet, treating the same low-grade native silver ores, made a series of assays to determine the actual loss per ton in metallic scales of native silver in the tailings. We found that the average loss did not exceed one ounce, and that the principal loss was in floured silver. We also found that, if one ounce of silver was divided up into particles as fine as those in the tailings, and then mixed in with a ton of sand, a horn-spoonful or any small amount of it vanned down would give quite a perceptible silver color, which would appear to the uninitiated as if the sand was rich in silver. Since the writer left, many tons of rich ore, probably exceeding \$100 per ton, have accumulated from the last bonanza, and it is a matter of much interest to know whether the loss in ounces has increased much with the richness. If the ores of Silver Islet were as easily amalgamated as those of Batopilas, a couple of pans with one settler, a couple of crucible furnaces, and three of the new and improved retorts would be amply sufficient to amalgamate and run out into bars the silver contained in the concentrations. The rich packing ore could be stamped wet and allowed to settle in vats, and, after siphoning the water off, be amalgamated in pans, as is done by the Consolidated Batopilas Silver Mining Company. But, owing to the refractory nature of most of the Islet ores, amalgamation could not be directly applied.

Since the above was written, Mr. Lowe has added the following:

The new Frue vanners recently erected for the Consolidated Batopilas Silver Mining Company, to work the low-grade native silver ores, similar to those of Silver Islet, are concentrating efficiently. With a very good ore recently run through the mill, the loss in metallic silver was only 1/2 ounce per ton, and the whole loss from the tables or in the tailings was only 2 ounces per ton. The metallic silver in the ore was concentrated to 92.3 per cent, and the whole amount of silver in the ore to 92 per cent, proving that clean-up tables, like those in the Silver Islet mill, are not necessary, as the writer believed them to be.

THE SCHRANZ MILL.

In a recent issue of the *Berg- und Huettten-Zeitung*, Herr Conrad Bloemke, of Aix-la-Chapelle, describes a mill invented by Herr Wilhelm Schranz, of the Laurenburg-am-der-Lahn, which possesses some interest as a modern modification of the old Chili mill, and some experiments which we may quote as an instance of the thorough manner in which Germans conduct such investigations. Of the mill we may briefly say that it consists of a rotating-table, slightly conical, and made of cast-steel. Against the upper part of this table bear three conical rolls, the distance of which from it can be closely adjusted. They are rotated by friction by the movement of the table, so that they simply crush and do not grind the mineral. The distance from the table of the first one which the ore encounters is greater than that of the second, so that a gradual reduction takes place. The ore is washed from the table by a stream of water, so that it acts continuously. It required about thirty gallons of water per minute, and ground 1.35 metric tons per hour, while a 15-stamp mill, of German build, of course, put through only 0.85 ton, using 112 gallons of water, and crushing through a screen of 0.1 inch mesh. The weight of each stamp was 352 pounds, dropping 7.8 inches 60 times a minute. The most interesting, however, to Americans is the record of a competitive trial of the Schranz mill and the 15-stamp batteries, both working the same ore, 0.2 to 0.3 inch middlings from jigs. In view of the well-known fact that the losses of metal in further dressing will increase as the quantity of slimes and fine grades of ore produced during the crushing augment, it will be seen from the following tables how superior to the stamp-mill is the Schranz mill for crushing from smaller sizes of middlings. We give for every item two figures, of which the upper represents the record of the stamps and the lower that of the new mill. The first column shows the percentage of each size made by the two, while the assays appended give an idea of the distribution of the metals in the various grades, which are very closely exhibited in the third series of figures. The silver is given in grams per metric ton, and the zinc and lead in kilograms. The figures under the heading of assays are the averages of the material submitted to the two different kinds of crushing apparatus:

SIZE OF ORE.	Per cent.	ASSAYS.			QUANTITY OF METAL.		
		Zinc per ct., 31.86 32.91	Lead per ct., 4.10 4.20	Silver, 52 50	Zinc, k.	Lead, k.	Silver, gr.
0.125 to 0.094 inch.....	6.95	27.0	3.3	52	18.8	2.3	3.6
0.094 " 0.062 "	4.08	17.8	1.3	20	8.3	0.6	0.9
0.062 " 0.035 "	21.07	29.9	3.3	52	63.0	6.9	10.9
0.035 " 0.019 "	15.15	24.8	2.1	28	37.5	2.0	4.2
0.019 " 0.008 "	26.27	30.5	3.3	52	80.1	8.8	13.7
Below 0.008 "	16.96	29.7	2.2	28	50.4	3.8	4.7
First slimes.....	16.92	31.4	2.9	32	53.1	4.9	5.4
Second slimes.....	24.08	34.7	2.4	32	83.6	5.8	7.7
In water to settlers.....	15.81	33.2	3.7	60	52.5	5.9	9.5
	16.72	35.6	7.1	94	59.6	11.9	15.7
	7.21	31.9	9.0	120	23.0	6.5	8.6
	5.87	32.8	7.3	96	19.2	4.3	5.6
	2.23	29.0	6.4	94	6.5	1.4	2.1
	3.88	32.2	9.1	118	12.5	3.5	4.6
	1.71	28.8	7.1	110	4.9	1.2	1.9
	12.66						
	1.83						

A study of these figures is instructive on a number of points. Pound

ing the ore, it will be noted, has the effect of making the quantity of slimes and waste heavy, and drives into it a large proportion of the lead, and with it the silver.

THE CLASSIFICATION AND THE USES OF STEEL.—I\*

With the growing variety of the products of modern and older processes of making what is commercially known as steel, the demand for some simple method of classification has become more urgent. Both producers and consumers have within the past few years made attempts to devise some means of classification that will aid both in designating exactly what the qualities of a given metal are. Sheffield crucible steel makers; Tunner, for the Austrian steel-works; almost every European establishment turning out merchant Bessemer or open-hearth metal; the German Railway Union; and committees of various technical societies, have tried to establish some such scale, but it can hardly be said that any of them have proved satisfactory. M. Victor Deshayes, of the Terre-Noire Steel-Works, France, has, so far as we know, been the latest, without, we regret to say, having succeeded better than the rest. His classification, which is used in a recent work before us, is based upon differences of tensile strength alone, and is as follows:

	Tensile strength.	
	Kilogs. per sq. millimeter.	Lbs. per sq. inch.
I. Exceptionally mild steel or ingot iron.....	Less than 45	Less than 64,008
II. Very mild steel.....	More than 40 but less than 50	More than 56,896 but less than 71,120
III. Ordinary mild steel.....	" " 50 " " " 60	" " 71,120 " " 85,344
IV. Ordinary hard steel.....	" " 60 " " " 70	" " 85,344 " " 99,568
V. Very hard steel.....	" " 70 " " " 80	" " 99,568 " " 113,792
VI. Exceptionally hard steel.....	" " 80	" " 113,792

It is difficult to see what special merit attaches to just this classification, and we can not escape the belief that M. Deshayes has adopted it more for the purpose of procuring a convenient mode of dividing his work into chapters than with a view to securing its general acceptance, and we are strengthened in this by the absence of any special effort to urge it. The true value of the work lies in the discussion of the question for what uses the various grades are specially adapted, and we shall, therefore, follow his plan, giving the mass of valuable data submitted, so far as our space will allow. The Terre-Noire engineers have deservedly the reputation of being among the most progressive of Europe; and as circumstances long ago forced them into a careful scientific and practical examination of various grades of metal for all purposes to which merchant steel is put, their experience will be very valuable to American metallurgists who are only now entering that field so full of promise. We may briefly preface our abstract from M. Deshayes's volume with a résumé of the plan followed in presenting the matter in every chapter, as best indicating the scope of the work. After a discussion of the various grades of the steel in which carbon is the leading constituent, he takes up those in which that body is replaced by manganese, phosphorus, chromium, etc. He then refers to details of manufacture, and discusses the tests by which the casts of steel are classified. This is followed by data on the best form to be given to the ingots according to the uses to which they are to be put, the effect of hammering, welding, rolling, etc. In the conclusion of every chapter M. Deshayes takes up the special uses of the steel in its ordinary state, and when annealed or hardened in different ways.

I. *Exceptionally Mild Steel* (the tensile strength being less than 45 kilograms per square millimeter, or less than 64,000 pounds).—This metal can be produced only with the best of raw materials, practically free from sulphur or phosphorus. It is generally made in the open-hearth furnace, because its manufacture by the Bessemer process is well-nigh impossible, according to M. Deshayes. We might remark here, however, that, as experience at Witkowitz has shown, the basic process has done good service in this direction of late. This class is represented by a type of metal which will, when hammered or rolled, show an elastic limit of less than 20 to 25 kilograms (28,448 to 35,560 pounds), and a tensile strength below or at most of 40 kilograms (56,896 pounds), figures which correspond to an elongation approximating 30 per cent, and giving even as high as 40 per cent. Theoretically, steel free from manganese, and holding as high as 0.30 carbon, ought not to go higher than 56,896 pounds; but as even the purest metal contains a slight quantity of manganese, silica, phosphorus, etc., the percentage of carbon must be limited to 0.15 or 0.18, with 0.20 to 0.30 of manganese, as an examination of Swedish steel will prove. Creusot's No. 11 is the same, and Terre-Noire metal, holding 0.15 of carbon, 0.213 of manganese, 0.035 of phosphorus, and traces of silicon and sulphur, showed annealed an elastic limit of 19.37 kilos (27,552 pounds), a tensile strength of 35.45 kilos (50,424 pounds), and an elongation of 31.39 per cent, while hardened in oil it ran 30.90 kilos (43,952 pounds) elastic limit, 45.35 kilos (64,506 pounds) tensile strength, and 24.50 per cent elongation. Hardened in oil, mechanical tests showed that it had an elastic limit of 31.46 kilos (44,748 pounds), a tensile strength of 50.18 kilos (71,376 pounds), and an elongation of 16.57 per cent. In Austria and Sweden, this metal is made either by blowing manganiferous pig directly, without final additions or recarbonization, or with the aid of ferro-manganese at the close. In France, the open hearth is used, and ferro-manganese of high grade, running from 80 to 85 per cent of manganese, is added. The ingots are partly solid when rapidly cast, and it is only necessary, in order to avoid blow-holes entirely, to have a slight quantity of silicon. Steel for wire-drawing has been made holding 0.23 of silicon, and then no unsoundness in the ingots was detected. The most important point in connection with this grade of steel or ingot iron, whatever it may be called, is, that it welds readily, and it is a remarkable fact, shown by the Jernkontoret and by Reschitza, that metal made by the Bessemer process will weld better than that manufactured in the open-hearth steel furnace. This mild metal undergoes

\* *Classement et Emploi des Aciers*. By VICTOR DESHAYES, Engineer at the Terre-Noire Steel-Works. Published by Dunod, Paris, France. 1880.



cold working, bending, hammering, punching, etc., without any signs of weakness. Its characteristic property, however, is that it will not harden. It is, however, necessary, as M. Deshayes says, to understand this point well. If the term "not hardening" is applied when steel, after being plunged at a red heat into cold water, can be bent double without cracking, the above statement is correct, and it proves only that these grades of metal are not so energetically changed by the hardening process that this change can be revealed by a simple bending test. When, however, the record of mechanical tests is examined, it will be found that the elastic limit and the tensile strength have been increased, while the ductility has been impaired.

As a general thing, it may be stated that the metals belonging to this class must be annealed before use, and M. Deshayes urges their value for boiler plates, for which, as the Swedish tests have proved, they possess the very important advantage of showing very small differences only when tested with or across the direction in which they were rolled. The Creusot Company has made a boiler for a locomotive, shown at Paris in 1878, entirely out of mild steel of various grades, and the Terre-Noire Company uses the material of which we have given details in the above. In Russia, 0.15 to 0.20 carbon steel is employed for locomotive boiler-tubes, and in Sweden 0.16 to 0.15 carbon metal sells for bolts. In Germany and in Sweden, mild steel is used for rifle-barrels, as the following analyses given by Westman, of Sweden, show :

	Mang.	Carb.	Silic.	Sulph.	Phosph.
Fagersta.....	0.169	0.150	0.019	tr.	0.025
Sollingen.....	0.144	0.130	0.107	0.015	1.076

For wire this grade of metal has found a growing market, though a very solid material, which only a few works can supply, is demanded. The analyses and tests given below will furnish an example for the metal employed for this purpose :

Mang.	Carb.	Silic.	Phosph.	Elastic limit.	Tensile strength.	Elongation.
0.160	0.139	0.20	0.080	.....	.....	.....
0.160	0.139	0.20	0.088	.....	.....	.....
0.320	0.206	0.07	.....	34,565	55,474	32.0
0.280	0.183	0.05	.....	34,138	55,474	27.2
0.225	0.200	0.07	.....	32,715	50,896	36.2

The metal generally used in Sweden for wire ranges between 0.10 to 0.15 per cent of carbon. In conclusion we may quote the following analysis as that of a metal which, though a little higher in carbon, is largely used in Sweden for parts of machinery :

Manganese.....	0.234	Silicon.....	0.236
Carbon.....	0.250	Phosphorus.....	0.022

II. *Very Mild Steel* (tensile strength greater than 57,000 and less than 70,000 pounds).—The grades of steel of this class to which their distinctive characteristics have been given by high carbon, include all those ranging from 0.30 to 0.50 carbon, and whose contents of manganese varies from a maximum of 0.50 to a minimum of 0.10. That is to say, steel having a tensile strength of 57,000 pounds may be obtained with 0.30 carbon and traces of manganese, or a steel going as high as 70,000 pounds may be made by producing metal carrying 0.50 of carbon and no manganese, or 0.30 to 0.50 of carbon, and 0.30 to 0.60 of manganese. Between the two extremes is the steel demanded by the French Navy, having a tensile strength between 59,741 and 62,586 pounds, and for which the specifications demand that it shall not harden. In order to bring up the steel to that limit, and still have metal that will not harden, the carbon must be lowered under 0.20, while the manganese is brought toward 0.30 to 0.35, a necessary condition being that the latter constituent be not too high, so that hardening, easily caused by manganese, does not take place. It should be understood that this refers only to perfectly annealed material.

Steel of this class may be obtained either by the Bessemer or the Siemens-Martin process, but the latter is the favorite method, and is generally necessary when a metal that will not harden is to be obtained. Pig containing some manganese, and as pure as possible, is used as a basis, and rail crop ends, puddled blooms, even steel scrap, are used as additions. The bath is made as mild as possible, and sufficient ferromanganese is added to make a product that will forge and roll well. At Terre-Noire, they have found that forging tests of a small sample ingot did not give any indication as to whether the metal will harden or not if it is rolled into sheet. In that special case, the sheet itself is tested after casting one ingot larger in size, so that a specimen can be submitted to hardening tests. Both Creusot and Terre-Noire now ascertain the tensile strength of the rolled metal, which offers important technical advantages, though an expensive method.

In view of the high melting-point of mild steels, they must be produced at elevated temperatures, so that the cinder will separate well during the casting. On the other hand, it is a fact generally recognized now by steel makers that metal cast very hot is harder than when cast at a low temperature. Therefore, it is advantageous to let the metal flow from the furnace at a high heat, and allow the cinder to separate and the metal to cool in the ladle before running into ingots, a practice which is followed with success both for the Bessemer and the open-hearth process in a number of French works.

The reduction of section by subsequent rolling has a very important effect upon the mechanical properties of steel, and therefore much attention must be paid in choosing the dimensions of the ingots with reference to the gauge of the plates or shapes to be rolled, without, however, falling into the extreme, because too considerable a reduction of section by rolling hardens the metal so that its tensile strength will run up 14,000 to 20,000 pounds, while the ductility suffers accordingly. For a bar weighing 2.52 to 3.36 or even 5.04 pounds per running yard, ingots 7.8 to 11.7 inches square will do well, and the same dimensions may be adopted for steel billets for small work. For sheet 0.39 to 0.78-inch thick, flat ingots 7.8 to 9.75 inches thick are employed by preference, while thicker ingots, 11.7, 15.6, or 17.5 inches, are used for 0.78, 1.17, and 1.36-inch plates, when it must bear tests approximating 64,000 pounds. The working of mild steel must take place within narrow limits of temperature, between orange red and cherry. If it is continued at too great a heat, the structure of the metal suffers, the tenacity increases while the ductility goes lower, and it is recommended that the rolling of sheets, tees, shapes, etc., be done in two

heats. M. Deshayes gives an interesting table to show the effect upon the mechanical qualities of the metal by rolling too cold. His table shows also the effect of annealing and hardening. We give below a few figures taken from it :

SHEET.	UNANNEALED.			ANNEALED.		
	E. L.	Tens. St.	Elong.	E. L.	Tens. St.	Elong.
0.867 inch.....	39,614	62,756	20.62	30,894	58,318	23.60
0.433 ".....	40,894	65,118	22.39	27,026	57,564	21.28
0.197 ".....	39,827	65,999	19.70	24,250	60,096	21.70
0.098 ".....	59,029	70,512	8.00	29,444	59,314	16.60

Steel belonging to this class is largely used in Europe for shipbuilding, the French and Italian navies demanding metal that will not harden and has a tensile strength of 64,000 pounds. The English Lloyd imposed similar conditions, but has since reduced them to from 60,000 to 67,500 pounds, metal which corresponds to No. 9 of Creusot, No. 6 of Reschitz, No. 1 of Seraing, Nos. 8 and 9 of Denain and Anzin, and Nos. 8 and 7 of St. Chamond. At Terre-Noire, this metal is thought to correspond to the following chemical composition : Manganese, 0.30 to 0.32 ; carbon, 0.17 to 0.18 ; sulphur, 0.53 ; phosphorus, 0.06 to 0.57 ; and traces of silver, an average of a large number of casts. M. Deshayes then goes into the question of using steel of this grade for rifle-barrels, giving a large number of analyses and tests, and then discusses its use for a variety of other purposes.

Our desire to place on record some of the facts and conclusions of M. Deshayes's work has led us farther than we anticipated, and we reserve for a future issue, the review of the remaining four classes of steel.

#### TESTING UNDERGROUND TELEGRAPH CABLES.\*

By Dr. Brix.

In a paper read before the Electro-Technical Society of Berlin, Dr. Brix describes in detail the methods adopted in practice of testing the underground cables on the lines of telegraph under his direction. The tests are made once a week. In measuring what the author calls the "copper resistance," that is, the electrical resistance of the copper conductors, great advantages are found in having several wires in one cable. In such a case, the wires may be measured in continuous circuit, instead of making use of an earth return. The importance of this in obtaining exact measurements will be understood when note is taken of the disturbing influences of polarization of earth-plates, and the working of other lines having earth-plates at no great distance.

At the distant station, the several conductors of the cable are connected together ; at the place of measurement, the testing-room of the home station, two of these conductors are connected with the Wheatstone bridge, and the resistance of this wire circuit is measured in the usual way. The battery is not in this case put to earth, but is in communication with the bridge, an arrangement which gives true results, even if one of the conductors has a fault of insulation, for no loss of current can then take place through the fault. When there is a fault of insulation in each of two conductors, the case is obviously different ; for if these faulty wires were connected up to form a circuit, a leak would occur from one wire to the other through the earth, and a false indication would be obtained. In such a case, the wires must be connected up singly, care being had that a faulty wire be joined to a sound one. When dealing with three wires, the resistance of these singly may be easily found by the method of connecting up in circuit here referred to. Connection is first made between Nos. 1 and 2, then between Nos. 1 and 3, and lastly between Nos. 2 and 3. The last measurement deducted from the sum of the two others gives twice the value of No. 1, and this value deducted from the first two measurements gives the value of Nos. 2 and 3. In a cable containing seven conductors, seven circuits, made up in like manner, will be sufficient. But in practice nine are formed ; the additional labor occasioned thereby is small, and more than compensated by the advantages gained. These nine combinations are so chosen that out of any three of them three circuits may be determined, and that a circuit, say No. 7, may be common to each of the three groups. From these nine measurements are thus obtained three values of No. 7. Each of these values is deduced from three independent measurements ; and if these three values agree one with another, there is strong presumptive evidence of their being all correct. A further proof may be obtained by comparing the measurements one with another, when these have been taken always in the same order. The difference between two consecutive measurements must always be about the same in amount. From the copper resistance obtained in this way, after making a suitable reduction for the temperature of the room and the rheostats, the mean temperature of the underground cable is deduced. The measured resistance of the conductors is compared with a standard resistance at a normal temperature of 15° Centigrade.

#### PUMPS AT HIGH ALTITUDES.

Writing from Leadville to the *American Machinist*, Mr. A. Falkenau gives some interesting facts in regard to the pumping in the mines of that region. The city is 14,000 feet above the sea, and the barometer stands at 20.14 inches, the air-pressure being therefore 9.89 pounds, which would theoretically support a column of water about 22 feet high. Practically, however, a 14-foot lift is considered very good, though an instance of 18 feet is given. As the prospecting shafts are generally only 3 by 6 feet, and the pump compartment is only 3 feet square, and must be used for other purposes, the size of the pumps must be small. In view of the low pressure of the air, the length of stroke, too, is limited, because, if it were unduly increased, the pump would have to be lowered too frequently during sinking. Therefore, Cornish pumps, which run at a slow speed, are necessarily too bulky for sinking, and steam pumps have found favor in Leadville, notwithstanding the objections which condensation of steam in pipes, the annoyance due to the heat, and the diffi-

\* Abstract of a paper in *Electrotechnische Zeitschrift*, January, 1881, pp. 3-6. From the Proceedings of the Institution of Civil Engineers of London, edited by James Forrest, Secretary.

culties of making repairs, all entail. Mr. Falkenau states that of the pumps principally used, the Knowles, Cameron, and Cope & Maxwell, the rubber valves of the first and last named wear out in a few hours under great pressure, while the combined metal and rubber valves of the Cameron pump do well. He holds that the Knowles possesses the advantage of occupying little space comparatively, while the Cope & Maxwell, though convenient in other respects, is bulky compared with its capacity.

INVESTIGATIONS ON THE ORE KNOB COPPER PROCESS.\*

By T. Egleston, Ph.D.

The works of the Ore Knob Copper Company are situated in the county of Ashe, in the northwestern part of the State of North Carolina, about ten miles from the Virginia line, at an elevation of 4600 feet above the sea. The nearest railroad station is at Marion, Smythe County, Va., about forty-five miles distant. The roads from the railroad to the works have been constructed by the company for the transportation of their material, and are very hilly and, in certain seasons of the year, in bad repair. Transportation is therefore always limited and never easy, although it is done by contract at a very low price. The main difficulty with the transportation is not so much its cost as the fact that it puts a limit to the production of the works. These unfavorable conditions make it necessary for the owners of the mine to smelt their ores and to send to market nothing except the metal, which alone will bear the cost of transportation.

The mine was originally opened on a very rich streak of chalcosite running at times as high as 30 per cent in copper. The works which were constructed to treat it were designed for the Hunt and Douglas process, which has been described in full.† This process was worked on a large scale until the amount of carbonate of lime which came into the ores rendered it impossible to use it any longer. It was then abandoned and the present works built. The ore afterward became poor, and no traces of chalcosite are now seen in the mine.

The smelting-works are situated only a few hundred feet from the mine. The ore is delivered into the dressing-house, where that containing copper is separated from the sterile material, and discharged into a car running by gravity to the smelting-works, where it is dumped into carts and carried to the piles to be roasted. After a series of experiments, extending over many months, it has been found that at present prices an ore containing three per cent of copper just pays the expenses of mining and smelting. There will consequently be a loss at Ore Knob, under the present conditions, in working by the method now used an ore of a less, and a profit in working those of a higher percentage.

Analyses No. 1 and No. 2 show the mineralogical composition of the ore taken from each of the two shafts of the mine. No. 3 is a sample taken from the heaps of poor ore lying on the surface.

	No. 1.	No. 2.	No. 3.
Chalcopyrite .....	11.33	13.30	4.76
Pyrrhotite .....	37.46	35.74	48.78
Sesquioxide of iron .....	8.14	16.34	18.36
Alumina .....	1.84	1.49	.....
Manganese .....	0.16	0.50	0.76
Lime .....	5.32	7.84	7.21
Magnesia .....	0.35	0.04	0.30
Carbonic acid .....	4.76	7.19	6.00
Zinc .....	0.67	0.66	0.65
Cobalt .....	0.09	0.09	0.095
Nickel .....	0.71	0.92	1.08
Siliceous residue .....	29.10	13.57	12.80
Metallic copper in the ore.....	99.93	98.58	100.79
Alkalies, etc., not determined.	3.92	4.60	1.65

The ore might be enriched much further by careful hand-picking. No dressing in the ordinary sense of the word is applicable to it, since the pyrrhotite and chalcopyrite are of very nearly the same specific gravity. No effort is made at dressing, except with the "fines," and the only attempt then made is to get rid, in a rough way, of part of the quartz in the ore.

The following interesting summary of the cost of mining and the production from January 1st, 1879, to April 1st, 1880, was taken for me from the books of the company by Mr. J. E. Clayton :

COST OF MINING.	
Cost of labor, for fifteen months.....	\$27,706.11
Cost of powder, fuel, candles, etc.....	3,480.24
Cost of carting, per ton of ore.....	0.815
Quantity of ore delivered in mill-house.....	38,372 tons.
Ore delivered yielded in furnace ore.....	21,223 tons.
Proportion of furnace ore to ore delivered.....	55.1 per cent.
Average yield of the ore.....	6 per cent.
Yield of furnace ore from ore mined, 1876.....	33 per cent.
Yield of furnace ore from ore mined, 1877.....	34 per cent.
Yield of furnace ore from ore mined, 1878.....	48 per cent.
Yield of furnace ore from ore mined, 1879 and 1880, to April 1st.....	55.1 per cent.
COST OF LABOR IN DETAIL.	
Cost of assorting, handling, and selecting.....	\$12,447.66
Cost per ton of assorting, handling, and selecting.....	0.3223
Cost per ton of handling, assorting, and delivering at furnace.....	0.586
Cost of surface work for fifteen months.....	8,802.63
Cost per ton of furnace ore, surface work.....	0.415
Cost of superintendents, managers, and bookkeepers.....	7,500.00
Cost of superintendents, managers, and bookkeepers, per ton of ore.....	0.208
WAGES (INCLUDING BOSSES)—UNDERGROUND.	
Seventy-two men, average daily pay.....	\$0.92%
WAGES—SURFACE.	
Assorting ore, 39 men, average daily pay.....	\$0.79 1.9
Furnace men, 87, average daily pay.....	1.06 1.5
Average number of men directly employed at the mine.....	220
Average daily pay for past 15 months.....	0.89 1-2

The arrangement of the metallurgical works appears at first sight not to be very regular, but their position has been determined by the lay of the

\*A paper read at the Virginia Meeting of the American Institute of Mining Engineers. †See *Engineering*, London, Eng., vol. xxii. p. 419. *Trans. Am. Inst. Mining Engineers*, vol. I. p. 253, vol. III. p. 391. ‡The labor of sinking over three hundred feet of shafting and all the development in the mine are included in this amount.

ground. They consist of six roasting-sheds, ten shaft-furnaces, one reverberatory furnace, and four houses for storing the coal. The plant is capable of producing a much larger amount of copper than it now does. The ore, as seen by the analyses, is so exceedingly pure, and the fuel so entirely free from every thing deleterious, that with careful refining a very high grade of copper might be made.

The works are very favorably situated with regard to fuel. The company owns a large amount of timber land, which, however, it has been thought good policy to leave untouched. It contracts for its wood with the neighboring farmers, who deliver it ranked at the following prices: all oak, per cord, \$1.85; mixed oak, per cord, \$1.65; soft wood, per cord, \$1.50. The charcoal is purchased by contract at five cents per bushel of from 18 to 19 pounds, delivered at the furnace.

All other materials are very cheap, as there is no market in the vicinity but the mine. It regulates the prices of most of the articles produced in the country. Bricks cost \$5 per thousand; lumber, \$10 per thousand feet; labor is cheap, and there is always an abundant supply of it; but the prices of country produce are such that the purchasing power of money is much greater than it is in most places.

Pig-copper is arrived at in four and ingot in five operations. The process consists of:

1. Roasting the picked ore and the dressed fines in piles.
2. Fusion in a shaft-furnace for mattes, generally called single mattes.
3. Roasting the mattes (Nos. 2 and 4) in piles.
4. Fusion in a shaft-furnace for black or pig-copper, and concentrated or double mattes.
5. Treatment of the salamanders.
6. Fining and refining.

1. ROASTING THE ORE.

The roasting of the ore is effected in three sheds, capable of holding 42 piles, 16 in the first, 14 in the second, and 12 in the third, which are 17 by 20 feet, and 8 feet high in the middle, and contain 100 tons of fresh ore and about 50 tons of partially roasted ore, so that in all each pile holds about 150 tons.

As the ore contains a very large excess of sulphur, owing to the presence of so large a quantity of pyrrhotite, but little fuel is required for the process. The greatest part of the heat is due to the sulphur in the ore. It requires but little labor to take charge of such a pile, since, if it is properly constructed and kept free from the influence of high winds, the heat of the burning sulphur spreads itself upward in layers sufficiently horizontal to insure a nearly equal distribution of the heat. The ease, however, with which the air has access to the pile will cause some irregularities, as will also the size and nature of the pieces of the ore, so that it is never uniformly roasted. In driving off the sulphur, sufficient must be left to form the matte, but enough must be driven off to insure that as much of the iron as possible shall pass at once into the slag. It takes about six weeks to burn a pile. When taken down, it is about three fifths roasted, and the rest goes into a new pile. The fine ore on the bottom is generally entirely agglomerated, so that it has to be broken with a pick or sledges. Three men and two horses and carts are required to bring the ore to the piles. Four men are required to clean them up and dress and break the masses, which have become agglomerated in the process of roasting. The analyses of the roasted ore are given below:

	No. 1.	No. 2.
Copper.....	4.68	3.04
Iron.....	39.08	38.38
Sulphur.....	6.76	7.64
Alumina.....	1.79	2.68
Manganese.....	0.40	0.86
Lime.....	8.10	8.01
Magnesia.....	0.88	0.65
Siliceous residue.....	15.20	17.52

The roasting of the ore is imperfectly done; but the ore is of such exceptional purity that there are but few disadvantages resulting from the hasty roasting, the most serious one being that the matte is not as rich as it might be, and more foreign matter than necessary must be put through the next operation.

DETAILED STATEMENT OF COST OF ROASTING AT ORE KNOB, TAKEN FOR FIFTEEN MONTHS FROM JANUARY 1ST, 1879, TO APRIL 1ST, 1880.

Hauling to ore-sheds—3 men at 75 cents, \$2.25; 2 carts and horses at 40 cents, 80 cents.....	\$3.05
Placing ore and caring for ore-heaps—1 man, \$1; 3 men, 75 cents.....	3.25
	\$6.30
(Average amount of ore roasted per day, 50 tons of 2000 pounds.)	
Average amount of fuel used per day, 1½ cords of wood at \$1.85.....	2.77
Cost for 50 tons.....	\$9.07
Cost per ton.....	0.1814

The ore is delivered in cars on the tramway near the furnaces.

2. FUSION FOR MATTES.

The roasted ore, as soon as taken from the piles, is carried to shaft-furnaces, both used for smelting ore and matte. There are eight ore-furnaces, which, when they are all running, produce forty tons of matte, or about five tons each in twenty-four hours. The furnaces are rectangular in section, and have two tuyeres in the back of the furnace 3 inches in diameter, with nozzles 2½ inches in diameter. The tuyeres converge so that lines passing through their centers meet at 21 inches from the nozzle. The material of which the furnace is built is partly soapstone and partly fire-brick. The whole of the furnace below the tuyeres is made of crushed quartz, and the cost of each is \$706.88 at Ore Knob.

A campaign in the ore and matte furnaces lasts from 40 to 60 days. If all the six ore-furnaces were running on good ore, the output of the works would be not far from 500 tons of matte per month. The mine did not, however, produce enough to keep more than two matte furnaces running in July, 1880. The analysis of this matte is given below:

Copper.....	23.41
Iron.....	47.00
Sulphur.....	23.08
Alumina.....	0.40
Manganese.....	0.24
Lime.....	0.85
Magnesia.....	0.38
Siliceous residue.....	0.57

The slags flowing from the furnace are separated into poor and rich.



The rich are put directly back into the furnace; the poor are sent to the dump-heap. The analyses of the rich and poor slag are as follows. This includes that from both the ore and the matte furnaces:

	Rich.	Poor.
Copper.....	1.35	0.57
Iron.....	40.83	40.83
Sulphur.....	2.87	1.82
Alumina.....	4.84	4.29
Manganese.....	1.17	1.11
Lime.....	9.87	9.59
Magnesia.....	1.12	1.11
Siliceous residue.....	25.96	27.56

These slags are a little more basic than a bibasic silicate. They are not, however, very infusible, owing to the large quantity of iron they contain. They flow freely from the furnace, but are a little pasty.

The poor slags do not differ essentially in composition from the rich, except in the quantity of copper they contain. They are generally produced a little before and at the time of casting. It would be better if these slags were more acid; they would separate more easily and attack the sides of the furnace less, but the iron would not be so rapidly separated nor the matte so rich. It is the very large quantity of iron present which makes all the difficulty in working the furnace and causes the short campaigns.

Only two of the ore-furnaces were working in the lower furnace-house at the time of my visit. They were working well, but I think there would be an improvement if the ore were more carefully sorted. The casting is made about once in eight hours. Twice in the interval the furnace is worked to get rid of the accumulations of iron which form in the lower part of the furnace. The first indication of a foul hearth is a foul slag. The sticking in the furnace is caused by insufficiently roasting the ore, and too high a temperature, which causes an energetic reduction of the iron, of which there is a very large quantity in the ore. These half-melted masses of iron are put back into the furnace, if small; but if large, are put to one side to be treated by themselves. After the furnace has been cleaned, the slag does not run again for an hour or more. The furnaces were formerly chiseled once a week; it is now done about once in twenty days. The material so accumulated is always put to one side, to be submitted to the special treatment No. 5. The blast for the six furnaces, four ore and two matte, in the upper furnace-house, is a No. 5 Root's blower, with a conduit-pipe 18 inches in diameter. The engine uses one and seven eighths cords of wood per day. For the four ore-furnaces in the lower furnace-house, a No. 4 Root's blower is used, and the engine uses one and a half cords per day. Each furnace has one charger above and one below per shift of twelve hours, one slag-man, and one keeper. Besides these, there is one slag-dumper for all the furnaces. The slag-boy, in addition, picks the slag and brings it back to the furnace.

**SMELTING THE ORE FOR SINGLE MATTES—TOTAL COST CHARGED AGAINST AMOUNT OF ORE SMELTED—LABOR AT FURNACE.**

Two furnace-keepers, at \$1.....	\$2.00
Two furnace-chargers, at 80 cents.....	1.60
Two slag-rollers, at 80 cents.....	1.60
Hauling ore, slag, clay, etc., to and from furnace, two men at 75 cents, one man at 60 cents.....	2.10
Cost for keep of one horse and repairing cart.....	.40
	<b>\$7.70</b>
Average ore smelted in furnace per day, 13 tons.....	
Cost per ton for labor.....	.60
Cost per ton for charcoal, 54½ bushels at 5 cents.....	2.72
Cost per ton for labor and fuel.....	<b>\$3.32</b>
Ore.....	13,686 tons.
Mattes.....	4,326 "
Gross.....	18,006 "
Amount of charcoal used.....	979,938 bushels.
Number bushels of charcoal used per ton.....	54½
Cost of charcoal per bushel, delivered at furnace.....	5 cents.

**3. ROASTING THE SINGLE MATTES.**

The matte is broken up and is roasted in piles. This roasting is carefully done, but the same is true of it that was said of the ore-roasting. The mattes require more fuel than the ore, and as they do not contain any arsenic or antimony, they could be roasted much better in a furnace, where they would be under complete control, than in piles, where they are exposed to the weather at all times. The quantity of wood to be used requires judgment, as the mattes, especially the rich ones, are very fusible, and are likely to become agglomerated, in which case they would have to be picked out, broken, and passed through another roasting, which is never so completely done on these agglomerated masses as on the original mattes, which are cast thin for the especial purpose of having the action of the roasting such that the sulphur may be driven off, even to the interior of each piece, which can only be done when it is thin and flat, which the agglomerated masses never are.

It takes about five days to burn a pile, and the matte is roasted six times before it is ready for the furnace, taking about a month. From the first to the third roastings it takes ten days to finish each pile; the fourth and fifth, fifteen days each. Each pile contains about thirty-two tons. The number of piles required for the matte furnace is seventeen, thirteen piles burning every day, and four not burning. Very often the material is taken to the furnace hot. One and a quarter cords of wood are used in burning and eight bushels of charcoal for the ton of ore. Two boys and one man are required to bring the matte. Besides this, there are two men and one boy for each pile, to look after and turn it, or four men and two boys to do the whole work of roasting. One horse and two boys do the whole work of bringing the matte. The analysis of the roasted matte is given below:

Copper.....	18.26
Iron.....	39.82
Sulphur.....	3.38
Manganese.....	0.28
Lime.....	1.10
Magnesia.....	trace.
Siliceous residue.....	14.50

**COST OF ROASTING THE SINGLE AND DOUBLE MATTES.**

Labor each turning, 3 men at \$0.75 each.....	\$2.25
Wood " " 1¼ cord at \$1.85.....	2.21
Charcoal " " 8 bushels at \$0.05.....	.40
Cost of one fire.....	<b>\$4.86</b>

Cost of six fires.....	\$29.16
Hauling to sheds, 2 men at \$0.75, 1 horse and cart at \$0.40, 1.90.....	2.85
One and a half day to each pile at \$1.90 per day.....	2.85
Cost per pile of 64,000 pounds.....	\$32.01
" " ton.....	\$1.00

**4. FUSION FOR BLACK COPPER.**

The roasted mattes are now fused for black copper and concentrated or double mattes. Two furnaces were constructed for this purpose, but only one of them was in use. They are exactly similar to the ore-furnace, except the presence of the dam-stone, which is hollowed out on the back side and underneath. The furnaces are of necessity low, on account of the very large quantity of iron, which would be reduced if they were high. The pressure of the blast is three fourths of a pound of mercury or twenty-one inches of water. The tuyeres are three inches in diameter, and are made of bronze. They have been in use for two years.

In addition to the roasted mattes, all the slags from the refining-furnace—some of which, as will be seen by their analyses, contain considerable nickel and cobalt—are added to the charge in the furnace. The charging bed is made of three loads of matte weighing 1700 pounds, one load of rich slag, and fifteen shovels of clay to each load of ore. It has been found necessary to add this amount of alumina in order to make poor slags. Nine shovels of the charge are made to one basket of charcoal, containing two bushels and weighing 18.5 pounds. The men employed are the same as in the other furnaces. The casting is done in pigs, which weight from 50 to 400 pounds, according to their length. The quantity of black copper produced in twenty-four hours is 3500 to 4000 pounds, averaging about 85 per cent. The possible output of each of the two furnaces is from 45 to 60 tons of black copper per month. The matte produced amounts to 3000 pounds, and averages about 55 per cent. This matte forms a thin coating on the top of the black copper, and is easily detached from it by a blow of the hammer. It is called a double or concentrated matte, or sometimes a thin matte. It contains considerable quantities of shot copper, but no attempt is made to separate this. It is not kept by itself, but is charged in the roasting heaps with the other mattes. Pieces of black copper are often attached to it, which are carefully picked out by the men breaking the mattes on the roasting piles. The shot copper in the sample of which the analysis is given below amounted to 1.04 per cent. When this was carefully sifted out, the residue contained:

Copper.....	54.93
Iron.....	20.66
Sulphur.....	23.44
Lead.....	0.50
Manganese.....	0.06
Lime.....	1.01
Magnesia.....	0.18

A little lead, only a slight trace of which appeared in the ore, shows itself here. The black copper contained:

Copper.....	94.24
Iron.....	3.38
Sulphur.....	0.74
Lead.....	0.02
Lime.....	1.35
	<b>99.73</b>

**COST OF SMELTING ROASTED DOUBLE MATTES.**

Two furnace-keepers, at \$1.....	\$2.00
Two furnace-chargers, at 80 cents.....	1.60
Two slag-rollers, at 80 cents.....	1.60
Labor per day.....	\$5.20
Hauling to furnaces, mattes, clay, fluxes, etc., 2 men, 75 cents; 1 horse and cart, 40 cents.....	1.90
	<b>\$7.10</b>
Average amount of matte smelted per day, 13½ tons.....	
Cost per ton for labor.....	52%
Cost per ton for charcoal, 54½ bushels, at 5 cents.....	2.72
Cost per ton for labor and fuel.....	<b>\$3.24%</b>

(TO BE CONTINUED.)

**PROGRESS IN SCIENCE AND THE ARTS.**

**An Electric Elevated Railroad.**—M. J. Chrétien has elaborated a project for building in Paris an elevated railroad to be operated by electricity. The plans are given in some detail by the *Revue Industrielle*. From the drawings given it appears that the roadway is to be built on single pillars, and that the cars are to be run singly. No special effort seems to be contemplated to make the structure any less unsightly than our own, which, however, makes the impression of having much greater stability. The proposal to use electricity is nothing new, as Siemens urged more than a year ago at Berlin. From a glance at M. Chrétien's designs, it would seem that he could learn much by visiting our city.

**Magnetic Properties of Nickel and Cobalt.**—M. A. Gaiffe, says the *Electrician*, has made some fresh experiments on the magnetic properties of nickel and cobalt, the specimens being obtained by an electro-chemical process, the currents employed being of sufficient intensity to render the metals very hard. Having divided them into bars of nearly equal dimensions, some of them were left in the hard state, others were annealed, and others again were annealed and forged. All of them were magnetized at the same time and in the same way, and measured by means of a magnetometer. After being left for 36 and 72 hours, they were again measured. He found that their magnetic properties increase, and concludes that this is owing to the presence, when first taken out of the bath, of hydrogen in combination with the metal, which paralyzes the magnetic power.

**The Working of Sulphur Ores.**—The crude methods of extracting sulphur from its ores in Sicily have suggested to many who have had occasion to examine them the necessity of improvements, and efforts have been made to supplant the old system of smelting the native sulphur out of the gangue by apparatus heated by hot air or superheated steam. M. de la Tour de Breuil, in a "note" submitted to the French Academy of Sciences, states that these methods have only imperfectly answered, and that he has therefore sought some other means. He thought of applying the well-known property of salts of elevating the boiling temperature of water, and among the number has chosen chloride of calcium, solutions

of which may be heated to 120 degrees Celsius, and which are neither affected, nor do they alter either sulphur or its gangue. He effects the liquation of the sulphur by direct contact with a boiling solution containing 65 per cent of the salt, and by alternately working in two tanks placed over one fireplace, keeps the hot solution continually at work, allowing it to flow on fresh ore in one, while the exhausted refuse is being emptied from the other, and a new charge is put in. He states that the process is a cheap one, not costing more than about 2 francs per ton; that the sulphur produced holds only from 1/2 to 1 per cent of impurities; that operations may be carried on all the year round; and that only 2 to 3 per cent of sulphur remains in the residue.

**The Relation of Rivers to Wells in their Vicinity.**—Herr Dr. Wackenroder communicates to the *Chemiker Zeitung* an account of a case in which he distinctly traced the influence of the Saale River on the well, 230 feet from it, from which the water-works of the city of Bernburg obtain their main supply. Dr. Wackenroder made a series of monthly analyses of the water of the well, which we give below, and was struck by the variations shown:

	CaSO <sub>4</sub>	CaCO <sub>3</sub>	MgCO <sub>3</sub>	NaCl	N <sub>2</sub> O <sub>5</sub> and org. matter.	Residue of evaporation.
March 1st.....	19.82	30.43	15.12	8.98	3.05	77.4
April 1st.....	25.06	5.57	8.13	8.53	26.53	74.0
May 1st.....	29.15	8.57	6.84	6.92	16.52	68.0
June 1st.....	27.40	6.85	8.11	12.21	15.43	70.0
July 1st.....	26.23	2.71	5.29	11.38	13.39	59.0
Aug 1st.....	21.57	12.64	6.04	10.17	18.58	69.0
Sept. 1st.....	18.87	1.27	5.29	9.77	29.00	64.0
Sept. 12th.....	19.82	9.43	6.04	8.14	16.57	60.0

In order to get at the cause of these variations, Dr. Wackenroder took careful daily measurements of the level of the river and the water in the well, and, as a graphic illustration of the results obtained proves, he found that within certain limits the water rose and fell in the well as it varied in the river. Thus it was shown that the water supplied to Bernburg was a mixture of water drawn from the river and that obtained from other sources.

**Solutions of Iron in Water Saturated with Carbonic Acid.**—M. A. Wurtz, at a recent meeting of the French Academy of Sciences, presented a paper embodying the results of researches made by M. J. Ville on the reactions of solutions of iron in water saturated with carbonic acid, a subject that is of much interest in connection with a study of the origin of many mineral deposits. M. Ville has found that the saturated solutions will contain more carbonate of iron than the earlier researches of Hauer would lead us to believe, and he has determined by direct experiment that at various temperatures the following amounts are dissolved: 29 degrees Celsius, 0.704 grams per liter; 24 degrees, 1.098 grams; 20 degrees, 1.142 grams; 19 degrees, 1.185 grams; and 15 degrees, 1.390 grams. After this preliminary work, M. Ville has determined that the following reactions take place: Neutral alkaline carbonates precipitate the iron at once, which is the result of the transformation of the neutral alkaline carbonate into bicarbonate at the expense of the ferrous carbonate, which gives a greenish-white precipitate which turns green and then yellow. Neutral compound carbonates of the alkalis and lime, alumina, baryta, etc., act in the same manner. They are converted into bicarbonates, a process attended by the precipitation of ferric hydrate, though it goes on slowly, by reason of the insolubility of the neutral carbonates. Chlorides and sulphates sensibly retard the decomposition by exposure to the atmosphere of ferric solutions in water containing carbonic acid. The action of neutral alkaline carbonates may explain the fact that those natural iron waters which do not contain them are richest in iron, and the presence of considerable limonite deposits in limestone formations may be accounted for by the action of neutral carbonate of lime.

GENERAL MINING NEWS.

ARIZONA.

By telegraph we have almost daily information regarding the Indian troubles, with no indication, however, of any very rapid settlement.

TOMBSTONE DISTRICT.

The *Epitaph* announces that the Head Center was enjoined by the Western Mining Company, the suit to come before the District Court at its next session, set for the 15th inst. The output of the mines for the month of September is given as under by the same authority:

Grand Central—tons .....	2,700
Contention .....	2,400
Tombstone .....	3,240
Head Center .....	900
Vizina .....	620
Ingersoll .....	200
Stonewall .....	200
Total .....	10,200

In detail, the news of the week are:

**ANCHOR.**—The tunnel is now in 135 feet, having cut a 2 and a 3-foot vein carrying medium-grade ore. It has entered a compact limestone, which, it is thought, will continue until the incline, now 180 feet deep, which was sunk on the main ledge, is struck.

**CONTENTION.**—Two new shafts have been commenced on the north end of the mine, and prospecting on the 312-foot level has begun. Good ore, the extent of which has not been determined, has been struck both in the 500 and the 600-foot level.

**FLORA MORRISON.**—Sinking on the main shaft, now down below the 300-foot level, is going on again as usual. East and west cross-cuts are being run on the first level.

**GRAND CENTRAL.**—Sinking on the new shaft goes on at the rate of 5 feet per day.

**VIZINA CONSOLIDATED.**—The shaft, now 438 feet deep, has entered a soft talcose formation, and developments are looked forward to with interest.

CALIFORNIA.

THE BODIE DISTRICT.

The *Free Press* prints the report that the differences between the Jupiter and Bodie companies have been adjusted, and that a compromise for a consolidation between the Bodie Tunnel and the Bechtel is among the possibilities. We take

the following summary of news from the above journal, under date of October 4th: A new spur-wheel for the Standard pumping-engine arrived Monday, and work on the 1000-foot level and in the shaft will doubtless be recommenced this week. The east cross-cut, 700-foot level, of the Lent shaft is in 85 feet, and near a point of decided interest. Exciting news from this neighborhood is among the early probabilities. The Oro is stopping out considerable rich ore, and is employing all ten of the stamps of the Silver Hill mill; all ore considered to be above \$500 per ton in value is sacked and shipped to San Francisco for treatment. The west cross-cut, 600-foot level, of the Red Cloud shaft is in 193 feet. The Concordia vein is supposed to be in about 300 feet. The flow of water at this shaft is decreasing, as indicated by the fact that the engine makes but four strokes per minute, while a short time since it was seven or eight. Work has been resumed in the Champion mine, and we are informed that new and heavier machinery is to be put up immediately. It is reported that operations at the Belvidere will also be resumed on an early day. The Tioga reports ore on the 982-foot level, from which assays are obtained of \$29. The Spaulding reports an improvement on the 240-foot level. Boston Consolidated reports a little water, while Black Hawk, Consolidated Pacific, the Noondays, Bulwer, and others are developing their ground as usual. The Syndicate is now milling ore from its northeasterly vein, the Tioga, which is yielding about the same as the Colcord.

**CHEROKEE.**—The superintendent officially reports great activity at the mine. The favorable condition of the new ore-body continues. The vein holds strong and the ore of excellent quality. The first hundred tons of ore mined from the 200 level have returned through the mill over one thousand dollars in goldbullion.

**GOLD STRIPE.**—The superintendent officially reports a most important strike in the mine—the recovery of the Goodwin ledge which yielded a large quantity of ore in the upper works. It was feared that the vein was lost, but careful development-work has succeeded in recovering it at the greatest depth of working in the mine. This gives 175 feet of unworked reserves of ore to the upper tunnel, where the vein averaged about 12 feet in width.

**RISING SUN.**—The superintendent officially reports that a most favorable change has taken place in the condition and promise from the lower levels of the mine, especially in the new works west of old shaft, which is reported as surpassing the best ore ever mined in the eastern part of the mine. It has gradually been improving in condition the past month. The ledge in the 500-level west has also gradually improved since it was struck, both in strength and in richness; and if it holds out, as it gives promise of doing, the production will be very largely increased. It has taken nearly three months of hard labor to reach this ore, during which time ore of an inferior quality had to be worked.

CANADA.

The *St. John Telegraph*, commenting on the statement by the *Royal Gazette* that mining licenses, on the Crown Lands in Albert County, will be sold on the 23rd of October next, says this is an extensive announcement, and may lead to the whole of the minerals being hung up for years. It was in 1872 that the Mining Regulations were last agreed upon, but experience has shown that they need revision both in the interest of the miner and of the crown. The former may have his rights unnecessarily interfered with under the existing regulations; on the other hand, valuable mineral regions may be shut up for years in county after county, without exploration or development. The regulations should be amended in both respects. There should be a mining superintendent appointed, as in Nova Scotia, to explore, report, and give the best practical advice possible to persons engaged in prospecting, etc. The subject is one that will, no doubt, receive the early attention of the government. The legislative committee on mines should also take up this and kindred matters, and make such recommendations and give such advice as the circumstances may seem to demand. There is an increased interest taken in mining matters now, which it might be well to turn to as good an account as possible.

The *Montreal Gazette* says some of the gold mining lands in Beauce are to be inspected by a French engineer now on his way out here, and if his reports are favorable, it is understood that the Quebec Mining Company, which has to depend upon French capital, will shortly commence mining operations.

An Ottawa, Ont., dispatch says: Labor is very scarce here at present. The agents of the French Phosphate Mining Company stood at the doors of the Roman Catholic churches at Hull, opposite this city, on Sunday, and offered advanced rates for two hundred men to work in the mines.

COLORADO.

CLEAR CREEK COUNTY.

The *Georgetown Courier* writes as follows: The fact that there is but one mine in this county owned by an incorporated company which is paying dividends works great harm to our mining interests. There are plenty of mines here that pay their owners handsome profits; but as they are in the hands of individuals who keep their business affairs to themselves, they are hardly known outside of the State, and consequently do not add to the county's credit abroad. However, there is a good prospect of a change in this respect; for nearly if not all of the prominent mines that have been sold to Eastern parties during the past three years are now making money; and as soon as the debts created by the former managers are wiped out, they will commence to accumulate a surplus for dividend purposes. The Little Emma is now the only regular dividend payer, but we have reason to believe that others will be added to the dividend-paying list before another year passes. Among these we may mention the Terrible, which during the past two years has paid a debt of \$80,000, and is now daily increasing its surplus fund. The Pay Rock will probably also be able to pay a dividend within a year, and the Colorado Central must have a surplus on hand. The Red Elephant is slowly working out of debt, and the Dunderberg is doing well in this direction. Regarding Freeland and Hukill, little is known outside the companies' offices. The mines that are now staggering under loads of debts were all paying properties while under the management of Colorado men. The new owners had to learn from experience, which they have paid for, and apparently profited by, and all that is now necessary is for them to get back to their starting-point.

CUSTER COUNTY.

**GEM NICKEL.**—The superintendent of the Gem Nickel mine, Silver Cliff, Colo., telegraphs that rich ore has been struck in a cross-cut on the 100 level of shaft No. 2. This shaft is 300 feet north of shaft No. 1, which shows two feet of solid ore worth over \$1000 per ton in nickel, cobalt, copper, and silver. This strike is believed to demonstrate the fact that there is a continuous ore-body for 300 feet.

GUNNISON COUNTY.

**PAINTER BOY.**—The *News-Democrat* announces that a rich strike has been made in the old shaft of this mine, at Elkton, Washington Gulch.

LAKE COUNTY.

The ore supplies for the smelters are reported to be ample, and they are doing full work. In general, there seems to be much activity in the Leadville mines. We take the following details from our Leadville exchanges:

**CHRYSOLITE.**—The Leadville *Herald* says that Mr. Marden, of the Chrysolite mine, reports having struck what promises to be a pretty rich development, yesterday, in the drift south of the Chrysolite drift, a five-foot vein of sand and hard carbonates.

**DUNKIN.**—The lessees of this mine are reported to have made a net profit of \$12,865.75 during September.

**LITTLE CHIEF.**—The *Tribune* has the following: The trustees of the Little Chief Mining Company, of Leadville, decided some time ago to invest the company's surplus—about \$135,000 cash—in the purchase of a developed, dividend-paying mining property. With this view, Manager Wood and other agents of the company have been privately examining leading properties in Colorado and



elsewhere. It is now understood that a desirable property has been found, and the trustees claim that the Little Chief will soon resume the payment of dividends.

**LITTLE PITTSBURG.**—An official telegram, dated October 10th, says: Shaft-house No. 3 Pittsburg burned last night. Also, shaft-house No. 1 Amie. Our shaft is safe and our loss trifling.

**MINER BOY.**—The *Herald* says of this mine: The superintendent is now at work in the tunnel in the immediate vicinity of shaft No. 3, cutting a chamber for the reception of a fifty horse-power boiler and engine, which is very shortly expected to arrive. In the 330-foot level, a pay-streak of solid mineral, three and a half to four feet in width, is shown. The ore is gray copper, copper and iron pyrites, galena, and silver. Alongside of this streak of ore is a vein several feet in thickness of copper and iron quartz, having considerable silver and gold, which is treated in the mill belonging to this company. Preparations are now in progress for starting another level, some fifty feet below the last one.

**DAKOTA.**

**CORA.**—It is officially announced that active operations have been commenced on the Silver King shaft at Galena, owned by the Cora Company.

**IDAHO.**

**CUSTER COUNTY.**

**MONTANA.**—The *Yankee Fork Herald* gives a statement of the output of this mine from June 14th to September 4th, according to which 130,098 pounds of ore contained a total assay value of \$73,170.46.

**WOOD RIVER REGION.**

According to the *Times*, the Hailey smelter is running regularly, and Mr. Wolters is credited by it with the statement that there is ore enough on the dumps in the various gulches to last three months. The Ketchum smelter is ready for a two months' run, and the Bellevue smelter is also approaching completion. Native silver has been found in the galena ore of the Mayflower.

**IDAHO.**—This mine, at Bullion, is described as follows in the *Times*: The developments consist of a 200-foot tunnel, a shaft near the outcrop, in the ravine, from which stopes were recently opened; a 90-foot winze about 60 feet from the shaft, and a 50-foot drift from the bottom of the winze. From almost any point in either tunnel, shaft, winze, or drift, sills could be laid and stopes opened. As above stated, it is expected that 500 tons more will be extracted this fall. This, in addition to the 120 tons shipped last fall and the 150 tons shipped to date this year, would place the yield of the Idahoan, for this year and last, at about 850 tons of ore, which averages 75 per cent in lead and 125 ounces in silver. Placing the value of the ore at the very moderate figure of \$175 per ton, this would give a yield of \$148,750, with probably as much more in sight.

**MONTANA.**

**BUTTE DISTRICT.**

The *Butte Intermountain* of October 4th announces the consolidation, under the title of the Mountain Consolidated Mining Company, of the Burnett, Mountain, and Buffalo mines, the trustees elected being William A. Callingwood, of New York; James A. Talbot, Marcus Daly, Richard S. Jones, Prof. J. E. Clayton, O. P. Blaine, and H. S. Clark, of Butte. The officers of the company are as follows: President, James A. Talbot; Vice-President, William A. Callingwood; Treasurer, Richard S. Jones; Secretary, H. S. Clark; Consulting Engineer, Professor Clayton. Our authority says further: The organization of the company, it should be stated, is the outcome of negotiations entered into last summer between the owners of the properties and an Eastern syndicate, George F. Prescott and J. M. Moore, of Salt Lake, being also interested in the enterprise. The amount for which the mines are capitalized is \$4,000,000 divided into 400,000 shares having a par value of \$10 each. One half the amount of the capital stock will be placed on the market at the bed-rock price of perhaps \$2, and with the money realized from the stock-sales the development of the property will begin on a large scale. The three consolidated mines are located in the heart of the Butte District, and comprise 3700 linear feet of mineral-bearing ground. A three-compartment shaft will be at once started on the Burnett ground, which will be sunk to the deep as readily as powerful machinery of the most improved pattern can do the work. Early next year, should the deep developments prove the ore-bodies to be as rich and extensive as they are near the surface, a forty-stamp mill will be erected.

The *Intermountain*, states in reference to the general condition of the mines of the district that frost has, to a certain extent, interfered with mining operations. It reports a strike in the west drift of the High Ore.

**NEVADA.**

**THE COMSTOCK LODE.**

We print below the weekly summary of the *Gold Hill News* for the week ending October 5th. The work in Sierra Nevada is going on as usual. There is nothing new to state regarding that mine. At the California and Consolidated Virginia, repairs to the drifts and air-channels are making. Both mines are very hot yet, notwithstanding the suction-fan over the Consolidated Virginia old shaft is working splendidly. Preparations are being hurried to commence the work of exploration and prospecting from the Gould & Curry and Best & Belcher shaft. The shaft is well equipped for such work, and it is provided with fine, substantial pumping machinery to take care of all the water encountered. Cross-cutting will be commenced there at no distant day. At the Savage, the work carried on at present is with the sole purpose in view of the extraction of low-grade ores from the upper levels. It is believed the water has been drained from behind the bulkheads of the Savage drift from the Chollar-Norcross-Savage shaft by the hydraulic pumps, and as soon as the preparations are completed, and the extraction of ore commenced, the bulkheads will be removed and running of the drift started. The public is somewhat disappointed at the result of the cross-cutting in Potosi. The west cross-cut was discontinued because of the finding of hot water by the drill run from its face. The east cross-cut is still carried forward, but has failed to develop any mineral of value. The Yellow Jacket will shortly be in a better position to prospect than heretofore. Connection will soon be made by the winze between the 2828 and 3000 levels. The good circulation of air secured by this connection will be of great benefit to the mine, to say nothing of the ground opened up for prospecting. Affairs at the Consolidated Imperial are assuming a shape that will enable work to be vigorously prosecuted there. Work is to be commenced in Alpha joint with Imperial next week. Of Belcher and Crown Point there is not much to be said save that they are extracting low-grade ores and preparing for the prospecting of their lower levels. The usual work is carried on in Overman and Alta with customary progress.

**DAY.**—The annual report of the superintendent, printed in the *Pioche Record*, contains the following: The depth of the main incline shaft is increased 158 feet, and it is now 314 feet below the tunnel level. On the 540 level, we have drifted 193 feet, 78 feet in the vein; uprise, 55 feet; stopes, 58 feet, of 16 feet average width; winzes, 22 feet. On 460-foot level, have extended drift 78 feet; stopes and uprise, 65 feet; winzes, 81 feet; cross-cuts, 69 feet; stopes in length, 45 feet. On the 400-foot level, made connection with uprise from 460-foot level, 83 feet. Old cave level, 300-foot, drifts 240 feet. Drifts, stopes, uprisings, and shafts all well timbered; good iron-bound car-tracks on each level. Excavation for our new steam machinery at breast of tunnel occupied three weeks, with 8-hour shifts and incidental labor. Aggregate of distance run, not reckoning dead-work in stopes, about 1150 feet. Have extracted and hauled to furnace 1154½ tons of ore, of which 387 tons remain on furnace dump. The nature of the formations

in which we are at present working is generally broken by open fissures, with masses of mineral-bearing conglomerate alternating with large bodies of soft carbonate ore, holding boulders from one to ten or more tons in weight, which, when subjected to the rock-breaker's hammer and giant powder, disclose sometimes our best ore. The promise for the company in the Day is certainly encouraging. The ground is dangerous, requiring expensive timbering and constant watchfulness to avoid accidents. The furnace was fired up for the first time on the 11th of July last, and on the 15th began the production of bullion. We were obliged to stop for repairs quite frequently, but nevertheless the yield to date, as appears by the clerk's books, is 2065 bars, weighing 205,389 pounds. Of this we have shipped to San Francisco 447 bars, and have on hand 1618 bars. We also have 8½ tons of fine bullion not yet sampled.

**WHITE MOUNTAIN.**—The following is an official telegram from Carson from the president of the White Mountain Water Company, under date of October 9th: Logan writes, pipe doing splendid; first hill, three hundred feet overcome; water flowing beautifully. This test settles all doubts. Speedy completion insures extremely valuable property.

**NEW MEXICO.**

**BREMEN.**—The *Tribune* prints the following: Among the few recent mining incorporations in New York which promise to prove a credit to the promoters, is the Bremen Silver Mining Company, with a capital of \$2,000,000 in 200,000 shares. The reports of the general manager and the well-known English mining expert, Ernest Le Neve Foster, just received, show that the property of the company is situated in Chloride Flats Mining District, near Silver City, Grant County. It consists of five claims, comprising about 78 acres. The formation is lime rock underlying slate. The latter, near the contact with lime rock, carries considerable native silver in the form of leaves between the seams, and rich sulphides in the form of shot. The lime rock is irregular, and carries mineral in every known direction. Calc-spar, heavily coated with horn-silver, pockets of decomposed rock very rich in chloride, bromides, and native silver, are characteristics of the mine. The mineralization of the lime rock appears to increase in richness as the depth increases. The mine has been worked more or less actively for ten years, but in a very crude manner. Until a recent date, the ore was carried out on the heads of Mexicans. Much valuable ore was stolen by the workmen; but notwithstanding all the disadvantages, the sales of bullion which have been properly accounted for exceed \$1,250,000. The greatest depth attained is less than 180 feet, and the indications are such as to encourage much deeper exploration. The boundaries of the ore-bearing rock have not been reached on either side nor at the bottom. No stoping has been done save in the pockets of decomposed rock encountered by the drifts from time to time. The company owns a 10-stamp amalgamating mill, a machine-shop and foundry. At the mine are several thousand tons of tailings and low-grade ores, besides 42 tons of very rich picked ores, for which the company has been offered \$60,000. Mr. Foster's report, under date of August 20th, 1881, concludes as follows: At present the mine looks very well, and its prospects are very encouraging. Ore in paying quantity has been found all around it, as well as all through it, and there is no reason to doubt that the ground as yet unexplored is not equally good, if not better, than that already developed. The property can be worked profitably now, and with increased development and facilities, combined with systematic work and economy, I believe will return very large dividends. The acting superintendent telegraphed, October 3d: Large bodies of first-class ore in three drifts leading south. Air-shaft nearly through. Forty-dollar slate being taken from north side, under which are indication of large body of first-class ore. Mill running on slate giving pulp-assays \$40 to \$63. He estimates that the dumps contain 12,000 tons, which will pay an average profit of \$25 per ton.

**UTAH.**

**EMMA.**—The *Salt Lake Tribune* announces the settlement of Judge Bennett's suit against the Emma mines, and work is to be pushed. There was a large amount of money paid to settle the claims. The English holders have undisputed control of the territory.

**JONES BONANZA.**—The *Park Mining Record* states that this mine was shut down for an indefinite period, because its owners did not furnish the funds for further work.

**SILVER REEF DISTRICT.**

**CHRISTY.**—On the Tecumseh, a new shaft is sinking near the west surface boundary. In the Maggie, work is confined to portions above the water-level pending the erection of new hoisting and pumping machinery, while the engines on the California are approaching completion.

**STORMONT.**—On the Buckeye, explorations continue both north and south from the bottom of the Savage shaft, and good ore continues in each header of the fourth or bottom level. A contract has just been let and work has begun on winze No. 3 south, on the third level, and will be pushed to completion as rapidly as possible, to open new ground in that direction. In the Stormont, according to the *Miner*, from which we take the data relating to this district, winze No. 1, sinking to connect the third and fourth levels north, continues in high-grade ore, and is advanced rapidly. The ore-body in the face of the fourth level north now shows a strong vein of \$100 rock.

**PROPOSALS AND SALES.**

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

Manufacture and delivery (not including erection) of about One Thousand Tons of Steel, required for the completion of the East River Bridge; Trustees of the New York and Brooklyn Bridge, 21 Water Street, Brooklyn, N. Y.	Oct. 15, 1881.
Dredging in Passaic River, between Newark Bay and Pennsylvania Railroad Bridge, and Dredging in Rahway River, N. J.; G. L. Gillespie, Major of Engineers, Room 59, Army Building, corner Houston and Greene Streets, New York City	" 18, "
Furnishing Materials and Labor of all kinds necessary for the completion and delivery of the Metal-Work of the Savannah River Lights, Georgia; Peter C. Hains, Major Engineers, Light-House Engineer, 6th District, Charleston, S. C.	" 20, "
Construction of Two Piers at the Mouth of the River St. Maurice, Quebec; F. H. Ennis, Secretary Department of Public Works, Ottawa, Ont.	" 20, "
Bids for the Sale of Obsolete and Unserviceable Fire-Arms of Foreign Molds and Manufacture which are stored at the various arsenals in the United States; U. S. Ordnance Agency, 146 Greene Street, P. O. Box 1811, New York City	" 26, "
Construction of a Bridge across the Potomac River at Three Sisters about 3100 feet above the present Aqueduct Bridge at Georgetown, D. C.; and also for the Construction of a Bridge on a Section of the River about 500 feet above the said Aqueduct Bridge; U. S. Engineer's Office, 1907 Pennsylvania Avenue, Washington, D. C.	" 29, "
Construction of the necessary Foundations, Masonry, Superstructure, and Approaches of a Highway Bridge to be built across Cumberland River at Nashville, Tenn.; Bridge Committee, Nashville, Tenn.	Nov. 1, "
Furnishing the Foundations and Masonry (in one contract) of the Railroad Bridge over the Ohio River at Henderson, Ky.; Office of the Henderson Bridge Co., Louisville, Ky.	" 5, "
Construction of a Jetty at the Entrance of the Christiana River, Delaware; William Ludlow, Capt. in of Engineers, U. S. Engineer's Office, 1125 Girard Street, Philadelphia, Pa.	" 8, "

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feet on Vein.	Capital Stock.	SHARES.		ASSESSMENTS.		DIVIDENDS.		HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.						SALES.								
			No.	Par Val.	Total levied to date.	Date and amount per share of last.	Total paid to date.	Date and amt. per share.	Oct. 8.		Oct. 10.		Oct. 11.			Oct. 12.		Oct. 13.		Oct. 14.			
									H.	L.	H.	L.	H.	L.		H.	L.	H.	L.	H.	L.	H.	L.
Alice, s. c.	Mon	3,000	10,000,000	400,000	25	*	320,000	Oct. 1881	10	6.63	6.38	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	5,760			
Amie Con. s. L.	Col.	5,000,000	500,000	100	10	140,000	Sept. 1881	10	40,000	Feb. 1880	20	31	29	31	29	30	28	31	29	2.55	5,88		
Argonia, s.	Uth	1,500	10,000,000	100,000	10	*	60,000	Nov. 1880	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200			
Barbed & Walker, s.	Col.	1,000,000	100,000	100	10	*	25,000	Feb. 1880	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100			
Baswick, g. s.	Cal.	10,000,000	100,000	100	100	55,000	Sept. 1881	10	300,000	Dec. 1879	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	100		
Beck Bear, g.	Cal.	1,500	10,000,000	100,000	100	15,000	Sept. 1879	50	532,147	Sept. 1881	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Belcher, g. s.	Nev.	1,000	10,000,000	100,000	100	2,800,000	Sept. 1881	50	15,397,200	Aug. 1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Bodie Cons. g.	Cal.	10,000,000	100,000	100	100	75,000	May. 1879	1 00	1,200,000	Mar. 1880	25	7.75	7.38	7.88	8.75	8.00	8.30	7.63	8.25	8.25	2,390		
Breece, c.	Cal.	5,000,000	200,000	25	5	*	2,000	Feb. 1880	01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,700			
California, g. s.	Nev.	600	64,000,000	540,000	100	162,000	June 1881	30	31,320,000	Dec. 1879	50	1.00	.95	.95	.90	1.00	.94	.95	.96	.95	9,325		
Calumet & Hecla, c.	Mich	2,500,000	200,000	25	25	*	16,850,000	Aug. 1881	50	60,000	Mar. 1880	10	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Caribon Con., s.	Col.	1,400	1,000,000	100,000	10	*	50,000	Mar. 1880	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Catalpa, s. L.	Col.	3,000,000	300,000	10	*	*	180,000	May. 1881	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100			
Chrysolite, s. L.	Col.	10,000,000	200,000	50	50	*	1,500,000	Nov. 1881	50	6.75	6.13	6.88	6.25	7.00	6.50	6.75	6.13	6.50	6.00	6.75	20,520		
Chimax, s. L.	Col.	2,000,000	200,000	10	*	*	180,000	Aug. 1880	30	40	30	35	.....	.....	.....	.....	.....	.....	.....	.....	2,115		
Cons. Virginia, g. s.	Nev.	710	54,000,000	540,000	100	573,200	Aug. 1881	30	48,000,000	Aug. 1880	50	2.55	2.50	2.50	2.50	2.46	2.55	2.40	2.60	2.50	2.55	30,315	
Copper Knob, c.	N. C.	1,000,000	1,000,000	1	1	*	15,000	Nov. 1880	02	.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Copper Queen, s.	Ariz	2,500,000	250,000	10	10	*	100,000	Oct. 1881	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Crown Point, g. s.	Nev.	600	10,000,000	100,000	100	2,573,370	Sept. 1881	0 75	11,588,000	Jan. 1875	2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Deadwood-Terra g.	Dak	5,000,000	200,000	25	25	*	401,000	Oct. 1881	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Dunkin, s. L.	Col.	5,000,000	200,000	25	25	*	200,212	June 1881	7 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Eureka Cons., g. s. L.	Nev.	1,000,000	100,000	100	100	100,000	May. 1876	1 00	4,730,000	Sept. 1881	50	22.00	20.00	22.30	22.50	.....	22.00	21.75	22.00	.....	400		
Excelsior W'r & M. Co	Cal.	525 acres	10,000,000	100,000	100	100,000	June 1881	1 00	850,000	Sept. 1880	25	2.13	.....	.....	.....	.....	.....	.....	.....	.....	60		
Exchange, s.	Nev.	1,000,000	100,000	10	10	*	6,000,000	Aug. 1881	03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Evening Star, s. L.	Col.	500,000	50,000	10	10	*	400,000	Sept. 1881	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Father de Smet, g.	Dak	10,000,000	200,000	100	100	*	340,000	July 1881	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Finley, g.	Col.	200,000	200,000	20	20	*	8,000	May. 1879	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Freeland, s.	Col.	5,000,000	200,000	25	25	*	50,000	May. 1880	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Glass Pandery, s. L.	Col.	5,000,000	250,000	20	20	*	50,000	May. 1881	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Gold Strip, g.	Cal.	1,500,000	150,000	10	10	*	80,000	July 1881	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Gold & Curry, g. s.	Nev.	612	10,000,000	100,000	100	3,314,000	July 1881	25	3,800,000	Oct. 1870	10 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Grand Prize, s.	Nev.	1,500	10,000,000	100,000	1	315,000	July 1881	25	450,000	Sept. 1880	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Great Eastern, g.	Dak	1,200	300,000	300,000	1	*	16,000	July 1880	01	1.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Green Mountain, g.	Cal.	4,350	1,250,000	125,000	10	10	201,925	Oct. 1881	7 1/2	5.25	5.00	5.25	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Halc & Norcross, g. s.	Nev.	400	11,200,000	112,000	100	3,698,000	July 1881	50	1,598,000	Apr. 1871	5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Hibernia, s. L.	Col.	7,500,000	300,000	25	25	*	180,000	July 1881	10	43	37	38	37	38	39	34	39	32	35	34	199,550		
Homestake, g. s. L.	Dak	10,000,000	100,000	100	100	200,000	Apr. 1878	1 00	1,143,000	Oct. 1881	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Horn-Silver, s. L.	Uth	10,000,000	400,000	25	25	*	200,000	Jan. 1880	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Hukill, g. s.	Col.	3,288	1,000,000	200,000	5	5	210,000	Dec. 1878	10	70	68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Independence, s.	Nev.	1,500	10,000,000	100,000	100	170,000	Aug. 1881	0 15	225,000	Sept. 1879	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Indian Queen, s.	Nev.	250,000	125,000	20	20	*	275,500	Sept. 1881	95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Inyo, s.	Cal.	500,000	100,000	5	5	*	25,000	Oct. 1881	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Iron Silver, s. J.	Col.	10,000,000	500,000	20	20	*	40,000	Oct. 1881	20	2.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
La Plata, s. L.	Col.	2,000,000	200,000	10	10	*	300,000	Sept. 1881	7 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Leadville Cons., s. L.	Col.	4,000,000	400,000	10	10	*	150,000	Jan. 1878	15	1.50	1.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Leads, s.	Uth	3,000	6,000,000	60,000	100	51,000	June 1881	25	75,000	Oct. 1878	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Little Chief, s. L.	Col.	10,000,000	200,000	50	50	*	700,000	Aug. 1880	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Little Pittsburg, s. L.	Col.	30 acres	10,000,000	200,000	100	.....	.....	.....	50	2.88	2.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Martin White, s.	Nev.	22,900	10,000,000	100,000	100	875,000	June 1881	25	90,000	July 1879	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Moose, s.	Col.	39,000	2,000,000	200,000	10	10	650,000	Mar. 1878	25	1.10	1.05	1.20	1.10	1.30	1.15	1.20	1.25	1.15	1.10	1.05	100,900		
Navajo, s.	Nev.	500	10,000,000	100,000	100	200,000	Aug. 1881	0 25	250,000	July 1881	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
N. Y. & Colorado, g.	Nev.	1,000,000	50,000	20	20	*	200,000	July 1879	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Northern Belle, s.	Nev.	1,600	5,000,000	50,000	100	25,000	Feb. 1880	15	2,025,000	Oct. 1881	75	12.25	.....	.....	.....	.....	.....	.....	.....	.....	.....		
North Belle Isle, s.	Nev.	1,500	10,000,000	100,000	100	25,000	Feb. 1880	15	15,000	Sept. 1880	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Ontario, s.	Uth	3,000	10,000,000	150,000	100	.....	.....	.....	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Ophir, g. s.	Nev.	675	10,000,000	100,000	100	3,092,600	Mar. 1881	1 00	3,800,000	Oct. 1881	1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Plumas, g.	Cal.	1,000,000	100,000	10	10	*	151,000	July 1879	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Quicksilver, Pref.	Cal.	4,261,300	42,913	100	100	.....	.....	.....	9 25	59.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Quicksilver, Com.	Cal.	5,708,700	57,087	100	100	.....	.....	.....	2 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Rising Sun, s.	Cal.	750,000	150,000	5	5	*	101,250	May 1881	7 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Robinson Cons., s. L.	Col.	10,000,000	200,000	50	50	*	525,000	Oct. 1881	50	13.25	13.00	13.50	13.13	13.75	13.13	13.88	13.25	13.50	13.98	13.63	17,120		
Savage, s.	Col.	11,200,000	112,000	100	100	5,584,000	Sept. 1881	50	4,469,000	June 1880	3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Sierra Nevada, g. s.	Nev.	10,000,000	100,000	100	100	4,650,000	July 1881	1 00	102,000	Jan. 1871	1 00	16.50	15.50	15.25	15.13	15.00	14.50	15.25	14.75	15.50	2,685		
Silver King, s.	Ariz	3,650	10,000,000	100,000	100	.....	.....	.....	2	18.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Spring Valley, g.	Cal.	1,500	200,000	200,000	1	1	50,000	Jan.															



NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, NUMBER OF SHARES, Par., ASSESSMENTS (Total levied to date, Date and amount of last), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (Oct. 8, Oct. 10, Oct. 11, Oct. 12, Oct. 13, Oct. 14), SALES.

Total shares of Non-Dividend Paying Stocks sold during the week, 525,370. Total shares sold at all the Exchanges during the week, 1,042,470

Boston. Quotations and Sales of Mining Stocks for week ending Oct. 12th.

Table with columns: NAME OF COMPANY, Opening Oct. 6, Highest during the week, Lowest during the week, Closing Oct. 12, Total shares sold.

Philadelphia. Quotations and Sales of Mining Stocks for week ending Oct. 12th.

Table with columns: NAME OF COMPANY, Opening Oct. 6, Highest during the week, Lowest during the week, Closing Oct. 12, Total shares sold.

running expenses, the company will have about \$60,000, or enough to pay a dividend of 12 cents per share. The policy of the company is to pay 20 cents per share bi-monthly dividends. To be enabled to do this, a profit of but \$50,000 a month is required. At the rate of a 20 cents per share dividend every other month, the company is paying 50 per cent per annum on the present price of the stock. The average grade of the ore, so long as there is plenty of it, and an assurance of a good market, does not cut any figure. The majority of practical miners would prefer a large body of low-grade mineral to a seam of native silver and gold. The resources of the Iron mine at present seem to be without limit.

One of the leading mining camps of the West is not represented in the public dealings of this market. We refer to Tombstone, Arizona, which reports bullion shipments for September as follows: Grand Central, \$180,000; Contention, \$117,000; Tombstone, \$111,995; Vizina, \$70,000; Head Center, \$22,229; Stone-wall, \$5300. This makes a total of \$503,424, or at the rate of over \$6,000,000 per annum.

Following is the July statement of the Central Arizona Mining Company:

Table with columns: GROSS PRODUCT, TOTAL EXPENDITURES, MILL OPERATIONS, VALUE AND COST, REMARKS.

UNLISTED QUOTATIONS. Mr. L. V. Deforest, No. 70 Broadway, under date of October 14th, 3 P.M., reports the current quotations of unlisted stocks as follows:

Table with columns: Bid, Off'd, Bid, Off'd. Lists prices for Bald Mountain, Highland Chief, Hite, May Flower, Menlo.

DIVIDENDS.

The Homestake Mining Company has declared its regular monthly dividend of 30c. per share, payable on the 25th inst. Transfer-books close on the 20th.

A fourth dividend of 5c. per share is announced by the Inyo Consolidated Mining Company; also, an extra dividend of like amount, payable October 15th. Transfer-books close October 14th.

The twenty-eighth monthly dividend of 7 1/2c. per share has been declared by the Green Mountain Gold Mining Company, making a total of \$203,000 declared thus far. Transfer-books close on the 19 inst.; dividend is payable on the 26th.

The Chrysolite Mining Company will divide \$100,000.

000, being a dividend of 50c. per share, among its stockholders on November 10th. Transfer-books close October 26th.

The fourth regular monthly dividend of 20c. per share has been declared by the Tip Top Mining Company, payable on the 26th inst. Transfer-books close on the 20th.

The Deadwood-Terra Mining Company has declared a dividend of 15c. per share, amounting to \$30,000, payable on the 20th inst. Transfer-books close on the 15th.

A dividend of \$1 per share on the stock of the Western Mining Company, owners of the Contentment mine, is announced.

The one hundred and forty-sixth dividend of the Idaho (Grass Valley) Gold Mining Company has been declared, making a total of \$3,055,050 disbursed to date out of a gross product of \$6,650,000.

The Northern Belle Mining Company announces its monthly dividend of 50c. per share; also, an extra dividend of 25c. per share.

The following dividends were paid in San Francisco during September:

Table with columns: Name, Per share, Amount. Lists dividends for companies like Christy Mining, Deadwood-Terra Mining, etc.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (Oct 7-12), Opening (Oct 13-14). Lists various mining stocks and their price ranges.

REVIEW OF THE SAN FRANCISCO MARKET.

The San Francisco market has remained almost stationary throughout the week, prices varying but few points either way. The Comstocks show no improvement and are rather inclined to weakness.

Copper and Silver Stocks.

BOSTON, Oct. 13. Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

The market for copper stocks the past week has been exceedingly dull, the transactions for the whole week being below the daily average in fairly active times.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Capital Stock, Shares, Last Dividend, Rate per Ann., Quotations of New York stocks (Oct 8-14), Sales from Oct 7th to Oct 13th inclusive. Lists coal companies like Am. Coal Co., Cameron Cl., etc.

slightly firmer feeling, and more disposition to buy stocks, although the tight money market has a tendency to restrict purchases.

on the City of Berlin, in the interests of the Reading Company. He departs in the best of spirits, fully confident of his election to the presidency of the company in January, and of being able to put the company on a dividend-paying basis at an early day.

At the Boston Mining Exchange, there has been a good deal of activity in two or three of the leading stocks. Deer Isle advanced from \$1.25 to \$1.70, with sales of about 100,000 shares.

Gas Stocks.

The following list of companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 47 Wall street, New York. Quotations are based on the equivalent of \$100.

Table with columns: COMPANIES IN NEW YORK AND VICINITY, Capital Stock, Par., Rate per ann., Dividends, Quotations. Lists gas companies like Mutual N. Y., N. York, Metrop., etc.

Coal Stocks.

NEW YORK, Friday Evening, Oct. 14.

These stocks have received a fair share of attention at the Exchange this week, and prices have been uniformly steady. The sales include 124,000 shares of Delaware, Lackawanna & Western at \$123 1/2 @ \$121 1/2.

Mr. Franklin B. Gowen leaves to-morrow for Europe

The Philadelphia Ledger says: In the approaching contest for the president and managers of the Reading Railroad, only such stock can be voted as has been registered in the names of its holders for at least three calendar months prior to the election.

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the presumption is, that much of this will be disfranchised by transfers between now and January, leaving the total votable stock about 470,000 to 500,000 shares at the time of the next election, or about the same amount as at the last election. The McCalmonts hold 186,584 shares, having somewhat increased their holdings since March, and there are several thousand additional English shares controlled by them. Mr. W. H. Vanderbilt is down for 40,000 shares individually, and about 25,000 additional shares are held by brokers and others presumably in his interest. In reference to the election prospects, Mr. Franklin B. Gowen, writing upon the subject, says: "There are over 360,000 shares now registered in the names of owners who will hold until next election and vote in my interest. The real strength of the opposition in January will be rather under than over 400,000 shares. There are, however, in addition to this, nearly 50,000 shares now registered in the names of those who would support Mr. Bond if they owned any shares—I mean names like Haseltine, Powell & Co. and E. L. Haseltine & Co.; but they do not own any shares, and therefore the real strength of the opposition can not be over 200,000." Mr. Bond states that he will start with the McCalmont list of about 195,000 shares supporting him, and, conceding Mr. Vanderbilt to Mr. Gowen, he gives that gentleman about 100,000 shares—though Mr. Bond does not admit that Mr. Vanderbilt will be with Mr. Gowen at the time of the election. It will be seen that there is a considerable divergence of opinion about the strength of the opposing parties; but, when the deductions are made for the franchise-men and absentees, it seems not unreasonable to suppose that whoever can muster 200,000 votes at the election will get a majority of the entire vote cast.

BULLION MARKET.

NEW YORK, Friday Evening, Oct. 14.

The London market has been a little firmer in consequence of rather limited supplies at hand, and a somewhat better demand for the East, but there is nothing of any special significance to note.

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

Table with columns for DATE, London Pence, N. Y. Cents, and corresponding values for Oct. 8, 10, 11, 12, 13, 14.

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ending October 13th, as compiled from various sources, amounted to \$632,796.90, as against \$196,934.33 reported for the previous week, and \$13,537,606.99 from January 1st, 1881, to date.

MISCELLANEOUS.

The receipts of treasure through Wells, Fargo & Co., at San Francisco, during the past three months, were as follows: July, \$3,871,204; August, \$3,413,139; and September, \$3,888,047; total, \$11,172,390. Of this amount, \$4,312,769 was in coin, \$3,353,475 in gold dust and bars, \$3,326,163 in silver bullion. For nine months, the total receipts foot up \$30,482,467, being less by \$22,762 than the same time in 1880. Mexico contributed \$2,479,992 of the total for the first nine months of the current year, against \$2,017,390 same time in 1880, being a gain of nearly half a million of dollars. The shipments of coin inland, through the same office, during the past three months, aggregate \$8,778,998, and overland \$1,404,749, including \$210,024 in silver bullion.

Australian Gold.—One million dollars in Australian gold were received in San Francisco October 7th, and, it is reported, will be shipped to New York shortly.

Exports of Gold and Silver from New York.

Table showing weekly exports of gold and silver from New York, with columns for week ending, gold, and silver values.

Leadville's Output for the Month of September.—The Leadville Herald of October 8th gives the bullion product of that camp for the quarter ended September 30th at \$3,170,245, against \$3,401,293 for the previous quarter. Silver Reef.—The bullion shipments from Silver Reef for September aggregated \$76,457.38.

METALS.

NEW YORK, Friday Evening, Oct. 14.

There has been but little business done during the past week. Some prices are a little weaker, partially on account of the high rate asked for money. The consumption in all departments shows no abatement, and as long as it continues, the holders of metals need not be alarmed.

Copper.—The high rate of money has caused a few weak speculators to force stock. The sales amount to 500,000 pounds at 18@18½c., closing at the higher figure. Chili Bars were quoted at £62 10s. in London yesterday.

Our London advices by mail include September 30th, from which we take the following:

Sept. 24th-27th. On the 26th, the Metal Exchange was closed in respect to the memory of President Garfield. Sellers have been scarce, which has reduced the business for the two days to about 500 tons;

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date, from the first of January, 1881.

The shipments of silver bullion are valued at \$1.20 per ounce, Troy; gold at the standard \$20.67 per ounce, Troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. If the price of silver be counted at \$1.12 per ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 13½ per cent to arrive at actual value.

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

Total amount of shipments to date..... \$19,066,644 \* Official. † Net. G. Gold. S. Silver. L. Lead.

g. o. bs. sold at £61¼@£62 cash, and £62½@£63 two and three months prompt.

Sept. 28th. The sales aggregate about 600 tons, mostly for cash or short arrival, at £62@£62½. A moderate amount of three months' metal sold at £62½ net money.

Sept. 29th. Good ordinary brands sold to a moderate extent at £62 cash, £62½ three weeks, £62½ one month, £63 three months.

Sept. 30th. Only a moderate trade was done today in Chili Bars, there being but little metal offering for sale at current quotations. Buyers seemed disposed to purchase freely of good ordinary brands, that description finding the readiest outlet at present moment, but could only secure a few parcels at £62½ cash, £62½@£63 three months prompt. Favorite marks were disposed of at £62½@£62½ cash, closing sellers at the highest rate. Best brands offered at £63 cash, without business resulting.

Wallaroo Cake rules at £68@£69; Burra, £68@£68½; English, very firm; Tough Cake, £65½@£67; Select Ingot, £68@£69½; India Sheets, £73@£74; Y. M. Sheets, 6¼@6½d. 3 lb.

The monthly statement of the Bureau of Statistics for July gives the following figures for copper, in pounds:

Table showing monthly statistics for copper in pounds for July 1881, 7 mo. 1881, and 7 mo. 1880.

STATISTICS OF COPPER—ENGLAND AND FRANCE, INCLUDING METAL AFLOAT.

Table showing statistics for copper in England and France, including metal afloat, with columns for Sept. 1 to 30, Imports, Deliveries.

Table showing stocks for copper in London and Liverpool, with columns for Sept. 30, Aug 31, Tons.

Table showing imports and deliveries for copper in London and Liverpool, with columns for Tons.

Table showing tin statistics for London, with columns for Jan. 1 to Nov. 30, 1881, 1880, 1879, Imports, Deliveries.

Tin.—The London market has still further advanced under large demands for consumption. Straits is quoted to-day in London at £97. The Singapore market is without stock, and \$30 is quoted. Penang quotes at \$29½. The sales here have amounted to about 250 tons at \$21½@£21½, thirty days. The same quotations are given at the close, although an order to buy for cash would probably secure a concession. L. & F. is held at 22½c.

Our London advices by mail include September 30th, from which we take the following:

Sept. 27th. An active trade has advanced rates about 9d per cent since the 23d. The transactions during the same time amounted to about 500 tons at 94¼@95s. sharp cash, 94¼@94½s. one and two weeks, 94½s. for one month, and 95@95½s. three months.

Sept. 28th. Sales about 200 tons at 95½@95½s. sharp cash, 95½s. six weeks hence, and 96@96½s. three months. The Banca sale of 23,400 slabs averaged 58½¢, equal to about 96½s. in warehouse Holland.

Sept. 29th. There was a large trade at prices not so strong as ruled earlier in the week.

Sept. 30th. Values are fairly maintained, the demand being apparently sufficient to absorb the quantity offering for immediate settlement. A good business was done at 95½@95½s. sharp and prompt cash, chiefly at the lower figure; a few parcels sold at 95½@95½s. cash, in one and two weeks respectively; while 96@96½s. was paid for a little three months' stuff. Dutch deliveries for September are 759 tons. English deliveries about 1500 tons. Stock in London is given as 6696 tons. Shipments from Australia and Straits not yet known.

The July statement of the Bureau of Statistics contains the following figures for tin, in cwts.:

Table showing monthly statistics for tin in cwts. for July 1881, 7 mo. 1881, and 7 mo. 1880.

Tin Plates.—Cokes in Liverpool are quoted at 17s There is a good jobbing business here, but no large transactions have taken place. Prices here have advanced in sympathy with the English market, which appears to have been put up almost entirely by speculators. We quote per box as follows: Charcoal tins, Melyn grade, ½ cross, \$6½; Allaway grade, \$5½@ \$6. Charcoal Roofing, Dean grade, \$5½ for 14 x 20, and \$11½ for 20 x 28; Allaway grade, \$5½ for 14 x 20, and \$11@£11½ for 20 x 28. Coke Roofing, B. V. grade, \$5½ for 14 x 20, and \$10½ for 20 x 28. Coke tins, B. V. grade, IC. \$5½, and ICW, \$4½@£5.

Messrs. Roberts Crooks & Co., of Liverpool, under date of September 29th, say: Tin and terne plates, while firm, do not show marked advance for spot specifications, but for any thing forward an advance of from 6d. to 1s., based on a corresponding advance in material, is asked. Buyers do not see the necessity of paying this, and business in every thing but lots for immediate shipment is consequently light.

**Lead.**—The consumption continues to be very large. Consumers, however, have made provisions for early necessities, and although the supplies are still small, prices are weaker. We note a sale of 100 tons at 5½¢, and some smaller lots at a higher figure. At the close, we can not quote better than 5'10@5½¢.

The July statement of the Bureau of Statistics contains the following data for lead, in pounds:

	July, 1881.	7 mo. 1881.	7 mo. 1880.
Imports.....	1,173,204	4,486,576	5,960,603
Re-exports.....	505,958		30,875

Net imports..... 1,173,204 3,980,618 5,929,728

The San Francisco Commercial Herald of October 6th says:

During the past week, the following shipments of lead to New York, per steamer City of Rio de Janeiro, have been made:

	Lbs.	Value.
Shippers.....	210,700	\$37,000
Bank of California.....	770,000	42,350
Daniel Meyer & Co.....		

Totals..... 980,700 \$79,350

The shipments of lead over the St. Louis & San Francisco Railroad for the week ended October 7th amounted to 214 tons.

**Spelter and Zinc.**—Both are very scarce on spot, and much dearer for immediate than future delivery. On spot 80c. is asked for domestic spelter. The last sale of 9x36 sheets was made at 7½¢, while to arrive it can be had at 7c.

The July statement of the Bureau of Statistics contains the following figures for spelter, in pounds:

	July, 1881.	7 mo. 1881.	7 mo. 1880.
Imports.....	220,460	1,175,946	5,743,843
Exports.....	100	292,000	735,669

For sheet zinc the following figures are given:

	July, 1881.	7 mo. 1881.	7 mo. 1880.
Imports.....	84,448	1,375,497	3,239,369
Re-exports.....		16,586	38,867

Net imports... 84,448 1,358,911 3,200,025

**Antimony.**—There is but little doing, although the quotations are stronger. We quote Cookson's at 14c. and Hallett's at 13½@13¼¢.

**Quicksilver.**—We are indebted to our correspondent in San Francisco for the following interesting table giving the total receipts of quicksilver at San Francisco, including direct shipments from the mines by rail since January 1st, 1881, up to September 30th, 1881:

	Month of September.	Year from January 1st, 1881.
Mines.....		183
Altoona.....		23
California.....		157
Cloverdale.....		32
Great Eastern.....		113
Great Western.....		457
Guadalupe.....		201
Napa Consolidated.....		592
New Almaden.....	1,620	17,842
New Idria.....		212
Reddington.....		187
St. John.....		109
Sulphur Bank.....	1,075	9,224
Various.....		5

Total shipments to date.... 4,495 45,198

Our market continues firm, with sales at 38c. Stock on hand very light.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Oct. 14.

The July statement of the Bureau of Statistics has the following returns on the imports of iron and steel, in tons of 2000 lbs., the re-exports of foreign material and the exports of domestic manufacturers being small only:

	July, 1881.	Seven months, 1881.	Seven months, 1880.
Pig-iron.....	50,788	291,040	627,843
Bar-iron.....	2,121	14,697	100,138
Band, hoop, and scroll-iron.....		4,783	21,355
Sheet-iron.....	389	1,791	7,871
Old scrap.....	14,321	79,040	468,789
Iron rails.....	15,133	97,375	89,368
Steel rails.....	25,935	121,414	77,713

There is but very little business reported; in fact, not as much as has been done. The higher prices are holding off buyers; but if they came forward, they would not meet with a very enthusiastic reception on the part of makers, who are generally well sold ahead, and in no instances carrying heavy

stocks. The advance in prices abroad is showing our home producers that there is a margin for further advances in domestic products, and already there are strong evidences of a liberal rise.

**American Pig.**—A very strange condition of affairs exists in the pig-iron market. There is a disinclination to quote business, and especially full prices received. This may be accounted for by the fact that many concerns are so far sold ahead that they do not want to create a "boom" in which they can not participate.

We have been quoted several sales of late at prices above the regular quotations, but were not allowed to make them public. This week we learn of a sale of 500 tons of a leading brand of No. 1 Foundry for next year's delivery at \$27. For 1000 tons of a good brand for early delivery, an advance on the quotations given below would have to be paid. Stocks are light, and the only thing likely to keep down prices is a severe winter and the inability to move iron. We quote No. 1 Foundry at \$25@26; No. 2 Foundry, \$22½@23; and Forge, \$21@22.

**Scotch Pig.**—The arrivals are but moderate, and fully absorbed on landing. The Scotch market is a little lower, but freights are still well maintained. We note sales of 300 tons of Gartsherrie at \$25; 300 tons of Eglinton at \$23¼@24; and 150 tons of Coltness at \$26@26½. There is good inquiry, and stocks are light. We quote Eglinton at \$23¼@24; Glengarnock, \$25; Gartsherrie, \$25; Coltness, \$26½; and Summerlee, \$25½@26. We quote a sale of 100 tons of English No. 3 at \$21, and quote at \$21@21½. A sale of 900 tons of Bessemer iron on spot at \$24.35 is reported.

Messrs. John E. Swan & Brothers, of Glasgow, under date of September 30th, report 120 furnaces in blast, as against 95 at the same time last year. The quantity of iron in Connal & Co.'s stores was 590,176 tons, an increase of 3374 tons for the week. The shipments show a decrease since Christmas of 102,424 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 38,853 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 60s.; Coltness, 62s.; Langloan, 62s.; Summerlee, 60s.; Carnbroe, 56s.; Glengarnock, 56s.; Eglinton, 52s. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 46s. 6d.; No. 2, 44s. 6d.; No. 3, 42s. 6d.; No. 4, 42s.; No. 4 Forge, 41s. 6d.

Messrs. J. Berger Spence & Co., of Manchester, England, under date of October 15th, say: So far, the arranged decrease of production in the Northern pig-iron trade has had a beneficial effect on the position of the markets; but it must be admitted that the result has not as yet been as great as was expected. It was anticipated prices would advance with a bound, whereas the actual increase in values is little more than the percentage of reduction of output, say 12½ per cent to 15 per cent. The business of last week has not been maintained, the strong desire to buy has been satisfied, and now buyers are inclined to hold aloof in hopes of a reaction. It is premature perhaps to expect this. Makers are not likely to evacuate any advantageous position they have secured, and although during the week much more iron might have been sold, they will not weaken the market by accepting reductions. Glasgow Warrants are now 51s. 3d., having fluctuated between 52s., 51s. and this figure. Middlesbrough Numbers are higher than last week, and may be taken as 45s. No. 1, 42s. No. 2, and 40s. 9d. No. 4 Forge. Bessemer iron is unaltered. Lancashire and Derbyshire iron are both dearer and in improved request.

**Rails.**—There is but very little doing in rails. In the absence of business it is difficult to give quotations, which are strong at nominally our quotations of a week ago.

**Old Rails.**—No transactions are reported in these. We quote Ts. at \$27¼@27½ and D. Hs. at \$29¼@30.

**Wrought Scrap.**—Outside of a sale of 1000 tons for future arrival at \$28½, we learn of no business. We quote at \$28@31.

We publish the following letters from our regular correspondents:

Cincinnati. Oct. 12.

[Specially reported by JACOB TRABER & Co.]

The demand for foundry grades of pig-iron continues

fully up to the supply, and some kinds beyond, favorite brands of coke irons being especially scarce. We quote:

	Four Months.
No. 1. Hanging Rock Charcoal.....	\$27.50@28.00
No. 2.....	26.50@ 27.00
No. 1. Tennessee.....	26.50@ .....
No. 2.....	25.50@ .....
No. 1. H. R. & Va. Coke.....	25.00@ 26.00
No. 2.....	24.00@ .....
Jackson Co. Stone Coal.....	21.50@ 25.00
H. R. C. B. Car-Wheels, all Nos.....	39.00@ 40.00
Southern C. B. Car-Wheels, all Nos.....	36.00@ 38.00
Virginia.....	38.00@ 39.00

Louisville. Oct. 11.

[Specially reported by GEORGE H. HULL & Co.]

The market during last week has been very strong on all grades of hot-blast iron, and an advance of fully \$1 per ton has been established. There is no demand for cold-blast irons, and prices of car-wheel irons remain stationary. Round sales of Southern mill irons have been made at \$3 per ton higher than same irons sold for in July, with still an upward tendency. We know of no sales of No. 1 mill above \$21.50 csh, but \$22@22.50 are prices asked, and it looks as though they would soon be reached.

**FOUNDRY IRONS.**

	No. 1.	No. 2.
Hanging Rock Charcoal.....	\$28.00@29.00	\$27.00@28.00
Southern Charcoal.....	25.00@ 26.00	23.00@ 24.00
H'n g Rock, Stc'l & Coke.....	25.00@ 26.00	24.00@ 25.00
Southern Stonecoal & Coke.....	24.00@ 25.00	22.00@ 23.00
Amer. Scotch.....\$22 @ \$24		Silver Gray.\$20.00@22.00
Scotch Iron.....	@ .....	

**MILL IRONS.**

No. 1 Charcoal, cold-short and neutral.....	@ .....
No. 1 Stc'l & Coke, cold-short and neutral.....	\$21.50@22.50
No. 2 Stc'l & Coke, cold-short and neutral.....	21.00@ 22.00
No. 1 Missouri and Indiana, red-short.....	26.00@ 27.00
White & Mottled, cold-short and neutral.....	17.00@ 19.00

**CAR-WHEEL AND MALLEABLE IRONS.**

Hanging Rock, cold blast.....	\$35.00@38.00
Alabama and Georgia, cold blast.....	34.00@ 37.00
Kentucky, cold blast.....	34.00@ 36.00
Hanging Rock W. B.....	29.00@ 33.00

Philadelphia. Oct. 13.

Quotations are quotably higher in some kinds of iron. For instance, Muck Bars have advanced to \$45, and 300 tons sold to-day at \$45.50, while one or two holders decline to sell below \$46. The greatest scarcity exists. Charcoal Blooms are in active demand. Quotations are \$70. The situation of the Merchant Bar market is unchanged. Stores are doing an active business at 2½@2½¢, and mills quote, but decline all orders at 2½@2½¢. There is a heavier inquiry, due no doubt to the requirements of the season, and to the stronger evidence that outside sources of supply are not available. From private sources of information, it appears foreign activity increases, and prices are very firm. There is talk of probable arrivals of Bar and Sheet, and perhaps some other iron on consignment later on, but this has little weight. All Sheet mills are out of stocks and overrun with orders, some of which will extend beyond the holidays; card, 5½@4½¢, from 28 to 16 gauge. Structural shapes are the subject of very active business, and the business done for the week is equal to that of any other week since July; quotations, 3@4c. Plates can not be had at any price. The requirements of consumers have exhausted all capacity for the present, and new customers must wait; card, 3½¢; Refined, 4c.; Shell, 4c.; Flange, 5c. Pig-iron is quite active, and at \$20@21 for Forge. Furnace, \$22.50 for No. 2; and \$24@25 for Foundry No. 1. All consumers are gradually increasing their orders for the future, instead of delaying any longer. The daily transactions cover smaller amounts, but there are more of them. English iron is neglected. The general market is stronger, and prices are gradually edging upward in sympathy with the tendency in Great Britain. Nails active at \$3.30 net; Pipes, 55 off; Steel Rails, \$58; Iron, \$47; Old Rails, \$28, and dull.

**John H. Austin & Co.'s Special Market Report.**

LONDON, E. C., Sept. 29.  
**STEEL RAILS.**—£6@£6 2s. 6d. per ton for usual weight and sections. It having transpired that two of our English makers had nervously accepted £5 15s. per ton for 56-lb. sections, spring shipment of 1882, a flood of inquiries followed, and a large business could have been done on that basis; but the cheap sellers withdrew, and prices remain as above quoted for November forward.

**IRON RAILS.**—£5 7s. 6d.@£5 10s. per ton, November forward; makers firm at these prices. Another large Welsh works is shortly going into steel, thus reducing the make of iron rails by another 600 to 800 tons per week.

**BAR IRON.**—Firm at £5 5s.@£5 7s. 6d. per ton.  
**OLD RAILS.**—These are without any new feature. A few lots of Flanges have been sold cheap for reasons named in our last; but sound holders are as firm as ever. D. Hs. are steady at 87s. 6d.@90s. per ton, c. i. f.; but freights to Philadelphia, Baltimore, etc., being difficult to obtain by sail, sellers are getting behind in their contracts.

**HEAVY WROUGHT SCRAP-IRON.**—Nominally 74@75s. per ton, c. i. f. New York.  
**STEEL BLOOMS, 7" x 7" AND UPWARD.**—A large business



done at \$5 10s. @45 12s. 6d. per ton cash terms. The control of this market for deliveries over the next four months seems getting into one or two hands.

BESSEMER PIG-IRON, Nos. 1, 2, AND 3.—Strong; 60s. per ton, f. o. b., paid for spot lots.

SCOTCH PIG-IRON.—Very unsettled, and fluctuations varied and rapid, owing to the recent not quite clearly-defined action of the makers. Cash price to-day, 51s. 6d. @ 51s. 9d.

MIDDLESBROUGH PIG-IRON, No. 3.—41s. 9d. @42s. cash.

FREIGHTS.—We quote to-day for rails from Wales to America per ton: Montreal, 15s.; New York, 13s.; Philadelphia, 13s. 6d.; Baltimore, 13s. 6d.; Charleston, Savannah, and Norfolk, 17s. 6d.; New Orleans, 15s.; Galveston Bay, 17s. 6d. @20s.; Galveston Wharf, 22s. 6d. @25s.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 14. Anthracite.

The condition of the anthracite trade is as good as could be expected. The demand is in many cases beyond the ability of the companies to supply, although, if no choice of coal is sought, there is still an abundance offering.

The scarcity of water is so great at the mines that in the Schuylkill region water trains are running to supply the requirements of the collieries. This adds to the cost of production, and probably curtails the output.

With good winter weather (not necessarily as severe as last winter), there will be a steady business until spring, and the indications point to a great scarcity of coal at many points. The wonderful development of the Western anthracite trade is but little appreciated by the general public, and is only being fairly grasped now by the railroad interests of the country.

Bituminous.

Low water in the Chesapeake & Ohio Canal and a general scarcity of cars have so much reduced the output as to make it impossible for many of the companies to meet the demands on contracts, thereby making it not only impossible to sell coal, but compelling them to enter the market as buyers to meet their contracts.

Imports, foreign, continue large and free, and wholesale dealers are now anxious to extend their trade by offering to sell 5-ton lots to families, ex ship, at a heavy abatement from those charged by retailers.

week include the following cargoes: Per Catloch, from Dundee, 1755 tons; Hylton Castle, 1900 tons, Wellington; Oriental, from Hull, 2180 tons; Majestic, 1963 tons, Seattle; Florence, from Liverpool, 2223 tons; Fiji, from Sydney, 2040 tons; Dunnottar Castle, 2327 tons, Dundee; Enos Soule, from Liverpool, 1600 tons; Inchgreen, Dundee, 1000 tons; Britannia, 1132 tons, Cardiff; Willamette, from Seattle, 3000 tons. We submit the following schedule of rates:

Table with 3 columns: Destination, Prices to arrive, Spot rates. Rows include Australian, Liverpool Steam, West Hartley, Scotch Splint, Lehigh Lump, Cumberland bulk, Egg Hard, Cardiff.

Since writing the above, advices reach us that the British Kilmoden, from Glasgow to this port, coal laden, was on fire and abandoned at sea; all hands saved. This reminds us forcibly of the "King of Rings," which now controls the spot market for coal.

STATISTICS OF COAL PRODUCTION

Comparative statement of the production of anthracite coal for the week ending Oct. 8th, and years from January 1st:

Table with 5 columns: Region, Tons of 2240 lbs., 1881 (Week, Year), 1880 (Week, Year). Rows include Wyoming, Lehigh, Schuylkill, Sullivan regions and a Total row.

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

Table with 2 columns: Total same time in 1876, 1877, 1878, 1879 and corresponding tons.

The decrease in shipments of Cumberland Coal, over the Cumberland Branch and Cumberland & Pennsylvania railroads, amounts to 185,323 tons, as compared with the corresponding period in 1880.

The shipments of Cumberland Coal, over the George's Creek & Cumberland RR., by the Maryland and the American Coal companies, for the week ending Oct. 8th, amounted to 10,364 tons, making a total of 123,788 tons since the beginning of transportation.

The Production of Bituminous Coal for the week ending Oct. 8th was as follows:

Table with 3 columns: Region, Tons of 2240 lbs., Week, Year. Rows include Cumberland, Barclay, Broad Top, Clearfield, Snow Shoe, Tyrone and Clearfield, Allegheny, Pennsylvania, Pittsburgh, West Penn, South Penn, Peun & Westmoreland gas-coal, RR., Pennsylvania RR.

The Production of Coke for the week ending Oct. 8th, and year from Jan. 1st:

Table with 3 columns: Region, Tons of 2000 lbs., Week, Year. Rows include Penn. RR. (Allegheny Region), West Penn. RR., Southwest Penn. RR., Penn. & Westmoreland Region, Pa. RR., Pittsburg, Penn. RR., Show Shoe (Clearfield Region).

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to Oct. 14th, 1881.

Table with 4 columns: PORTS, From Philadelphia, From Baltimore, From Elizabethport, Fort Johnson, South Amoy, Hongkong, and Weehawken. Rows include various ports like Alexandria, Annapolis, Albany, Baltimore, Bangor, Bath, Me., Beverly, Boston, Mass., Bristol, Bridgeport, Conn., Brooklyn, Cambridge, Mass., Cambridgeport, Charleston, Charlestown, Chelsea, City Point, Com. Pt., Mass., E. Boston, East Cambridge, E. Greenwich, R. I., Fall River, Galveston, Georgetown, D. C., Gloucester, Hartford, Hackensack, Hudson, Lynn, Marblehead, Medford, Millville, Milton, Newark, N. J., New Bedford, Newburyport, New Haven, New London, Newbern, Newport, New York, Norfolk, Va., Norwich, Norwalk, Conn., Pawtucket, Philadelphia, Portland, Portsmouth, Va., Portsmouth, N.H., Providence, Quincy Point, Richmond, Va., Rockland, Rockport, Roxbury, Sag Harbor, Salem, Mass., Saugus, Savannah, Somerset, Staten Island, Trenton, Troy, Wareham, Washington, Weymouth, Williamsburg, N.Y., Wilmington, Del., Wilmington, N.C.

\* And discharging. † And discharging and towing. ‡ 3c. per bridge extra. § Alongside. ¶ And towing up and down. \*\* Below bridge.

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Advertisement for THE CONTINENTAL WATER METER CO., featuring text about the company's products and John D. Gould, Manager, Office, 95 Milk Street, ROOMS 64 AND 65.

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SPECIAL NOTICES.

WANTED.—GOOD, WIDE-AWAKE. PRACTICAL MEN for introducing and selling Blast-Powder, etc., through the country. Address: THE HECLA POWDER CO., 57 Broadway, N. Y.

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A CHEMIST, Thoroughly conversant with the Management of Furnaces, Also an EXPERIENCED ANALYST, wants a position with a smelting concern. Address, D. 5245, care Rudolf Mosse, at Frankfort-on-the-Main.

DIVIDENDS.

OFFICE OF CHRYSOLITE SILVER MINING COMPANY, No. 18 Wall Street, New York, Oct. 13, 1881. A dividend (No. 10.) of ONE HUNDRED THOUSAND DOLLARS, or fifty cents per share, has been declared, payable on the 10th November proximo.

THE NEW PULSOMETER. CHEAP, ECONOMICAL, EFFICIENT. OFFICE OF JOSEPH FIRMENICH, Steam Syrup Refinery, 1 to 25 Mortimer Street, and 386 to 412 Jefferson Street, BUFFALO, N. Y., May 16, 1881.

DIVIDENDS.

THE TIP TOP SILVER MINING COMPANY has declared DIVIDEND NO. 4 of Twenty (20) Cents per share, payable on the 26th inst. The transfer-agents, the Farmers' Loan and Trust Company, will pay on stock registered in New York. Transfer-books close on the 20th inst.

OFFICE OF THE TOMBSTONE MILL AND MINING COMPANY, 432 Walnut Street, PHILADELPHIA, Sept. 13, 1881. NINETEENTH DIVIDEND.

The Executive Committee of the Board of Directors of this company have this day declared the regular monthly dividend of \$50,000, being TEN CENTS ON EACH SHARE of the capital stock of the company, payable on and after October 15th at this office.

OFFICE OF THE GREEN MOUNTAIN GOLD MINING COMPANY, of California, No. 18 Wall Street, New York, September 13th, 1881. DIVIDEND NO. 7.

The Trustees have this day declared a dividend of SEVEN AND ONE-HALF CENTS per share on the capital stock of this company for the month of August (being the 27th consecutive monthly dividend) and making a total to date of \$193,625, payable on the 26th inst.

OFFICE OF COPPER QUEEN MINING COMPANY, 36 Thomas Street, New York, Sept. 23, 1881. The Board of Directors of this company have this day declared a monthly dividend (No. 4) of Twenty-five Thousand Dollars, being 10 cents per share on the capital stock, payable to stockholders of record on and after October 1st, 1881.

THE STANDARD CONSOLIDATED MINING COMPANY to-day declared its regular monthly dividend of SEVENTY-FIVE CENTS PER SHARE, payable Oct. 12th, 1881, at the Farmers' Loan and Trust Co., 26 Exchange Place, New York.

OFFICE OF THE STORMONT SILVER MINING COMPANY, 2 Nassau Street, cor. Wall, New York, Sept. 13, 1881. DIVIDEND NO. 4.

The Board of Trustees have this day declared a monthly dividend of FIVE CENTS a share, payable on the first day of October, at this office. The transfer-books will close on the 15th inst., and reopen October 3d.

ROBINSON CONSOLIDATED MINING COMPY DIVIDEND NO. 7. New York, Oct. 1, 1881.

The Board of Trustees have this day declared the regular monthly dividend of Fifty Thousand Dollars, also an extra dividend of Fifty Thousand Dollars, making one hundred thousand dollars, payable on and after October 15th, 1881, at the office of the company, 18 Wall street.

THE SCIENTIFIC PUBLISHING CO., P.O. Box 1833, 27 Park Place, New York.

MAPS.

ARIZONA AND NEW MEXICO.—This Map shows all the Township Surveys, Private Land Claims, Post-Offices, and Settlements. It also exhibits the Explorations of other Government and Private Expeditions, including the facts developed by the Surveys for the Routes of Proposed Railroads, etc. 1881. Scale, one inch to thirty three miles. Colored. 24x17 inches. Pocket form, \$1.

COLORADO.—Topographical and Township Map of the State. Compiled from U. S. Government Surveys and other authentic sources, by Louis Nell, Civil Engineer. By means of symbols, the following mass of facts is graphically shown: Railroads in operation; Railroads chartered or in progress; Wagon-roads; Wagon-roads proposed; Trails; Drainage dry during the greater part of the season; County-seas; Post-offices; Villages; Townships subdivided; Townships surveyed in outlines; Contour-lines, with vertical intervals of 1000 feet; Altitudes in feet above sea-level, by barometer observations, and by spirit-levels; Private grants; Military reservations; Indian reservations ceded to the U. S. Government; Arable and, with irrigation. Tables of Areas of Counties; Astronomical Positions; Arable Land. Scale, 1 inch: 10 miles. Size, 31 x 40 inches. Pocket form, \$1.50, on thick paper.

COLORADO.—Topographical and Township Map of Part of the State, exhibiting the San Juan, Gunnison, and California Mining Regions. By Louis Nell. Substantially same as above. Post-offices, March 1st, 1880. Scale, 1 inch: 9 miles, 1-370,240. Plain sheets for wall, 90 cents.

SAN JUAN MINING DISTRICT (COLO.)—Kibbe's Map of the San Juan Mining District locates towns, camps, post-offices, frontier-works, mining districts, etc. It gives the new local names of towns, mountains, and gulches in all the mining camps, including Durango, Rico, and the new county of Dolores, the new railroad and railroad towns, and the proposed railroads, stage routes, wagon-roads, and trails; the elevation of mountains and towns above sea-level. It is colored by counties, 25x27 inches, linen paper, folded in cloth cover for pocket form, or printed on heavy paper for office use. Also, a complete GEOLOGICAL MAP of the same size. Either map, \$1.50.

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

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

MEXICO.—Map of Mexico. Showing Railroads, Broad Gauge and Narrow-Gauge, Constructed; and Railroads, Broad-Gauge and Narrow-Gauge, Proposed. This very large and finely-engraved Map, constructed originally by the government for official purposes, contains all the information obtainable by it, and shows minutely the towns and villages of the entire country. Scale: 26/6 Mexican Leagues to the degree, and 69/16 English Miles to the degree; also, Kilometrical Scale, 1881. Size, 53x41 inches. Printed in colors. Pocket form, \$5.

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

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

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

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