

# THE ENGINEERING AND MINING JOURNAL



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

VOL. XL. DECEMBER 12. No. 24.

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

Articles, communications, reports, documents, books—all things whatsoever belonging to the Editorial Department, should be thus addressed: **MANAGING EDITOR ENGINEERING AND MINING JOURNAL, P.O. BOX 1833, New York City.**  
Cable address: "Rothwell," New York.

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 "R"; and only for articles so signed is he responsible.

SUBSCRIPTION PRICE, including postage for the United States and Canada, \$4 per annum; \$2.25 for six months; all other countries, including postage, \$5 = 20s. = 25 francs = 20 marks. All payments must be made in advance.

FILE COVERS will be sent by mail for \$1.25 or delivered at office for \$1 each.

Advertising Rates.—See page 411.

Mr. C. A. Green is our accredited representative for New York.

Mr. A. R. Brown, Jr., is our accredited representative for Boston and the Eastern States. Office, Room 1, Simmons Building, 38 Water street, Boston.

Mr. T. O. Dowd, Providence, R. I., is our special agent for the Eastern States.

Mr. J. Viennot, 150 South Fourth street, Philadelphia, is our accredited representative for Pennsylvania, Maryland, and Delaware.

Mr. O. D. Cotton, Columbus, O., is our accredited representative for Ohio, Illinois, Missouri, Iowa, Michigan, Indiana, and the Southern States.

Mr. O. J. Frost, care Boston & Colorado Smelting Company, Argo, Colo., is our accredited representative for Denver and vicinity.

REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

**THE SCIENTIFIC PUBLISHING CO., Publishers.**

R. P. ROTHWELL, Pres. HENRY M. GEER, Sec. and General Manager,  
P.O. Box 1833. 27 Park Place, New York.

## CONTENTS.

<b>EDITORIALS:</b>	<b>PAGE.</b>	<b>COAL TRADE NOTES:</b>	<b>PAGE.</b>
To Employers in Any Part of the World.....	397	Alabama.....	405
The Fearful Waste of Life on the Work of the New Croton Aqueduct.....	397	Colorado.....	405
President Cleveland's Message.....	397	Illinois.....	405
The Dakota School of Mines.....	397	Pennsylvania.....	405
The Geology of the Comstock Lode.....	397	West Virginia.....	405
		<b>GAS AND PETROLEUM NOTES.....</b>	<b>405</b>
<b>CORRESPONDENCE:</b>			
Alleged Improvements in Ore-Crushing Machinery.....	399	<b>GENERAL MINING NEWS:</b>	
The Central Silver Mine, Mexico.....	399	Arizona.....	405
The Hunt and Douglas Copper Process.....	399	California.....	405
		Colorado.....	406
Official Reports and Statements.....	399	Dakota.....	406
Utilization of Slag from the Basic Bessemer Process.....	400	Mexico.....	407
Extracts from the President's Message.....	401	Michigan.....	407
Modern American Methods of Copper Smelting.....	402	Minnesota.....	407
The New Croton Aqueduct Disasters.....	403	Montana.....	407
The Venezuela Gold Mines.....	404	Nevada.....	407
Patents Granted by the United States Patent Office.....	404	New Mexico.....	407
Furnace, Mill, and Factory.....	405		
Labor and Wages.....	405	<b>MARKETS:</b>	
Transportation Notes.....	405	Silver, Copper, Tin, Lead, Spelter, etc.....	407
		Iron Market Review.....	408
<b>NOTES:</b>		New York.....	408
Rolling Circular Weldless Boiler Plates.....	398	Philadelphia.....	408
Exports of Ore from Bilbao.....	400	Coal Trade Review.....	409
The Meldometer.....	400	Statistics of Coal Production.....	409
The Electrolytic Cartridge for Blasting.....	403	New York.....	409
Treatment of Old Zinc.....	403	Buffalo.....	410
Hoisting from Great Depths.....	404	Boston.....	410
		<b>FINANCIAL:</b>	
		Mining Stocks.....	410
		Coal Stocks.....	410
		Boston Copper and Silver Stocks.....	411
		<b>Advertisers' Index.....</b>	<b>xii</b>

IF employers in any part of the world who desire the services of superintendents, mining or civil engineers, metallurgists, chemists, mine or furnace foremen, or other assistance of this character, will send us particulars of what they need, their wants will be advertised in the **ENGINEERING AND MINING JOURNAL**, WITHOUT CHARGE, and answers will be forwarded to them.

This offer is made in the interest of subscribers to the **ENGINEERING AND MINING JOURNAL**.

THE fearful loss of life on the work of the new Croton Aqueduct has become a shame and a disgrace to those responsible for it. It is useless to tell any mining engineer that such a loss of life, now, we believe, amounting to some thirty lives, from a great number of so-called "accidents," is not wholly unavoidable. Even admitting that sinking or tunneling in vertical schists is more dangerous than in more compact rocks, it is very evident that there has been gross carelessness, probably combined with some ignorance of the proper execution of such work. Our correspondent, Mr. E. E. OLCOTT, whose experience gives weight to his opinion, shows clearly the culpable carelessness to which were due some of the recent "accidents," where a number of lives were lost. We commend his remarks to those responsible; for it is high time that a stop should be put to this disgraceful record.

THE message of President CLEVELAND has no doubt been perused by all our readers; but we place upon record for further reference the President's suggestions regarding the tariff and the silver dollar coinage.

Without necessarily agreeing with all the President's views on the many subjects treated of in his message, it must be admitted that this is one of the very ablest and best written state documents that has ever been presented by a president of the United States. Among the representative business men having to do with the industries represented by the **ENGINEERING AND MINING JOURNAL**, it is generally considered to be a careful, conservative document, and its recommendations, which will undoubtedly have great influence on legislation, both from the character and the official position of their author, are opposed to any changes that could disturb the reviving prosperity of the country. It has had a reassuring effect among those who feared any great change in our tariff. We shall refer again to its recommendations and to those of other government reports on future occasions.

### THE DAKOTA SCHOOL OF MINES.

At the last session of the Legislative Assembly of the Territory of Dakota, provision was made for the establishment of a School of Mines for Dakota at Rapid City—the "Gate City" of the Black Hills, soon to be connected by rail with the Missouri Valley system. The object of this school is declared to be to furnish facilities for the education of such persons as may desire to receive special instruction in chemistry, metallurgy, mineralogy, geology, mining, milling, engineering, mathematics, mechanics, drawing, the fundamental laws of the United States, and the rights and duties of citizens. It will be open gratuitously to all citizens of the territory, of either sex. A commodious brick building for chemical and mineralogical laboratories has been erected at a cost of \$10,000, and will form one wing of the final structure. The equipment and organization of the institution have been intrusted to Prof. W. P. BLAKE, a most excellent selection; for Professor BLAKE is one of our most experienced engineers, and is thoroughly informed on the requirements of such an institution.

### THE GEOLOGY OF THE COMSTOCK LODGE.

Bulletin No. 17 of the United States Geological Survey, a monograph by Messrs. ARNOLD HAGUE and JOSEPH P. IDINGS, "On the Development of Crystallization in the Igneous Rocks of Washoe, Nevada, with Notes on the Geology of the District," is one of the most interesting and important contributions which have been made in this country to the literature of science. In order to appreciate its significance, it is necessary to bear in mind the history of successive foregoing investigations and theories.

In early days, the ordinary classification of the Washoe rocks, adopted by mining engineers, was very simple. There was the "syenite" of Mount Davidson, forming the west wall. There was the "porphyry," constituting for a considerable distance the east or hanging-wall, but changing to the north and south, first to diorite and then to a syenitic rock which could scarcely be distinguished from that of the foot-wall. Finally, there was the "black dike," found underground, and lying on the west wall. Adopting this popular classification, Dr. RAYMOND wrote in 1868-69 (Report of the United States Commissioner of Mining Statistics), "The notion that the Comstock is a 'contact-vein' between two distinct formations, appears, therefore, to be an erroneous one."

But Baron RICHTHOFEN had already made his famous examination of the Comstock lode for the Sutro Tunnel Company, in which he had proposed a more complicated classification of the Washoe rocks. Retaining the name of syenite for Mount Davidson, he added a quartzose porphyry, as overlying the metamorphic strata north and south of it, and classed the remaining rocks of the locality as Tertiary. The oldest of them he called propylite, and distinguished several later eruptive rocks, especially (as an important factor in the formation of the Comstock lode) sanidin-trachyte. RICHTHOFEN's propylite was the "porphyry" of the hanging-wall. He found it (and not syenite) to the north and south constituting both walls. Andesite he mentions as insignificant in bulk in that region

composing a few hillocks on the propylitic plateau, and dikes observed in cuts and tunnels. Probably the black dike was one of these.

CLARENCE KING, whose study of the lode was made in 1867-68, followed RICHTHOFEN'S classification in the main, but found a great deal of andesite, and thought there was a close alliance between it and propylite. RICHTHOFEN'S quartz-porphyrus he called a quartz-propylite. According to Mr. KING'S view, the Jurassic upheaval of the ancient sedimentary beds of the Cordilleras was accompanied with outpourings of granite and syenite. The eastern front of Mount Davidson, one of the syenitic outflows, was shaped by erosion to a smooth surface, constituting the present west wall of the Comstock. Then came in the volcanic period of the late Tertiary, an eruption of propylite, or trachytic greenstone, "which deluged the range from summit to base." After that, the andesites appeared, first as a thin intrusive dike, penetrating a new-formed fissure on the contact-plane of the ancient syenite and the propylite. The andesitic period was characterized by solfataric action, which produced the ore-bearing quartz-bodies of the Comstock. It terminated with larger outflows of andesite. Outside of the lode, there were, from parallel fissures, vast eruptions of sanidin-trachyte, and finally, at the close of the volcanic period, a less powerful, but still important, outpouring of basalt. According to this theory, the Comstock is a contact-vein; and the east wall, prior to the formation of the vein itself, was built, as it were, of molten masses, against the pre-existing syenite on the west.

In 1875, Prof. FERDINAND ZIRKEL, distinguished as an expert in the new science of geological microscopy, examined the Washoe specimens, and came to novel conclusions concerning their lithological characters. The ancient syenite became, in his hands, a granular diorite; the quartz-porphyrus of RICHTHOFEN and quartz-propylite of KING, he determined as dacite; and to the growing list of Washoe eruptive rocks he added three species, augite-andesite, rhyolite, and a new kind of basalt.

Passing over the report of Mr. CHURCH, who adopted substantially the lithology of his later predecessors, we come to the work of Mr. BECKER, as set forth in Vol. III of the Monographs of the United States Geological Survey. This investigator had the great advantage of the deeper and more extensive exposures furnished by the Comstock mines and the Sutro Tunnel; and his careful study of the district led to some novel and revolutionary conclusions. The most startling of these was the abolition of propylite as a rock-species. Says Mr. BECKER in his "brief outline of results:" "The so-called propylite of Washoe comprises a number of Tertiary and pre-Tertiary rocks, reduced to a nearly uniform appearance by decomposition." Moreover, according to the same authority, "the greater part of the hanging-wall of the lode is diabase; the 'black dike' is also a variety of diabase; and the supposed trachyte of the district is a hornblende-andesite."

As we have above shown, Mr. KING'S conception of the chronological order of the Washoe rocks was metamorphics, granite and syenite, propylite, andesite, sanidin-trachyte, basalt. For this list, Mr. BECKER substitutes granite, metamorphics, granular diorite (the syenite of KING), porphyritic diorite, metamorphic diorite, quartz-porphyrus, earlier diabase, later diabase ("black dike"), earlier hornblende-andesite, augite-andesite, later hornblende-andesite, basalt. As we understand him, he considers the diorite, quartz-porphyrus, and diabase to be pre-Tertiary. The east or hanging-wall of the Comstock he pronounces to be diabase throughout the entire 10,000 feet of the main lode, and the west or foot-wall to be granular diorite for more than three quarters of its length, but to be chiefly composed of metamorphic slates at its southern end. While he regards the whole lode with its northern and southern branches as a fissure-system, "referable to a single mechanical cause" and charged by "simultaneous lixiviation," he adds that "the lode considered as a great ore-deposit is limited to the contact of the diabase with the underlying rocks." This view is the basis of certain recommendations which he makes concerning future explorations for ore.

While the foregoing summary does not present with fullness or justice the literature of Comstock geology, it may serve to indicate the importance of the new contribution to which we now turn attention. Messrs. HAGUE and IDDINGS come forward with a demonstration that the greatest distinction established by their predecessors, namely, the distinction between the pre-Tertiary and the Tertiary rocks of the district, does not exist; that the igneous rocks of Washoe are all Tertiary; that the "syenite" or granular diorite of Mount Davidson is the same rock as the "porphyry" or "propylite" or diabase of the east wall, and that both are andesite, which appears sometimes pyroxenic and sometimes hornblende; that these andesitic rocks have been broken through by numerous intrusive bodies of both acidic and basic lavas, represented by hornblende-andesites, dacites, rhyolites, and basalts; that the "black dike" or later diabase is the same basalt as is found capping the hills on the surface; and that the Comstock lode "occupies a fissure along a line of faulting in rock of Tertiary age, and can not be considered as a contact-vein between two rock-masses."

The nature of their proof is threefold: geological, chemical, and microscopical. Besides proving by chemical analysis the substantial

identity of the rocks which have been deemed distinct, they show by microscopical examination their lithological identity, and the passage of one supposed species by insensible gradations into the other; and these conclusions are confirmed by considerations drawn from the geological position and *habitus* of the rock-masses themselves.

Besides simplifying the classifications which preceded them, these investigators have incidentally furnished the explanation of the conflicting views of earlier authorities. Accepting their conclusion, that the lode occupies the fissure of a fault, and that there has been a relative movement of the walls of considerable extent, we see at once that this movement would bring opposite to each other portions of the igneous rock not originally contiguous. But our authors have shown that "the degree of crystallization developed in igneous rocks is mainly dependent upon the conditions of heat and pressure under which the mass has cooled, and is independent of geological time." Hence the two parts of the original mass thus brought opposite to each other, having cooled at different depths and under different conditions of heat and pressure, might be expected to present a deceptive difference in general appearance. To this must be added the disguises which have been produced by subsequent decomposition and metamorphosis. Yet it is quite likely that under such circumstances the mutual resemblance of the two walls might be at many points apparent; and we have accordingly the United States Mining Commissioner declaring in 1868 (on the authority of LUCKHARDT) that the "porphyry" hanging-wall changes, north and south, to diorite and then to syenite like the foot-wall; and RICHTHOFEN finding both walls in the same region turning to "propylite." If diorite, syenite, propylite, and porphyry—to say nothing of the later terms diabase and andesite—here signify the same rock under varying conditions of cooling and metamorphosis, it is not wonderful that the numerous apparently distinct varieties of rock thus formed should have led to much clashing of opinion among geologists. Emerging out of the confusion, however, we now have a much more comprehensible theory of the Comstock vein-formation than has been presented since science set aside the simple and rude notions of mere mining engineers.

The nature and extent of metamorphosis is coming to be better understood. In the September number of *Silliman's*, Mr. C. R. VAN HISE, of the United States Geological Survey, shows for hornblende what had already been shown by SORBY and himself for quartz and feldspar, that fragments or crystals may be enlarged by renewed growth during the processes of rock-metamorphosis. This is only one illustration of the fact that a rock may be changed by such processes, not merely until it can not easily be recognized (which is the common notion), but even until it is positively recognized as a separate species, and erroneously ascribed to a distinct age or formation.

Unfortunately, the able studies, by successive scientific authorities, of the rocks of Washoe, which presented data too dubious and complicated for general deductions, have had no little influence on geological science elsewhere. Besides furnishing material for futile classifications, they have doubtless stimulated that tendency, which may be said to have set in with RICHTHOFEN, to classify and sub-classify, on the strength of mineralogical characters only, the eruptive rocks, and to extend into this realm also the use of lithology as a test of geological age, which had already been carried too far in the realm of the crystalline schists. The Veteran COTTA protested against this tendency with his latest breath; and Messrs. HAGUE and IDDINGS have done good service in checking it, by their timely demonstration, which, we fancy, will cause many hasty conclusions and daring speculations to be revised, in other countries than our own. We have not stated all their results, nor can we pretend to give their arguments. To us, it seems that they have made out their case; and at all events, the serious importance of their work can not be denied.

**Rolling Circular Weldless Boiler Plates.**—An entirely new type of rolling-mill, which has been especially constructed from the designs of Mr. John Windle, of Manchester, for rolling vertical circular weldless boiler-plates, 4 feet wide up to 16 feet internal diameter, is about completed by Messrs. Daniel Adamson & Co., of Hyde Junction, for the Victoria Steel and Forge Company, Barrow. The mill, with the engines, is throughout of massive construction, and the total weight of the plant complete, when fixed in position, will be nearly 300 tons. The mill is carried upon a foundation base-plate, 35 feet in length by 17 feet in width, which weighs about 90 tons. The main driving-roll is 22 inches diameter, 4 feet wide between the flanges, and the bearings are 12 inches diameter in the necks. The set-up roll, which acts in the same way as the top roll in an ordinary horizontal mill, is 18 inches diameter, and is actuated by hydraulic power, having a total range of 16 inches. The mill itself is driven directly by means of a vertical spindle, and the engines to which this spindle is geared by means of a pair of steel bevel wheels weighing 12 tons, are placed directly underneath. The bottom of the vertical shaft is carried upon a massive foundation base-plate and foot-step weighing 30 tons. The engines are a pair of the horizontal type, with 40-inch cylinders and 4-foot stroke, the crank-shaft being 27 feet long and 16 inches diameter in the necks. The engine-bed is of the trunk girder type, cored out for the reception of the slides, and the cylinders are fitted with the patent Wheelock automatic expansion gear. The engines complete will weigh about 140 tons, and at 100 revolutions will work up to 3000 indicated horse-power.

## CORRESPONDENCE.

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

## Alleged Improvements in Ore-Crushing Machinery.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In order to make the record complete, allow me to say, what I omitted in my last, that the original Partz patent (Patent-Office Report, 1864) made no reference to tie-bolts to take the strain in crushing. The model was destroyed by fire in 1877. The tie-bolts appeared in the reissued patent. Fifteen years after the first issue, tie-bolts are shown.

New York, Dec. 10.

Yours,

S. R. KROM.

## The Cedral Silver Mine, Mexico.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of the 5th inst., under General Mining News, you published a note regarding the Cedral silver mine, situated near Santa Rosa, Coahuila, Mexico, and owned by a Mobile company.

I desire to state emphatically that it is not only an ancient provision of the Mexican mining code, dating since 1788, which demands that no mine shall be idle more than six months, but also a very recent and very well-understood one, which has never been abrogated. Chapter IV, "Codigo de Minería," which went into effect in 1884, distinctly provides that any mine in which work is suspended for six months without a "proroga," is open for relocation. No one point in Mexican mining usage is better understood.

I consider, moreover, that any company that owns a \$5,000,000 property and has expended \$1,250,000, as stated in the reports, and then allows its mine to stand idle over six months, has no one but itself to blame, if some smart Mexican steps in and denounces it.

Foreigners have sometimes suffered injustice in our sister republic, but this is no reason why those who voluntarily put themselves under the Mexican law should not abide by its clear and distinct provisions.

Mexico, in allowing the free location of unoccupied mines, does so on the distinct condition that they shall be kept in exploitation.

Our own law imposes the responsibility of assessment-work on the locator of a mine, and until a United States patent is obtained, every miner knows that he must do his \$100 worth of work each year.

No. 10 CEDAR STREET, NEW YORK CITY, Dec. 10.

Yours,

E. E. OLCOTT.

## The Hunt and Douglas Copper Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Allow me a few remarks upon the new Humid Method of Copper Extraction, by Dr. T. Sterry Hunt and James Douglas, Jr., published in the ENGINEERING AND MINING JOURNAL of October 3d, 1885.

The new method, called a "Dichloride Process," purposes to be a regenerative process. That is, the solution employed for the extraction of copper from ore may, after the removal of the extracted copper by precipitation, be again utilized for the treatment of fresh ore.

The difficulties attending the successful installation of a regenerative process are necessarily much greater than those to be encountered in a simple extraction process; but when the claim of regeneration is made, the obstacles to be surmounted in this part of the process must be fairly considered, even though there can be no question as to the success of the extraction in the first instance.

The old notation and nomenclature adopted by Dr. Hunt and Mr. Douglas are now no longer employed by modern chemists in this country, and the use of these in describing new processes is apt to lead to confusion.

Briefly, the novelty of this process consists in the *complete* or *nearly complete* precipitation of the copper from *cupric* solutions, reducing it to the less soluble *cuprous* salt by injection of sulphurous acid.

In the year 1871 (English patent No. 1101), Claudet recovered silver and gold from cupric solutions containing chlorides by *partially* reducing these with sulphurous acid to cuprous salt, which, in precipitating, carried with it the noble metals, and left a purified cupric salt, to be precipitated as usual by means of iron.

Here, Messrs. Hunt and Douglas desire to avoid dissolving the noble metals with the copper in the first instance, and they extend Claudet's process of *partial* precipitation to one in which the precipitation is as complete as is practicable.

The formula they give is as follows:



which, expressed by the new notation, would be:



Now, it will be seen that neither of these equations is balanced, one of oxygen being wanting in the product in each case, and the proper expression of the reaction would be:



That is—avoiding the obsolete terms "dichloride and protochloride of copper"—that reduction of cupric chloride to cuprous chloride by means of sulphurous oxide is accompanied by simultaneous production of hydrochloric and of sulphuric acid.

Now, the mere presence of any considerable quantity of sulphuric acid in the liquors is, in practice, a serious difficulty. Here, the hydrochloric acid holding the copper in solution is constantly precipitated and withdrawn from the cycle of operations; but in this process, the sulphuric acid resulting from the injection of sulphurous oxide is never removed, and must quickly accumulate in the liquors as sulphate. The addition to the regenerated liquors of those resulting from the decomposition of the precipitated cuprous chloride by iron does not *actually* reduce the quantity of sulphate in the liquors, although, of course, it is proportionately decreased.

These liquors must, after a short time, be thrown away as unserviceable, and the copper remaining in them will be lost, unless special expedients or means be adopted for its recovery.

When, again, lime is employed for the decomposition of the cuprous chloride, the ultimate product, oxide of copper, is less valuable than the

metallic copper obtained when iron has been so used. At the same time, chloride of calcium is produced, and this, when added to the liquors, must result in the production of a most inconvenient precipitate of an impure sulphate of calcium, carrying with it some of the copper left after the incomplete precipitation by sulphurous acid.

Instead of taking credit for sulphate of lime produced as a by-product—as the authors virtually do, in saying, "In localities where sulphate of lime and sulphate of iron possess any value, these can be saved as by-products"—it would, perhaps, have been fairer to have represented the unavoidable production of sulphate of lime, if the liquors are to be kept clean, as a positive disadvantage in the process.

The applicability of this process will necessarily be chiefly determined by the nature of the ore subjected to treatment; and since the necessary complete calcination of sulphureted ores to oxide is rarely practicable, treatment by this process is likely to be restricted to natural oxide or carbonate ores. With such ores, the sulphur required for the precipitation of copper must be derived from some exterior source, and this adds a serious item to the cost of treating any such ores.

LONDON, Nov. 14, 1885.

LONDON FIELDS LABORATORY.

HENRY FULTON, F.R.C.S.

## OFFICIAL REPORTS AND STATEMENTS.

## Chrysolite Silver Mining Company, Leadville, Colo.

The following extracts from the report of Mr. R. Neilson Clark, the General Manager, show the condition of the mine and the work done during the year:

Every effort has been directed to exploring for new ore-bodies and to the successful amalgamating of our dump ores. Until nearly the close of the year, all our efforts were unsuccessful, although carried on vigorously, and unfortunately at a severe loss to our reserve fund. But, very recently, a new ore-body was discovered, north of the Roberts shaft; a new and profitable market was opened in the mining of iron ore containing silver; and the last run at the amalgamating mill, upon a lot of ore purchased from a neighboring mine, was profitable. Gloomy, therefore, as this report must be, our present year opens with the knowledge that money is being made, and last year's endeavors will result in profit to the company.

The work done underground was mostly clearing up the old stopes, in which was found ore that had been purposely left unmined during the past years, because it was of low grade, and the cost of reduction was then higher than now.

The company has been mining chiefly by days' labor. No lessee has shipped any ore.

The new demand of the smelters for "basic iron ore" containing silver has at length permitted the shipment of many tons of this material, the value and location of which was determined when sampling the faces of mineral over a year ago. This business is growing rapidly, and will yield a good revenue while it lasts.

At and near G 26, the territory once known as part of the Marden lease, and called the "chloride stopes," a small force was kept at work with some profit during the first two months of the year. Since then, some additional ore has been taken out under the McDonald contract.

At the concentrating mill, a slight alteration was made last April, and charged to running expense, the mill not being enlarged. It has run steadily with profit. The material used was chiefly the fine material screened from the dumps, the resulting coarse iron being shipped directly to the amalgamating mill. The total amount handled for this purpose was 9185 tons, fifteen tons being used to produce one ton; this was done at a cost of \$1.37 per ton crude material, or \$20.60 per ton concentrates. The average value of the concentrates was but \$30.14 above smelting charges. The fact that so many tons were reduced into one, at such a low cost per ton, with labor at three dollars a day, speaks very plainly of the value of the experiments that led to our constructing this mill.

The average tailings carried eight tenths of one per cent in lead, and nine ounces per ton in silver. This silver undoubtedly remains in the iron that is washed off.

The total business of the year at the mine was a shipment of 1803 tons 842 pounds, for which \$47,946.77 were received, this work being done at a cost of \$33,928.96, leaving a profit of \$14,007.81, from which last are to be deducted the expenses of management and kindred expenses.

By far the greater expense of exploration was incurred in extending levels in the old workings, and has been charged into the above cost of ore mined by the company, \$19,716.12. During the year, several small ore-bodies were found and mined at profit. A body was found and cut for a height of twelve feet during September. This has been found to be a valuable body of ore; its extent is not yet known, but it is possible for it to exist through an area covered by three blocks of the map, or 7500 square feet. It is the chief source of supply at present.

A shaft, named Vulture No. 9, was sunk in H 23. At 112 feet, the well-known contact between porphyry and lime was cut, and found to be barren; the shaft was continued through the lime to a depth of 140 feet, when, dike porphyry being struck, it was abandoned. This work cost \$965.99.

During the existence of the Richards and Flynn lease, a shaft was sunk in the Fairview claim in AA 38, for a depth of 104 feet, and drift started near the bottom on an iron streak, which proved to be barren. The bottom of the shaft is in quartzite. The company bore a proportion of the cost of this shaft, and thus expended \$567.10.

While extracting the basic iron ore for the smelters, stringers of ore have been found that may lead to ore-bodies; and as work on the iron masses progresses, valuable ore-bodies may be found, heretofore concealed in these large, unbroken areas.

Under the instructions of the board, no leases were let during the year on the old workings. On ground outside of these limits, the following leases have been in operation:

The Richards and Flynn lease, on the Fairview claim. This has been mentioned above. They expended all their resources, and the property has reverted to the company.

The Darby lease, given for one year, from June 2d, 1885, on a strip of

ground 200 feet north and south by 350 feet east and west, extending from the New Discovery claims through the north ends of the Vulture, Colorado Chief, and Pandora claims. This lease, working through the old Pandora shaft No. 4, in L 19, has found a small body of ore, but so far shipped no mineral.

The Finn lease. This lease was given for one year, from September 10th, 1885, to the same party and upon the same property as the lease of 1884. Exploration is pushed, but so far without success.

The Wallace lease. This was given for one year, from October 2d, 1885, on the south end of the Fairview claim. No ore has yet been found.

All of these leases have explored, chiefly at their own cost, a widely distributed territory; and have so far proved the non-mineral-bearing character of the ground opened by them.

The usual table showing the labor account at the mine, which includes the work in hutching ore at the concentrating mills, shows that the monthly average of wages per day was \$3.25. The pay-roll from October 1st, 1884, to September 30th, 1885, inclusive, amounted to \$31,701.08. The amalgamating mill was enlarged by the addition of six amalgamating pans and three settlers at a total cost to date of \$12,923.42. On February 26th, the mill was started on our dump-ores, with the natural expectation of the same fair results as had been obtained before the mill was closed during November last. This expectation was not realized. Although every effort was made and every known method was used in succession, during a campaign extending through seven months, a proper result in saving a profitable percentage of silver could never be realized continuously. During such times as the ore was clayey, it was stamped with moderate speed and yielded good returns. But when it became flinty in nature, it stamped very slowly, formed a sand pulp that would not uphold the quicksilver in the pans in suspension, and would not therefore yield the proper proportion of silver. On account of the frequent changes in method, the mill did not run full-time. The total battery run was for 171 days, during which time 6964 tons were treated, or 40.66 tons daily; this was done at a cost of \$50,486.16, and but \$21,422.97 resulting silver was sold. The consequent loss of \$29,063.19 has been a severe blow to the company's treasury. While the mill was under lease, \$10,582.63 was obtained from the sale of silver produced. This is included below.

The product of the Chrysolite Silver Mining Company for the year ended September 30th, 1885, was: Mine, silver, ounces, 58,174; lead, pounds, 334,407; cash received, \$47,946.77. Mill, silver, ounces, 30,308; cash received, \$32,952.71. Total for year, silver, ounces, 88,982; lead, pounds, 334,407; cash received, \$80,899.48.

The amount reported in the book accounts as received from sales of silver bars is \$32,987.47; but \$34.76 of this sum consists of small items refunded in adjustment. Hence the sum of \$32,952.71, given as the proceeds of silver sold, is more strictly accurate.

During the year, we have obtained the receiver's receipt for United State patent on Chrysolite II. Claim, under which title we covered our Eaton and Little Silver claims, the only remaining part of our property unpatented.

The suit of the Company vs. the Bank of Leadville is still pending. It is expected that we shall obtain hearing during this present autumn term of the District Court.

The company paid a dividend December 20th, 1884; and on October 13th, 1885, had cash on hand, \$55,316.47.

#### Colorado Central Consolidated Mining Company, Georgetown, Colo.

This company has issued a very gratifying annual report—gratifying to the stockholders, who have waited with more or less, generally less, patience for the expected dividends. As the president stated in his address to the stockholders:

"I can assure you that, during five out of the six years I have had the honor to hold the office of president of this company, it has been any thing but gratifying to stand at the head of the concern. Unjust complaints from all sides, clamor for dividends when there was nothing to draw them from, calumnies, abuse, and blackmail were incessantly pouring down on us. Advice, often of the worst kind, was not only offered, but tried to have it forced upon the board. This, in a few words, was the situation in which I found myself constantly."

From which it appears that the stockholders of the Colorado Central greatly resemble those of a good many other companies.

The story is now changed; for the mines are in bonanza, and the stockholders have been made happy with \$60,000 in dividends and about \$69,000 added to the reserve fund, which now amounts to nearly \$85,000, and will soon reach \$100,000, at which figure it is intended to maintain it. The report states that the following work was done during the year:

Total number of feet drifting during the year.....	2479
" " " " cross-cutting during the year.....	277
" " " " old levels retimbered.....	840
" " " " fathoms ground stoped.....	943
" " " " opened.....	5550

The report nowhere indicates the character of the vein, the extent or value of the reserves, or the cost of doing the work. We learn from other sources that the property is worked altogether on tribute or leases, the lessees getting first wages, calculated on the high Colorado basis, and then they pay the company a royalty of from 10 to 50 per cent of the value of the ore obtained. The company is also interested with the lessees in most of the leases, the object being to get the benefit of the more economical work of tributaries, without running risk. The data given in the report do not permit of any analysis that would enable us to determine whether this method of work is really advantageous. It is generally conceded that tribute work is in the long run expensive and unsatisfactory, though temporarily it may effect a reduction in expenses; but the plan pursued at the Colorado Central has some modifications of the usual system that may change the ordinary result.

The accounts of the company are not so represented as to make a close analysis of cost; and we think this an excellent opportunity to call attention to this very important matter; for our private advices, as well as the general figures given, convince us that the company is fairly and honestly managed, and that the omissions we notice and the unsatisfactory

form of keeping the accounts is not with the object of deceiving any one.

It would appear that 6493 fathoms of ground worked were out during the year; but the thickness of the vein is not given, and we only presume that the fathom refers to the 6 feet by 6 feet surface and for the thickness of the vein.

The following table shows, we believe, the receipts and expenditures; but it is not possible from them to determine the degree of economy with which any part of the work has been conducted.

RECEIPTS.	
Ore sold, 1391.81 tons at \$176.06 a ton.....	\$243,584.54
Supplies sold, etc.....	2,809.63
Company's interest in leases.....	52,487.42
	\$298,881.59
Balance in New York, November 1st, 1884.....	16,319.62
Interest and miscellaneous receipts, New York.....	367.60
Apparent total receipts.....	\$315,568.81
EXPENDITURES.	
Mines.	
Labor.....	\$57,962.88
Paid lessees.....	89,472.13
Building, etc.....	6,932.31
Supplies.....	8,863.98
Wood and timber.....	3,861.88
Salaries.....	9,395.89
Litigation.....	1,982.55
Purchase of property.....	3,755.57
New York.	
Printing and advertising.....	\$874.06
Office expenses.....	1,334.06
Salaries.....	3,320.00
Miscellaneous.....	4,724.11
Legal.....	752.23
Dividends.....	60,000.00

#### UTILIZATION OF SLAG FROM THE BASIC BESSEMER PROCESS.

We have on several occasions reproduced notes from German papers showing the great attention given to the phosphate slag obtained from the basic process in Germany, and such notes continue to appear. A recent article in a paper devoted to agricultural interests deals with two of the forms in which the phosphate is offered to farmers as manure. One is known as "Thomas slag," or "Thomas phosphate" (the process being universally known in Germany as the "Thomas" process), and consists of the slag as obtained from the converter, simply allowed to weather for some time, and then ground fine. Samples of this, analyzed at one of the agricultural laboratories, showed a percentage of phosphoric acid ranging from 17.65 to 19.98, giving an average of 18.75. This is about the same percentage of phosphoric acid as that of a good superphosphate. But then none of it is soluble in water, and only a small portion of it is soluble in citrate of ammonium, which latter solvent is used as a test as to how much of the phosphoric acid is present in such a condition as to be immediately or rapidly assimilable by the soil. So that in all about five sixths of the phosphoric acid are present in a form that can only be very slowly available for the improvement of the land. That such excellent results have been obtained in some special soils as are reported from many quarters, is considered to be due very much to the action of the caustic lime contained in the slags. The land that has been so much benefited is chiefly moorland, or poor heavy meadow land, with acid reaction. Lime alone would much improve such soils; but it is admitted that the "Thomas slag" has done much more than lime alone would do. This is attributed to the improvement caused by the caustic lime putting the ground into better condition for profiting by the phosphates introduced; and the slag is supposed also to be very much more easily decomposed and dissolved, owing to the acid nature of the soils, than would be the case in other soils in which the same slag has not brought about a marked improvement. Another form of manure from the basic slag is known as "Thomas precipitate." This is prepared by chemical processes from the slag, and contains over 36 per cent of phosphoric acid. Here, again, no part of the acid is soluble in water, but very nearly all of it is soluble in citrate of ammonium, and is therefore looked upon as assimilable by the soil. This is spoken of as a very excellent phosphate manure, giving good results in all soils, when mixed, in the necessary cases, with the requisite amount of nitrogenous manures. We do not recollect having seen or heard any thing as to utilization of the basic slag in England, but it is not probable that the material is wasted.

**Exports of Ore from Bilbao.**—The following extract from a Spanish newspaper, showing the exports of ore from Bilbao down to the end of October for several years, will be of interest to many:

Tons.		Tons.	
1878.....	1,074,977	1882.....	3,174,580
1879.....	947,603	1883.....	2,863,525
1880.....	2,038,604	1884.....	2,651,568
1881.....	2,215,972	1885.....	2,872,812

**The Meldometer.**—The meldometer—μελδειν, to melt—is the name given by Professor Joly to an apparatus that consists of an adjunct to the mineralogical microscope, whereby the melting-points of minerals may be compared or approximately determined and their behavior watched at high temperatures, either alone or in the presence of reagents. It consists of a narrow ribbon of platinum, 2 mm. wide, arranged to traverse the field of the microscope. The ribbon, clamped so as to be readily renewable, passes bridgewise over a little scooped-out hollow in a disk of ebony. The clamps also take wires from a battery, and an adjustable resistance being placed in circuit, the strip can be thus raised in temperature up to the melting-point of platinum. The disk being placed on the stage of the microscope, the platinum strip is brought into the field of a one-inch objective, protected by a glass slip from the radiant heat. The observer is sheltered from the intense light at high temperatures by a wedge of tinted glass, which further can be used in photometrically estimating the temperature by using it to obtain extinction of the field.

## EXTRACTS FROM THE PRESIDENT'S MESSAGE.

## REDUCTION OF REVENUE.

The fact that our revenues are in excess of the actual needs of an economical administration of the government justifies a reduction in the amount exacted from the people for its support. Our government is but the means established by the will of a free people, by which certain principles are applied which they have adopted for their benefit and protection; and it is never better administered and its true spirit is never better observed than when the people's taxation for its support is scrupulously limited to the actual necessity of expenditure, and distributed according to a just and equitable plan. The proposition with which we have to deal is the reduction of the revenue received by the government, and indirectly paid by the people from customs duties. The question of free trade is not involved, nor is there now any occasion for the general discussion of the wisdom or expediency of a protective system. Justice and fairness dictate that in any modification of our present laws relating to revenue, the industries and interests which have been encouraged by such laws, and in which our citizens have large investments, should not be ruthlessly injured or destroyed. We should also deal with the subject in such a manner as to protect the interests of American labor, which is the capital of our workingmen; its stability and proper remuneration furnish the most justifiable pretext for a protective policy.

Within these limitations, a certain reduction should be made in our customs revenue. The amount of such reduction having been determined, the inquiry follows, where can it best be remitted and what articles can best be released from duty in the interest of our citizens? I think the reduction should be made in the revenue derived from a tax upon the imported necessities of life. We thus directly lessen the cost of living in every family of the land, and release to the people in every humble home a larger measure of the rewards of frugal industry.

## BANKING AND CURRENCY.

During the year ended November 1st, 1885, one hundred and forty-five national banks were organized, with an aggregate capital of \$16,988,000, and circulating notes have been issued to them amounting to \$4,274,910. The whole number of these banks in existence on the day above mentioned was 2727. The very limited amount of circulating notes issued by our national banks, compared with the amount the law permits them to issue, upon a deposit of bonds for their redemption, indicates that the volume of our circulating medium may be largely increased through this instrumentality.

Nothing more important than the present condition of our currency and coinage can claim your attention. Since February, 1878, the government has, under the compulsory provisions of law, purchased silver bullion and coined the same at the rate of more than two millions of dollars every month. By this process, up to the present date, 215,759,431 silver dollars have been coined. A reasonable appreciation of a delegation of power to the general government would limit its exercise without express restrictive words, to the people's needs and the requirements of the public welfare. Upon this theory, the authority to "coin money" given to Congress by the constitution, if it permits the purchase by the government of bullion for coinage, in any event, does not justify such purchase and coinage to an extent beyond the amount needed for a sufficient circulating medium. The desire to utilize the silver product of the country should not lead to a misuse or the perversion of this power.

The necessity for such an addition to the silver currency of the nation as is compelled by the silver coinage act is negated by the fact that, up to the present time, only about fifty millions of the silver dollars so coined have actually found their way into circulation, leaving more than one hundred and sixty-five millions in the possession of the government, the custody of which has entailed a considerable expense for the construction of vaults for its deposit. Against this latter amount, there are outstanding silver certificates amounting to about ninety-three millions of dollars. Every month, two millions of gold in the public treasury are paid out for two millions or more of silver dollars, to be added to the idle mass already accumulated.

If continued long enough, this operation will result in the substitution of silver for all the gold the government owns applicable to its general purposes. It will not do to rely upon the customs receipts of the government to make good this drain of gold, because the silver thus coined having been made legal tender for all debts and dues, public and private, at times during the last six months 58 per cent of the receipts for duties have been in silver or silver certificates, while the average within that period has been 20 per cent. The proportion of silver and its certificates received by the government will probably increase as time goes on, for the reason that the nearer the period approaches when it will be obliged to offer silver in payment of its obligations, the greater inducement there will be to hoard gold against depreciation in the value of silver, or for the purpose of speculating. This hoarding of gold has already begun. When the time comes that gold has been withdrawn from circulation, then will be apparent the difference between the real value of the silver dollar and a dollar in gold, and the two coins will part company. Gold, still the standard of value, and necessary in our dealings with other countries, will be at a premium over silver; banks which have substituted gold for the deposits of their customers may pay them with silver bought with such gold, thus making a handsome profit; rich speculators will sell their hoarded gold to their neighbors who need it to liquidate their foreign debts, at a ruinous premium over silver, and the laboring men and women of the land, most defenseless of all, will find that the dollar received for the wage of their toil has sadly shrunk in its purchasing power. It may be said that the latter result will be but temporary, and that ultimately the price of labor will be adjusted to the change; but even if this takes place, the wage worker can not possibly gain, but must inevitably lose, since the price he is compelled to pay for his living will not only be measured in a coin heavily depreciated and fluctuating and uncertain in its value, but this uncertainty in the value of the purchasing medium will be made the pretext for an advance in prices beyond that justified by actual depreciation.

The words uttered in 1834 by Daniel Webster in the Senate of the United States are true to-day: "The very man of all others who has the deepest interest in a sound currency, and who suffers most by mis-

chievous legislation in money matters, is the man who earns his daily bread by his daily toil." The most distinguished advocate of bimetalism, discussing our silver coinage, has lately written: "No American citizen's hand has yet felt the sensation of cheapness, either in receiving or expending the silver act dollars." And those who live by labor or legitimate trade never will feel that sensation of cheapness. However plenty silver dollars may become, they will not be distributed as gifts among the people; and if the laboring man should receive four depreciated dollars where he now receives but two, he will pay in the depreciated coin more than double the price he now pays for all the necessities and comforts of life.

Those who do not fear any disastrous consequences arising from the continued compulsory coinage of silver as now directed by law, and who suppose that the addition to the currency of the country intended as its result will be a public benefit, are reminded that history demonstrates that the point is easily reached in the attempt to float at the same time two sorts of money of different excellence, when the better will cease to be in general circulation. The hoarding of gold, which has already taken place, indicates that we shall not escape the usual experience in such cases. So, if this silver coinage be continued, we may reasonably expect that gold and its equivalent will abandon the field of circulation to silver alone. This, of course, must produce a severe contraction of our circulating medium, instead of adding to it.

It will not be disputed that any attempt on the part of the government to cause the circulation of silver dollars worth eighty cents side by side with gold dollars worth one hundred cents, even within the limit that legislation does not run counter to the laws of trade, to be successful must be seconded by the confidence of the people that both coins will retain the same purchasing power and be interchangeable at will. A special effort has been made by the Secretary of the Treasury to increase the amount of our silver coin in circulation; but the fact that a large share of the limited amount thus put out has soon returned to the public treasury in payment of duties, leads to the belief that the people do not now desire to keep it in hand; and this, with the evident disposition to hoard gold, gives rise to the suspicion that there already exists a lack of confidence among the people touching our financial processes. There is certainly not enough silver now in circulation to cause uneasiness; and the whole amount coined and now on hand might, after a time, be absorbed by the people without apprehension; but it is the ceaseless stream that threatens to overflow the land which causes fear and uncertainty.

What has been thus far submitted upon this subject relates almost entirely to considerations of a home nature, unconnected with the bearing which the policies of other nations have upon the question. But it is perfectly apparent that a line of action in regard to our currency can not wisely be settled upon or persisted in without considering the attitude on the subject of other countries with whom we maintain intercourse through commerce, trade, and travel. An acknowledgment of this fact is found in the act by virtue of which our silver is compulsorily coined. It provides that "the President shall invite the governments of the countries composing the Latin Union, so-called, and of such other European nations as he may deem advisable, to join the United States in a conference to adopt a common ratio between gold and silver for the purpose of establishing internationally the use of bimetallic money, and securing fixity or relative value between these metals."

This conference absolutely failed, and a similar fate has awaited all subsequent efforts in the same direction. And still we continue our coinage of silver at a ratio different from that of any other nation. The most vital part of the silver coinage act remains inoperative and unexecuted, and without an ally or friend, we battle upon the silver field in an illogical and losing contest.

To give full effect to the design of Congress on this subject, I have made careful and earnest endeavor since the adjournment of the last Congress.

To this end, I delegated a gentleman well instructed in fiscal science, to proceed to the financial centers of Europe, and, in conjunction with our ministers to England, France, and Germany, to obtain a full knowledge of the attitude and intent of those governments in respect of the establishment of such an international ratio as would procure free coinage of both metals at the mints of those countries and our own. By my direction, our consul-general at Paris has given close attention to the proceedings of the congress of the Latin Union, in order to indicate our interest in its objects and report its action.

It may be said, in brief, as the result of these efforts, that the attitude of the leading powers remains substantially unchanged since the monetary conference of 1881, nor is it to be questioned that the views of these governments are in each instance supported by the weight of public opinion.

The steps thus taken have therefore only more fully demonstrated the uselessness of further attempts at present to arrive at any agreement on the subject with other nations.

In the mean time, we are accumulating silver coin, based upon our own peculiar ratio, to such an extent and assuming so heavy a burden to be provided for in any international negotiations as will render us an undesirable party to any future monetary conference of nations.

It is a significant fact that four of the five countries composing the Latin Union mentioned in our coinage act, embarrassed with their silver currency, have just completed an agreement among themselves, that no more silver shall be coined by their respective governments, and that such as has been already coined and in circulation shall be redeemed in gold by the country of its coinage. The resort to this expedient by these countries may well arrest the attention of those who suppose that we can succeed without shock or injury in the attempt to circulate upon its merits all the silver we may coin under the provisions of our silver coinage act.

The condition in which our treasury may be placed by a persistence in our present course is a matter of concern to every patriotic citizen who does not desire his government to pay in silver such of its obligations as should be paid in gold. Nor should our condition be such as to oblige us, in a prudent management of our affairs, to discontinue the calling in and payment of interest-bearing obligations, which we have the right now to discharge, and thus avoid the payment of further interest thereon. The so-called debtor class, for whose benefit the continued compulsory

coinage of silver is insisted upon, are not dishonest because they are in debt, and they should not be suspected of a desire to jeopardize the financial safety of the country in order that they may cancel their present debts by paying the same in depreciated dollars. Nor should it be forgotten that it is not the rich nor the money-lender alone that must submit to such a readjustment, enforced by the government and their debtors. The pittance of the widow and the orphan and the incomes of helpless beneficiaries of all kinds would be disastrously reduced. The depositors in savings banks and in other institutions which hold in trust the savings of the poor, when their little accumulations are scaled down to meet the new order of things, would, in their distress, painfully realize the delusion of the promise made to them that plentiful money would improve their condition.

We have now on hand all the silver dollars necessary to supply the present needs of the people and to satisfy those who from sentiment wish to see them in circulation; and if their coinage is suspended, they can be readily obtained by all who desire them. If the need of more is at any time apparent, their coinage may be renewed.

That disaster has not already overtaken us furnishes no proof that danger does not wait upon a continuation of the present silver coinage. We have been saved by the most careful management and unusual expedients, by a combination of fortunate conditions, and by a confident expectation that the course of the government in regard to silver coinage would be speedily changed by the action of Congress.

Prosperity hesitates upon our threshold because of the dangers and uncertainties surrounding this question. Capital timidly shrinks from trade, and investors are unwilling to take the chance of the questionable shape in which their money will be returned to them, while enterprise halts at a risk against which care and sagacious management do not protect.

As a necessary consequence, labor lacks employment, and suffering and distress are visited upon a portion of our fellow-citizens especially entitled to the careful consideration of those charged with the duties of legislation. No interest appeals to us so strongly for a safe and stable currency as the vast army of the unemployed.

I recommend the suspension of the compulsory coinage of silver dollars directed by the law passed in February, 1878.

#### MODERN AMERICAN METHODS OF COPPER SMELTING.\*

By Edward D. Peters, Jr., M.E., M.D.

#### CHAPTER X.

#### BLAST-FURNACES CONSTRUCTED OF BRICK.

There remains to be still considered the application of water tuyeres and other cooling devices to furnaces constructed of brick or stone.

##### ESTIMATE OF COST OF LARGE BRICK BLAST-FURNACE.

Excavation for foundation: 1000 cubic feet at 8 cents.....	\$80.00
Foundation of beton.....	65.00
Cubic feet.	
Total fire-brick for furnace proper.....	1,640
Lining for cross-flue and down-take.....	540
Fore-hearth, etc.....	45
Total.....	
2,225	
At 18 brick per cubic foot = 40,050 at \$40 a thousand.....	1,602.00
Red brick for down-take and flue: 16,800 at \$8.....	134.40
6½ tons fire-clay at \$8.....	52.00
6 casks lime at \$1.50.....	9.00
2 tons sand at \$1.50.....	3.00
Old rails for binders: 180 yards at 80 pounds a yard = 14,400 pounds at ¾ cent.....	108.00
Pounds.	
Tie-rods for furnace, flue, and down-take: 620 feet of 1½ iron = 2480 pounds.....	2,480
Loops, nuts, etc.....	166
Angle iron for down-take.....	172
Wrought-iron rods, etc., about fore-hearth.....	66
Total.....	
2,884	
At 2 cents a pound.....	57.68
Pounds.	
Castings:	
3 feed-door frames.....	792
Damper and frame.....	455
Plates for fore-hearth.....	560
Slag and matte-spouts.....	80
Plates for charging-floor.....	1,260
Miscellaneous.....	420
Total.....	
3,507	
At 2½ cents a pound.....	89.17
Material and labor for arch patterns and other carpenter work.....	32.40
Labor:	
Mason, 88 days at \$4.....	352.00
Ordinary labor, 102 days at \$1.50.....	153.00
9½ days smith and helper.....	47.50
Blast-pipe and tuyeres.....	136.00
Cloth for tuyere bags and labor.....	3.80
Superintendence.....	120.00
Miscellaneous.....	65.00
Grand total.....	
\$3,109.90	
Tools essential to furnace, steel and iron bars, shovels, rakes, hammers.....	\$55.90
15 slag-pots at \$1.50.....	20.25
4 iron barrows at \$9.....	36.00
Manometer.....	2.50
\$114.65	

The above estimate is exclusive of main blast-pipe, blower, motive power, hoist, and chimney or dust-chambers; the allowance for cross-flue and down-take being sufficient to cover cost of chimney in those exceptional cases where no provision is made for catching the immense amount of flue-dust generated in this method of smelting.

A compact and economical hoist and ample provision for a large charging-floor and generous bin room are essential to convenient and economical work.

\* Copy-right 1885, by the Scientific Publishing Company.

The author's own experience is entirely in favor of the employment of properly constructed iron, or better, bronze or copper tuyeres, containing a space for the introduction of water. In Colorado and other places, he has used water tuyeres with invariable satisfaction, the only drawback being the frequent cracking of the cast-iron, which is now overcome.

While they offer little or no protection to the furnace wall, they are indestructible themselves, and by delivering the wind at a fixed point, even though the walls may be eaten away all about them to the depth of a foot or more, they remove the point of greatest heat from the wall itself and practically retain the smelting area at the same invariable size, the latter being practically bounded by vertical planes passing through the nozzles of the tuyeres.

It is also possible, if desirable, to project them into the interior of the furnace to a distance of several inches from the walls. Although this practically diminishes the size of the smelting area, it saves the walls from burning, and in case of a weak blast or of an unusually dense charge arising from a large proportion of fine ore, may render practicable the smelting of material that would be impossible under other circumstances.

They were tried on the first large Orford furnaces, but failed, owing to the severity of the winter and other accidental causes, rather than from any fault due to the tuyeres themselves. Their construction and management are too familiar to require further explanation in these pages.

The surface cooling of the brick-work by means of a spray of water on the outside has been tried on many occasions and with various forms of apparatus. It has rarely given satisfaction, and in the writer's opinion is as dangerous and worthless a device as can well be imagined.

To those familiar with the results of contact between water and molten matte, it is not necessary to bring up any further arguments to condemn a device that can only be accompanied by a constant wetting of every thing in the vicinity of the furnace.

Besides, the idea itself is an extremely faulty one, as, owing to the non-conductivity of fire-brick, a wall less than a foot thick may continue melting on one side, while its other surface is constantly sprayed with cold water.

All devices of this kind, in which the water comes in contact with the free exterior surface of the furnace wall, are worse than useless, and likely to be accompanied by most dangerous results.

##### ESTIMATE OF COSTS OF CUPOLA SMELTING.\*

Details of expense of running a 42-inch circular water-jacket cupola, smelting 56 tons of fusible ore per twenty-four hours.\*

As it may be a matter of interest to many to compare the cost of copper smelting in Arizona, Montana, and other remote districts with the cheaper scale of prices assumed for our standard, this information is given in a second column. These figures refer to works situated near a line of railroad, and of large capacity, as the smelters at a distance from travel must frequently pay double or even treble the amount given for coke and other supplies, while the cost of running a single furnace is proportionately much greater.

PER TWENTY-FOUR HOURS.		
<i>Fuel and supplies:</i>		
Eight tons coke.....	\$40.00	\$200.00
Fuel for blast, and attendance.....	7.50	16.00
Clay and sand.....	.60	1.50
Five tons limestone (or other flux).....	7.50	15.00
Cost of pumping water for jacket.....	4.80	11.50
Oil, lights, etc.....	3.50	9.00
Renewal of tools, pots, molds, etc.....	2.25	4.60
Repairs on furnace and machinery.....	2.00	4.10
Proportion of cost of blowing-in and out.....	.40	.85
Sinking fund to replace furnace, etc.....	1.65	2.95
Miscellaneous.....	4.00	11.00
\$74.20		\$276.50
<i>Labor (per twenty-four hours):</i>		
Six men on lower floor.....	\$10.00	\$15.00
Four men on charging floor.....	7.00	13.00
Two foremen.....	5.00	10.00
Two laborers.....	3.00	6.00
Proportion of blacksmith work.....	1.25	3.50
Proportion of laboratory work.....	2.00	7.00
Proportion of superintendence.....	3.20	10.50
\$31.45		\$65.00
Fuel and supplies.....	74.20	276.50
Total.....		\$341.50
Costing respectively per ton.....		\$1.88½    \$6.10

To which should be added 5 per cent for resmelting foul slag and flue-dust, increasing the final cost to \$1.98 and \$6.40 a ton. Nothing is allowed for transporting ore to the furnace and many other items, which only obscure an estimate supposed to refer to the cost of running a furnace as part of a larger plant.

If the entire expense of the works were supported by a single smelting-furnace, the estimate would be so complicated and the cost of smelting so high as to create an entirely false impression. Such instances occur, however, though only financially successfully under exceptionally favorable conditions and with abundant and high-grade ores.

The following estimate of the cost of smelting a fusible ore in the large brick furnace so often referred to is also based upon the same conditions, the furnace being supposed to be only a portion of a large plant, and only to be charged with its own share of the cost of power, superintendence, etc., etc.

The ore is supposed to be a low-grade, roasted pyrites, or some other

\* These estimates, both of construction and smelting, are taken from the results of actual work, not being drawn exclusively from any one establishment, but being the average results of several successful works representing advanced American practice. It must not be forgotten that several of the heaviest items that go to make up the running expenses of all metallurgical establishments are necessarily omitted. These are the general expenses and salaries: extraordinary expenses arising from accidents; cost of experimental work, and similar matters, which may aggregate a very large amount.

equally fusible and self-fluxing material. It is assumed that the furnace makes campaigns of nine months, smelting daily 95 tons of ore.

ESTIMATE.

<b>Fuel and supplies:</b>	
12½ tons coke, at \$5.....	\$61.67
Four tons pea coal for blower, at \$3.50.....	14.00
Sand and clay.....	2.45
Oil, lights, etc.....	4.40
Wear and repairs on slag and matte-pots.....	3.85
Wear and repair on other tools.....	1.12
Daily slight repairs on furnace.....	2.60
Proportion of radical repairs at close of campaign (found by experience to be 3 cents a ton).....	2.85
Wear on belting, blower, etc.....	1.25
Engine and boiler.....	1.45
Proportion of cost of blowing in and out.....	.72
Sinking fund.....	1.95
Miscellaneous.....	6.50
<b>Labor (per twenty-four hours):</b>	
Six men below at furnace.....	10.00
Four feeders.....	8.00
Six wheelers.....	9.00
Two metal men.....	4.00
Two laborers.....	3.00
One dump man.....	2.00
Two foremen.....	5.00
One engineer.....	2.50
Blacksmith work.....	2.10
Laboratory work.....	2.00
Superintendence.....	4.00
<b>Total.....</b>	<b>\$156.41</b>
Or a cost per ton of.....	1.64%
Adding 8 per cent for remelting slag and flue-dust, gives total cost per ton.....	7.78

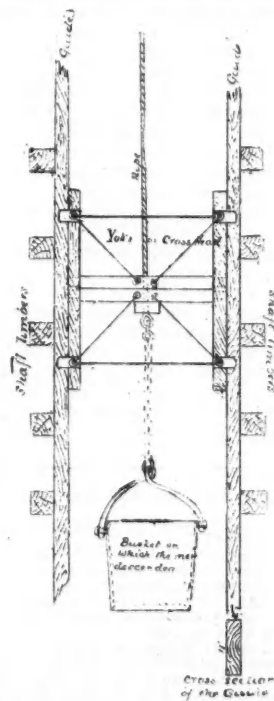
Many points worthy of consideration still remain in connection with this subject, and it is the wealth of material rather than its scarcity that renders the treatment of this important branch of metallurgy difficult. The restriction of this work to American conditions and practice simplifies it to a certain extent; but on the other hand, the tendency toward change and originality peculiar to our people greatly extends the ground that must be traversed, and, from the impossibility of including the whole, renders embarrassing the selection of those points worthy of notice or even of a more extended description.

(TO BE CONTINUED.)

**THE NEW CROTON AQUEDUCT DISASTERS.**

Written for the Engineering and Mining Journal, by E. E. Oloott, E.M.

The terrible accidents constantly occurring on the work of the new Croton Aqueduct lead to the inquiry whether they are avoidable or unavoidable. I do not propose to discuss all accidents that have taken place since the beginning of this work; but it seems probable that many of them have been the result of carelessness. Having, however,



No. 3 Shaft in Vertical Section.

examined minutely into the cause of the accident that occurred on December 7th, at No. 3 shaft, I desire to call attention to the cause, and suggest a remedy. The accompanying figure will show the arrangement of the fatal shaft.

The yoke or cross-head is used to prevent the swaying of the wire rope, which merely passes freely through it, and it is lifted by the shoulder on the shackle, which will not pass through the cross-beam. In descending, the yoke is supposed to rest on this shoulder, and to be carried down the shaft by its own weight. Unfortunately, it has not always slipped down the guides as it should.

On November 28th, it caught, and the bucket descended away from it, and then it suddenly started down with an acceleration due to its weight, and killed the three unfortunate miners who were on the bucket. Not

content with this example, no attempt was, I understand, made at perfecting the operation of the yoke. The same accident was repeated on December 7th, when the fall of the yoke, 250 feet, broke the shackle, and the bucket and five men were dashed to the bottom of the shaft, four of them being instantly killed and the other mortally injured. Nor is this all; after the second accident, a coroner's jury agree in rendering a verdict that the men "came to their death by an accident of their own carelessness." Now, from all we can learn, these miners had no power to prevent the accident, and were in no way responsible for it, and their lives were sacrificed by the gross ignorance and carelessness of the contractors and perhaps of the aqueduct engineer.

It appears that the bucket-lander or "head man," was not at his post when these five men stepped on the bucket. Why was the bucket-lander allowed to be away, when men were descending? By whom could their cries have been heard if they had noticed that the yoke did not start? How is it that the engineer did not see that the yoke remained stationary when the bucket started? And why did he lower away 250 feet without the yoke? These things should be inquired into.

But it is not so much these workmen, bucket-lander, and engine-runner that are to blame, as the persons who supervise the appliances to be used and who are intrusted with the lives of men.

The yoke is miserably constructed; suspended at only a middle point, it is liable to cant and jam at any part of the shaft. There is not enough play for it between the guides. The guides are 11 inches by 4 inches, with their flat sides toward the shaft, when they should be 4 inches by 6 inches, projecting 6 inches into the shaft, and the yoke made accordingly. Shaft-guides should always be well greased, while these were not; this would have prevented freezing and sticking.

A parachute might easily be used on such a yoke or cross-head. The engine-room ought not to be separated, as it is, from the shaft-head, with only dirty windows for the engineer to look through.

If a yoke or cross-head is used in a shaft, there is no earthly reason why it should not be perfect in its operation. The writer used one in South America over a year, and never saw it catch once. In Mexico, also, he used another about two years that gave no trouble.

Since these are facts beyond dispute, should not the whole matter be subjected to rigid examination? Are not men who through carelessness cause mining accidents as guilty as unprincipled builders whose walls fall with fatal results?

Mining is attended by many unavoidable accidents, but do not let this be the excuse for covering culpable carelessness.

**The Electrolytic Cartridge for Blasting.**—The cartridge consists of a glass tube of a diameter to fit easily into the bore-hole, which should be small. The tube is very strong, the thickness of its walls being about equal to the diameter of the bore. Two wires are fused into this tube, which is hermetically closed after being nearly filled with water rendered conductive with a little acid or some metallic salt. When this cartridge has been inserted into the bore-hole and the latter tamped or stemmed in the usual way, its projecting wires are connected with cables serving as "leads" from a source of electricity. All being ready, the current is put on, and the current from the generator passes between the ends of the wires within the glass tube and decomposes the water, oxygen being liberated at one pole and hydrogen at the other. This explosive mixture continues to accumulate as the decomposing action of the current goes on. It is to withstand the increasing pressure of these gases that the thick glass is required. So long as the ends of the wires are covered by the liquid, no spark can be produced to ignite the gaseous mixture; but when these—or one of them—are laid bare by the conversion of the water into gas, the current has to pass through the latter, which is then fired. The resulting explosion is extremely violent—more violent than that of nitro-glycerine even." [The chief objections are, that glass cartridges are expensive, and will occasionally get broken in tamping; that decomposing the water is a comparatively slow operation; and that the amount of water decomposed, and, therefore, the strength of the explosive, depend on the inclination of the cartridge, and can not be adjusted to the work to be done. In some cases, it would be insufficient, and therefore ineffective; in other cases, it would be too powerful, and, in the case of coal, would crush it to powder. Of course, the explosion would be as dangerous in igniting fire-damp, though probably not as liable to fire coal-dust, as that from powder.—Ed. E. AND M. J.]

**Treatment of Old Zinc.**—According to the *Revue Industrielle*, a new method has been introduced by M. Pierrat for dealing with the clippings, shavings, turnings, and other forms of waste zinc resulting from various manufactures. The value of these forms of old zinc is very much lower than that of new zinc, because there is always an amount of solder present, which spoils the zinc for rolling and for most other direct uses. The difference in value is so considerable that M. Pierrat considered the subject of treating this zinc *débris* to be well worth study and experiment. It is stated that he has fully succeeded in making a very profitable success of his labors. He places the zinc cuttings, etc., in a sort of basket, in which they can be subjected to heat and to centrifugal force at the same time. The actual basket-like container is surrounded by an outer envelope. Superheated steam or heated air can be used, and the temperature regulated as desired. Under the influence of the heat and the centrifugal action, the solder is melted, detached from the zinc, and driven to the exterior of the container, where it collects and is drawn off. The solder thus collected is remelted and cast into bars. It is stated that the value of it alone will pay all the costs of the operation. The zinc remaining after this operation is further purified by fusion. It is then very suitable for use in making small castings, and can be sold at lower price than the brands of zinc that are now specially in use for this purpose. This branch of trade is stated to be of considerable importance, great quantities of zinc being used in Paris alone for casting figures and for clock-making. M. Pierrat estimates that one of his machines, working ten hours a day, can extract the solder from three tons of old zinc. This amount of purified zinc will be too great to be all disposed of for casting purposes, and so the remainder is to be rendered pure and soft enough for rolling into sheets. It is stated that M. Pierrat has also found a method of purification far superior to any in ordinary use, and producing a better quality of metal than any on the market; but this method is kept a secret at present.

## THE VENEZUELA GOLD MINES.

Written for the Engineering and Mining Journal by E. E. Olcott, E.M., New York.

I have had the pleasure of a conversation with Mr. Walter L. Hoyt, who has just returned from El Callao mine, Venezuela; and as his remarks recall to me so much of my experience in that interesting country, I think the readers of the ENGINEERING AND MINING JOURNAL may enjoy a very brief synopsis of the results of gold mining in the district of the Yururi. Formerly, this region was a part of the State of Guiana, but it is now directly under the control of the federal government of Venezuela, and has its capital at Guacipati—which is situated some fifteen miles from Callao—188 miles south of the Orinoco River, at Puerto de las Tablas, and 180 miles southeast of the important city of Bolivar.

The Yururi River flows through the district, and, for the most part, affords the water-supply for the mining operations.

The inhabitants of Ciudad Bolivar, capital of the State of Guiana, have known of the existence of gold in this section since about 1853; but it is believed that it was obtained there much earlier by the Indians. The first attempts were at placer work, with the *batea* or gold-pan, and the results were fabulous, and give evidence that, over restricted areas, the gravel was the richest ever found.

Subsequently, attention was called to the quartz veins, from which the gold in the placers had been produced, and concessions were granted to various parties for the location of land and mines. The difficulty of making these selections from surface and geological indications became very apparent, and results have proved that many of those who were first in the field became possessed of the poorest veins; in fact, as so often happens, the number of rich mines in the district has been very small. Extensive work has been carried on by several companies, formed in the United States, England, and Venezuela, with varying success. Some have failed, some have exhausted their ore-bodies and suspended work, and one or two have sold their properties to larger corporations. Among the companies that have had an important influence for a greater or less time, but at present are not working, may be mentioned the Mocupio & New York (American), sold out to the Chili Mining Company, of England; the Potosi Mining Company (English), also sold out to the Chili Mining Company, of England; the Orinoco Exploring and Mining Company (American); the Caratal Mining Company (American); and the Remington Mining Company (American).

For two years past, this section of country has suffered from exceptional droughts, and the water in the Yururi has been so scarce that mining operations have been much hampered; even the Callao Company having had some difficulty in obtaining a sufficient supply of water. Recent rains, however, make the outlook more favorable.

The companies now in existence that are not heavy producers may be enumerated as follows:

The Panama Company (English), which has a 40-stamp mill, situated at Panama, five miles from El Callao. This has a beautiful vein, about 5 feet wide, dipping at about 35 degrees, which has produced largely near the surface, and has one chute or chimney of fine free-milling ore that will yield in the mill an average of more than one ounce of gold to the ton. The rest of the vein yields considerably less, and although it would be considered a perfect bonanza in the United States, the results have not, on the whole, proved very satisfactory. The water for the milling operations has to be pumped 450 feet high, over a line about four miles long. Owing to the scarcity of water in the river, the mill has been idle a good deal, and the output during the past year has been small—1200 ounces of gold, or say \$24,000 United States currency, per month, representing about the output, when the mill has made full-time.

The Nacupai Mining Company (English) owns a 50-stamp mill, situated at Nacupai, near the banks of the Yururi. The vein is well defined, with an average dip of say 70 degrees; it varies in width from 3 to 12 feet, but where wide, its yield is very low. It crosses Carina Hill, which was famed for the production of some of the first and richest quartz ever found in the district. The first mill, erected on this property by an American company, known as the Orinoco Exploring and Mining Company, produced good results, and a considerable surplus was accumulated in the treasury. Another mill was then erected, which, owing to the caving-in of the old mine, and inadequate development, was never fully stocked with ore. This, combined with other circumstances, and the fact that the yield of the ore decreased in depth, caused the bankruptcy of the company. Subsequently, the present English company was formed; but it has not been much more successful. The mill has been run but little, and is now stopped, awaiting the erection of new hoisting machinery.

El Tigre, an English concern, formed on the wreck of the Caratal Company, has also had poor success.

La Union was started, but its paying ore gave out.

El Callao-bis was organized on the strength of the glory of El Callao, to prospect for the continuation of the Callao vein, which, unfortunately, has never been found, and the general opinion prevails that it never will be—at least, not on Callao-bis grounds. A drift is now running by El Callao and Callao-bis for the purpose of prospecting the vein.

Having touched upon the unsuccessful and dubious enterprises that have been undertaken in this region, it is now with pleasure that we turn to the really successful ones.

The Chili Company (English), whose works are at Chili, ten miles from Callao, produces from 5000 to 6000 ounces of gold a month (or from \$100,000 to \$120,000), which should leave a large margin of profit, but the enormous expenses have absorbed much of it.

El Callao has been more prominently before the public than any other mine in the district, because of its fabulous richness. Especially since Mr. Hamilton Smith has been the general manager, and Mr. H. C. Perkins the superintendent, have we watched this enterprise with interest. Two mills are in operation, one of which contains 60 stamps, ordinary amalgamated copper tables, and self-discharging buddles, to concentrate the tailings; and the other (erected by Mr. Perkins) 40 stamps, but now enlarging to a 60-stamp mill. Copper plates are used to catch the amalgam, and blanket-slucies to concentrate the tailings. In all the mills in the district, the ore is amalgamated in the batteries. The average output

of the company is 12,000 ounces of gold a month (about \$240,000), and regular dividends, varying from \$300,000 to nearly \$2,000,000 a year, have been paid since 1875. We trust that many more years of prosperity are in store for this company. We shall look with interest for the report for 1885, which, judging from the last one, will be concise and interesting. Only one who has himself been baffled by the difficulties in Venezuela can understand how it could have cost the following prices to mine and treat the ore in 1884:

Mining .....	\$27.14 per ton.
Milling .....	7.54 " "
Sinking No. 6 shaft .....	2.88 " "
General expenses .....	1.46 " "
Total .....	\$39.02 " "

The labor is poor and commands extravagant prices; freight, transportation, and fuel are enormously high, taxes of all kinds most oppressive, and mining supplies very expensive. The climate is rather unhealthy, and a large force of foremen and high-priced men has to be kept employed so as to fill the places of those who are sick; and, owing to the temptations to steal the rich quartz and gold amalgam, a constant watch has to be kept on the workmen in every department. The general enervating influence of the climate also tends to reduce the work of every man to less than would be expected in this country.

The vein, like all in this district, is in diorite, clearly defined, and is peculiar in varying widely in dip; this gives to it a curving form, and it is this that probably led to the mistake of expecting to find the vein on the Callao-bis grounds.

## PLACER MINING.

Placer mining has never been successfully carried on in the district, except to the most limited extent, and with such small apparatus as the *batea* and pan. The gravel is rich but thin, and extends over limited areas. The fall in the natural water-courses is too slight to carry off the *débris*; and water under a head for hydraulic operations is also lacking.

The gold bullion is probably higher than that obtained from any district; a few years ago, it averaged over 930 fine.

## RAILROAD PROJECT.

For many years, a project has been discussed for erecting a railroad from the Orinoco River to the mines, and it is now said that this work will soon be carried out under concessions granted by Guzman Blanco to a French company.

**Hoisting from Great Depths.**—Prof. J. Hrabák, of Austria, in discussing the means that will have to be adopted to raise ore or coal from depths exceeding 1000 meters, points out that that depth was reached in 1883, by the Prziham mines, and that several collieries are rapidly approaching it. He shows, says the *Colliery Guardian*, that the ordinary method with ropes of any form whatever will be practically impossible when the ore has to be raised 1200 meters, without the use of supplementary engines placed lower down the shaft, and that even these would not enable the ore to be raised from depths greatly exceeding 1200 meters. The method that, in principle at least, would enable the ore to be raised from almost any depths is the pneumatic system, which has been in use since 1876 at the Epinac Colliery, in the south of France. The results obtained have been very satisfactory; but as the cost of a pneumatic plant would be greatly in excess of a rope one, it is very improbable that it will come into general use as long as it is found practicable to employ ropes. Having this in view, the author proposes a method by which he considers it will be possible to overcome the difficulties attaching to the ordinary rope arrangements. He proposes to increase the width of the shaft for half its depth to such an extent that, besides the two principal winding divisions, two secondary ones could also be arranged. Through the principal divisions, the winding would be effected by ropes that reach to the bottom of the shaft, and they would be worked in such a manner that, while half the length of each was wound upon the drum, the other halves would hang down the shaft and counterbalance one another. The ore would be raised by these ropes half the height of the shaft, and would be lifted the remainder of the distance by the secondary ropes. This method of winding would be expensive on account of the enlargement of the shaft, and the necessity for two winding-engines. The expense would, however, be compensated for by the winding power being increased by 50 per cent.

## PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED DECEMBER 1ST, 1885.

- 331,319. Core-Breaker and Fuller for Rock-Drills. F. D. Parker, Denver, Colo.  
 331,341. Ratchet Drill. Axel A. Strom, Chicago, Ill.  
 331,393. Dust-Guard for Pulverizing-Machines, etc. Ryerson D. Gates, Chicago, Ill. Assignor to Alma Florence Gates, same place.  
 331,409. Boiler-Covering. Matthew Keenan, Armagh Works, Tredegar Road, North How. County of Middlesex, England.  
 331,420. Brick-Machine. Peter B. Mathison, St. Louis, Mo.  
 331,435. Rock-Drilling Machine. Charles F. Peebles, Berea, Ohio.  
 331,437. Mold for Casting Metal. William S. Platt, Waterbury, Conn.  
 331,544. Gas Regulator and Cut-off. John P. Reinecke, Pittsburg, Pa.  
 331,562. Machine for Feeding Sand and Water to Stone-Sawing Machine. David Short-sleeve, Rutland, Vt. Assignor to Edmund A. Morse, same place.  
 331,571-72, 74-77, 79-84. Machine for Making Tubes from Hollow Ingots. Stephen P. M. Tasker, Philadelphia, Pa.  
 331,595. Means for Detecting and Carrying off Leakage from Gas-Mains. George Westinghouse, Jr., Pittsburg, Pa.  
 331,596. Means for Detecting and Closing Leaks in Gas-Mains. George Westinghouse, Jr., Pittsburg, Pa.  
 331,613. Machine for Grooving Metal Rolls. Charles R. Campbell and William H. Campb-II, Buffalo, New York.  
 331,621. Apparatus for Making Illuminating Gas. Frederick Egner, St. Louis, Mo.  
 331,649. Gold-Separator. Samuel C. Oliphant, Novinger, Mo., Assignor to himself, Samuel M. Pickler, and William H. Johnson, all of same place.  
 331,656. Method of Tunneling and Sinking Shafts. C. SooySmith, Chicago, Ill.  
 331,657. Method of Building Tunnels. Charles SooySmith, Chicago, Ill.  
 331,658. Method of Closing Spaces between Submerged Bodies. Charles SooySmith, Chicago, Ill.  
 331,686. Gas-Conveying Apparatus. Thomas A. Connolly and Anthony A. Connolly, Washington, D. C.  
 331,908. Apparatus for Feeding White Lead. Michael Forst, St. Louis, Mo., Assignor to the Southern White Lead Company, same place.  
 331,714. Apparatus for Supplying Natural Gas to Locomotives. J. Harnar Katz, Pittsburg, Pa.



**FURNACE, MILL, AND FACTORY.**

The new Gaskill engine for the Water Department at Buffalo, New York, has been tested. It was found that the engine could pump 16,500,000 gallons of water a day, or 1,500,000 more than the contract called for.

The reports concerning the proposed consolidation of the Westinghouse Brake Company, Limited, of London, England, with the Westinghouse Air-Brake Company, of Pittsburg, Pa., are said to be without foundation.

The Ohio Iron and Steel Company, Youngstown, Ohio, operating and owning the Lowell furnace, has leased from Receiver Brown, of Brown, Bonnell & Co., the Struthers furnace, which has been out of blast two years. The output of the two furnaces will aggregate 1500 tons of iron a week.

The Brier Hill Iron and Coal Company, which now operates two furnaces on Bessemer iron, has leased the Himrod furnace, of Youngstown, Ohio, and on January 1st will put it in blast on Bessemer iron. This furnace has been out of blast for a year.

The property of the Wampum Co-operative Wire Company at Wampum, Pa., has been seized by the sheriff. The liabilities are said to be \$20,000, and the assets about \$5000.

The Thomas furnace, at Niles, Ohio, is about ready to blow in.

A co-operative nail company, with a subscribed capital of \$100,000, has been organized in Pittsburg by a number of striking nailers and by hardware dealers. Five acres of ground have been given to them at Homestead, Pa., for the erection of a factory.

The Western Nail Association held its regular monthly meeting at Cincinnati, Ohio, on the 9th inst., and adopted resolutions reaffirming the manufacturers' scale of prices, but advancing the price of steel nails to \$2.50 a keg.

At the meeting of the stockholders of the Westinghouse Machine Company, at Pittsburg, Pa., on the 7th inst., the resolution assessing the stock 50 per cent, to meet current indebtedness, was formally adopted. Stockholders have the alternative of surrendering 50 per cent of their shares to the company. The company is selling engines at the rate of two a day. The works will be shut down on the 20th inst., for the purpose of taking stock.

Proposals will be received by the United States Navy Pay-Office at Norfolk, Va., until January 6th, 1886, for furnishing the following supplies to the Bureau of Steam-Engineering: Hardware, files, pipe and fittings, belting, canvas, packing, bolts and nuts, lanterns, brass and copper, oils and tallow, waste, cement, charcoal, tools, iron and steel, screws, and coal.

**LABOR AND WAGES.**

The scarcity of labor in the Connellsville coke region, Pa., has become so marked that labor is now imported from the Hocking Valley and other sections.

The hearing of the twenty-three coal miners charged with inciting the riot in the Fourth Pool two weeks ago, was concluded at Coal Center, Pa., on the 9th inst. Five were held in \$500 bail each for trial, and the others were discharged.

The warlike preparations making at the coal mines at Bevier, Mo., during the last week continue. It has been discovered that an organized attack upon the stockade is to be made on Saturday night, if Mr. Loomis does not disarm his men, and this he positively refuses to do. He says that he has discharged all the ruffians and disreputable characters from the mines, and that those who remain will participate in no quarrel unless in self-defense.

In the vicinity of McKeesport, Pa., a riot occurred on the 10th inst., and it is reported that twelve men were murderously assaulted by a masked mob of two hundred. It is feared that other attacks on non-union men will follow, and the trouble in the Monongahela Valley is not yet apparently nearing its end.

The board to arbitrate the mining difficulties in the Hocking Valley met at Columbus, Ohio, on the 7th inst., and organized by electing Chris Evans Chairman and David Patterson Secretary. The miners and operators are represented by five members each, with power to select an umpire in case of disagreement. During the week, they have examined the books of some of the coal companies to convince the miners that the operators are not making an unreasonable profit, as the miners allege.

**TRANSPORTATION NOTES.**

The last boats were loaded with coal at the Susquehanna Coal Company's chutes at Nanticoke, Pa., on the 7th inst., and sent down the North Branch Canal. Immediately afterward, navigation was declared closed.

The Reading & Pottsville Railroad was opened on the 7th inst., for regular trains between Reading and Hamburg, at the foot of Blue Mountain. The road is rapidly approaching completion to Pottsville.

For the past twenty years, the Central Railroad of New Jersey has been running its trains from Mill Creek to Green Ridge, a distance of twenty miles, over the Delaware & Hudson Canal Company's road. It being feared that the latter company will not renew the lease, the Central officials are preparing to build a road of their own between Wilkes-Barre and Scranton. It is rumored that the Lehigh Coal and Navigation Company will furnish the money for the Central to make the extension. When the road has been laid to Scranton, it will be extended from there to Carbondale.

At a meeting of the directors of the Baltimore & Ohio Railroad Company, this week, Robert Garrett was re-elected president for the ensuing year.

According to reports, it has been determined to proceed at once to build seventy-five miles of the Arizona Mineral Belt Railroad southward from Flagstaff, on the Atlantic & Pacific Railroad.

The general government is now completing the long-continued and expensive canal improvement around Muscle Shoals, in the Tennessee River, in North Alabama.

**COAL TRADE NOTES.**

**ALABAMA.**

The Southern Mining and Transportation Company has sold 40,000 acres of coal land in Bibb and Tuscaloosa counties to J. B. Aldrich, of the Cahaba Coal Mining Company.

**COLORADO.**

The Colorado Coal and Iron Company proposes to light its coal mines at Crested Butte with electric light.

**ILLINOIS.**

The Kinmundy Coal Mining and Manufacturing Company, of Kinmundy, has filed a certificate of an increase of capital stock from \$12,000 to \$15,000.

The Central Coal Mining Company, of Mattoon, has filed a certificate of dissolution.

The Kloess Brick and Coal Company, at Belleville, has been incorporated to manufacture and sell brick and tile, and to mine and sell coal; capital stock, \$50,000; incorporators, John Kloess, Louis Kloess, and John J. Kloess.

**PENNSYLVANIA.**

**ANTHRACITE.**

Packer Colliery No. 5, situated at Lost Creek, owned and operated by the Lehigh Valley Coal Company, and more than a year and a half in course of opening, was formally started on the 3d inst. A new breaker has been erected and other improvements made, which, it is said, cost over \$250,000.

Notwithstanding that every effort on the part of the Lehigh Valley Coal Company and their officials has been made to subdue the fire in No. 2 Packer Colliery at Lost Creek, which broke out in the third level, west side, in the old and abandoned workings of that colliery, two months ago, it is rapidly on the increase, and threatens the entire destruction of its valuable workings. An immense sum of money has already been expended in the vain hope of getting it under control, which, from its present indications, can not be accomplished without flooding the entire mine, which would entail a year's idleness and an enormous expenditure of money.

The new slope at Lawrence colliery, Mahanoy Plane, is finished, and it is expected that 80 cars of coal a day will hereafter be shipped.

At last, after much expensive and troublesome delay, the branch road is to be put in to the Chamberlain colliery. The colliery will now be developed as rapidly as possible.

**WEST VIRGINIA.**

A party of five men was drawing the pillars in one room of the Hampshire coal mines, near Piedmont, to let down roof coal, and when the mass fell, three of them were caught beneath it, killing two men and severely injuring the third.

Mrs. Amanda Delphus's suit against Jacob H. Shipherd, of Pennsylvania, was decided in her favor by

the Supreme Court at New York City on the 8th inst. She charged him with fraud and deceit in attempting wrongfully to get possession of valuable coal lands belonging to her, and to secure them for his own benefit and that of certain associates, in fraud of her rights. These coal-mining lands, known as Enterprise, are situated at Point Creek, Kanawha County, West Va. There were certain liens upon them to the amount of \$25,000. A mining engineer reported to her that an expenditure of \$50,000 was required to operate the mines, including the liquidation of the liens. Shipherd was introduced to her as a person who could secure the loan. He got her to sign certain papers recognizing him as her attorney and conveying her property to the Washington Coal Company. The court directs that he return all her papers, and the agreement and conveyance are to be declared void.

**GAS AND PETROLEUM NOTES.**

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 5th:

	1885.	1884.
	Gallons.	Gallons.
From Boston .....	8,120,887	7,027,204
Philadelphia.....	142,272,537	107,515,976
Baltimore.....	10,520,087	14,151,033
New York.....	344,752,199	360,684,948
Total exports.....	505,665,710	489,379,161

**COLORADO.**

The Colorado Oil Company's oil refinery at Florence is now said to be in full blast. It is stated that the refinery has a capacity of 1000 gallons a day.

According to *Bradstreet's*, a swarm of the natural gas companies, organized under the law of 1874, and mentioned in a former number of that paper, are taking steps to formally dissolve, to avoid the tax on corporations levied in this State.

**NEW YORK.**

The Standard Oil Company's plan of supplying Buffalo with natural gas fuel from Venango County, Pa., is not regarded hopefully there. It is thought that the city can be supplied from wells nearer at hand.

**PENNSYLVANIA.**

A charter has been granted to the Scottdale Natural Gas Company of Westmoreland County; capital stock, \$5000.

It is stated that a natural gas well is boring at Homewood, Pa. It has attained a depth of 6000 feet, and is therefore the deepest well in the world. A careful record is kept, and portions of each formation met with are preserved.

**GENERAL MINING NEWS.**

**ARIZONA.**

**COCHISE COUNTY.**

**COPPER QUEEN VS. COPPER PRINCE.**—According to the *Tombstone Epitaph*, the Copper Queen Mining Company has begun suit against the Copper Prince in the county court of Cochise County for damages amounting to \$40,000.

**TOMBSTONE DISTRICT.**

**CONTENTION.**—A rich strike is reported near the 700 level in the bottom of the main shaft.

**CALIFORNIA.**

**AMADOR COUNTY.**

**PLYMOUTH CONSOLIDATED.**—An official circular states that, as the company has a large amount of low-grade ore exposed and now easily accessible, and that delay in working it will largely increase the cost, making necessary the construction of new openings, retimbering, etc., therefore it has been resolved to proceed at once to mine and mill the ore. In carrying out this plan, the lower grade rock will not, of course, produce as large a percentage of profit; and for some months, a lower rate of dividends will be paid.

**INYO COUNTY.**

**INYO MARBLE COMPANY.**—This company has been organized under the laws of Nevada, with a capital stock of \$500,000. The principal place of business is Carson City, and the trustees and incorporators are H. M. Yerington, D. A. Bender, and Israel Luce. The first shipment of marble from Owens Lake has been made. It is said to be of good quality and pure white.

**MONO COUNTY—BODIE DISTRICT.**

Reports for the week ended November 30th:  
**BULWER.**—The south drift, 110 level, Stonewall ledge, averages about 18 inches in width, and the average of four samples of ore taken during the week was \$16.71 a ton, assay value. They are still pushing the stope south on Ralston No. 2 ledge with encour-

aging results. They have put in another ore-chute (the others all being filled with ore). The ledge continues strong and of good stopping size, as far as the work extends both south and upward.

**CONSOLIDATED PACIFIC.**—The Fortuna vein is looking better than at any time heretofore. In No. 3 vein north, there is still an average of 15 inches of ore, giving a value, as shown from average samples, of nearly \$45 a ton.

**STANDARD.**—Ore-bodies continue without material change. The Bulwer side of the mill was started on the 28th ult., on ore. The entire mill is now running on the Standard ore. Shipped to the mill for the week, 393 tons of ore.

#### NEVADA COUNTY.

**NORTH BLOOMFIELD GRAVEL.**—Mr. Houghton, the master in chancery, to whom was referred the matter of the charge against this company for violating an injunction issued out of the United States Circuit (Judge Sawyer's) Court, filed his report on the 21st ult. He says that the evidence clearly shows that, since the filing of the injunction decree, mining tailings have been discharged into Humbug Creek by respondent, the North Bloomfield Gravel Mining Company, from its mines described in the bill, and further states: "I therefore find and do report that, since June, 1884, the North Bloomfield Gravel Mining Company has been continuously engaged in practical drift mining in its mine described in the bill; that, in prosecuting, facilitating, and protecting such drift mining operations, the respondent has removed from its mine and discharged into Humbug Creek, a tributary of the Yuba River named in the decree, a considerable quantity of mining tailings; that mining tailings in much less quantity have also been by the respondent discharged from its mine into the creek by means of water run from ditches over the banks of the mine; and that thereby said respondent has violated the order of this court, and is in contempt."

#### COLORADO.

##### CHAFFEE COUNTY.

**GLADSTONE.**—A strike is reported in this tunnel, which at a distance of over 1700 feet has cut the vein at a depth of about 700 feet.

**UNITED CLAIMS.**—The operations of the company, which has just been incorporated, with a capital stock of \$100,000, will be carried on in Chaffee County, with the principal office in New York City. The incorporators are Andrew J. Perry, Brooklyn, New York; Victor de M. Upham, Brooklyn, New York; Norvin Green, Louisville, Kentucky; and Martin C. Parker, New Haven, Connecticut.

##### CLEAR CREEK COUNTY.

**FAIRMOUNT GOLD AND SILVER MINING COMPANY.**—On the 9th inst., the property of this company was to be sold at Denver by John W. Webster, Master in Chancery. This sale is a foreclosure to satisfy John H. Pugh, surviving trustee of the old company.

**SUMMIT TUNNEL MINING COMPANY.**—An effort will be made to start up work on the tunnel soon, work on which was stopped two years and a half ago.

##### FREMONT COUNTY.

The Gettysburg lode mining claim at Cañon City, which has been pending before the interior department for some years on the protest of the Southwestern Mining Company, assignee of the Techatriep Mining Company, has been allowed a patent by a decision of the secretary just made.

##### GILPIN COUNTY.

The Omaha & Grant Smelting Company has established an ore-purchasing agency in Black Hawk. This makes three competitive ore-purchasing agencies in that city—the Boston & Colorado Works, the Golden Works, and the Omaha & Grant Works.

**LA CROSSE.**—This company, which owns and works mines and tunnels in Gilpin County, makes claim to 400 feet along the line of its tunnel (now run into Quartz Hill about 1800 feet), some of the most valuable gold property in Nevada District. The tunnel was located under the miners' law enacted May, 1861, and the work was kept up continuously. The first suit will be brought against the parties that own property on the Roderick Dhu lode, through which this tunnel passes about 200 feet below the surface. The company will make claim to the 400 feet to within 50 feet of the surface, and to the entire mine below. It will also ask to recover the value of the gold taken from the mine below the 50 feet of surface, which will amount to a large sum. In this case, the validity of the old mining laws will be fully tested. The Lacrosse

Company is one of the oldest mining companies doing business in Colorado under its original name and charter.

#### LAKE COUNTY.

The Leadville *Herald* reports the following:

**CROWN POINT.**—The magnificent new hoisting plant on this shaft has been completed and is now running very satisfactorily. The machinery is from Messrs. Hendy & Meyer, of Denver.

**EVENING STAR.**—During November, 416 tons of ore were shipped, of which 56 tons were silver and lead ore and the remainder argentiferous iron ore.

**LEADVILLE CONSOLIDATED.**—During November, about 150 tons of ore were extracted, averaging \$100 a ton. The mine is looking well, and its possibilities are fair.

**LITTLE SLIVER.**—The new Sliver shaft, situated about 300 feet northeast of the Robert E. Lee mine, has disclosed 17 feet of fine ore. Masses of very high-grade ore are found in the general mass of mineral. A drift driven from the Forepaugh shaft shows ore of high grade 32 feet below the present bottom of the Little Sliver shaft.

**MORNING STAR.**—During the past month, there were produced 572 tons of silver and lead ore, and 985 tons of iron ore. Work will soon be resumed from the bottom of the McHarg shaft, when a greatly increased production of high-grade lead ore will follow.

**SMALL HOPES.**—About two years ago, Mr. Dennis Sullivan bought 25,000 shares of this stock of Dr. Williams, of Denver, at one dollar a share. Recently, it is stated, he sold the entire lot at \$4.50 a share. During the time he held the stock, he was paid \$6 a share in dividends. Mr. John T. Elkins, it is reported, also disposed of a large block of this stock some time ago, at \$5 a share.

**SMUGGLER.**—An effort will be made to secure a dissolution of the injunction that now prevents the successful working of this property.

#### LA PLATA COUNTY.

**LA FAYETTE REDUCTION-WORKS.**—These works at Animas City are meeting, it is said, with great success in treating copper and dry ores. The supply, however, is somewhat curtailed, owing to the idleness of the Hudson and Congress mines. It is pretty certain that both these copper producers will start up next spring.

#### PITKIN COUNTY.

Mr. W. B. Devereux has sent us the following:

**ASPEN MINING AND SMELTING COMPANY.**—A consolidation has just been effected by the owners of mines at Aspen, which resulted in the incorporation of a new mining company, which now owns a large portion of the most valuable mining property in Aspen. The new company has just been incorporated under the laws of the State of New York. The capital stock is two millions. The following properties have been deeded to the new company, and December 1st the new management took possession: The Spar Consolidated mines, consisting of the Spar, Washington, Betsey Jane, Millionaire, Enterprise Tunnel, Millionaire, mill-site, Galena, and also the Robert Emmet, General Shields, Hidden Treasure, Emma, Vallejo, Aspen Mammoth, and Chance; also the smelting plant and works of the Aspen Smelting Company. The mining claims enumerated above form a solid block of about ninety acres on Aspen Mountain, and include ground from which very large dividends have been paid in the past year. The new company assumes all complications, lawsuits, and obligations of every sort, and has issued its stock to the various owners of the mines and the smelting company, in payment for their property. J. B. Wheeler was elected president at a meeting of the Board of Directors in New York City, and W. B. Devereux was elected General Manager. Messrs. J. J. Hagerman, of Colorado Springs; H. B. Gillespie, David R. C. Brown, and W. B. Devereux, of Aspen, are members of the Board of Directors residing in Colorado. A large amount of development-work will begin at once, and the mines be worked as a unit. This will permit the abandonment of a number of hoisting-works and shafts, and will cheapen the expense of mining ore very largely.

#### PUEBLO COUNTY.

The Massachusetts Smelter, near Pueblo, blew in on the 3d inst. According to the *Denver Tribune-Republican*, the style of the furnaces is similar to that of the Omaha & Grant, except that the lower parts are crucibles in the Swansea pattern,

#### RICO COUNTY.

**GRAND VIEW.**—The smelter is receiving from 25 to 30 tons of ore daily, which is fully equal to the consumption. The construction of the cupeling-furnaces was to begin this week. It is thought that concentration-works will be added to the smelting plant at an early date next spring, if not during the winter.

**PUZZLE.**—This company has given a lease of the Puzzle and Little Carrie properties for one year, giving lessees the privilege to purchase both for \$10,000. The lessees have the privilege of working the properties in any manner they desire, and are to pay a royalty of 15 per cent.

#### SAN JUAN COUNTY.

**GREAT EASTERN.**—The company has been organized to work the Great Eastern mine. The capital stock is \$1,500,000. The principal office is at Silverton; branch office at Chicago. The incorporators are Robert W. Roloson, Myron I. Barber, William B. Keep, Charles W. Allen, Edgar M. Johnson, George Crawford, and Oliver P. Posey.

**SOUTHERN COLORADO BISMUTH AND SILVER MINING AND SMELTING COMPANY.**—The *Silverton Democrat* has published the following letter regarding this company, the financial embarrassment of which we stated in our last issue: Mr. Jackson, of Silverton, writes to the president and board of directors of this company, making two propositions concerning the Sampson mine. The first is, that he will bond the property of the company at \$500,000 for one year from April 1st, 1886; the deed to be placed in escrow in the First National Bank of Silverton, to be delivered on payment of the money within the specified time, on condition that the debts in Silverton contracted for labor and supplies be paid, and the personal property released from the attachments thereon. The second proposition is, to lease the property for one year from April 1st next, one half the net proceeds to be deposited monthly to the credit of the company. Mr. Jackson was formerly secretary of the company, but he was ousted through Manager Hamilton's influence. He says he is fully convinced that the pretense of the Sampson mine and mill being unable to pay expenses, which is given as the reason for closing them, is entirely without foundation, and if given the opportunity, he is confident of his ability to demonstrate the fact. Peter Brechisen, who assumed charge of the property on the departure of Manager Hamilton for the East, says he is confident that the local indebtedness of the company will be paid in a short time, and the affairs be sufficiently straightened out to resume work at the mine and mill by next March. The old miners who have been working on the mine say that they have plenty of rich ore, and that it is one of the cheapest mines in the State to work. It is believed by many that there is a gigantic game of freeze-out in progress, but the friends of the management claim that the mine is not as rich as is generally believed.

#### DAKOTA.

##### LAWRENCE COUNTY.

**CALEDONIA.**—The superintendent's report for the week ended November 30th shows that there is no particular change in the stopes with the exception of the one on the 425-foot level. The breast samples of this stope show a marked improvement. The ore produced from the 425-foot level was 1073 tons. From the Cave, 265 tons. Total, 1338 tons. We give below a short history of this company's property, which is attracting considerable attention at the present time, having entered on the list of dividend-paying mines. The property is located at Terraville, in Shoemaker and Bobtail gulches, two and a half miles south of Deadwood, and consists of the Caledonia, Oro Fine, Union, Grand Prize, Cornucopia, Ella Monroe, three fifths of Clara No. 2, three fifths of Queen of the Hills, and a portion of the Mono, all quartz locations; placers Nos. 9 and 10 on Bobtail, placers on Shoemaker, mill-site, 60-stamp mill, hoisting-works, and other necessary buildings to a large and complete plant. The Caledonia is the only well-developed location, and the only one receiving attention other than assessment-work. As a rule, most of the claims were purchased to protect the Caledonia from infringement on trespass. More or less mineral abounds in all, and it is highly probable that in time good mines will be developed outside of what is known as the Caledonia proper. It is stated that thus far the average value of new ore milled has exceeded \$9 a ton, and caved ore averaged \$2.90 a ton. Work is moving along smoothly, all the winter

supplies are in, and the property is said to be in a good condition. About eighty men are employed.

FATHER DE SMET.—Official reports state that, for the week ended December 1st, 2670 tons of ore were extracted from the first, second, and third levels.

IRON HILL.—Many sales are made of this stock at Deadwood. On the 1st inst., the prices ranged between \$1.18@\$.1.25. The mill is running successfully and bullion is produced.

MEXICO.

The Mexican *Financier* reports the following:

The quicksilver mine at Huitzaco, State of Guerrero, has been recently troubled with water, but that has been overcome, and the prospects are excellent. No shares in this property are on the market.

Much rich ore is shipped from Pachuca to Germany for smelting. Ore also continues to go north to the Kansas City Smelting-Works.

Chief Manager Bornecke, of the Maravillas mine, Pachuca, recently died at the City of Mexico. Mr. Bornecke was well known in mining and financial circles both here and in France.

LA LUZ.—Reports are current regarding a threatened lawsuit over this mining property at Pachuca.

MARAVILLAS.—An inspection of this mine, at Pachuca, is soon to be made on account of a complaint that the mine was drained through the San Juan mine, belonging to the Real del Monte. The pumping machinery at Maravillas is in full activity, and the Maravillas people can not believe that the San Juan is getting their water.

PORVENIR.—In this mine, two varas wide of very good ore have been cut.

PROGRESO.—An attempt was recently made at these reduction-works at Pachuca to operate an American machine with wooden pans instead of the usual iron pans, but the trial is reported as unsatisfactory.

REAL DEL MONTE.—An expert examination of the Rosario mine has just been made, it being claimed by the manager of this company that the Rosario had been invaded by the Guadalupe mine.

MICHIGAN.

COPPER MINES.

The November reports of the output of the Lake Superior copper mines are herewith given in comparison with the outputs of the same mines for the corresponding months of the two preceding years:

	November.		
	1885.	1884.	1883.
Calumet & Hecla.....	2275	2124	1826
Quincy.....	636	450	452
Franklin.....	223	289	200
Atlantic.....	203	180	161
Huron.....	126	125	73

CALUMET & HECLA.—This company is now shipping its copper overland, the first consignment having gone forward last week via the Marquette, Houghton & Ontonagon Railroad.

GOLD MINES.

ROFES.—The shaft has reached a depth of 250 feet, and drifting for a fifth level will soon be started, probably when a depth of 260 feet has been attained. In the bottom of the shaft, the vein is somewhat broken; but a recent change in the character of the quartz is encouraging to the management, that now mined being identical with that taken from the first level. Four stamps in the mill have resumed operations.

IRON MINES.

The following statement, published by the Marquette *Mining Journal*, shows the amount of iron ore and pig-iron shipped from the lake ports of that district for the season, up to and including December 2d:

	Gross tons.
Marquette—Iron ore.....	750,047
L'Anse—Iron ore.....	20,027
Pig-iron.....	9,025
St. Ignace—Iron ore.....	93,588
Pig-iron.....	13,549
Escanaba—Iron ore.....	1,219,771
	2,106,007

LAKE SUPERIOR.—The company has begun working on the new shaft to the east of the main shaft of the hematite mine. Work will be vigorously prosecuted until the shaft has been sunk to the ore.

MINNESOTA.

MINNESOTA IRON COMPANY.—Shipments of iron ore from the port of Two Harbors, Vermilion range, have ceased for this year. The entire shipments from the range named for the current year amount to 225,484 gross tons, very nearly four times the output of last year. This product was obtained from five of the Minnesota Iron Company's six mines at Tower, these being the Tower, Breitung, Stone, Lee, and Stunz. The Ely mine, which promises to prove one of the most

valuable of the company's possessions, is receiving machinery and opening up. It will be actively worked next season, when all six of the company's mines will be active producers.

A second ore-dock is in process of construction at Two Harbors, and will be in readiness for service by the opening of navigation next spring.

MONTANA.

SILVER BOW COUNTY.

PARROT.—The main shaft is down 430 feet, and cross-cuts are running both north and south to cut the veins. The new stack at the furnace is about completed, and will be in operation in about two weeks. This, it is said, will give the company an additional capacity of 100 tons of ore a day, making 400 tons in all.

NEVADA.

ELKO COUNTY.

BLUE JACKET.—John Lloyd, as assignee of John A. Robinson, an insolvent debtor, has served the Public Administrator, Philip A. Roach, with a notice that on the 4th inst. a motion will be made before Judge Coffey, at San Francisco, to obtain \$27,000 for services rendered by Robinson to the Blythe estate. The services consist of two journeys to London and the sale of 45,000 shares of the stock of the Blue Jacket Mining Company to a syndicate of capitalists for \$135,000. The expense of the trips amounted to \$5000, and 20 per cent commission is asked on the sale.

ESMERALDA COUNTY.

MOUNT DIABLO.—Official advices state that no ore has been milled since July 31st. After paying all expenses of every character to December 1st, the cash surplus will be about \$40,000. They will not resume crushing before February 1st, and possibly not sooner than the 1st of March.

EUREKA COUNTY.

JACKSON.—Work has begun in freeing the 600-foot level of the 12 feet of water that have accumulated there during the past three years. It is expected that the level will soon be entirely freed, so that the miners can enter it and prepare for prospecting-work.

STOREY COUNTY—COMSTOCK LODGE.

The pay-rolls of the Comstock mines for November aggregate \$122,938, an increase of nearly \$15,000 over the pay-rolls for October. The above does not

BULLION PRODUCTION FOR 1885—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of November.	Year from Jan. 1st, 1885.
Adams, S. L.....	Colo...	25,000	310,103
Alice, G. S.....	Mont.....	.....	855,248
Belmont.....	Nev.....	.....	10,003
Bodie, G.....	Cal.....	.....	**17,967
Boston & Montana, G.....	Mont.....	55,112	462,722
Caladonia, G.....	Dak.....	36,149	36,149
Christy, S.....	Utah.....	11,889	120,396
Chrysolite, S.....	Colo.....	23,245	77,972
Colorado Central, S.....	Colo.....	26,751	210,871
Consolidated Bobtail, G.....	Colo.....	.....	41,228
Deadwood-Terra, G.....	Dak.....	30,861	368,644
Derbec Blue Gravel, G. S.....	Cal.....	16,615	125,314
Essex, G. S.....	N. S.....	.....	6,474
Eureka Consolidated, S. L.....	Nev.....	.....	180,619
Father de Smet, G.....	Dak.....	35,263	312,671
Freeland, G. S. C.....	Colo.....	.....	26,141
Grand Prize, S. G.....	Nev.....	12,319	236,192
Granite Mountain, S.....	Mont.....	91,842	879,860
Hall-Anderson, G.....	N. S.....	.....	7,741
Head Center & Tranquillity.....	Ariz.....	.....	85,396
Hecla Consolidated, G. S. L. C.....	Mont.....	**69,453	732,308
Helena, G. S. L. C.....	Mont.....	100,000	846,584
Homestake, G.....	Dak.....	123,788	1,077,830
Hope, S.....	Mont.....	.....	107,448
Iron Silver, S. L.....	Colo.....	.....	463,385
Kentuck, S.....	Nev.....	**873	4,435
Lexington, G. S.....	Mont.....	74,182	734,386
Montana, Limited, S. G.....	Mont.....	71,400	722,438
Moulton, S. G.....	Mont.....	**8,933	655,529
Mount Diablo, S.....	Nev.....	.....	325,231
Navajo, S.....	Nev.....	.....	82,894
New Hoover Hill, G. S.....	N. C.....	3,250	61,009
New Pittsburg, S.....	Colo.....	.....	14,594
North Belle Isle, S.....	Nev.....	.....	2,118
Ontario, S.....	Utah.....	168,347	1,685,074
Oxford, G.....	N. S.....	.....	14,697
Plymouth Consolidated, G.....	Cal.....	.....	724,651
Rooks, G.....	VI.....	.....	28,383
South Yuba, G.....	Cal.....	.....	3,085
Standard Consolidated, G.....	Cal.....	15,696	152,614
Stormont, S.....	Utah.....	19,472	147,040
Syndicate, G.....	Cal.....	.....	**62,327
Tombstone, G. S. L.....	Ariz.....	.....	403,875
Total.....			13,707,613

G., gold; S., silver; L., lead; C., copper. Silver valued by the different companies from \$1@\$.1.29 per ounce to \$1.05; gold, \$20.67. \*Not including value of lead and copper. †Royalty. ‡Net. — No shipments during month mentioned. \*\* Not official.

include the sum disbursed to employes of mills on the Carson River.

CONSOLIDATED CALIFORNIA & VIRGINIA.—During the week ended November 28th, there were extracted from the 1750 level 841 tons of ore and 866 ton shipped to the Morgan mill. The value per ton of or milled during the week was \$14.17, according to assays made from samples taken from the batteries. Under the Jones contract, 1190 tons of ore were shipped to the Eureka mill. The value of the ore milled during the week was \$31.92 a ton, according to assays made from battery samples.

KENTUCK.—About one hundred tons are produced daily. A decided improvement is said to have been developed in the grade of ore.

KEYES.—The lawsuit between Dr. Hiller and Col. P. J. Keyes over their interests in this mine, Virginia City, has been amicably settled. All lienholders and creditors are to receive the full amount of their claims filed against the mine. Work will be resumed January 1st.

NEW MEXICO.

GRANT COUNTY.

OLD MAN.—A new tunnel is running on this mine for the purpose of striking the incline at a depth of 250 feet. This will open up the mine from 75 to 100 feet below the present workings. The mine is in good shape, with quantities of ore in sight.

SILVER BAR No. 2.—The superintendent of this company has gone to St. Louis, to confer with the directors as to the erection of a twenty-stamp amalgamating mill for the treatment of its own output.

MARKETS.

NEW YORK, Friday Evening, Dec. 11.  
Silver.

DATE.	London.	N. Y.	DATE.	London.	N. Y.
	Pence.	Cents.		Pence.	Cents.
Dec. 5	47 1/4	103	Dec. 9	47 5-16	102 3/4
7	47 1/2	103	10	47 3/4	102 1/2
8	47 7-16	102 3/4	11	47 3-16	102 3/4 @ 1/2

A further decline in the Indian Exchanges has lowered the price of silver in London. The recommendations of the President's Message and the Report of the Secretary of the Treasury have, doubtless, increased this tendency of the market; but it may well be doubted whether the determined opposition of the silver party in Congress to any suspension of coinage will not have the effect to strengthen the market.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting made no change in the bank's minimum rate of discount, and it remains at 3 per cent. During the week, the bank lost £246,388 bullion; but the proportion of its reserve to its liabilities was raised from 44% to 45%, against 41 3/8 per cent at this date last year. On the 10th inst., the bank gained £75,000 bullion on balance. The weekly statement of the Bank of France shows losses of 1,641,000 francs gold and 4,410,000 francs silver. The weekly statement of the Imperial Bank of Germany shows a gain in specie of 8,479,000 marks.

Copper.—Our market is very firm, and transactions were quite important. We note sales of 300,000 pounds of Baltimore B. C. W. at 10'10@10'15c., and it is doubtful whether any large amount could be obtained at less than 10 1/4 @ 10'30c. The same may be said of Orford, which is held at 10 1/2 c. firm. The scarcity of furnace material is very marked, and these brands of copper are likely to be produced in restricted quantity, unless there should be such an advance here as would keep our furnace material from seeking a foreign market.

Lake is quoted 11'15@11 1/4 c., and 11 1/2 c. is talked of, though there is an impression that it will not be reached in the contracts now negotiating by the Calumet & Hecla with manufacturers for their next three months' supply.

The London market has declined from £42 a week ago to £40 5s. yesterday, from which there is a recovery to-day to £40 12s. 6d. It is supposed that the decline was due to manipulation.

The Anaconda Company, we understand, has reduced the number of its running furnaces from 26 to 18, a reduction equal to nearly one third of its production. We are not informed whether this reduction is to be maintained for any time. It is rumored that other Montana producers may also make a reduction.

Tin.—This market is dull, and we may quote spot

20½@20¾c., and futures a shade less. In London, cables to the New York Metal Exchange quote £92 15s. for spot, and £93 10s. for futures.

**Lead.**—The lead market has practically reached the importing point, or as near it as it is safe to go. Some spot has been sold in car-load lots at 4¾c., and some 800 tons have changed hands in round lots at 4.50@4.60c., convenient delivery. The market is very strong, and the general conviction is, that our price will hereafter depend a good deal on that of Spanish lead and of freights. Foreign can be imported now at about 4¾c., and our own lead will probably keep just below the importing price. Soft Spanish in London declined slightly during the week, touching £12 on more than one occasion, but it has fluctuated mostly between £12 5s. and £12 7s. 6d. The Richmond lead has ceased to be an oppressive load on the market. It can come here but slowly and in small quantities, and the impression is becoming pretty general that, unless some new sources of supply are opened up, we shall possibly have to import lead next year.

Messrs. John Wahl & Co., of St. Louis, telegraph us as follows to-day:

The market is a little stronger, and there is a very good demand. Stocks in the hands of holders are limited, and offerings are very light. Sales for the week amount to about 400 tons, at prices ranging from 4.25@4.37½c. Chemical lead is very scarce.

Messrs. Everett & Post, of Chicago, telegraph us as follows to-day:

There has been an increased demand for spot lead for the past few days. Sales for the week sum up over 450 tons, prices ranging from 4.35@4.42½c., the latter for spot. Offerings are very light for December, though free for January.

**Spelter.**—This metal is still very lifeless, and we quote Domestic 4.40@4.60c., according to brand. New Jersey, 6¼@6½c. Foreign, 5c.

In London, Silesian Spelter is quoted £14 17s., being an advance of 17s. 6d. On the 9th inst., £15 was reached.

**Sheet-Zinc** has declined, and may now be quoted 5.35@5.50c. for Domestic.

**Antimony** is quite dull and unchanged at 8¾@9c. for Hallett's; 9½c. Cookson's here, and £36 for Hallett's in London.

**Nickel.**—We quote nominally 70c., but this figure is shaded by foreign brands.

### IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 11.

**Iron Ore.**—The ore market is still active so far as orders are concerned, but importers are afraid to make prices on account of the difficulties in arranging for freights. Nominal quotations are 9@10c. per unit for Foreign.

**American Pig.**—This market is nominally unchanged in price, and is quite strong. We continue to quote: No. 1 X, \$18@19; 2 X, \$16@17; Forge, \$15@16, for standard Lehigh brands. There is little fair quality of iron selling much below the lower figures, and some extra makes, such as Chickies and some others, ask fully 50c. above our upper figures.

There is a firm conviction in the trade that the price will be advanced next month; but it is not thought that the advance will exceed \$1 a ton, and there is an opinion among some of our most experienced iron merchants that even that advance will not long be maintained. There are few who expect any large advance in prices. The number of furnaces blowing in, or ready to blow in, may overstock the market; but at present, stocks are very light with most of the standard makers.

**Bessemer Iron.**—Both domestic and foreign, is in active demand, and the price has still farther advanced on account of an increase in freights. These are now quoted from 5s. to 7s. 6d. per ton. We quote \$20.50@21 for foreign, with quite large sales during the week.

**Spiegeleisen.**—We note sales of several thousand tons at about \$28 for English 20 per cent. We quote now full \$28 for this quality, and \$32 for 30 per cent; \$67@68 for 80 per cent.

**Scotch Pig.**—This market is very quiet, the high freights having checked the business. We continue to quote: Coltness, at Glasgow, 50s.; at New York, \$19.50@20. Summerlee, at Glasgow, 49s.; at

New York, \$19@19.50. Gartsherrie, at Glasgow, 45s. 6d.; at New York, \$19@19.50. Eglinton, at Ardrossan, 42s.; at New York, \$18.

**Steel Rails.**—The recent purchase of English steel rails at a price \$10 or \$15 above our price for American is still attracting great attention. It is understood that the claim made in justification of the transaction is, that the quality of the rails is said to be much superior to American. It is said that the contract does not contain any guarantee as to durability, but specifies that a certain proportion of Swedish charcoal pig-iron and a certain proportion of hammered blooms shall be used in their manufacture, the standard aimed at being the same quality as in the original John Brown Sheffield rails. If the Barrow Company, which has taken the order, does use these materials, it will certainly not be a very profitable contract. The ordinary Barrow rails have been used in this country, and are reported to be much inferior to our American rails. This experience has been recorded by a great number of our roads; but it is sufficient to cite the testimony of Mr. Robert M. Olyphant, the President of the Delaware & Hudson Canal Company, who courteously writes us that "the experience of the Chicago, Burlington & Quincy road must be very different from ours if it has authorized a price of \$10 or \$15 a ton more for English than for American rails. We had the standard rails of England and America side by side, and were led to conclude that the American rails were in no respect inferior to those of any other country."

We believe an extra price is to be paid the Chicago mills for rails in the manufacture of which 25 per cent of charcoal pig has been used, and there can be no question but that any quality that may be desired can be obtained from our mills if the price is paid for the use of special materials.

The steel mills representatives, at a meeting in Philadelphia, on Wednesday last, agreed upon an addition of 250,000 tons to the quota of 750,000 tons, making the quota now 1,000,000 tons; the increase to take effect from the 15th of December. As we stated last week, the amount of rails on the books of the companies for 1886 delivery was 529,000 on the 1st of December. Since that time, this amount has been increased to about 600,000, which, however, would include some rails ordered for this year, but which it is now evident can not be delivered until next. It is generally understood that the opposition of some of the small mills to increasing the quota was overcome by an understanding that they shall have the opportunity to book all the large orders until they have "caught up" on their stronger or more fortunate rivals. And there also appears to be a more general feeling against advancing prices than we found existing a few weeks ago—in fact, it is said that one of the Pennsylvania companies has sold some 10,000 or 16,000 tons at a delivered price that has been "figured out" to mean \$34 at the mill.

On the other hand, the 15,000 tons reported in our last issue was at \$35 at the mill, and the same company has sold a smaller lot this week at the same price. Another Eastern mill has this week booked an order for 5000 tons with the option of making it 10,000 tons at \$35 at the mill; but we also hear of small spot lots being sold at a little less than \$35. There are still large orders in the market, but we hear of none of the mills willing to take them below \$35, though the disinclination of many makers to take orders and the desire to avoid any ground for an advance in wages while old low-priced contracts are filling undoubtedly lead some of them to name less than \$35 for small and unimportant lots or for orders they are unwilling to take.

At the close of the year, most of the railroads make up their books, and naturally desire to make the best showing possible; this will probably make the market dull until after the holidays. With these explanations, we quote \$34@35 at Eastern mills and \$37@38 at Western mills, equal to Chicago delivery.

**Structural Iron and Steel.**—A good business has been reported during the week, but prices remain unchanged. Angles, 1.90@2c. delivered; Tees, 2¼c. Iron Beams and Channels, 3c.; American and Belgian, 2.60@2.75c.; Steel Angles, 2.90@2.40c.; 3-inch to 4-inch square steel billets under 10 carbon are quoted \$32.50 ex ship.

**Plate Iron.**—Unchanged. Quoted at 2@2½c., according to quality; Common Tank, 2c.; Refined, 2½c.; Flange iron, 3¼@3½c.

**Bar Iron.**—We quote at 1.40@1.55c. for Common; 1.75@1.85c. Refined.

**Steel Plates.**—Quoted 3@3½c. for Boiler and Ship Plates; 3½@4c. for Flanges.

**Merchant Steel.**—We continue to quote American Tool Steel, 8@10c.; special qualities, 12@15c.; Crucible Machinery, 4½@5½c.; Bessemer Machinery, 2@2½c.

**Old Rails.**—Are quite scarce, and \$21 is offered in this market without drawing out any large amount. We quote \$21@21.50.

Philadelphia, Dec. 11.

[From our Special Correspondent.]

It is impossible to discover evidences of any change in conditions of the iron trade heretofore noted. The brokers are all in a very good humor over the steadiness of prices, and some declare that in January an advance is sure. So far as inquiries go, there seems to be no solid ground for the assertion. Four or five of the stronger companies are decidedly in favor of an advance, and, if their counsels could have any weight on the smaller producers, an advance would be made, particularly if, after the opening of the new year, the demand should brighten up a little. The opinion of buyers is, that there will be enough iron offered of one kind or another to enable them to get along on the basis of \$18, \$16, and \$15.50. They can get iron at these figures now, and they think they will find all they want at these prices, as they want it. They are in no wise troubled over the talk about an upward tendency in prices. At the same time, the possibility of this is kept in view by every one on the buying side, and they are placing orders for material a little farther ahead on this account. The talk of an advance grows out of the fact that several furnaces have sold themselves up for from one to three months, or at least have buyers on whom they can depend. Taking in the situation impartially, it is probable that consumers will be able to purchase all the material they need through the winter at about present prices. There are a few brands that are held very firmly. No. 2 iron is quoted for best at \$16.50, though comparatively little foundry of this kind is selling. The trade is of a hand-to-mouth character for this month. What will be done next month, it is only guess-work to say at this time. A good many furnace people say \$16 ought to be and will be the bottom price for forge; but bar men say the demand must be better before that price can be held without concessions.

**Muck-Bars.**—Good business is in quiet progress in Muck-Bars between the limits of \$27.50 and \$28.50.

**Bessemer Iron.**—Contracts for Bessemer iron have been placed at from \$19.75@21, according to quality.

**Spiegeleisen.**—No large transactions of spiegeleisen are heard of. Agents have a good deal of business in sight, and are looking for the closing of negotiations. Quotations are \$26.50@27 for 20 per cent.

**Manufactured Iron.**—Merchant iron is selling at \$1.40 for Common to \$1.80 for Refined. No special interest has been evinced by store-keepers or buyers, as the mills have not as much as they can do, and therefore they are buying material as they want it, and in most cases insisting on concessions, which, where they are made, are made in a very grudging way. The car-builders are using up a good deal of iron, and they are about the only people that are making a ripple on the market.

**Sheet-Iron.**—All of the sheet-iron makers are in need of more business than they are getting; but so far as sales go this week, no reduction in selling price has been made, and as a rule, card rates are held on the business done, which is mostly of a retail kind.

**Plate Iron.**—Tank iron is selling at from 2@2.10c. Skelp iron is in very active demand at from 1.80@1.85c. The capacity is all taken up, and contracts are in hand for as much as sixty days ahead. A few lots of shell iron have been bought, and some flange is under inquiry. Some little fire-box material has been contracted for this week, but the plate-iron trade is in general quiet.

**Wrought Pipes.**—The wrought pipe demand seems to have temporarily dropped off. This makes no difference, as the mills are sold away ahead, and the managers say there is enough business in sight to keep prices firm. An advance is much desired, as the margins are far less than the volume of business ought to allow.

**Merchant Steel.**—The makers of specialties in steel have hunted up some winter business, but have secured it, they say, at low prices. The steel-makers feel rather despondent over the prices that they are

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, Highest and Lowest Prices per Share at which Sales were Made (Dec 5-11), and Sales. Divided into Dividend-paying and Non-dividend-paying mines.

Dividend shares sold, 31,135. Non-dividend shares sold, 52,400.

obliged to take business at. On the whole, their position is no worse than that of bar-iron makers, nor as bad.

Nails.—The Western nail-makers mean to fight out the difficulty. The Eastern nail-makers are glad of it. The nailers themselves are receiving support from the East, and are indisposed to make any overtures.

Steel Rails.—Steel rails are selling at from \$34@35. Fewer orders have been reported this week. Some rumors are afloat to-day as to the probable closing of some very large transactions for late spring delivery.

Old Rails.—Old Rails are quoted from \$19.50@20. Spot lots are hard to get. Every thing is sold up. There are inquiries for several thousand tons in this market.

Scrap.—No. 1 Scrap is selling at \$17; selected lots are selling at \$18; Wrought Turnings, \$11@12; Steel Scrap, \$10@12.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 11. Statistics.

Production of Coke on line of Pennsylvania RR. for week ended December 5th, and year from January 1st.

Table showing production of coke in tons of 2000 pounds for 1885 and 1884, broken down by region (Alleghany, West Penn, Southwest Penn, Penn & W, Monongahela, Pittsburg, Snow Shoe).

Total... 74,751 2,280,010 \* 2,328,006 \* Reports for the week ended December 6th, 1884, were not published.

Production Anthracite Coal for week ended December 5th, and year from January 1st:

Table showing production of anthracite coal in tons of 2240 lbs. for 1885 and 1884, broken down by company (P. & Read RR, V. R.R., D. L. & W. R.R., U. & H. Canal, Penna. RR., N. & West Br. RR., S. H. & W. B. RR., P. & N. Y. R.R., Penna. Coal Co., Penna. Canal Co., Shamokin Div., C. RR., Lykens Valley).

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

Production of corresponding period: 1880... 22,388,806; 1881... 22,695,916; 1882... 30,145,547.

Production Bituminous Coal for week ended December 5th, and year from January 1st:

Table showing production of bituminous coal in tons of 2000 pounds for 1885 and 1884, broken down by region (Philadelphia & Erie RR, Cumberland Region, Barclay Region, Broad Top Region, East Broad Top, Clearfield Region, Snow Shoe, Karthaus, Tyrone & Clearfield, Alleghany Region, Gallitzin & Mountain).

Total... 151,635 6,470,226 141,369 6,732,167 \* Tons of 2240 lbs.

Table showing production of bituminous coal in tons of 2000 pounds for 1885 and 1884, broken down by region (Pittsburg Region, West Penn RR, Southwest Penn RR, Pennsylvania RR, Westmoreland Region, Pennsylvania RR, Monongahela Region, Pennsylvania RR).

Total... 41,569 1,868,829 50,220 2,034,514 Grand total... 193,234 8,337,055 191,589 8,766,681

The Norfolk & Western Railroad Company reports the shipments of Pocahontas Flat-Top coal for the week ended December 5th and year from January 1st as follows, tons of 2000 pounds: 1885—Week 13,730; year, 551,547. 1884—Week 7,177; year, 189,925. Increase, 1885—Week, 6,553; year, 361,622.

Anthracite.

The colder weather of the past week has slightly increased the demand, and has helped to prevent lower prices, although trade is still very quiet. We think, however, that, although we are unable to note a lower range of prices, the higher range is not nearly so well maintained. In fact, there are rumors of much quiet undercutting on the part of some of the large companies.

We quote coal, f. o. b., as follows:

Table showing coal prices: Stove... \$3.75@3.90; Chestnut... 3.00@3.35; Broken... 3.00@3.30; Egg... 3.20@3.50.

It is said that the Delaware & Hudson Canal Company is cutting retail prices in Boston fully 25 cents a ton, which is discouraging other dealers there, and is bound to compel the other companies to protect their customers by making further concessions.

It is said that the Lehigh Valley Coal Company has taken the Elevated Railroad contract for next year at a slightly better price than for this year.

There has been considerable talk about the allotments for the first three months of next year, and the indications are, that they will be agreed upon. We think, however, that the quantity is likely to be made large, and that the restriction will not be sufficient to give good, firm prices.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.										Sales from Dec. 5th to Dec. 11th, inclusive.		
		Dec. 5.		Dec. 7.		Dec. 8.		Dec. 9.		Dec. 10.			Dec. 11.	
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.		H.	L.
Barclay Coal	50	17 1/4	16	16 3/4	16	15 3/4	15 1/2	15 1/2	15 1/2	15	14 3/4	14 3/4	14 3/4	3,500
Cameron Coal	10	24	23 1/2	24 1/2	24	24 1/2	24	24 1/2	22 1/2	22	23	21 1/2	5,755	
Col. C. & I.	100	12	11	12	11	12 1/2	12	11 1/2	11 1/2	12	12	12	2,080	
Consol. Coal	100													
Cumb. C. & I.	100													
Del. & H. C.	100	98	97 1/2	98 1/2	97 1/2	98 1/2	97 1/2	99	97 1/2	99 1/2	98 1/2	97 1/2	11,715	
D. L. & W. RR.	50	122 1/2	121	123 1/2	122 1/2	124 1/2	122 1/2	128	122 1/2	125 1/2	128 1/2	124 1/2	403,968	
Elk Lick Coal Co.	50	47	46 1/2	48	47	47 1/2	47 1/2						5,621	
Lehigh C. & N.†	50	57 1/2	57 1/2	58	57 1/2	58							587	
Lehigh Valley RR.†	50													
L. & W. C. & I. Co.	100													
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50							133 1/2					300	
New Central Coal	100			14							12 1/2		120	
N. J. C. RR.	100	46 1/2	45 1/2	46 1/2	45 1/2	45 1/2	45 1/2	44 1/2	43 1/2	44 1/2	42 1/2	43 1/2	25,055	
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR.†	50	54 1/2	54 1/2	54 1/2	54	54 1/2	53 1/2						4,691	
Ph. & R. RR.†	50	22 1/2	22 1/2	23 1/2	22 1/2	23		22	20	21 1/2	20	20 1/2	40,014	
Spring Mountain	50													
Westmoreland Coal.†	50													

\* Of the sales of this stock, 5,084 shares were in Philadelphia and 34,930 in New York. Total sales, 503,406.  
 † The quotations for these stocks are not percentage, but actual price.  
 ‡ Ex-dividend.

next year's combination. This has been partially denied; but the impression prevails that that company will be much more flexible next year, and that it may meet the requirements of the other companies, even though it may not become a party to a full-fledged combination.

The New York Coal Exchange has filed its certificate of incorporation; capital, \$2,000,000. The trustees for the first year are: Richmond Talbot, R. H. Williams, E. J. Berwind, Frank F. Robinson, E. B. Ely, A. S. Swords, J. D. Kurtz Crook, Frank A. Bassler, and William G. Payne.

Bituminous.

This trade is always quiet and featureless at this season of the year. The shippers note change neither in prices nor demand.

Buffalo. Dec. 10.

[From our Special Correspondent.]

This will be a short letter, as the preparation of the annual statistics of the port of Buffalo is a work of considerable labor and requires much time. Since December 2d, about 20,000 tons of coal have been shipped by lake to Chicago.

There are nominally no changes in the prices of either anthracite or bituminous coal, or of coke. Rather than lose a customer, coal is "cut" occasionally.

Coke is quiet and unchanged. Messrs. Bell, Lewis & Yates, of this city, have nearly completed the Reynoldsville & Falls Creek Railroad, which connects the coal mines of Messrs. Powers, Brown & Co., at Reynoldsville, with the Buffalo, Rochester & Pittsburg Railroad at Falls Creek, thus making a more direct and cheaper line for shipping coal to our market.

It is the intention of the owners of the Pittsburg mines to put their coal on this market at the same price as the Reynoldsville. Pittsburg and Alleghany River coal is offered here at lower prices than ever before known. The competition among bituminous coal dealers is very sharp, and the canvasser is loth to leave without an order, so keen is the strife for business.

It is reported that a scheme, fathered by the Standard Oil Company, is on foot to pipe natural gas from the Venango region via Corry to Buffalo. At Corry, the pumping machinery necessary to force the gas to its destination will be placed. Engineers are making the necessary surveys and estimates for the work. Operations will begin early next spring. If this rumor becomes a fact (the supply of gas proving adequate and the great distance overcome), a revolution in the coal trade at this port may be expected, provided the cost is below the present price of the bituminous or anthracite varieties.

Our Coal Exchange, as described by a retail dealer, "is an organization with good aims and intentions, but as a power in the land it is dead." "I suppose," says he, "that dealers went into it with honest intentions, but the temptation to cut prices is too great. Very few are holding to published prices, and there seems to be a greater disposition to cut now than ever before. Wholesalers are sending out canvassers, and

I have had a good many callers lately, and was of course offered cut rates every time."

The scarcity of coal during the last weeks of navigation prevented a larger movement than was recorded. Vessel-owners, finding that they could not secure cargoes, "tied up." The vessels that did obtain freight had to stand a reduction from \$1.35 to \$1 a ton to Chicago and Milwaukee.

Navigation is still open here, although the season is practically closed. Yesterday, a steam barge and tow arrived.

I hope to send you the yearly statistics next week.

Boston. Dec. 9.

[From our Special Correspondent.]

The market has been quiet this week. Almost all the business done is on old orders, and this term may be stretched, in our opinion, to cover recently made "extensions" of old orders. The Reading is understood to have no coal to sell to transient trade, and much coal yet to deliver to regular customers on old orders. Some other companies are sold ahead to a less extent. Thus it is that quotations vary according to the ability of the several companies to deliver coal. Indications point to the fact, however, that there is beginning to be an improvement in transportation facilities in the mining regions. The greatest delays were passed a month ago. Stocks at tide-water are not large, however.

The pocket dealers are having a good trade, and anticipate its continuance for some weeks to come, as the towns and cities that look to the pockets for a supply are but very moderately stocked.

Nothing has occurred to break the monotony in the bituminous coal line. Owing to high freights, delivered prices remain at \$3.50@3.70.

The feeling in freights is very strong. Rates easily remain as last quoted and above the minimum rates of the Coastwise Commission. Some hostility is encountered by the new bill of lading, and we hear of one jobbing firm that refuses to charter under it, unless its customers desire it especially. Jobbers are generally throwing the matter upon their customers for decision. The tug of war will come next summer, however. The changes that the new bill of lading makes are not very burdensome just now. We quote:

New York, \$1.20@1.25; Philadelphia, \$1.40@1.50; Baltimore, \$1.50; Newport News, \$1.40@1.45; Richmond, \$1.40@1.45; Cape Breton, \$1.60@1.75; Bay of Fundy, \$1.40@1.50.

Retail trade is dull, and dealers are disappointed. Another source of discomfort is given to parties holding winter delivery contracts in the advancing freights. Fewer dealers will take these contracts early in the season than was formerly the case. We quote:

White ash, furnace and egg	\$4.75@5.00
" " stove and nut	5.25@ 5.50
Shamokin, egg	6.00
" " stove	6.25
Lorberry, egg and stove	6.50@ 7.00
Franklin, egg and stove	7.25@ 7.75
Lehigh, furnace, egg, and stove	5.25@ 5.50
" " nut	5.50@ 5.75

Wharf prices are as follows: Broken, \$4.25; Egg, \$4.50; Stove, \$5.

FINANCIAL.

NEW YORK, Friday Evening, Dec. 11.

Mining Stocks.

Business in the mining market has been less active than last week, and the sales have been comparatively small, except in one instance, that of Sutro Tunnel, the sales of which are almost one half of the week's transactions. Prices in many cases have ruled lower. The total transactions amounted to 83,585 shares, showing a decrease of 24,476 shares as compared with those of the preceding week.

Caledonia has come forth with a second dividend of \$10,000. The stock did not advance, as would be supposed, but went from \$2.70 to \$2.20, with sales of 3850 shares. In another column, our readers will find a brief history of this company's property. Father de Smet has been quiet at \$4.50, and Homestake at \$23.

Horn-Silver has declined to \$2.60, with a smaller business. A few shares of Ontario sold at \$32. Stormont is slowly advancing with increased interest in the stock, which is now quoted at 17@18c.

The Bodie group has been quiet. The greatest interest is still centered in Bulwer, which ranged from 64@55c. Bodie has also declined, selling from \$2@ \$1.70. Mono continues its gymnastic movements, and has gone from \$5—the price given last week—to \$3.95. Among the other California stocks, Green Mountain shows a few sales at from 57@52c. Quick-silver Preferred has been lower at from \$25@23. A hundred shares of Common sold at \$7 a share. No sales of Plymouth Consolidated are reported. This company, which has been paying dividends at the rate of \$50,000 a month, has now reduced the same to \$25,000, and an official circular states that this reduction will continue for some time, the company being obliged to mill the low-grade ore, which will somewhat decrease the profits.

Sutro Tunnel continues to be the point of interest, and has added 33,500 shares to the week's sales; the price has ranged from 25@20c. The other Comstocks were quiet. Consolidated California & Virginia sold at from \$1.50@1.35. Hale & Norcross, at from \$3.60@4.75.

Little interest was shown in the Colorado stocks. Iron Silver shows a large business, and advanced from \$1.50@1.80. Robinson ranged from 80@95c. Lacrosse, at 10@12c. Colorado Central shows but one sale at \$2.60.

Silver King, which opened at \$7.50, sold as high as \$8.50. Alice records a few sales at \$1.90.

Coal Stocks.

At the end of last week, the West Shore lease to the New York Central was announced, and the market became very strong. Early in the week, there was a slight reaction, but on Tuesday there were again evidences of a coming boom. On the same day, however, after the Stock Exchange was closed, it was announced that Mr. William H. Vanderbilt was dead. The utmost excitement prevailed, and despite enormous support, the market opened off 2 to 3 per cent for the leading stocks the next morning. Before the day was over, however, a large recovery was made. Since then, there have been much irregularity and much feverishness. There are some black clouds hanging over the market that may produce further disturbance, and in the mean time there is much distrust.

The coal stocks have been exceedingly strong and active on pure manipulation. Lackawanna sold at \$122 1/2 on Wednesday, and before night at \$128. The sales aggregated for the week 403,968 shares, at \$121@ \$128 1/2, closing at \$128 1/2. The sales of Delaware & Hudson were 11,715 shares, at \$97 1/2@99 1/2, closing at \$98. Reading was more particularly affected by Mr. Vanderbilt's death, and sold from \$23 1/2 down to \$18 1/2, and closed at \$20. The transactions in Jersey Central aggregated 25,055 shares, at \$46 1/2@42, closing at \$43. The drop in Jersey Central, although in proper sympathy with the rest of the market, was due largely to the resignation of Mr. Garrett from the board of directors, being a further indication that the Baltimore & Ohio will pursue an independent action. The market closed very strong.

Meetings.

Meetings of the following companies will be held at the time mentioned: American Coal Company, No. 110 Broadway, New York City, December 24th, between twelve and one o'clock P.M., annual meeting.

California Water and Mining Company, No. 43 Broadway, New York City, December 15th, at twelve o'clock m., annual meeting postponed to this date.

Consumers' Coal Company, No. 640 Sixth avenue, New York City, December 15th, at twelve o'clock m., annual meeting.

Pipe Line Certificates.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the week:

The oil market during the week has merely reflected the whims of room traders. There was no pronounced buying or selling, and the position of parties on the market is well defined. It is easier, however, to say who is short of oil than who is long of the 27,000,000 certificates. Commission brokers have very little oil; Wall street has very little. The banks have very little on loans; and we wish to reiterate our belief that they are held in the strong-boxes of persons who fully understand what they are doing.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

Table with 6 columns: Opening, Highest, Lowest, Closing, Sales. Rows include Dec 5, 7, 8, 9, 10, 11.

Dividends.

DIVIDENDS PAID BY MINING COMPANIES DURING THE MONTH OF NOVEMBER AND FROM JANUARY 1ST, 1885.

Table with 4 columns: NAME OF COMPANY, Location of mines, Paid during month of November, Since January 1st, 1885.

S., Silver; L., Lead; G., Gold; C., Copper; M., Mica.

Adams Mining Company, of Colorado, has declared a dividend (No. 18) of ten cents a share, or \$15,000, and an extra dividend of five cents a share, or \$7500,

payable December 21st, at the Farmers' Loan and Trust Company, New York City.

Boston & Montana Gold Mining Company, of Montana, has declared a dividend (No. 18) of fifteen cents a share, or \$30,000, payable December 12th, at 30 Broad street, New York City.

Caledonia Gold Mining Company, of Dakota, has declared a dividend (No. 3) of ten cents a share, or \$10,000, payable December 24th, at Messrs. Laidlaw & Co.'s, No. 14 Wall street.

Franklin Copper Mining Company, of Michigan, has declared a dividend of \$1 a share, or \$40,000, payable to stockholders of record December 19th.

Lehigh Valley Railroad Company has declared a quarterly dividend of one per cent on the capital stock, payable to stockholders of record December 21st, at No. 228 South Third street, Philadelphia.

Plymouth Consolidated Gold Mining Company, of California, has declared a dividend (No. 31) of twenty-five cents a share, or \$25,000, payable December 5th.

Richmond Consolidated Mining Company, Limited, of Nevada, has declared a dividend of five shillings a share, free of income tax, payable on and after December 2d, at the Union Bank of London, England, Princes street, E. C.

Silver King Mining Company, of Arizona, has declared a dividend (No. 53), of twenty-five cents a share, or \$25,000, payable at San Francisco, December 15th.

St. Joseph Lead Company, of Missouri, has declared a dividend of two per cent on the capital stock, payable December 21st, at 55 Liberty street, New York City.

ASSESSMENTS.

Table with 6 columns: COMPANY, No., When levied, Delinquent in office, Day of sale, Amount.

\* Assessment postponed until above date.

† Upon the failure of any stockholder to pay the above assessment on or before five o'clock p.m. of the 14th December, said stock or any part thereof upon which said assessment shall remain unpaid as aforesaid, will be declared forfeited for the benefit of the company.

San Francisco Mining Stock Quotations. Daily Range of Prices for the Week.

Table with 7 columns: NAME OF COMPANY, Dec. 4., Dec. 5., Dec. 7., Dec. 8., Dec. 9., Dec. 10.

Boston Copper and Silver Stocks. [From our Special Correspondent.]

BOSTON, Dec. 10. The market for copper stocks the past week has been active with a strong upward tendency, and more disposition to buy than we have seen for a long time. The high-priced stocks have been comparatively neglected, the greatest activity being in Franklin, Osceola, and some of the speculative stocks that have not seen the light for many a day. It is quite evident that this class of stocks will have a run during the coming year and purchases made now will no doubt show good profits before many months. In Calumet & Hecla, only 27 shares have changed hands the past week, at \$210@212, and only 6 shares of Tamarack, at \$90. Quincy has ruled dull but strong, and on sales of 80 shares advanced from \$48@55. Franklin has been very active. The dealings in this stock have been unusually large, and the price steadily advanced from \$11@12 1/2, one small lot selling at \$13. This is due in part to the improved condition of the mine, and to the fact of the declaration of \$1 a share dividend, payable next month; sales, 2750 shares. Osceola advanced on sales of 1340 shares from \$14 1/2@15. In the low-priced speculative list, we note sales of 255 Pewabic, at \$3 1/2@3 3/4; 425 shares Alloway at \$7 1/2@8; 1250 shares Huron, at \$1 1/2@1 3/4; 850 shares National, 75c@81; and 600 Arnold at 30c. Total, 7585 shares.

The silver stocks have been rather quiet this week, but prices are quite well maintained, and we look for a better business in this line of stocks during the coming year. Bonanza Development is in better demand, and advanced from \$1 1/2@1 3/4, with sales of 2500 shares. Crescent and Catalpa were dull but steady, at 17 1/2c. for the former and 35c. for the latter. Breece sold at 30c. (1000 shares), and 100 Harshaw are quoted at 20c.; Bowman Silver improved to 18c., sales and bid, to-day. "Cusi" sold at 80c. Dunkin, at 25@26c. Stormont, at 20@21c.



We desire to call the attention of manufacturers of High Explosives to the above cut, which represents Our Genuine EAGLE BLASTING CAPS. The spurious Eagle Caps which have been placed on the market are a SHAMEFUL IMPOSITION and SWINDLE. We have tested and analyzed the filling of the spurious caps, and find them very poor in quality, and in every way inferior to our genuine Eagle Caps. It is of the utmost importance to the manufacturers of High Explosives that only a reliable and strong cap should be used, as otherwise the reputation of the explosive is endangered. It has been proved by years of practical experience that our Eagle Caps are the strongest, and infallible if properly used, and it is a well-known fact to every one using Dynamite, that the stronger the cap the better the result of the explosion. STRULLER, LAU & CO., 89 Chambers St., New York.

ADVERTISING RATES.

FOR THE ENGINEERING AND MINING JOURNAL. No deviation whatever from the rates given herewith will be allowed except to educational institutions. (NON-PARCEL MEASUREMENT.)

Table with 7 columns: Line, Inches, One Issue, 1 Month (4 issues), 3 Months (12 issues), 6 Months (24 issues), 9 Months (36 issues), 12 Months (48 issues).

Double these rates for outside front, add 80 per cent for outside back page, 50 per cent for page next to front reading matter, and 25 per cent for page opposite back reading matter.

# LOWE MFG. COMPANY,

BUILDERS OF

# GAS WORKS AND GAS APPLIANCES.

Fuel Gas and Incandescent Gas Lighting Specialties. Fuel Gas for all Melting Purposes.

# GENERAL MACHINE AND FOUNDRY WORK.

MAIN OFFICES AND SHOPS, - NORRISTOWN, PA.

BRANCH OFFICE AND TELEPHONE:

## 333 Walnut Street, Philadelphia.

T. S. C. LOWE, President.

LEON P. LOWE, Secretary.

### STEAM-ENGINES AND HOISTING AND WINDING MACHINERY

For Mines and Inclines.

Stationary Steam-Engines for General Use. Estimates Furnished on Application. **THOMAS CARLIN**, Allegheny, Pa. Write for stock list of Second-hand Engines and Boilers.

**A MINING ENGINEER OF EXTENSIVE** experience and successful in the management of mines, and of reduction works of gold and silver ores—also practically familiar with every branch of the profession—with 8 years of active service in Mexico. desires a situation as superintendent of some legitimate mining operation. References are made to the following persons, and particulars furnished upon application:  
 Alexander Willard, U. S. Consul, Guaymas, Mexico.  
 Louis Janin, M. E., San Francisco, Cal.  
 J. C. Bartlett, M. E., Taunton, Mass.  
 John Hays Hammond, M. E., New York City.  
 Bainbridge, Seymour & Rathbone, Mining Engineers, London, England.  
 Address V. M. C., care of this office.



### FOR SALE.

## SIX LOCOMOTIVES,

in fair working condition, now running regularly upon the **N. Y., P. & O. R.R.**, Numbers 186, 191, 194, 202, 242, and 243. May be seen on the Western Division. For prices or information, apply to Master Mechanic at Galton; or to **WILLIAM FULLER**, Superintendent of Motive Power, Cleveland, Ohio; or to **W. G. TULLER**, Purchasing Agent, 21 Cortlandt street, New York.

**I. P. MORRIS CO.,**

Port Richmond Iron Works,  
**PHILADELPHIA.**

MANUFACTURERS OF

### MINING MACHINERY,

INCLUDING

HIGH DUTY PUMPS,  
 HOISTING APPARATUS,  
 HOISTING DRUMS,  
 BOILERS.

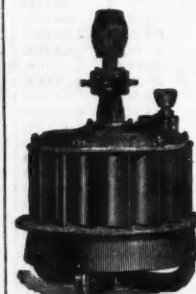
Heavy and Difficult Castings a Specialty.

### TELEPHONES SOLD.



Don't pay exorbitant rental fees to the Bell Telephone Monopoly to use their Telephones on lines less than two miles in length. A few months' rental buys a first-class Telephone that is no infringement, and works splendid on lines for private use on any kind of wire, and works good in stormy weather. It makes homes pleasant; annihilates time; prevents burglaries; saves many steps, and is just what every business man and farmer should have to connect stores, houses, depots, factories, colleges, etc., etc. The only practicable and reliable Telephone that is sold outright and warranted to work. Chance for agents. No previous experience required. Circulars free. **WM. L. NORTON**, Buffalo, N. Y.

## VICTOR TURBINE



Possesses more than **DOUBLE** THE CAPACITY of other Water-Wheels of same diameter, and has produced the best results on record, as shown by the following tests at Holyoke Testing Flume:

Size Wheel.	Head in feet.	Horse-Power.	Full effect.
15 inch	18'06"	30-17	8932
25 "	17'06"	68-62	8584
30 "	11'65"	52-54	8876

Such results, together with its nicely working gate, and simple, strong, and durable construction, should favorably commend it to the attention of all discriminating purchasers. These wheels are of very superior workmanship, and of the **VERY BEST** material. We also continue to manufacture and sell at low prices the

### ECLIPSE DOUBLE TURBINE,

so long and favorably known. Send your requirements and send for Catalogues to the

**Stilwell & Bierce Manufacturing Co.**  
 DAYTON, OHIO.