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MESSRS. HELLER & BRIGHTLY, manufacturers of surveying instruments, have changed their quarters, and may now be found at the southeast corner of Spring Garden and Ridge avenue, Philadelphia.

OUR correspondent, J. D., Jr., in the second of his "Letters from the West," continues his sketch of the struggle for domain which the various Rocky Mountain railroads are so fiercely waging. His communication will be read with interest, as it is the best review so far published of a subject that is of vital importance not alone to Western producers of precious and base metals, but also to the large and varied industries which depend upon them for raw materials.

A STATEMENT is going the rounds through the daily and technical press that the U. S. Commissioner of Patents has decided in favor of Mr. JACOB REESE'S claim to "priority of invention of the basic dephosphorizing process in the manufacture of steel." Mr. REESE has allowed it to be given out, or permitted it to be inferred, that he "conceived the basic dephosphorizing process in 1863, and that he built a basic plant in 1866, and reduced the basic dephosphorizing process to a practical success in 1867 by the use of lime linings, lime additions, and the over-blow." We are

in a position to state that the decision, from which an appeal will be taken, does not affect the original THOMAS and GILCHRIST patent, but refers only to patents for certain improvements.

We print elsewhere a list of prices paid for various mining supplies as they affect Querida, Colo., the first of a series for the publication of which we have made arrangements. We need hardly dwell upon the importance which such data possess for all those connected with mining in our various camps in all sections of the country, and for those who audit bills on supplies. We trust that we shall be able from time to time to give figures covering not alone the main centers of distribution, but also those on the more remote districts, and hope to offer to managers at the mines an opportunity to judge whether or not they are buying to best advantage. We believe that, with their co-operation, we can do much toward a full and free interchange of notes on this subject, and would urge them to assist in this work by favoring us with full data. An examination of the table we print elsewhere will aid all those interested in judging what ground we desire to cover. It should in all cases be distinctly stated whether the rates given are those of the local market, or whether they refer to the prices paid at some larger center of distribution. In the latter case, the rates of freight for rail or wagon should be given in detail, the distances being added. The amount of "special discounts" should be given, unless there are circumstances which make their publication impossible.

In outlining the policy of the executive, President ARTHUR, in his message, has dealt with some of the questions of public interest with tact and moderation, and so far as a document so general in its character can be relied upon to reveal indications of his future course, it is full of promise. The President "approves the recommendation made by the Secretary of the Treasury that provision be made for the early retirement of silver certificates, and that the act requiring their issue be repealed." He also, like Mr. BURCHARD and Mr. FOLGER, recommends that the compulsory coinage of two millions of silver dollars per month be stopped, and that after the repeal of the act only so much be coined as shall be necessary to supply the demand. With sixty millions stored in the vaults of the treasury, and only thirty-four millions in actual circulation, it is not likely that additional coinage will be required for months, or even for years.

On the tariff question, Mr. ARTHUR speaks briefly, admitting only the necessity of the revision, with the recommendation that changes be made with caution. Secretary FOLGER goes into the matter in greater detail, and, instancing the case of iron and steel, throws light upon the muddle into which a mixture of specific and ad valorem duties has brought us. He speaks with approbation of the plan of appointing a committee of business men to frame a tariff law, adding the suggestion that any attempt to delay reform by undue deliberation be checked by putting a limitation of time upon the life of the commission. Both Mr. ARTHUR and Mr. FOLGER urge the abolition of internal taxes upon all articles except tobacco and spirituous liquors. Their recommendations deserve the full consideration of the country, and of Congress whose action upon these important matters should be taken speedily.

It is notoriously difficult to get at any figures concerning the cost of making steel rails. We have seen many varying estimates, but the most grotesque that has ever come to our notice is the following, for which the Chicago Journal of Commerce deserves full credit, which probably nobody will be prepared to dispute with it:

The ore is worth.....	\$5.00
The coal to make pig.....	5.00
The coal to make steel.....	5.00
The labor to dig ore.....	1.00
The labor to make pig.....	10.00
The labor to make steel.....	10.00
The labor to roll.....	10.00
Interest and machinery.....	10.00
Total.....	\$56.00

We sympathize with the steel rail-makers, who have such friends to defend them. With an output of one hundred thousand tons of rails per annum, the poor rail-makers are actually paying out directly or indirectly \$31 per ton, or more than three millions, and it takes just a million a year to pay interest on the cost of plant and for keeping the rickety works in repair. We have hitherto labored under the impression that very little coal is used to make steel and roll it, but we see now that it takes as much as is required for smelting the ores. Nor did we have any idea that the ten or fifteen men who roll, hot-straighten, and drill and saw rails are paid at the rate of one million dollars a year. We always supposed that they were ordinary workmen; now we are convinced that they must have been the board of directors in disguise, wisely taking the lion's share.

No practical problem in which thorough scientific investigation is urgently required affects the future of the steel trade more at the present time than that concerning the relations between chemical composition and welding properties. Upon its solution hinges the question

whether or not the puddling process will be crowded out by modern steel-making processes, and notably that recently invented by Messrs. THOMAS and GILCHRIST, and advanced by so many accomplished engineers and metallurgists. The United States Testing Board, whose labors were brought to such an untimely close by the parsimony of Congress, commenced excellent work in that direction by taking up the question as it affected wrought-iron. Since then, the matter has become much more important, and accordingly experiments more or less elaborate have been begun abroad. Dr. H. WEDDING has organized a series of investigations under the auspices of the German government, which have not as yet been terminated. Dr. KOLLMANN, an able German metallurgist, as the result of his researches, has announced that steel, in order to weld easily, must range in carbon between 0.1 and 0.3 per cent; in silicon, between 0.1 and 0.2 per cent; and in manganese, must not go higher than 0.4 per cent. This is not quite in accordance with the experience with low and mild basic steel in Austria, where the principal point to be attained is deemed to be to eliminate the silicon as completely as possible, and to make as pure a product as possible. At Duesseldorf, according to Herr GRESSER, open-hearth steel made by the pig and ore process welded easily, but became less malleable when hot. Herr GRESSER, believing that the addition of silicon aided the welding properties of steel, and holding that manganese would render the metal less red short, introduced four parts of manganese for one part of silicon, with satisfactory results, it is claimed. At BOCHUM, attempts to get a good welding steel by low carbon, low silicon, or low phosphorus did not yield metal good in this respect. It will be noted, therefore, that thus far experimental working has not led to any decisive discoveries, and it must be stated that, while encouraging successes have been obtained, no steel has been made, either by the basic Bessemer or by the open-hearth process, that fully meets requirements. There is room for much improvement, and scientific investigation can do much to guide the efforts of practical men into the right channels.

#### THE OUTLOOK IN METALS.

There are few, probably, to whom the course of the metal market has not been the source of some surprise, and it is notably in copper that the predictions of even those best informed have proved erroneous. To producers the turn which events have taken will be generally acceptable, and consumers have little cause for complaint in view of the enormous business which they have been doing. In all the leading metals, the requirements of consumers have been far beyond those of any previous time on record, and have so fully kept pace with current production that a remarkable scarcity is noticeable in the principal markets. Producers will naturally anxiously inquire whether the present state of affairs is only a temporary spurt, to be followed by a period of comparative inactivity, or whether it represents the requirements of a legitimate growth of the business of the country. If the latter is the case, capital may be safely invested in enlarging existing plant or embarking in new enterprises which will open out dormant producing regions. The prosperity of so many of our old Western mining regions, and the early future of many promising new fields, are so entirely dependent upon the prices for metals like copper and lead, that a close study of the present state of affairs is a matter of vital interest. Whether the Missouri lead mines, Leadville, and Utah can prosper and leave enough room for the development of Wood River and other new lead-producing camps is a question which must largely influence capital in making ventures; and that question hinges upon the continuance of the present rate of consumption, which alone can hold prices. How nicely balanced the output and the demand have been this year, so far as lead is concerned, is clearly shown by the fact that, as it draws to its close, and what is ordinarily the dull season has set in, the stocks in the principal Eastern markets were at times at the lowest ebb, so that it has actually been impossible to fill paltry jobbing orders for prompt delivery at ruling rates. As with every other article, the position of lead is affected by the general condition of the country, but it is more directly influenced by the building trades. Throughout the land, there are on every hand evidences of the prosperity of that branch; and it is particularly in the construction of large and costly dwellings and business houses in the cities that great activity is displayed. Besides the growth due to an increased population and an enormous immigration, which may be claimed as a permanent and legitimate increase, there is an expansion of business beyond its average proportion, called forth by the present prosperous condition of the country. There are those who claim that, while there is much to warrant its existence, there are indications which justify the prediction of an early slackening. While it may be conceded that there are some causes for uneasiness, as there always will be, we can not, from a contemplation of the actual state of affairs, admit the existence of elements of danger to the lead trade at large. There has been in the past, and there probably will be in the future, a change in the control of the various sections, and Western manufacturers may continue to gain

ascendency, a circumstance which, in reducing the cost of the finished articles, may stimulate consumption, and thus act in favor of the producers of the metal. But aside from such sectional loss, a maintenance of the general advance of consumption seems assured. The lion's share of the increase of the output of the last few years has of course been secured by Leadville; but with the present general outlook, it would appear that Wood River, which promises to step in next year with possibly as much as 7000 tons per annum, and other camps scattered throughout the Rocky Mountains, will find room without seriously affecting prices. Of course, predictions of this kind can only be ventured with caution, and many unforeseen circumstances may seriously interfere; but with due reserve for such contingencies, the outlook for producers may be fairly claimed to be favorable.

The future of copper is, more than that of any other metal, full of uncertainty. Consumption is large beyond expectation, and much is said in an indefinite way concerning new uses which that metal has found or will find. Prominent among these is its application for electric light purposes, and some extravagant estimates are made. We have received from two of the largest electric light companies a statement concerning the quantities used by them during the current year. According to it, both together required one million pounds of copper. Based upon these figures, the most liberal allowance for all of the consumption from this source would place it at between four or five millions of pounds of copper. This is approximately equal to the quantity exported during the year by the Lake Superior companies; and as that grade of copper is preferred for the purpose to any other, an increase in consumption will simply do away with the necessity of exportation, unless a pressure is exerted by other grades upon the use of Lake copper for brass and bronze. It is true that, according to all expectations, the wants of the electric light companies will be much greater next year than now. Mr. EDISON alone estimating that he will require two million pounds. But even if it should be doubled to nine or ten millions, the demand from that source will not keep pace with the growing production of the Western mines, the estimates of close and reliable observers for the output of Arizona in 1882 placing it alone at fifteen millions of pounds. There is little chance for a reduction of output on Lake Superior, and probably little as concerns the smaller districts throughout the country. Consumption, therefore, will have to cope with a growing production, and as the principal quantities of copper go into brass for innumerable articles of hardware and fittings, the position of the metal will depend upon the continuance of the present active business in the machinery and hardware trades. For the former, the fact that orders for delivery far into the next year are refused speaks sufficiently; and for the latter, the prospects are flattering. A very considerable portion of the brass and bronze consumed goes into the building of rolling stock, which is constructing now at a rate never before witnessed. Every locomotive and every railroad car added to the equipment of our roads represents a steady consumer of copper in various forms; and as all the construction-works are supplied with orders far into the future, their demand for the next year is well assured.

On the whole, the outlook for producers and miners is a promising one, and as the general situation is very good, the prospects of a rapid development seem very encouraging.

#### THE PARIS EXPOSITION REPORTS.—III.\*

The report of Mr. THOMAS E. JENKINS on Chemical and Pharmaceutical Processes and Preparations, which begins the fifth volume of this series, shows a rapid progress in chemical manufactures, evidenced in the cheapening of prices or the improvement of products, or both, as well as in the increased importance of many industries. A striking example is the effect of the development of the bromine manufacture in Ohio, Pennsylvania, and West Virginia, which has both greatly increased the demand and reduced the price from \$7.50 to 30 cents per pound. In like manner, the introduction of Peruvian iodine (extracted from the nitrate of sodium mother-liquor) has lowered the price from \$20 to \$4. In both these cases, the corresponding European manufacture has been seriously if not fatally injured by the new competition. The borax deposits of California and Nevada might have achieved a similar commercial victory but for the development of still larger deposits near the Sea of Marmora and the Black Sea. In the great fundamental technological industries, however (with one or two exceptions, perhaps, like the bichromate manufacture of the Tysons, of Baltimore), the supremacy of the old world remains unchallenged. Cheap salt and cheap sulphuric acid are the basis of immense industries, which can scarcely be said to have obtained a foothold as yet in this country. Mr. JENKINS chronicles two most important steps of progress in this department: the almost universal use of pyrites instead of sulphur in the manufacture of acid, and the practical demon-

\* REPORTS OF THE U. S. COMMISSIONERS TO THE PARIS UNIVERSAL EXPOSITION, 1878. Published under Direction of the Secretary of State, by Authority of Congress. VOL. IV. Chemical Processes, Mining Industries, Steam and Gas Engines, Machines and Machine Tools, Clocks and Watches, Railway Apparatus. VOL. V. Agricultural Implements, Agricultural Products, Live Stock, Horticulture, Pisciculture. Washington, 1880.



stration of the superiority of the ammonia process in the manufacture of soda. We understand that the latter process is to be tried in this country. At present, we believe our soda manufacture is confined to the use of cryolite, in which the works at Natrona, Pa., and one establishment in Denmark, enjoy a monopoly. The Pennsylvania works consume 6,000,000, and the Danish 2,000,000 kilos of cryolite annually. The importation of soda from England was over 115,000,000 kilos in 1878. Mr. JENKINS thinks the extensive deposits of natural soda in Wyoming, etc., may bring about a change in this state of affairs. Our manufacturers of sulphuric acid are still using sulphur, of which 32,656,000 kilos were imported in 1877. This material also can be supplied from many localities on the Pacific slope. As to the use of pyrites, Mr. JENKINS says our deposits, though abundant and of fair quality, are still generally too remote from industrial centers. To which the reply is, that deposits of that kind are capable of becoming themselves industrial centers, and will doubtless be made so, when American enterprise gets time to attend to the matter. We can't do every thing at once.

Of the many interesting topics treated with more or less fullness in this report, we can mention but one more—namely, the history, by Dr. GEORGE BIRDWOOD, of the successful acclimation of the cinchona tree in India—an enterprise full of suggestion to the capitalist, as well as of blessing to suffering humanity.

The report of Mr. JAMES D. HAGUE on Mining Industries (principally compiled, as Mr. HAGUE'S preface declares, by M. GEORGE F. BECKER, of the United States Geological Survey, and lately of the University of California) presents an interesting survey of the mining industries of France and the French colonies, Great Britain, Australia, Russia, Sweden, Norway, Belgium, Austria-Hungary, Italy, Spain, Portugal, Greece, and the Dutch East Indies. The statistics of production are in general brought down to the end of 1875 or 1876. Prussia is introduced in some of the general tables; the German Empire as a whole is usually omitted. As is well known, Germany was not represented at the Paris Exposition—at least, not fully and formally—and this is no doubt the reason of the above omission, which should, however, have been made up, as it could easily have been, by reference to official documents. Apart from this unfortunate deficiency, the report is an excellent survey of the mining industries of the civilized world, and contains many brief but clear accounts of mining districts not familiarly known to ordinary readers, even of technical literature. We notice particularly the descriptions of the copper mines of Portugal, the tin of Australia, the nickel of New Caledonia, the silver of Greece, etc. Better-known deposits, like those of Great Britain, Belgium, and Austria-Hungary, are also described, in many cases with considerable fullness of detail and comprehensiveness of generalization. The report concludes with a discussion of the bullion yield of the United States.

The reports of Mr. ANDREW J. SWEENEY on Steam and Gas Engines, of Mr. WILLIAM T. PORTER on Machines and Machine Tools, and of Dr. E. H. KNIGHT on Clocks and Watches are too brief to require comment. The report of Mr. WILLIAM A. ANDERSON on Railway Apparatus contains some interesting views and descriptions of foreign railway plant, but nothing that we think needs to be recommended for adoption in this country. The fact is, that Europe must take lessons of us in most of the problems of railway transportation. This was very generally admitted by the foreign engineers who visited the United States at the time of our Centennial Exposition; and the situation has not sensibly changed since that time.

The fifth and final volume of this series contains the elaborate and instructive report of Dr. E. H. KNIGHT on Agricultural Implements, and the reports of Mr. JOHN J. WOODMAN on Agricultural Products, Mr. SAMUEL DYSART on Live Stock, Mr. GEORGE W. CAMPBELL on Horticulture, and Mr. THOMAS B. FERGUSON on Pisciculture. Mr. FERGUSON gives unnecessary and disproportionate space to pictures of Norwegian fishing-boats; indeed, this subject and the account of the tanks in the Exposition occupy most of his report. In Mr. CAMPBELL'S report are figured some clever examples of French gardeners' art in the training of trees in fanciful forms. The reports of Mr. DYSART and Mr. WOODMAN amount to little; that of Mr. KNIGHT, on the contrary, amounts to a great deal. As a summary of the present state of agricultural mechanics in foreign nations as well as our own, it is as valuable as it is fascinating by reason of its clear arrangement and abundant illustrations.

Before concluding our remarks upon these reports, we must say a word of the manner in which they have been edited and published. In these respects, they surpass all previous exposition literature issued by our government. They are beautifully printed and illustrated; and they are provided with indexes, the copiousness and analytical completeness of which leave nothing to be desired. In this feature, and in the marginal sub-titles which greatly facilitate reference, we see the skillful and experienced direction of Dr. E. H. KNIGHT, the editor, whose *Mechanical Dictionary* is noted for its ingenious system of indexes and cross-references. Mr. DORSEY GARDNER, the Assistant-Secretary of the Commission, should have the credit of actually preparing the indexes; but we can not be mistaken in ascribing to Dr. KNIGHT the general system pur-

sued. As a specimen of thorough editing, the books must be seen to be appreciated. To this feature, quite as much as to any inherent value in the several reports, is owing the praise which we think the series deserves as a useful and pleasant memento of the Exposition. \*

#### CHEMICALLY PURE ZINC.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: You publish in last week's issue a brief note on "Bertha Spelter" and its analysis, in which occurs the statement, also to be found in all the text-books, that zinc is not freed from impurities, such as lead, iron, and arsenic, by redistillation. It is of general interest to know that this old rule, accepted as it is by all zinc metallurgists, may now be totally and emphatically upset, not only as regards zinc for the laboratory, but for common use in the arts. I point to the fact that I have made over a hundred tons of chemically pure zinc, tested on average samples of fifty tons, from very impure galvanizers' zinc bottoms, and from commercial spelter. For the *modus operandi*, I am compelled, for want of time and of your space, to refer to my patent, preferably the English one; but I will state here, that the principle upon which I work in my invention or system is, that volatile impurities are gained separately in the simplest way, and that metals requiring a very high heat will not distill over when the conditions are:

1. Immense pressure on the zinc.
2. Condensation *in vacuo*.

I obtain these conditions by a hermetically tight retort, a large weight of zinc therein, great heat, a narrow condensing outlet artificially cooled, a closed receiver in which impurities are also lodged. There is no loss of zinc nor any deposit of zinc-dust. I gain zinc, lead, iron, arsenic separately, and my zinc possesses a greater specific gravity than pure laboratory zinc (7.2), and mechanical properties equal to copper in rolling, drawing, etc. I sold from the same pile to laboratory purveyors and to brass makers. All want more. I only worked experimentally, on sufferance, in a copper-works, and am not making it now, preferring that zinc-producers should learn how to apply my principle in their own works. There is no economical obstacle, and a much greater profit in selling pure than in selling impure spelter.

What I have done on a large working scale the college laboratories ought to have the spirit to do on a small scale, since what I have done flatly contradicts their axiom in the matter of zinc: and when they do so, they will invite the authors to correct their text-books.

A. HARNICKELL.

#### LETTERS FROM THE WEST.—II.

Special Correspondence of the Engineering and Mining Journal.

##### ROCKY MOUNTAIN RAILROADS.

In our last letter was described the struggle between the Union Pacific and the Denver & Rio Grande, and the competing lines by which they were carrying on the warfare. But the Denver & Rio Grande is not the only foe the Union Pacific is fighting, nor are these mountain roads in Colorado the only enterprises helpful to mining in process of consummation by this powerful corporation. On the Eastern Division of its road, by a cross-line from Julesburg to Evans on the Cheyenne branch, it is shortening the distance from Denver to Omaha. Will it proportionately reduce its freight? And it is building a branch from Grand Island station (on its main line) to the Black Hills of Dakota and the Big Horn country, namely, the Omaha & Republican Valley Railroad, which in its proportions will be a trunk rather than a branch line; and finally, is surveying a loop line which will unite the Denver branch at Greeley with the main line at Laramie, with the view of reaching the stone quarries of Cache la Poudre River, the North Park, its coal-fields, and the soda lakes.

But a competitor for the traffic of these mountains more dangerous to the Union Pacific than the Denver & Rio Grande is its old ally, the Central Pacific, which, unable to control a through line from ocean to ocean in the South, and goaded by the threat of the Union Pacific to seek an outlet to the West, is now retaliating by endeavoring to force its way from Ogden, through the Rockies of Wyoming, to the Plains. Chief-Engineer Montague, of the Central Pacific, has received information from a surveying party under Engineer Warner, which started east from Ogden a few weeks ago to examine the new line, that he has found a favorable route through an open, productive country, with grades not exceeding fifty-three feet to the mile, all the way from Salt Lake to Fort Fetterman by the way of South Pass. Warner's party intended to continue its survey eastward until met by a party working back. The Central Pacific managers assert that they intend to construct this new extension as speedily as possible unless the Union Pacific gives up its scheme of building an independent line to San Francisco and encroaching upon their territory. And another great competitor, the Chicago, Burlington & Quincy, has already laid its track across the plains well on to Denver, with the implied intention of not being deterred from further progress by the mountains. The monopoly of the united roads, whether used generously or harshly we do not pretend to say, is evidently near its end, and the result of competition will not prove to the detriment of the miner and the smelter.

Into Wyoming the Union Pacific has thrown off no branches, if we except that now under construction from Cheyenne to Fort Laramie, and another to the coal-beds near the Utah line; for Wyoming has not taken rank yet among the great bullion-producing territories and States. And therefore the traveler can dismiss the subject of mines, and can enjoy the ascent of the mountains, and can watch the antelopes on the Laramie plains, and has time to think of the strange fate which induced a community of religious bigots, devoted by the very articles of their creed and the rules of their church to agricultural and pastoral pursuits, to plant itself in the heart of these mountains, where its members are industriously reclaiming the desert and tilling every nook and crevice among the mountain recesses which will raise a blade of grass, while around them surges a population of restless, reckless miners and specu-

lators—gamblers all—their very opposites in character and pursuits: and one wonders what the upshot will be!

But before we enter Utah, we pass the station of Granger, which is the starting-point of another of the ambitious schemes of the Union Pacific. From this point it is surveying a line northwest which is to run through Northern Utah and Idaho into Oregon, and enter the domain of the Northern Pacific. In Utah, this all-absorbing corporation has carried two very considerable schemes to fruition. From Ogden, it has built, while within Utah, in conjunction with a Mormon corporation, but beyond, out of its own resources, a northern branch, and has aided in the construction of a southern. The Utah & Northern has already reached Silver Bow in Montana, a distance of 410 miles. It runs past the Glendale mines and furnaces at a distance of five miles, and is fast approaching the active town of Butte, with its three copper-smelting works and many silver mines and mills. What its ramifications will be, its officers have probably not decided; but they have tapped Northern Montana a year in advance of the Northern Pacific, and they will endeavor to keep the lead in the race. They would perhaps act more wisely were they to conciliate their clients by reasonable freights rather than to use their advantage, as they do, so imperiously.

Southward from Ogden, the Mormons have run a road to Salt Lake City, the Utah Central Railroad, whence it has been continued jointly by the Saints and Gentiles to the Horn-Silver mines at Frisco, a distance of 226 miles south of Ogden. The road runs along the base of the Wahsatch range to Juab, and should be fed by the minerals (were they produced) of the Big and Little Cottonwood and a host of other mining camps in that imposing but unhappily imposture-breeding mountain chain. It brings to market the coals, and may make valuable the beds of rock-salt and sulphur which occur in that range. It crosses the valley to Frisco, and takes daily from the Horn-Silver mine to its works near Salt Lake City about 100 tons of lead ore, in addition to the bullion produced at the two smelting-works there. The road will probably be extended to the iron and coal of St. George and the Stormont silver mines. But its destiny promises to be much more important than that of a local feeder; for the Union Pacific does not disguise its intention of extending it to Silver Peak in Nevada, where there is a rumor that a junction will be formed with the Atlantic & Pacific, the 35th Parallel Division of the Atchison & Topeka; and that the united companies will build the rest of the road over the Sierra to the Big Trees, the Yosemite, and thence to San Francisco. Such a road would be a boon to Southern Nevada, the most poorly provided with railroad facilities of any of the promising regions of the West. Ogden is now, therefore, one of the prominent railroad centers of the country, and it has advantages which should make it a prominent seat of metallurgical industry. Besides being the meeting-point of the four roads, the Union Pacific, the Central Pacific, the Utah Northern, and the Utah Southern, it is near an excellent coking coal, which should be delivered at under \$4 per ton, and can command lower labor than any locality west of the mountains. The only circumstance which militates against it is, that three of the four roads are controlled by the Union Pacific Railroad, which therefore can at will cut off by arbitrary freight rates, should it be their interest to do so, both coal and ore supplies.

If we look westward from Ogden in our survey of the railroad expansion of the last ten years, we find that in place of a solitary feeder to the Central Pacific, the Virginia City & Truckee Railroad, we have, branching from the main artery:

	Miles.
The Eureka & Palisade Railroad, leading to the Eureka and Richmond lead mines.	90
The Nevada Central Railroad, from Battle Mountain on the Central Pacific to Austin, Nevada.	93
The Carson & Colorado Railroad, connecting with Virginia City & Truckee at Hawthorn, and running southward to Mound House.	100
The Nevada County Railroad, from Colfax on the Central Pacific to Grass Valley and Nevada City.	22
The Sacramento & Placerville Railroad.	47
The Stockton & Copperopolis Railroad.	42
The Western Division of the Central Pacific.	122

Tending northward there are:

The California Northern Railroad.	74
The California, Pacific & Northern Railroad.	41
The North Pacific Coast Railroad.	80
The San Francisco & Northern Pacific Railroad.	89
	810

All these roads are all more or less, directly or indirectly, tributary to mining interests.

The Northern Pacific Railroad, though already surveyed and building ten years ago, has as yet afforded very little aid to the miner. It was the cause of Jay Cooke's failure. Its fortune and his were so intimately joined that his suspension occasioned virtual suspension of progress in its construction. For several years past, however, the greatest activity has prevailed, and each autumn has seen the gap between the eastern and western sections growing less; but as the ends of the road, which have been built, run, the one through an agricultural, the other through a grazing and lumbering region, and the central section only, which is still on paper, traverses in Montana and Idaho a developed mineral zone, the road as yet carries little or no metal to market. At present, there are 868 miles in operation, and 816 miles of the main through line to be completed. The eastern terminus is now near the Rosebud, and the western near Lake Pend d'Oreilles, 450 miles from Portland. If construction next year does not meet with some unforeseen check, the termini will approach within 300 miles—a distance which can be bridged in the season of 1883. The Western division now connects at Wallalula, in Washington territory, with the system of roads of the Oregon Railway and Navigation Company, which already operates 300 miles of railroad in Washington and Oregon. Mr. Villard, in his annual address to the shareholders of the Oregon Railway and Navigation Company, is enthusiastic as to the future of that enterprise, when, as he says: "We shall carry to the Northern Pacific the through business of our own system of 700 miles, and that of the 900 miles, already built and to be built, of additional standard gauge of road in Western Oregon and Western Washington, and receive from the Northern Pacific the Pacific-bound traffic of its own net of 3500 miles of roads, including main line and branches." One sympathizer in his enthusiasm as more reasonable than that of the promoters of Southern roads, whose freight, besides a share of the through traffic, must depend on mines alone and their uncertain

yield, inasmuch as this northern system will be subsidized by the farmer, the herder, and the lumberer, as well as the miner.

Returning southward, we find that within the last ten years the Southern Railroad, really an outgrowth of the Central Pacific, has been built without government or State aid beyond the limit of California, through Arizona and New Mexico, to El Paso on the borders of Texas—a distance of 1286 miles—with 284 miles of tributaries in California; and the Atchison & Topeka, also unaided, has run from the Arkansas Valley through Colorado and New Mexico, to make connection with the Southern Pacific at El Paso, and has thus within the past decennial period expanded into one of the most important mineral roads of the West. It has laid within the mining zone, including its 35th Parallel Division, 750 miles, and is still vigorously prosecuting extensions which I hope to describe in a future letter.

We have thus, as the sum of track laid within the period under review:

	Miles.
By and tributary to the Union Pacific.	1,350
By and tributary to the Central Pacific.	1,000
By and tributary to the Southern Pacific.	1,690
By Denver & Rio Grande, about.	900
By Texas Pacific, about.	500
By sundry roads in Oregon and Washington, about.	450
By the Oregon Railway and Navigation Company.	280
By the Northern Pacific, about.	600
	6,750

If these railroads have cost \$40,000 per mile, the capital invested for the transport chiefly of miners and their supplies and the product of their labor reaches the enormous sum of \$270,000,000. During the same period, the West has produced \$800,000,000 of gold and silver. Thirty-three per cent therefore of this prodigious yield of the precious metals has been returned to the region whence it came in labor, ties, and rails to build her roads. J. D., Jr.

CENTRAL PACIFIC RAILROAD, 1881.

#### FIRE RISKS OF THE ELECTRIC LIGHT.

In the *Sanitary Engineer*, Prof. Henry Morton gives quite a clear summary of the causes which may lead to fires by the use of the electric light. He says that the sources of danger are essentially two: from the conducting wires and from the electric lamps. As long as the electric fluid or electric energy is conveyed by a sufficiently good conductor, it is perfectly harmless, resembling a river flowing in its natural channel, and powerless to rise above its banks; it is only when some easier channel into surrounding objects is offered, or some partial obstruction of a certain character impedes its regular flow, that trouble may rise. The conditions of these difficulties are, moreover, very peculiar. Thus, for example, if two electric conducting wires, forming the outgoing and returning paths of a powerful current, are placed near each other, but are separated by a bad conductor, as, for example, when both are tacked on to a board partition-wall, the current will follow the wire from end to end, with no development of heat in the same, or tendency to leave the conductor or pass into any adjacent object. If, however, between the two conducting wires we introduce some imperfect conductor, such as a small wire, some metallic dust, or a film of water containing mineral matter in solution, then a portion of the current will be diverted into this "short-cut" from wire to wire, and may heat the fine wire or the metallic dust or the wood wetted with the aqueous solution, so as to cause the ignition of inflammable matter. Accidents of this nature have already occurred. Thus, a telegraph or telephone wire having fallen across one or more of the conductors used for street-lighting purposes, has been fused, or, itself escaping, has caused the fusion of finer wires connected with it. Again, two wires, being the outgoing and return circuits of a powerful current, have been nailed side by side, without other insulation, on the same board of a floor, partition, or ceiling; and though used safely for a long time, while the wood-work was in its normal state, have developed a very dangerous activity when the wood between them was wet with dirty or impure water. In that case, the water offers a circuit through which a cross-current is established, which first heats the damp wood, then chars it, and finally establishes a series of minute arcs or electric sparks along this charred surface, which would soon develop a conflagration if left uncorrected. Again, two such wires as above, insecurely attached near each other, may be brought into momentary contact and then separated, in which case an electric arc, with its intense light and heat, will be established between them. In like manner, a conducting wire itself may be insecurely connected at some point, and if the abutting ends are separated slightly during use, a similar "arc," with its intense heat, may be there developed.

Turning to the dangers which might be expected from the electric lamp, it is to be remarked, in the first place, that these in the case of the arc lights depend much upon the number of lamps operated on the same circuit. Thus, if thirty or forty lamps are operated in series, the electro-motive force of the current must be sufficient to maintain a corresponding number of arcs; and therefore, if by any means many of these arcs are closed out, the electro-motive force of the current available for the remaining ones would be so excessive that their arcs might become excessively long, and even the metallic carbon-holders and other parts of the lamps constitute poles between which the arc would spring, melting the metal work and establishing a very dangerous center of combustion.

To avoid this class of dangers, two provisions should be made. In the first place, some arrangement in the lamp itself, by which, whenever the arc exceeds certain safe limits, the current will be automatically diverted from it and carried through a good and sufficient conductor; and in the second place, some apparatus in connection with the electric generating machine by which the electro-motive force of its current should be varied automatically in correspondence with the resistance of the circuit, so that any diminution of such resistance, as by the closing out of several arcs, should cause a corresponding diminution in the force of the current generated. Numerous contrivances for both of these purposes have been already carried to greater or less perfection and efficiency, and it is manifestly possible by such means to secure immunity from risks of this sort.



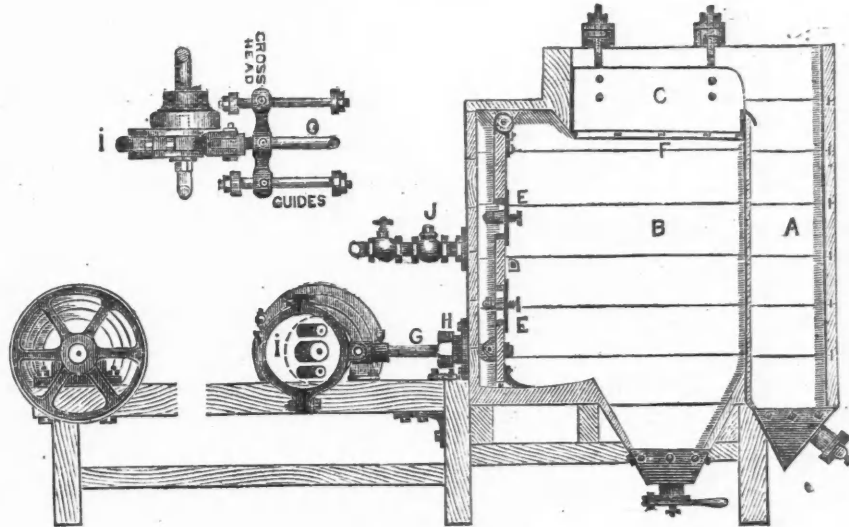
THE ROGERS JIG.

One of the most important steps taken in enlarging the sphere of utility of jigs was the introduction abroad of machines in which there is no special discharge opening or slit for the concentrates, that part of the ore passing through the sieve, while the waste rock is got rid of in the usual way. Abroad, this work of "jigging through a bed" has been used for classified sands, filling a gap between ordinary jigs and the usual forms of sluice-tables. So far as we know, jigs of this kind have been little used in this country. It may be of general interest to briefly review the main principles which affect their construction and working, as the special machine which we illustrate, the Rogers jig, belongs to this class, and is of interest, as an attempt to cover rather more ground than has been conceded to it elsewhere. We do not mean to assert that Mr. T. M. Rogers, the inventor of the jig in question, proposes to employ it for sizes which clearly are not within its range. He uses it, however, for 10 to 80-mesh stuff, thus going farther than any before him. The necessary conditions for successful working are the maintenance on the sieve of the jig of a layer or bed of particles of ore or other suitable material, the size of which is greater than that of the ore to be worked, and the density or specific gravity of which is at least equal to that of the concentrates to be obtained. As the latter must pass through the sieve, its mesh must so be chosen that, while it allows the denser particles of ore to pass through, it will hold back those of the bed. The velocity of the intermittent current of water passing upward through the sieve, bed, and ore must be such that both the particles of ore and those constituting the bed be lifted. Then the ascending current will uniformly raise both the bed and the stuff to be jigged. The small particles of ore can not be raised perceptibly higher than the coarser grains of the bed, because the higher layer of poor material above prevents a free movement. In falling after a cessation of the upward impulse of the water, both the rich ore particles and those of the bed can move downward without being much disturbed, because there is only a body of water between them and the sieve, above which they are lifted. During this descent, the smaller ore particles have a tendency to fall more rapidly than the coarser grains of the bed, and thus the former approach the sieve, and, working their way through the bed, finally drop through it into the jig-box below. It will be understood, therefore, why the size of the grains of the bed must not be much greater than that of the ore, and why the density of the bed material must be much greater. It will be seen, too, how it is possible, by a judicious choice of the material constituting the bed, to get through it only the purest grains of mineral, or a mixture of them and middlings or particles in which gangue and ore are mixed. The thickness of the bed layer must be chosen with reference to the character of the ore worked. With poor stuff, it must be higher than with rich ore. The principal advantage of jigging through the bed is its simplicity, and the fact that it is superior to ordinary discharge devices for finer grades of mineral.

With this preliminary statement of the principles of the Rogers jig, the aim and the merits of some of the details of its construction will be more fully understood. The sieve-frame C, in the accompanying section, can be raised and lowered, by means of four screws attached to its corners, so that the depth of the layer of ore above the bed on the sieve F can be readily regulated. To the right is the discharge for the tailings into the box A, from which they can be drawn at will. The dimensions of the sieve vary according to circumstances. For rich ores, the separation of which is comparatively an easy matter, say, for instance, galena and calc spar or quartz, the sieve is much shorter and wider, so that the discharge edge is comparatively wide while the travel is short. For complex ores, the specific gravity of whose constituents approaches closely, the sieve is made long and narrow. The ore, of course, is charged along the left-hand edge opposite the discharge, toward which it gradually travels. The principal feature of the Rogers jig is the manner in which the intermittent current is produced. Instead of having a plunger or piston, as generally used, Mr. Rogers employs what he calls a "swing-gate," hinged at its upper portion and moved below. Its vertical edges are packed by a strip of round rubber inserted in a notch, and the lower edge has a flap, shown in our section. The gate has four valves E E, which close during the forward movement of the gate and open at the return stroke, the object being to prevent that back suction, the injurious influence of which upon separation is conceded by all who are acquainted with the details of concentration by jigs. The forward swing of the gate moves the large body of water in front of it upward through the meshes of the sieve, causing the intermittent ascending current. At the same time, this forward movement produces a partial vacuum in the small body of water behind it. This causes the check-valve J to open, thus supplying the water ejected with the tailings over the discharge. In cases where water is scarce, these concentrators can have a pipe, protected with a screen nozzle, projecting into the waste compartment A and running through into the main compartment B, where a check-valve allows of an

intermittent stream being pumped, by the action of the vibrating gate through from the waste, and forcing it up through the screen. By this simple arrangement, the water can be used repeatedly. The motion of the gate is obtained by means of a rod G attached to its lower part, passing through the stuffing-box H and moved by the adjustable eccentric I. In order to prevent the danger of a leakage caused by undue strains upon the stuffing-box, the rod G has a cross-head sliding over guides, as shown in the small plan. Special arrangements, not fully shown in our drawing, are provided to allow of a rapid removal of the gate for examination and repairs. The arrangement for changing the stroke of the eccentric is a very important matter, as it permits a rapid and easy method of adapting the jig for work on various grades and sizes of ore at short notice, a point which notably custom concentration-works will fully appreciate. It is one of the importance of which is greater in this country than anywhere else, the greater number of mills built in Europe, and often too closely copied here, having been built to work ore well known, and which changes in character but little from one year to another. The growing, well-pronounced tendency of American mechanists is, therefore, justly in direction of introducing appliances that will admit rapid and ready adjustment. By stepped pulleys, provision is also made in the Rogers jig for changes of speed. An important matter in the apparatus before us is the proportion of the area of the gate to the area of the sieve, and we are informed that usually it is three to one. If the gate were moved bodily forward, like a piston, the lift of the ore on the bed would approximately be three times the stroke; but of course, as it simply swings, it is considerably less.

Six of the Rogers jigs have been in use for some months at the Pembina mill at Alpine, Colo., and a brief outline of the plant may serve to show best what range of sizes the jig has been thought capable of operating upon. The ore, which contains pyrites and galena, and carries silver, is passed through a Blake crusher, and drops down to a pair of rolls, from which an elevator carries it to a set of four screens, any material too large going back to the rolls. The ore, which, after passing through the first revolving screen, is all below 10-mesh to the inch, goes to the second screen, which allows all below 60 to 40-mesh stuff to go through, and, passing to the third, the range between 40 and 20-mesh is screened out, while the fourth takes the range between 20 and 10-mesh. The ore from each screen is distributed to two Rogers jigs, having an 1867 24-inch sieve. Each works from 10 to 12 tons in 10 hours, the power required per jig being three horse-power. When the water in the jig-tanks is used over again, a half-inch supply-pipe suffices; otherwise, a 1½-inch pipe is required. The slimes are worked on Rittinger percussion-tables. The results indicate good work; but as the figures are not



THE ROGERS JIG.

complete, they do not suffice for a full presentation.

THE SAN JUAN COUNTRY.

Special Correspondence of the Engineering and Mining Journal.

The snow-fall along the valley of the Animas has been very light this season. At Eureka, it has not yet exceeded one foot, a remarkably small amount for November. My duties having called me across the range to Del Norte, I went out by the old route, crossing the divide on snow-shoes. Notwithstanding the slight depth of the snow (about three feet on the summit), the trip was exceedingly difficult and dangerous. This may account for my return by rail to Durango.

We have heard something of late, through the subsidized press of our State, of "the petered-out San Juan." Presumably the expression was intended to apply to this section of country, and to convey the idea that the resources of San Juan have already been exhausted. Without taking the trouble to controvert the statement by giving the real facts, which are accessible to every candid investigator, and which have caused the most careful and experienced of them to put their capital into our district, I will only remark in passing that the author of this new phrase is either a detestable knave or a complete ignoramus. Any one who can become acquainted with the growth of such towns as Durango in one short year, who can learn of the actual product of our mines in 1881, and witness the nature of the deposits exposed by this season's labor, without being impressed with the abundance and permanence of the treasures that lie in our veins, is certainly incapable of judging of the worth of any mining district. And if any competent authority applies the term "petered-out" to a region which has this year produced one million of dollars, without a tithe of the facilities of other sections, and without including the vast product left upon the dumps, and all this at the minimum of cost and labor; if such a one says that San Juan is "petered-out," he states what he knows to be false, and for some base purpose or other. We do not care what are his motives, and we do not believe he has influence enough to hurt us in the least.

The product of the San Juan counties is steadily increasing, and each year adds much to our facilities for the extraction and after-treatment of

ores. There can be no better proof that we are progressing than the growth and stability of this same Durango. Though every thing is supposed to be dull at this season of the year, one short month since my last visit has produced wonderful changes. Nothing, even in Colorado, has equaled the history of this city; for it already vies with Leadville, in its early stages, at least, in the permanent character of its buildings. One feature of Durango is especially noteworthy as indicating the faith that is placed in its future. It has already become distinctively a city of homes. As it grows, it purifies itself effectually from those insidious vices that have so eaten into the life of many mining towns. Your readers have already been treated to interesting accounts of the place, and I do not care to dwell here upon its many advantages. A subject more closely connected with the purpose of the JOURNAL is brought to my attention by a study of the remarkable engineering feats which have been performed in giving us the railroad, which means so very much to us in the development of our resources. In earlier days, we were taught that the capabilities of the railroad were put to the most severe tests by some of the demands of nature with respect to curves and grades in the mountains traversed by our Eastern trunk lines. The limits of safety, as wisely ordained by English and other foreign legislatures, were exceeded by our home construction to such an extent that it became a very serious question whether the inevitable demand for increased speed would not require marked modifications of course and profile. At that time, it would have been thought simple folly to predict the changes which have now taken place, and without which the railroad would have acted less as an aid than as a hinderance to civilization in the Rocky Mountains. The narrow-gauge is of quite recent date in this country, and yet it has now become the greatest factor of all in the development of the resources of Colorado, though it is just beginning to exhibit its capabilities even here. As in every branch of science, one-sided advancement is very limited, so the progress of the railroad was held in check by the imperfections of the motive power. The present narrow-gauge, with its sharp curves and remarkable grades, would be of little avail without decided advances in the construction of specially adapted locomotives. We were formerly taught that uniform grades throughout the line were more economical than increased local gradients introduced to lessen the average slopes of the remainder of the profile. To a considerable extent, this principle has been modified in practice upon our Western lines, perhaps originally as much from necessity as from choice. Curves are now made so sharp that the middle pair of locomotive drive-wheels can not be used with flanges, and grades of 200 feet and even 300 feet to the mile are more common than those of 100 feet were ten years ago or less. Problems in alignment and construction which were formerly solved by expensive tunnels, cuttings, embankments, or trestle-work are now settled with much less alteration of natural contours. Just how far future competition and the necessity for cheaper transportation of freight and passengers will require modifications of the structures now building, must be for the present mere matter of conjecture, though it is highly probable that some very long tunnels will finally afford means of access to some points now reached only by very roundabout routes.

The use of the narrow-gauge did not originally contemplate the attempt to copy the proportions of the standard gauge in the rolling stock; but to-day the capacity of the cars is almost as great on the first "baby roads" as of those used a few years ago on the trunk lines. We have passed from the triple-seated passenger coach to those with double seats upon each side of a central aisle, equivalent to an effective increase of twenty-five per cent, without material addition to the weight. The freight-cars, also, of the narrow-gauge have now a full capacity of 20,000 pounds. Not only this, but even the Pullman sleeping-coaches are found to be none too cumbersome for comfortable use, as specially constructed for narrow-gauge service.

But the boldness and ingenuity of American engineering, which have conquered the obstacles attending railroad construction in the Rocky Mountains, have also introduced new elements of danger and difficulty into the operation of the lines. These must be overcome by the exercise of similar skill and undaunted courage on the part of our civil and mechanical engineers. The railroads of which we speak have ascended to altitudes hitherto unheard of for such enterprises; and we must meet the problems introduced by extreme rarity of the atmosphere, excessively low temperatures, high winds, heavy accumulations of snow, and peculiar electrical conditions, besides the destructive effects of avalanches, land-slides, etc. The use of the snow-shed has become a necessity in all parts of the Rocky Mountains, and it is highly creditable to the profession that such structures have thus far been built at the minimum of cost with the maximum of efficiency. The principles involved in their construction are among the simplest, perhaps, with which the engineer has to deal; but the planning of the work for each individual case calls for an intimate knowledge of dynamics in the field. This knowledge is of just that particular kind which is not apt to be included in the training of American engineers.

Still another class of work is very noticeable upon our Western railroads, and must be regarded as the most original and audacious of all attempts to combat nature in her wildest haunts. I refer to the novel means adopted in hundreds of instances to establish grades through almost impassable cañons. Where else in the world are such master-pieces of engineering skill as the hanging-bridges, suspended earth-works, and trestle-balconies along the lines of the Denver & Rio Grande and the Denver, South Park & Pacific railroads in the cañons and gorges of Colorado? One or two successful works of this nature would have immortalized an engineer in days past, but now they are becoming too common to attract more than ordinary attention. With so much already accomplished in a very short period, what may we not expect in the next decade? All this has been done to open to view a mining region possessed of resources greater than any that have hitherto been known anywhere in the world—a region that has held its own and made wonderful progress in the face of untold obstacles and discouragements. Fully realizing now the necessity that rests upon us of proving by our own efforts the real value of the faith that is in us, capitalists will find from this on that our development will far exceed the most sanguine of our own predictions.

It is now time for the era of rapid progress in mine-engineering to begin. Our branch of the profession has not received the attention it justly merits from the investing public, and there has heretofore been

very little inducement to improve methods or appliances, because capitalists have not duly appreciated skill and experience in mining affairs, as in railroad work and in other enterprises. Again, our profession has been more than any other abused by the pretensions of a class of untrained men, whom the public has accepted by title, without ample investigations of ability. In America, we are too young and too few in number successfully to cope with these obstacles all at once. But we are moving, and it will not be many years before we can show a record for boldness and ingenuity which will place the mining industry upon as sure a footing as that of railroad transportation to-day.

DURANGO, COLO., Nov. 23.

THEODORE B. COMSTOCK.

#### THE ERIMUS STEEL PLANT.

At a recent meeting of the British Institution of Mechanical Engineers, Mr. C. J. Copeland gave the following description of the plant of the Erimus Steel-Works, which is of much interest, as it varies largely in detail from the American type:

The Erimus Works were originally designed for the Danks process, and the steel plant has been necessarily introduced in a comparatively limited space. The cupola stage, and the cupolas for melting the pig-iron, remain as they were, and the wall of the new converter-house leaves them outside the building. The elevation of these cupolas, as constructed for the Danks process, not being sufficient to run the metal directly into the converter, it is run into a receiver, and from thence tapped into the ladle on the table of the hydraulic lift. This lift has a ram 14 inches diameter, and 21 feet 6 inches stroke. The table is made sufficiently strong for a locomotive to run over it, when it is on the ground level. The lift is worked by an ordinary slide-valve, levers for which are placed both on the platform and floor level; and there is a knock-off arrangement at the top and bottom of the stroke. There are two guide-pillars, which are also used for supporting the platform. The metal ladles have a capacity of six tons, with an ample allowance for slag, and being made to tap, have no tipping gear attached to them. They are supported on the carriage by an angle-iron belt, and are easily removed for re-lining and repairs. The metal runner is suspended in a movable sling at the outer end, and supported on wheels at the back; it is easily adjusted to the spout on the metal ladles and the mouths of the converters. The spiegel cupolas are 4 feet 4 inches diameter inside the shell, and are placed on the platform one on each side of the lift. The spiegel is run into small ladles which were formerly lifted by the hydraulic crane attached to the wall of the house; it is weighed, in the act of running from the cupolas, by one of Duckham's patent machines suspended to the jib. The metal in the ladles is then tipped into the runner. The valve gear for the crane is fixed on the platform. The converters, two in number, have wrought-iron shells, 8 feet diameter outside, and  $\frac{3}{8}$  inch thick. The length from the center of the trunnion to the top of the nose is 8 feet 8 inches, and to the bottom, exclusive of blast-box, 5 feet 10 inches. The shells are carried by a strong cast-iron belt 3 feet deep, a portion of which is used for conveying the blast. The trunnions are 19 inches diameter, and are cast on the belt, which is made in segments, and fitted to the converter between strong angle-iron rings, so that it can be removed without damaging the shell of the converter. A special feature of the converter is the cast-iron hood fixed on the back above the belt, to form a tapping-hole. By this means, should any difficulty arise from the metal taking up phosphorus from the slag, when it is poured in the ordinary way, it can be tapped out, with the converter in a horizontal position, from beneath the slag. The converters are carried on cast-iron standards, the bases of which are, on the floor level, 15 feet 6 inches from the center of the trunnions. These standards are tied to the walls of the house and secured together by the platform girders. The tipping gear is carried on brackets attached to the outer standards, and consists of movable horizontal hydraulic cylinders, on which are fixed cast-steel racks, working in steel pinions keyed on the trunnions. The piston-rods are of Siemens steel, and are bored out so as to conduct the pressure to each side of the pistons. The outer ends of the rods are secured to the standards, and the cylinders have sufficient traverse to turn the converters three fourths of a revolution. Hand-cranes are fixed on each side of the platform for lifting the blast-box covers, etc., and jack-rams are provided for changing the bottoms. The center casting-crane has a ram 2 feet in diameter and 36 feet long, the working-stroke being 19 feet. The extreme radius of the ladle is 17 feet, with a traverse inward of 18 inches. The jib is turned and the ladle traversed by hand-gear; the center casting having a steel pivot at the top, and being fitted with a ring of live rollers at the bottom. The great length of lift was arranged specially for the dephosphorizing process, in order to permit the transfer of metal first blown in an acid converter into one with a basic lining. The ingot cranes, two in number, are of the ordinary type, having rams 10 inches and 16 inches in diameter, and a working radius of 18 feet, with a lift of 7 feet 6 inches. The objection urged against this kind of crane is, that the weight of the ram and jib are greater than the weight the crane will lift; but, having regard to the great desideratum of all steel plant, namely, simplicity, this objection may be disregarded. The jibs are fitted with the usual racking-out gear, and the cranes are made for a lift of five tons. The low level of the Erimus Works necessitated special arrangements for draining the crane and hydraulic lift pits. This is accomplished as follows: The top supporting plates of the cranes are bedded in cement over the pits, so as to form an air-tight joint; 2-inch drain-pipes are carried to the bottom of the pits, and a pipe from the blast main is introduced at the top, so forcing the water up into the culverts provided for surface drainage. The accumulator has a ram 2 feet diameter, with a stroke of 20 feet, and is weighted to give a pressure of 600 pounds per square inch. The ballast-box surrounds the cylinder, and is hung from a cross-head. The accumulator is fitted with a relief-valve, and has knock-off gear attached to it for stopping the engine when the accumulator is at the top of its stroke. The steam cylinders of the hydraulic engines are 18 inches diameter and 30-inch stroke. The piston-rods, which are of steel, pass through the back of the cylinders to work the double-acting pumps, which are placed directly behind them. The pump pistons or buckets are  $6\frac{1}{2}$  inches diameter, and the rams  $4\frac{1}{2}$  inches diameter. The valves are placed at one side of the



pump-barrels, and are arranged for the delivery of water on both the in and out stroke of the pistons. The blowing-engines are of the vertical compound type, with steam-cylinders 42 inches and 78 inches diameter, and air-cylinders 54-inch diameter, with 5-foot stroke. The blast and water pressure are led to a distributing-box, over which there is a platform, on which is arranged a series of levers for working the valves. It is proposed to carry the blast to a lime-infuser in a single 18-inch main; although there are two blast-valves on the distributing-box, one for each converter. On the other side of the lime-infuser, the main is divided into two 12-inch pipes, on each of which there is a sluice-valve. To prevent the possibility of the converters being turned up with these sluice-valves shut, there is a small hydraulic cylinder fixed over each of them, the valves for working which are on the distributing-box. The levers for working these valves have a cross-bar attached to them, which comes in front of the blast-valve lever; so that the act of opening the blast-valve would work the hydraulic valve, should the attendant forget to do so. The lime-infuser is perhaps somewhat of a novelty. It consists of a wrought-iron casing, 5 feet diameter and 10 feet high, placed on a cast-iron base or hopper. The charging-door on the top is on a level with the converter platform, and there is also a blast connection on the top for admitting the pressure when the infuser is charged. At the bottom of the hopper, there is a cylinder containing a worm, which is driven by a small pair of engines, and this conveys the lime to the blast-main. The blast for the cupolas is supplied by three Root's blowers, and the steam for the Bessemer plant comes from eight Lancashire boilers, 30 feet long by 7 feet diameter, with two 2-foot 9-inch flues in each, and working at a pressure of 70 pounds per square inch.

MINING FOR GEMS.

Seven years ago, Mr. J. A. Stephenson, now of Statesville, N. C., commenced to urge the farmers of the vicinity of Stony Point, Alexander County, N. C., to gather the specimens of minerals of that region, which he collected. In a period of about six years, a number of emeralds were found loose in the soil, none of which, however, were dark colored or transparent enough for use as gems. Mr. William Earl Hidden, whose attention was directed to the matter, began a series of explorations, which have led to the present mining for gems in that locality, the only one probably where such work is carried out in this country. Mr. Hidden gives the following account of the occurrence of minerals at Stony Point, and the operations there carried out:

The locality is situated about thirty-five miles, air-line measure, southeast from the Blue Ridge Mountains, sixteen miles northwest from Statesville. The contour of the country is low rolling; the altitude, something over a thousand feet. The soils are mostly red, gravelly clays, of not much fertility. The prevailing rock is gneiss, with more of a feldspathic than micaceous nature. The trend of the strata is N. N. W. and S. S. E., with a dip nearly vertical. The gems and crystals occur implanted and not imbedded in open pockets or veins of very limited extent, that are cross-fractures or fissures in the rock. These fissures (lenticular in shape) are usually situated nearly perpendicularly. There being no glacial drift here, the soils are necessarily the result of decomposition and disintegration on the spot. It is therefore an easy task to find the source of minerals found on the surface. The frost-drift theory of Professor Kerr\* is everywhere proved in this region. He says that "to a foreign geologist, entering the South Atlantic States for the first time, a hundred miles or more from the coast, the most striking and novel feature of the geology is the great depth of earth which everywhere mantles and conceals the rocks. This is readily discovered to be, for the most part, merely the result of the decomposition *in situ* of the exposed edges of the underlying strata. The vertical and highly inclined bedding-lines of the strata are distinctly traceable by the eye through this superficial earth covering, and are seen to pass by insensible gradations into the undecayed rock beneath." At this locality the unaltered rock is found at a depth of twenty-six feet, and is of unusual hardness, especially where it walls the gem-bearing pockets.

Thus far, the gems have been found in a narrow belt running N. E. and S. W., and scattered over a distance of three miles. In this belt, signs of cross-fissures are very abundant, and it is a very common thing to find crystals of quartz, rutile, tourmaline, etc., etc., perfectly preserved, scattered over the surface.

The location of the present mine was obtained in the following manner: A corps of men was engaged to dig a series of deep ditches in directions that would cut the strata at different angles. The site chosen for work was on the spot where at least a half-dozen pale emeralds had been found. Not knowing then their manner of occurrence, Mr. Hidden hoped in this way to strike a vein bearing them. Five weeks were spent (July to August, 1880) before any success was met with, and then, at a depth of eight feet, a blind vein bearing very small emeralds was discovered. In this vein, or pocket, as it proved to be later, and outnumbering the emeralds fifty to one, was found the new emerald-green mineral called "Hiddenite" by Dr. J. Lawrence Smith, which was such a surprise to the scientific world, and which was destined to answer the same purposes as does the gem sought, and become in all probability the main object of future mining.

The search for emeralds at Stony Point is interwoven with my discovery of emerald-green spodumene. The two minerals occur intimately associated together, and while mining for the one the other is constantly found. This blind vein yielded very handsomely of the new mineral, but very sparingly of emeralds, and the few found were too small to be useful as gems, although their color was very good. A tunnel 260 feet long, mostly through rock, was cut to this vein, and a shaft eight feet square sunk down upon it. Up to October, the vein has been worked down to a depth of thirty-three feet, at which point it has proved its pocket nature by showing signs of pinching out—closing together. Thus far, twelve of these pockets have been found within an area of a forty-foot square, carrying emeralds, four of which pockets contained also the Hiddenite. All these veins maintained nearly the same character of dip, thickness, length (horizontally), and associations. Other pockets were found that yielded quartz, rutile, monazite, and mica crystals. Others yet whose

walls were covered with finely crystallized dolomite, calcite, apatite, rutile, pyrite, quartz, and mica. In one instance, a small pocket that contained two beautiful small emeralds had its walls covered with large crystals of albite (twinned parallel to the basal plane). Another pocket contained only mica and one small pellucid colorless beryl that had both ends terminated with many planes.

In the rock mining, as also in the soil, the sign of a vein "coming in" is the presence of small streaks of massive quartz or of mica in a contra direction to the strike of the rock, either of which indications leads to open pockets not many feet off. The gems thus far have been found in the bottom of the pockets. Not over nine emeralds have as yet been found at any one time. So far, the pockets have been very crumbly, and the crystals obtained only in a detached condition. Mr. Hidden claims that mineralogists have a great treat in store for them when deep rock mining is accomplished here; then the emeralds, beryls, and Hiddenites will be found firmly attached to the matrix. The largest emerald found thus far was three and one quarter inches long by three quarters of an inch in diameter. It was one of five fine crystals contained in one pocket. Their color was excellent, and they were transparent, though somewhat flawed. A peculiar feature pertains to most of the emeralds and beryls from the region. They appear to have been filed across the prismatic faces. The basal plane is also often pitted with minute depressed hexagonal pyramids that lie with their edges parallel to one another and to the edge of the di-hexagonal prism. Rarely, though, crystals are found with perfectly smooth and brilliant faces. The emerald color is often focused on the surface, and fades gradually to a colorless central core, which feature is of exceeding interest when the cause of the color is considered. The emeralds have been found of richer color and less flawed as the mine gets deeper.

PROGRESS IN SCIENCE AND THE ARTS.

**A New Process for Utilizing Sulphurous Acid.**—According to the *Chemiker Zeitung*, Pierre Manches claims to have found that when sulphurous acid is passed into water through which an electric current is conducted, the sulphur will be deposited as a yellowish-white powder on the negative pole.

**Water in Steam.**—Herr Stoupler, of Lucerne, Switzerland, by adding fluorescine to the water of a boiler, which by calorimetric tests enabled him to detect the presence of one half of one per cent of water carried mechanically out of the boiler by the steam, found that from 2-3 to 4 per cent was actually thus present in the steam. The deep green color of the water in the boiler was retained in it for weeks, and yet no trace of coloring could be detected in the water condensed in the steam cylinder, a proof that the water which gathers there is entirely due to condensation caused by the expansion of steam, and that very little water is actually mechanically carried away by the steam from boilers.

**The Output of the Edgar Thomson Steel-Works.**—Capt. William R. Jones sends us the following details: For the month of November, the Edgar Thomson Steel-Works produced 16,193 tons of ingots and 13,648 tons of rails. The best week's work was 3902 tons of ingots and 3202 tons rails weighing 56 pounds per yard. The best 24 hours' work was 700 tons of ingots and 608 tons of 56-pound rails. November, having but 30 days, is what is called a "short month." If one more day be added to November by taking the product of the last day in October, the product would be 16,836 tons of ingots and 14,194 tons of rails. This closes the record of the Edgar Thomson Works as a two seven-ton vessel plant, as during December it will be changed to a three ten-ton vessel plant.

**The Expansion of Water by Heat.**—Herr P. Volkmann has in the *Annalen für Physik und Chemie* compiled the results of Hagen, Matthiessen, Pierre, Kopp, and Jolly on the expansion of water, and has obtained the following mean results for the volume and density of water at various temperatures:

Temp.	Volume.	Density.	Temp.	Volume.
0 degr. C.	1.000122	0.999878	15 degr. C.	1.000847
1 "	1.000067	0.999933	20 "	1.001731
2 "	1.000028	0.999972	25 "	1.002868
3 "	1.000007	0.999993	30 "	1.004250
4 "	1.000000	1.000000	40 "	1.007700
5 "	1.000008	0.999992	50 "	1.011970
6 "	1.000031	0.999969	60 "	1.016940
7 "	1.000067	0.999933	70 "	1.022610
8 "	1.000118	0.999882	80 "	1.028910
9 "	1.000181	0.999819	90 "	1.035740
10 "	1.000261	0.999739	100 "	1.043230

**Commercial Sulphate of Ammonia.**—M. Debray has warned manufacturing chemists in France, through the Société d'Encouragement, against one kind of commercial sulphate of ammonia now manufactured. It is generally required that that product be free from iron, which necessitates special precautions and enhances its price. The test made to determine whether or not it is pure is to obtain a blue precipitate by yellow cyanide of potassium. The fraudulent article does not show any iron by this test, and yet it contains a considerable proportion of it. It is obtained by boiling impure solutions of sulphate of ammonia with zinc. A sample contained 22 per cent of alumina, 4 per cent of zinc, and one per cent of iron, and yet the product had all the appearance of the purest sulphate of ammonia. Besides its impure character, it is very deceptive as to the real contents of alumina. When precipitated with ammonia in the presence of sulphate of zinc, the alumina may contain as much as 25 per cent of its weight in zinc, although the oxide alone is easily soluble in an excess of ammonia.

**Cast-Iron versus Converted Smooth-Bore Guns.**—Col. T. T. S. Laidley, of the Ordnance Bureau, has made a very valuable series of experiments with the famous Watertown testing-machine on the resistance of thick cast-iron cylinders to internal pressure, which are incorporated in a beautifully illustrated pamphlet. Aside from their value as the first experiments on a large scale, they have a direct bearing on the question whether the plan adopted by our ordnance department of converting old smooth-bore cast-iron guns into rifled guns lined with wrought-iron is the best. Colonel Laidley's experiments prove that a simple cast-iron

\* See *American Journal of Science*, vol. xxi., pages 345-355.

cylinder, with solid breech, has 18 per cent greater strength than a similar cylinder lined with wrought-iron tubes of the proportional thickness used in the 9-inch gun, and 10 per cent greater than the cast-iron cylinder with the breech bored through. According to his experiments, the strength of the different kinds of cylinder is in direct proportion to the area of cast-iron in the longitudinal section through the axis of the cylinder. Colonel Laidley urges that, pending further experiments, the continuance of the present system of converting smooth-bore into lined rifles be discontinued, a request which ought to be complied with.

**The Oldest Concentrator.**—A number of years ago, French capitalists reopened the mines of Laurium, Greece, where the ancients had done a vast amount of work, the evidences of which still remain in the shape of vast slag-piles and refuse-dumps. Under the latter, masonry washing-tables have been repeatedly found, but not in so perfect a state of preservation as to permit a very exact idea to be formed of the details of their construction. Quite recently, however, one of these dressing-tables has been opened up at Sintirini, which shows its construction fully. M. Ph. Negrin, now of Laurium, has described it in the 4th number of Volume XX. of the *Annales des Mines*, giving what might be called working drawings. The washing-table consists of a rectangular wall of masonry, 25.5 feet wide and 39 feet long. At the head is a trench about 3 feet deep and 2 feet wide, running across almost the whole width of the washer. From it four cone-shaped holes in the lower wall lead to a sort of platform about 5.3 feet wide. Below the latter is a second trench, also crossing almost the width of the table. The ore to be dressed was spread upon this platform and the water run over it from the head trench. The lower one caught the tailings and the waste water, which were conducted in a narrow channel along one of the sides of the washer, across its lower end and along the other side to a basin near the head trench, there being also settling tanks at both of the lower corners. The object seems to have been to classify the ore and clear the water previous to using it over again. Between the tailings trench and the lower end of the table is a commodious platform which was used for allowing the washed ore and the middlings to drip off, the water running into the lower channel. It will be noted what pains the ancient dressers took to recover all the water, and prevent the possibility of any waste, the scarcity of water in that region being great so that it had to be accumulated in deep cisterns. With the same object in view, they covered the whole of the masonry with water-tight mortar containing small pieces of quartz or schist. According to an analysis it consisted of:

	Per cent.
Carbonic acid .....	25.68
Silica .....	24.70
Alumina .....	6.16
Oxide of iron .....	2.75
Lime .....	26.40
Magnesia .....	5.10
Water at 100 degrees C. ....	1.52
Total .....	92.23

Generally, agglomerated slimes have been found in these dressing-tables, and notably on the drying platform, which usually hold from four to five per cent of lead and sometimes as much as 12 to 15 per cent. M. Negrin describes also a mortar-mill in which the ore was ground previous to washing.

**A NEW JOURNAL.**—A new scientific journal is projected in London, under the title of *Knowledge*, with Mr. R. Proctor as editor.

The representatives of the Bessemer steel interest have had a hearing before the Secretary of the Treasury in reference to the recent ruling of the department concerning the duty on steel blooms.

**WATER-WORKS AT TOMBSTONE, ARIZ.**—The extensive system of water-works, to cost over half a million, which is now constructing at Tombstone, by the New York, New England & Western Investment Company, is progressing rapidly.

**PURCHASE OF MAGNETIC IRON-ORE LANDS.**—A dispatch from Ballston, N. Y., says that Mr. George Fowler, of New York, has purchased fifty acres of land in Hadley, Saratoga County, containing a large vein of magnetic iron ore, mixed with feldspar in proper proportions to render it self-fluxing.

**LIABILITY FOR PATENT ROYALTY.**—The first business introduced in the United States Senate at the opening of the session was a resolution submitted by Mr. Ferry, of Michigan, instructing the Committee on Patents to consider and report by bill or otherwise such proposed legislation as shall effectually protect all innocent purchasers and users of any device, invention, or article patented under the laws of the United States from the payment or obligation to pay any royalty for such purchase or use of any patented article abandoned to public or general use by the inventor or patentee thereof, or from the payment of any royalty for such purchase or use of any patented article whatever, unless claim therefor shall formally be made and presented by the inventor or patentee to the purchaser or user of the same within two years after such purchase or first use of the device or article so claimed to have been duly patented.

**THE SILVER PURCHASES AND THE PROFITS OF THE MINTS.**—The Director of the Mint has caused an examination to be made of the accounts of the mints from July 1st, 1878, to June 30th, 1881, to ascertain the exact amount and cost of the silver purchased by the government and the profits on the coinage of silver during the three fiscal years named. The profits have been \$9,752,210.54, which, with the profits on hand at the mints July 1st, 1878, \$424,725.47, and \$4560.30 profits on trade-dollars and surplus bullion credited to the same account, make a total of \$10,181,496.31. Of this amount, \$8,774,374.81 has been deposited in the Treasury, \$221,124.78 paid for expenses of distribution, and \$84,351.29 paid for wastage and losses by sale of sweepings, leaving in the mints on July 1st, 1881, \$1,101,645.43, which was verified by actual count on June 30th by representatives from the Treasury Department.

**DUTIES ON IMPORTS.**—The total value of imports of merchandise entered for consumption in the United States during the year ended June 30th, 1881, amounted to the sum of \$650,618,909.63. The value of dutiable merchandise amounted to \$448,061,387.93, and the value of mer-

chandise free of duty amounted to \$202,557,411.68. The total amount of duties collected upon imports amounted to \$183,800,879.67, and constituted 43.25 per cent of the value of the dutiable merchandise entered for consumption. Of the total amount of duties collected on imports, the duties on sugar and molasses amounted to \$47,984,032.84, or 24.79 per cent; the duties on wool and manufactures thereof amounted to \$27,235,624.78, or 14.10 per cent; the duties on iron and steel and manufactures thereof amounted to \$21,462,534.34, or 11.69 per cent; the duties on manufactures of silk amounted to \$19,038,665.81, or 9.84 per cent; the duties on manufactures of cotton amounted to \$10,825,115.21, or 5.91 per cent; and the duties on flax and manufactures thereof amounted to \$6,984,374.90, or 3.80 per cent. The duties collected on these six commodities and classes of commodities amounted to \$133,580,347.88, and constituted 69.01 per cent of the total amount of duties collected on imports.

## GENERAL MINING NEWS.

### ARIZONA.

**WORONOCO MINING COMPANY.**—The Tombstone *Epitaph* says of this San Diego company, in which a number of Westfield (Mass.) people are interested: A rich strike has been made in an uprise from 130-foot level. A six-inch vein of gray carbonate was encountered, assaying \$260.91 silver with a trace of gold. The average of assays taken across a four-foot ledge was \$51.

### SILVER BELL DISTRICT.

**DOXOLOGY.**—The Arizona *Journal* says that the manager of this group of mines reports that work is pushed at the True Blue and Spring claims belonging to the company. The True Blue has an 85-foot shaft, and the ore is steadily improving in character. When a depth of 100 feet is reached, a cross-cut will be made to determine the width of the ledge. There is a considerable quantity of ore on the dumps, and it is the purpose of the company to erect a smelter at an early day. They are now sinking on the Spring claim, with the view of opening up a sufficient supply of water, not only for domestic purposes, but also for the furnace. They are now down twenty feet. When a depth of fifty feet is reached, they will run drifts, and feel confident an ample supply of water will be afforded.

### TOMBSTONE DISTRICT.

**BRADSHAW.**—The mill is expected to be completed in ten days.

**GRAND CENTRAL.**—At the new shaft, a station has been opened at the 400-foot level, from which exploration will soon be made. On the 300-foot level, cross-cuts have been started. The blower and pipe heretofore used in the Grand Central shaft, have been purchased and will be placed on south 200-foot level, to force air in an uprise driving from that level to the 100.

**HEAD CENTER.**—The Tombstone *Epitaph* gives the history of this mine, in a special mining report, as follows: The Head Center mine is a small fraction of a claim lying and being on the great Contention fissure, bounded on the south by Flora Morrison and Sulphuret, on the west by Tranquillity, and on the east by Contention and Contentment, being a triangular piece of ground containing about five acres. It so happens that Head Center is on the direct northern extension of the Contention bonanza, and the whole area productive ground. They have fine hoisting-works on the mine, near the south line, with a working-shaft about 520 feet deep. At a little over 500 feet, water was struck, which, as depth was attained in the shaft, came in so strong that it could not be hoisted out with buckets holding from 300 to 500 gallons; therefore sinking had to be abandoned, and the water now stands 18 feet deep in the bottom of the shaft. From this the boilers and shops are supplied, with no other cost than hoisting it into the reservoir. The mine was extensively opened before any steps were taken for a mill. Fortunately for the company, the Sunset Mining Company had built a mill in advance of their wants, and was forced to sell it, whereupon the Head Center Company became the purchaser. The mill stands about one half-mile below the Contention mill, on the San Pedro, and is of 10 stamps capacity. Some few changes were made in it after the purchase, when it started upon its work for the mine on April 15th, 1881. Since that date, and up to November 1st, 5930 tons of ore had been sent to the mill, of which 5876 tons had been worked, yielding \$156,520.52. This gives an average of \$26.80½ per ton. While this appears a low average, it must be remembered that there has been no assorting of the ore, and the stopes have been worked clean as far as they have gone. It costs the company \$3.25 per ton to deliver the ore to the mill, and about \$5.50 to mill it and return the product in bullion, thus making a cost of \$8.75 per ton after the ore is dumped into the ore bin at the mine. Add the cost of mining, including the cost of all dead-work, which does not exceed \$6 per ton, and we have a total cost of \$14.75 per ton, thus leaving as a margin of profit \$12.05½, or nearly one half. Were the mill situated at the mine—there being ample water to run one of 30 or 40 stamps—there would be the cost of hauling and its incidental losses to be added, which would make \$15.30½ per ton profit on this grade ore. The ore is so free-milling that it is worked up to 92½ per cent, thus leaving the tailings practically valueless. The reserves of ore now developed are so extensive that the superintendent assures us that he could keep a 20-stamp mill running for two years without exhausting them.

**STONEWALL.**—Men are at work straightening up the two shafts; but no ore is extracted except such as is necessary in performing the work mentioned. When the shafts are put in good working order, the mine will be more thoroughly developed and the shipment of ore resumed.

### CALIFORNIA.

#### THE BODIE DISTRICT.

Official reports of November 26th are as follows:

**BODIE CONSOLIDATED.**—There were 90.6 tons of ore hauled to the mill during the past week. On the 23d instant, connection was made between the south drift from winze No. 9 and the north drift from winze No. 6, the former drift having been advanced 3 feet and the latter 2 feet. The total length of the drift between these winzes is 79 feet. From winze No. 9, the north drift was driven 4 feet, making its total length 33 feet. The quartz is now better segregated in the face of this drift than it has been, there being 8 inches of medium quality of ore on the hanging-wall. On the 23d instant, the work of sinking winze No. 9 was resumed; its length was 69 feet. Winze No. 13 along the red vein is now 29 feet. The ore is of excellent quality in the bottom of that winze, but the vein is still narrow. The bullion shipment was \$5272.38.

**BULWER CONSOLIDATED.**—The west cross-cut from south drift on the 500-foot level of the Standard mines is in 227 feet. The west cross-cut from the 1000-foot level of the Standard shaft is in 358 feet. There is nothing new to report.

**GOODSHAW.**—The only work doing in this mine is sinking the shaft. It is now down 731 feet. As soon as 750 feet are reached, a station will be cut out and cross-cutting commenced.

**NOODAY.**—An uprise from the 512 to the 412-foot levels on the east prong of vein No. 1 has been started, and is now up 18 feet. This uprise is about 700 feet south of the shaft, and shows a vein of 3 feet wide of fine milling ore. The east cross-cut from No. 1 vein, 512-foot level, is out 134 feet. Ore is stoped from the 212, 312, 412, and 512-foot levels, and the mill kept steadily at work.

**STANDARD CONSOLIDATED.**—Development-work is going on steadily in the shaft, the east and west cross-cut 1000-foot level, the south drift from the east cross-cut, and the upriser on the Bullion vein 550-foot level, and on the Cook ledge. The different stopes show no particular change. All are looking well and



yielding the usual quantity of ore. On the 385-foot level, the ledge is 10 feet wide in the south and about 30 feet wide in the north end of the mine. On the 550-foot level, the vein is 15 feet wide of clean ore. During the week, there were extracted and shipped to the mills 1274 tons of ore from the 300, 385, 500, and 550-foot levels. The average pulp-assay for the week was \$31.73. The amount of bullion shipped to San Francisco was \$82,381.69.

**TOGA.**—The north lateral drift east of the shaft, 982-foot level, is in 463 feet. There are no important changes to note in this drift, other than that the ground passed through is of a more favorable appearance than heretofore. From this drift they have started west cross-cut No. 3, which is now in 11 feet. The short distance thus far run has developed nothing worthy of note. On the 520 foot level, some necessary work is doing in repairing the Syndicate tunnel.

## CANADA.

## PROVINCE OF MANITOBA.

Accounts from Edmonton state that gold operations are brisk. A good deal of the dirt pans out from \$3 to \$12 per day.

## PROVINCE OF QUEBEC.

A recent report states that 1700 acres of phosphate lands in Ottawa have been sold to an American company, which intends to work the mines actively all next summer. The mineral is to be shipped to Philadelphia, where it will be converted into superphosphates.

## PROVINCE OF NOVA SCOTIA.

Our correspondent, under date of December 5th, reports the following:

The Stuart iron mine, Guysboro' County, specular iron ore, has been sold to the Crane Iron Company, of Philadelphia.

A valuable bed of red hematite, 15 feet wide, has been found within two miles of the Pictou coal-fields, on the property of T. Watson.

The yield of the Sherbrooke gold mines for November was 188 oz. 5 dwts. from 374 tons of quartz. The Symonds mill, Montague, after six weeks' delay for repairs, has resumed work on good quartz.

## COLORADO.

## CLEAR CREEK COUNTY.

**DUNDERBERG.**—Under date of November 21st, the superintendent of this mine reports that the ore in the winze is improving; the higher fourth level drifts are better, showing solid streaks of ore two inches wide; stopes from drift show ore from four to five inches wide; first level drifts are in better condition.

**RED ELEPHANT.**—The *Courier* of the first inst. says of the mines of this company: The new shaft and ore-house at the Barrett shaft on the Boulder Nest mine is completed; the engine has been repaired and is in running order; the new spool and running gear are on the ground, and it is expected that hoisting will be resumed on next Monday morning. The new building is larger, higher, and more convenient than the one that was destroyed by fire. The new shaft and ore-house at the Schwarz shaft, which was built by the lessee, is completed. The new engine is on its bed, the boiler is in place waiting for the masons to brick it in, and in a short time all of the machinery will be in running order. The work at this shaft has been detained by the Boulder Nest fire. The mines of the company, generally speaking, are looking well, and late mill-runs have shown a decided improvement in quality over those of last month. There are about forty men in the employ of the company.

## GILPIN COUNTY.

**HIDDEN TREASURE.**—We learn from a recent issue of the *Register-Call* that the working-shaft of this lode is now 1275 feet deep. The width of the crevice is 3 feet, between walls, of milling dirt and smelting iron. The mill-dirt from workings of the shaft yields from 5 to 6 ounces per cord. Sinking is to be continued to the depth of 1320 feet, when the 1320-foot station will be established. The output of the mine in mill-dirt is 6 cords or 42 tons every 24 hours. This will be largely increased when the present developments inaugurated are fully matured. The company owns its own mill, in which is crushed the ore from the mine. Above the 800-foot station, a comparatively small amount of work is done, and that by tributers.

## GUNNISON COUNTY.

**FOREST QUEEN.**—The annual meeting was held in Denver on the 1st inst. The report of the superintendent showed the following developments on the property: Shafts, 185 feet deep, with a level at 65 feet from the surface, which has been run south 60 feet and north 35 feet. A tunnel on the vein 535 feet long and connecting with the bottom of the main shaft and running south from it. The vein has also been explored at different points by cross-cuts and shafts. No stopping has been done except above the 65-foot level, above which ore has been broken nearly to the surface. The company has received for ore sold during the year about \$30,000, the value per ton being approximated at \$300. The ore was not sorted, but sacked and shipped as it was raised from the shaft. The number of men employed during the year has averaged thirteen, and most of the work has been development. The total receipts from ore sold, from the opening of the property to date, have been \$80,000. The company decided to push work on the property vigorously during the coming winter. The main shaft is to be sunk at least 100 feet deeper, which will give a total depth of 285 feet, and levels are to be run in both directions from the bottom. Cross-cuts from the tunnel are to be run at different points, to open the rich ore-chute which has recently been uncovered 60 feet west of the first one opened, and when reached it will be developed by levels. The pay-streak which has been opened shows an average width of three feet, and widens in places to six feet of ore, carrying on the average 200 ounces silver per ton. The highest mill-run on any ore hitherto was on a lot of four tons sold in the fall of 1879, and which yielded 1080 ounces silver per ton. Ore in twenty-ton lots has run 540 ounces per ton without any sorting. The product of the property in 1880, when very little work was done, was \$10,000.

## LAKE COUNTY.

**BREEZE IRON.**—This company has not been making any heavy shipments of ore, but the manager states that he has been driving two development-drifts that have necessitated the removal of a large amount of waste, and he expects to commence shortly, shipping about 40 tons per day.

**BIG PITTSBURG.**—According to the *Leadville Herald*, the affairs of this company are in sad shape. The treasury is depleted, and there is no money with which to further prosecute work. Besides this, there are bonds issued against the property to the amount of three hundred thousand dollars. A foreclosure of the bonds seems certain, and the company thus swept out of existence. A short time ago, a lease was made of the Joe Bates shaft of the mine, and a few men are working. No results of value are yet obtained, however. The Big Pittsburg Company has a very large territory, well located, and beyond doubt of great value. It is, therefore, too bad to have the mine lying idle and no immediate effort making to develop it. If the present company can not be resurrected, it will be well for the public when the bondholders foreclose and take some action toward working the mine.

**CATALPA.**—This mine is sending out about 200 tons of ore per month, a considerable decrease. The principal work done at present is in prosecuting development.

**DUNKIN.**—The *Leadville Herald* denies the report that the lessees of the mine are making extraordinary profits on their lease. It says: At the time the lease was made, it seemed the best thing to do, and as the lease still exists and will until next March, there is no necessity for further discussion about it. The company receives \$2500 a month, and if the lessees by some stroke of fortune should clear

\$50,000 a month, it would be their own money. It is, however, certain, that up to the present time they are earning but a fair recompense for their risk.

**LA PLATA.**—This mine continues its large production, and the prospects are better than ever. The grade of the ore has increased, and is about seventeen ounces of silver to the ton and thirty-five per cent lead.

**LEADVILLE CONSOLIDATED.**—The superintendent reports, under date of December 2d, that ore has been struck in the Combination incline at the south end of the company's property. This strike is viewed with much satisfaction by the management, as the development of ore-bodies in this section of the company's claims must add materially to their value, it serving to prove that valuable deposits exist throughout the entire territory owned by the company. The superintendent also states that in the fourth level, south of main incline, he is in ore thirteen feet in thickness and seven feet in width, which promises to assay well; and that bed-rock or lime has not yet been reached. All other portions of the mine continue to look as favorable as last reported.

**LITTLE CHIEF.**—This mine is sending out about 300 tons of ore per month. Between 65 and 70 men are employed.

**ROBERT E. LEE.**—The new pump over the main shaft of this mine has been successful in its operations, and the main shaft is entirely free of water. A drift which is running from this shaft to connect with the main stopes and drifts will be through in a few days. The mine is reported as looking well in every part, and excellent ore is taken out. A lot of ore weighing about 24 tons netted the company \$23,000.

**SILVER CORD.**—A *Democrat* reporter visited the Silver Cord mine and went through No. 3 shaft only, which is 110 feet below the incline level. The shaft goes through sixty feet of sand carbonates. From this shaft, two drifts have been run approximately at right angles and about 40 feet each way. The ore-body has developed to such a size that the manager has deemed it advisable to relieve the incline from the work of raising the ore, which will be done by a shaft extending down 70 feet from the source, which will connect with the ore-shaft. A fissure, so termed by the miners on account of the quality of its walls, is in a body of ore twelve feet high and eight feet wide, and its extent still remains unknown. The ore in this part of the mine goes down continually, and improves as the depth increases. The mine has so many ore-faces that the company can afford to let it stand, and only ore enough is taken out to pay the expense of the work until the workings can be so improved that the ore can be taken out at a much less expense than at present. There are now about 50 tons per day taken out, and the average from the start will be \$25.75. There are about 205 men working the property.

## SAN JUAN COUNTRY.

**RICO MOUNTAIN.**—The *Rico Electric Light* says: This company is at present working its various properties, ten in number, located on the mountains and in the gulches around Rico. The 66 joins the Puzzle on the east, and is developed by a tunnel which is now in 30 feet. It is thought by the miners working on the Puzzle and Puzzle Extension that the same body of ore can be struck by projecting the present workings in a less distance than 25 feet. This is for that reason regarded as a valuable property; then it is a full claim, 1500 feet long and 300 feet wide, and is surrounded by rich mines. The workings of the Puzzle are but a few hundred feet from the work on the 66. The company lately purchased two thirds interest in the Broadway Broker lode, on the northern slope of Smith Fork, near the Legal Tender, Rico, and Johnny Bull. The vein is well defined, being the same kind of quartz as is characteristic of this section. There has just been completed an open cut of 15 feet, and a tunnel of 14, which has struck a spur of the main lead. The company will resume work on this property in early spring. It is a good prospect.

## SUMMIT COUNTY.

**ROBINSON CONSOLIDATED.**—Mr. William Ashburner, under date of November 24th, 1881, has given the following report on this property. In view of the interest which it generally commands, we print it in full below, reserving comments for another column:

The Robinson mine is situated at the town of Robinson, Summit County, Colorado, about sixteen miles northerly from Leadville, and is reached by one of the branch lines of the Denver & Rio Grande Railroad.

The vein has a direction of a few degrees west of north, and dips easterly at an angle of from 30° to 33°. The foot-wall is a bluish limestone, while the hanging-wall is a micaceous sandstone, which is also, at least in proximity to the vein, quite calcareous. This hanging-wall is smooth, well defined, and much more regular in its dip than the foot-wall.

The ore-chute is about 100 feet long and 30 feet thick between walls in the thickest place. It has been followed continuously from the outcrop down to the eighth level, and here the ore-body exhibited no signs of weakness or tendency to thin out.

The ore is generally very massive, and consists mainly of argentiferous iron pyrites, associated with blende and a small percentage of galena. In places, the pyrites have become oxidized, and the ore is then soft and easily removed; but as a rule, the body of the ore-chute is undecomposed, hard, compact, very free from gangue, and nearly the whole is sent to the reduction-works without any previous assorting. The assay value in silver of large lots of this ore varies from 50 to 80 ounces per ton, while samples of a few pounds give much higher results.

The mine is now worked through a large tunnel, nearly 1000 feet in length, furnished with a double track, and which has been driven in a northerly direction approximating to the general course of the vein. This tunnel, which is also called the 5th level of the mine, cuts through the ore-chute and exposes it for a length of 105 feet. At a point 14 feet northerly from the southern limit of the ore-body on this level, an inclined working-shaft, now 370 feet deep, is sinking, following the hanging-wall and is connected at intervals by drifts 100 feet apart with the ore-body, which, below the 6th level, lies to the north of it.

The hoisting from the lower works is done by an engine at the mouth of the incline. To facilitate the working of the mine in depth, a vertical shaft is now sinking, which will cut the vein about 350 feet from the surface, if it maintains its present dip. This shaft is now 213 feet deep.

Above the 4th level, as I understand from Mr. Ewing, the general manager of the property, the ground is mostly worked out, and I did not examine this portion of the mine.

Between the 4th and 5th levels, the ore-body was something over 100 feet long, and appears to have been separated into an upper and lower portion by an intruded "horse" of limestone. The upper of these has been worked for some time, furnishing a large quantity of ore, while the dimensions of the lower one are not as yet ascertained, although it is known to be 12 feet thick on the 5th level, and its existence is demonstrated at a point 25 feet higher up toward the 4th, where it has been cut into in order to place timbers. It therefore seems reasonable to presume that this ore-body will continue some distance farther up, and perhaps even to the 4th level, although, not being developed, it can not properly be regarded as ore "in sight." I think, however, it would be safe to assume for this body the following dimensions: Length, 100 feet; height, 25 feet; thickness, 12 feet=30,000 cubic feet.

In addition to this, there is now standing between the 4th and 5th levels, a block of ground 50 feet long, 100 feet high, and 6 feet thick=30,000 cubic feet. On the 5th or tunnel level, the ore is first met with at a point 14 feet southerly from the top of the incline, and continues on this level for a distance of 105 feet. On the 6th level, the ore-chute begins at the incline, and is 102 feet long. The drift, however, which cuts it, passes 29 feet beyond its northerly limit into barrea ground. A sample of ore taken from a point in this drift 88 feet north of the incline assayed at the rate of 241½ ounces per ton.

Stopes have been extended from the 6th level to the 5th, a distance of 100

feet, and expose an unbroken, solid body of ore. A sample taken from the side of these stipes assayed at the rate of 77 ounces per ton.

As the vein is here very thick—nearly 30 feet, in fact—I should estimate the original dimensions of this block of ground as follows: Length, 108½ feet; height, 100 feet; thickness, 14 feet = 144,900 cubic feet.

On the 7th level, the ore is first met with 29½ feet northerly from the incline, and has been drifted upon 48 feet, the drift ending in oxidized and hard ore, samples of which assayed as follows: Oxidized ore, 80 ounces per ton; hard ore, 177½ ounces per ton.

The stipes on this level are only 45 feet high, but are pushed forward to connect with those above. The vein is thicker here than on the 6th level, and is quite as massive, without any indication of the chute proving much, if any, shorter. I shall, however, take it at 90 feet, and consider the original dimensions of this block of ground to have been as follows: Length, 90 feet; height, 100 feet; thickness, 15 feet = 135,000 cubic feet.

On the 8th level, the ore is first struck 40 feet north of the incline, and had been drifted upon at the time of my visit 28 feet. The bottom, top, and sides of this drift were all in ore, and I took four samples from it on different occasions which assayed respectively 63, 87, 113, 125 ounces per ton. Taking now the mean between 90 feet, the length assumed for the ore-body on the 7th level, and 28 feet, the distance drifted upon in ore on the 8th, we should have 59 feet as a length, which I think quite safe to take for an estimate of the ground standing between the 7th and 8th levels. We should have, therefore, for this block of ground: Length, 59 feet; height, 100 feet; thickness, 15 feet = 88,500 cubic feet.

This ore is very heavy, and between 6 and 7 cubic feet of it would weigh a ton. I shall, however, take the larger number in order to provide for the lighter oxidized ore. To recapitulate, therefore, we have for developed ore, most of which is exposed on three sides, and without making any estimate below the 8th level:

Above 5th level.....	30,000 cubic feet.
Between 5th and 6th levels.....	144,900 cubic feet.
Between 6th and 7th levels.....	135,000 cubic feet.
Between 7th and 8th levels.....	88,500 cubic feet.

Total cubic feet.....	398,400
At 7 cubic feet to the ton.....	56,914 tons.
Deduct for ore extracted above 6th.....	4,000 tons
Deduct for ore extracted between 6th and 7th.....	1,850 tons = 5,850 tons.

Total ore developed.....	51,064 tons.
If now we add to this.....	4,286 tons.
which I think it safe to assume will be found underlying the limestone "horse" above the 5th level, we should have a total of.....	55,350 tons.

The ore from this mine is treated mainly at the reduction-works of the Boston & Colorado Smelting Company, at Argo, near Denver, and a contract has been entered into, beginning with October 1st, 1881, to supply them with 30,000 tons at the rate of 100 tons a day, and to pay \$19.50 per ton for reduction, they to return 90 per cent of the assay value of the ore. Freight from the mine to Argo is \$6 per ton, which the smelting company advances, and makes settlement with the mining company every few days on lots of 100 tons. Thus these settlements represent the net value of the ore to the Robinson Company, less the cost of mining.

In addition to what is sent to the Argo Works, from 400 to 500 tons monthly are sent to the La Plata Mining and Smelting Company, near Leadville. It is intended to send the lower-grade ore, and those that contain lead, to the La Plata Works, as those parties allow 30 cents a unit for the lead, and freight is only \$2 per ton, as against \$6 to Argo, at which latter establishment no allowance is made for the lead the ores might contain.

To arrive at the average value of the ore, I went over all the settlements made by both the Argo and La Plata people since October 1st, and found that the

Argo had settled for 2,988 8 tons, and paid	\$125,647.08
La Plata 491 8 " " " "	15,600.18
Total for 39 days....	3,480 6
	\$141,247.26

This is at the rate of \$40.58 per ton, and as before stated, represents the net profit per ton exclusive of the expenses at the mine. These were as follows for the three months of August, September, and October:

1881.	Tons.	Mining expenses.	General.	Total.
August.....	2,954	\$13,228.07	\$1,257.41	\$14,525.48
September.....	3,148	12,122.19	2,079.35	14,301.54
October.....	3,220	15,919.65	2,265.83	18,185.48
	9,322	\$41,269.91	\$5,642.59	\$46,912.50

The above represents an average cost of \$5.03 per ton. The expenses, however, for these three months include disbursements for the winter supply of timbers, wood, steel, etc., and are probably more than they would average for the whole year.

Taking therefore for the value of the ore now in the mine the average of the settlements made by the Argo and La Plata works, or \$40.58, and deducting therefrom \$5.03, the cost of mining, we should have \$35.55 as representing the probable net value per ton of the ore now in reserve, namely, 55,350 tons at \$35.55, or \$1,967,692.50.

The thirty settlements made by the Argo Company would represent an approximate average assay value of 66½ ounces with silver at \$1.12½ per ounce. It will be observed that the average of my assays was at the rate of 120½ ounces per ton; and if the highest be rejected, the average would then be 103½ ounces per ton, while, if only those be taken which fall below 100 ounces, the average would then be 76½ ounces. In view, however, of the fact that every car-load is sampled as it leaves the mine, and that the settlements are made upon lots of about 100 tons, the only conclusion I feel inclined to draw from my assays is, that they prove the existence of silver in paying quantity in those portions of the mine from which they were taken.

In this examination, Mr. Ewing, the General Manager, gave me every facility, and afforded me free access to the books, vouchers, and certificates from the smelting companies. The mine impressed me as being well and economically managed, and so developed that there need be no fear but that the present shipments of ore can be maintained.

RECAPITULATION.

Number of tons of ore developed.....	51,064
Number of tons of ore underlying the limestone above the 5th level, but only partially explored.....	4,286
Total.....	55,350
Average value of the ore, based upon thirty settlements made by the Boston & Colorado Smelting Company and the La Plata Company, aggregating 3480 6 tons, per ton.....	\$40.58
Cost of mining, per ton.....	5.03
Net value per ton.....	\$35.55
Net value of reserves (55,350 tons at \$35.55 per ton).....	\$1,967,692.50

GEORGIA.

The Dahlonega Mountain Signal states that work at the different mines in that vicinity is pushed vigorously. At the Consolidated, the location and grade of its new ditch (15 miles long, which will give them free water) are about completed, and the question of a new mill is under consideration. At the Findley, it is stated that large bodies of ore are being opened; the 30-stamp water-power mill is running satisfactorily. Work on the forty-stamp mill of the Calhoun

mine will be commenced shortly. The prospects at the Barlow, Singleton, and other mines, continue to be favorable.

IDAHO.

CUSTER MILL.—From a letter written to the Ogden Pilot, we condense the following: The 20-stamp mill crushes on an average 27 tons of ore per day. The bullion produced assays 978 in silver and 12 in gold, or 990. Wood is used for fuel to the extent of 300 cords per month. The mill started up last February, the first bar having been shipped on the 11th of that month. The mill has run 250 days, during which time it has sent to market about \$800,000 worth of bullion.

VARKUFF.—The superintendent telegraphed from Silver City, December 5th: Furnace running splendidly, turning out 60 to 70 bars a day.

MONTANA.

ALTA-MONTANA.—The last of the requisite machinery has arrived on the ground and is going into position as rapidly as possible, and within a fortnight or sooner, the entire works will be available. Serious delays have been caused in several departments by the extreme difficulty the company has experienced in getting lumber as it has been needed. A million feet of it have been consumed in the buildings, thus far, and 100,000 feet more ought now to be at command for use in the completion of the plant as planned. The works will start with 500,000 bushels of charcoal, 5000 cords of wood, 2500 tons of ore, 2000 tons of iron ore, 1000 tons of lime rock, and 150,000 pounds of salt on hand.

GREGORY.—The reduction-works are rapidly going forward toward completion. The site chosen for them is in every respect desirable.

BUTTE DISTRICT.

MINAH LODGE.—There is nothing of importance to report of the mines in this district. At the most prominent mines, the work is carried on with the usual vigor and regularity, and the prospects continue to be favorable.

NEVADA.

THE COLUMBUS DISTRICT.

Official reports of November 26th are as follows:

MOUNT DIARLO.—Connection has been made between the intermediate and the north cross-cut from the bottom of winze No. 1. At this point, there is a bunch of ore about two feet wide, on which an uprise has been started. The ore assays from \$60 to \$80 per ton. In the east drift, from this cross-cut, there is a 10-inch streak of \$70 ore that looks extremely promising for opening. A drift is running easterly from the north cross-cut at the bottom of winze No. 3, on the third level, which is in 15 feet. The east drift on this level has been following a seam of \$85 ore during the past few days that looks very well. The winze in the gulch has connected with the uprise from the west drift, from the second level. About 120 feet east from the bottom of this winze, an opening has been made, and will be sunk toward the third level. The winze from the east drift on the second level is down 71 feet, and the uprise from the third level to meet this has reached a length of 43 feet.

NORTHERN BELLE.—The fourth shaft level has shown no very material change during the week. The west drift has been extended 12 feet in favorable-looking ledge-matter giving low assays. The uprise is also in a promising formation. No change in other shaft levels. The levels above the adit present about the same appearance as at the time of last report, and are yielding about the same quantity of ore. There are extracted and sent to the mills about 66 tons of ore daily. Both mills are running as usual, and doing the regular amount of work. Bullion shipments for the week ending November 23d amounted to \$20,037.69. Shipments on November account to November 23d, \$80,896.95.

NEW MEXICO.

An official dispatch from the Bremen mine, Silver City, N. M., December 6th, says: In north end, a body of black slate rich in native silver has been found. This is the first native silver found in this end of the mine. Quarts vein looks splendid.

PETROLEUM STATISTICS.

COMPARATIVE SYNOPSIS OF REPORTS FOR SEPTEMBER AND OCTOBER, 1881.

	1881.			
	September, 30 days.	October, 31 days.	Increase in Oct.	Decrease in Oct.
42 GALLONS = 1 BARREL.				
Production for the month..... bbls	2,193,420	2,323,171	129,751	
Daily average..... "	73,114	74,941	1,827	
Stock at the wells..... "	585,585	579,618		5,967
Iron tank stock..... "				
Total stock..... "	25,066,657	25,309,391	242,734	
Number of producing wells..... "	17,562	17,799	237	
" " drilling wells..... "	386	445	57	
" " completed..... "	312	3-2	10	
" " dry holes..... "	14	15	1	
Aggregate daily production of new wells..... bbls	4,763	5,104	341	
Average daily production of new wells..... bbls	15 7-10	15 8-10	1-10	
Number of rigs building..... "	433	484	51	
Total shipments out of the region, bbls.....	2,137,950	2,080,467		57,483

—Stowell's Petroleum Reporter, Nov. 28.

MINING AND MILL SUPPLIES.

QUERIDA, COLO.—Principal market for supplies, Denver. Freight from Denver: Railroad, 170 miles; wagon, 6 miles; 80 cents per 100 pounds. The following are the Denver prices for goods in quantity:

- Powder.—50 to 35 cents per pound.
- Steel.—Jessop's, 19 cents, with special discount.
- Candles.—Proctor & Gamble's, \$6 per box.
- Fuse.—Double tape, \$4.25 per 1000 feet.
- Hammers.—24 to 26 cents per pound.
- Sledges.—19 cents per pound.
- Picks.—\$12 to \$16 per dozen, less 35 per cent discount, according to size and quality.
- Shovels.—Ames's round point, \$17 per dozen, with special discount.

Pipe.—	1½ inch diameter.	8 cents per foot.	
1 " " "	11 " " "		Less 45 per cent discount.
2 " " "	19 " " "		
3 " " "	46 " " "		
4 " " "	95 " " "		
		\$1.50 " " "	

Wire Rope.—	Iron	Price per foot.	Steel	Price per foot.
1½	.....	37 cents.	1	.....
1	.....	25 "	¾	.....
¾	.....	21 "	¾	.....
¾	.....	17 "	¾	.....
¾	.....	14 "	¾	.....

Fire-Brick.—\$80 per thousand.  
Common Brick.—(Freight from Silver Cliff) \$8.50 per thousand.



FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Dec. 9.

The week under review shows a very large business, the transactions aggregating 1,246,309 shares. Prices, however, although above the lowest, do not improve rapidly. In fact, in some cases, there are further declines to notice. There are plenty ready to buy or sell mining stocks when they feel sure which action is a sound one to take. There has, however, been so much deception in the past that the public will believe but little that is said, good or bad.

The business in the Tuscarora stocks has hardly been worthy of notice.

The Bodies have been fairly active but weak. Bodie declined from \$4 1/4 @ \$2, with sales of 3475 shares. Standard has been dealt in to the extent of 1495 shares, and, notwithstanding the extra dividend, declined to \$21. Boston Consolidated has been active and strong. The sales aggregate 49,100 shares at 38 @ 62c.

The Comstock shares have had a moderate business at weak prices. California declined from 60 @ 43c. under sales of 5540 shares. Consolidated Virginia declined from \$1.90 @ \$1.30 with sales of 7940 shares. Sierra Nevada was dealt in to the extent of 1420 shares at \$11 1/2 @ \$10. Union declined from \$14 1/2 @ \$13 1/4, and recovered to \$14. Suro Tunnel was dealt in to the extent of 10,715 shares at \$1.35 @ \$1.10.

Amie has been quiet and still weaker, selling at 13c. to-day. Chrysolite has had but a moderate business at weak prices, selling between \$4.85 @ \$4.50. Green Mountain, under moderate transactions, has been fairly steady, ranging between \$2.90 @ \$3.15, the latter price being reached to-day. Homestake has been more active than usual, selling from \$16 @ \$14, and recovering to \$15 1/2. The sales aggregate 1325 shares. Horn-Silver has been quiet and steady at \$14 1/2 @ \$15. Iron Silver has been very active and strong; the sales aggregating 17,100 shares at \$2.05 @ \$2.25, the latter price being reached to-day. Northern Belle declined to \$10 under a small business. Robinson Consolidated continues to be the feature of the market. For a time it was fairly steady, but during two or three days past it has steadily weakened, selling down to \$4.30 to-day. The sales for the week aggregate 243,950 shares. Spring Valley, under a small business, sold at \$3.95 @ \$3.50. Starr-Grove ranged between \$3.75 @ \$3.25, with small sales, and Stormont \$1.80 @ \$1.75.

There have been sales of Big Pittsburg at 64 @ 50c. Bradshaw has been fairly active at 70 @ 90c. Central Arizona has been more active at \$1 1/2 @ \$1 1/4 @ \$1.45. Mariposa Common has been fairly active at \$2 1/2 @ \$4. Miner Boy declined from 20 @ 8c. on sales of 26,800 shares. Oriental & Miller has had a moderate business at weak prices, declining from 49 @ 38c. Silver Cliff has been active but very weak, declining from \$3.40 @ \$2 1/4, the sales aggregating 17,170 shares. Silver Nugget new stock was quite active, advancing from 8 @ 18c., the sales amounting to 67,300 shares. South Pacific records a business (9) of 113,500 shares at \$6 1/2 @ \$3 @ \$3.60. The State Lines have been active, irregular, and weak. Nos. 1 and 4 record sales of 24,900 shares at 31 @ 41 @ 32c. Nos. 2 and 3 have been dealt in to the extent of 319,065 shares at \$1.20 @ \$2 @ \$1.60.

It is gratifying to learn through Mr. William Ashburner, an expert who commands confidence for ability and integrity, that the bottom has not gone out of Robinson Consolidated, as might have been expected at one time from the appearance of the market for the stock. From an examination of his report, it is evident that there is a very large amount of valuable ore exposed in the mine. He estimates the quantity at 55,350 tons. From his report it is impossible to say to what extent he has sampled this great body of ore. He assumes, however, that it will average as much as that already taken out, and thus gets a net value of ore in sight of \$1,967,692.50. Had the mine been worked without a market for stock in view, this might be a fair assumption; but there appears to have been a stock deal in the working of this mine for which somebody was responsible. The "point" was freely distributed that the stock was to go to \$20 per share. Strong efforts were made to get it up to that figure, but in vain. When this fact is considered, it will be well not to put too much value on the past record. It is a well-known fact that no one knows

DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, SHARES, ASSESSMENTS, DIVIDENDS, HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Rows include Alice, Mon., Amie Con., Argenta, Bar & Walker, Ut., Cassick, Co., Erie Isle, Ne., Black Bear, Ca., Fecher, Ne., Bodie Cons., Ca., Breece, Co., Bulwer, U. S., California, Ne., Cal. & Hecla, Mch., Caribou Con., Co., Catalpa, Co., Chrysolite, Co., Climax, Co., Cons. Va., Ne., Copper K's, N.C., Copper Queen, Ar., Crown Point, Ne., D'w'd-Terra, Dk., Dunkin, Co., Eureka Cons., Ne., Excelsior Co., Ca., Exchange, Ne., Fa. de Smet, Dk., Indley, Ga., Freeland, Co., Gem Co., Glass Pass, Co., Gold Stripe, Ca., G'd & Curry, Ne., G and Prize, Ne., Great Eastern, Dk., Gr. Mountain, Ca., Hale & Nor., Ne., Hibernia, Co., Homestake, Dk., Horn-Silver, Ut., H. Hill, Co., Idaho, Ne., Independence, Ne., In. Queen, Ne., Iron Silver, Co., Jucuitita, Mex., La Plata, Co., Leadville, Co., Little Chief, Ar., Little Pitts., Co., Martin White, Ne., M. Jose, Co., Nevada, Ne., N. Y. & Colo., N. Belle, Ne., N. Belle Isle, Ne., Ontario, Ut., O. Hill, Ne., Oseola, Mich., P. una, Ca., Quicks. Pref., Ca., Quincy, Ne., Rising Sun, Ca., Robinson C. Co., Robt. E. Lee., Savage, Ne., Sierra King, Ne., Silver Cliff, Ne., Silver King, Co., Spr'g Valley, Ca., Standard, Ca., Starr-Grove, Ar., Stormont, Ut., St. Joseph, Mo., Tip Top, Ar., Tinbstone, Ar., Yuma, Ar., Vel. Jacket, Ne.

better where the good ore of a mine is than the manager; and when that manager is a large stockholder on a "bull" market, it is most probable that he can not resist the temptation to make the best showing possible.

Even though the ore in sight may not prove to be as valuable as estimated by Mr. Ashburner, there can be no question that it has considerable value, and that the mine has an additional speculative value to be determined by developments.

William A. Farish, late Superintendent of the State Line Mines, Nos. 2 and 3, has made a report to the company which in many particulars agrees with such information as we have previously given, but which the public is led to believe is much under the true condition of affairs.

By "pumping back," he expects to get enough water for the mill. But what is to become of the domestic wants? The mill, he says, is capable of reducing 80 to 100 tons per day. He says, however, that, by careful sampling of the whole mine, he gets but \$6 to \$10 per ton, while the cost of mining and milling will be \$5 per ton, leaving a daily profit of \$100 to \$500 per day for the two companies.

Since the publication of the report, the following correspondence has passed:

NEW YORK, Dec. 3, 1881. Hon. John B. Alley, President State Line Mines, Nos. 2 and 3. DEAR SIR: I notice several newspapers of this city misrepresent my position, statements, and opinions of your mines, severely criticising my course as general manager, and strongly intimating that I have betrayed my trust, claiming these opinions represent the feeling and sentiments of the president and directors of the companies. If this be so, then I have misapprehended the views of the

directors as well as yourself, and I wish to know if these severe newspaper criticisms represent the feelings of your Board. I think my report is misunderstood by many of the stockholders. While I do not agree with the other experts as to the value of the ore, yet I think if the vein develops the quantity of ore that indications justify in believing it will, then they are very valuable mines, and worth a great deal more than they are now selling for, even if the grade is as low as my sampling shows it to be. Yours truly, WILLIAM A. FARISH.

NEW YORK, Dec. 3, 1881. DEAR SIR: Your favor of to-day has just been handed me, and I hasten to reply. I can only say that no statement with regard to you or your report represents correctly the feeling and sentiment of our Board of Directors that does not accord with the sentiments of the President as published in this morning's Tribune in the form of an interview as reported by one of the reporters of that paper. It is true that we all think you are mistaken—greatly mistaken in differing so essentially from all the other experts in relation to the value of the ore. You certainly can not expect us to place more confidence in your sampling and assays than of those of others—some thirty in number—of equal experience and standing with yourself as mining experts. Neither is your report, as you justly observe, so discouraging as may be supposed; for if your sampling and assays are correct, it is still a very valuable property. And I assure you we see no necessity of impugning your integrity, and any such statements as you allude to are in no way authorized by our Board of Directors. Yours truly, JOHN B. ALLEY, President, etc.

The World says: Manager Farish submitted his report this morning to the directors of the State Line mining companies. The report was not given to the public, but a synopsis was obtained from one of the officers. On the most important point, namely, the value of the ore, it is anything but encouraging. The mill and arrangements for water supply he pronounced of the best description, but he estimates that the ore will not mill more than \$10 per ton, and it will cost about \$3.50 to mine and mill. The company is \$80,000 in debt. The resignation of Mr. Farish as manager was accepted, and Mr. John Selover appointed in his stead. It was decided to push the completion of the mill as rapidly as possible, as a mill test, in view of the conflict of evi-

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, NUMBER SHARES, Par., ASSESSMENTS (Total levied to date, Date and amount of last), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (Dec. 3, Dec. 5, Dec. 6, Dec. 7, Dec. 8, Dec. 9).

SALES.—Alta (uez. 51); Alta Montana, 120; Barcelona, 23,300; Bechtel Consolidated, 300; Best & Belcher, 950; Big Pittsburg, 3,000; Bonanza Calif., 100; Boston Consolidated, 49,100; Boulder Consolidated, 310; Bradshaw, 17,700; Buckeye, 100; Bull-Domingo, 19,000; Byrd and Byrd, 18,300; Calaveras, 630; Calaveras W. & M. Co., 160; Cal. B. H., 500; Carbonate Hill, 1,000,000; Central Arizona, 100; Chapparral, 100; Cherokee, 100; Cheyenne, 300; Clarence, 100; Colorado Cent., 300,000; Col'n's Con., 500,000; Cons. Imp'rl., 1,375,000; Con. Pacific, 60,000; Con. Pay Rock, 250,000; Crescent, 3,000; Crowell, 50,000; Danbreen, 250,000; Dandelites, 100,000; Dundeeberg, 150,000; Durango, 500,000; Empire, 100,000; Enterprise, 100,000; Exchequer, 630,000; Globe Copper, 100,000; Glyn Dale Con., 100,000; Gold Placer, 200,000; Goodshaw, 100,000; Grandville, 300,000; Harshaw, 100,000; Head Center, 100,000; Hortense, 200,000; Index, 100,000; Julia, 100,000; Kossuth, 100,000; Larosse, 100,000; Legal Tender, 200,000; Leviathan, 100,000; Livermore, 500,000; Malachite, 200,000; Mariposa Pref., 50,000; May Belle, 100,000; Mayflower, 100,000; Mexican, 100,000; Michoacan Synd., 200,000; Mineral Creek, 200,000; Miner Boy, 50,000; Miller, 200,000; Mono, 50,000; Moose Silver, 3,000; Nevada Synd., 100,000; North Standard, 100,000; North State, 100,000; N. Horn-Silver, 400,000; Noonday, 50,000; Old Dominion, 200,000; Oriental, 200,000; Orin & Miller, 400,000; Overman, 115,200; Rappanahock, 250,000; Red Elephant, 500,000; San Pedro, 400,000; Silver Cliff, 200,000; Silver Islet, 200,000; Silver Nugget, 200,000; Silver N. & W. stks., 250,000; Sonora Con., 100,000; South Bodie, 100,000; South Bulwer, 100,000; South Hite, 100,000; South Pacific, 100,000; State Line No. 1, 200,000; " No. 2, 200,000; " No. 3, 200,000; " No. 4, 200,000; " Nos. 2 & 3, 200,000; " Nos. 3 & 4, 200,000; Sutro Tunnel, 2,000,000; Tabor Mine Co., 250,000; Taylor Plumas, 100,000; Toigi, 100,000; Tuscara, 100,000; Unadilla, 500,000; Union Cons., 100,000; Utah, 100,000; Vanliewater, 200,000; Washington, 200,000; Willshire, 50,000.

dence, is alone to be relied upon. The Oriental & Miller companies are creditors to the extent of about \$50,000. The following is from the American Exchange: NEW YORK, Dec. 5. To the Editor of the Daily American Exchange: My attention has been called to an extract published in your paper to-day from the Leadville Chronicle of November 29th, in which I am represented in an interview with a reporter as having made serious accusations against Messrs. Brayton Ives and S. V. White in connection with the recent decline in Robinson stock, and I hasten to deny most emphatically that I made the charges stated therein. I confess that I may have made some criticisms on the conduct of these gentlemen when I was angry at their action in sending Mr. Ashburner to examine

the mine without notifying me beforehand, because I considered it a reflection upon my integrity and my management of the mine. But I am glad to have an opportunity of saying publicly that since my return to New York I have become convinced that all my criticisms were undeserved, and that the course of Mr. Ives and Mr. White, both as individuals and officials, has been entirely honorable, and such as to promote instead of injure the interests of the Robinson Company. I regret very much that you should have published the article alluded to without first verifying its statements, and I hope you will give my denial as much prominence as possible. THOMAS EWING. UNLISTED QUOTATIONS. Mr. L. V. DeForest, No. 70 Broadway, under date of

December 9th, 3 P.M., reports the current quotations of unlisted stocks as follows: Bid. Off'd. Bid. Off'd. Colum. & Beaver, \$1.00 Lowland Chief, \$.05 Globe Copper, 1.80 Menlo, \$1.25 Highland Chief, \$.20 Satemo, 1.50 Hite, 2.00 3.00

DIVIDENDS. The Alice Gold and Silver Mining Company has declared a monthly (No. 10) dividend of 10c. per share, payable on the 15th inst. Transfer-books close on the 10th. The Bulwer Consolidated Mining Company has declared its first monthly dividend of 10c. per share, payable on the 12th inst. Transfer-books closed on the 5th. The Chesapeake & Ohio Steam Transportation and Mining Company has declared a final dividend of 22c. per share, payable at the office of the Farmers' Loan and Trust Company, 26 Exchange Place, on the surrender of the certificates. The Deadwood-Terra Mining Company has declared its dividend for November of 15c. per share, payable on the 20th inst. Transfer-books close on the 15th. The Ontario Silver Mining Company has declared its usual monthly dividend of \$75,000—making \$3,950,000 to date—payable on the 15th inst. Transfer-books close on the 10th. The Silver King Mining Company, of Arizona, has declared a dividend of 25c. per share.

SAN FRANCISCO MINING STOCK QUOTATIONS. Daily Range of Prices for the Week. Table with columns: NAME OF COMPANY, Dec. 2, Dec. 3, Dec. 5, Dec. 6, Dec. 7, Dec. 8, Dec. 9.

Table with columns: NAME OF COMPANY, Dec. 2, Dec. 3, Dec. 5, Dec. 6, Dec. 7, Dec. 8, Dec. 9. Lists various mining companies and their stock prices.

REVIEW OF THE SAN FRANCISCO MARKET.

Union Consolidated has been well maintained during the business of the week under review, but with this exception the market is lower. It is stated that the principal interest in the Comstocks now centers in Union Consolidated, and that seams of ore which pitch to the south continue to be met with as the drifts from the Union Consolidated shaft and the Union Sierra joint winze near each other. It will require several days' work, however, to prepare for cross-cutting from the drifts on the 2700 level of this mine.

It is stated that the drill on the lower level of the Mexican has passed into a lower grade of ore. This stock is down to 89%. A dispatch to the Tribune, dated December 7th, says:

The superintendent of the Sutro Tunnel reports the progress of the south lateral drift for the two weeks ending December 1st 180 feet; total for December, 330 feet. The prospect-drift is now in 205 feet. Suit has been brought against the trustees of the Raymond & Ely Company for \$377,000. The plaintiff claims fraud in the management; but the suit is considered a blackmailing scheme. Segregated Belcher has been assessed \$1 per share;



COAL STOCKS.

Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.

NAME OF COMPANY.	Capital Stock.	SHARES.		Last Dividend.	Rate per Ann.	Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.												Sales from Dec. 1 to Dec. 9th inclusive.
		No.	Par Val.			Dec. 3.		Dec. 5.		Dec. 6.		Dec. 7.		Dec. 9.		H.	L.	
						H.	L.	H.	L.	H.	L.	H.	L.	H.	L.			
Am. Coal Co.	1,500,000	90,000	25															
Cameron Cl.	2,500,000	50,000	50															
Col. C. & I.	10,000,000	100,000	10															
Ches. & C. RR	15,000,000	150,000	100															
Consol. Coal	10,250,000	102,500	100	Jan. 77	2%													
Cumb. C. & I.	500,000	5,000	100															
Del. & N. C.	20,000,000	200,000	100	Sept. 81	1%													
D. & W. RR	28,000,000	280,000	50	Sept. 81	1%													
Lehigh & N.	10,448,500	208,971	50	Nov. 81	3%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	
Leh. V. Y. R.R.	27,042,900	540,858	50	Oct. 81	1%													
Maryd. Coal	4,000,000	40,000	100															
Moncauk Cl.	2,500,000	25,000	100															
Morris & Es's	15,000,000	300,000	50	July 81	1%													
New Cen. Cl.	5,000,000	50,000	100	Apr. 80	2%													
N. J. C. R.R.	20,000,000	200,000	100	Oct. 76	2%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	
Penn. Coal	5,000,000	100,000	50	May 79	3%													
Penn. R. R.	18,870,200	1,887,020	50	Nov. 71	1%													
Ph. & D. RR	34,278,150	685,563	50	7%	10%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	
Spring Mt. Cl.	1,500,000	30,000	50	Dec. 81	3%													

Total Sales... 39,879.

Of the sales of this stock, 43,686 shares were in Philadelphia and 168,735 in New York.

BOSTON MINING STOCKS.

	Dec. 1.		Dec. 2.		Dec. 3.		Dec. 5.		Dec. 6.		Dec. 7.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adrie Cons.	1.14	1.13	1.15	1.14	1.15		1.15		1.15				2,200
Allouez	4.00	3%					3%						550
Ariz. Queen													
Atlantic	17%	16%			16%		16%		16				780
Beacon Hill	1.15		1.16		1.16	1.15	1.17	1.16	1.16		1.16		1,700
Blue Hill													
Bonanza Devel.	5%	4%	5%		5%	5.3-16					5%		3,398
Breece													
Brunswick Ant'y											6.00		25
Cal. & Hecla			235.00		237.00		239.00	238.00					98
Catalpa			81%	75	75		75	71%	62%				1,275
Cedar Springs	.94	.85			1.00		30		30%		.95		1,800
Central													300
Central Arizona													
Commonwealth Mica			1.40						1.42		1.43		250
Columbus Gold													
Copper Falls	5.00												70
Copper Harbor			2%	2.13-16	2%								400
Copperopolis	2.37	2.22	2.37	2.22	2.2%		2.22		2.22				6,000
Crescent	6%												100
Crystal Mica													
Cumberland	.60	.54	.61	.55	.62	.55	.55	.54	.62	.55			9,000
"Cusi"													
Dana			.25		.33		.33		.33				1,200
Deer Isle	.61	.50	.60	.52	.52	.49	.55	.40	.52	.42	.45	.43	31,050
Douglass	3%				2.00		2%	1.25					350
Duncan													
Dunkin													
Edgemoggin	.65	.52	.54		.32	.31	.33	.31	.65	.52			6,500
Empire	.36	.34	.31	.30	.32	.31	.33	.31			.32		6,100
Eureka Tunnel													
Franklin	15%	14%	14		14%	14%	15	14%	14%	14	14%	13%	2,230
Galena Hill, pref.													
Gem													
Globe, pref.													
Golden Development													
Gouldsboro													
Granger			.03				.04						1,500
Harshaw							3%	3.00	3%				360
Hopewell Mang.	.87	.86	.96	.88	.90		.91	.90	.90				3,400
Huron	4%										4%		170
Indian Queen													
Mammoth Copper													
Mascot													
Mass. & N. Mex.	.22	.21	.22	.21			.22		.22	.21	.21	.20	13,700
Mendocino													
Mesnard													
Mitton	1.45	1.20	1.45	1.22	1.32	1.20	1.32	1.15	1.54	1.14	1.65	1.51	74,400
Napa													
National	3%	3%	3%		3.00						3.00		825
No. Castine													
Osceola	32%				31%		32	31%					175
Peabody									.65				500
Pewabic	17%	16%	16%	16	16%	16	16	15%			15%		2,609
Phoenix									2.00		2%		450
Pine Tree													
Plymouth Gold													
Port & Sullivan													
Quincy	.50	.48	.48%	.48%	.48	.47%	.48%	.48	.48%	.48%	.48	.47%	1,504
Ridge	4%		4%						4%	4.00			400
San Pedro	1%				15-16				1%				425
Silver Hill													
Silver Islet	25%	24%	25%		25		25						355
Silver Lake													
Simpson Gold													
South ite.													
Sta. Copper													
Sultan Mtn. Silver	.55		.55	.54	.55		.55		4.00		.56		1,600
Sullivan	4.00	3%			4%	4.00			4.00		3.15-16		4,660
Svamore													
Titus Cons													
Tremont Silver											.42		100
Twin Lead									.46		.44		200
W. Minnesota													
Young Hecla													

Mono and Bodie each 70 cents; California and Lady Bryan each 25 cents; and Putnam 10 cents.  
The Yellow Jacket delinquent sale has been postponed one week.  
The Austin, Nev., Reveille has this to say of the Comstock quotations as they prevailed in 1867:  
In looking over our old files, we came across the stock quotations of July 3d, 1867, as follows: Yellow Jacket, \$1650 per foot; Savage, \$5000; Crown

Point, \$2200; Gould & Curry, \$755; Kentucky, \$540; Chollar-Potosi, \$450; Belcher, \$470; Overman, \$220; Ophir, \$350; Imperial, \$220; Bullion, \$4; Justice, \$1; Sierra Nevada, \$20. Savage was at that time paying a monthly dividend of \$300 a foot. It was all feet those days. About the 1st of August, 1867, Savage was cut up into 20 shares to the foot. Very shortly afterward, the foot business was set aside and stock-watering became of frequent occurrence. Some of the stocks were watered to such an extent that they sank out of sight under the treatment.

Coal Stocks.

NEW YORK, Friday Evening, Dec. 9.  
With a few exceptions, there is a slight downward tendency in the market for these stocks. A very liberal business has been transacted and prices were irregular and rather inclined to weakness, though stiffening somewhat at the close. The movement in Reading has been the principal feature of the market. The sales in this market amount to 108,725 shares, closing at \$68%. Delaware, Lackawanna & Western has had sales of 162,000 shares at prices ranging from \$128%@\$126%, and closing \$127%. Delaware & Hudson records sales of 4725 shares at \$108%@\$107. New Jersey Central, on sales of 33,322 shares, has fluctuated between \$96% and \$94%, and closes at \$95%.

Copper and Silver Stocks.

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

BOSTON Dec. 8.  
The market for copper stocks during the past week shows a good degree of activity, but owing to some realizing, and the tightness of the money market, prices generally have declined slightly from the highest quotations of last week. The decline we regard, however, as only temporary, as, with a strong market for ingot copper, higher prices must rule during the next two or three months. Calumet & Hecla shows an advance from \$235@\$239, and is exceptionally strong. Quincy opened at \$48%, declined to \$47%, and again advanced to \$48%, closing to-day at \$48. About 1200 shares changed hands for the week. Franklin declined from \$14%@\$15%, and closed at the lowest price for the week. Pewabic also declined from \$17%@\$15%, which was the lowest for the week. The product of this mine for the month of November exceeded 150 tons, against 80 tons during the same month last year. The ore is high-grade, and the production will undoubtedly show a large increase in the ensuing year. The stock is cheap at present prices compared with other mines. Atlantic declined from \$17@\$16, the sales being, however, quite light. Osceola has ruled quite steady at \$31%@\$32%. Central sold at \$30, a small lot going to-day at \$29.

In silver stocks, there was but little doing at the regular Stock Board, transactions in this class being confined largely to the Mining Board. Silver Islet has been quiet, with sales of less than 200 shares at \$25%@\$25. Bonanza steady at \$5%@\$5. Sullivan advanced to \$4%, closing lower at \$3% sales. Harshaw declined to \$3, closing \$3%. Catalpa declined to \$5%.  
At the Boston Mining and Stock Exchange, Milton has been the principal feature, showing large sales and an advance from \$1 1/4@\$1.65. Deer Isle has also been quite largely dealt in, declining from 52@40c., the last sale being made at 42c. Edgemoggin steady at 52@55c. regular, and 65c. buyer 60 days. Empire once more comes to the front, and is quite active at 30@32c.

3 P.M.—The market this afternoon was without any special change worthy of notice. Franklin, \$13% bid; Pewabic, \$15 bid, \$17% asked; Quincy, sales at \$48 and bid; Harshaw, \$3%@\$3%.

BULLION MARKET.

NEW YORK, Friday Evening, Dec. 9.

The somewhat higher figures in London have advanced our market here the past week; but at the close private advices from abroad report the market uncertain, in consequence of the recommendations of the President and Secretary of the Treasury, that the coinage of silver dollars be restricted for the future.

DATE.	London		N. Y.		DATE.	London		N. Y.	
	Pence.	Cents.	Pence.	Cents.		Pence.	Cents.	Pence.	Cents.
Dec. 3.	51%	112%	52	112%	Dec. 7.	52</			

price of silver. If the price of silver be counted at \$1.12 per ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 13½ per cent to arrive at actual value

MINES.	States.	For the week.	Month of November.	Year from Jan. 1st, 1881.
*Alice, g. s.	Mont.			\$856,741
*Barbee & Walker, s.	Utah	\$1,039	\$13,217	186,732
*Belle Isle, g. s.	Nev.	5,100	5,100	17,160
*Big Pittsburg, s.	Cal.			57,949
*Black Bear, g.	Cal.			84,976
*Bodie, g.	Cal.	6,000	23,700	334,507
*Caledonia, g.	Cal.			101,974
*California, g. s.	Nev.			118,094
*Caribou, s.	Cal.			121,991
*Castle Dome, s.	Ariz.			197,259
*Christy, s.	Utah			255,884
*Chrysolite, s.	Cal.			810,242
*Concordia, g.	Cal.			2,234
*Connor, s.	Utah		9,030	108,723
*Con. Virginia, g. s.	Nev.			148,960
*Crismon-Mammoth, g.	Utah		3,852	60,454
*Custer, g. s.	Idaho			722,889
*Deadwood-Terra, s.	Dak.		67,117	687,913
*Herbec-Blue-Gray, g.	Cal.			109,267
*Eureka Con., g. s. L.	Nev.			1,333,538
*Exchange Silver.				44,400
*Fresno Enterprise, g.	Cal.			9,600
*Grand Central, s.	Ariz.	119,277		728,990
*Grand Prize, s.	Nev.			51,658
*Hale & Norcross, g. s.	Ariz.			33,090
*Harshaw, s.	Ariz.			402,649
*Head Center, s.	Dak.			80,231
*Homestake, g.	Dak.	102,412	1,074,035	1,074,035
*Horn-Silver, s. L.	Utah	7,500	315,000	1,595,519
*Idaho, g.	Cal.			34,600
*Independence, s.	Nev.	11,500	11,500	162,410
*Indian Queen, s.	Cal.			327,600
*Iron Silver.	Cal.			405,211
*Jocunita, s.	Mex.			169,645
*Little Chief, s. L.	Cal.			246,753
*Mack Morris, s.	Ariz.	21,300		34,704
*Modoc, s.	Cal.			15,200
*Morning Star, s.	Cal.			74,319
*Mount Potosi, g. s.	Nev.			128,124
*Navajo, s.	Ariz.			2,755
*New York & Arizona.	Cal.			197,343
*Noonday, g.	Nev.	19,500	77,640	1,119,406
*Northern Belle, s.	Cal.			46,045
*Oneida, g.	Utah			2,038,650
*Ontario, s.	Nev.			22,170
*Ophir, g. s.	Utah	17,000		29,950
*Pascoe, s.	Cal.			10,512
*Rebellion, s.	Nev.			672,135
*Richmond, s. L.	Cal.			129,009
*Robinson Con., s.	Cal.			179,001
*Sierra Nevada, g. s.	Nev.			432,504
*Silver Bow, g. s.	Mont.			26,925
*Silver Cliff, s.	Cal.			541,683
*Silver King, s.	Ariz.	26,000	79,325	3,060
*Sonora Con. M. & M. Co.	Cal.	42,800	178,476	1,851,835
*Standard, g.	Nev.			233,755
*Star, g.	Utah	6,685	29,600	237,511
*Stormont, s.	Utah			5,347
*Sullivan, s. L.	Maine.			84,587
*Syndicate, g.	Cal.	6,000		108,071
*Tintic M. and M. Co.	Utah	11,783		255,029
*Tip Top, s.	Ariz.			1,306,498
*Tombstone, g. s.	Ariz.			43,100
*Union Con., g. s.	Nev.			1,700
*Vandewater, s.	Cal.			388,402
*Vizina, s.	Ariz.			1,170,476
*Western, g. s.	Cal.			

Total amount of shipments to date. . . . . \$23,379,218

\* Official. † Net. G. Gold. S. Silver. L. Lead. ‡ Assay value.

**METALS.**

NEW YORK, Friday Evening, Dec. 9.

As the close of the year is approaching, consumers appear to show less disposition to buy more than their immediate requirements call for.

**Copper.**—The Lake companies do not all appear to be acting in concert, some of them asking 19½c. for cash copper, while others ask less. During the week, the market has been quiet, though tolerably firm, a few hundred thousand pounds having changed hands at 19½c., the ruling rate, both for Lake and Baltimore, which has, however, been shaded in some instances in favor of buyers. Our market is, therefore, stationary, so that the advance now being realized abroad is again approaching the two markets. The latest quotations by cable from London are £69.

From London we have the following advices by mail:

Nov. 18th. Chili Bars continue in active request, and we note a further improvement in values. Spot metal, g. o. bs., sold from £66@£66½ cash, £66½@£66¾ one month, £67@£67½ being paid for January deliveries, £67@£67½ for three months prompt. The market for this description is in somewhat an excited state, and there are now rather buyers than sellers at top rates. Best brands found takers at £63½@£67 cash; £67½ short arrival.

Nov. 21st. An active market for Chili Bars since we last wrote, though prices hardly closed at their best. Cash metal has been dealt in since Friday, from £66½@£67, but the highest rate was only obtained in one

isolated instance, and the bulk of the trade was done at £66½@£66¾. Parcels with one month's prompt fetched £66½@£67; three months' stuff went at £67½@£67¾, chiefly, however, at £67½.

Nov. 22d. Chili Bars are steady, with a fair business doing at current values; spot metal is comparatively scarce, and it would be difficult to purchase any important quantities at the ruling quotations. We note a warrant or two of g. o. bs. at £66½ cash, while a good trade was done in forward deliveries at £67½ two months, £67½@£67¾ three months prompt. Sales are reported in best brands at £67@£67½ cash.

Nov. 25th. Values of Chili Bars have nearly recovered to the point from which they fell, g. o. bs., which were sold this morning at £65½@£65¾ cash and short fixed prompts, finding takers on afternoon 'Change at £66½ same terms. A good trade was also done in three months' stuff at £67@£67½, and we closed with rather buyers than sellers at top rates. Wallaroo Cake is quoted at £71½@£72; Burra, £70@£70½.

**Tin.**—During the week, there have been sales and re-sales of an aggregate of 1000 tons of tin, at prices beginning at the close of week at 23c., and ending to date at 23½c., partly spot, but chiefly to arrive. Some of this tin was bought for foreign account, but it is not known whether it is intended to ship any of it. In England, the price of the metal was, according to the latest cables, £108 10s., at Singapore \$35½, and at Penang \$33½. The market here closes with 23½c. bid and 24c. asked for cash lots, and 24c. bid and 24½c. asked for January delivery.

We have the following mail advices from London: Nov. 18th. Tin has been somewhat irregular to-day, but closed firm at the highest prices. Transactions took place in sharp cash from 103½@104½s.; fourteen days, from 103½@104½s.; three months, from 105@106s.

Nov. 21st. Tin has been largely dealt in from 106@107s. sharp cash, 106½@107½s. fourteen days, 107@108½s. three months; but a slight reaction took place this afternoon, and we closed with sellers at 106s. cash, 106½s. fourteen days, 107½s. three months, buyers showing but little disposition to make counter offers.

Nov. 22d. Irregular and rather lower in price. Our first 'Change transactions took place at 105@105½s. sharp cash, but value subsequently recovered to 105½s.; fourteen days' stuff sold at 105½@106s.; and a little three months changed hands at 106½@107s.

Nov. 25th. Tin has recovered from the recent depression, and a fair business was done to-day at higher prices. Sharp cash sold from 104½@105½s.; fourteen days, at 105@105½s.; three weeks, at 105½s.; two months, at 105½@105¾s.; three months' prompts at 106@106½s., closing steadily at the highest quotations.

**Tin Plates.**—There has been considerable activity in cokes, owing to a scarcity of spot stocks. We quote: Charcoal tins, Melyn grade, ½ cross, 86½; Allaway grade, \$5.87½. Charcoal Terne, Dean grade, \$5.37½@5½ for 14 x 20, and \$11½@11½ for 20 x 28; Allaway grade, \$5@5½ for 14 x 20, and \$11@11.12½ for 20 x 28. Coke tins, B. V. grade, IC, \$5.50.

**Lead.**—This metal is in a somewhat anomalous position in this market, due principally to the fact that it is pretty bare of spot stocks, thus being dependent for supplies upon the West, where, however, there seems to be no scarcity. Here there is little doing in common, the sales probably aggregating about 200 tons, at rates ranging from 5@5.20c., according to delivery. Refined has been selling to the extent of 300 to 400 tons at 5c., so that buyers virtually have the option of taking either grade.

The receipts of lead at St. Louis via the St. Louis & San Francisco Railroad for the week ended November 30th amounted to 279 tons.

**Spelter and Zinc.**—There has been a moderate business in spelter, which commands from 5½@6c. for common domestic, and the same for Silesian, of which 200 tons were sold during the week. We may mention here that there are rumors that the water in the mine of the Bergen Port Company at Friedensville, Pa., is getting troublesome.

**Antimony.**—The demand for this metal continues at a jobbing rate at unchanged price. We quote

Cookson's, 14½c.; Hallett's, 13½c.; and American, 13c.

**Quicksilver.**—The San Francisco Commercial Herald of December 1st says:

Our London correspondent sends us the following, dated November 8th, 1881: The copy of a London circular, which we quote on the 6th of October, requires careful attention. It makes an error in giving the exports from California. For the first six years it gives the quantity shipped by sea only, but in the last four years it includes overland. The California exports by sea were as follows: In 1877, 46,280 flasks; 1878, 34,280 flasks; 1879, 52,180 flasks; 1880, 34,648 flasks. The circular goes on to give the annual consumption as 41 per cent increase. We have no figures to verify this. The exports from London and California were as follows:

1871 to 1875, California. Flasks.	70,283
London . . . . .	162,323
1876 to 1880, California. Flasks.	208,528
London . . . . .	129,658

Increase about 45 per cent. It is important therefore that the increased production should be noted:

1871 to 1875—California, London, etc.	427,200 flasks.
1876 to 1880—California, London, etc.	631,500

There is increase about 48 per cent. So that the production has increased greater than the consumption. The production is now, however, less than it was. Quicksilver can be put free to Eastern ports of the United States from London at a price under the London quotations. The following are the official figures of this year up to October 31st last of imports and exports:

Years.	Exports.		Imports.	
	Pounds.	Flasks.	Pounds.	Flasks.
1880 . . . . .	919,209	12,175	3,612,026	47,841
1881 . . . . .	1,449,724	19,201	3,528,467	46,734

The imports are less, while the exports have increased about 58 per cent since same time last year. The latest London cable quotation is £6 10s. Here the price is nominally 40c. At the close, small spot sales are said to be making at 38@38½. The receipts for the first eleven months of 1881 aggregate 46,928 flasks. The exports overland for the first ten months were 10,310 flasks, of which 5550 flasks were shipped from this city. The exports by sea for the first eleven months were 29,538 flasks.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Dec. 9.

The week under review has not brought with it any important business, and prices are about as they were a week ago. The situation is a very strong one, and it would not be surprising if some large contracts were made before the end of the year, while soon after there will probably be many more.

**American Pig.**—We learn of sales of 4000 tons of Nos. 1 and 2 X Thomas iron at \$24@26 respectively, and 100 tons of Crane No. 1 Foundry at \$26½. There is some No. 1 iron, a Lehigh make, which has been refused, offering at \$25, but does not find takers, owing to quality. It is said that some North River brands of No. 1 Foundry are offering as low as \$24½. We quote No. 1 Foundry at \$25@26; No. 2 Foundry, \$23@24; and Forge, \$22@23.

**Scotch Pig.**—Owing to the long passages made by the steamships, there has been but little iron pressed on the market, and prices are firm, with but little doing. The Glasgow market is higher. We have cable advices quoting Warrants at 58s.; Coltness, 62s. 6d.; and Summerlee, 61s. 6d. It is surmised that the Scotch makers have taken a favorable view of the President's message, and are looking for a reduction in the duty, and hope thereby to find a greatly increased market in this country. In this they are likely to be mistaken, unless a much greater reduction were made than any one is looking for on this side. We quote Eglinton at \$23½; Glengarnock, \$24½; Gartsherrie, \$25 from ship and \$26 from yard; Coltness, \$26½; and Summerlee, \$26. A sale of 1000 tons of Bessemer iron ex store at \$26 is reported. It is said that this exhausts all spot iron. It is rumored that 5000 tons have been sold to arrive at \$27. English is firm at \$22 for red car.

Messrs. John E. Swan & Brothers, of Glasgow, under date of November 25th, report 105 furnaces in blast, as against 120 at the same time last year. The quantity of iron in Connal & Co.'s stores was 617,477 tons, an increase of 2914 tons for the week. The shipments show a decrease since Christmas of 88,815 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 40,151 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 59s.; Coltness, 52s. 6d.; Langloan, 61s. 6d.; Summerlee, 58s.; Carnbroe, 53s.; Glengarnock, 52s. 6d.; Eglinton, 51s. 6d.; Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 46s.; No. 2, 44s.; No. 3, 42s.; No. 4, 41s. 6d.; No. 4 Forge, 41s.

Messrs. J. Berger Spence & Co., of Manchester, under date of November 26th, say: The reports to



hand during the week show that the pig-iron trade has remained in an almost unchanged position. As a rule, stocks are not increasing, and in the absence of any material increase in the quantities shipped, a proof is furnished of the enormous quantity of iron going into consumption in the home trade. Glasgow continues to be the weakest link in the chain. In the presence of the enormous stocks held there, it would require considerable confidence on the part of the operators in an endeavor to manipulate them successfully to an advance. But as the current trade seems to be almost entirely of demand and supply, no doubt a speculative movement will soon arise. It would seem, judging of the position as it is, that the greater the activity in a movement of this nature, the greater would be the success in "bulling" prices. Toward the close of the week, Scotch Warrants have weakened, and are now obtainable at about 50s. 9d. This has had an adverse influence on Middlesbrough numbers. While early in the week quotations for No. 3 were firm at 41s. 10½d., sales have since been made under 41s. 9d., at which figure they nominally stand at present, with No. 1 at 45s. 6d., and No. 4 Forge 40s. 9d. Connal's stocks were lower on Tuesday by 1900 tons. Bessemer iron is, in some cases, quoted higher, but advances are difficult to obtain, notwithstanding that a rather large trade is done.

**Rails.**—In steel we do not learn of any business, and quote domestic at mills for next year's delivery at \$60@61. Foreign cost from \$62@64 to land. There is a good inquiry for iron rails, with but little business doing. Domestic rails at mills are quoted at \$48@50, and foreign here at \$48@49.

**Old Rails.**—A speculative remnant of the iron "boom" was sold at auction during the week. It was 1000 tons of Ts. and D. Hs. The former brought from \$28@29, and the latter \$30. We learn of other sales aggregating 3500 tons of Ts. and 1400 of D. Hs. We quote Ts. at \$29, and D. Hs. at \$31.50.

**Wrought Scrap** is quiet at \$30.50 for shipment, and \$32 from yard.

We publish the following letters from our regular correspondents:

**Cincinnati.** Dec. 7.

[Specially reported by JACOB TRABER & Co.]

Our market for pig-iron of all grades is firm at our quotations, with a demand fully equal to the supply. The outlook is promising for a continuance of a fair demand; and unless it is attempted to run prices up still higher, this market will be able to maintain present prices.

**Louisville.** Dec. 6.

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

The market is quiet but firm; nearly all the consumers are well supplied here by purchase. The amount of iron received and delivered on contract is large, but sales small. Our quotations are for cash:

**FOUNDRY IRONS.**

	No. 1.	No. 2.
Hanging Rock Charcoal...	\$29.00@30.00	\$27.00@28.00
Southern Charcoal.....	26.00@ 27.00	24.00@ 25.00
H'n g Rock, Stc'l & Coke....	27.00@ 27.50	25.00@ 26.00
Southern Stonecoal & Coke	26.50@ 27.00	25.00@ 26.00
Amer. Scotch... \$24 @ \$25	Silver Gray \$22.00@ \$24.00	
Scotch Iron.....	@	

**MILL IRONS.**

No. 1 Charcoal, cold-short and neutral...	\$24.00@ \$25.00
No. 1 Stc'l & Coke, cold-short and neutral...	23.50@ 24.00
No. 2 Stc'l & Coke, cold-short and neutral...	22.00@ 23.00
No. 1 Missouri and Indiana, red-short...	25.00@ 26.00
White & Mottled, cold-short and neutral...	18.00@ 20.00

**CAR-WHEEL AND MALLEABLE IRONS.**

Hanging Rock, cold blast.....	\$35.00@ \$38.00
Alabama and Georgia, cold blast.....	34.00@ 38.00
Kentucky, cold blast.....	34.00@ 36.00
Hanging Rock W. B.....	30.00@ 33.00

**Richmond.** Dec. 6.

[Specially reported by ASA SNYDER.]

There has been no change in the market since last report. Prices are strong at following quotations:

Scotch Pig-Iron.....	\$24.50@ \$27.50
Anthracite Pig-Iron No. 1.....	25.00@ 27.00
" " " " No. 2.....	23.00@ 24.00
" " " " No. 3.....	22.00@ 23.00
Virginia Coke Pig-Iron, No. 1.....	@ 24.00
" " " " No. 2.....	22.00@ 23.00
" " " " No. 3.....	20.00@ 22.00
Va. Charcoal C. B. Wheel Iron.....	34.00@ 36.00
Old Rails.....	22.00@ 24.00
Wrought Scrap No. 1.....	24.00@ 25.00
Cast Machinery Scrap.....	20.00@ 21.00
Richmond Refined Bar-Iron.....	2 8-10@ 03
Horse-Shoes (Tredegar).....	@ 4.00
Nule.....	@ 5.00

**St. Louis.** Dec. 3.

[Specially reported by HOFFER, PLUMB & Co.]

We continue our quotations of last week, and there is nothing new to report of the condition of the market:

**HOT BLAST CHARCOAL.**

Missouri.....	\$25.00@
Southern.....	28.00@
Ohio.....	30.00@ \$31.00

**COKE AND COAL.**

Missouri.....	None offering.
Southern.....	\$27.50@ \$29.00
Ohio.....	27.00@

MILL IRONS.	
Red short.....	\$25.00@ \$26.00
Neutral.....	23.00@ 24.00

CAR-WHEEL AND MALLEABLE IRONS.	
Missouri.....	\$28.00@ \$34.00
Southern.....	35.00@ 38.00
Ohio.....	32.00@ 43.00

**Philadelphia.** Dec. 9.

The market in crude iron leans to higher prices. Renewals of old contracts were refused this week, and nothing is offering. Very limited purchases will be made this month. Furnace companies are content to let quotations follow English prices, which they are quietly doing. About \$21 represents prices obtained this week for Forge iron. Bids were made for special grades for February and March. Makers prefer, when they enter into contracts, to name prices month by month. No. 2 is scarce at \$23.50; No. 1 sells mostly at \$26. Any increased demand will harden prices. Importers have orders for large lots, which they can not fill. Bessemer continues active, and sales since 1st inst. will aggregate 40,000 tons. Steel blooms are high and scarce, but negotiations are in progress. Five hundred tons Muck Bars sold at \$45; smaller lots brought \$45.25. The demand absorbs production. Charcoal blooms are active at \$72 delivered. One lot of three hundred tons were placed slightly under this; 500 tons Skelp sold at 3¼c., and smaller lots are inquired for. The pipe and tube works are pushed, and their capacity sold far ahead. Merchant iron continues in fair demand at 28c.; stores, 29@3c. The demand is still crowding on capacity, but requirements are under control. The general tone of inquiry indicates a healthy state of trade. Consumptive demand is large and steady, and mill; are quietly booking orders for execution late in January. Structural iron is quiet at 3¼c. for Angles, 4c. for Beams, 4¼c. for Channels and Ties, with such moderate concessions as the outlook seems to warrant. Manufacturers do not solicit business. Plate and Tank orders are quiet. Tank can not be had ordinarily under 3¼c.; concessions have been given on 4c. for Refined. Negotiations for domestic steel rails failed this week, and two orders went abroad, covering 15,000 tons. Old material is dull. Scrap is firm and active at \$33@37.

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, Dec. 9.

**Anthracite.**

The amount of coal being distributed does not decrease, and new orders are still fairly numerous especially for stove and chestnut sizes. Some of the larger sizes are easy, as well as pea size. The larger sizes, however, are not accumulating rapidly, as many companies are crushing a great portion of such sizes for the purpose of making stove and chestnut coal, which are in such great demand. The result is a greater proportion of pea size than usual. Besides, at this season of the year but little pea coal is usually sold. Prices for all sizes are about as they were a week ago, and but little change is looked for this month. Vessels have been fairly abundant, especially for points this side of the Cape, while to Boston and points beyond the Cape rates are higher.

In the movement and mining of coal there has been nothing during the past week to attract especial attention. It is stated that the contract of the firm of Charles Parish & Co., which employs a large number of men, with its employes, expires at the end of the year. It is thought higher wages will have to be paid in 1882, and that demands will also be made by the employes of the Delaware, Lackawanna & Western, Delaware & Hudson, Pennsylvania Coal, and other companies operating in the Wyoming District.

The following figures from the reports of coal mining and transportation companies ending their fiscal years with November 30th are highly encouraging to the stockholders of said companies:

The Lehigh Valley Railroad Company reports the following coal tonnage for the fiscal year ended November 30th, as compared with 1880:

	Tons, 1881.	Tons, 1880.
From Wyoming Region.....	1,356,507	1,162,706
" Hazleton.....	2,674,078	2,125,105
" Upper L'gh.....	29	
" Beaver Meadow.....	502,631	441,592
" Mahanoy.....	1,257,933	876,860
" Mauch Ch'k.....	198	152
" Port Del'w'e.....		
Increase in 1881.....	5,791,376	4,606,415

The Pennsylvania & New York Railroad reports the

**FREIGHTS.**

**Coastwise Freights.**

Per ton of 2240 lbs.

Representing the latest actual charters to Dec. 9th, 1881.

Ports.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Am boy, Hoboken, and Weehawken.
Alexandria.....		1.25	
Annapolis.....		2.00	
Albany.....			1.00
Baltimore.....	.60		1.75
Bangor.....			1.75
Bath, Me.....			1.75
Beverly.....			1.70
Boston, Mass.....	2.30@2.40	2.25	
Bristol.....			.70
Bridgeport, Conn.....			
Brooklyn.....			
Cambridge, Mass.....			
Cambridgeport.....			1.60
Charleston.....			1.75
Charlestown.....			
Chelsea.....			
City Point.....			
Mem. Pt., Mass.....			1.70
E. Boston.....			
East Cambridge.....			
E. Greenwich, R. I.....			1.00
Fall River.....	2.00	1.90	
Galveston.....			
Georgetown, D. C.....			
Gloucester.....			
Hartford.....			1.10
Hackensack.....			
Hudson.....			
Lynn.....	2.55		
Marblehead.....			
Mem. Pt., Mass.....			
Millville.....			
Milton.....			
Newark, N. J.....			1.10
New Bedford.....	2.00		1.85
Newburyport.....		2.50	.70
New Haven.....			1.00
New London.....			.75
Newbern.....			1.00
Newport.....			
New York.....	77½@.85	1.70	
Norfolk, Va.....	1.00	1.00	
Norwich.....		2.00	
Norwalk, Conn.....		1.90	.80
Pawtucket.....		1.90	\$ 1.10
Philadelphia.....		.85	
Portland.....	2.00	2.25	1.70
Portsmouth, Va.....			1.10
Portsmouth, N. H.....		2.25	1.85
Providence.....	1.95@2.00	1.85	1.00
Quincy Point.....			1.60
Richmond, Va.....	1.30@1.50		
Rockland.....			
Rockport.....			
Roxbury.....			
Saco.....			
Sag Harbor.....			
Salem, Mass.....			1.70
Saugus.....			
Savannah.....			
Somerset.....			1.10
Staten Island.....			
Trenton.....		1.10	
Troy.....		2.00	
Wareham.....		2.50	
Washington.....	1.20@1.25	1.25	
Weymouth.....			
Williamsbz, N. Y.....			
Wilmington, Del.....		.85	
Wilmington, N. C.....			

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

following anthracite coal tonnage for the fiscal year ended November 30th, as compared with the previous year:

	Tons, 1881.	Tons, 1880.
From the Lehigh Valley RR.....	712,014	410,701
" Lack. & Bloomsburg RR.....	253,631	208,069
" Pleasant Valley Branch.....	87,577	37,046
" State Line & Sullivan RR.....	64,854	48,617
Increase in 1881.....	1,108,056	705,464

This road also carried 419,551 tons of bituminous coal, as compared with 435,517 tons during the previous year, showing a falling off of 15,966 tons for 1881.

The Philadelphia & Reading Railroad Company's report shows that the total amount of coal carried during the fiscal year ended November 30th was 8,072,440, tons, as compared with 7,179,399 tons in 1880, showing an increase for 1881 of 893,041 tons.

The shipments over the Schuylkill Canal aggregated 600,447 tons, as compared with 521,989 tons in 1880, showing an increase of 78,458 tons for 1881.

Our report for the week ended December 3d shows that the shipments of anthracite coal were 654,376 tons. This is a remarkable business for this season of the year, and although there will probably be some reduction in output during the remaining four weeks of this

year, the average shipments will probably equal 600,000 tons per week. Should this prove so, the shipments will aggregate for the year 28,500,000 tons, or greater than was expected by the most sanguine. This, however, does not represent the actual production, as it is estimated by the best authorities that at least six per cent of the production is consumed at the mining centers and does not appear in the shipments reported by the railroad companies. With this amount added, the production will be brought up to nearly 30,250,000 tons.

The production of anthracite coal last week was 654,376 tons, as compared with 457,812 tons the corresponding week of 1880. The total production from January 1st to December 3d was 26,100,763 tons, as against 21,924,560 tons for the like period of last year, showing an increase this year of 4,176,203 tons.

Our Philadelphia correspondent, under date of December 8th, says:

The local trade is still holding remarkably well for the season, though showing the approach of the holidays. New orders for shipments are scarce, and broken egg dull, but old unfilled orders for stove are still pressing, and that size very scarce. Vessels have to wait five or six days for a load. Chestnut is also scarce. More vessels have arrived this week than for weeks past. The rate is maintained at \$2.30 to Boston for from 500 to 600 tons and up, to \$2.50 to \$2.60 for light-draught vessels. The prospect for next year is very encouraging, and but little curtailment this winter will be needed, if judiciously applied.

**Bituminous.**

There is but little change in the business for this coal. As high as \$5.25 is paid now, while in emergencies even higher prices have been paid by those mining companies and firms which have contracts which they are unable to fill from their own productions. The production at present is only about large enough to meet contracts, while new and incidental business, although not large, is the main factor in putting up prices. The Chesapeake & Ohio Canal is still doing some business, but a fear that it as well as the Potomac River may freeze up at any day makes this outlet very uncertain, and naturally curtails the shipments. Cars are scarce to all the districts, and as yet there are no signs of a material improvement. Until the railroad furnish greater means of transportation, there does not appear to be any chance of a material reduction in the market price of this commodity.

**San Francisco, Dec. 1.**

Word has gone out from the old resurrected coal combination that prices are this day to be advanced 50c. per ton. Our spot stocks are unprecedentedly large of all kinds of foreign bituminous, and bought at prices below the actual cost of importation, and the advance demanded is to enable the North Pacific coast mines and those of British Columbia to prosecute their business without loss at current high freights. Imports for the week include 2800 tons Seattle, per Willamette; 950 tons same, per Harvest Home; 1540 tons Wellington, per Germania; 1850 tons same, per Barnard Castle; 1570 tons from Liverpool, per San Jaquin. A private circular before us says: Coal arrivals during the week have been very light, a few days of cold weather having increased consumption, hence prices have sustained themselves. Freights now asked on coals from foreign ports are materially advanced over the asking rates of last month, which accounts for the large falling off in orders. The stock on hand of bituminous coal is the largest ever known, every available space being occupied. Lehigh grades are still in light supply. We submit the following schedule of rates:

	Prices to arrive.	Spot rates.
Australia.....	\$6.25 @ 6.50	\$6.50 @ ---
Liverpool Steam.....	5.75 @ 6.00	5.75 @ ---
West Hartley.....	6.50 @ 6.75	6.50 @ ---
Scotch Splint.....	6.25 @ 6.75	6.25 @ ---
Cardiff.....	6.50 @ 6.75	6.25 @ ---
Lehigh Lump.....	13.25 @ 13.50	14.00 @ ---
Cumberland bulk.....	11.00 @ 11.25	13.00 @ ---
Egg Hard.....	11.25 @ 11.50	15.00 @ ---

The Romsdal, from Glasgow, brings 2305 tons Scotch; Mississippi, from Seattle, 225 tons; City of Corinth, from Sydney, 1700 tons; America, from Liverpool, 2500 tons; Holland, from Newcastle, Eng., 1720 tons; Nancy Pendleton, 1930 tons Wellington; A. J. Fuller, from New York, 300 tons hard.—Commercial Herald.

**STATISTICS OF COAL PRODUCTION.**

The Production of Bituminous Coal for the week ended Nov. 26th was as follows:

Tons of 2000 lbs., unless otherwise designated.	Week.	Year.
Cumberland Region, Md.	59,054	2,041,244
Barclay Region, Pa.	8,003	385,752
Barclay RR., tons of 2240 lbs.	8,003	385,752
Broad Top Region, Pa.	1,418	192,350
Huntingdon & Broad Top RR.	1,679	79,520
East Broad Top.....	4,181	1,679
Clearfield Region, Pa.	2,992	109,954
Snow Shoe.....	46,071	2,153,714
Tyrone and Clearfield.....	6,398	256,376
Pennsylvania RR.	6,286	261,705
Pittsburg Region, Pa.	576	25,518
West Penn RR.....	22,568	851,231
Southwest Penn. RR.....	13,948	614,668
Penn & Westmoreland gas-coal, Pa. RR.....		
Penn & Westmoreland RR.....		
Pennsylvania RR.....		

\* For the week ending Dec. 3d.

**The Transportation of Coke over the Pennsylvania Railroad for the week ending Nov. 26th, and year from Jan 1st:**

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region).....	2,024	89,332
West Penn. RR.....	1,947	111,964
Southwest Penn. RR.....	27,104	1,259,162
Penn. & Westmoreland Region, Pa. RR.....	8,445	178,800
Pittsburg, Penn. RR.....	8,413	502,383
Show Shoe (Clearfield Region).....	392	11,494
<b>Total</b> .....	<b>44,525</b>	<b>2,153,195</b>

Comparative statement of the production of anthracite coal for the week ended Dec. 3d, and years from January 1st:

Tons of 2240 Lbs.	1881.		1880.	
	Week.	Year.	Week.	Year.
<b>Wyoming Region.</b>				
D. & H. Canal Co.....	81,170	3,347,302	77,617	2,835,271
D. L. & W. RR. Co.....	102,486	3,980,653	94,637	3,284,143
Penn. Coal Co.....	32,104	1,319,566	25,313	1,054,233
L. V. RR. Co.....	47,531	1,086,507	20,418	880,915
P. & N. Y. RR. Co.....	3,253	96,587	600	37,142
C. RR. of N. J.....	36,421	2,118,175	13,484	1,537,046
Penna. Canal Co.....	6,197	454,327		457,629
<b>Total</b> .....	<b>300,142</b>	<b>12,408,097</b>	<b>233,529</b>	<b>10,186,439</b>
<b>Lehigh Region.</b>				
L. V. RR. Co.....	111,428	4,197,421	48,168	3,213,134
C. RR. of N. J.....	42,304	2,023,344	25,394	1,909,016
S. H. & W. B. RR.....		10,926		9,515
<b>Total</b> .....	<b>153,732</b>	<b>6,231,691</b>	<b>73,562</b>	<b>5,221,665</b>
<b>Schuylkill Region.</b>				
P. & R. RR. Co.....	164,597	6,478,338	130,684	5,029,255
Shamokin & Lykens Val.....	25,500	927,260	10,448	842,502
<b>Total</b> .....	<b>190,097</b>	<b>7,405,598</b>	<b>150,132</b>	<b>6,471,757</b>
<b>Sullivan Region.</b>				
St. Louis & Sul. RR. Co.....	1,405	60,377	589	44,699
<b>Total</b> .....	<b>654,376</b>	<b>26,100,763</b>	<b>457,812</b>	<b>21,924,560</b>
Increase.....	196,564	4,176,203		
Decrease.....				

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.

Total same time in 1876.....	17,102,745 tons.
" " " " 1877.....	18,821,378 "
" " " " 1878.....	16,152,525 "
" " " " 1879.....	24,467,939 "

**Belvidere-Delaware Railroad Report for the week ending Dec. 3d:**

	Week.	Year.	Year.
		1881.	1880.
Coal for shipment at Coal Port (Trenton).....	4,894	78,756	52,737
Coal for shipment at South Amboy.....	17,827	607,934	460,847
Coal for distribution.....	18,908	670,108	465,447
Coal for company's use.....	2,735	105,541	97,192

The decrease in shipments of Cumberland Coal, over the Cumberland Branch and Cumberland & Pennsylvania railroads, amounts to 131,267 tons, as compared with the corresponding period in 1880.

The shipments of Cumberland Coal, over the George's Creek & Cumberland RR., by the Maryland and the American Coal companies, for the week ended Dec. 3d, amounted to 10,033 tons, making a total of 190,715 tons since the beginning of transportation.

**ADVERTISING RATES OF THE ENGINEERING AND MINING JOURNAL.**

NON-REBIL & EQUIPMENT. No deviation whatever from the rates given herewith will be allowed, except to educational institutions.

Lines.	Inches.	One Issue.	1 Month (4 issues).	3 Months (13 issues).	6 Months (26 issues).	9 Months (39 issues).	12 Months (52 issues).
6	1/4	\$1.50	\$4.23	\$11.64	\$20.60	\$28.99	\$34.35
8	1/4	1.75	4.84	13.34	24.75	33.71	40.17
12	1/4	3.00	7.46	20.04	34.70	47.03	56.00
15	1/4	3.66	9.28	24.49	42.42	57.49	73.35
18	1/4	4.33	10.78	28.95	50.14	67.96	86.70
21	1/4	5.00	12.44	33.41	57.86	78.42	100.05
24	1/4	5.67	14.10	37.87	65.99	88.99	113.49
27	1/4	6.34	15.81	41.85	72.48	98.23	125.98
30	1/4	7.01	17.51	45.82	79.28	107.58	137.25
33	1/4	7.68	19.22	49.79	86.28	116.93	148.17
36	1/4	8.35	20.92	53.76	93.19	126.28	161.10
39	1/4	9.02	22.63	57.73	99.98	134.86	171.82
42	1/4	9.69	24.33	61.70	106.58	143.99	182.55
45	1/4	10.36	26.04	65.67	113.08	151.49	193.27
48	1/4	11.03	27.74	69.56	119.58	159.90	204.00
51	1/4	11.70	29.45	73.45	126.08	167.19	215.25
54	1/4	12.37	31.15	77.34	132.58	174.48	226.50
57	1/4	13.04	32.86	81.23	139.08	181.77	237.75
60	1/4	13.71	34.56	85.12	145.58	189.06	249.00
63	1/4	14.38	36.27	89.01	152.08	196.35	260.25
66	1/4	15.05	37.97	92.90	158.58	203.64	271.50
69	1/4	15.72	39.68	96.79	165.08	210.93	282.75
72	1/4	16.39	41.38	100.68	171.58	218.22	294.00
75	1/4	17.06	43.09	104.57	178.08	225.51	305.25
78	1/4	17.73	44.79	108.46	184.58	232.80	316.50
81	1/4	18.40	46.50	112.35	191.08	240.09	327.75
84	1/4	19.07	48.20	116.24	197.58	247.38	339.00
87	1/4	19.74	49.91	120.13	204.08	254.67	350.25
90	1/4	20.41	51.61	124.02	210.58	261.96	361.50
93	1/4	21.08	53.32	127.91	217.08	269.25	372.75
96	1/4	21.75	55.02	131.80	223.58	276.54	384.00
99	1/4	22.42	56.73	135.69	230.08	283.83	395.25
102	1/4	23.09	58.43	139.58	236.58	291.12	406.50
105	1/4	23.76	60.14	143.47	243.08	298.41	417.75
108	1/4	24.43	61.84	147.36	249.58	305.70	429.00
111	1/4	25.10	63.55	151.25	256.08	313.00	440.25
114	1/4	25.77	65.25	155.14	262.58	320.29	451.50
117	1/4	26.44	66.96	159.03	269.08	327.58	462.75
120	1/4	27.11	68.66	162.92	275.58	334.87	474.00
123	1/4	27.78	70.37	166.81	282.08	342.16	485.25
126	1/4	28.45	72.07	170.70	288.58	349.45	496.50
129	1/4	29.12	73.78	174.59	295.08	356.74	507.75
132	1/4	29.79	75.48	178.48	301.58	364.03	519.00
135	1/4	30.46	77.19	182.37	308.08	371.32	530.25
138	1/4	31.13	78.89	186.26	314.58	378.61	541.50
141	1/4	31.80	80.60	190.15	321.08	385.90	552.75
144	1/4	32.47	82.30	194.04	327.58	393.19	564.00
147	1/4	33.14	84.01	197.93	334.08	400.48	575.25
150	1/4	33.81	85.71	201.82	340.58	407.77	586.50
153	1/4	34.48	87.42	205.71	347.08	415.06	597.75
156	1/4	35.15	89.12	209.60	353.58	422.35	609.00
159	1/4	35.82	90.83	213.49	360.08	429.64	620.25
162	1/4	36.49	92.53	217.38	366.58	436.93	631.50
165	1/4	37.16	94.24	221.27	373.08	444.22	642.75
168	1/4	37.83	95.94	225.16	379.58	451.51	654.00
171	1/4	38.50	97.65	229.05	386.08	458.80	665.25
174	1/4	39.17	99.35	232.94	392.58	466.09	676.50
177	1/4	39.84	101.06	236.83	399.08	473.38	687.75
180	1/4	40.51	102.76	240.72	405.58	480.67	699.00
183	1/4	41.18	104.47	244.61	412.08	487.96	710.25
186	1/4	41.85	106.17	248.50	418.58	495.25	721.50
189	1/4	42.52	107.88	252.39	425.08	502.54	732.75
192	1/4	43.19	109.58	256.28	431.58	509.83	744.00
195	1/4	43.86	111.29	260.17	438.08	517.12	755.25
198	1/4	44.53	112.99	264.06	444.58	524.41	766.50
201	1/4	45.20	114.70	267.95	451.08	531.70	777.75
204	1/4	45.87	116.40	271.84	457.58	539.00	7