THE ENGINEERING AND MINING JOURNAL

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

VOL. XLIX. JANUARY 11. No. 2.

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ROSSITER W. RAYMOND, Ph.D., M.E., Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition.
London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.
Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.
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SUBSCRIPTION PRICE, including postage:
Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.
Monthly Export Edition, all countries, $2.50 gold value per annum.
REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING CO., Publishers,
SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

THE sudden and serious illness of our statistical editor, from which he is now slowly recovering, was briefly mentioned in our issue of the 4th inst. as explaining the absence of further studies of the statistics. Unfortunately it led also to the introduction of several slight clerical errors in some of the copper production tables, of which he could not see the final summing up, or the proofs, and as, unfortunately, he alone had followed the subject, no one else on the staff could take it up at the last moment. These errors were occasioned chiefly through the usual clerical and typographical vagaries with which every editor is familiar.

THE dividend table of mining companies in the United States and Territories which we published in our last issue shows a total of $10,537,522 distributed during the year 1889 by 61 companies, against $13,061,105 distributed in dividends by 64 companies in 1888. The first falling off of importance in the list as compared with the previous year is in the amount paid by the Consolidated California & Virginia, which in 1888 divided $1,188,000 and last year $756,000; this with Hale & Norcross dropping out of the list altogether from $224,000, points to a bad Comstock year compared with the previous one.

On the other hand, our greatest silver producer, the Granite Mountain Mining Company, paid $2,400,000 against $1,600,000 in 1888. Ontario, the next in rank of production to the two named, maintained its division of profits at the highly respectable figure of $900,000. Montana, Limited, another of the important producers, was only able to give its proprietors one-half of that earned in 1888, viz., $206,250 against $412,500. The other changes to be noted in the list are the reduction of dividends of most of the copper companies, some to the extent of one-half and more, while some dividend-payers among the gold and silver mines in 1888 have been replaced by others in 1889.

It must be borne in mind that a very large number of the profit earning mines in this country are owned by private companies or individuals, who furnish no returns, so that the dividend table published is a contribution to the public information on the subject, but does not even approximate the profits on mining in this country, and therefore any deductions from it can only be partially correct as to the result of mining as an investment. The actual return, based on the total dividends ($9,472,257) paid by thirty-one companies for the shares of which we have been able to obtain market quotatations, viz., on a value of $78,111,150, is more than 12 per cent.

THE ELECTRICAL PROBLEM.

The final report of the Commissioners of Electrical Subways for the city of Brooklyn, of which we publish a portion this week, contains the first comprehensive statement in popular language from an impartial as well as competent authority of the problem of the distribution of electrical energy. As such it is worthy of careful attention at the hands of municipal authorities and legislators.

The legislation of New York State in this important matter has been about as bad as it could well be. The act of 1884, applying to the cities of New York and Brooklyn only, peremptorily required, within the period of four and a half months, the removal of many thousand miles of electrical conductors of all kinds from poles and housetops, and the substitution of a similar amount underground, or else, as the sole alternative, the summary destruction of all the property and business which they represented. Not even the police and fire telegraph wires of the cities themselves were excepted. Yet there was no effective penalty provided for its violation. In other words, the framers of this act attacking a problem of great difficulty, of which they were entirely ignorant, selected for their reckless experimenting the places where the conditions were most complicated, and the results of mistakes would be most serious, then commanded a physical impossibility, on penalty of a general confiscation, and finally failed to furnish the means for executing either its command or its threat. There could scarcely be a more illustrious instance of ignorant audacity, only rendered harmless by the impotence of its own expression. Yet this amazing statute has never been repealed, and by the lapse of the Brooklyn Subway Board and the stupid refusal of the Legislature to provide for any successor to its powers and functions, it has become unconditionally the duty of the city authorities of Brooklyn to remove at once all wires and poles not protected by the permits of that Board. Of course they will not do so. But it is a disgrace to the Legislature of New York that the safety and comfort of a great city can only be maintained by defying its absurd mandates.

The act of 1885 was not much better than its predecessor. For the city of New York it was speedily found to be inadequate, and was superseded by special legislation, the fruits of which are scarcely to be contemplated with pride and delight. For Brooklyn it remained in force; and the commissioners appointed under it in that city have accomplished a considerable reform, in spite of its defects. It was so drawn as to put the inspection and regulation of overhead wires beyond their control; and all their attempts to obtain additional and wiser legislation were defeated by political and commercial combinations, in which the electric lighting companies, the Aldermen and the Governor of the State were concerned.

The report of the Brooklyn Board not only presents a record containing no engineering errors or backward steps, but incidentally suggests that the subways of New York have been badly planned and badly built. Our New York Board seems to have been too proud to inquire how things were done in the city across the bridge, and the result appears to be that at every point in which the two systems differ, that of the metropolis is distinctly inferior.

MAYOR GRANT is quite right in suggesting, as he has done in his late message, that a board composed, *at least partly*, of persons who know something about electricity would be of great service to the authorities of New York.

CHEAPER TRANSPORTATION AND UTILIZATION OF ANTHRACITE CULM.

The Report of the Transportation Committee of the Scranton Board of Trade deals with two questions of great importance to our anthracite coal fields. It is pointed out that the demand for finer sizes of coal has led to the rebreaking of the larger sizes, and the reports of the different companies show that sizes of stove and smaller have increased about 14 per cent. of the entire production in eight years, while the trade in the larger sizes has proportionately decreased.

The rebreaking of the coal largely increases the production of pea, buckwheat, and culm, so much so that, taking only the coal actually sent to market, one-third consists of the smaller sizes. This, of course, means that the proportion of coal that goes to the culm heap is larger than formerly, and must represent an enormous amount annually. In the words of the committee, millions of tons of fuel are thrown away every year for want of cheap transportation, while soft coal is carried past our doors to drive us out of the markets of New England and the eastern Middle States, by reason of low rates. Many operators make no effort to save the buckwheat, owing to the difficulty of obtaining a market for it, and throw it directly upon the waste pile.

The remedy for this is clearly that anthracite, or at all events buckwheat and culm, should be carried at the same rate as bituminous coal, say at 4 mills per ton a mile, which, by the new bridge over the Hudson

at Poughkeepsie, would enable the producers to sell in Boston at a profit, and at a price which would compete with bituminous coal in that market. The present rate on anthracite is about 1¼ cents per ton a mile, or about three times as much as the rate on bituminous, which must seem to any one irrational and unjust. It is proposed to call a conference of representatives from the leading cities of the anthracite coal fields and individual collieries, to be held in Scranton, to take into consideration the best means of obtaining from the railroad companies reduced rates on the smaller sizes of coal.

The other subject dealt with by the committee in their report, viz., the utilization of the millions of tons of culm that have been accumulated, and are still being added to annually, in the anthracite coal regions, is even more important than the preceding. For by this means the supply of available anthracite, which, as we pointed out in our issue of September 22d, 1888, is within measurable distance of exhaustion, will be increased and the frightful waste now going on will be diminished. The case made out for the value of culm as a really cheap and efficient fuel is a good one, and there is no doubt that its evaporative power, price for price, renders it the most economical fuel there is. From the carefully prepared tables accompanying the report we see that according to a series of careful and reliable tests, it takes to evaporate 30,000 pounds of water 26,038 cubic feet of gas; 3,131 pounds free burning bituminous coal; 3,178 pounds anthracite prepared sizes, and so on, till we arrive at culm, of which 4,662 pounds are required to perform the same work. Taking the price of gas at 10 cents per 1,000 feet, bituminous coal at $1.50 per ton, anthracite large sizes, at $2.50 per ton, and culm at 10 cents per ton, and adding the cost of handling the coal and ashes, we find that it costs to evaporate 30,000 pounds of water $4.75 with anthracite, prepared sizes; $3.35 with free burning bituminous coal $2.61 with gas and $1.51 with culm.

It is not suggested that there is any profit in the introduction of culm as a fuel where transportation is in question, unless rates can be secured at very much lower figures than those now existing, but used locally and with a proper form of grate, the results are very satisfactory. One company in Scranton, using boilers of 365 H. P., consumes seven tons of culm a day, at 10 cents a ton royalty; and after payment of all labor connected with handling this fuel, the cost per boiler horse-power per day is 1·56 cents.

Taken generally, it may be safely stated that anthracite coal, prepared sizes, costs five to eight cents per boiler horse-power per day, bituminous coal four to six cents, natural gas three to five cents, culm one half to two cents. The statement is made that the amount annually thrown upon the culm pile is equal to the entire Western trade in anthracite coal, and that steel rails are made in Scranton to-day with culm, at less cost than in Pittsburg with natural gas, so much less that, after paying freight on the 300 miles to Pittsburg, they can undersell the gas-made rails.

There are many places in the gas regions that owe their prosperity to the supply of gas, and by their cheap fuel have attracted to themselves a large and still growing industry and it is clear that the advantages offered by an enormous culm pile at a moderate royalty, and constantly being added to, are superior to the dearer and somewhat uncertain (as to continuance) supply of gas.

THE LATEST FLYING MACHINE.

As is customary, we get an account of what the inventor is going to do —not of what he has done. This time it comes from Boston, that fertile soil of invention.

The inventor is a Dr. THAYER. His idea, as given us second-hand through the daily press, and possibly slightly misrepresented, is somewhat as follows: Having made a transatlantic voyage, and noticed, as all voyagers do, the exasperatingly easy way in which the gulls follow the steamer, and, when it pleases them, mock its speed by circling around it—oftentimes for many minutes without any apparent flutter of wing—he has come to the conclusion that the theory of the flying machine is the theory of bird-flight and that he has solved it. His solution is the old ærophane (or kite) in a new guise.

If he has solved the problem, he has done a great deal. But, unfortunately, he hasn't. His idea is that the soaring motion of birds is due to two forces—one the direct wind action, the other a resistance to it. This is ingenious. RAY LANKESTER, we believe, originated the idea of a resultant from a "parallelogram of forces," in which the wind force was one factor and gravity the other. According to this, the stronger the wind and the heavier the bird the greater should be the effect. On this scheme gravitation would play the part of the string of a kite. There is, however, one little objection to such a nice simple solution of bird-soaring, and that is that birds soar without any breeze whatever. Any one who has watched eagles, chicken hawks and other soaring birds will attest to this. There is another small objection to this explanation, and that is that the forward motion ought to be in the eye of the wind, and the stronger the wind the faster the motion; but it isn't.

There is no mention of gravitation as the second pull according to the new theory. As we read it, the wind force is one factor and some sort of a drag is to be the other; and according to the press reports, the resistance to the wind is that other. But this is evidently unfair to our inventor, as will be seen by a brief description, of his described, but inchoate, machines.

It is proposed to make huge kites, controlled at top and bottom by suitable halyards, so as to obtain any wished angle of incidence; to provide them with hinged side wings for steering. To support these and the passenger car, a set of small balloons provided in case the wind gives out; the drag is to be for water a catamaran or a series of logs, or for land some kind of a weight on wheels. Here we would have *three* forces at least, one of which is evidently not counted on by the inventor, and that is gravity.

Now a big kite, or set of kites and balloons, will, with a wind, stay in the air and move. They will move surely, but they will move to leeward. One can predict that without experiment. Any small boy who has tried kite-flying could assure our inventor of this. His kite may move slightly upward in the arc of a circle, but it most certainly does not go to windward. If he should suddenly move his end of the string to a point beneath the kite (thus imitating or adding to the pull of gravitation), he knows that his kite will either come to earth or drift off to a new and corresponding position. A simple trial of this kind will at once settle the aërophane question.

But suppose our Boston friend wishes simply to have his machine, himself, and the admiring shareholders, or prospective shareholders, make a voyage before the wind. Then he would simply repeat the experience of hundreds who have tried kites instead of sails. Considering the catamaran or log drags as a boat and the big kite as a sail, the result would hardly be satisfactory. There would be little choice of direction, perhaps three points or so off the course of the wind, and in an emergency the navigator would have to let go his kite. As between being a passenger on the aerial car or upon the catamaran, one would think that the latter mode of propulsion, however unsatisfactory, would command the highest fares. If it were a matter of shipping Chicago dressed beef or Lackawanna coal, the freighters would probably take the same view.

There is one great advantage about the new Boston scheme. It should not cost over $238.21 to try it. The ambitious inventor whom we advertised about two years ago, and who was going to start his inclined-plane machine from the top of Pike's Peak, and by the impetus of the fall gain a momentum which would carry him some four thousand miles, would have had his railway fare to pay besides the construction and surgical expenses. He didn't try it. But our Boston friend ought to try his scheme, and organize his company (if it has not already been put on foot) subsequent to the experiment.

Aerial navigation is a certainty. Whether it will come in our day or not is a different matter. But so far our knowledge is rather of a negative character. How not to do it is pretty well established, though our Boston friend does not seem to think so. And this remark will also hold, though we say it more diffidently, with the inventors of dirigible balloons. The flying machine, that is, the practical one, will have a self-contained motor for lifting and driving it: it will have its motive appliances in duplicate and exchangeable at a moment's notice; it will not carry heavy freight, and at all events it will probably be an article of luxury only the chances being, so far as can be foreseen with present knowledge, that land and water transportation will always be the cheaper, the safer, and perhaps nearly the swifter modes.

NEW PUBLICATIONS.

A HANDBOOK ON MODERN EXPLOSIVES. By M. Eissler. Published by Crosby, Lockwood & Son, London, 1889.

Mr. Eissler has in this volume added much to his very good work, "High Explosives." The rapidity with which "progress is progressing" in the discovery or invention of high explosives is something startling.

Yet, notwithstanding all this progress, we find American miners steadfastly adhering to the use of the old standard makes, the ones which have been common since 1880. The truth about explosives (that is, those of what are called the "high" class) is that most of the novelties are in the line of materials for military purposes; a small part expulsive, but a larger portion explosive. All the military nations of Europe, and our Torpedo Station, have been testing explosives as blasting charges in shells, and their efforts have been mainly confined to the safe, or moderately safe (which would be the better term), use of these high explosives. In a few cases, as in the use of picrate powders, these new explosives are availed of as expulsive rather than as explosive agents.

In this country, so far, we adhere to the use of wet gun cotton mainly, and to gelatine dynamite in a less degree for military use. There is no concealment about this. In France they are working now on melinite, and every military nation knows what that is.

Here, for mining and ordinary use, the old nitroglycerine compounds still hold the upmost regard. Whether it is kieselguhr, gunpowder, sawdust, or any other absorbent, the old names still prevail. And the largest works are patronized, new compounds being generally slighted.

For both military and ordinary uses it often happens that the sharpest explosives are not the best. If you put nitro-gelatine into a shell, and blow it to flinders, its effect is lost. And, in the same way, if you use too sharp a charge in a mine drill hole you may lose. Mr. Eissler is, perhaps, a little too much in favor of the "high" explosives.

The book is nicely gotten up, and well arranged. It is a little scanty in the way of index. There are a good many criticisms which any reader could make; yet, on the whole, the book is the newest summary of a great and wide subject, and is, therefore, worth reading. It gives short descriptions of many of the new explosives, which, to the many, are simply names.

CORRESPONDENCE.

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

Wurtzilite, Professor Blake's New Mineral.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Both Prof. Blake and yourself have asked me to present any remarks that may occur to me regarding the new and highly interesting mineral first described in a precise scientific way in your issue of Dec. 21, 1889, by Prof. Blake. It was shown to me by yourself some time ago, and I then formed and expressed the view that it possessed novel characteristics in a high degree. The compliment of the attachment of my name to this curious new American product was of course a surprise to me, and—though I am not yet an appropriate subject for an obituary—I am nevertheless inclined to recall the epitaph dictated by the dying Spartan: "Sparta hath many a worthier son than he."

Under the circumstances, I have felt bound to make an effort to look into the history of the case as far as possible, and do what I can to help in setting forth the basis on which the new species rests. Professional occupation, of an imperative kind, has intervened, and made it impossible for me as yet to give the time and labor due; but I will say what I can say.

The principal question is in regard to the placing of this substance under the head of Hausmann's so-called *elaterite*—a species adopted, with this name, by such eminent authorities as Leonhard, Beudant, Haidinger and last, but by no means least, Dana. The name itself and its etymology, when examined, seem to involve a sort of jest, and it is hard to assign to them any scientific significance. The elaterium or "squirting cucumber," however, suggests, if anything, what Professor Blake well calls "tensile elasticity," as distinguished from mere elasticity of flexure; a matter of import here.

The kind of elasticity referred to by the most ancient authority on "elaterite," Lister, in 1674, is that of caoutchouc, or what we might designate as *gelatinous* elasticity. Lister says of the Derbyshire mineral that it is "much like peats or turff cut up in the high moors, both in the sooty color and inward substance; this only is more clammy and tough, and dries not. And some of this fungous substance is very soft and like gelly." Hatchett, in 1797, wholly unaware of Lister's account of more than a century previous, and attributing the first discovery of the Castleton (Derbyshire) mineral to a Mr. de Born in 1787, describes characteristic varieties as follows:

—— "Dark yellowish brown, elastic, very soft and adherent to fingers.

—— "Brownish olive, becoming reddish brown in the air. Opposed to the light it appears semi-transparent, and of a yellowish brown inclining to orange; soft, elastic, and when recently cut adherent to fingers.

—— "Same as the last, darker brown and harder. *Specific gravity* = ·9053.

—— "Dark brown, harder than the last. *This exactly resembles cahoutchou* in the *degree of elasticity*,* and in the property which it possesses of removing the traces of black lead."

An appropriate interpolation here will be the remark that Professor Blake's wurtzilite marks ordinary foolscap paper with a distinct brown streak, and writes its own name quite legibly. Hatchett introduces his subject with the remark that this "new species of bitumen much resembles in elasticity and color the substance known by the name of cahout-chou, or Indian rubber." It is proper to add that he describes one variety as follows: "Reddish brown, perfectly hard and brittle. The characters of asphaltum are complete in this specimen. Specific gravity = 10·233" (doubtless a misprint for 1·0233). This variety is the only one Hatchett describes that approximates in any respect to wurtzilite, but Hatchett compares it to asphaltum, with which no mineralogist would place Professor Blake's mineral. Its characteristic sectility and cohesion, with its infusibility, etc., would forbid this. Hatchett says that in his Castleton specimens all the grades of modification between petroleum and asphaltum could be traced, "the elasticity being most complete in the variety which occupies the middle place between petroleum and asphaltum."

One of his varieties, moreover, *resembles cork in color and texture when recently cut*. This forms exterior coatings on the more compact varieties described above. The specific gravity of this was ·9881 and ·9748 mean = ·9815. This variety passes further into an "ochraceous colored powder." The second variety mentioned above, on which Hatchett lays stress, as characteristic of the species, is partly dissolved by ether at 55 degrees (Fahrenheit, doubtless). The solution is yellowish brown by transmitted and brownish olive by reflected light. This would import the presence of some fluorescent matter, similar to that in many crude petroleums. Evaporation of the ethereal solution gives a "yellowish brown bitumen," constituting 18 per cent. of the original, "totally devoid of elasticity." The cork-like variety is little affected by ether.

I have, so far, been able only to make some preliminary tests with ether on shavings of wurtzilite, too incomplete to carry much weight. The ether becomes colored pale yellow, taking up a small portion of the mineral, not yet examined.† Klaproth (1802) quotes Hatchett, and states that he has himself examined several varieties of the mineral, which he calls "Elastisches Erdpech," in compact pure fragments of brownish olive color, which against the light is semi-transparent and transmits a bright hyacinth-red tint. It is *soft, very elastic, and adheres to the fingers.* Insoluble in all liquids tried by him (he does not mention ether). Absorbs petroleum and swells up and becomes softer. Boiling fuming nitric acid and strong alkaline lyes are without appreciable action on it. Fuses at a high heat, and after this may be drawn into threads (zu Fâden ziehen) between the fingers. After fusion, soluble in petroleum and other oils. No specific gravity stated. It contained 6 to 7 per cent. of reddish-brown ash, alkaline in reaction.

The first edition of Hausmann's Handbuch (1813) I have not access to. In the edition of 1847 he describes "elaterite," among other characters, as "very soft," at times somewhat pasty; as elastic as Kahutschuk; odor bituminous; easily fusible." Very little soluble in alcohol; occurring in kidney-shaped or mushroom-shaped masses. He cites the analyses of Henry, Jr. (1826), and of Johnston (1838), and concludes that it probably has the composition CH^2 corresponding to ozocerite.

The most important record regarding the assumed species, elaterite, is doubtless the paper of Prof. J. F. W. Johnston, of Durham, which I have succeeded in finding in the *Lond. & Edinb. Phil. Mag.*, Vol. XIII., 1838, p. 22. His analytic computations require revision, apparently, as I have already indicated in your JOURNAL more ten years ago, with regard‡ to analyses in general of carbohydrogen minerals made previous to 1841, when the true equivalent of carbon was first made known by Dumas and Stas. The discussion of these analyses, therefore, would require more time than I now have, and probably more space than you would give, and must be deferred.

Prof. Johnston's description of what he calls "Elastic Bitumen of Derbyshire" covers three varieties: 1. Soft, elastic, adheres to fingers, yields to slight pressure, brown, and of peculiar odor. Lost weight and an odorous volatile matter at 212 degrees F. 2. Closely resembling moderately soft india rubber; dark brown. When boiled in water; "a volatile portion collected on the surface of the water, and the sides of the flask, which on cooling presented the appearance of a very soft white or slightly brownish solid. Boiling alcohol and ether extracted a similar volatile substance, but very sparingly."

Wurtzilite—at least as represented by Prof. Blake's specimens—differs from Hausmann's so-called *elaterite* in the following particulars:

"Specific gravity, which Hatchett makes, in his characteristic *elastic* varieties, less than that of water, namely, as low as ·9053. Prof. Blake's figure for wurtzilite is 1·03. I obtained, in water, for some very pure and brilliant flakes selected for me by Prof. Blake, 1·026; and for some larger pieces selected by myself, taken in alcohol, 1·022. I propose making further determinations of this figure; but the evidence is sufficient that the mineral is heavier than water.

"The *elasticity* of wurtzilite, on which so much stress has been put, is, in the characteristic variety (if varieties there are) to which the name has been given, as it appears to me, no characteristic at all. Probably all solids possessing rigidity and cohesion show in thin sheets or flakes this kind of elasticity of flexure. Cannel coal is a familiar example among carbohydrogen minerals. The elaterite elasticity is clearly of the *gelatinous* kind.

"A true characteristic of wurtzilite is the combination of the splendent vitreous fracture with the remarkable degrees of sectility and hardness. This alone separates it from all the varieties of *elaterite* of which I have so far encountered descriptions.

"Its behavior with both alcohol and ether distinguishes wurtzilite from *elaterite*. On the latter, alcohol is stated by Johnston to have considerable solvent action. My own experiments show me that long soaking in anhydrous alcohol does not even effect the brilliant natural lustre of the fractures of wurtzilite.

"Hausmann makes his *elaterite* 'easily fusible,' but there is a lack of consentaneity among the authorities on this point, going to prove, together with many other circumstances, that this name has been used to cover several distinct materials. Wurtzilite, unless under pressure, begins to decompose below its point of fusion.

"Several of the points of chemical character and behavior mentioned by Professor Johnston are not recognizable in the case of the wurtzilite. Johnston's later paper on the "Settling Stones Resinoid" (quoted by Dana under "Elaterite") is still wider of the mark."

My general conclusion must be that Professor Blake's mineral is certainly not to be rationally put under Dana's heading of elaterite, and is a well-characterized new species. I shall entertain the hope to get at some analyses of the mineral, both proximate and ultimate, in the course of a short time. Respectfully. HENRY WURTZ, PH.D.

NEW YORK, Dec. 31, 1889.

*The italics are mine.—H. W.

† I have since completed this experiment, and will give the result, with others, in another communication. H. W.

German Railroad Practice.—It is stated in the *Zeitung der vereinigten deutschen Eisenbahnverwaltungen* that the State railway authorities are far from likely to introduce a stronger rail, but that they would increase the sleepers. The space between the latter is to be reduced from 0·9 metre to 0·7 metre. This is, without doubt, the cheapest. It is, however, to be feared that the desired aim will only be attained in an inferior degree. As is well known, the increase in the speed and in the weight of the rolling stock in Belgium and England has already lead to the use of the Goliath rails, as these rails alone afford the necessary safety to the train at the greatest speed. It is recognized in England that a large number of sleepers close together under the present rails do not sufficiently provide for the safety of fast trains. In that country the sleepers are mostly placed at distances of 0·6 metre, while here in Germany it is first proposed to reduce the distance from 0·9 metre to 0·7 metre. When the necessary conditions for the safety of a fast train are considered, it will be readily perceived that a thin and weak rail, even when placed on more sleepers than is the practice at present, does not offer sufficient resistance to the great outward pressure. When a weak rail is laid on a larger number of sleepers the number of fastenings and points of danger are increased in the same proportion. The fewer pieces the rails, etc., contain, so much better may they be considered. That is attained and all the above mentioned inconveniences are obviated by the use of a strong rail, the introduction of which in any case is only to be regarded as a question of time. Only by a strong rail is the necessary endurance and resistive capacity against all influences to be attained; merely to increase the number of sleepers will never attain the same end.

‡ ENGINEERING AND MINING JOURNAL, April 5th, 1879, in an article on the Utah Ceroid Minerals. See foot note, in which allusion is made to the fact that Professor Dana has overlooked this important matter *in some* of his citations. The many analyses of Johnston are, at least in part, included in this remark.

THE STRENGTH OF ALLOYS AT DIFFERENT TEMPERATURES.*

The strength of the commonly used alloys, such as gun metal and brass, at moderately high temperatures, is a question of some practical importance. It is well known that iron and copper decrease in tenacity as the temperature is raised, the latter in a very marked degree. There are also experiments showing a still more considerable decrease of tenacity in gun metal. In some experiments for the Admiralty in 1877, copper, Muntz metal, and phosphor bronze showed a tolerably regular decrease of tenacity as the temperature was raised to 500 degrees Fahrenheit. But in the case of gun metal the results were more anomalous. The gun metals tried were all alloys of copper, tin and zinc. In the bars tried the tenacity diminished tolerably regularly up to a temperature of 300 degrees or 350 degrees. But beyond that temperature there was a sudden decrease of tenacity generally of more than 50 per cent., and at a temperature of 500 degrees in several cases the tenacity had become *nil*. Now at the high pressures, and correspondingly high temperatures, at which steam engines are often worked, gun metal is exposed in many cases to temperatures of 350 degrees or 400 degrees. It is practically important to know if at such temperatures its strength is seriously impaired.

In the present experiments the bars to be tested were fixed to an oil bath heated by a gas jet. The middle part of the bar for a length of 2 inches was turned down to a diameter of $\frac{1}{4}$ inch or $\frac{5}{16}$ inch. The temperatures were taken by a mercurial thermometer. It is believed that the temperatures are quite accurate, except those above 600 degrees. Above 600 degrees the thermometer behaved irregularly. The bars were broken in a small special testing machine of the manometer type, the pressure on the diaphragm being balanced by a mercury column.

Rolled bars of yellow brass, Muntz metal, and Delta metal were tried, and the results of these are quite regular. Some bars of cast brass also gave very fairly regular results. The bars of gun metal gave results of less regularity. This is due, in part at all events, to the fact that some of the bars cast first proved unsound, and new bars had to be cast to replace them.

The results were plotted in a diagram, and show that in all cases the decrease of strength follows a regular law, without any such sudden loss of strength as was shown in the Admiralty experiments. Even at temperatures of 600 degrees to 650 degrees all the bars had still a not inconsiderable tenacity.

The ultimate elongation of the bars in the 2 inch test length was measured, and is given in the table. There is a peculiarity in the influence of temperature on the ductility of the bars. In most cases the ultimate elongation diminishes with increase of temperature. With Muntz metal the decrease is regular, and there is still considerable elongation before fracture at a temperature of 650 degrees. With yellow brass (rolled) the decrease is more rapid, and there is very little elongation before fracture at temperatures above 500 degrees. Cast brass behaves in the same way. The elongations of the gun metal bars were very irregular, and at temperatures of 600 degrees and upward the elongation was extremely small.

On the other hand, in the case of the Delta metal bars the elongation increased regularly with increase of temperature.

The contraction of area was also measured. This follows generally the same law as the elongation of fracture, but the contractions of area are more regular than the elongations.

We are indebted to our contemporary *Industries* for the diagrams.

* From a paper read by Prof. W. C. Unwin before the Mechanical Section of the British Association at Newcastle.

TESTING OF METALS AT DIFFERENT TEMPERATURES.

Laboratory No.	Diameter in ins.	Section in sq. in.	Temperature Fahr.	Tenacity in tons per sq. in.	Elongation in 2 in. per cent.	Contraction of section per cent.
			Yellow Brass.			
938	·308	·07451	atmospheric	24·09	41·0	61·0
941	·309	·07499	258°	22·44	30·5	28.0
939	·307	·07402	400°	21·23	19·0	10·0
940	·312	·07645	500°	18·33	5.0	very little
942	·308	·07402	602°	15·86	2·5	" "
943	·309	·07499	640°	14·49	1·0	" "
			Delta Metal (Rolled).			
945	·249	·04870	atmospheric	31·16	20·0	55·0
949	·243	·04638	260°	28·30	22·0	44·0
946	·249	04870	400°	26·58	25·0	53·0
944	·249	·04870	500°	23·83	27·9	59·0
947	245	·04714	570°	19·32	38·5	60·0
948	·240	·04524	650° abt.	16·04	33·0	48·0
			Muntz Metal.			
950	·362	·07163	atmospheric	24·68	35·0	59·6
951	·309	·07499	300°	22·83	28·5	41·2
952	·310	·07548	400°	20·84	37·5	55·1
953	·311	·07596	500°	18·81	28 5	38·4
954	·306	·07354	600°	16·69	17·0	19·2
955	·310	·07548	650°	17·15	16·0	very little
			Gun Metal.			
977	·376	·11104	210°	11·66	10·0	15·8
980	·376	·11104	380°	12·26	17·0	18·2
979	·376	·11104	406°	11·06	12·5	12·8
957	·309	·07499	440°	12·30	16·5	7·6
981	·376	·11104	500°	7·84	13·0	14·8
978	·376	·11104	600°	5·22	1·5	2·1
982	·376	·11104	600°	7·84	....	very little
960	·311	·07596	615°	4·82	....	" "
			Cast Brass.			
989	·376	·11104	atmospheric	12·45	24·0	16·4
991	·376	·11104	350°	11·83	27·5	23·4
992	·376	·11104	450°	10·40	23·0	22·5
990	·375	·11045	500°	7·69	11·5	16·2
993	·376	·11104	550°	7·68	13·5	17·8
994	·376	·11104	645°	3·23	....	very little
			Phosphor Bronze (Cast).			
995	·312	·07645	atmospheric	16·06	13·5	10·0
1,000	·312	·07645	270°	14·16	12·5	12·4
997	·312	·07645	550°	12·26	7·5	10·0
999	·312	·07645	430°	12·41	10·5	8·7
996	·312	·07645	500°	11·10	6·0	6·3
998	·312	·07645	600°	8·17	3·5	2·5

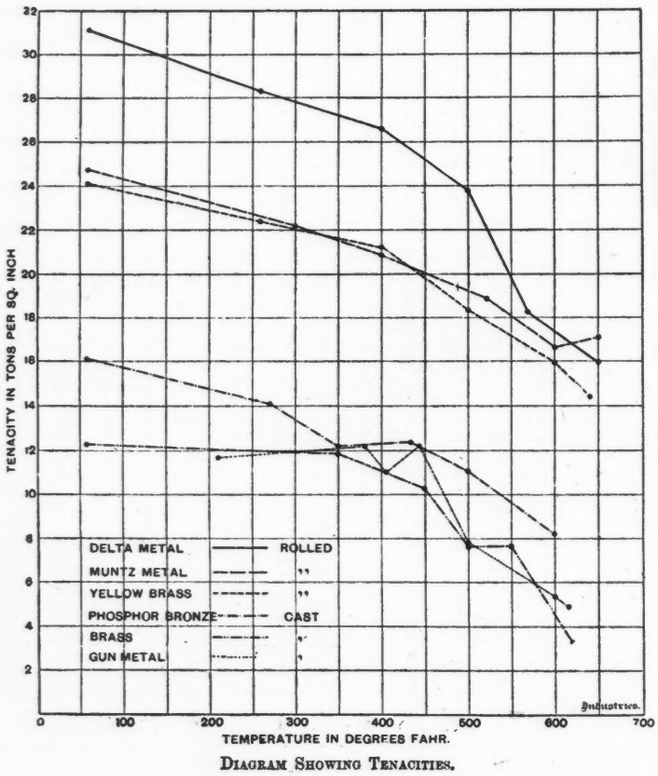


DIAGRAM SHOWING TENACITIES.

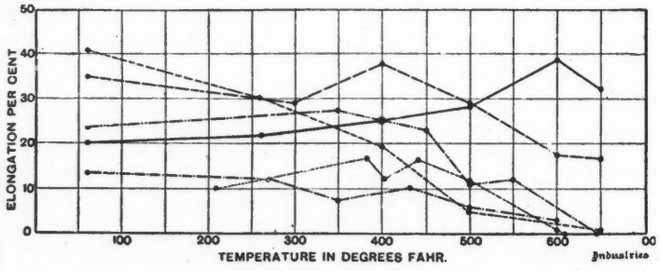
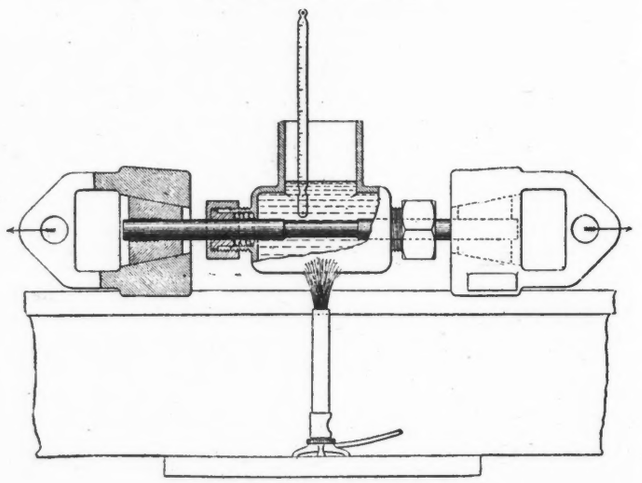


DIAGRAM SHOWING ELONGATION.



VIEW OF TESTING APPARATUS.

STRENGTH OF ALLOYS AT DIFFERENT TEMPERATURES.

English Production of Iron Ore.—The total output of iron ore from the mines of the United Kingdom in 1888 was 14,590,713 tons, valued at £3,501,317, an increase of 150,000 tons on the figures for 1887 as regards quantity, and an increase in value of £266,000. Twenty years ago the total production of the iron mines of Great Britain was a little over 10,000,000 tons annually, but ten years ago the output exceeded 18,000,000. In 1880 the maximum seems to have been reached, the annual output steadily declining until 1887, when the Government returns placed the total at 13,098,041 tons. As already noted a revival in iron mining occurred last year, and the returns for 1889 will show a still further expansion of the industry, but the figures will still be far behind those for 1880. The output of ironstone from mines working under the Coal Mines Regulation Act was last year 8,635,032 tons; from pits regulated by the Metalliferous Mines Acts, 2,937,253 tons; and from open workings, 3,018,428 tons.

ELECTRIC MOTOR CAR HAULAGE.

We illustrate herewith the Jeffrey Manufacturing Company's motor car in operation. The electric motor on this machine is arranged with a reverse rigging, which consists of a brush holder carrying four brushes, two being in contact when the car runs forward, the other two when running in the opposite direction. The main frame, rectangular in shape, is made of cast iron, with soft steel tires on the car wheels. The motor is located in the center of the frame and transmits power from the armature shaft through a succession of straight gears to the axles. The car is arranged with drawbars and pilots on each end. The speed of these motors vary according to the work they have to perform. There are motor cars of this description running in coal mines hauling loads over as high grades as 4½ per cent. with perfect ease, at the rate of 3½ miles per hour. The machinery being compact and occupying but little space, brings the operator near the parts it is necessary to handle in order to operate the car. The operator is able to turn on the current with one hand and at the same time is able to handle the brushes or brake. Power is conveyed to the motor by means of a trolley, running on a trolley line, invented by D. D. Osyor. The trolley line is known as the "all metal" system, and is one that does not require a ground or rail return, being much safer than the latter. The motor cars carry their own lights, which is a great advantage in coal mines, and can be handled as easily, safely and quickly as any steam locomotive. These motor cars and trolley lines are made by the Jeffrey Manufacturing Company, Columbus, Ohio.

THE USE OF BICHLORIDE OF MERCURY IN THE SAVING OF FINE GOLD.

Written for the Engineering and Mining Journal by B. F. Wilson, Jr.

In several portions of the United States, notably in the Carolinas, the gold occurs in a very fine state. That of North Carolina is scattered over wide areas, and if concentrated would show such vast results as would rival the great California output.

This gold occurring broadcast as it does must of necessity be low grade; and it is a fact that the ores of this region are nearly all low grade, averaging about (free milling ores) $12 per ton, very rarely higher, and only then when occurring in pockets.

Oftentimes the miner, unless very well experienced with this class of gold, whose only method of determining the value of his ore is by panning, is deceived and thinks that he is not being treated fairly, if he happens to sell it to some reduction works who have it assayed. The trouble is that while it makes a great showing in the pan, in reality its weight is much less than he thinks, owing to its extreme fineness.

I think it is obvious that the saving of this fine gold is a matter of great importance in this region.

It is a well-known fact that the great fault with the stamp mill for saving gold is that it will not catch the fine stuff. It may be remarked here that it seems strange that the number of plates to the stamp mill is not more frequently increased, thereby rendering this loss much smaller. However, this is only one more instance of the conservatism of mining men. There is really no good reason why the number of plates should not be increased, only no one will be the head sheep.

And now we come to a method that has been tried hundreds of times and proven to be successful. This is the method comprising the use of bichloride of mercury.

The writer was for some months connected with the Carolina Reduction Works at Charlotte, N. C., as assayer and metallurgist. Here the mill used was the new Wiswell, with a grinder of three wheels and two amalgamating pans, arranged one above the other, the grinder coming first. Tanks were supplied for holding the water to be used and for the bichloride solution.

The company was connected with the so-called Electric Gold and Silver Chloridizing Company, and combined the mill with their process.

Their idea was to generate the bichloride solution by means of the action of an electric current on a solution of common salt, when passed through it, having metallic mercury as one pole of the battery in the bottom of the trough containing the salt solution with the other pole composed of suspended carbon slabs. It was expected that the nascent chlorine produced would attack the mercury and form at once a solution of bicholoride of mercury, which was to be drawn off into a storage tank.

When this beautifully devised plan was put into practice it was found that it would not work; that instead of getting a good solution of bichloride of mercury, only a trace of it could be discovered, and that the energy of the current was used up in the formation of a mysterious "blue mud," as the proprietors styled it.

This "blue mud" when qualitatively analyzed proved to be simply the lower chloride of mercury, or commercial calomel; and nothing else could have been expected, for, had the projectors of this process only looked a little into its chemistry, they would readily have found that nascent chlorine acting on metallic mercury would give simply the lower chloride. Encouraged by the slight amount of bichloride found to be generated, the current was passed through in various ways in hopes of increasing this amount, but in vain.

This trace of the bichloride of mercury can readily be explained, and on its explanation the writer devised a plan by which the storage tank was quickly filled with the desired solution.

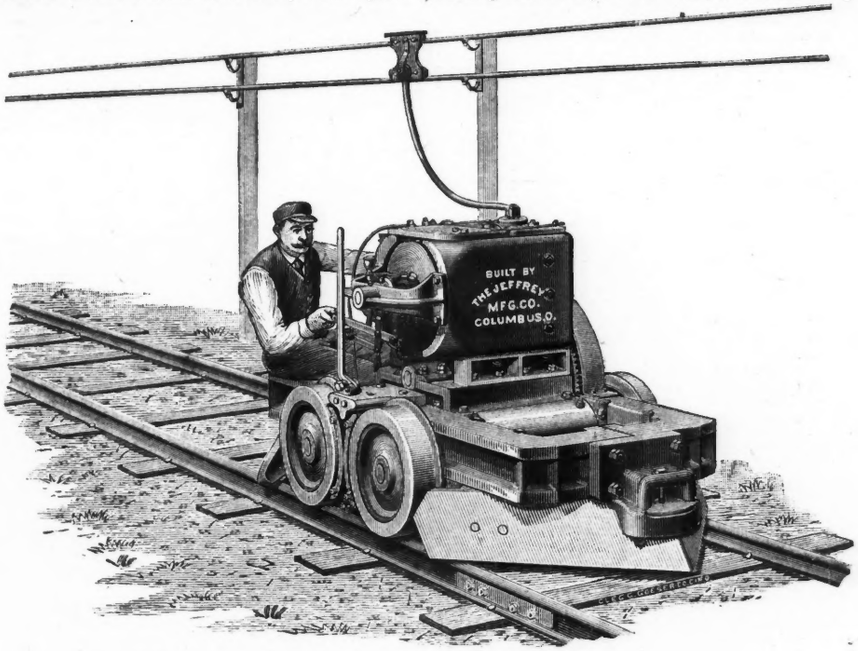
It is this: The excess of chlorine present simply attacked the calomel formed in the bottom of the trough, and formed the higher chloride.

$$Hg_2Cl_2 + xCl = xHgCl.$$

Acting on this knowledge, some of the calomel, about two pounds, was taken from the bottom of the generating boxes and treated with nitro-hydrochloric acid:

$$HNO_3 : HCl : : 1 : 3.$$

The solution was concentrated and then syphoned off, and its strength tested by its ability to coat copper wire. It was found that, when diluted to thirty-two thousand times its own bulk with water, it still showed a coating of mercury on the wire, and was strong enough to be used when diluted to sixteen thousand times. Thus one quart of this solution would make sixteen thousand quarts, or two thousand gallons, of bichloride solution ready for use, thus filling a good-sized tank. It is passed in from the tank to the grinder pan, and serves to save the gold in connection with the mercury which is used, as in ordinary amalgamation.



JEFFREY ELECTRIC MOTOR MINE CAR.

The bichloride being in the liquid state entirely permeates the ground-up particles of ore, and amalgamates with the very fine particles of gold which might otherwise escape and not be touched. The mercury in the pans serves the double purpose of amalgamating with the coarser gold, and collecting these amalgamated particles which the bichloride attacks.

We see, then, the mission of the bichloride; that it acts as a helper to the mercury in the pans by thoroughly mixing with the ore, and catching those fine particles which might escape the more sluggish mercury.

One of the most serious problems in its use is the limit of strength at which it can be used. The greatest strength is of course the greatest efficiency; but if the solution be too strong it is found that it comes over with the tailings, thereby causing a loss, and just the right strength has to be used. Now the great problem remains: how are we to use a strong solution and not lose any of it in the tailing race? When that problem is solved then the use of bichloride of mercury in gold amalgamation will be an established fact. As it is, it is a great helper. In the laboratory tests on ore, where a strong solution could be used, the results on free milling ores would approximate the assay value, and in some cases where the amount of gold in the ore was very small, say below three dollars per ton, the assay value was beaten. Thus I think that it has been shown that the use of a solution of bichloride of mercury in the saving of fine gold, now in it infancy, will, as soon as it becomes generally known, be used whenever gold is saved in amalgamating pans.

SOUTH PITTSBURG, Tenn., Jan. 3, 1890.

QUARRYING IN BENCHES WITH A BAR-CHANNELER.

The illustration, showing the method of working a quarry in benches by the channeling process, is from a photograph, so that it actually represents work done.

The advantages of a quarry in such regular shape will be apparent to any quarryman. The stone is removed in blocks ready for the market without subsequent work; a uniform system is followed in removing the stone from its place in the bed, enabling those in charge to calculate with accuracy how much stone will be shipped within a definite length of time. Besides these advantages it is only necessary to see a channeler at work to appreciate the saving in expense over other methods of quarrying. And apart from the direct economy in doing the work, the stone naturally costs less per cubic foot when brought out in blocks with little or no waste. The work illustrated was done with the Ingersoll Bar Channeler, which is really a combined rock drill, gadder, quarry bar and channeling machine.

The adaptation of the rock drill for the purpose of channeling was the invention of Mr. William L. Saunders, engineer to the Ingersoll-Sergeant Rock Drill Company.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The following correspondence will be of interest to the members of the Institute of Mining Engineers. There can be no doubt that Mr. Hewitt will be enthusiastically elected to the presidency of the Institute, and that the fitness of this choice will be recognized, abroad and at home.

Hon. Abram S. Hewitt, New York City:

DEAR SIR: The undersigned, members of the American Institute of Mining Engineers, earnestly desire your acceptance of the nomination as president for the year beginning in February next.

In every volume of the Transactions of the Institute your name appears in the catalogue of its members. You were elected in August, 1871, at the first meeting held after formal organization, and the cordial adhesion of so eminent a representative of American mining and metallurgical industries was an invaluable reinforcement to the new society, then numbering 48 members.

The reputation at home and abroad won by your report as Commissioner to the Paris Exposition of 1868 on the manufacture of iron and steel, and the public duties, in the discharge of which you had commanded the respect of all parties, led to your election as president of the Institute (then numbering about 600 members) in 1876, the year of the Centennial Exposition; and you accepted the office in spite of the overwhelming political engagements, that you might do your part in worthily representing, toward engineers and captains of industry from all nations, the forces of science and practice so recently organized for the development of the natural resources of the United States.

Fourteen years have passed, and the Institute will be, at the date of the next annual election, nearly four times as strong numerically as when you became its president in 1876. During this period you have never failed to evince on all occasions your continued interest in the Institute and its objects, while its individual members have been on many occasions the recipients of your friendly courtesy. At the same time your public career has but increased the distinction you had early achieved, and more strongly marked your representative position in connection with the sciences and industries to which the Institute is devoted.

We should be glad to testify our recognition of these facts, even were there no other and special reason for the desire at this time, by electing you to the presidency of the Institute, now that it covers the continent and is known throughout the world. But we deem it particularly appropriate and important to make you our official head at this time, because the British Iron and Steel Institute has accepted our invitation to hold in the United States its autumn meeting of 1890, and doubtless many other foreign engineers and metallurgists will visit us at the same season. We wish our brethren from abroad to find at our head in 1890 the man whom they found there in 1876; who in 1868, before the Institute was born, set in motion the influences to which its origin was largely due; who, in 1871, made haste to its support, and whose whole career illustrates that intelligent and liberal employment of scientific skill, together with that exercise of business energy and wisdom, animated by justice, honor and earnest endeavor for the welfare of society, to develop which is the highest purpose of our Institute.

Moreover, as citizens of free commonwealths, we should deem ourselves fortunate to be represented at this time by one who, besides his acknowledged eminence in the departments with which we are especially concerned, is also a statesman, whose record in the legislature of the Republic, and in the chief-magistracy of its metropolis, entitles him to universal praise.

We are aware that you have already, in answer to an unwarranted newspaper report, authorized the statement that you are not a candidate for the presidency of the Institute, and we realize the reluctance with which you will contemplate a new intrusion upon your business engagements or your well-earned repose. But we trust that you will waive these considerations, and permit your fellow-members to honor themselves in honoring you with this testimony of their confidence and esteem.

DECEMBER, 1889.

Richard Pearce,	Andrew Carnegie,
J. C. Bayles,	T. Sterry Hunt,
Thos. Egleston,	Eckley B. Coxe,
Charles Kirchhoff, Jr.,	Charles Macdonald,
E. Gybbon Spilsbury.	James F. Lewis,
R. P. Rothwell,	Frank S. Witherbee,
A. B. DeSaulles,	Charles M. Rolker,
John Stanton,	Henry M. Howe,
F. M. Drown,	A. C. Rand,

And many others.

NEW YORK, Dec. 20, 1889.

Messrs. Richard Pearce, Andrew Carnegie and other:

GENTLEMEN: Your very complimentary letter, requesting me to accept the nomination as president of the American Institute of Mining Engineers, constitutes, under the circumstances, a call of duty as well as a distinction most gratifying to my feelings.

If, as you so kindly declare, I can render important service to the Institute by becoming at this time its official representative, I feel bound to disregard the personal considerations which would otherwise lead me to prefer co-operating with you as a private member.

Placing upon you, therefore, the responsibility of the opinion you have expressed, I can only say that if your fellow-members ratify it by their votes, I shall deem it a high honor and privilege to occupy the position of president of the Institute during a period of such international importance.

Yours truly, ABRAM S. HEWITT.

THE PROBLEM OF ELECTRICAL DISTRIBUTION.*

The telegraph and telephone do not employ large amounts of energy and cannot be used as vehicles of its distribution for other uses. Their currents are not dangerous,† although their conductors may become so.

The placing of such conductors underground is not difficult. Whether it can be done in a given case without commercial ruin depends upon the cost of the operation and the earning power of the conductor. Main lines of telegraph certainly can be fairly required to go underground in large cities. The earnings of the telegraph are proportioned to its business and limited only by capacity of transmission. This capacity is somewhat reduced by placing the wires underground; but the loss is practically counterbalanced by reduced cost of maintenance. . . .

The conductors of electrical energy in large amounts, for transformation into light, heat and power, present a much more difficult problem, the pressing importance of which will be far greater in the future than it is to-day.

Electrical, like all other energy, involves two factors. As a certain amount of heat is contained in a given body at a given temperature, and an equal amount may be contained in another body, smaller or larger, but correspondingly hotter or cooler; or, again, as the energy of a rifle ball moving swiftly may be equal to that of a cannon ball moving slowly; or, as the energy of a slender stream of water falling from a great height may be the equivalent of that of a larger stream with small "head"; so a given amount of electrical energy may be expressed in a certain current with a certain "potential" or intensity, or in a smaller current with higher intensity.‡ . . .

The familiar analogy of water forced through a long pipe presents conconditions roughly similar to those of an electrical conductor, but the strain thus produced is not ordinarily a bursting strain, like that of water in too small a pipe. In the case of the incomparably intense and powerful current of lightning rending effects are included; but the energy of artificial currents is transformed under such conditions into heat, and thus a conductor may be made white hot by passing through it a current of relatively excessive quantity. This is the principle of the incandescent or "glow" lamps, in which a short conductor of small diameter and inferior conductivity is made to convey a current of relatively large quantity, and thus by its resistance becomes white hot, although the same current in the larger copper wire on both sides of the lamp is carried without perceptible rise of temperature.

Just as a water pipe, originally large enough, but becoming deformed or clogged by accident, may then behave like a pipe made too small, so the conductors of "quantity" currents of electricity may be accidentally affected so as to increase the friction of the current at certain points, and to become, at such points, heated even to whiteness. This is not the direct result of imperfect insulation. To recur to the analogy of water, a pipe that leaks is not more, but less, likely to burst, because the leak relieves the bursting strain; and so a defective insulation, permitting the escape of a part of the electrical current, prevents, to that extent, its transformation into heat. But indirectly, the defective installation of quantity currents often leads, particularly in house interiors, to the dangerous heating of the wires. For instance, a building has been carelessly "wired" by the contractor for incandescent lights. It is subsequently found that, by reason of the imperfect insulation, much of the current escapes into the walls and the lights are dim. The easiest remedy is to put on more current in order to give the lamps enough, notwithstanding the leakage, and in this way the parts of the circuit not relieved by leakage may become overheated. Several instances in which those or similar conditions have led to incipient conflagrations are known to the board. The popular impression, therefore, that the low-tension, quantity currents are perfectly safe is erroneous. Whether used for incandescent lighting or for the transmission of power, they carry the potential risk of fire. This can and should be adequately met by a rigorous inspection of the interior, as well as the street installation of such systems. The underwriters' regulations have not been suitable. Some of their regulations have been unnecessary or absurd; others have been fatally deficient. The practice of the first-class electrical companies is usually good, but building contractors are often engaged to "wire" new houses before any arrangements for the actual lighting have been made with this or that company, and their work, once hidden in the walls, is beyond inspection.

For convenience, the quantity currents have been spoken of above as if they were always of low tension. This is not necessarily the case. High intensity and large quantity may be combined in the same current. Currents of sufficient intensity for many arc lights may be carried through incandescent lamps in the same circuit with the arc lamps, and this is sometimes done, particularly in the illumination of industrial establishments, where both kinds of illumination are desired. (The method of reaching a similar result by the use of alternating currents will be described hereafter.) But practically the great incandescent systems (such as the Edison) employ low tension currents. These can be easily operated underground.

Currents of high potential, whatever be their quantity, present dangers of a different kind.

In the first place, just as high pressure on a water pipe tends to make it leak at all points, though it may have seemed perfectly tight at lower pressure, so the "potential," "intensity," or pressure of an electrical current increases its tendency to leakage. This is counteracted by "insula-

* Extracts from the final report of the Brooklyn Subway Commission.

† Except as any current, which may under any circumstances give a spark, is dangerous in the presence of explosive gas—which the smallest spark may ignite.

‡ The analogy of hydraulics here employed may be open to objection, on the ground that the words "current" and "resistance" have a technical meaning among electricians, different from that which this analogy would suggest. The precise expression of the proposition above stated would be deduced from the well-known electrical formula: W=EC, in which W is the energy in watts, E the electro-motive force in volts, and C the current in amperes. It is evident that for the same value of W, the values of E and C may be varied indefinitely so long as their product is not changed.

For the purpose of this report, the analogy with the hydraulic formula is sufficiently accurate, although the further electrical equation

$$C = \frac{Q}{T} = \frac{E}{R}$$

in which Q is the quantity of electricity in coulombs, T the time in seconds, and R the resistance in ohms, indicates a distinction between "quantity" and "current."

tion;" that is, by surrounding the conductor with a substance which is a so-called "non-conductor." All these non-conductors are really capable of conducting electricity; they simply do not conduct it freely, and since the electrical current chooses the easiest path, or rather divides itself, among all paths presented, in proportion to their relative ease (as water under pressure divides itself among different ways of escape, or air currents employed in ventilating mines divide themselves among the different air courses), it consequently does not in large proportion adopt a "non-conductor." That no such substance is a theoretically perfect protection, the following explanation will show:

The so-called "current" of electricity is the result of a disturbance of equilibrium between the two ends of its path. This disturbance of equilibrium is expressed by a difference in "potential," that is, of electrical pressure. . . .

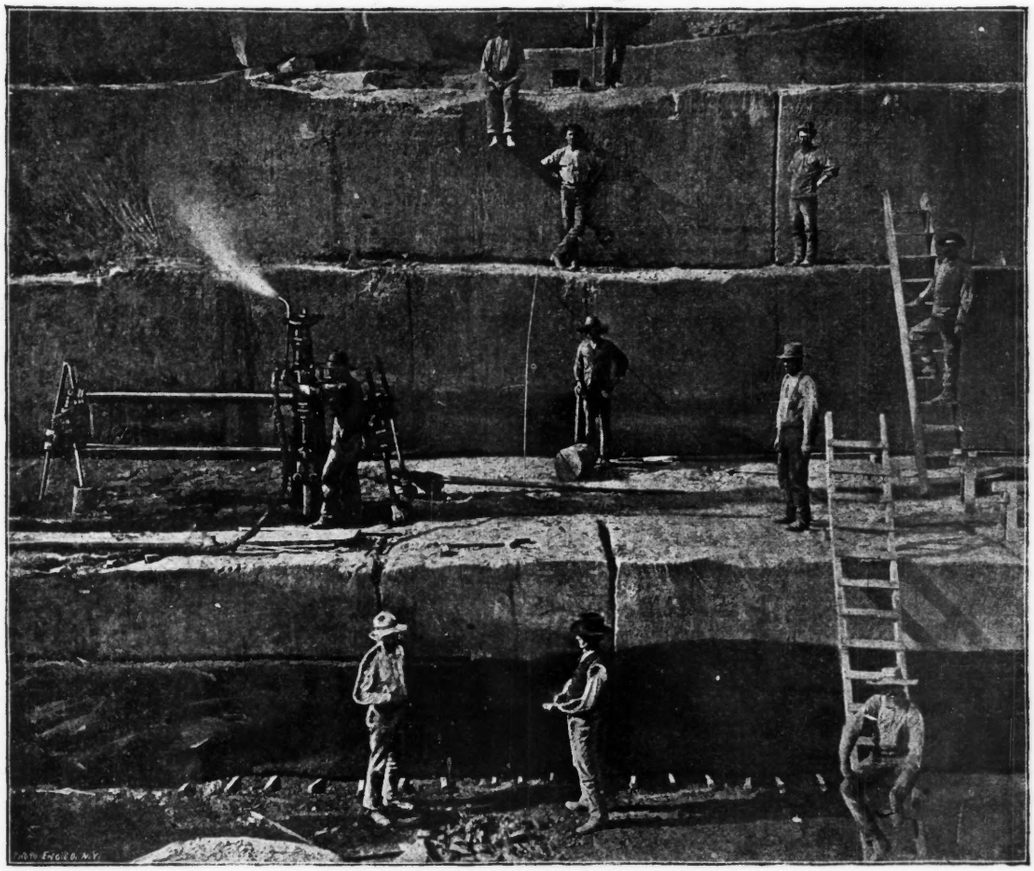
The general "potential" of the earth is very low—so low as to practically be adopted as the zero of the scale; and hence we may conceive the electric current as striving to reach the earth with an effort proportional to its own intensity. It will take the longer road through its own conductor to an extent determined by the relative resistances of the various possible paths; and these resistances are dependent upon the nature of the substances to be traversed and the length of the path. . . .

Perhaps even one inch of dry air would give more effective insulation than the equal thickness of any other practically available substance. Moisture impairs the insulating quality of air, and moisture collected upon solid non-conducting material may itself constitute a good conductor.

The safe insulation of high-tension currents above ground, then, requires, to the ordinary protection given by the glass, wood and air intervening between them and the earth; there should be added protection against moisture, and against accidental contact with other conductors, among which living bodies may, under certain circumstances, be unfortunately found. Such protection is not adequately given by the thin fibrous covering of the "underwriters'" wire, too often employed in street lighting. After a single season, this covering is affected by moisture, and becomes practically worthless. Moreover, every insulating material, not absolutely solid and hard, or covered with some shield, may be sawed through by friction of crossed and tangled wires, and thus destroyed locally. Safe overhead installation, therefore, requires not only a thorough protective insulation, but also such choice of position for the wires that they shall not be liable to contact with others, particularly as the result of storms.

When high tension conductors are put underground the difficulty of insulation is indefinitely increased, because the zero potential of the earth is brought so much nearer to the high potential of the current; and the thickness of the protecting insulation, whatever it may be, is correspondingly diminished. The suspended portion of a naked wire between two poles, 20 feet above the earth, is probably 240 times as well insulated as a wire in a subway duct two inches in diameter would be, though the whole duct were filled around the central wire with the best insulating material now known in commerce. For the earth (that is, the wall of the duct which would be practically at the earth-zero of potential) would be, in the latter case, only an inch away, and the insulating material would not be superior to an equal thickness of dry air. It has been attempted, with some success, to surround underground conductors with air, and as an auxiliary insulation it is no doubt beneficial; but there is difficulty in keeping it dry, and it cannot well be relied upon as the sole protection for naked wires. Nor does it prevent their accidental contact with one another. Finally, it may involve, for the accommodation of any considerable number of conductors, more space than could be conveniently given.

The principal evils resulting from the difficulty of insulating high-tension underground conductors are two. First, they are liable to fail, after brief use, by the sudden destruction of their insulation at single points. This may be the result of original defects in construction or in connections. It is at the joints that the failure most frequently occurs. And one of its most frequent forms is that of the so-called "disruptive discharge," of which more will be said presently. This is undoubtedly often produced by careless management of the dynamo, especially in starting or stopping, which may produce a violent electrical disturbance, analogous to the "water-hammer" occasioned in water pipes by suddenly opening or closing valves, and thus greatly augmenting ordinary strains. Finally, the failure of underground cables may be due to the accumulated effects of slow deterioration of the insulating material under the excessive strain to which it is subjected by the close proximity of the earth zero of potential. Conclusive proof of this gradual process has not been obtained. It is difficult to obtain, because the usual daily electrical tests of operating companies are not delicate enough to detect it, and because failure, when it occurs, is local at some weakest or most severely strained point. But the general experience that underground high-tension conductors fail within three years points to such a constantly operating cause; and the fact that, under conditions otherwise alike, the strain upon insulation is much severer underground cannot be successfully denied.



QUARRYING IN BENCHES WITH A BAR CHANNELER.

All such failures require the renewal of the section of conductor in which they occur. They may be measurably prevented by care in construction and operation, and they may be retarded by improved quality and increased thickness of insulation. Considered as an element of expense and loss to the electrical companies, and thus indirectly, as enhancing the price and impairing the effectiveness of the service rendered, they constitute the first of the two evils referred to.

The second evil is that this escape of the intense current, being likely to occur at joints, and, therefore, in manholes, and being usually accompanied with a spark, may ignite explosive mixtures of gas. As already explained, the proper ventilation of the subway will reduce the danger from gas to a minimum. Nevertheless there is more or less risk in carrying currents which *may* thus be discharged with a spark through places where gas *may* have collected, notwithstanding all precautions. No absolute preventive of the disruptive discharge has yet been fully proven in

practice, though some ingenious and promising devices have been proposed, to render it harmless in this respect. It can, undoubtedly, be so far avoided by careful installation and management as not to be more frequent underground than overhead, but there is this great difference, that overhead it usually does no more than spoil a piece of conductor, easily renewed, while underground, it may blow up a manhole besides. The board believes that (perhaps on the principle already suggested by one expert, of providing a path for the spark, which might effect the "sparking" outside of the conduit altogether) the dangerous possibilities of the discharge will ultimately be removed. In that event it will remain merely a commercial injury, and high-tension conductors in well-veutilated conduits, not containing conductors of other classes, will be safe enough.

Meanwhile, the question is thus raised whether, *for such conductors*, it would not be better to use solid conduits, packing the insulated conductors in a mass of asphaltic concrete or other material, which would admit neither gas nor moisture. The board has examined several such systems, and has been favorably impressed with their apparent adaptation, at least to special kinds of service. But it is compelled to admit that within the the fateful three years (and usually in a much shorter period) they have failed for one reason or another. Certainly they do not permit with facility the making or changing of new connections. Any disturbance of them is likely to destroy the whole system. If a single conductor out of a number thus laid in one mass, should fail, it must simply be abandoned; the replacing of it with another would be impracticable. Finally, all these solid conduits of various concretes are liable to crack somewhere, sooner or later; cracks admit moisture and moisture is rapidly fatal to the insulation.

Open conduits have been successfully operated in cities like Washington, where the wide streets, or some other circumstance, make the danger from gas inconsiderable. In such cases the above considerations may be neglected.

Besides the results of imperfect insulation above discussed, the disturbing effects of induction upon telegraph and telephone wires must be considered. An induced current is set up in any insulated conductor by every change of electrical condition in a neighboring conductor.

Induction shields, to receive the inductive effect, and, partially at least, convey it to the earth, have been proposed. Iron pipe or the lead covering of the underground conductors may serve such a purpose. It is quite practicable in such ways to reduce the effects of induction to a tolerable minimum; and it is probable that overhead installations, where the natural insulation is superior, are more troublesome in this respect than underground ones. But the general practice of electric arc lighting companies of carrying their wires on extended circuits, so that every conductor exposed to their inductive influence receives the effect of one wire alone, without the counteracting effect of its fellow, will probably have to be stopped. And this is one of the features of installation which should be under public control. For the same reason, grounded circuits will probably have to be abandoned for all kinds of electrical service in cities, except possibly the telegraph; and complete metallic circuits will have to be substituted—a change which may be made progressively and under proper expert authority. . . .

It is to this phenomon of induction, presented in a maximum degree by the alternating current, that one of the greatest modern advances in the application of electricity is due; and since the "alternating system" is destined to receive a very wide extension, and to effect in important particulars the municipal problem under discussiou, a simple statement of its peculiarities, in popular language, will here be given.

As has been remarked, a given amount of electrical energy may be conveyed by a current, either of small amount and high potential, or of larger amount and lower potential. Now (to confine ourselves for the moment to electric lighting as the use of the energy), it has been shown that the Edison system, for instance, with its low-tension current and incandescent lamps, is (when properly installed so as not to be liable to set fire to house interiors) not dangerous to human life. Moreover, it is successfully operated underground, on a system admirably perfect in ingenious device and mechanical execution. The incandescent light is the best indoors; and for ordinary street lighting, it is really the best outdoors. The substitution for the old gas lamps of incandescent lamps of equal number, and say 25 or 30 candle power, would give a diffused street illumination, free from the black shadows and irritating fluctuations of the arc lights, and certain to be more satisfactory to citizens.

Why, then, should not this system be adopted, and high-tension currents be excluded altogether? This interesting question involves important commercial interests, but will be frankly and impartially discussed. So far as the public action of the board is concerned, it has been consistently in favor of the Edison system. As compared with any other system now operated in Brooklyn, whether for street lighting or domestic purposes, it is undoubtedly superior; its introduction into the city after a prolonged struggle with adverse interests was a public benefit; and its use in our streets would be another. Nevertheless, the system labors under commercial disadvantages, which make it almost impracticable for the wide distribution of light, and will probably prevent it from becoming the "system of the future," although the incandescent lamp will very likely be the lamp of the future.

The principal disadvantage lies in the fact that the low-tension current requires large conductors and expensive machinery, and cannot be operated for more than a mile, at most, from the central station, without such cost in copper, etc., as prohibits its commercial use; whereas high-tension currents carrying an equal amount of energy can be generated with cheaper plant, and conveyed by smaller conductors for many miles. Electric arc lights are operated in Brooklyn as much as eight miles from the dynamo.

But some high-tension currents can be transformed at any desired point into electrical energy of larger quantity and lower potential, and utilized in that form for incandescent lighting. In other words, the energy packed for cheap transportation in small quantity can be unpacked and expanded, as it were, in order to utilize it in quantity. This is possible with the so-called "alternating" currents, from which by means of so-called transformers or converters, induced currents may be obtained, representing portions of the total energy of the original current, but in different proportions of the two factors, quantity and intensity. The alternation—*i. e.*, the swift successive reversals—of this current, giving the maximum inductive effect, is what permits "conversion" in this way. A "direct" coutinuous current produces induction by its fluctuations only, after it has once started; and such fluctuations, kept as small as possible in order to secure uniform work, are too insignificant to be utilized by conversion.

Without describing the details of the converters of the alternating systems, it is sufficient to say here that the main wire, carrying the high-tension alternating current is not tapped by any metallic connection. The coil which receives the less intense current is simply brought near to the main current, and thorough insulation separates the two. No instance has ever come to the knowledge of this board in which the intense current has escaped to the conductor thus brought near to it. Such proximity in a carefully constructed, locked apparatus, accessible to trained experts only, is a very different thing from proximity in the air or in manholes frequented by more or less unskilled workmen.

The cheapness of high-tension currents, and the fact that with given conductors already laid, and burdened up to the safe limit of quantity, the only way to increase the delivery of energy is to raise the potential has led to a constant quiet advance on the part of the electrical arc light companies. Almost without exception they use more intense currents than they profess to use, or formerly did use. An arc light company having a certain number of lamps "in series" (that is, strung together so that the current passes successively through all, losing a certain number of "volts" of its intensity at each) can only extend that series by increasing the intensity so as to supply additional lamps; and since this requires no additional station plant the temptation to do it is strong. Increased intensity may also be resorted to for increasing the amount of light at each arc. Consequently, companies which began with 1,500 volts not infrequently employ 2,000, 2,500, and 3,000.

The "quantity" currents cannot be thus increased in quantity upon the same conductors. Since the incandescent lamps consume principally quantity of current, they are usually set (in the Edison system) "in multiple arc;" that is to say, a certain portion of the current is switched off at intervals to pass through a group of incandescent lights, after which, in diminished quantity, it joins the main return current. Hence the conductors are made largest nearest the station, and are diminished gradually for economy as the current is diminished by the serving of successive groups of lamps. It is not practicable beyond narrow limits to extend the system once planned for a certain area.

The alternating currents, consisting as they do of rapid reversals of current, each of which constitutes a separate shock, are, *at the same potential*, more destructive to life than the direct continuous currents. But the difference is not of much practical importance at a tension of 2,000 or 3,000 volts. Either current under such circumstances is sufficiently fatal. And since the irresistible commercial tendency is toward higher potentials, it will probably be found safer in the end to adopt very high tension, and to use the alternating currents.

For the currents are dangerous either through direct contact with man or beast, or through contact with other conductors which may indirectly lead to the same result. Now, the alternating current may be put underground beyond any risk of the first danger; and the second danger may be entirely confined to the transforming apparatus, accessible to experts only. It is perfectly feasible to distribute electricity in this way, from a current of 10,000 volts intensity, carried underground, so that the working currents everywhere used, and the only ones exposed to any chance of accidental coutact, shall be no more intense than 500 or 100 or 50 volts, according to the work required of them. A main alternating current of 10,000 volts is now carried in this way into London, and reduced to much lower potential (though not so low as the above) for arc lighting, . . .

Such being the actual present and probable future of this problem, the following suggestions are offered as to the legislation best adapted to meet it, especially in this city:

1. Since the space under the streets is limited, the city ought not to surrender it beyond recovery on reasonable terms to any private company. For if at last the perfect comprehensive system should be reached (in the direction above indicated or in any other), the city would be most unfortunate if, by grants already made, its free action in the matter were prevented.

2. The placing of telegraph and telephone wires underground may be continued without fear of interfering with the future comprehensive system; for these wires will never be advantageously included in the same conduit with the other classes, and, since they constitute by far the larger present nuisance (and, in the neighborhood of high-tensiou currents, indirectly the larger danger also), they ought to be buried as fast as possible.

But this should be done under official control, not limited by law to single, rigid functions, but clothed with full power for the regulation of all overhead as well as underground systems.

3. It is of the highest importance that the city itself should take the lead in this matter, by putting its police and fire telegraph lines underground. In those cities, outside of Brooklyn, where the largest amount of underground electrical service has been provided, the city has thus set the example. In Brooklyn it has lagged in the rear, and hundreds of poles from which the private wires had been removed have remained in our streets, as plain a nuisance as before.

4. Either the executive authority, controlling the electrical conductors, should also make contracts for street lighting, or the department making such contracts should act in harmony with it and according to its advice. The plan of contracting for the whole city, or for very large portions of it, with a single company and for a single year, though it may secure a low price, does not promote the progress of improvement and the ultimate selection of the best system. The short contract encourages neither permanent installations nor experiments for better service. The cheapest plant is the best—for one year—and the construction of subways for so short a certainty of use is out of the question.

Probably equally cheap service, with far greater perfection, could be secured by a system of district contracts, under which rival underground systems might compete side by side in adjoining districts—all being under continuous and rigid inspection and held to careful specifications as to quality, uniformity and safety of service. Such contracts, in order to secure a low price to the city, would have to be for a longer period than one year—say five years at least; and probably special privileges as

to the supplying of private customers through street conduits would have to be added as a final inducement, being carefully guarded. (For the next five years there is little danger of extortionate charges for domestic lights. The electrical companies are competing with gas and can only get that business by bidding as low as possible.) At the end of the period of contract the city should be free to act as might seem wise—either abolishing, modifying or continuing the district system, and selecting for further service those methods which had proved best in practice. The control of the street space and the ownership of the conduits should revert to the city, on equitable terms stated in the contracts.

A plan of this general nature would involve a monopoly, it is true, but it would be limited in area and time, and under close supervision. On the other hand, such a plan would put rival systems into intense competition as to excellence of service, and would constitute a conclusive test, in which every citizen would take part. Moreover, it would hasten the solution of the remaining difficulties of the subject by the most capable —almost the *only* capable—persons. For the best practical electricians are unquestionably in the service of the electrical companies. If it can be made the interest of these companies, not by unreasonable threats, but by fair business inducements, to operate underground, they will find ways and means of doing so, sooner than any one else.

5. Whether any such plan be followed or not, the details of electric light installation should be subject to inspection and summary control by some authority outside of the companies themselves. The inspection exercised by the underwriters furnishes a simple model. No arbitrary order could command more prompt obedience than does the simple notification of an insurance inspector that unless a certain danger be removed, insurance will be voided; and a provision of law, subjecting electrical companies to exemplary damages in every case where notice of a dangerous defect, given by the electrical inspector, had been disregarded, would probably be effective. But the proper authority should also have power of summary action in case of such disregard.

Ozokerite.—During 1889, the product of ozokerite, or "mineral wax," from the Utah mines was approximately 130,000 lbs., as compared with 65,000 lbs. in 1888. The foreign market has been greatly excited on account of the absorption by English capitalists of the greater part of the Galician deposits. Within the last six months of the year prices advanced abroad from 31 florins to 38 florins per 100 kilograms.

Gold and Silver in India—What Becomes of the Gold when Silver is the Standard.—The net import of gold to India last year was 231½ lakhs and of silver 924¾ lakhs. During the thirty years since 1859, says Mr. O'Conor, India received and retained of the precious metals £113,250,000 of gold and £227,000,000 of silver, all the gold being practically withdrawn from circulation to be hoarded or converted into ornaments. Altogether since 1834 Mr. O'Conor estimates that £442,000,000 of the two precious metals have been received and retained by India.

Exports of Petroleum from Batoum.—In 1888 the petroleum products exported from Batoum amounted to 450,326 tons, valued at £1,724,446, against 263,000 tons, valued at £1,062 000 in 1887. The British Consul at that port states, in a report just issued, that this increase is largely due to the steadily increasing demand for Russian oil in foreign markets, and especially with India, China and Japan. To these three countries the export in 1888 amounted to 108,891 tons, or 3,426,716 cases, being an increase of 81,171 tons over the previous year. India alone took over two thirds of the quantity.

Dutch Telegraphs in 1888.—It appears from the official report on the telegraphic service in 1888 that the system on the 31st of December comprised 17,513 kilometers, 13,757 being laid along railways and the remainder along roads and canals. A considerable proportion of these lines are either subterranean or subaqueous, and many are worked by private companies, from which it follows that there is no State monopoly in telegraphs. Of 676 offices existing on December 31st, 1888, 232 were government and 309 private offices, besides 139 telephone offices and seven signal offices for coast service. The government officials (41 ladies) numbered 924; 4,084,188 telegrams were forwarded during the year, the receipts amounting to 1,263,071, and the expenses to 1,455,779 guilders, so that there was a loss of about 200,000 guilders. Telephones are worked by private companies, and the government is preparing a new bill for the better regulation of the whole system.

Illinois Steel Company's Work in 1889.—The Illinois Steel Company report the following business in 1889: Capital issued, $17,622,600; number employed, 9,247; total wages, $4,577,000; value of product, 19,000,000; pig metal produced, tons, 572,095; rails, tons, 461,147; wire, tons, 43,488, merchant bar and nails, tons, 60,230; billets, tons, 50,289; spiegel and ferro-manganese, tons, 18,031; beams and slabs, tons, 4,030. They consumed 775,000 tons of ore, 575,000 tons of coke, 140,000 tons of coal and 200,000 tons of limestone. The Chicago Furnace Company made 55,000 tons of pig iron. The company's four per cent. dividend is payable February 2d to stock of December 31st, the books to reopen January 7th. This dividend is for eight months ended December 31st, and while the company expect to earn over eight per cent. for the year to end April 30th, it is not intended that payments on the stock shall exceed six per cent. per annum for the present. Four per cent. for eight months is at that rate per year.

The Export Trade of France.—Statistics recently prepared show that there was a decline in the value of French exports during the past 12 years, amounting to no less than £7,500,000. The woolen exports, which in 1882 were valued at £16,000,000, fell to £15,000,000 in 1886, and scarcely exceeded £12,900,000 in 1888. Silks declined from £10,360,000 in 1887 to £8,920,000 in 1888; and linens, which had an export value of £1,240,000 in 1877, scarcely yielded £320,000 in 1888. There was also a considerable decrease last year in the exports of turnery, leatherware, refined sugar, articles of fashion and gold and silverware. Taking the countries to which exports were sent, there was no material change as regards Portugal, Austria, China and British America, while the exports to Belgium, the United States, New Grenada, Spain, the Argentine Republic, and a few minor States exhibited a total improvement of £9,160,000 during the past twelve years. But this gain was more than counterbalanced by a decrease of upward of £18,000,000 in the value of the exports to all other countries. The exports to Great Britain fell from £42,000,000 in 1877 to £34,500,000 in 1888; those to Germany decreased in the same interval from £15,000,000 to £12,000,000, and those to Italy went down from £7,400,000 to £4,760,000.

BOOKS RECEIVED.

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

The Cosmic Law of Thermal Repulsion. An essay suggested by the projection of a comet's tail. Published by John Wiley & Sons, New York, 1889. Pages 60. Price 75 cents.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

ISSUED DECEMBER 31ST, 1889.

418,147. Steam-Boiler Cleaner. Eleazar Ainsworth and Louis J. Lingo, Wilmington, Del.
418,150. Draw-Bar for Railway Cars. David L. Barnes, Chicago, Ill., Assignor to Rowland R. Hazard, New York, N. Y.
418,154. Manufacture of Composite Metallic Pipe. James C. Bayles. East Orange, N. J.
418,158. Metallic Railway Tie and Chair. Bassler Boyer. Lebanon, Pa.
418,170. Foundry Flask. John M. Cornell, New York, N. Y.
418,187. Steam-Generator. Clark Jilison, Worcester, Mass.
418,191. Metallic Lift Pump. George J. Keller, Osceola, Neb.
418,197. Clutch-Operating Mechanism. Martha S. Latham, Windsor Locks, Conn. Administratrix of Eugene E. Latham, deceased.
418,193. Method of Making Collars on Axles By Electricity. Herman Lemp and Elihu Thomson, Lynn, Mass.
418,205. Clutch Pulley. Henry I. Mason, Cuyahoga Falls, Ohio, Assignor to the Rivet and Machine Company, same place
418,208. Insulating and Waterproofing Composition. Anthony E. Menuez, Minneapolis, Assignor of two-fifths to James H. Southall and Walter Ruan, both of St. Anthony Park, Minn.
418,221. Derrick. William B. Pless, Stockton, Assignor of one-half to Roswell C. Sargent, San Joaquin, Cal.
418,231. Automatic Coal Bucket. Alexander M. Rucker and Timothy Long, Milwaukee, Wis.
418,238. Car-Coupling. Damond D. Shaw. Big Bend. Kans.
418,243. Petroleum Burner. Frederick H. Smith, Kansas City, Mo.
418,248. Electric Magnetic Motor. Nikola Tesla, New York, N. Y., Assignor to the Tesla Electric Company, same place.
418,259. Process of Making Bicalic Phosphate. Camille E. D. Wissenger, Brussels, Belgium.
418,264. Apparatus for Recovering Soda. Edward M. Atwood, Portland, Me., Assignor by mesne assignments to S. D. Warren & Co., Boston, Mass.
418,272. Excavator John Cable, Cable, Minn
418,273. Apparatus for Recovering Soda. Francis A. Cloudman, Cumberland Mills Me., Assignor to S. D. Warren & Co., Boston, Mass.
418,275. Method of Heating in Furnaces. Elijah B. Cornell, Philadelphia, Assignor to the Natural Gas Fuel Co., same place.
418,281. Device for Transmitting Different Speeds. Sterling Elliott, Newton, Mass.
418,297. Friction Gear. Imie E. Storey, Boulder, Colo.
418,304. Water Motor. Andrew A. Bessemer, Tecumseh, Mich., Assignor of one half to Charles E. Williamson, same place.
418,306. Cinder Car. James Bowen, Pittsburg, Pa.
418,314. Regenerative Gas Retort Furnace. William Foulis, Glasgow, County of Lanark, Scotland, Assignor to Frederick Siemens, and Alexander Siemens, London, England.
418,315. Drying and Roasting Apparatus. Herman Frasch, London, Ontario, Canada.
418,320. Apparatus for Burning Crude Petroleum. Nathan Washburn, Boston, Mass.
418,370. Mode of Manufacturing Sheet Metal. Joseph R. Jackson, Pittsburg, Pa.
418,373. Electric Railway. Hosea W. Libbey, Boston, Mass.
418,374. Rail Joint. Ives Lynd, Troy, N. Y.
418,410. Lubricants. John A. Holmes, Salt Lake City, Utah.
418,417. Gas Engines. Lewis H. Nash, South Norwalk, Conn., Assignor to the National Meter Company, New York, N. Y.
418,424. Process of making Bronze Alloys. Augustin Sentex, Constantin Merechal, and Alfred Saunier, Paris, France.
418,425. Car Coupling. Harvey A. Snyder, Chicago, Ill.
418,449. Rock Drill. John Cody, New York, N. Y.
418,465. Portable Furnace. Richard Huff, Russellvill, Mo.
418,471. Setting Spud and Gage for Dredgers. Alonzo P. Payson, San Francisco, Cal.
418,481. Hydrocarbon-Burner. James H. Whitburn, Los Angeles, Cal.
418,487. Car-Axle Box. Edward Best, Carleton Place, Ontario, Assignor of one-half to William Prenter, Ottawa, Canada.
418,506. Air Brake. Theron S. E. Dixon, Chicago, Ill
418,509. Oil Saving Apparatus for Petroleum Wells. Joseph W. Felt, Allegheny, N. Y.
418,514. Pulverizer and Concentrator. Irwin W. Heilig, Pottstown, Pa., Assignor of one-half to Samuel K. Snodgrass, Delaware, Ohio.
418,552. Gunpowder. Paul Butler, Lowell, Mass.
418,551. Rock Drill. James M. Clark, Malden, Mass.
418,562. Die for making Rolled Forgings. Charles E. Gould, Leominster, Mass., Assignor to the Gould Rolling Machine Company, same place.
418,591. Pipe-Coupling. Edward F. Roberts, Rochester, Assignor of one-half to Thomas R. Sully, Buffalo, N. Y.
418,622. Stirrer for Molten Metal. William T. Macfarlane, Bridgeport, Conn.
418,635. Gunpowder. Arson F. Woods, Lagro, Assignor to Harvey E. Misener, Servia, Ind.
418,644. Manufacture of Cast Iron Enameled Pipe. August Haarlander, Allegheny, Pa., Assignor to the Standard Manufacturing Company, same place.
418,646. Process of Making Gas. Philip W. Mackenzie, New York, N. Y., Assignor to the Fuel Gas and Light Improvement Company of America, same place.
416,554. Electric Motor. Francis J. Patten, New York, N. Y.

ISSUED JANUARY 7TH, 1890.

418,665. Rotary Engine. Thomas R. Almond, New York, N. Y.
418,726. Coffer-Dam. George K. Kirkham, Brooklyn, N. Y.
418,741. Valve Gear for Engines. Ronald F. McFeely, Pittsburg, Pa.
418,742. Combination Tool. William J. McFeely, Mount Vernon, O.
418,745. Pump. George G. Patchel and Thomas T. Patchel, Darby, Pa.
418,748. Distribution of Electricity by Secondary Batteries. George B. Prescott, Jr., Newark, N. J., Assignor to the Electrical Accumulator Company, New York, N. Y.
418,750. Core for Casting. William N. Reddout, Rushville, N. Y., Assignor to Arthur B. Burtis, Cleveland, O., and Frank Hammond, Phelps, N. Y.
418,760. Reversing Lever for Steam Engines. Theodore M. Shearer and James W. McKee, Butler, Pa.
418,761. Apparatus for Making Salt. Frederick Siedentopf, Terre Haute, Ind., Assignor of one half to Joseph H. Briggs, James N. Phillips, Andrew Grimes, Judson Q. Button, James B. Reynolds, John F. Gulick and J. C. Harper, same place.
418,763. Wagon Dump. John Simpson, Minneapolis, Minn., Assignor of one-half to Deighton A. Robinson, same place.
418,767. Mold for Making Compound Metal Ingots. John L. P. Spooner, Providence, R. I.
418,785. Dumping Car. Charles H. Evans and Charles Wilson, Rockport, Mo.
418,839. Endless Chain Elevator. Charles A. Case, New York, N. Y.

PERSONALS.

Mr. Chas. Bullman, the mining engineer, of New York, sailed on the 10th inst. for Buenaventura Colombia, to be absent some three or four months, on professional business.

Mr. Clemens Herschel has resigned his position as engineer of the Holyoke Water Power Company, and will go to Newark, N. J., where he will have charge of the construction of the new waterworks.

Mr. James C. Hartt, the treasurer and general sales agent of the Delaware and Hudson Canal Company, on February 1st, 1890, will have been connected with the company for forty years. Few men in the coal trade have enjoyed so long and valuable an experience as has Mr. Hartt.

The winter meeting of the Ohio Institute of Mining Engineers will be held in the old Board of Trade rooms, in Columbus, Ohio, beginning Thursday evening, January 23d, 1890. This meeting, it is expected, will be of especial interest to all engaged in mining. The Executive Committee have made arrangements with Mr. Thos. Shaw, M. E., of Philadelphia, the expert on mine gases and discoverer of a positive means of detecting and measuring the quantity of gas present in the air. He has also invented a system of signals in mines, all of which will be practically illustrated in the above lecture. The committee will furnish samples of gas from different mines in Ohio to be tested at this meeting.

Some rumors having been circulated again that the late Mr. F. B. Gowen had been in debt to Mr. Alfred Sully, it seems well to reproduce the following telegram sent by Mr. Sully to the Philadelphia *Inquirer*, December 29th, and which set the question at rest effectually:

"I noticed some days ago an article in the *Inquirer* mentioning a rumor that Mr. Gowen owed me $100,000, and a rumor that his inability to pay the same probably caused him to commit suicide. I immediately telegraphed to Mr. Frank Gowen that there was no truth whatever in this. I notice other papers are repeating the rumor, and therefore I take the liberty of writing directly to you to say that Mr. Gowen never borrowed any money of me. I do not know of any loans he made from any one. I am certain he was not at all financially embarrassed. On the contrary, as far as I know, his financial affairs were never in better condition. A coal property in which he was very largely interested, he told me at different times, has grown remarkably in value; his interest had quadrupled in value. His estimate should have increased in value $250,000 within the past eighteen months from this source alone. I regarded Mr. Gowen as worth from $500,000 to $750,000.

If Mr. Gowen really took his own life it was purely from insanity. I saw him several times since election day and lunched with him a week before his death. At each interview I noticed a change. It seemed to me to come from some physical cause. He seemed obliged to rally himself, and in my mind there can be no question but something like a tumor or clot was growing and pressing upon his brain. No one who knew Mr. Gowen well can believe for a moment that he took his life through discouragement or depression. He was the bravest man, the most courageous soul I ever knew. He was incapable of taking his life because discouraged. No man who knew well the great, tender heart, the brave, strong soul—this man of courage, this perfect gentleman, who was incapable of falsehood or deceit or guilt, whose life was the exponent of the highest type of honor—can believe for one moment that weakness or cowardice caused his death. Yours truly, ALFRED SULLY.

INDUSTRIAL NOTES.

Everett Furnace, formerly operated by the Everett Iron Company, at Everett, Pa., but which has been idle for about three years, has been put in operation. It has a capacity of about 100 tons a day.

Curtins & Co., proprietors of the Eagle Iron Works and Eagle Furnace, at Roland, Centre County, Pa., have made an assignment. The liabilities are reported to be $120,000, and the assets from $40,000 to $60,000.

An explosion in the building occupied by Mr. Thornton N. Motley, dealer in engineers and contractors' supplies, at 27 Liberty street, New York City, this week, caused a fire, and a reported loss of several thousand dollars.

Messrs. Frank Janson, Valentine Janson and Frank Kasel, of Columbia, Pa., have formed the firm of Janson, Kasel & Co., and have closed a five year lease for the Chickies Rolling Mill. It is intended to commence operations at once, and to have the old mill in full running order within the next ten days. They will make muck bar iron. Mr. William McDevitt will probably manage the plant.

A company has been organized under the style of the Ironton Rolling Mill Company to lease and operate the works of the New York & Ohio Iron and Steel Company, Ironton, O. The officers of the company are J. H. Moulton, president; C. M. Buchannan, secretary and treasurer. The product will consist of sheet and tank iron. The works will be started on January 15th.

A contract for steel ship plates was concluded in Duluth, Minn., on Saturday, says a press despatch, by the American Steel Company with a representative of Andrew Carnegie. The contract calls for about 5,000 tons of steel plate, costing over $300,000. It will furnish plates enough for seven vessels of the McDougal type, which are to be built this year.

James I. Bennett, of the iron firm of Graff, Bennett & Co., in Pittsburg, who failed two years ago, has filed a petition in the courts, asking that the sale of the property by the assignee be set aside. He alleges that the sale was fraudulent, and that through illegal means the company's property, valued at $500,000, was sold for $25,000. Mr. Bennett says there is not sufficient left to pay the creditors 20 per cent., and asks for the appointment of a receiver.

CONTRACTING NOTES.

Messrs. Gordon, Strocbel & Laurean, Limited, of Philadelphia, Pa., have contracted with the Southern Iron Company, of Nashville, Tenn., for two 16 × 55 Gordon fire brick stoves, to be erected at their West Nashville furnace.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

475. Drill for a coal machine to bore a hole in coal, 3¾ inches in diameter and 4 feet deep. Illinois.

476. Tools. Prices on small lathe 10 inches × 8 feet Large lathe 30 inches × 12 feet. Plane 24 inches × 24 inches—8 feet. Upright drill. Hand feed and back geared 24-inch hand shaping machine. Bolt and milling machine. Also tools for above machines. North Carolina.

477. Grist Mill. Bids on machinery for grist mill with a capacity of 30 or 35 bushels of corn per hour. Florida.

478. Pump to supply water to brick yard tank. West Virginia.

479. Elevator with small engine, boiler and hoist complete, to hoist brick and other material on buildings as they are put up. West Virginia.

480. Electric power. Estimates on transmission of power by electricity a distance of two miles. Tennessee.

481. Water Wheel. Cost of turbine water wheel, everything complete, of say 50 horse-power, to work under 26 feet head. Tennessee.

482. Gun with barrels 36 inches long; the bore of one barrel of proper size for No. 10 brass shell, and the other No. 16 shell. Weight about 10 pounds. Mississippi.

483. Ax handle, pick handle, broom handle and spoke handle lathes. Mississippi.

484. Excelsior machines for new plant. Mississippi.

485. Gas engine three or four horse-power. Mississippi.

486. Wood-working machinery; full line. Tennessee.

487. Foundry and machine shop supplies. Tennessee.

488. Brick machinery for manufacturing about 25,000 brick per pay. North Carolina.

489. Wood-working machinery; band saw, blind stile mortising and boring machine, shaper and carving machine. Tennessee.

515. Engine, second-hand three-foot gauge. Virginia.

516. Cars. Passenger coach, flat and box cars. Virginia.

517. Prices of steel rails, second-hand, 25 to 35 pounds. Virginia.

518. Two dummy motors and four coaches for suburban passenger traffic. Tennessee.

519. Tee rails; four miles, weight 20 to 30 pounds. Tennessee.

520. Engine 15 or 20 horse power. Texas.

521. Boiler 20 or 30 horse power. Texas.

522. Canning factory outfit. Georgia.

523. Nitrate soda; carload lots periodically. Tennessee.

524. Mixed acid; carload lots periodically. Tennessee.

525. Sweet glycerine; 50 to 10,000 pound lots, periodically. Tennessee.

526. Ice machine; 6 or 10 tons, with steam boiler. Tennessee.

527. Ore washing and cleaning machine. Georgia.

AMERICAN GOODS WANTED ABROAD.

449. Dry lubricant for the journals of the bearing rolls of a revolving calcining furnace. The journals are 6 inches × 3¾ inches, resting in half brass; the movement is a very slow one, only about 1¼ revolutions a minute. South Australia.

450. Turning lathe with bed long enough to turn a stick of timber 30 inches long; also a frame for circular saws, one rip saw and one cross-cut saw, each 10 inches in diameter. West Africa.

490. Teal hoists. Australia.

491. Cigars; good line to represent. Australia.

492. American goods on consignment. Australia.

493. India rubber goods, mechanical. Australia.

494. Cutlery. Australia.

495. Watches; cheap grade. Australia.

496. Wire cables. Australia.

497. Blasting powder. Australia.

498. Safety burglar alarms. Australia.

499. Gas works; especially gas water system. Australia.

500. Electrical supplies; full line. Australia.

501. Crackers. Queensland.

502. Spades, shovels, &c. Queensland.

503. Sweat collars. Queensland.

504. Large line of various boxes. Queensland.

505. Trunks. Queensland.

506. Tin-working machinery; especially a machine that will do folding, grooving and turning, all in one, for canisters. Queensland.

507. Lighting by electricity for railway cars. Queensland.

508. Lighting by oil for tram cars. Queensland.

509. Blasting and sporting powder. New South Wales.

510. Milk. Queensland.

511. Shooks. Quotations for white pine and spruce shooks, ¾-inch dressed one side, f. o. b., in the following quantities and sizes: 2,000, 10 inches wide and 15 inches long; 2,000, 10 inches wide and 12 inches long; 6,000, 2 inches wide and 12 inches long; 2,000, 10 inches wide and 18 inches long; 2,000, 10 inches wide and 14 inches long; 6,000, 2 inches wide and 14 inches long. West Indies.

512. Portable houses. South Africa.

513. Coal cutter. South Africa.

514. Agency wanted for mining and other machinery. South Africa.

GENERAL MINING NEWS.

ARIZONA.

PINAL COUNTY.

Our special correspondent, referring to his letter in the ENGINEERING AND MINING JOURNAL of December 14th, calls attention to several typographical errors and requests that these corrections be made.

MAMMOTH MINES.—Between the 400 and 500 level was erroneously printed as the 4,500 feet level.

REYMERT MINES.—Distance from which it is contemplated to bring low-grade carbonate ores for smelting should be 20 miles, not 70, as stated.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—Secretary H. W. Lazelle informed an ENGINEERING AND MINING JOURNAL representative this week that nothing but development and prospecting work is being done on this company's property at present. No. 3 tunnel, which is being extended northward in the old workings, is now in 220 feet. No. 2 south drift, running into this Indiana ground, is going in about 10 feet per day, according to the superintendent's latest reports. No ore is being taken out and the mill continues shut down. Mr. Lazelle expects that the annual financial statement will be ready before long.

MONO COUNTY.

The news was received in San Francisco on January 1st that the pumps in the Lent shaft, through which the Bodie Consolidated and Mono mines at Bodie are operated, had been stopped and the lower levels of those mines abandoned. The water will be allowed to rise to the upper levels, it is stated, where for a time a little prospecting will be done. Out of a force of forty men employed in the two mines only eight will be retained.

COLORADO.

CLEAR CREEK COUNTY.

FREELAND MINING COMPANY.—The stock of this company has awakened into unusual activity on the New York Consolidated Stock and Petroleum Exchange within the past two months.

Inasmuch as the shares have long been dormant, this sudden revival has naturally aroused the suspicion that the advance from 15c. to 65c. a share which has taken place has been caused principally

by the manipulation of insiders, particularly as the condition of the mine does not seem to have sufficiently improved to bring about such a rise in value. We have heard nothing of late from the mine, which is located in the vicinity of Idaho Springs,. From May, 1885, to July, 1886, it paid seven consecutive quarterly dividends of $20,000 each, which, together with a previous one of $50,000, makes $190,000 to July, 1886, since when none has been paid. For the past two or three years it is stated that work has been kept up steadily, but with a greatly reduced force of men, and the grade of the ore has left only a bare profit over the cost of extraction and treatment. Mr. D. F. Verdenal, the secretary of the company, says that this was the condition of the company up to the latter part of 1889, when the Colorado smelters raised their charges for smelting the company's ore to $12 per ton, which was more than the ore will stand. This forced the management to seek some other means of treating the ore, and the secretary says that an amalgamating process is now being experimented with. In speaking further of the condition of the company to an ENGINEERING AND MINING JOURNAL representative this week, Mr. Verdenal said: "Our smelting ore averages from $16 to $18 per ton and our concentrates $32 to $33. As a rule, it runs 80 per cent. gold and 12 per cent. silver, with some copper. A new shaft, which is being sunk about 1,200 feet from the old workings, has now reached a depth of 150 feet. Assays made down to 50 feet are encouraging. Our trouble has been the unreliability of the ore; it varies greatly in grade, at one time enabling us to pay big dividends, and at another leaving us the most meagre profits." The officers of the company at present are: Henry Rosener, president; D. F. Verdenal, secretary, and the Nevada Bank, treasurer.

LAKE COUNTY.

LITTLE CHIEF MINING COMPANY.—Secretary Edward Earle informs us that this company's property is now yielding monthly about $2,000, from which the company receives $600 or $700. Both the Little Chief and Little Pittsburg mines are leased. There are altogether seven leases running at present. After paying the $10,000 dividend the company will have a surplus of about $4,000. Mr. Earle says the company has a large body of low-grade iron ore, but none of the prospecting work under way gives promise of new developments of importance.

LAS ANIMAS COUNTY.

COPPER KING SMELTING AND REFINING COMPANY.—Work on the smelting plant of this company at Trinidad, which was begun October 1st, is progressing rapidly. The ore and crushing house will be a frame building 54 × 112, covered with currugated iron siding. This is substantially finished, except plati ·g and roofing. Next east is the calcining furnace, where the ores will be subjected to a roasting process. This building also will be of frame with iron sides and roof. The foundation is nearly completed and is 54 × 144. Adjoining this will be the calcining ore shed 16 × 144. This has not been commenced yet, but soon will be. The smelter and furnace will be south of the above, and is to be of brick, 50 + 134 in size. · The plans also call for a refining building, which will also be of brick, and in size about 50×200,the exact deminsions not yet being determined. The officers of of the company are John C. Hoffman, president; D. E. Meyer, vice-president; D. Thormeier, secretary; J. B. Kavalage, treasurer, and Edward O'Neil, superintendent. All but the last named are Milwaukee gentlemen. Mr. O'Neil was for a long time connected with the Boston & Colorado Smelting Company at Argo, Colo.

OURAY COUNTY.

CALLIOPE MINING COMPANY.—In the capital stock of this company, which is now being traded in on the Denver Mining Exchange, there are 1,000,000 shares with a par value of $1 each. The officers are D. C. Hartwell, president; A. G. Hersinger, vice-president, and E. J. Bent, secretary and treasurer. From the company's prospectus we condense the following: The Calliope mine is located in the Paquin Mining District, Ouray County, Colo., and about four miles from the town of Ouray. The altitude of the mine is 8,300 feet above sea level. It is two miles from a siding on the Denver & Rio Grande Railroad, which railroad runs into the town of Ouray. The property comprises one full claim, the title to which is a United States patent. The work done consists of a cross-cut tunnel, 1,040 feet in length, intersecting the vein at a depth of 500 feet below the surface, and by which, in connection with shafts and winzes, the mine is ventilated, and by which also the mine is drained and the ore conveyed to the surface. There are also 1,500 feet of tunnels driven on the course of the vein, all of which were driven in ore; and 150 feet of shafts and winzes. The gross value of ore actually in sight is computed at $400,000. The ore is a highly argentiferous galena and gray copper, associated with native silver carrying some gold. The average of the ore sold to date has been of a value of about $125 per ton, and it is shipped to Denver and Pueblo smelters for treatment. The Calliope was first brought into a paying condition by Adam Hersinger, the present superintendent and part owner, in the fall of 1887, and since that time about $250,000 worth of ore has been sold from the mine.

YANKEE GIRL MINING COMPANY.- The stockholders of this company held their annual meeting December 13th. The report of the treasurer showed that the output of the mine during the past year was about $139,000, of which $113,667.88 was during the last four months. It was calculated that the output for the next twelve months would be upward of $250,000. The old board of directors and officers were re-elected, as follows: Joseph McKelvy, W. J. Hammond, Charles Lockhart, Wm. N. McKelvy and George Crawford. Joseph McKelvy was elected president, George Crawford manager and secretary, and W. J. Hammond, treasurer.

PITKIN COUNTY.

Work in the Aspen and Compromise mines has been started up again with nearly a full force of men.

ASPEN FAVORITE MINING AND MILLING COMPANY.—This company has filed artlcles of incorporation with the Secretary of State to purchase and operate mines and reduce ores at Aspen. The capital stock is $500,000, and the incorporators are W. Porter Nelson, I. W. Shilling, Frank Meyer, J. S. Hunn and S. J. Dillabaugh.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Jan. 4.

The car famine still continues, and fully 1,000 tons of zinc ore are stored in bins awaiting shipment, $30.50 per ton was paid for some clean lots of zinc ore, and $46 per ton for lead ore. The following is the sales of ore from the district for the week ending December 28th: Joplin mines, 765,590 pounds zinc, and 84,025 lead; value, $11,122.

Webb City mines, 796,060 pounds zinc ore and 39,040 lead; value, $11,166.

Carterville mines, 379,570 pounds zinc ore and 39,810 lead; value, $6,089.

Zincite mines, 379,890 pounds zinc ore and 10,540 lead; value, $6,457.24.

Lehigh mines, 86,950 pounds zinc; value, $1,212.

Oronogo mines, 42,510 pounds zinc and 6,170 lead; value, $586.85.

Galena Kansas mines, 712,000 pounds zinc and 112,000 lead; value, $10,142.

Alldistricts, total value, $46,775.09.

Shults & Co., on the Standard lease at Zincite, turned in 53,880 pounds of zinc, and Hoover & Co., 59,650 pounds. The main shaft of the Standard Company turned out 92,990 pounds.

The Bay State mines on the Osmego land produced 52,920 pounds of zinc that sold for $673.

Output of the Joplin district for the week ending January 4th, was as follows: Joplin mines, 855,610 pounds zinc ore, and 74,140 pounds lead: value, $13,430.59. Webb City mines, 638,800 pounds zinc ore, and 40,200 pounds lead; value, $10,820. Carterville mines, 232,480 pounds zinc ore, and 175,650 pounds lead; value, $6,065.50. Zincite mines, 595,200 pounds zinc ore; value, $8,400.35. Lehigh mines, 105,000 ponnds zinc ore; value, $1.211. Galena, Kans. mines, 269,810 pounds zinc ore, and 53,306 lead; value, $4,920.76. All districts, total value, $44,848.20.

The South Side Mining Company, of Galena, Kan., produced during the past week 279,540 pounds of crush rock, 51,440 pounds of free zinc ore, and 15,850 pounds of lead.

The Windsor Company made no shipments. They are holding ore for better prices.

Standard Company, of Zincite, produced 196,360 pounds of free zinc ore and 158,280 pounds crush rock; total value, $3,045.85.

The statement of the output of the Jasper County mines, as prepared under the direction of Col. H. H. Gregg, was forwarded to Commissioner Meriweather at Jefferson City, January 4th. The value of the district's product for the fiscal year ending June 30th, 1889, as shown by the statement was $2,144,743, or $525,750 greater than the commissioner's report shows. Zinc ores sold from $26 @28.50 per ton; lead, $45 per ton.

The mines are all in a prosperous condition for the opening up of the new year; several companies are putting up new and improved machinery. This has been much needed here, as in the past there has been nothing but light machinery in use.

The four machine shops here are crowded with orders for new mining machinery.

The Empire Zinc Company has made another rich strike of zinc.

Mr. Thos. H. Heist, of Harrisburg, who represents the Pennsylvania Company which recently purchased the Parson Wilks tract, one and one half miles south of the city, is having the land surveyed into mining lots preparatory to a systematic plan of development.

Captain T. H. Ijams and O. B. Steen, of Kansas City, purchased the Nugent mine on the Oswego land during the week.

Mr. Loyd, manager of the Grimm and Loyd land, is sinking a lift in three of the mine pump shafts. This will open up new stoping ground.

Gen. Boyle, of St. Louis, is giving his attention to putting up his new plant of machinery on the Stevens mines.

The Ruby mines now have their new crusher and rolls all completed, which will enable them to handle the crush rock to a good advantage.

MONTANA.

BEAVERHEAD COUNTY.

HECLA CONSOLIDATED MINING COMPANY.—The bullion product of this company for 1889, as officially reported, has been as follows: Lead 6,191,794 pounds; copper, 226,447 pounds; silver, 581,521.64 ounces; gold, 1,095.6395 ounces.

DEER LODGE COUNTY.

Mining operations in the vicinity of Grant and Phillipsburg are being conducted with more activity than at any time during the past season. There have not been any heavy snows or hard freezing so far, and circumstances have been favorable for new enterprises. New strikes in the Flint Creek district are looked for during this year.

BI-METALLIC MINING COMPANY.—Superintendent R sque has completed such improvements on the tramway and at the mine as will insure comfortable working and prevent any trouble from heavy snows during the winter.

ELIZABETH MINING COMPANY.—Since the consummation of the West Granite-Elizabeth deal, this company, as stated in the ENGINEERING AND MINING JOURNAL, advertised for bids for sinking a new shaft 4 feet 6 inches by 14 feet 8 inches in the clear, to a depth of 500 feet. After careful examination of these bids the management of the company decided to reject all, and have commenced sinking. A depth of 38 feet has been reached, and from all appearances the shaft will go down rapidly during the coming year. The location of this sha·t is about one-half mile southwest of the Granite Mountain workings.

GRANITE MOUNTAIN MINING COMPANY.—This company has resumed sinking in the Ruby shaft, which now has a depth of 1,028 feet. The ore chute reported not long since in level No. 8 east, has also been opened 100 feet lower in No. 9 east. The body of quartz in the latter place is quite large, and it is thought that this is one of the finest ore bodies ever opened in the mine.

SILVER CHEST MINING COMPANY.—Among the new properties upon which development work is being done is the Silver Chest, about three miles northwest of Granite, and the same distance northeast of Phillipsburg. It is in the granite formation, a short distance from the lime and granite contact. This property is controlled by the Clark syndicate of St. Louis. The president, Mr. Charles Clark, was here last month and decided to continue the cross-cut tunnel. The work is being done with air drills, and is making good progress.

LEWIS AND CLARKE COUNTY.

MINAH.—This mine, two-thirds of which has been sold to an English syndicate for $400,000, says the Helena *Independent*, has three tunnels which have been run in on the vein a distance of 1,800, 1,300 and 1,200 feet, respectively, one below the other. The greatest depth reached is 500 feet. The present work is being done in tunnels Nos. 2 and 3 and the amount of ore shipped daily is from 30 to 60 tons. The money to pay for the mine was sent from London recently. Besides the money the owners are to receive one-third of the stock.

MONTANA COMPANY, LIMITED.—The following circular has been sent to stockholders, bearing date of London, December 24th. An approximate estimate of the company's financial position to the 31st December having been received from the resident director, the Board are enabled to declare a further dividend for the current half year of fourpence halfpenny per share free of income tax, payable on the 15th January, 1890, being at the rate of 7½ per cent. per annum.

On the 7th November, Mr. R. T. Bayliss writes: "I am sorry that I am unable to report any developments of an encouraging nature, for in the present low-spirited frame of mind of the shareholders it would be a real pleasure to me to convey this intelligence; at the same time, while I have not anything particularly favorable to mention, I am able to state that, taking the mine as a whole, the developments are as encouraging as they have been for the past twelve months, and that although we are not opening up any ore bodies of startling value, we are adding an additional quantity of ore to our reserves, which fully equal the rate of extraction." The directors learn from a telegram received from Mr. R. T. Bayliss yesterday that on the West Side lode, in the 400 feet level north, and No. 2 longitudinal drift north, the average width of the pay ore may be taken at two feet; length of shoot 55 feet; assaying $60 to $70 a ton. On the Castletown lode, Cruse level north, it is expected to reach ore very soon. The Empire workings show a well-defined lode, with an average width of eight feet of pay ore, assaying from $25 to $30 per ton. The fore breast of the Castletown lode, at the 400-foot level, is unproductive; but there is a very good prospect of finding ore about 140 feet ahead. At the 400-foot level south, we have got through the pay streak, but the upraise is in good ore and showing signs of improvement. In the 800-foot level north, and in the 1,000-foot level, the lode is at present unproductive. Generally, however, the workings are more encouraging than they have been during the past few months.

SILVER BOW COUNTY.

BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—Sealed proposals addressed to the New England Trust Company at its office, 85 Devonshire street, Boston, and endorsed "Proposals to sell B. & M. C. C. & S. M. Co. 7 per cent. bonds," will be received until noon of Thursday, January 23d, 1890, for the sale of the above named bonds at not above 110 and accrued interest, sufficient to absorb the sum of $50,452.93 or any part thereof, in accordance with the mortgage of

said mining company to Charles Van Brunt. Proposals will be opened and accepted bids declared January 23d, 1890, and interest on accepted bonds will cease on that day unless otherwise provided in proposals.

GALENA.—It is reported that this mine, in the Pony district, recently has been sold, according to Butte papers, to St. Louis parties by Mood & McKitrick for $50,000.

NEVADA.

ELKO COUNTY.

YOUNG AMERICA SOUTH.—The lessees of this mine, at Tuscarora, have made another bullion shipment, valued at $9,300, of which $6,500 is in gold. The lease expired December 31st, 1889, after which, it is stated, the mine will be worked by the company, who propose to sink a new shaft and develop the property in a systematic manner.

EUREKA COUNTY.

EUREKA CONSOLIDATED MINING COMPANY.—San Francisco advices say that owing to the snow blockade at Eureka, which prevents the bringing in of supplies, the Eureka mine has been temporarily closed down.

STOREY COUNTY—COMSTOCK LODE.

The December bullion yield of Comstock Mines, according to the Virginia City *Chronicle*, aggregates in round numbers about $820,000, divided as follows: Con. Cal. & Va., $300,000; Savage, $45,000; Alta, $30,000; Hale & Norcross, $100,000; Justice, $25,000; Yellow Jacket, $40,000; Crown Point, $55,000; Occidental, $15,000; Overman, $10,000.

CONSOLIDATED NEW YORK MINING COMPANY.—This company is about to grant the Lady Washington Consolidated Mining Company the right to work its ground through the Consolidated New York shaft. This will add another bullion producing mine to the south end group, as the Lady Washington is said to contain considerable ore, which may now be easily reached and extracted.

COMSTOCK TUNNEL COMPANY.—We have received the following "Approximate Statement of the Financial Condition and Prospects" of this company, December 1st, 1889:

Capital stock: Two million shares, par value $2	
Indebtedness: Thirty-year First Mortgage 4 per cent. non-accumulative income bonds, dated September 1st, 1889: authorized issue, $3,000,000, of which there have been issued $2,139,000. The balance of bonds, $861,000, constitute a reserve fund, to be deposited with the Union Trust Company, the trustee of the mortgage, and issued only upon a unanimous vote of the Board of Trustees of the Comstock Tunnel Company.	
The company has no other debts whatsoever.	
Surplus cash: It has surplus cash amounting to the sum of about	$115,000 00
Outstandings: Uncollected balance of royalties for the months of October and November, 1889, about	34,000 00
Receipts: Gross receipts from the property (including money received from the mining companies for making certain new connections with the mines) for the twelve months ending September 1st, 1889	261,133 02
Operating expenses: The operating expenses in Nevada (including cost of the aforesaid new connections) during the same period	88,934 32
Prospects: The average receipts per annum for the three years ending on September 1st, 1889 (including money received for the aforesaid new connections during the same period) were	276,915 67
The average operating expenses in Nevada during the same period (including cost of the aforesaid new connections) were	83,337 38
As no new connections of any magnitude with the mines are in contemplation for the coming year, it is estimated that the income for the year ending September 1st, 1890, will probably be about	265,000 00
And that the operating expenses will probably not exceed $70,000	
And other expenses outside of Nevada not exceed 14,000	
Together	84,000 00
Leaving net income about	$181,000 00

The only other expenses now in prospect are legal expenses which will probably be incurred in disposing of certain litigation instigated by a single individual, but these expenses cannot be very large, as this litigation, being without foundation or merit, will probably be of short duration. As the interest charge on the bonds already issued (and there is at present no intention of issuing any more) for the year ended on September 1, 1890, is only $85,560, there would remain a net surplus from the anticipated income up to said date of about $95,440. Adding to this the present surplus cash would make a total, on the first day of September, 1890, of about $210,440 cash, one half of which, under the terms of the mortgage, will be available for the redemption of bonds, the other half for paying dividends or making improvements or extensions in the property. The reason that the foregoing statement is only approximate in some particulars is because the books showing the details during the three years ending September 1st, 1889, are not at present accessible, being in the office of the old company in San Francisco, and also because certain minor items in the accounts with the Union Trust Company remain to be adjusted.

Signed, THEODORE SUTRO, President.
HORACE H. THAYER, Sec. and Treas.

HALE & NORCROSS MINING COMPANY.—The Nevada mill is crushing about 4,500 tons of ore from this mine monthly, and had it not been for the falling off in the assay value of the ore, from $30 to $22 per ton, the bullion yield for December would have reached nearly $120,000. The average for the month will not fall far short of $25 per ton, which, calculating that 85 per cent. of the assay value is saved, will give a total bullion yield of $100,000 for December.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—The extraction of ore from the Occidental Consolidated will be resumed shortly, and as soon as a sufficient quantity is on haud the mill will be started, says the Virginia City *Chronicle*, and will be run steadily thereafter to its full capacity. Superintendent Kerwin, of the Gould & Curry and Best & Belcher, has inspected the Occidental Consolidated and says the ore resources of the mine are ample to keep the mill running steadily for months. The ore hereafter crushed will be graded to between $25 and $30 per ton. The ore crushed in the new mill, during its three months' run, produced about $90,000 in bullion, which was worked up to within 85 per cent. of the pulp assay value—which is an average of 25 per cent. above the percentage before attained. Two levels below those now producing ore will be opened up shortly.

SUTRO TUNNEL COMPANY.—The complaint of the representatives of the dissatisfied stockholders of this company reached New York this week. Those named as respondents are the Union Trust Company, the Comstock Tunnel Company, Sutro Tunnel Company, Theodore Sutro, Frederick A. Benjamin, George E. Butler, Philip N. Lilienthal, Milton B. Clapp, Edmund Tauszky, Horace H. Thayer, Herman R. Baltzer, Otto Lowengard, Theodore Seligman, P. C. A. M. Van Weel, Gordon Macdonald, Jesse Seligman and James Seligman, partners doing business under the firm name of J. & W. Seligman & Co.; Robert Fleming, George W. Stern, Herman Stursberg, Adolph Ladenburg, Ernst Thalmann, Richard Limberger, John Doe, the legal representative of Abraham Limberger, deceased, and Gerson Von Bleichroder, partners doing business under the firm name of Ladenburg, Thalmann & Co.; Henry P. Goldschmidt, Joseph E. Heimerdinger and August Rutten, partners doing business under the firm name of H. P. Goldschmidt & Co.; Maitland Phelps, E. W. Clark and John Deun, partners doing business under the firm name of E. W. Clark & Co.

WHITE PINE COUNTY.

ROBINSON CANYON CONSOLIDATED PLACER MINING COMPANY.—This company has been recently organized to operate in Robinson district. The principal place of business is Ely, the county seat. The capital stock is $120,000, shares $2 each.

WATSON.—This gold mine, located in the Robinson district, is rumored to have been sold for $250,000.

NEW MEXICO.

SANTA FE COUNTY.

SANTA FE MINING COMPANY.—A dispatch from Colonel Webb, New Mexico director, to Boston officials of this company says that he finds matters generally satisfactory. The mine is in good condition. Low grade ores, he says, are practically inexhaustible, and a concentrator is imperative. New strikes east of pitch show 40 foot face, five-foot vein, average, 16 per cent. copper. There are 2,000 tons of ore broken in the mine. The smelter will start shortly. The product is calculated at 15 tons of 50 per cent. matte daily. The purchase of a concentrator has been ordered.

PENNSYLVANIA.

COAL.

The following collieries in the Schuylkill region drawn at Pottsville to return prices for coal in December, 1889, to determine the rate of wages to be paid for work in last two weeks of December, 1889, and the first two weeks of January, 1890, make the following returns: Bear Ridge Colliery (P. & R. C. & I. Co.), $2.40; Mahanoy City Colliery, $2.38; North Mahanoy Colliery, $2.36; West Shenandoah Colliery, $2.41; Beechwood Colliery, $2.58. The average of these prices is $2.42, and the rate of wages two per cent. below the $2.50 basis.

COKE.

The Carrie Furnace Company, of Pittsburg, has purchased 600 acres of coal land in the vicinity of Uniontown, Pa., and it is reported will shortly commence the erection of 225 coke-ovens in order to make its own coke.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 21st, were as follows:

	1889. Gals.	1888. Gals.
From Boston	4,534,265	4,446,330
Philadelphia	156,997,998	132,065,602
Baltimore	8,335,244	6,836,325
Perth Amboy	16,181,566	21,611,707
New York	432,237,358	361,577,890
Total exports	618,286,431	526,537,854

SOUTH DAKOTA.

SPINK COUNTY.

Natural gas has been discovered in this county. The find is the strongest yet found in the State and the quality is of the best. The discovery was made by parties digging for water. This is the fourth discovery of the kind made in South Dakota within sixty days.

UTAH.

From an exhaustive review of the progress of the mining industry of this territory published by the Salt Lake *Herald* we, condense the following:

BEAVER COUNTY.

HORN SILVER MINING COMPANY.—The following statement for the last quarter of 1889 has just been issued:

Oct. 1st.—Cash balance, per last quarterly report		$251,807.47
Receipts.		
Sales of ore:		
October	$23,685.25	
November	31,132 63	
December	34,373.69	
		89,191.62
Francklyn smelter:		
Net proceeds of sale of slag, scrap iron, iron ore, blowers, etc., sundry rents, etc		3,842.29
Total		$344,841.38
Disbursements.		
Mining		$31,950.82
General expenses, salaries and expenses, etc.		2,795.64
Sales of ore, royalties		441.32
Dividend No. 16, paid from net earnings of the current quarter		50,000.00
New York office		3,0 7.14
Balance cash on hand		256,646.46
Total		$344,841.38

Advices received in New York this week from the superintendent state that work in the mine was temporarily suspended during the holidays to afford the men a much needed rest, and to make necessary repairs to the hoisting and mining machinery.

JUAB COUNTY.

The Tintie mining district, one of the oldest in the territory, comprising the towns of Eureka, Mammoth and Silver City, is gradually awakening.

BULLION BECK.—New hoisting works and machinery will be put on this property in the spring of 1890. There has been considerable new work done during the year, the most important of which, probably, was the sinking of the shaft from the 500 to the 600-foot level. The fourth and fifth levels have also been opened up considerably, and veins of good ore have been encountered. South from the shaft on the 400-foot level, a body of ore was struck near the Clayton winze, which assays about 45 silver and 38 lead. They have worked up on this body to the 300-foot level, and the ore body still continues to look well, maintaining its uniform quality and regularity of shape. To the west and a little south of the Clayton winze, another body of ore was cut. The ore at this point was of low grade, but showed gradual improvement as the fifth level was reached. At the extreme north end, rising up from the 500-foot level, another body of ore was struck. On the north end of the same level, and near what is known as the Young winze, a streak of ore was encountered which reaches to the 600-foot level. It is chloride of high grade, and the vein is three feet wide. Work has also been actively prosecuted on the fourth level. One hundred and fifty men are now employed in the Bullion-Beck, and the output for the year will reach 16,000 tons, valued at over $500,000. The company in connection with the Centennial-Eureka is now laying pipes from Hornansville to Eureka, a distance of over three miles, by which to supply the mine and camp with water. The water will be forced by a duplex pump to the top of the ridge separating the two towns, at which point it will be discharged into a couple of 20,000-gallon tanks, the elevation of which will give sufficient fall to supply the town with ample protection in case of fire, the springs which form the source of supply yielding between 40 and 50 thousand gallons per day.

CAROLINE.—This mine is situated south of the Bullion-Beck, and produces a similar grade of ore. It now yields about 15 tons of ore per day, averaging 40 lead and 50 silver, and employs 14 men.

CENTENNIAL EUREKA.—Considerable development work has been done on this property. The output for the year foots up 1,742,000 pounds. The main shaft is down 450 feet, and there are three other shafts, one of which has reached a depth of 100 feet, one 75 feet, and the other 68 feet. There are 3,400 feet of levels and drifts, and 800 feet of stopes and winzes. The water supply is pumped 5,000 feet through a two-inch pipe, rising 410 feet in that distance. The mine is well equipped for work, and employs about 35 men.

MAMMOTH MINING COMPANY.—This company is now working 100 men. A rich strike was recently made. The mine has paid dividends aggregating $130,000 during the year, besides incurring expenses in bringing a water supply a distance of 8 miles to the amount of $30,000, putting in compressed air drills, the purchase of an electric plant which is now ready to set up, and other improvements. The mine is now under the superintendency of Captain Day.

NORTHERN SPY.—This property, which was recently purchased by Messrs. Beck, Hyde and others, is located across the ridge from Eureka. The shaft has been sunk 350 feet, and a tunnel shows 400 feet of ore. The dumps are also full of ore, which cannot be hauled at present owing to the bad roads. Work will be continued on the mine all winter, however.

SUMMIT COUNTY.

The ore shipments from Park City for the year ending December 1st have been as follows: Ontario, 21,103,760 pounds; Daly, 12,484,650 pounds: Woodside, 17,083,640 pounds; Mayflower, 1,935,760 pounds; Union Concentrator, including Woodside, Alliance and Anchor concentrates, 1,780,420 pounds; Alliance, 273,780 pounds; Jupiter, 484,610 pounds: North Pole, 39,985 pounds; Crescent, 5,000,000 pounds.

ANCHOR MINING COMPANY.—During the year the tunnel on this company's property has been completed, a large amount of development work done and shipments of ore made. The company was organized in 1885, with a capital of $1,500,000, shares $10 each. Its officers are John L. Wood. of Cleveland, O., president; Edward P. Ferry, of Park City, vice-president and manager; W. S. McCornick, of Salt Lake, treasurer, and W. V. Rice, secretary. The property owned by this company consists of 21 patented claims. The vein is presumed to be the extension of the Ontario and Daly veins. Up to 1887 the property had been very fully prospected, and more immediately by a shaft near its east end line sunk to a depth of 800 feet, with levels running to the vein at 400, 1,500 and 1,600 feet, finding ore in each level. The large amount of water, and the necessary expense to free the shaft therefrom by pumping machinery and fuel, led the management to begin the running of a tunnel, one and one-quarter miles in length. During the summer an attempt was made to connect the bottom of the shaft with the tunnel by drilling a hole, which, however, was not successful, owing to the inexperience of the parties who took the contract, and the inadequacy of the machinery. Later a contract was made with W. W. Dull, of Pennsylvania, who is now on the ground with his machinery and appliances, and expects to complete his work within 30 or 40 days. Meantime work is being prosecuted in the development of the vein below the bottom of the shaft, and upon a level of the tunnel. W. M. Curtis is superintendent of the company.

COMSTOCK MINING STOCK.—This property has been thoroughly developed during 1889. Through the efforts of Mr. Morris Duseldorf, who is now president and manager, an English company was induced to take hold of the property, of four patented claims known as the Comstock, Black Bear, Black Hawk, and Intervention. A company was organized under the English laws, with a capital stock of $2,000,000, of $10 each. Work was commenced in June on the Comstock, which was then in only a short distance, to connect with the shaft, which has a depth of 80 feet. This tunnel has been run 650 feet, and at 300 feet from the mouth of the tunnel a vein of ore from five to seven feet was struck. The company owns 4,500 feet of working ground on the vein, which will give an average depth of 700 feet for stoping purposes above the tunnel. Arrangements have been made by which the shaft will be sunk 500 feet, and hoisting works will be put in to more thoroughly develop the lower ground. No shipments have been made as yet, although 50 tons of first-class ore have been taken out and are laying on the dump. Mr. William Curtis is superintendent.

GLENCOE GOLD AND SILVER MINING COMPANY.—About the middle of September this company was organized to work the property, consisting of the Glencoe, Sofia and Northside claims. The capital stock is $2,500,000 with shares $25 each, unassessable. M. Shaughnessy is president and treasurer, G. S. Erb is vice-president and H. G. McMillan secretary. Their ground lies in Blue Ledge district—southeast of the Ontario. At present a tunnel is being run through the adjoining property, the Fourth of July, to connect with the old Glencoe works, which will tap the vein at 250 feet. Three upraises have been run at a distance of 150 feet from each other, and in all the vein has been found about four feet in width. The ore will assay on an average 60 per cent. lead, 42 ounces silver and $1.50 in gold. About 300 tons of ore have been taken out since the work started and some shipments made. This will continue all winter until spring, when a concentrator and sampler will be put up at the works.

JUPITER.—This group, one of the largest in the camp, lies at the head of Thayne's cañon, south of the Comstock and Apex. The Jupiter is one of the oldest properties of the district. Charles E. Street controls the group. During the past year it was worked on a lease by Peterson, Lund & Co., and two shipments of ore were made. Over $5,000 of work has been done in 1889, principally in the lower tunnel. This will tap the vein at a depth of 450 feet.

MCCUNE TUNNEL.—This group of twenty-two claims lies in Blue Ledge district, about three miles from Park City, on the Heber road. The group is worked through one tunnel, known as the McCune tunnel. This is now in 1,600 feet, and it is expected that shortly the main ledge will be tapped. Three small veins have already been cut, from which ore has been taken that assayed as high as 480 ounces silver. The character of the ore is free milling. James McCune and E. C. Williamson are the owners of these properties.

UNION CONCENTRATING COMPANY.—This company was organized in May with a capital of $20,000. Edward P. Ferry is presideut of the company, Alonzo B. Richardson vice-president, and W. V. Rice secretary and treasurer. It was organized for the erection of a concentrator to serve the camp in the treatment of ores that might need concentration. Work was at once commenced on the building in Empire cañon, a short distance below the water works, and was completed in August. Its work since completion has been largely in the treatment of Woodside second-class ore, while a large amount of Alliance ore has also been treated. The total concentrates shipped have amounted to 1,780,420 pounds.

WASATCH.—There are eight claims belonging to this property, lying in Blue Ledge district, about one and a half miles east of the Ontario. It belongs to the estate of S. P. Hoyt, of Kamas, who worked it for a number of years unsuccessfully. A few months ago James McCune secured a lease of this property, part of which he sold to E. C. Wilkinson and John Farish. Work was at once commenced, and it was but a short time until a paying vein was uncovered. The ore assays from 40 to 84 ounces silver and 45 per cent. lead. A shipment of 15 tons was made recently, and 20 tons are lying on the dump awaiting shipment.

WOODSIDE MINING COMPANY.—This company was organized n June with a capital stock of $1,000.000—shares of $10 each. Edward P. Ferry, of Park City, is president of the company; D. C. McLaughlin, vice-president, and W. V. Rice, secretary-treasurer. The company embraces all the mining claims known as the Woodside group, situated about half a mile southwest of town in Woodside canon. It has an extent of length of 3,600 feet and of width 1,000, all claims being patented. Since the purchase of the lease by the present company work has been confined largely to clearing the ground opened up by the lessees and putting the property in shape for further operations. Two crosscuts were run in a northeasterly direction from the old workings, and in the early part of the present month a fine vein was cut in the No. 2 level. Already shipments have been made from this strike. A hoisting plant has been erected and a vertical shaft sunk about the center of the property, reaching now a depth of over 200 feet. The company paid dividend No. 1 of $25,000 in October last, and is expected to pay another dividend in January. Mr. Charles H. Gitsch is superintendent.

FOREIGN MINING NEWS.

CANADA.

ONTARIO—PORT ARTHUR DISTRICT.

(From our Special Correspondent.)

R. R. Paulenson, of Detroit, writes that he will arrive here early in January with an improved diamond drill, capable of drilling to a depth of 1,200 feet. He intends to thoroughly test the quality and quantity of iron on his extensive properties in the Pewabic Mountain and Gunflint Lake iron region.

A discovery of anthracite coal is reported to have been made near Savanne, on the Canadian Pacific Railway, 70 miles west of here. The extent of the deposit is not definitely known, but samples purporting to be from the recent discovery are apparently of excellent quality.

Kakabeka City.—The promoters of this city have matured the plans for the erection of a large smelter for the reduction of iron and silver. It will be operated by electricity, generated by water power at the falls. The Port Arthur, Duluth & Western Railway have located a branch line into the new city, which will be in operation 1st of June. The prospectus of this company will soon be placed before the public, and will show that they not ouly have the determination, but the necessary financial backing and enterprise to carry it to a successful issue.

Three veins carrying $5 in gold and $64 to the ton in silver have been located in the unsurveyed portion of Conmee Township, north of Kakabeka Falls. These veins are in the same range as 163 T, and give equally promising outlooks on the surface.

BADGER.—The December shipment will consist of 15 barrels of high grade ore, and 13 barrels of concentrates; value, $17,000. Everything looks prosperous and business like around this mine. Seventy men are employed. The mill is kept running night and day under the able management of Chas. Brent, M. E.

BADGER SILVER MINING COMPANY.—This company, to whose work reference has frequently been made in these columns, has declared its first dividend, one of fifty cents a share, or $25,000. The capital stock is $250,000, divided into $5 shares. Milwaukee people are largely interested in the company. Its present officers are John M. Howell, president; C. A. Read, treasurer; Geo. W. Robinson, vice-president and general manager, and Walter Read, secretary. The main office is at Milwaukee, Wis. Mr. Herbert Shear is the mine superintendent.

BEAVER.—The diamond drill is still at work. Stoping is continuously carried on, the richer portions being barreled for shipment and the lower grades deposited on their already extensive dump. Captain Hooper is opening up two other veins on the northern boundary of the Beaver property, which are showing excellent prospects. The very favorable outlook for a large output from this mine in 1890 is confidently looked forward to by the management.

PORCUPINE.—Rumors are again current, and are believed to have good foundation, that this property has been sold to an English company. The price is stated to be $50,000.

SHEMIAH WEACHU.—The December shipment of high-grade ore will amount to $10,000 (22 tons). It is now at Murilla Station, on the Canadian Pacific Railroad, en route to Liverpool, England. The managers have undertaken to ship 100 tons of this grade of ore before spring. All the workings continue to do well. No. 4 shaft shows good silver all the way. No. 1 drift, west from No. 3 shaft, is in first-class ore. No. 1 drift, east from No. 4 shaft, continues good. Some excellent stoping ground has recently been opened.

SULTANA ISLAND—LAKE OF THE WOODS.—English capitalists have been nibbling at this property for some time. It is now announced that an arrangement between the company controlling the property and an English syndicate has been made, by which the latter will take hold of the property in the spring and develop it. It is said to be the intention of the syndicate to spend a large sum of money on intelligent development work, and to make such a test as will forever set at rest the value of the Lake of the Woods gold mines. The syndicate has an option to purchase the property after testing it.

"THREE A."—The long pending litigation which has tied up this property has at last been settled and it is now offered for sale. Terms will be arranged on a liberal basis, so that the proceeds of the mine will meet the purchase money of the property. Three shafts, in all 32 feet in depth, have been sunk on this property, 300 feet of levels, 100 feet of cross-cutting and considerable surface improvements. It is situated 12 miles east of Port Arthur on the shore of Thunder Bay, and is accessible by wagon-road or steamboat.

VULCAN.—Notice of application for letters patent of incorporation has been published on behalf of the Gravel Bay Mining Company, the object being to work the Vulcan location, situated six miles north of Gravel Bay Station on the Canadian Pacific Railway. Five well-known gentlemen are the promoters, namely: Hugh Wilson, P. L. S, Mount Forest; Judge Kingsmill, Bruce; F. T. Sibley, formerly of the Silver Islet Company; W. E. Price, of Montreal, and Mr. Walter A. Dixon, of Toronto. The location is 160 acres in extent. Assays of the ore by Prof. Chapman, of Toronto, give 60 per cent. lead and a high percentage of silver and gold.

WOLVERINE.—The main shaft is down 130 feet. The vein is improving as the shaft increases in depth. Galena and blende are showing in considerable quantities. The water in the shaft is causing some trouble. While the cellar for Capt. Gilbert's home was being excavated a bed of magnetic iron was encountered, showing that the iron deposits in the township of Strange extend into the heart of the Whitefish Lake silver region.

PROVINCE OF NOVA SCOTIA.

ANNAPOLIS COUNTY.

[From an Occasional Correspondent.]

LONDONDERRY IRON COMPANY, LIMITED.—This company recently sent an agent to examine the deposit of red hematite occurring at Torbrook, near Wilmot. The bed is reported to be six feet in thickness, and to average 62 per cent. in metallic iron. It is understood that leases have been signed covering nearly two miles in length of the deposit.

PICTOU COUNTY.

ACADIA COAL COMPANY, LIMITED.—On Sunday evening, December 22d, fire was discovered in the McBean coal seam at Thorburn, in this county. The manager, Mr. Turnbull, immediately went below with a force of men, and found that the fire had originated in the timber work of the 800-foot level near the steam slope, which is a slope lying parallel to the main slope, and about sixty feet to the eastward. The fire extending from the woodwork had ignited the coal, causing heavy falls of roof, and, although a continuous force was employed from Sunday night until Tuesday in fighting the fire, the mine had finally to be closed, and will probably be a total loss. The McBean seam, at Thorburn, belonged to the group controlled by the Acadia Coal Company, Limited, and was not a very important producer, the yearly output running from 70,000 to 80,000 tons.

MEXICO.

CHIHUAHUA.

CHIHUAHUA MINING COMPANY.—This company has been incorporated, with a capital of $600,000, to do a general mining business in Santa Eulalia, State of Chihuahua. The stock is to be divided into shares of $1 each. The trustees are Charles H. Payne, Charles T. Barney, John W. Shaw, Herbert L. Tyrrell and John R. Robinson.

GUANAJUATO.

LA UNION MINING COMPANY.—President Taylor of this company, having offices in St. Louis, has mailed a circular to the stockholders, requesting that they come to the rescue of the property which has been seized for debt. The company, he says, has become indebted to parties in Guanajuato, the mines have been seized and legal steps taken to annul the "Avio" contract under which the company assert title to the property. The officers of he company have been advised that they have a

perfect defence to this litigation, but before it can be interposed provision must be made for the payment of the debts of the company. It is also necessary that provision should be made for additional machinery in the properties. For these purposes, President Taylor says not less than $50,000 will be needed. The company has now in its treasury about 200,000 shares of stock. To aid in raising this much-needed fund any stockholder willing to contribute will be given the six months' note of the company, and as a bonus will also be given of his treasury stock, valued at 25 cents per share, an amount equal to any such advance. Unless a full and complete adjustment of this litigation can be secured and complete restoration of the property be obtained, he says these advanced funds will be returned to the persons who made the advances. It is stated that the mines are free from water, all connection for ventilation and hoisting have been made, and large bodies of highly valuable ores exposed, that are now being taken out by Mexican parties. The great value of the prope ty, it is elaimed, has contributed in no small degree to the anxiety of the Mexican parties to regain control of the mines.

MEETINGS.

Alice Gold and Silver Mining Company, at the Union National Bank, Salt Lake City, January 14th, at ten o'clock A. M. James F. Lees, secretary.

California Water and Mining Company, Room 10, 47 Broadway, New York, Jan. 20th, at twelve o'clock, noon, for the object and purpose of taking action for the sale of all the property of said company wheresoever situated. The annual election for trustees stands adjourned until the same time and place.

Minas Prietas Mining Company, Room 45, No. 18 Wall street, New York City, January 16th, at twelve o'clock, noon. Wm. N. Olmstead, secretary.

DIVIDENDS.

Badger Silver Mining Company, of Ontario, dividend No. 1, fifty cents per share or $25,000, payable January 15th, at Milwaukee, Wis.

The Calumet & Hecla Mining Company, of Michigan, $5 per share, or $500,000, payable February 1st.

The Cumberland Mining Company, of Castle district, Montana, have declared a dividend aggregating $15,000.

The Iron Mountain Mining Company, of Montana, five cents a share, or $25,000.

The Napa Mining Company, of California, dividend No. 35, payable January 1st, 20 cents a share, or $20,000.

ASSESSMENT.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Belle Isle, Nev	13	Dec. 4	Jan. 8	Jan. 30	.15
Bodie	11	Nov. 11	Dec. 7	Jan. 22	.25
Bullion, Nev	35	Dec. 4	Jan. 7	Jan. 24	.25
Con. Imperial	26	Nov. 22	Dec. 27	Jan. 15	.05
Cons. New York, Nev	2	Dec. 11	Jan. 15	Feb. 5	.15
Exchequer, Nev	28	Dec. 16	Jan. 21	Feb. 11	.25
Grand Prize	23	Nov. 21	Dec. 24	Jan. 15	.30
Kentuck, Nev	20	Dec. 11	Jan. 14	Jan. 27	.07
Mexican, Nev	39	Dec. 21	Jan. 27	Feb. 4	.30
Mono	29	Nov. 18	Dec. 23	Jan. 24	.25
Mongold, Cal	29	Nov. 18	Dec. 23	Jan 24	.25
N. Occidental, Nev.	1	Dec. 2	Jan. 6	Jan 27	.25
Palisade, Nev	2	Nov. 1	Dec. 16	Jan. 9	.05
Ruby Hill, Nev	18	Nov. 12	Dec. 16	Jan. 16	.01
Summit	11	Nov 14	Dec. 20	Jan. 14	.05
Trinity River, Cal.	2	Nov. 27	Jan. 6	Jan. 28	.50

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 76 and 77.]

New York.

FRIDAY EVENING, Jan. 10th.

There has been a partial stiffening of values in the mining market this week, which has given a slight encouragement to traders, who fervently hope that the prophesied "month of profits" in January may be realized. The market, however, has been confined largely within professional limits and outside speculative interest has not been particularly apparent. The manipulation which the money market has undergone has, of course, seriously hampered the operations of a number of small traders. The various applications for listing before the Mining Committee, to which reference has been made in this column, are still under consideration, and, as yet, nothing definite has been done. The latest applicant is the Ruby Silver Mining Company, the shares of which for a year past have been dealt in quite actively on the Kansas City Mining Exchange.

The only development of interest in the Comstock share market this week was the declaration of a dividend of 25 cents a share on Consolidated California and Virginia. There has been a good deal of discussion as to whether or not this dividend would be declared, and the reduction in its amount was, to some extent, anticipated. Traders are very loath to believe that this reduction of dividends is to be permanent, and a hope that it is only a part of a typical Comstock deal is secretly cherished. The stock sold this week at $4.90@$4.70. The closing quotation this afternoon was $4.40 bid, $4.75 asked. Among other sales of Comstock shares during the week were the following: Crown Point, $1.65; Gould & Curry, $1.40@$1.55; Ophir, $3.25; Sierra Nevada, $1.90; Yellow Jacket, $2.25@$2.15; Alta, $1.45@$1.50; Andes, 70c.; Best & Belcher, $2.50—an assessment of 25c. a share has been levied on this stock—Bullion, 60@85c.; Exchequer, 55c.; Julia, 45c.; Mexican, $2.45@$2.35; Occidental, 80@75c.; Oriental & Mil., 6c.; Potosi, $1.95; Union Consolidated, $2.25; Utah, 70@65c.

There have been no new developments of interest in the Sutro Tunnel discussion this week. Sutro Tunnel old stock sold at 7c.@5c., and the Trust Certificates at $1.50. Common stock of the Comstock Tunnel Company shows firmer tendency, sales being made from 17c. to 19c.

Reports of increased activity at the mines of the Tuscarora Camp fail to infuse any more life in the shares in this market.

At last word has been received that deep mining in two of the principal mines of the Bodie Camp, the Bodie Consolidated and the Mono, has been abandoned, and the force of men at work in the mines greatly reduced. In the East this is regarded as the natural sequence of the kind of management these mines have had for some time past. Fortunately, if the advice given in this column frequently has been heeded, very few Eastern investors have suffered severely. The purchases in this market have not been large. During the week Bodie Consolidated sold at 40c., Mono at 35c. No sales of Standard are reported. The latest quotation is 60c. bid.

Astoria is still on the active list with sales at 10c. Large transactions in Brunswick at a cent a share are reported, presumably on account of the contemplated organization. No sales of Plymouth are reported. For the stock, $2.85 is bid. The company's annual financial statement will probably be completed shortly. It is said that a balance of from $30,000 to $40,000 in its treasury will be shown.

Quicksilver Pref. sold at $39@$38, and the common stock has been more active than usual at from $7.25 to $8.

Among the Arizona shares, Phœnix shows a stiffening tendency and quotations are being gradually advanced. Sales were made Wednesday at 55c. At the close 51c. was bid. Silver King sold at 35c.@40c.

Colorado shares have not materially advanced in price and have only been moderately active. Little Chief sold at 28c., and 24c. ex dividend. Transfer books were closed on the 7th inst., and will be reopened on the 22d., the day after the payment of the dividend of 5c. a share. The company now has a balance on hand of about $4,000, and is making about $600 monthly. However, as it requires $10,000 to pay a 5c. dividend, it is evident that unless a strike is made in the mine another dividend will hardly be forthcoming for some time. Lacrosse sold at 7c. Leadville Consolidated, after a slight weakness, has recovered to its former quotations, 10c. bid and 12c. asked. The activity in Freeland Consolidated still continues. Sales were made during the week as high as 70c. The basis upon which the stock is ostensibly being advanced is outlined in an interview with the secretary of the company published in the Mining News column. So far as is shown, there is apparently little to justify a great rise in value at this time. Cashier sold at 3c.

There is a dearth of news concerning the Dakota stocks. Latest quotations are as follows: Deadwood, $1.45 bid, $1.60 asked; Caledonia, $1.45 bid, $1.75 asked; Iron Hill, 53c. bid, 70c. asked; Father de Smet, 33c. bid. Ontario sold at $37. Encouraging news continue to come from the Horn Silver mine. The stock has stiffened up during the week. Sales were at $2.10. At the close, $2.10 is bid and $2.20 asked. In our Mining News columns we print the quarterly statement, just issued.

Rappahannock showed increased activity at 8@5c.; Mutual Mining and Smelting sold at $1.55@$1.60; El Cristo has kept steady during the week from 1.45@1.50, with a slightly weaker tendency towards the close.

Alice is a trifle firmer on reports of the good showing made by the December statement of bullion shipments.

Some investors who bought Stormont at low figures some time ago are now said to be indignant because they cannot get any information from the officers of the company in Philadelphia as to what is being done upon the property.

Boston. Jan. 9.

(From our Special Correspondent.)

The boom is fairly on in the copper stocks. The transactions for the week are the largest recorded for twelve months, and there is every indication of an active business and higher prices in the near future. The strength of ingot copper and the expectation of good dividends during the present year gives vitality to the market, and induces large buying orders for the whole list. Even the non-producing mines are coming to the front, and there is a good inquiry for this class, as in case of an active market they offer large margins for profits. Calumet & Hecla declared a $5 dividend this week, which sent the stock up to $271, a gain of $13 per share, and it was strong to-day at $266 ex dividend

Tamarack sold at $160, an advance of $10, and but little stock comes out even at this price.

Boston & Montana sold up to $52 on transactions of about 10,000 shares, closing at $50¾.

Quincy advanced from $70 to $72, and is in good demand at the latter figure.

Osceola has been very active and strong, advancing from $23 to $26½. The Portage Lake *Gazette* says: "Among the copper mines of Lake Superior which seem to have an excellent outlook for the coming year none are brighter than the Osceola."

Franklin advanced from $15⅝@17¾, ex-dividend. The demand for this stock is excellent, and $20 will not look high for it.

Atlantic touched $16, with a reaction to $15½. The prospects of this mine as a dividend-payer are first class.

Kearsarge sold at $8⅜, and back again to $7⅞, closing sale at $8¼.

Butte & Boston, for some reason, has been pressed for sale, and declined to $15. It would seem at this price to be the cheapest stock on the list, and, we think, there is money in buying it.

Huron sold up to $4½, a gain of $1 per share, reacting to $4⅛. National touched $3, closing at $2¾.

Allouez was very steady at $2 early in the week, but declined to-day to $1.60.

Pewabic sold at $8 and is very strong at this price bid.

Santa Fé with sales of over 20,000 shares advanced from $1.45 to $1.65, losing only 5c. and closing at $1.60.

The strength of the general market for copper stocks has brought to the front quite an active demand for the low priced stocks, and we note sales of Winthrop at 20c.; Dant, 35 to 20c.; Hanover, 25c.; Star, 37½c.; Washington, 40 to 25c.; Mesnard, 50c.; South Side, 25c.; Native, 25c.

Bonanza steady at 90@97½c. Ridge was active at $1@$1⅜, with later sales at $1.25.

The silver stocks are quiet. Dunkin is in better demand, with sales at 70c. Catalpa advanced to 20c., Crescent to 10c., and both are good purchases at these prices. Napa quicksilver steady at $4.

3 P. M.—The market closes strong. Franklin sold at $18; Osceola at $27, Boston & Montana at $51.50.

Lake Superior Gold and Iron Stocks.

(Special Report by David M. FORD, Houghton, Mich.)

The prices of the gold and iron stocks show but little change, but continue to be in demand.

GOLD MINING STOCKS.

Name of Company	Par value.	Jan. 4. Lowest.	High.
Grayling Gold & Silver Co	$25.00	$0.90	$1.00
Michigan Gold Co	25.00	2.50	3.50
Peninsula Gold & Silver Co	25.00	.75	.90
Ropes Gold & Silver Co	25.00	2.25	2.50

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25 00		$65.00
Aurora Iron Co	25 00	7.50	8.00
Champion Iron Co	25 00	$100.00	110.00
Chandler Iron Co	25.00	44.00	45.00
Chapin Iron Mining Co	25.00	25.00	33.00
Chicago & Minn. Ore Co	100.00	115.00	130.00
Cleveland Iron Co	25.00	19.00	20.00
Germania	25.00		11.00
Jackson Iron Co	25 00	100.00	110 00
Lake Superior Iron Co	25 00	62.00	66.00
Milwaukee Iron Co	25.00	4.00	6.00
Minnesota Iron Co	100.00	80.00	85 00
Montreal Iron Co	25.00		5 50
Norrie (Metropolitan)	25.00	62.00	65.00
Odanah Iron Co	25.00		15.00
Pittsburg Lake Angeline Co	25.00	150.00	160.00
Republic Iron Co	25.00	48.00	49.00

PIPE LINE CERTIFICATES.

(Special Report by Messrs. WATSON & GIBSON.)

The petroleum market, the last day or two, has been a little more active, and promises to go higher under the influence of a monthly statement showing a reduction of 900,000 barrels in the outstanding certificates. This brings the total number of certificates dealt in down to about 5,400,000, with about as many barrels additional in the shape of credit balances, a considerable portion of which could, of course, be converted into certificates if they were wanted.

The strong statistical showing of the Pennsylvania commodity ought to exercise a bullish influence on the market, though the worst feature is a complete indifference of speculators to the situation.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 4	103⅛	103½	103	103¼	116,000
6	103¼	103¼	102⅝	102⅞	120,000
7	102⅝	103¼	102⅝	103	119,000
8	103⅛	103¼	102⅝	103⅛	108,000
9	102⅞	103⅛	102⅞	103⅛	44,000
10	103⅝	105¾	103⅛	105⅜	566,000

Total sales in barrels.... 1,073,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 4	103⅝	103⅞	103⅝	103⅞	25,000
6	103⅜	103⅝	103	103⅝	89,000
7	103	103⅝	102¾	103¼	145,000
8	103¼	104⅛	103⅛	103⅜	175,000
9	103⅞	104	103⅜	104	175,000
10	104	106¼	103¾	106⅛	925,000

Total sales in barrels.... 1,537,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 10.

Statistics.

PRODUCTION OF BITUMINOUS COAL for week ended January 4th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.	1,226	1,226	1,447
Cumberland, Md.	65,000	65,000	60,000
Barclay, Pa.	6,000	6,000	3,500
Broad Top, Pa.	6,507	6,507	8,000
Clearfield, Pa.	62,017	62,017	58,478
Allegheny, Pa.	18,145	18,145	16,885
Beach Creek, Pa.	35,000	35,000	30,000
Pocahontas Flat Top.	35,000	35,000	29,428
Kanawha, W. Va.	30,000	30,000	35,000
Total	258,895	258,895	242,738

WESTERN SHIPMENTS.

Pittsburg, Pa	16,705	16,705	12,272
Westmoreland, Pa.	19,315	19,315	27,707
Monongahela, Pa.	5,410	5,410	3,511
Total	41,430	41,430	43,490
Grand total	300,325	360,325	286,228

PRODUCTION OF COKE on line of Pennsylvania R. R. for four days ending January 4th, and year from January 1st, in tons of 2,000 lbs.: Week, 62,260 tons; year, 62,260 tons: to corresponding date in 1889, 76,465.

Anthracite.

The new year, thus far, has brought little improvement to the anthracite coal trade. With a sort of philosophical calmness, every one is waiting for a few weeks of zero weather. There is no loud grumbling, such as there was a month or so ago when the first disappointment was felt. After all, statistics show that the consumption of coal was about as large as could be expected with unusually mild weather, over which coal sellers have no control, and after a year of abnormal conditions such as was 1888.

Perhaps the most important development of the week has been the announcement that the Philadelphia and Reading Company has secured the contract to furnish the 200,000 tons of broken coal required by the Manhattan Elevated Railway Company of this city. For the past five years the Lehigh Valley Company has had this contract. The price at which the contract was secured this year is a matter of considerable discussion, and figures as low as $3.46 and $3.53 per ton have been named. We are reliably informed that the exact figure was approximately the same as last year, $3.65 per ton. Probably, considerations other than the difference in price were influential in the disposition of the contract.

This subject naturally brings us to the point over which financial circles have been greatly agitated during the latter part of the week, viz., the payment of interest upon the first preference income bonds of the Reading company. On Wednesday it was rumored that no interest would be paid on these issues on account of the large decrease in net earnings during 1889. A semi-official statement on Wednesday read as follows: The accounts of the company, which have been made up in anticipation of the annual report, show that it has earned a sufficient amount to fully meet all its fixed charges, but that the surplus over this sum is quite small. The Reading companies, on account of the mildness of the season and the diminished consumption of coal, have not been able to sell their coal either to the amount or for the prices heretofore obtained, and the net earnings have, therefore, decreased. There has also been a loss of some $70,000, on account of the great flood last year, through the destruction of property and the necessary expenses of restoration. The work of maintaining the old collieries, which had fallen into bad repair, and was necessary to keep them up, has cost about $1,000,000, and this has been charged to expenses. At the same time all work at opening and developing new collieries, costing about $100,000, has been charged to betterments.

Several meetings of the Board of Managers of the company have since been held and final action has been deferred. The annual election occurs in Philadelphia on Monday next, and a spirited contest will undoubtedly ensue. The management of the road has not been always conservative or wise, and in some quarters there is a bitter feeling against Mr. Corbin and his friends. The result of the election is awaited by the coal trade with great interest, as the character of the new management may have an important bearing upon the trade this year.

Up to the hour of writing Mr. John H. Jones' statistics of production for last week have not been received.

In our annual review of the coal trade last week, in the table of production and stocks, a clerical error caused the production for December to be overestimated, thus causing the output for the year to be exaggerated. The actual aggregate shipment for the year, however, about 35,500,000 tons, were accurately stated in the tables of production, both by companies and regions, which are very interesting at this time.

The output for last week is estimated between 450,000 and 500,000 tons.

Prices are not the subject of discusion just now, and probably concessions are not difficult to secure.

The meeting of the general sales agents, which was to have been held last Tuesday afternoon, has been indefinitely postponed.

Broken coal seems to be in rather better demand, and pea and buckwheat are well sold up.

The New York Retail Trade.

The first regular meeting of the Retail Coal Exchange in 1890 was held in the rooms of the Exchange last Friday evening. The attendance was light; the necessary quorum, 15 members, not being obtainable until nine o'clock. President Thetford occupied the chair. The minutes of the previous meeting were read and approved in the usual manner, and two new members were elected. The treasurer's report for 1889 was on hand: January 1st, 1889, $532.15; received—dues, $1,846; memberships, $325; from other sources, $7. Total receipts, including cash on hand the first of the year, $2,710,15. Disbursements, $1,420.44. Balance on January 1st, 1890, $1,289.71. This, of course, is a very encouraging showing.

What was probably the most important action of the meeting was the presentation of a plan by the executive committee of the Exchange for raising a fund to procure a building for the use and purpose of the Coal Exchange of the city of New York. The details of the plan have not been matured as yet as it is desired at first to simply secure the sentiments of the Exchange in regard to the proposition. If the idea is looked upon with general favor the project can be perfected either by a special committee or at a regular meeting of the Exchange. The plan presented last Friday night is stated in a circular which has been sent to all the members, as follows.

"A plan to raise a fund for the erection or purchase of a building for the uses of the coal trade, in which they can hold their meetings and meet informally every day, if desired, and where a part of the building can be rented to secure an income from the investment. Stock certificates of $50 each to be issued, to be confined to dealers in coal. Members can subscribe to one or more shares as they wish. Subscriptions to be paid in 25 per cent. instalments, at least three months apart. All money so paid in to be in the hands of a building fund committee, to be elected by the Exchange, and said money to be deposited in a trust company in the city of New York, at interest, until such time as the fund shall warrant the commencement of operations. All interest accruing during that time to be returned to subscribers in pro rata shares. Certificates of stock to be delivered to subscribers on the completion of the payment of the $50.

Attention was then directed to the suggestion that the Exchange give a dinner shortly. The success of the rather informal collation at the annual election of officers at the last meeting in December was such that it is believed that a banquet would be highly desirable and beneficial to the Exchange in awakening interest among its members and in promoting sociability and harmony. The secretary was instructed to present the proposition to members by circular and to ascertain how many would support it. Judging from the expressions of those present at Friday night's meeting, there would probably be little difficulty in making a banquet a success.

It is evident that the Exchange enters upon the new year under most propitious circumstances. It is to be hoped that by energetic and united action the usefulness of the Exchange may be increased. That the scope of its work may be profitably widened is not doubted. Careful and intelligent consideration should be given to any projects in this direction, and when a plan of action is determined upon, let there be no faltering or lack of energy and enthusiasm.

Bituminous.

The demand for soft coal is rather easier than for some weeks past, and coal seems to be in more adequate supply. The opening weeks of the year bring the usual quietness. There is, apparently, less striving for contracts than usual owing to the agreements that have been entered into as to sales of coal before February 1st. In the meantime nothing new regarding the progress of the combination scheme has developed.

So far as can be judged at present, the outlook for the future, combination or no combination, is not an unsatisfactory one.

Boston. Jan. 10.

[From our Special Correspondent.]

As might be expected, a touch of cold weather has slightly improved the anthracite coal trade, and as consumers and dealers are carrying light stocks, there is no doubt that a continuance of low temperature would quickly bring many cargo orders to wholesalers.

Prices are virtually unchanged. No one pretends to be securing prices any nearer the schedule than heretofore, and indeed until some substantial improvement in the condition of the trade takes place very few expect to be able to advance prices.

Naturally, some interest is felt in the loss of the Manhattan Elevated Railway contract by the Lehigh Company, and there is some talk of resultant trouble in general market conditions.

Bituminous coal is in sharp demand, and is not quite so hard to get.

Freight rates are as yet unchanged, but New York charges are expected to advance shortly.

News is as scarce as coal is plenty.

Buffalo. Jan. 9.

(From our Special Correspondent.)

At the annual meeting of the Trustees of the Merchants' Exchange, held yesterday, Mr. Thomas Hodgson, the Chairman of the Coal Committee, made the following report for the year 1889. He was afterward elected one of the thirteen trustees for the current year.

Your committee beg to submit the following report: The anthracite coal shipped from Buffalo by lake, for the season of 1889, was 2,075,188 tons, being about 450,000 tons less than the lake shipment for 1888, the decreased tonnage being accounted for by the extremely mild winter of 1888–1889, and the large stocks carried over in the hands of the dealers west of Buffalo. This entire quantity was carried in 1,710 vessels, and shipped to 60 different ports. Freights varying from 45c. to 75c. to Chicago and Milwaukee, and from 20c. or lower to 75c. for Duluth.

"The amount passing through Buffalo for Western points by rail, is an undetermined quantity. No facilities, up to date known to your committee, are given to obtain correct figures. Notwithstanding the apparent reduction in the volume of business, the interests located here do not appear to have diminished any of their energies in the matter of furnishing facilities for the transportation and handling of this commodity.

"The General Dock and Terminal Company handling the coal shipped over the New York Central Railroad, notably that of the Philadelphia & Reading, have completed extensive docks for the handling of water coal for shipment West, and for retail purposes for town trade. The total length of their shipping dock, including approaches, is 1,800 feet; shipping dock proper about 500 feet, with 40 pockets on either side, making a total of 80 pockets for the shipment of vessel coal, with a capacity of 5,000 tons. In conjunction with this, they have 32 pockets with a capacity of 100 tons each, for town trade. It is rumored, and doubtless upon good authority, that they propose constructing a storage plant at East Buffalo during the present winter, with a capacity of 250,000 tons.

"The New York, Lake Erie & Western Railroad have finished the additions to their shipping dock on Blackwell Canal, and have also put in facilities at East Buffalo, which is known as the Brown Hoist, where they have a storage capacity of something like 100,000 tons, connected with which there is a transfer trestle to facilitate their business of transferring coal from dump to box cars.

"The Lehigh Valley are arranging to increase their present large terminal facilities by the erection of a storage plant on land acquired by them at East Buffalo. There will be three tunnels, 12 by 12, 1,300 feet long each, cut through the solid rock, above which will be a dumping trestle 35 feet high, covered by a building 1,200 feet long, 200 feet wide and 90 feet high, the storage capacity of which will be 175,000 tons. They propose to have standing room for 1,200 cars. The unloading of the cars at the tunnels will be virtually automatic; the empty cars being delivered to them by the engine, at one end, will be handled through the tunnels and out on the opposite end by gravity. They have also in contemplation two other trestles for retail business in the city.

The Delaware, Lackawanna & Western have about double their storage capacity at the foot of Erie street, having put up an entirely new set of shipping pockets, during the winter of 1888–1889.

"The improvements by the other companies here are of minor importance. The general coal business of the city has been good. The advance in the cost of the National Fuel Gas puts it where it is no longer a competitor with coal.

"The bituminous coal, handled by Buffalo interests, has very largely and materially increased in quantity. The business done in the early part of the season was unsatisfactory, but for the last half has been both remunerative and satisfactory to the operator, barring the contracts made early in the season. The market has taken all of the coal that the operators could get here and that the railroads could transport.

The coke interests have also been good, taking the total outputs of the ovens, and at a fair price.

Your committee beg leave to again say, that the statistics on this article, as well the bituminous coal by rail, to and through Buffalo, are almost impossible to obtain.

The business in the commodities is very large and of very great importance, and should receive more attention in the matter of statistics by the transporters."

There are no special items of interest this week to report in the demand, supply or prices of coal.

Pittsburg. Jan. 6.

(From our Special Correspondent.)

Coal.—The trade remains quiet and unsettled. The Monongahela and Ohio rivers are in good order for navigable purposes. Most of the mines in the pools are in operation; prices in the lower markets are unusually low, and the report comes

back, weather too warm; but from present indications this will soon be changed.

The nominal rates are:

PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.

First pool	$4.75	Fourth pool	$3.95
Second pool	4.50	Railroad coal	5.00@5.50
Third pool	3.90		

Connellsville Coke.—The market has ruled firm with a liberal demand. The H. C. Frick Company continues to increase its ovens, having added since our last 70 ovens. The McClure Company has completed 25 ovens, and has 75 more in a forward state. The Hostetter Company has entered the market, having fired 55 ovens at Whitney, and others will be put in operation as fast as possible. Week's shipments 6,845, against 7,770 previous week; deficiency, 925 cars.

Quoted rates are: Furnace, f.o.b., $1.75; foundry, $2.05: crushed, $2.55.

Freights.—Shipments, 70c.; Mahoning and Shenango valleys, $1.35; St. Louis, $3.65; Chicago, $2.75: Cleveland, $1.70.

The H. C. Frick Coke Company has agreed to hold a conference on Thursday with the K. of L. in regard to the new scale. Superintendent Lynch calls attention to a clause in the present agreement, which reads:

This agreement to take effect August 8th, 1889, and to continue in effect and binding on said company and their workmen until February 9th, 1890, and to be continued after the expiration of that date if no other arrangement shall have been made until 30 days' written notice shall have been previously given by either to the other at their respective office of their desire to discontinue the same.

Superintendent Lynch takes the ground that the present agreement must exist thirty days after February 9th, while District Master Workman Kerfoot insists that the provisions of the above section will be strictly complied with, and that upon the adoption of a new scale on the 9th inst., the thirty days' notice will be given and the new scale will go into effect February 10, and the spirit and letter of the agreement will be strictly followed.

Kerfoot, Parker and Wise intimated to-day that their demands were only in accordance with the selling price of coke, and that the scale will have to be signed by February 9th or the men would be called out on a strike thirty days thereafter.

At the convention of miners, held in K. of L. Hall, resolutions were adopted recommending that each mine send a delegate to the Columbus convention, which occurs on January 22d. The resolutions state that the miners are in favor of the scale formulated at the Indianapolis convention fixing the rate for mining in the Pittsburg district at 90 cents per ton; that they favor the eight hour movement and the creation of a defense fund, to be raised by contributing $1 per month for the three months before May, 1890.

Superintendent Ramsey, of the Southwest Coal and Coke Company, has replied to the notice issued by the Knights of Labor at Scottdale for a conference to-day, and raises the same objection as Superintendent Lynch, that the men must give 30 days' notice after February 9th if an agreement has not been effected in the meantime. Superintendent Brennan, of the McClure Coke Company, will also be present. None of the small operators have signified their attention to be present at the conference, but, as the above superintendents represent 10,434 ovens and consume most of the output of the small operators, it is not really necessary that the latter should be present.

FREIGHTS.

From Baltimore to: Boston, Mass., 1.60; Bridgeport, Conn., 1.40; Brooklyn, N. Y., 1.00; Charleston, .80; Fair Haven, Mass., 1.40; Fall River, 1.40; Galveston, 2.75@3.00; New Bedford, 1.40; New Haven, 1.40; New London, 1.40; New York, N. Y., 1.10; Norfolk, Va., .60@.65; Portland, 1.60; Portsmouth, N. H., 1.60; Providence, 1.40; Quincy Point, 1.60; Richmond, Va., 1.70; Salem, Mass., 1.60; Savannah, 1.00; Somerset, 1.40; Weymouth, 1.60.; Williamsburgh, N. Y., 1.10.

From Philadelphia to: Alexandria, Va., 1.00†; Boston, Mass., *1.40@1.50; Charleston, .75; Galveston, 3.05; Georgetown, D. C., 1.00†; New York, .90†; New Orleans, 2.75; Norfolk, Va., .75†; Providence, R. I., *1.20@1.30; Richmond, 1.00; Savannah, .90; Washington 1.00; Wilmington, N. C., *1.00.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, FRIDAY EVENING, Jan. 10.

Prices of silver per ounce troy.

Jan.	Sterling Exch'ge	Lond'n Pence.	N. Y. Cts.	Jan.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
4	4 83	44⅛	95⅜	8	4.84¾	44 5-16	93¼
6	4.83¾	44⅜	95½ @95⅝	9	4 85¾	44⅝	96½
7	4.84¼	44⅛	95¾	10	4.85¾	44⅞	96½

Council Bills advanced ⅝d. on Wednesday's allotment. Silver market has been strong and advancing on large London orders, and, with the sharp rise in sterling exchange, silver closes at 96¼c. United States Assay Office at New York reports total receipts of silver for the week 45,000 ounces.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting made no change in its minimum rate for discount, and it remains at six per cent. During the week the bank gained £363,000 bullion, and the proportion of its reserve to its liabilities was raised from 27·17 to 30·64 per cent., against an increase from 29·90 to 38·90 per cent. in the same week of last year, when its rate for discount was four per cent. The Bank on Thursday lost £50,000 bullion on balance. The weekly statement of the Bank of France shows a decrease of 7,125,000 francs gold and a decrease of 4,000,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .75	$ —
Mexican dollars	.75	.76
Peruvian soles and Chilian pesos	.72	.73½
English silver	4.83	4.88
Five francs	.94	.95
Victoria sovereigns	4.85	4.88
Twenty francs	3.85	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.65
Ten guilders	3.96	4.00

Copper.—The tone of the copper market is still very firm, and the demand for consumption continues highly satisfactory. The yearly statistics of production, consumption and stocks, published in our last issue, while hardly as startling as those of a year ago, were certainly surprising as indicating the enormous increase in consumption during the past year; though these figures of consumption may have to be modified somewhat by the full returns of export, which were possibly greater than given, the consumption figure being correspondingly less. These statistics are generally recognized as indicating the thoroughly sound and promising condition of the copper market generally, which is certainly in a more healthy state than for a long time past, and if the present enormous rate of consumption continues the heavy accumulations of warehouse stock must inevitably disappear very rapidly. The Lake companies are now asking 14¾@15 for their produce, but a little spot Lake copper can possibly still be picked up at 14½, although this is somewhat questionable. There is a very good demand for Arizona copper at about 13½ which, in comparison with lake is very cheap, and casting brands are quoted at 13@13½c. The quantity of copper of any kind offering is remarkably small, and no pressure to sell is observable in any quarter.

The London market for Chili bars and G. M. B.'s opened firm on Monday morning at £51 10s.@£51 15s. spot, and £51 17s. 6d.@£52 three months, and rose a little higher still on Tuesday, after which a slight reaction set in, and this (Friday) morning the lowest point of the week was touched, with quotations standing at £50 10s. @£50 15s. spot, and £50 15s.@£51 three months, one cable reporting "realizations of speculative holdings." The closing prices this afternoon are, however, stronger again at £50 17s. 6d.@£51 spot, and £51 5s.@£51 10s. three months. Otherwise prices have been fully sustained, and the latest quotations for refined and manufactured copper in London are English tough, £55; best selected, £57; strong sheets, £55; India sheets, £58; yellow metal, 6d. per lb.

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

	Copper Matte.	Lbs.	
To Liverpool—			
By S. S. The Queen	3,825 sacks	449,064	$20,000
By S. S. Ruric	4,055 "	454,290	30,000
To Rotterdam—	Copper.		
By S. S. Veendam	18 casks	22,500	2,531

Tin.—Rather a severe drop in values has to be reported this week. It appears that recently several lots have got into the hands of rather weak speculators, and, under the influence of realizing sales, prices have given way from last week's quotations of 21·25 for spot, January and February, and 21·35 for March to to-day's closing prices of 20·65 spot, 20·70 January, 20·75 February, 20·80 March, which prices are really about ½c. below the cost of importing; and as this condition of affairs has prevailed now for some time, and naturally greatly curtailed importations, it seems not at all improbable that we shall soon witness another period of scarcity of spot tin. The London market has been rather flat throughout the week, and the latest cabled quotations from there are: Spot, £95 2s. 6d.@£95 5s. Futures, £95 5s.@£95 7s. 6d., or a decline of more than £2 for the week. This relapse is probably due to rather heavy shipments from the East in the first part of this month.

Lead.—In spite of the sound position of this article as exhibited in the recently published statistics of stocks, from which it was made clear that consumption had more than kept pace with production, the market has exhibited rather a dull feeling, and with little business doing prices are more or less nominal at 3¼@3·90. London prices have also eased off somewhat during the week, the latest quotations there being £14 for Spanish and £14 5s. for English.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows: Lead has been very quiet since our last report; buyers are acting unusually timid. The demand is only from hand to mouth. Sales will probably aggregate 500 tons at from 3.60@3.62½c. Sellers appear a little anxious to trade, but from all accounts are unwilling to make concessions.

The Chicago Market.—Messrs. Everett and Post telegraph us as follows to-day: Our lead market has ruled firm during the past week with a fair demand noticeable. Sales aggregate six hundred tons at and around 3·70c. At the close 3·70c. is asked and 3·67½c. bid.

Spelter continues very strong in tone and the demand is increasing. We quote: prime Western, 5·45 to 5·50, delivered in New York. The London market is firm at £24 5s. for ordinaries; £24 10s. for specials.

Antimony remains in good demand at 20½c.@20¾c. for Hallett's, and 28c.@30c. for Cookson's.

Quicksilver.—Quietness pervades the market for this metal. In New York, wholesale quotations are $49.00@$49.50, and in jobbing lots, 65c.@66c. per pound is asked. The London quotation remains at £9 15s.

Nickel.—Asking prices have raisen a few cents per pound since our last report, and in moderate quantities 78@80c. per pound is quoted.

Importations during the week included 9,330 pounds on Monday and 1,800 pounds on Thursday.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 10.

Pig Iron.—The week has been a quiet one in the pig iron market, but a healthy feeling continues to prevail in the trade. The volume of business is not large. Most of the large consumers have contracted for their supply for the next few months, and there is no great rush for iron at present. Prices have become pretty definitely and generally settled, and no immediate advance is looked for. Average ruling values are about $20 for 1 X foundry, $19 for No. 12, 2 X foundry, and $18 for gray forge.

The Thomas Iron Company has booked orders for foundry and forge irons aggregating 132,000 tons. Some of these run throughout the year, the prices for deliveries after July 1st being left to be adjusted hereafter. The prices announced last Friday, it will be remembered, hold good only for six months. The company's annual balance sheet, which has just been completed, shows that during the last six months of 1889, 105,189 tons of pig iron were shipped. A larger proportion of foundry iron than usual was made. The company now has all of its eleven furnaces steadily in blast.

Some weeks ago erroneous rumors were in circulation to the effect that inquiries had been received in this city for iron for shipment to Liverpool. As stated in this column at the time, these inquiries were on the part of English capitalists, who desire to engage in speculation in pig iron on this side of this water. Since then they have made a definite offer to the Thomas Iron Company, of $20 per ton, for all its product of No. 1 X foundry during 1890. Inasmuch as the regular customers of the company would thus be neglected, the offer was promptly refused, but it is significant as illustrating the confidence of foreign speculators in the continuance of high prices during the year.

Very little has been done in pig iron warrants during the week. The official statement of the Warrant Company shows that the company had in its yards on the 1st of January 35,100 tons.

The last sales of warrants reported were three lots of 500 tons each at $19 for January, February and March delivery, respectively.

Southern producers continue to quote $16 for No. 1 X at furnace or $20.11 delivered in New York, and while reporting a firm market, express themselves conservatively as to the future.

Advices from our special correspondents in other parts of the country, notably Philadelphia and Pittsburg, indicate that the usual January quietness is everywhere prevalent; but confidence as to a prosperous year for the trade is apparently unshaken.

Scotch Pig.—In this market there is scarcely any demand for Scotch brands. The foreign market continues very firm. Quotations for Glasgow warrants cabled to-day to the Metal Exchange were 63s. 1d. Late mail advices from Glasgow state that on Dec. 31 there were in blast in the Scotch producing district 88 furnaces, as compared with 75 a year ago, but owing to the irregular working of many of them at present, the aggregate weekly capacity is only slightly larger than it was at the corresponding date in 1888.

Stocks in makers' hands during the year decreased 121,000 tons in Scotland.

Writing us from Manchester on December 28th, a correspondent says: After a falling off in values of pig iron during the first half of this month a turn took place, and prices have again advanced steadily. The holidays have quietened matters, and there is little demand for pig iron for present delivery, a strong inquiry, however, existing for delivery over the first quarter of next year, and for which considerably higher prices are asked—the reverse of the position a month ago. Shipments for Middlesborough during this month are very poor—about 25,000 tons up to 21st inst.—being affected by the high prices there as compared with those ruling for Scotch iron.

Spiegeleisen and Ferro-Manganese.—Neither in spiegeleisen nor in ferro-manganese is there much activity at present. Prices are quiet and unchanged. The outlook for the future seems firm, but the tremendous rise in values which has taken place within the past twelve months naturally rather checks business. Nominally for spiegeleisen, 20 per cent., $37@$38 is quoted; for ferro-manganese, 80 per cent., $95@$100 is asked.

Steel Rails.—One Eastern Pennsylvania mill reports sales of 15,000 tons of blooms and rails at $35, but in general there is very little activity. The new year has not sufficiently advanced to allow of new enterprises being matured. At Eastern mills $35 continues to be quoted.

Structural Iron and Steel.—There is apparently something of a lull in business in structural material, but so far as can be learned of, all of the mills have a fair quota of orders on their books. There is, however, little inducement or justification for an advance in prices just at present.

The latest asking prices are as follows:

Delivered on wharf, bridge plate, 2·30c.; iron angles, 2·30c.; iron tees, 2·80@2·85c.; steel angles, 2·70c.; beams and channels on wharf, 3·1c.

Steel plates on wharf: Tank and ship, 2·75c.; shell, 3c.; flange, 3·25c.; fire-box, 4@4·1c.

Iron plates on wharf: Common tank, 2·35c.; refined, 2·45c; shell, 2·6c.; flange, 3·5@3·7c.; extra flange, 3¼@4c.

Bar iron at mill is quoted at 1·8@1·9c. for common and 1·9@2c. for refined. Deliveries from store are quoted as follows: Common, 2·1c. base; refined, 2·3c. base; "Ulster," 3c. base; Norway bars 4c.; shapes, 5c., and Norway nail rods, 5¼c.

Merchant Steel.—Prices are as follows: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¼c.; open-hearth machinery, 2¾c.; open-hearth spring, 2¾c.; tire steel, 2¾c.

Pipes and Tubes.—Rates of discount on wrought-iron pipe remain as follows: Butt welded, plain and tarred, 50 per cent. discount; galvanized, 42½ per cent. discount; lap-welded, plain and tarred, 62½ per cent. discount; galvanized, 50 per cent. discount. A discount of 55 per cent. is allowed on boiler tubes of 2 inches and larger, and 50 per cent. on 1¾ inches and smaller.

Cast-iron pipes remain at $25@$28, according to size.

Rail Fastenings.—As we have from time to time intimated in these columns, the recently advanced quotations for rail fastenings seem to be more or less artificial. We hear of sales below the ruling asking prices which are as follows: Spikes, 2·25c.; angle fish plates, 2·15@2·25c.; bolts and square nuts, 3c.; hex. nut, 3·25c.

Old Material.—The tendency still seems to be a stiffening one. From $28 to $29 is now asked for old tee iron rails. Double heads are held nominally at $30. Stocks are very light, the cost of importation is high, and as at this season of the year there is little chance of old rails being taken up, sellers are congratulating themselves that still higher prices ought to prevail before long.

Louisville.

(Special market report by Messrs. HALL BROS. & CO.)

The volume of business has increased a little during the past week, but the developments during the last few days have disclosed sales at prices very much under paper quotations. Some furnaces hold out for full figures and are hopeful of further advances. But it is evident that they are not all of this turn of mind, and that some are accepting business liberally at a reduction in prices. A number of speculative lots have also appeared upon the market at lower figures. A few furnaces have added the 40 cents advance in freight to their prices, while others have not taken it to account in the same way. The general market conditions for coke iron are regarded as strong.

Hot Blast Foundry Irons.

Southern Coke	No. 1	$19 00@	19.50.
"	" No. 2	18.75@	19.00.
"	" No. 3	18 00@	18.75
Mahoning Valley, Lake ore mixture			20.00
Southern Charcoal	No. 1	18.50@	19.00.
"	" No 2	18.00@	18.50.
Missouri	" No. 1	19.50@	20.00.
"	" No. 2	19.00@	19.50.

Car Wheel and Malleable Irons.

Southern (standard brands)	23.50@	24.50.
" (other brands)	15.50@	20.50.
Lake Superior	23.00@	23.50.

Forge Irons.

Neutral Coke	17.50@	18.00.
Cold Short	16.75@	17.00.
Mottled	15.50@	16.00.

Pittsburg. Jan. 9.

(From our Special Correspondent.)

Raw Iron.—Trade since our last has exhibited less activity than for some weeks past; still, taken as a whole, a fair business was transacted. To a certain extent both the buyer and seller are in a good position to hold off, for a short time at least. The heavy transactions in raw material reported during the closing months of the old year have only been partially delivered, hence buyers are not actually in want of fresh stock in order to keep their mills in operation. This gives them an independence for the present at least, and enables them to talk about lower prices. On the other hand, furnace men, many of them, have all the contracts they want, some of them extending over the first four months of the present year, and, as a matter of course, there is little use in talking lower prices to them. Occasionally we have reports of sales below current rates, but after careful inquiry the party cannot be found.

In our last report we noted a sale of 2,500 tons of City Furnace at 50 cents above the figures fixed by the Thomas Iron Company, and there is no doubt our furnaces have a reputation second to none for making good iron. There seems to be a wide difference of opinion in regard to the future value of iron and steel, though it is conceded on all sides that there will be an increased consumption of both iron and steel products.

On the one hand, the opinion is very strongly entertained that the highest limit of prices has been reached, and that the present capacity will be sufficient to protect consumers against further fluctuations; and on the other hand, it is argued that we are simply at a way station upon the upward course of the market, and that all kinds of material will advance within the next sixty days, beginning with Lake ore. It is upon this point that all interest centers, and those whose opinions with reference to future possibilities are respected are being consulted by many who desire to have light thrown upon the immediate future of trade and prices. The large margins now being realized on Bessemer will result in more furnaces turning out that iron, thus reducing the output of forge, and possibly enhancing its value. In the first place, the cost of Lake Superior ore delivered this year is $1 per ton more than last year's. The mention we made last week in regard to Eastern buyers being here resulted in sales of 10,000 tons steel billets for Eastern delivery.

Coal and Coke Smelted Lake Ore.

4,000 Tons Bessemer	$24 60 cash.
2,500 Tons Gray Forge, City Furnace	18.50 cash.
2,000 Tons Bessemer	24.00 cash.
1,500 Tons Bessemer	24.50 cash.
1,500 Tons Bessemer	24.00 cash.
1,000 Tons Gray Forge, Valley Furnace	18.50 cash.
1,000 Tons Gray Forge	18.35 cash.
500 Tons Gray Forge	18.25 cash.

Coke, Native Ore.

500 Tons Gray Forge, all ore	19.00 cash.
200 Tons No. 2 Foundry, at Furnace	18.50 cash.

Charcoal.

100 Tons No. 2 Foundry	21.52 cash.
1 0 Tons No. 2 Foundry	22.50 cash.
75 Tons Cold Blast	29.00 cash
50 Tons Cold Blast	26.50 cash.

Muck Bar.

1,500 Tons Neutral, January	31.25 cash.
500 Tons Neutral	31.00 cash.

Steel Slabs and Billets.

10,000 Tons Billets, Eastern delivery	36.50 cash.
4,500 Tons Billets	36 75 cash.
1,350 Tons Billets for Wheeling	37.25 cash.
1,200 Tons Billets	36.00 cash.
500 Tons Nail Slabs	37.00 cash.

Steel Wire Rods.

3,000 Tons American Fives, Spring delivery	50.50 cash.

New Steel Rails.

10,000 Tons. Spring delivery, on cars	35 00 cash.

Spiegel.

1,000 Tons 20 per cent., New York	38.00 cash.
100 Tons 20 per cent., f.o.h. Baltimore	37.00 cash.
100 Tons 10 to 12 per cent., Baltimore	32.00 cash.

Bloom Ends.

300 Tons Bloom Ends	26.00 cash.

Manganiferous.

5,000 Tons at seaboard, per unit	.20 cash.

Ske p Iron.

700 Tons Sheared Iron	2.15 4 mo.
300 Tons Narrow Grooved	1.85 4 mo.
250 Tons Wide Grooved	1.90 4 mo.
100 Tons Narrow Grooved	1.85 4 mo.

Ferro-Manganese.

150 Tons 80 per cent., February	95.00 cash.
50 Tons 80 per cent., Spot	102.00 cash.

Prices.

Coke or Bituminous Pig—		20% Spiegel at seaboard	36.00@38.00
Foundry No. 1	$20 00@20.25	Muck-Bar	31.75@31.00
Foundry No. 2	19.00@19.25	Steel Blooms	36.00@37.00
Gray F. No. 3	18.25@18.50	Steel Slabs	36.00@37.00
" No. 4	@17.50	Steel Cr'p Ends	25.00@26.00
White	17.00@17.25	Steel Bl. Ends	25.00@26.00
Mottled	17.00@17.25	Ferro-Man., 80%	101.00@105.00
Silvery	18.25@18.50	Steel Billets	36.50@37.00
Bessemer	24.00@24.50	Old Iron Rails	27.50@28.00
Low Phos	.@28.00	Old Steel Rails	23.00@24.00
Charcoal Pig—		No. 1 W. Scrap	22.00@23.00
Foundry No. 1	23.50@24.50	No. 2 W. Scrap	.@19.00
Foundry No. 2	22.00@2 .25	Steel Rails	@35.00
Cold-Blast	25.00@.8.00	" light sec	35.00@38.00
Warm Blast	24.00@25.00	Bar Iron, nom.	1.90@1.95
10 + 12% Spiegel at seaboard	30.00@32.00	Iron Nails	2.50@2.30
		Steel Nails	2.50@2.30
		Wire Nails	2.90@3.00

Nails advanced yesterday 15c. per keg.

Philadelphia. Jan. 10.

(From our Special Correspondent.)

Pig Iron.—A rumor gained currency this week that some reselling of iron was quietly going on, and it led to some active inquiry among both buyers and sellers to see whether there was any foundation for it. About the only basis is that accommodation transfers were made of two or three lots of good iron by one or two firms to others, as the buyers desired the particular iron purchased, and could not obtain it from the makers. Apart from this, everything is straight in this market. There is no weakness, and only a moderate amount of buying and of inquiry. To all appearances there will be some very heavy business in both foundry and forge after Monday. The heavy consumption heretofore referred to will be continued. The holiday idleness is past, and every plant is now being pushed to its full capacity. Special brands of No. 1 are $20.50 and standard $20. No. 2 is $19@$18.50, and forge $18.50@17.50. The crude iron market is being strengthened by the development of a large demand for finished products. Those who represent Southern furnaces have been asked to make prices for the early spring and to allow options, but the Southern makers are unwilling to do so.

Foreign Material.—An advance of 50c. per ton has been made in 20 per cent. spiegel, and round lots now being made offered at $38, without finding takers.

Muck Bars.—Up to present writing, sales of 3,000 tons of muck bars have been made. The mill price for the best makes this week is $31.50, and manufactures are advising their customers to fence in muck bars quickly, as they will certainly bring $32 or $32.50 before the close of the month.

Billets and Blooms.—Buyers differ decidedly in their views as to quotations, and for this reason three or four parties who were obliged to have billets at any cost found it necessary to pay as much as a dollar more than quotations heretofore given. Some buyers say that manufacturers are better able to accept contracts than they appear to be, but are giving it out that they are completely oversold, in order to draw out the best possible offers from a good many users of billets who must have them. It is this policy which has caused an advance this week, so that it is difficult to give a quotation which all hands will admit is a correct one. Billets have sold at $38, but there are parties to-day who refuse to take less than $40 for them, delivered. For scrap, anthracite and charcoal blooms, the quotations are $35, $45 and $55 respectively, with actual prices decidedly in favor of makers.

Merchant Iron.—The bar iron people do not know exactly what to make of the situation. Consumers are not being heard from as promptly as was expected; salesmen, who have been following the trade up very closely, have been reporting since Monday that, excepting a few consumers, buyers would be heard from before long. The trouble in the matter is simply this: consumers of merchant bar iron do not believe that the outside prices now asked can be rigidly maintained. Still, there are a good many orders coming along at 1·90@2c. for refined, with the usual shadings for common and medium.

Skelp Iron.—The demand for skelp will be all right, so the manufacturers report, just as soon as the buyers have had a chance to complete their winter arrangements for work. Skelp has been advanced to 1·90@1·95c. for grooved; sheared, 2·15@2.20c. There are no reasons in sight for predicting any decadence in demand.

Wrought Iron Pipe.—Two or three parties have been talking business, but are asking for a concession from old quotations. Manufacturers are in no humor for cutting prices at this time of the year, and intimate that the next meeting of the manufacturers will result in an advance. There is a good deal of business promised for he winter, but nothing of importance has been done since last report was written.

Nails.—For the first time for months the nail trade is dull Factories are accumulating stock. Quotations for iron, $2.15 to $2.25; for steel, $2.45. Both buyers and sellers are making no effort. Buyers think the market will weaken in view of the fact that there is so much capacity at work.

Sheet Iron.—The sheet mills are all back to work again, after a short intermission, during which time needed repairs were made. Stocks at stores are light. The manufacturers will push work hard, whether demand justifies or not, as they anticipate a very active spring trade, and meantime will stick to quoted rates.

Plate and Tank Iron.—A very strong demand will probably set in next week. A number of parties who failed to place business during December will soon be in the market. Tank work especially will be active for both iron and steel. Quotations for tank are 2·30c. to 2·40c.; shell, 2·60c. to 2·70c.; flange, 3·20c. to 3·30c.; fire-box, 3·70c. to 3.80c., all iron; steel tank, 2·75c.

Structural Iron.—The correspondence which brokers have recently had with some of their old customers concerning winter business is encouraging to them. There is, however, some unwillingness to make large contracts at the figures named by manufacturers; the latter are not disposed to grant any favors. All have a good deal of work, and are in position to ignore the notions and wishes of

buyers. Bridge plate is 2·35c.: angles, 2·35c.; tees, 2·80c.; beams, 3·10c.

Steel Rails.—Eastern rail makers are now making some effort to close business for which inquiries were received in November and December. No one is shading $35, so far as known. A good deal more business has been done in steel rails during the past few months than has reached trade papers, at least as to details. One or two parties, representing rail making interests, said this week that there was business floating about the market that would be soon placed, and that would foot up as high as 200,000 tons; no details are vouchsafed.

Old Rails.—Since Monday, old rail brokers have received inquiries for many more rails than they are able to promise for delivery within the next month. The outlook for old rails is very discouraging. There are a good many rails on Southern roads that should have been pulled up long ago. To-day's quotations are $28@$28.50, delivered.

Scrap Iron.—Quotations for No. 1, $25.50. Choice lots are out of the market. Machinery scrap is offered at $17; old fish plates are quoted at $29, but there are none here.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. 10.

Heavy Chemicals.—No new features of interest have been developed during the week in this line, with the exception of an increased firmness is caustic soda. Advices from abroad indicate an advancing tendency in consequence of the increased cost of raw material. Quotations in New York are therefore highest. From 2·60 to 2·62½c. is now asked. The high tests, 70 to 74 per cent., are held at 2·40 to 2·45c.; although there is a very limited supply on the spot, a few lots may be obtainable at the lower figure. It is of course a question whether the advance can be maintained, but inasmuch as it is a matter of importance to many English makers, a strenuous effort in this effort will undoubtedly be made.

There is little alkali on the spot. The market is firm, but quiet. The culmination of the bottlemakers' strike is eagerly waited for. Most of the other glass makers seem to be fairly well supplied with soda ash.

Bleaching powder is still in a depressed condition. In the absence of any actual transactions, it is difficult to give accurate quotations; and, in fact, the market is so weak that it is really difficult to ascertain the bottom figure at which orders might be placed; nominally about 1·50c. may be quoted.

Sal soda is rather weaker than at the date of our last report. The latest quotation for English brands is 95c. per 100 lbs. There is very little, if any, activity in hyposulphite of soda, quotations for which remain at $1.50 per cwt. in casks and $1.60 in kegs.

An effort was recently made to push the sale of hyposulphite of soda in this country. It was thought that the increased use of metallurgical processes in which hyposulphite is largely used offered an opportunity to widen the market for the article here, but the results thus far obtained have apparently not been at all encouraging.

Acids.—On the surface there is nothing to show that the career of the Knickerbocker Chemical Company has begun. Business is going on quietly, much in the same manner as heretofore, and until the end of the month, when reports of sales are made, there will be little to show that over 75 per cent. of the acid makers in this vicinity are under the control of the "combine." The Executive Committee of the Knickerbocker Chemical Company are losing no time, however, and such energetic workers as Messrs. Kalbfleisch, Deshon and Waugh, who constitute this committee, may be expected to perfect the details of the organization without unnecessary delay.

No meeting of the New York Chemical Club was held on Wednesday, the usual date for the semi-monthly meeting, and it is probable that these meetings will be discontinued hereafter, the gatherings of the board of directors of the Knickerbocker Chemical Company being substituted therefor. Thus, although the club will still continue in existence, its aims appear to have been fulfilled.

The new year brings little talk of changes in prices save that some of the manufacturers of nitric advocate a revision of the schedule of quantities and prices of this article, and when such a revision is made, an advance in prices may take place; nothing as yet has been done officially.

Fertilizing Chemicals.—A few additional sales of ammoniacal material continue to encourage the belief that prices have gone as low as they will for some time to come, but on the whole trade is very quiet and there are few buyers of importance in the market. Makers who lay in their supplies for some time ahead, or whenever they can get them cheap, seem to have contracted for about all the crude material they require for the present, while those manufacturers who pursue a more or less hand-to-mouth policy show no inclination to anticipate their requirements. Although predictions as to the course of the market during the year at present must be merely guess-work, there are many whose views are not at all sanguine. Reports from North Carolina complain particularly of the excessive rains and consequently poor crops during the last year, and the argument is that the farmers have little money available for the purchase of fertilizers.

The annual meeting of the New York Fertilizer Chemical Exchange will be held at the office of the president on Monday afternoon next. It is not expected that there will be time to transact much business of importance, except the annual election. The subject of credits still continues to be informally discussed, but none of the plans thus far presented seems sufficiently feasible to secure general support.

During the coming session of the New York State Legislature it is probable that a fertilizer bill will be presented. Senator W. P. Richardson is understood to have one under consideration at present. As was noted in our annual review of the fertilizer market last week, an attempt was made in 1889 to pass such a measure, but through lack of time it did not receive consideration.

The report has in some way gained circulation that the New York fertilizer manufacturers are opposed to a fertilizer law. In conversation with influential manufacturers, we are assured that this is not the case, and any measure that is equitable will receive earnest support. Respectable manufacturers of fertilizers are anxious to secure protection from the encroachments of less scrupulous competitors and manufacturers of inferior articles, but one and all will oppose attempts at unjust taxation and unnecessary restrictions upon the trade.

Ruling prices are as follows: Azotine, $2.05; dried blood, low grade, $2.00; high grade, $2.10. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20.50@$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $20@$20.50. Fish scrap, $21.50@$22 per ton, f.o.b. factory. Sulphate of ammonia at $3.15@$3.20 per cwt. Concentrated tankage, $2@$2.05. Refuse bone-black, guaranteed 70 per cent. phosphate, $20 per ton. Dissolved bone-black is 90@92½c. per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln dried, $6.75@$7 per ton, both f.o.b. vessels at the mines. Freights by sail from Charleston to New York, $3@$3.25 per ton. Charleston rock, ground, $11.50@$12, ex-vessel at New York.

Double manure salts, 48 to 51 per cent. sulphate of potash, for 1890 shipment, $1.12½ per 100 pounds; high grade manure salts, basis 90 per cent. sulphate of potash, $2.37½ per 100 pounds. These prices are for invoices of 50 tons, based on foreign analyses and foreign invoice weights, ex-ship, New York.

Kainit.—Very little is doing in this article at present. The official prices, it is thought, will not be announced for some weeks yet, but any one wanting kainit can easily obtain quotations for forward delivery by application to the syndicate sales agents in this city, who will cable all offers received to the other side.

Fertilizer Market of the United Kingdom.

(Special Report by Messrs. Couper, Millar & Co.)

LONDON, December 16th, 1889.

"History repeats itself," and such is the position of the phosphate trade at this moment, for, about eight years ago, we had quite a scare as to supplies, with prices ruling even higher than at present; certainly with less reason, as since then many sources of supply have been exhausted, and new fields do not open out as rapidly as could be wished. But for the "Somme," our manufacturers would have been in a corner long ere this; however, demand creates the supply, and though difficulties and high prices seem inevitable next year, we think we know of new sources of supply of both high and medium tests that may be available by next autumn, though not in time to prevent anxiety. Sulphate of ammonia rules higher, owing to the gas strikes and the electric light looming in the near future, though the increased supply of nitrate of soda serves to check any serious advance. Organic ammonia is scarce and wanted.

Mineral Phosphates.—South Carolina is "off the market," probably through better prices being obtained in U. S. Some of all tests in request, and but little available even at the extreme prices offered by continental buyers. Canadian held firmly, and we hear of no new sales for next year's shipment. Belgian of the higher tests sold forward on Continent, and only a little 40 to 45 and 45 to 50 per cent. available, with some few thousands of tons of residue—20 to 25 per cent. Aruba is off the market, and no signs of Curacoa being offered. Cambridge and Bedford coprolite wanted, but nothing offered.

Bone Ash, Bones and Meal.—In sympathy with mineral phosphates these are all dearer. Bone ash nominally £5 basis 70 per cent., and bones £5 10s., but nothing offers, while bone meal has been sold at £5 10s.@£5 12s. 6d. per ton.

Sulphate of ammonia commands £12 7s. 6d. per ton.

Nitrate of soda has fluctuated considerably during the past three weeks, closing quietly on spot at 8s. 7½d.@8s. 10½d. per cwt., according to quality.

Ammoniacal materials.—Fish guano sold forward at 10s. and 1s. 3d. f. o. b. Thames in buyer's bags. Ground hoofs and horns offering at 9s. 9d.@10s. per unit of ammonia. Dried blood scarce at 11s. 6d. per unit.

Muriate of potash.—We quote at £7 12s. 6d. on 80 per cent. in bags. Kainit at 31s. 6d. in bags or 28s. 6d. in bulk f. o. b. Hamburg in lots of not less than 50 tons. Net cash. Stassfurt weights and sampling.

Manchester. Dec. 28.

(S. W. ROYCE & Co.'s report.)

Chemicals.—The decrease that is generally so noticeable in the volume of trade at this period of the year has been during this month much less than usual. Business has been brisk throughout the month, the weather continuing very favorable to shipping operations; indeed, this December is a fitting close to a year that we feel has been very satisfactory in most branches of the chemical trade, and a great improvement upon any of its immediate predecessors, and there are genuine reasons for expecting that this improvement will be continued. The one dark blot is the alkali branch, the outlook in which is certainly not encouraging. The Board of Trade returns for the eleven months ending November 30th last, as compared with those for the corresponding period of last year, show a decrease of 12,812 tons in weight and of £53,452 in value in the exports of alkali, and of 3,475 tons in weight and £41,977 in value in the exports of bleaching materials. Bleaching powder has declined in value about 20 per cent. during the last four weeks, and is neglected, buyers feeling certain that the bottom has not yet been reached. Caustic soda, which had been persistently dull though steady, has recently improved; indeed, there is at present a scarcity of the better qualities. Makers of soda ash are full of orders; soda crystals are steady, and bicarbonate is firm at the recent advance.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Jan. 10.

Late statistics of real estate transactions show the magnitude of the operations during the year recently closed. The total conveyances of property numbered 12,312, and the total consideration was $258,338,176. The large growth of real estate business in this city is well illustrated, when it is remembered that in 1879, ten years ago, the conveyances amounted to only 8,969, and the total consideration was $85,563,913. If such a growth as this has been achieved during the last decade, what prophet will be bold enough, or sufficiently far-seeing, to predict the value of the real estate that will change hands in the year 1900.

The figures must be encouraging to building material dealers. Those for last year were the largest ever reached, and with the exception of 1888, the growth in the number and value of conveyances has been steady; it therefore seems probable that this will continue during 1890. Another interesting feature of these statistics is that building loans last year were made at a lower rate than ever before. Our figures of the buildings projected during the past year, published last week, were necessarily estimated for the month of December, but nevertheless were remarkably accurate. The official statement shows that the buildings projected were 3,621, against 3,076 in 1888 and 4,385 in 1887.

Brick.—There is still plenty of brick to go around, and, in fact, more than enough, a small surplus being carried over from day to day. Prices show no important variations from the figures quoted last week.

About $7 is the top quotation, and is obtainable for only the best quality of smooth Haverstraws, and other grades are proportionately lower.

An open winter is not always, in fact, is very rarely, welcomed by brick dealers. There always seems to be more brick coming forward from the yards than is used, no matter how mild the weather may be, and this prevents any great advance in values. Last year local receivers were unable to raise prices until navigation was actually closed hard and fast. Then brick became scarce. So most of the local traders are hoping for a snap of cold weather to close the river, and thus afford them an opportunity to send prices up with a rush to $8 per M or thereabouts. No Long Island brick has yet come forward, and none is expected until the supply from other points is cut off.

Plaster.—A press despatch to a morning paper from Grand Rapids, Mich., says: "A syndicate of Minneapolis capitalists are securing options on all the plaster works, quarries, mills and properties in the country with the view of purchasing and conducting the plaster business of the United States as a single industry. They have already secured options on the plaster works in this city, the most extensive in the United States, and the works at Alabaster, Mich., which are owned by capitalists here, at figures that aggregate nearly $1,000,000. They have also obtained options on plaster mills at Fort Dodge, Iowa, and at the Blue Rapids, Kan., and have every hope of bringing the mills at Sandusky, Ohio, and at Newburg, N. Y., and on Staten Island into the fold. Messrs. Brown and Hubble, of Minneapolis, are now in the city completing negotiations, and are confident the enterprise will go through and that everything will be arranged by March 1. It is probable if the mills are purchased, as desired, that a company will be organized with a capital of $1,500,000 or $2,000,000 to carry on the business. They will have no competition and will fix prices as they see fit."

DIVIDEND-PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last			Dividends. Total paid.	Date and amount of last.		
1	Adams, S. L.	Colo.	$1,500,000	150,000	$10		....		.....	$555,000	Jan.	1887	.15
2	Alice, S. C.	Mont	10,000,000	400,000	25	*	....	....	.....	82,000	Dec	1889	.06¼
3	Alma Cons., G.	Idah.	300,000	30,000	10	*	....	....	.....	45,000	Dec.	--8	.50
4	Amy & Silversmith, S.	Mon.	....	341,419	...	....	....	....	.....	247,530	Aug.	1887	12½
5	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	520,000	Feb.	1889	2.00
6	Argenta, S	Nev.	10,000,000	100,000	100	335,000	July	1889	.10	40,000	Feb.	1880	.20
7	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10	*	....	....	.....	360,000	July	1889	.20
8	Aurora, I.	Mich	2,000,000	100,000	20		....	....	.....	155,000	Oct.	1887	1.87½
9	Badger, S.	Ont	2: 0,000	50,000	5	....	....	....	.....	25,000	Jan.	1890	.25
10	Bassick, G. S.	Colo.	10,000,000	100,000	100					400,000	Mar.	1884	1.00
11	Belle Isle, S.	Nev.	10,000,000	100,000	100	155,000	Apl	1889	.10	300,000	Dec	1879	.25
12	Belcher, G. S.	Nev.	10,400,000	104,000	100	2,822,000	Feb.	1889	.50	15,397,200	Apl	1876	1.00
13	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	88,750	May	1889	.10	187,500	Jan.	1887	.10
14	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	575,000	Nov	1889	.25	1,295,000	Apl.	1885	.50
15	Boston & Mont, G.	Mon	2,500,000	250,000	10	*	....	....	.....	520,000	Jun	1886	.15
16	Boston & Mont., C.S.	Mon	2,500,000	100,000	25	*	....	....	.....	1,300,000	Nov	1889	1.00
17	Breece, S.	Colo	5,000,000	200,000	25	*	....	....	.....	2,000	Feb.	1880	.01
18	Brooklyn Lead, L. S.	Utah	500,000	50,000	10		....	....	.....	127,000	July	1887	.05
19	Bulwer, G.	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	175,000	Jan.	1884	.10
20	Bunker Hill & Sull.	Idah.	3,000,000	300,000	10	*	....	....	.....	150,000	Oct.	1883	.06⅔
21	Caledonia, G.	Dak	10,000,000	100,000	100	505,00	May	1885	.15	138,000	Oct	1889	.08
22	Calliope, S	Colo.	1,000,000	¶	1	*	....	....	.....	50,000	Dec.	1889	.01
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000	....	....	.....	33,350,000	Feb.	1890	5.00
24	Carbonate Hill, S. L.	Colo.	1,500,000	200,000	10	*	....	....	.....	80,000	Apl.	1884	.05
25	Carlisle, G.	N. M.	1,000,000	200,000	5	....	....	....	.....	175,000	Dec.	1888	.12½
26	Castle Creek, G.	Idah.	100,000	100,000	1	....	....	....	.....	51,000	Oct.	1885	.03
27	Catalpa, S. L.	Colo.	3,000,000	300,000	10	*	....	....	.....	270,000	May.	1884	.10
28	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,930,000	Feb.	1889	2.00
29	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*	....	....	.....	1,650,000	Dec	1884	.25
30	Colorado Central, S. L.	Colo.	2,750,000	275,000	10	*	....	....	.....	406,000	July	1889	.05
31	Confidence, S. L.	Nev.	....	24,960	...	287,440	Apl.	1887	.50	199,680	Apl.	1889	1.00
32	Cons. Cal. & Va., G. S.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	3,304,800	Dec.	1889	.50
33	Contention, S	Ariz.	12,500,000	250,000	50	...	....	....	.....	†2,587,000	Dec.	1884	.25
34	**Cop. Queen Cons, C.	Ariz.	1,400,000	140,000	10	....	....	....	.....	140,000	Oct.	1888	.50
35	Crescent, S. L. G.	Utah	15,000,000	600,000	25	*	....	....	.....	228,000	Oct.	1888	.03
36	Crown Point, G. S.	Nev.	10,000,000	100,000	100	2,850,000	Sept	1889	.50	11,588,000	Jan.	1875	2.00
37	Daly, S. L.	Utah	3,000,000	150,000	20	....	....	....	.....	1,312,500	Dec.	1889	.25
38	Deer Creek, S. G.	Idah.	1,000,000	200,000	5	*	....	....	.....	20,000	Jun.	1889	.05
39	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*	....	....	.....	§1,000,000	Nov.	1887	.10
40	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	210,000	Oct	1889	.10
41	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*	....	....	.....	390,000	Sept	1889	.05
42	Dunstone, G. S. L.	Mon.	1,000,000	200,000	5	*	....	....	.....	6,000	Nov	1888	.03
43	Eclipse	Colo.	100,000	100,000	1		....	....	.....	20,000	Nov.	1887	.10
44	Elkhorn, G. S.	Mont	1,000,000	00,000	10	50,000	July	1883	.50	170,000	July	1887	.05
45	Empire Lt., G.	Mont	500,000	00,000	5		....	....	.....	70,500	Oct.	1887	.37½
46	Eureka Con., G. S. L.	Nev.	5,000,000	50,000	100	550,000	Jun.	1889	.50	4,955,000	July	1888	.25
47	Evening Star, S. L.	Colo	500,000	50,000	10	*	....	....	.....	1,437,500	Dec	1889	.25
48	Excelsior, G.	Cal.	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
49	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
50	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871	.....	1,600,000	Jan.	1889	2.00
51	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*	....	....	.....	190,000	July	1880	.10
52	Garfield Lt., G. S.	Nev	500,000	100,000	5		....	....	.....	85,000	Apl.	1888	.12½
53	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	4,434,600	Oct.	1889	.30	3,826,800	Oct.	1870	10.00
54	Grand Prize, S.	Nev.	10,000,000	100,000	100	715,000	Nov.	1889	.30	49[illegible]	Mar	1884	.25
55	Granite, S. L.	Idah.	500,000	500,000	1	*	....	....	.....	31,000	Oct.	1889	.02
56	Granite Mountain, S	Mont	10,000,000	400,000	25	....	....	....	.....	7,600,000	Nov.	1889	.50
57	Green Mountain, G.	Cal.	1,250,000	125,000	10	*	....	....	.....	212,000	Nov.	1881	.07½
58	Hale & Norcross, G. S.	Nev.	11,200,000	112,000	100	5,086,000	July	1887	.50	1,164,000	July	1888	.50
59	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50	....	....	....	.....	1,437,500	Dec.	1889	.50
60	Helena Mg & Red, G.S.L.	Mont	3,315,000	663,000	5	*	....	....	.....	197,979	July	1886	.06
61	Holmes, S.	Nev.	10,000,000	100,000	100	300,000	Sept	1885	.10	75,000	Apl.	1886	.25
62	Holyoke, G.	Idah.	200,000	200,000	1	....	....	....	.....	27,000	Feb.	1883	.10
63	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	4,481,250	Dec.	1889	.10
64	Honorine, S. L.	Utah	500,000	250,000	2	37,500	Apl.	1889	.05	125,000	Sept	1887	.05
65	Hope, S.	Mont	1,000,000	100,000	10	*	....	....	.....	233,252	Apl.	1888	.25
66	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*	....	....	.....	4,050,000	Dec.	1889	.12½
67	Hubert, G.	Colo.	1,000,000	1 mil'n	1	*	....	....	.....	247,000	Dec.	1889	.00½
68	Idaho, G.	Cal.	310,000	3,100	100	....	....	....	.....	5,250,500	Dec.	1889	5.00
69	Ideal, S. L.	Colo.	1,500,000	50,000	10	....	....	....	.....	15,000	Oct.	1886	.05
70	Illinois, S.	N. M.	100,000	100,000	1	*	....	....	.....	45,000	Apl.	1889	.20
71	Independence, S.	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
72	Iron Hill, S.	Dak.	2,500,000	250,000	10	134,000	July	1889	.03	156,250	Nov	1887	.07½
73	Iron-Silver, S. L.	Colo.	10,000,000	500,000	20	*	....	....	.....	2,500,000	Apl.	1889	.20
74	Jackson, G. S.	Nev.	5,000,000	50,000	100	237,500	Nov	1880	.20	55,000	Jun	1889	.10
75	Jay Gould	Mont	2,000,000	40,000	5	*	....	....	.....	365,000	Apl	1889	.04
76	Jocuistita, S	Mex.	2,500,000	250,000	10	....	....	....	.....	1,200,000	Feb.	1885	.50
77	Jumbo, G.	Colo.	2,000,000	200,000	10		....	....	.....	35,000	Oct.	1887	.02½
78	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct.	1887	1.00	100,000	Jan.	1890	2.00
79	Kentuck	Nev.	3,000,000	30,000	100	369,000	Dec.	1889	.30	1,350,000	Dec.	1880	.10
80	La Plata, S. L.	Colo.	2,000,000	200,000	10	*	....	....	.....	610,000	Sept	1882	.30
81	Leadville Cons., S.L.	Colo.	4,000,000	400,000	10	*	....	....	.....	423,000	Apl.	1887	.05
82	Lexington, G. S.	Mont	4,000,000	40,000	100	*	....	....	.....	565,000	Jan.	1885	2.00
83	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*	....	....	.....	810,000	Jan.	1890	.15
84	Little Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	....	....	.....	1,050,000	Mch.	1880	.50
85	Martin White, S.	Nev.	10,000,000	100,000	100	1,175,000	Jan.	1889	.25	140,000	Dec.	1886	.25
86	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*	....	....	.....	175,000	May	1888	5.00
87	Matchless, S.	Colo.	500,000	500,000	1	*	....	....	.....	12,500	Dec.	1889	.01½
88	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1.00	1,820,000	Mar.	1876	....
89	Mono, G.	Cal.	5,000,000	50,000	100	102,850	Nov.	1889	.25	12,500	Mar.	1886	.25
90	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*	....	....	.....	2,355,285	Oct.	1889	12½
91	Morning Star, S. L.	Colo.	1,000,000	100,000	10	....	....	....	.....	795,000	Dec.	1889	.10
92	Moulton, S. G.	Mont	2,000,000	100,000	5	*	....	....	.....	380,000	Dec.	1887	.07½
93	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	....	....	.....	150,000	Feb.	1887	.30
94	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	150,000	Oct	1889	.20
95	Napa, Q	Cal.	700,000	100,000	7	....	....	....	.....	350,000	Jan	1890	.20
96	Navajo, G. S.	Nev.	10,000,000	100,000	100	485,000	Apl.	1888	.30	365,000	Apl.	1889	.10
97	New Guston, S.	Colo.	500,000	100,000	5	....	....	....	.....	287,500	Dec	1889	.87½
98	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*	....	....	.....	30,000	Dec.	1885	.01⅛
99	Northern Belle, S.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.50	2,400,000	Apl.	1883	.50
100	North Belle Isle, S.	Nev.	10,000,000	100,000	100	400,000	Sept	1889	.20	230,000	May	1888	.50
101	North Star, G.	Cal.	1,000,000	100,000	10	....	....	....	.....	250,000	Dec.	1889	.50
102	Ontario, S. L.	Utah	15,000,000	150,000	100	....	....	....	.....	10,625,500	Dec.	1889	.50
103	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,159,440	May	1889	.50	1,595,800	July	1882	1.00
104	Original, S. C.	Mont	1,500,000	60,000	25	*	....	....	.....	123,000	July	1888	.05
105	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,222,500	Mar.	1889	1.00
106	Oxford, G.	N. S.	125,000	125,000	1	*	....	....	.....	73,500	Sept	1888	.02
107	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	57,000	Apl.	1888	.15	150,000	Apl.	1887	.10
108	Parrot, C.	Mont	1,800,000	180,000	10	....	....	....	.....	440,000	Oct.	1889	[illegible]
109	Peacock, S. G. C.	N. M.	2,000,000	200,000	10	*	....	....	.....	60,000	Nov.	1886	[illegible]
110	Plumas Eureka, G.	Cal.	1,400,250	140,025	10	....	....	....	.....	2,548,046	Oct.	1889	[illegible]
111	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*	....	....	.....	20,000	Feb.	1880	[illegible]
112	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	....	....	.....	2,280,000	Feb.	1888	[illegible]
113	Quicksilver, pref., Q	Cal.	4,300,000	43,000	100	....	....	....	.....	1,728,462	Oct	1889	1.50
114	" com., Q	Cal.	5,700,000	57,000	100	....	....	....	.....	643,867	July	188.	.40
115	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862	.....	5,250,000	Aug	1889	2.00
116	Richmond, S. L.	Nev.	1,350,000	54,000	25	*	....	....	.....	4,312,587	Jun.	1887	1.25
117	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar	1886	.50	99,785	Feb.	1880	.50
118	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*	....	....	.....	585,000	Mar.	1880	.05
119	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20	....	....	....	.....	100,000	Dec.	1882	.50
120	Savage, S.	Nev.	11,200,000	112,000	100	5,542,000	July	1889	.50	4,460,000	July	1869	3.00
121	Shoshone, G.	Idah.	150,000	150,000	1	....	....	....	.....	7,500	Apl.	1883	.01
122	Sierra Buttes, G.	Cal.	2,225,000	222,500	10	....	....	....	.....	1,568,145	Apl.	1888	.12½
123	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,250,000	Oct.	1889	.50	102,000	Jan.	1871	1.00
124	Sierra Nevada, S. L.	Idaho	1,000,000	¶	1	*	....	....	.....	40,000	May	1889	.02
125	Silver Cord, G. S. L.	Colo.	4,500,000	150,000	10	....	....	....	.....	270,000	Apl.	1889	.10
126	Silver King, S.	Ariz.	10,000,000	100,000	100	50,000	Jun.	1888	.50	1,950,000	July	1887	.25
127	Silver Mg. of L. V.	N. M.	500,000	500,000	1	....	....	....	.....	50,000	June	1889	.05
128	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*	....	....	.....	50,000	Nov.	1886	.02
129	Small Hopes Cons., S	Colo.	5,000,000	250,000	20	*	....	....	.....	3,137,500	Jun	1889	.10
130	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan	1881	.25
131	Standard, G. S.	Cal.	10,000,000	100,000	100	25,000	Oct.	1884	.25	3,595,000	Jun.	1888	.05
132	Stormont, S	Utah	500,000	500,000	1	*	....	....	.....	155,000	Nov.	1881	.05
133	St. Joseph, L	Mo.	1,500,000	150,000	10	*	....	....	.....	844,000	Dec.	1887	.20
134	Swansea, G.	Colo.	600,000	60,000	10	*	....	....	.....	9,000	Apl.	1888	.02½
135	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl.	1885	3.00	1,200,000	Jan.	1890	3.00
136	Tip Top, S	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov	1881	.20
137	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*	....	....	.....	1,250,000	Apl.	1882	.10
138	United Verde, C.	Ariz.	3,000,000	300,000	10	*	....	....	.....	97,500	Feb.	1884	.20
139	Valencia, M.	N. H.	150,000	1,500	100		....	....	.....	37,500	Apl	1886	2.50
140	Viola Lt., S. L.	Idah	750,000	150,000	5	*	....	....	.....	272,500	Oct.	1888	.37½
141	Ward Cons., S. L.	Colo.	2,000,000	200,000	10	....	....	....	.....	20,000	Dec.	1889	.05
142	Yankee Girl	Colo.	2,500,000	250,000	10		....	....	.....	1,275,000	July	188.	.10
143	Yellow Jacket, G. S.	Nev.	12,000,000	120,000	100	5,505,000	Mar	1889	.50	2,184,000	Aug	1871	1.50
144	Webb City, L. Z.	Mo.	55,000	11,000	5	....	....	....	.....	3,300	Jun	1889	.10
145	....		....	....		....	....	....	.....	....	....	....	.....

NON-DIVIDEND PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value	Assessments. Total levied	Date & am't of last.		
1	Agassiz Cons., S. L.	Colo	$2,500,000	50,[illegible]	$[illegible]	*	...	....	...
2	Alleghany, S	Colo.	5,000,000	500,000	10	....	....	....	....
3	Allouez, C.	Mich	2,000,000	80,000	25	$697,000	Mar.	1889	.50
4	Alpha Con., G. S.	Nev.	3,000,000	30,000	100	588,750	July	1889	.37½
5	Alta, S.	Nev.	10,080,000	100,800	100	2,248,800	Sept	1888	.50
6	Amador, G.	Cal.	400,000	200,000	2	*	....	....	..
7	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jan	1877	.10
8	Amity, S	Colo.	250,000	250,000	1	....	....	....	....
9	Anglo-Montana, Lt	Mon.	600,000	120,000	5	....	....	....	....
10	Astoria, G.	Cal.	200,000	100,000	2	....	....	....	....
11	Barcelona, G.	Nev.	5,000,000	200,000	25	*	....	....	....
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan	1883	.10
13	Belmont, S.	Nev.	5,000,000	50,000	100	735,000	Apl	1886	.10
14	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,155,3[illegible]	Sept	1889	.25
15	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	...	....	....
16	Bi-Metallic, S.	Mon.	5,000,000	200,000	25	*	....	....	....
17	Black Oak, G.	Cal.	3,000,000	300,000	10	*	....	....	..
18	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Bremen, S.	N. M	5,000,000	500,000	10	*	...	....	....
20	Brownlow, S	Colo	250,000	250,000	1	....	....	....	....
21	Brunswick, G.	Cal.	2,000,000	400,000	5	*	....	....	....
22	Bullion, G. S.	Nev.	10,000,000	100,000	100	4,007,000	Aug.	1888	.50
23	Calaveras, G.	Cal.	500,000	500,000	1	*	....	....	....
24	Carisa, G.	Wy.	500,000	100,000	5	*	....	....	....
25	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	....	....	....
26	Cashier, G. S.	Colo.	500,000	250,000	2	*	....	....	....
27	Charles Dickens, G.S.	Idah.	1,250,000	250,000	5	*	....	....	....
28	Cherokee, G.	Cal.	1,500,000	150,000	10	....	....	....	....
29	Chollar, S.	Nev.	11,200,000	112,000	100	1,484,000	July	1889	.50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*	...	....	....
31	Colchis	N. M.	500,000	50,000	10	....	...	....	....
32	Commonwealth, S.	Nev.	10,000,000	100,000	100	170,000	Nov	188?	.50
33	Comstock, G. S.	Nev.	10,000,000	100,000	100	30,000	Mar.	1887	.15
34	Con. Imperial, G. S.	Nev.	5,000,000	50,000	100	1,802,500	Nov.	1889	.05
35	Con. Pacific, G.	Cal.	6,000,000	60,000	100	192,000	Oct.	1889	.10
36	Cons Silver, S.	Mo.	2,500,000	250,000	10	....	....	....	....
37	Crescent, S. L.	Colo.	3,000,000	300,000	10	*	....	....	....
38	Crocker, S.	Ariz.	10,000,000	100,000	100	125,000	Jun.	1889	.10
39	Crowell, G.	N. C	500,000	500,000	1	....	....	....	....
40	Dahlonega, G.	Ga.	250,000	250,000	1	*	....	....	....
41	Dandy, S.	Colo.	5,000,000	500,000	10	....	....	....	....
42	Decatur, S.	Colo.	1,500,000	300,000	5	*	....	....	....
43	Denver City, S. L	Colo.	5,000,000	500,000	10	*	....	....	....
44	Denver Gold, G.	Colo.	300,000	60,000	5	....	....	....	....
45	Durango, G.	Colo.	500,000	500,000	1	*	....	....	....
46	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
47	El Cristo, G. S.	U.S.C	1,000,000	500,000	2	....	....	....	....
48	El Dorado, G	Cal.	1,000,000	250,000	4	*	....	....	....
49	El Talento, G.	U.S.C	1,000,000	500,000	2	....	....	....	....
50	Empire, S.	Utah	10,000,000	100,000	100	....	....	....	...
51	Eureka Tunnel, S. L.	Nev.	10,000,000	100,000	100	*	....	....	....
52	Exchequer	Nev	10,000,000	100,000	100	815,000	Apl.	1889	.25
53	Found Treasure, G.S.	Nev.	10,000,000	100,000	100	30,500	Apl.	1889	12½
54	Gogebic I. Syn., I	Wis.	5,000,000	200,000	25	....	....	....	....
55	Gold Cup, S.	Colo.	500,000	500,000	1	*	....	....	....
56	Golden Era, S.	Mon.	2,000,000	200,000	10	*	....	....	....
57	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
58	Gold Rock, G.	Cal.	1,000,000	500,000	2	*	....	....	....
59	Goodshaw, G.	Cal.	10,000,000	100,000	100	*	....	....	....
60	Grand Belt, C.	Tex.	12,000,000	120,000	100	....	....	....	....
61	Grand Duke	Colo.	800,000	80,000	10	....	....	....	....
62	Great Romance, G.	U.S.C	1,000,000	500,000	2	*	....	....	....
63	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*	....	....	....
64	Gregory Con., G.	Mon	3,000,000	300,000	10	....	....	....	....
65	Harlem M. & M. Co, G.	Cal.	1,000,000	200,000	5	....	....	....	....
66	Head Cent. & Tr. S. G	Ariz.	10,000,000	100,000	100	....	....	....	....
67	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan.	1889	.15
68	Highland, C.	Mich	500,000	25,000	20	....	....	....	....
69	Hollywood	Cal.	200,000	100,000	2	....	....	....	....
70	Hortense, S.	Colo.	2,000,000	200,000	10	....	....	....	....
71	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.00
72	Iron Gold & Silver, S	N. M	2,000,000	200,000	10	*	....	....	....
73	Ironton, I.	Wis.	1,000,000	40,000	25	....	....	....	....
74	Iroquois, C	Mich	1,250,000	50,000	25	....	....	....	....
75	J. D. Reymert	Ariz.	10,000,000	100,000	100	*	....	....	....
76	Julia Cons., G. S.	Nev.	11,000,000	110,000	100	1,660,000	Jan.	1889	.10
77	Lacrosse, G.	Colo.	1,000,000	100,000	10	*	....	....	....
78	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	....	....	....	....
79	Mammoth Bar., G.	Cal.	10,000,000	100,000	100	50,000	Dec.	1881	....
80	May Belle, G.	Cal.	10,000,000	100,000	100	84,000	Mar.	1884	.15
81	Mayflower Gravel	Cal.	1,000,000	100,000	10	485,000	Jan	1889	.[illegible]0
82	May Mazeppa, S.	Colo	500,000	500,000	1	....	....	....	....
83	Medora, G.	Dak	250,000	250,000	1	....	....	....	....
84	Mexican, G. S.	Nev.	10,000,000	100,000	100	2,800,760	Dec.	1889	.25
85	Middle Bar, G.	Cal.	490,000	200,000	2	*	....	....	...
86	Mike & Starr, S. L.	Colo	1,000,000	200,000	5	*	....	....	...
87	Mollie Gibson	Colo.	2,000,000	100,000	2	....	....	....	..
88	Monitor, G.	Colo	100,000	1,0 0, 00	1	*	....	....	....
89	Mutual Mg. & Sm.	W'sn	100,000	1,100,000	1	*	....	....	....
90	Native, C.	Mich	1,000,000	40,000	25	....	....	....	...
91	Neath, G.	Colo.	1,000,000	100,000	10	....	....	....	...
92	Nevada Queen, S.	Nev	10,000,000	100,000	100	250,000	Oct.	1889	.20
93	New Germany, G	N. S.	100,000	100,000	1	*	....	....	..
94	New Pittsburg, S. L	Colo	2,000,000	200,000	10	*	....	....	..
95	N. Commonw'h, S.	Nev.	10,000,000	100,000	100	60,000	Apl	1889	.30
96	North Standard, G.	Cal.	10,000,000	100,000	100	20,000	Nov	....	....
97	Noonday	Cal.	600,000	60,000	10	208,000	Dec	1881	.10
98	Oneida Chief, G.	Cal.	500,000	125,000	100	*	....	....	...
99	Oriental & Miller, S.	Nev.	10,000,000	400,000	25	....	....	....	...
100	Osceola, G.	Nev.	5,000,000	500,000	10	*	....	....	....
101	Overman, G. S.	Nev.	11,520,000	115,200	100	3,794,600	July	1889	.25
102	Park, S.	Utah	2,000,000	200,000	10	....	....	....	...
103	Peer, S.	Ariz	10,000,000	100,000	100	155,000	Sept	1889	.10
104	Peerless, S.	Ariz.	10,000,000	100,000	100	370,000	Mar	1889	.25
105	Phoenix	Ariz	500,000	500,000	1	*	....	.....	...
106	Phoenix, G. S.	Ark.	5,000,000	200,000	25	*	....	....	...
107	Phoenix Lead, S. L.	Colo.	100,000	100,000	1	*	....	....	....
108	Pilgrim, G.	Cal.	600,000	300,000	2	*	....	....	...
109	Potosi, S.	Nev.	11,200,000	112,000	100	1,461,600	Sept	1889	.50
110	Proustite, S.	Idah	250,000	250,000	1	*	...	....	....
111	Puritan, S. G.	Colo.	1,500,000	150,000	10	*	...	....	....
112	Quincy	Colo.	3,000,000	300,000	10	....	....	....	....
113	Rappahannock, G.S.	Va.	250,000	250,000	1	*	....	....	....
114	Red Elephant, S.	Colo	500,000	500,000	1	*	....	....	....
115	Ropes, G. S.	Mich	2,000,000	80,000	25	147,200	July	1887	.50
116	Russell, G	N. C.	1,500,000	300,000	5	....	....	....	...
117	Sampson, G. S. L.	Utah	10,000,000	100,000	100	288,157	July	1888	.06
118	San Sebastian, G.	San S	1,600,000	320,000	5	*	....	....	....
119	Santa Fe, C.	N. M.	5,000,000	500,000	10	....	....	....	....
120	Santiago, G.	U.S.C	400,000	200,000	2	*	....	....	....
121	Security, S.	Colo.	10,000,000	1,000,000	10	....	....	..	....
122	Sheridan	N. M.	2,000,000	200,000	10	....	....	..	....
123	Silver Queen, C.	Ariz.	5,000,000	200,000	25	*	....	..	..
124	South Bulwer, G	Cal.	10,000,000	100,000	100	100,000	May	1887	...
125	South Hite	Cal.	10,000,000	100,000	100	195,000	Jan.	188.	.25
126	South Pacific	Cal.	500,000	100,000	5	....	....	...	.05
127	Stanislaus, G.	Cal.	2,000,000	200,000	10	....	....	...	....
128	St. Kevin, G. S.	Colo.	100,000	100,000	1	*	....	...	....
129	St. Louis & Mex., S.	Mex.	5,000,000	500,000	10	*	....	...	...
130	St. Louis & St. Elmo	Colo.	2,000,000	200,000	10	....	....	....	...
131	St. L. & St. Felipe, G S.	Mex.	1,500,000	150,000	10	....	....	....	...
132	St. L. & Sonora, G.S.	Mex.	1,500,000	150,000	10	....	....	....	....
133	St. Louis-Yavapai	Ariz.	3,000,000	300,000	10	*	....	....	.
134	Sunday Lake, I.	Mich	1,250,000	50,000	25	....	....	....	....
135	Sullivan Cons. G.	Dak.	600,000	200,000	3	*	....	..	....
136	Sutter Creek, G.	Cal.	500,000	100,000	5	....	....	....	....
137	Sutro Tunnel	Nev.	20,000,000	2,000,000	10	*	....	....	..
138	Sylvanite, S	Colo.	5,000,000	500,000	10	*	....	....	....
139	Taylor-Plumas, G.	Cal.	1,000,000	200,000	5	10,000	Feb	188	.10
140	Tioga Cons., G.	Cal.	10,000,000	100,000	10	295,0.0	May	188.	.25
141	Tornado Cons. G S.	Nev.	100,000	100,000	1	*	..	...	.25
142	Tortilita, G. S.	Ariz.	1,000,000	100,000	10	*	...	....	....
143	Tuscarora, S.	Nev.	10,000,000	500,000	20	16[illegible],00	Oct	1889	....
144	Union Con., G. S.	Nev.	10,000,000	100,000	100	3,260,00	Oct	1889	...
145	Utah, S.	Nev.	10,000,000	100,000	100	170,000	July	1889	..
146	Whale, S	Colo.	500,000	500,000	1	....	....	....	....
147	Washington, C.	Mich	1,000,000	40,000	25	....	....	....	....
148	West Granite Mt., S.	Mon.	5,000,000	500,000	10	*	....	....	....
149	Yuma, C. S. G	Ariz.	10,000,000	400,000	25	....	....	....	....
150	Zelaya, G. S	C. A.	600,000	300,000	2	*	....	....	....

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid $275,000 in eleven dividends, and the Terra $75,000. Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia, $240,00 ,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid $1,350.00 in dividends. ¶ 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Jan 4. H	Jan 4. L	Jan 6. H.	Jan 6. L.	Jan. 7. H	Jan. 7. L	Jan 8. H	Jan 8. L.	Jan. 9. H	Jan. 9. L.	Jan 11. H.	Jan 11. L.	Sales.
Alice, Mont.					1.15	1.10	1.15	1.10			1.10		1,900
Argenta, Nev													
Atlantic, Mich.													
B s , Colo													
Beecher													
Belle Isle, Nev.													
Bodie Cons., Cal	.4												400
Bos. & Mont., Mont.													
Breece, Colo													
Bulwer, Cal													
Caledonia, Dak													
Calumet & Hecla													
Colorado Central													
Cons. Cal. & Va., Nev	4 9		4.75		4 70								440
Crown Point, Nev							1.65		1.60				200
Deadwood, Dak													
Eureka Con., Nev.													
Father De Smet, Dak.													
Franklin, Mich													
Freeland, Colo	5	.52	.70	.50	.57	.55	.6	.55	.65	.55	.65	.62	30,1 2
Gould & Curry, Nev.	1.40		1 45		1.35				1.5				400
Hale & Norcross, Nev													
Holyoke, Id													
Homestake, Dak.	9 50				9 00								120
Horn-Silver, Ut.	1.95		2 0		2 05	2. 0	2.10		2,05		2 10		1,240
Iron Hill, Dak.													
Iron Silver, Colo.							2.10						100
Leadville C., Colo.					.10								1,900
Little Chief, Colo.					.28				.25	.24			1,000
Little Pittsburg, Colo													
Mono, Cal.	.35												200
Moulton													
Navajo, Nev													
North Belle Isle, Nev													
North Star, Cal.													
Ontario, Ut.	37.00								40 00				230
Ophir, Nev.							3.25						100
Osceola, Mich													
Plutus, Colo.													
Plymouth, Cal.													
Quicksilver, Pref	39 00	38.00											200
" Com.	7.75	7.78	8.00	7.50	7.25								1,500
Robinson Cons. Colo.													
Savage, Nev.													
Sierra Nevada, Nev.							1.90						100
Silver Cord.													
Silver King	.35		.40						.33				700
Silver Mg of L. V.													
Standard, Cal													
Stormont, Utah													
Tamarack, Mich.													
Ward Con													
Yellow Jacket	2.25						2. 5						200

NON-DIVIDEND-PAYING MINES

Name and Location of Company.	Jan 4. H	Jan 4. L.	Jan. 6 H.	Jan. 6 L.	Jan 7 H.	Jan 7 L.	Jan 8 H	Jan 8 L.	Jan 9 H.	Jan 9 L	Jan. 11. H.	Jan. 11. L.	Sales
Alpha													
Alta, Nev.			1 45		1 50		1 45						
Andes, Nev.			.70										500
Amador, Cal.													200
American Flag, Colo													
Astoria, Cal	.10		.10		.10		.10				.9		13,5 0
Barcelona, Nev.	.30	.28			.25		3						800
Bechtel, Cal													
Best & Belcher, Nev.			2.50						2 2				20
Brunswick, Cal.	.01		.1		.1		.01		.01		0.		18,500
Bullion, Nev.	.60		.65		.55								600
Cashier, Colo			.05										400
Castle Creek, Id.													
Chollar, Nev									2.45				20
Col. & Beaver, Id.					.03				.02				3,0 0
Commonw., Nev.					3.10								150
Comstock T., Nev	.18	.17	.19	.18	.19		.19		.19		.20	.19	12,700
" bonds.					.31		.33						1,000
" scrip													
Con. Pacific, Cal.													
El Cristo, Rep of Col	1.50	1.45	1 50		1.40		1.45	1.40	1 45		1.4	1 40	1,000
Excelsior, Cal													
Exchequer, Nev.	.75												2,0
Gold Stripe, Cal.	.04		.04										1 0
Julia, Nev.					.45								400
Kingst'n & Pemb'ke													
Kossuth, Nev.													
La Crosse, Colo	07										.08		3,600
Lee Basin, Colo.													
Mexican, Nev	2.45		2.35										200
Middle Bar, Cal.													
Monitor, Colo.													
Mutual Sm & M. Co	1.60		1 55		1.60				1 70		1.65		1,700
Nevada Queen, Nev.													
N. Com'nw'th, Nev													
Occidental, Nev.	.80		.75										800
Oriental & Mil., Nev	.05						.06						1, 00
Overman, Nev.													
Phoenix of Ariz.	.50	.47	.50	.49	.53	.50	.55	.52	.50		.55	.50	6,7 0
Potosi, Nev	1.95								1 85				3 0
Rappahann'k, Va	.07		.08	.07	07	.06	07		06		.05		11,9 0
S. Sebastian, San S													
Scorpion, Nev													
Shoshone, Idaho													
Silver Hill, Nev													
Silver Queen													
Stanislaus, Cal													
Sutro Tunnel, Nev.	.07				.05				.05		.07	.06	4,500
" Trust Cert.			.50										30
Sutter Creek, Cal.	.60		.60		.60		.60		.60		.60		
Union Cons., Nev	2.25												6,5 0
United Copper													100
Utah, Nev.			.7		.65								5 0

*Ex dividend. †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment unpaid. Dividend shares sold 40 830 Non-dividend shares sold, 98,680 Total, New York, 139 510.

BOSTON MINING STOCK QUOTATIONS.

Name of Company	Jan. 3		Jan. 4		Jan. 6.		Jan. 7.		Jan. 8.		Jan 9.		Sales.
Atlantic, Mich.	14 75	14.38	15 00	14 75			16 00	15 25	15.50				1,215
Bodie, Cal.													
Bonanza Developm't	.95	93	.95	9			.18						1,250
Bost. & Mont., Mont.	51.50	50 00	51 6	49 75			52.00	51.13	51 53	50.75	51.50	49⅞	9,237
Breece, Colo.													
Calumet & Hecla, Mich.	26	258	265	264			271	269	271				55
Catalpa, Colo.	.14						.20		.20				1,2 0
Central, Mich.													
Chrysolite, Colo.													
Con. Cal & Va., Nev.													
Dunkin, Colo.	.6		.60				65		.70				900
Enterprise													
Franklin, Mich.	16 00	15 75	16.50	15.88			17.63	17.00	17.25	17 00	18 00	17.00	3,426
Hale & Norcross, Nev.													
Bororme, Utah													
Little Chief													
Little Pittsburg, Colo.													
Martin White, Nev.													
Moulton.													
Napa, Cal.									4 00				100
Ontario, Utah													
Osceola, Mich	24 00	24.00	24 50	23 63			25 25	24 75	24 88	21.63	27 00	21.63	4,871
Pewabic, Mich.			7 00				7 8	7 00	8 00		8.00		1,350
Quincy, Mich	70 0		71.00	70. 0			72.09	71.00	72.				19
Ridge, Mich.			1.00				1.25		1.25		1.25		2,200
Sierra Nev., Nev.													
Silver King., Ariz.													
Standard, Cal													
Tamarack, Mich.	150		151	150			160	155	1 9⅛	157	157½	156	2 1

Name of Company.	Jan 3.		Jan. 4.		Jan 6.		Jan. 7		Jan. 8.		Jan 9		Sales
Allouez, Mich.	1.88		1 90				2 00		1.88		1 75	1.60	1,700
Arnold, Mich.													
Aztec, Mich.													
Bowman													
Butte & Bost., Mont	18.00	1 .50	16.00	15 50			15.50	1 .00	16.00	15 0	15 00		1,968
Canada													
Cashier, Colo.													
Crescent, Colo.													
Dana													
Don Enrique, N M							.85		.20				600
Everett, Mich.													
Hanover, Mich.													
Humboldt, Mich.							.25		.23				800
Hungarian													
Huron, Mich.	3.88												
Kearsarge.			4. 0				4 50	4.25	4 38	4.25	4 25		1 850
Mesnard, Mich.			8.63	8 00			8.50	8.25	8 38	8.0	8.25	7 75	3,495
National, Mich.	2.88	2.75	2.88	2 75			2 88		2.75		.50	.45	150
Natica, Mich											2 75		1,0 0
Phoenix, Ariz.											.25		500
Pontiac, Mich.													
Rappahannock, Va											.20		100
Rockland.													
Santa Fe, N. Mex.	1.50	1.45	1.50				1 65	1.58	1.63	1.60	1.65	1 60	15,895
Security, Colo													
Shoshone, Idaho													
South Side, Mich.													
Star											.25		50
Washington, Mich							.38						500
							.28		25				800

Boston: Dividend shares sold, 27.414. Non-dividend shares sold, 29,458. Total Boston, 56 872.

COAL STOCKS.

Name of Company.	Par val. of sh'rs.	Jan. 4. H.	Jan. 4. L.	Jan. 6. H.	Jan. 6. L.	Jan. 7. H.	Jan. 7. L	Jan. 8 H	Jan. 8 L.	Jan. 9. H	Jan. 9. L.	Jan. 10 H.	Jan. 10 L.	Sales.
American Coal.														
Cambria Iron.														
Cameron Coal & Iron Co						5½	4¾	4¾						350
Ches. & O. RR.	100													
Chic. & Ind. Coal RR.	100													
Do. pref.	100													
Col. & Hocking Coal.	100	16⅞	16½							14½		15		500
Col., C. & I.	100	44	42	45½	42¾	44¾	43¼	44⅝	43⅛	45½	43⅞	45⅝	44½	29,810
Colorado Fuel Co.	100													
Del. & H. C.	100	149⅛	148¾			147¾	147½	150⅜	149⅛	150⅜	149¾	151¼	150	5,295
D., L. & W. RR.	50	136⅞	135⅝	136⅝	134⅞	136¼	134½	138	135¾	138⅜	137¼	137½	136⅞	173, 42
Hocking Valley	100			20½	20	20¼	20⅛			19½		19⅝	19½	900
Hunt. & Broad Top						17								5
Do. pref.		45												105
Lehigh C. & N.	50	52⅜				52¾	52⅜	52½	52	52¼				1,0 5
Lehigh & W. B. Coal.														
Lehigh Valley RR.	50	53⅝		53¼	53⅛	53⅛	53	52⅞		53	52⅞			933
Marshall Con. Coal.	100													
Mahoning Coal.	100													
Do. pref.														
Maryland Coal.	100													
Morris & Essex.	100	150½	150⅜	151	150⅛	150½	150			151	150			213
New Central Coal.	50									10⅛				100
N. J. C. RR.	100	127½	127	127	126¾	126½	125½	127½	125⅛	126⅜	126	126⅛	125⅝	5,700
N. Y. & S. Coal	100													
N. Y., Susq. & Western	100													
Do. pref.	100									7¾	5⅝			200
N. Y. & Perry C. & I.	100													
Norfolk & Western R R	50	22				22⅛	21¾							
Do. pref	50	6 ¼	61¼	62	61½	61⅜	61	61⅛	60¾					1,585
Penn. Coal	50													5,2 0
Penn. RR.	50	53⅝	53½	52⅝	53⅜	53⅝	5 ⅜	54⅛	53⅜	5 ⅛	53⅜			4.833
*Ph. & R. RR		39⅛	39⅜	39¼	39¼	38⅝	36⅛	37⅛	3 ¾	3 ½	37	37¼	36½	510,804
Sunday Creek Coal.														
Do. pref.	100													
Tennessee C. & I. Co.		8 ¾	85	87	8 ¾	89	87	88⅛	83½	86½	83	86	85⅛	9,470
Do. pref.		101												100
Westmoreland Coal.														

*Sold in New York, 415,390; in Philadelphia, 95,414. Total sales 75 ,430.

San Francisco Mining Stock Quotations.

Company	Closing Quotations. Jan. 3.	Jan. 4	Jan. 6.	Jan. 7.	Jan. 8.	Jan. 9.
Alpha						
Alta				1.25		1.20
Belcher						
Belle Isle	.10		.20	.25	.25	30
Best & Bel.	2.30	2.35	2.15	2.10	2.25	2 25
Bodie	.35		.45	.45	.45	.40
Bulwer						
Chollar	2.30	2. 0	2 25	2.25	. 5	2.20
C'm'weal'h	3.25	3.15	3.20	3.30	3.65	3 85
Con. C. & V.	4 55	4.60	4 50	4.55	4.55	4 45
Con. Pac.						
Crown Pt.	1 60	1.60	1.55	1.50	1.50	
Eureka C.						
Gould & C.	1.30	1 35	1 30	1 30	1.35	1 30
Grd. Prize.						
Hale & N.	2.55		2.50	2.70	2.75	2.65
M. White.						
Mexican	2.30	2 30	2.20	2.10	2.25	2.10
Mono.	.25		.35		.35	
Mt. Diablo						
Navajo		.35	.3		.40	
Nev. Queen			1.00	1.10		1.10
N. Belle I						
Occidental						
Ophir.	3.70	3.25	3.15	3 10	3.10	3 0
Potosi	1 85	.80	1.75	1.65	1 7	1 6
Savage	1.4	1.45	1.40	1.45	1 55	1 45
Sierra Nev	1.80	1.80	1 75		1.85	1 80
Union Con	2.20		2.15		2.10	2.15
Utah				65		.55
Yellow Jkt.	1.90	1 95			1.80	1.75

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal	[illegible]	[illegible]
Balt. & N. C.	.10	.15
Big Vein Coal	....	....
Conrad Hill	....	....
Cons. Coal	....	.27
Diamond Tunnel	....	.75
George's Crk. C.	....	1.12
Lake Chrome	....	.08
North State (Balt.)	....	....
Silver Valley	....	....

Prices bid and asked during the week ending, Jan. 9th, 1890.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Con. C. & C. Co.	....	$20
Ala. R. Mill Co.	...	$60
*Alice Furnace.	$102	....
Anna Howe G. Mg. Co.	$⅜	....
Bir. Mg. & Mfg.	....	$1[illegible]0
Broken Arrow.	....	$3¾
Cahaba Coal Mg. Co.	....	$63
Camille Gold Mg. Co.	$½	$¾
De Bardeleben C. & I. Co.	$75	$80
Decat. L. Imp.	$10@$10⅜	$10⅜@$11⅛
Decatur Min. L.	$1	$12¼@$13
*Eureka	$100	....
Florence L. & Mg. Co.	$2¾	....
Hecla Coal Co.	[illegible]	....
Hen. S. & I. Co.	$75@$85	[illegible]
Jagger Fowley C. & C.	$10@$11½	11@13
Mag-Ellen.	[illegible]	...
Mary Lee C. & R. Co.	$40	....
Sheffield C. & I. Co.	$59@$60	$63@$65
Sloss I. & S.	$59½@$60	
†Sloss I. & S.	$95	$95
††Sloss I. & S.	$74	$80
Tuscaloosa C. I. & L. Co.	$20½	....
Tenn. C. & I. Co.	$75@$76	$76@$77
" Pref.	$100	$102
Woodstock I. Co.	$56@$57	$58@$60

Prices bid and asked during week ending Jan. 6th, 1890.

* Bonds. † First mortgage. †† Second mortgage.

Denver, Colo.

COMPANY.	H.	L.	Sales.
Allegheny, Colo	.35	.29	22,000
Amity "	.19	.17	21,000
Aspen Mutu'l "	.35	.30	5,500
Big Indian "	.42	.33	21,400
Brownlow "	.45	.40	700
Calliope "	.46¼	.45	.....
Claudia, J., "	.15	.14	200
Clay County "	.72½	.65	7,100
Hard Money "	.10	.07	200
Legal Tender "	.08½	.06½	100
Matchless "	1.80	.....	...
May-Mazeppa "	.82	.75	13,400
Mollie Gibson "	.52½	.50	.....
Morning Glim "	.26	.23	5,100
Pay Rock "	.15	.10	40,800
Puzzler "	.25	.19	124,900
Silver Cord "	.72½	.....	1,400
Whale "	.35	.32	3,500
Total			266,500

Prices during the week ending Jan. 5th, 1890.

Kansas City, Mo. Jan. 5th, 1890.

COMPANY.	Par value.	Bid.	Asked.
Ben Harrison	..	$25.00	$35.00
Burch, L. & Z., Mo.	1	.20	.30
Express Group	...	.75	1.00
Hillsboro Gold	...	...	..
Farmers' Coal Co	...	50.00	75.00
Ida Hill, S., N. Mex	100	...	100
Kansas City L. & Z.	...	.60	....
Kan. City M. & M. Co.	...	2.60	3.00
K. C. Colo	...	....	....
Kentuck, Z., Mo	1	....	....
La Motte, Mo	100	....	100.00
Leona	...	....	125
Maverick, S., Colo	10	....	1.00
Minnequa Zinc	...	.25	.45
Quartz Mt	...	.67	...
Ruby Silver	...	1.12	1.25
Sonora, G. & S., Mex.	10	....	1.00
Standard, S. S., Colo		....	....
Silver Monument	...	....	3.00
Templar, N. Mex	1	....	1.00
The Sylph	...		2.50
Webb City, L. Z., Mo.	5	5.65	....
Wichita, L. Z., Kan.	100	....	.40

Pittsburg, Pa.

COMPANY.	H.	L.	Closing
Allegheny Gas Co.	$39.00	....	$39.00
Bridgewater Gas Co.	32.00	29.00	32.00
Chartiers Val. Gas	46.00	.....	46.00
Columbia Oil Co.	2.75	....	2.75
Consolidated Gas Co.	38.00	.....	38.00
Forest Oil	108.00	.....	108.00
Hazlewood Oil Co.	50.00	.....	50.00
La Noria Mining	.88	.....	.88
Luster Mg. Co.	45.00	30.00	40.00
Manuf'turers Gas Co.	25.00	16.00	25.00
Nat. Gas Co. of W. Va	75.00	65.00	75.00
N. Y. & Clev. Gas Coal.	37.00	.....	37.00
Ohio Valley Gas	35.00	31.00	31.50
Pennsylvania Gas	13.25	12.75	13.12½
People's N. G. & P. Co.	15.50	14.75	15.37
Philadelphia Co.	30.25	30.00	30.13
Pine Run Gas Co.	....	.....	.....
Pittsburg Gas	80.00	66.00	80.00
South Side Gas.	.....	.....	.....
Tuna Oil Co.	70.00	69.00	70.00
Union Gas	....	.....	.....
Washington Oil Co.	90.00	75.00	80.00
W'house Brake Co.	62.75	.	62.75
W'house A. B. Co.	111.00	110.50	111.00
W'house E. Light.	47.50	.....	47.50
Wheeling Gas	22.00	19.00	20.00
Yankee Girl Mg.	3.75	3.50	3.50

* Actual selling price.

Sales during the week ending Jan. 7, 1890:

St. Louis. Jan. 8.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo	$ .28¾	$ .31¼
American & Nettie	1.17½	1.22½
Anderson	....	.....
Aztec, N. Mex	.15	.....
Black Oak, Cal	.....	.00½
Black Spar	.	.....
Carriboo, Idaho	.....	.
Central Silver	.16¼	.17¼
Cleveland, Colo	.00½	.02½
Cleveland, Idaho	.32½	.40
Cœur d'Alene	.70	.90
Dinero, Colo	.....	.....
Golden Era, Mont	....	.....
Golden King	.07	.10
Gold Run	.	.
Granite Mountain, Mont.	44.50	46.00
Hope, Mont.	2.40	6.25
Ingram	.....	.....
Iron Clad	.....	.....
Ivanhoe, Colo	.....	.....
I. X. L., Colo	.04½	.06½
Jumbo, Colo	.....	.....
Keystone	.02	.03
La Union	.....	.....
Little Giant	....	.03
Major Budd, Mont	.18¾	.20
Mexican Imp., Mex	.	.....
Michael Breen	.52½	.
Montrose Placer, Colo.	....	.42½
Mountain Key.	.60	.65
Mountain Lion	.09	.10
Neath, Colo	.....	....
Old Colony	.....	.....
Old Jesuit	.03½	.06
Pat Murphy, Colo	.03½	.06
Phillips, Colo	.08	.09
Pine Grove, Idaho	.01	.02
Queen of the West, Idaho	.....	.12½
Raspberry, Mont	.....	.....
Rosalis	.....	.....
San Francisco, Mont	.01	.01½
San Pedro	.....	.....
Silver Age, Colo	1.52½	.....
Silver Bell	.....	.....
Small Hopes, Colo	.80	1.00
Tourtelotte, Colo	.08½	.09½
West Granite, Mont	.77½	.78¾
Wire Patch	.10½	.14
Yuma, Ariz	.....	.47½

Trust Stocks. Jan. 10th, 1890.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.	
American Cotton Oil	$35 @$35½
Cattle Trust	10 @ 12
Distillers' & Cattle Feeders'.	39¼@ 40¼
Linseed Oil	43½@ 45
National Lead	20½@ 20⅝
Natural Gas	122 @ ...
Standard Oil	164¼@165½
Sugar Refineries	52⅛@ 52¾

Sales at the New York Stock Exchange week ending Dec. 13:

	Sales.	Price H.	Price L.
American Cotton Oil	6,089	35½	30¼
National Lead	5,980	22	20¼
Sugar	176,657	59¼	49

Foreign Quotations.

London. Dec 21.

COMPANY.	Highest.	Lowest.
Almada, Mex	1s. 6d.	1s.
Alturas Gold, Idaho	.	....
Amador, Cal	1s.	¾s.
Appalachian, N. C.	1s. 6d.	1s.
Arizona Copper, Ariz.	....	....
California Gold, Colo.	....	....
Callao Bis, Venz	....	....
Canadian Phos. Canada.	£⅛	£⅛
Carlisle, N. Mex	4s. 3d	3s. 9d.
Colorado, Colo	3s. 3d.	3s.
Comstock, Utah	.	...
Copnova	1s. 9d.	3d.
Cons. Esmeralda, Nev.	4s.	3s. 6d.
Denver Gold, Colo.	1s. 3d.	9d.
Dickens Custer, Idaho.	3s. 9d.	3s. 3d.
East Arevalo, Idaho.	3s. 6d.	2s. 6d.
Eberhardt, Nev	....	...
El Callao, Venezuela	....	...
Elmore, Idaho	4s.	3s. 6d.
Empire, Mont	1s. 6d.	1s.
Flagstaff, Utah	....	....
Garfield, Nev	4s.	3s.
Hambley Freehold N.C.	...	....
Ilex, Cal	....	....
Jay Hawk Mont	4s.	3s.
Josephine, Cal	6s.	4s
Kohinoor, Colo	2s 3d.	1s. 9d.
La Luz, Mex	2s. 6d.	2s.
La Trinidad, Mex	3s. 6d.	2s. 6d.
La Valera, Mexico	1⅛s.	1⅛s.
Montana Lt., Mont	£1⅜	£1¼
New California, Colo.	11s. 6d.	9s. 6d.
New Consolidated	1s.	6d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Emma, S., Utah	3s.	2s. 6d.
New Flagstaff Utah	2s. 6d.	2s.
Newfoundland, N. F.	2s.	1s. 6d.
N. Gold Hill, N. C.	1s.	6d.
New Hoover Hill, N. C.	1s. 9d.	1s. 3d.
Old Lout, Colo	£15-16	£13-16
Palmarejo, Mex	22s. 6d.	21s. 6d.
Pinos Altos, Mex	13-16	11-16
Pittsburg Orig., Cal	£⅜	£¼
Pittsburg Cons., Nev.	£⅜	£¼
Quebrada, Venezuela		....
Richmond Con., Nev.	1⅞s.	1⅝s.
Ruby & Dunderberg, Nev	9d	3d.
Sam Christian, N. C.	3s. 6d.	3s.
Sierra Buttes, Cal	£⅜	£¼
Sonora, Mex	9d.	3d.
Stanly, N. C.	7s.	6s.
United Mexican, Mex.	7s.	5s.
U. S. Placer, Colo	4s. 9d.	4s. 3d.
Viola Lt., Idaho	1s. 6d.	1s.

Paris.* Dec. 26.

Belmez, Spain	550.00	550.00
Callao, Venz	93.75	93.75
Callao Bis, Venez	4.00	4.00
East Oregon, Ore.	19.00	19.00
Forest Hill Divide, Cal.	.....	.....
Golden River, Cal	390.00	390.00
" " parts	65.00	65.00
Lexington, Mont	125.00	125.00
" parts	4.00	4.00
Ouray, Colo	.....	.....
Rio Tinto, Spain	393.25	393.25
Tharsis, Spain	119.50	119.50

* Francs.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ⅌ 100 lbs. $1.75@$[illegible]
Muriatic, 18°, ⅌ 100 lbs. 1.[illegible]@1.50
Muriatic, 20°, ⅌ 100 lbs. 1.12½@1.75
Muriatic, 22° ⅌ 100 lbs. 1.37½@2.10
Nitric, 36°, ⅌ 100 lbs. 4.00@4.25
Nitric, 42°, ⅌ 100 lbs. 6.00@6.25
Oxalic, ⅌ 100 lbs. 6.50@10.50
Sulphuric, 60°, ⅌ 100 lbs. 80@1.5
Sulphuric, 66°, ⅌ 100 lbs. 1.00@1.75
Alkali—
Refined, 48 p. c. 1.50@1.55
Refined, 58° 1.40@1.45
Alum—Lump, ⅌ lb. 1¾
Ground, ⅌ lb. 1⅞@2
Lump ⅌ ton, Liverpool £4 17 6
Sulphate of Alumina, ⅌ ton £4 10
Aqua Ammonia—18°, ⅌ lb. 4¾
20°, ⅌ lb. 6
22°, ⅌ lb. 6@7
26°, ⅌ lb. 10@11
Ammonia—Sul., ⅌ 100 lbs. 3 5
Carb., per lb. 7½@8½
Arsenic—White, powdered, ⅌ lb. 3¼@3½
Red, ⅌ lb. 5¾@6¾
White, at Plymouth, ⅌ ton. £12 2 6d
Asbestos—Am., p. ton $50@$500
Italian, p. ton. c. i. f. L'pool. £18@£50
Asphaltum—P. ton 13.00
Prime Cuban, ⅌ lb. 4½@5½c
Hard Cuban, ⅌ ton $ 8.00
Trinidad, refined, ⅌ ton $30.00
Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.00
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f.o.b. L'pool, ton £6
No. 1, casks, Runcorn " " £4 10 0
No. 2, bags Runcorn " " 3 15 0
Bleach—Over 35 p.c., ⅌ lb. 1.70@1.75
Borax—Refined, ⅌ lb. 9½@9⅝
Concentrated 7¾@8⅜
Refined at Liverpool, ⅌ ton. £29
Brimstone—See Sulphur.
Bromine—⅌ lb. 37@38
Chalk—⅌ ton. .75
Precipitated, ⅌ lb. 4¾@5
China Clay—English, ⅌ ton 13.50@18.50
Southern, ⅌ ton 13.50
Chrome Yellow—⅌ lb. 1 @25
Cobalt—Oxide, ⅌ lb. 2.60@2.80
Copper—Sulph. English Wks, ton £20@£21
Copperas—Common, ⅌ 100 lbs. 70
Best, ⅌ 100 lbs. 75@1.00
Liverpool, ⅌ ton, in casks £1 15s.
Cream of Tartar—Am. 99%. 22½
Powdered, 99 p. c. 23
Emery—Grain, ⅌ lb. 4½@5
Flour, ⅌ lb. 3¼@3½
Feldspar—Ground, ⅌ ton. 15.00
Fuller's Earth—Lump, ⅌ bbl. .90@95
Powdered, ⅌ lb. 1⅞@2
Gypsum—Calcined, ⅌ bbl. 1.25@ 50
Iodine—Resublimed 2.75
Kainit—⅌ ton 10.00
Kaolin—*See China Clay.*
Lead—Red, ⅌ lb. 6¾@9
White, American, in oil, ⅌ lb. 6¾@7¼
White, English, ⅌ lb. 8½@8¾
Acetate, or sugar of, white 12@13
Lime Acetate—Amer. brown. .95@1.00
" Gray 1.75@1.87½
Litharge—Powdered, ⅌ lb. 6½@6¾
English flake ⅌ lb. 9@9½
Magnesite—Greek, ⅌ ton. 20.00
Manganese—Crude, per unit .23@28
Oxide ground, per lb. 2½@6½
Mercuric-Chloride—(*Corrosive sublimate*) ⅌ lb. 70@72
Mineral Wool—⅌ lb. 2
Mica—In sheets according to size.
1st quality ⅌ lb. 25@$6.00
Ochre—Yellow, "B. F.," ⅌ ton, f. o. b. mill 30.00
"J. F. L. S.," ⅌ lb. ex dock 2⅛
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston. 5.75@7.00
Ground, ex vessel New York. 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ⅌ ton 16.00
Phosphorus—⅌ lb. 70@75
Plumbago—Ceylon, ⅌ lb. 4@5
American, ⅌ lb. 5@7
Potassium—Cyanide, ⅌ lb. .30@40
Bromide, ⅌ lb. 33
Chlorate, ⅌ lb. 13@14
Carb. ⅌ lb. 4.70@5.50
Caustic, ⅌ lb. 7⅛@8
Iodide 2.65@2.70
Muriate, ⅌ 100 lbs. 1.80
Nitrate, refined, ⅌ lb. 6@8
Bichromate, ⅌ lb. 10½@11
Sulphate, ⅌ 100 lbs. 2.30@2.35
Yellow Prussiate, ⅌ lb. 17½@18
Red Prussiate, ⅌ lb. 43@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ⅌ lb. 1¾@2
Powdered, pure, ⅌ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d
Quartz—Ground, ⅌ ton. 14.00@16.00
Rotten Stone—Powdered, ⅌ lb. 3¼@3½
Lump, ⅌ lb. 6@10
Salt—Liverpool, ground ⅌ sack 75@80
Turk's Island ⅌ bush 23@2
Salt Cake—⅌ lb. 60@62½
Saltpeter—Crude, ⅌ lb. 5¼@5⅜
Refined ⅌ lb. 6@8
Soda Ash—Carb., 48% 100 lb. 1.45
Caustic, 48% 1.30
Soda Caustic, 60% 2.50
" " 70% 2.27½@2.35
" " 74-6% 2.27½@2.35
Sal, English, ⅌ 100 lbs. 1.00
Sal, American, ⅌ 100 lbs. 90
Nitrate 100 lbs. 1.90@1.95
Strontium—Nitrate ⅌ lb. 9@9½
Sulphur—Roll, ⅌ lb. 1¾
Flour, ⅌ lb. 2
Crude Brimstone, 2s., ⅌ ton. 19.50
Crude Brimstone, 3ds, ⅌ ton. 19.10
Talc—Ground French, ⅌ lb. 1¼@1½
Domestic, ⅌ ton $18@$20
c. i. f. Liverpool, ⅌ ton £4 5
Vermillion—American, ⅌ lb. 61
English, ⅌ lb. 82@85
Vitriol—(Blue), Ordinary, ⅌ lb. 5½@5⅝
Extra ⅌ lb. 7
Zinc Oxide—Am., Dry, ⅌ lb. 4½
Antwerp, Red Seal, ⅌ lb. 6@6½
Paris, Red Seal, ⅌ lb. 6⅛@7
* Spot

THE RARER METALS.

Aluminum—(Metallic), ⅌ lb. $1.@$2.50
Sheet, per lb. 2.50
Arsenic—(Metallic) per lb. .40
Barium—(Metallic) per gram $4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1.00
Calcium—(Metallic) per gram 10.00
Cerium—(Metallic), per gram 7.50
Chromium—(Metallic), per gram 1.00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram 9.00
Erbium—(Metallic), per gram 7.50
Gallium—(Metallic), per gram 140.00
Glucinum—(Metallic) per gram 12.00
Indium—(Metallic), per gram 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 10.00
Lithium—(Metallic), per gram 10.00
Magnesium—Per lb. 4.50
Manganese—Metallic, per lb. 1.10
Chem. pure per oz. 10.00
Molybdenum—(Metallic), per gm. .50
Niobium—(Metallic), per gram 5.00
Osmium—(Metallic), per oz. 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 9.00
Potassium—Metallic, per lb. 28.00
Rhodium—(Metallic), per gram. 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic) per lb. 2.50
Strontium—(Metallic), per gm. .60
Tantalium—(Metallic) per gram 9.00
Telurium—(Metallic) per lb. 5.00
Thallium—(Metallic) per gram .25
Titanium—(Metallic) per gram. 2.25
Thorium—(Metallic) per gram. 17.00
Tungsten—(Metallic) per oz. 2.25
Uranium—(Metallic) per lb. 5.00
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram 9.00
Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale ⅌ 1,000 3.25@3.50
Jerseys, ⅌ 1,000 5.50@6.00
Up Rivers, ⅌ 1000 6.00@6.50
Haverstraw seconds, ⅌ 1000 6.25@6.50
Haverstraw firsts ⅌ 1,000. 6.50@7.00
Fronts, nominal, ⅌ 1000.
Croton 14.00@13.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore ...
Building Stone—Amherst freestone, ⅌ cu. ft. 95@1.00
Brownstone, ⅌ cu. ft. 1.10@1.35
Granite, rough, ⅌ cu. ft. 45@1.25
Granite, Scotch ⅌ cu. ft. 1.00@1.15
Cement—Rosendale, ⅌ bbl. .85@1.10
Portland, American, ⅌ bbl. 2.15@2.45
Portland, foreign, ⅌ bbl. 2.30@2.40
Portland, " special brands. 2.45@2.75
Roman, ⅌ bbl. 2.65@2.85
Keene's coarse, ⅌ bbl. 4.50@5.50
Keene's fine, ⅌ bbl. 7.00@8.25
Slate—Purple and green roofing ⅌ 100 ft. 7.00@7.50
Red roofing, ⅌ 100 sq. ft. 12.00
Black roofing, ⅌ 100 sq. ft. 4.25@5.00
Lime—Rockland common ⅌ bbl. 1.00
Rockland finishing, ⅌ bbl. 1.20
St. John, com. and finish, ⅌ bbl. .90@.95
Glens Falls, com. and fin., ⅌ bbl .85@1.10
Labor—Ordinary, ⅌ day 1.50@2.00
Masons, ⅌ day 4.00
Plasterers, ⅌ day 4.00
Carpenters, ⅌ day 3.50
Plumbers, ⅌ day 3.50
Painters ⅌ day 2.50@3.50
Stonesetters, ⅌ day 3.50@4.00
Tilelayers, ⅌ day 3.50@4.50
Bricklayers, ⅌ day 4.00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.